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List of classified vessels according to their capabilities of collecting acoustic data

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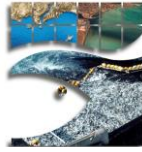


**LIST OF CLASSIFIED FISHING VESSELS ACCORDING TO
THEIR CAPABILITIES OF COLLECTING ACOUSTICA DATA**

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1. Introduction

The Habitat Monitoring Working Group (HMWG) faces the need of data and analysis of scientific quality in order to provide advice for the management of species being exploited. Resources for scientific surveys are scarce therefore it is of the highest interest to access to 'vessels of opportunity' to acquire data for habitat monitoring purposes.

Acoustic data from fishing vessels provide a valuable source of information. To maximize the utility of the fishing vessels' acoustic data, objectives on the use of that data must be clearly defined in the context of the needs for habitat monitoring. This can be achieved through a qualitative or quantitative evaluation of all monitoring needs within the fisheries. Therefore, it is necessary to explore the available technologies aboard fishing vessels authorized to operate in the SPRFMO convention area, in order to classify them and identify the best options to perform data collection of acoustics and other needed information to produce quantitative indices on fish and zooplankton.

To accomplish this task, it was created by HMWG a sub-Group of Specialists on the classification of fishing vessels regarding their acoustic data collection capacities (SGAD). The SGAD progressed by agreeing a single classification protocol which is described in this document. The SGAD unified the protocol of the industry vessels operating in Peru and in the central-south regions of Chile.

2. Selection of instrumentation

- The performance of echosounders selected to support scientific objectives should be stable; digital systems that provide control over the temporal and spatial resolution of output data are preferred.
- Split-beam transducers and echosounders are generally preferred because these systems facilitate calibration and in situ target-strength measurement.
- Selection of appropriate echosounder settings is particularly important (e.g. transmit power, pulse length, frequency).
- Instrument settings should be checked and recorded periodically.
- GPS data should always be collected and properly interfaced with the acoustic instruments.
- The need to collect ancillary data depends on the objectives of the study.
- When appropriate, ping synchronization of acoustic systems and time synchronization of all instruments should be implemented.

3. Considerations for the collection of acoustic and ancillary data

- Investigators are advised to draft a survey plan that defines the survey goals and objectives and details protocols associated with all aspects of the study. This plan should also consider logistical tasks (e.g. retrieval of data, communication, and port visits).
- Collection of raw data files is generally recommended, although the storage of digital data collected during prolonged surveys can be problematic. Researchers should carefully consider the trade-offs between quantity and resolution of data collected and the ability to meet research objectives.
- Metadata requirements and recording protocols should be established and documented.
- It is useful to begin with the end in mind. Consider how data synthesis and post-voyage analysis will be done when planning fieldwork.
- Calibration of acoustic systems is required for the quantitative use of acoustic data and is recommended for all studies.
- Noise measurement must also be performed. A protocol for this aspect should be designed if the collected data is going to be used for quantitative purposes.

- The possibility of performing intercalibration of echosounders deploy by different vessels must also be based on a specific protocol, being the basic condition which is that at least of the participant vessel must be previously calibrated. Results of compared echointegration, if consistent, can be used to correct NASC values collected of vessels that have not been calibrated.
- Time synchronization of acoustic and ancillary instruments is critical. All instruments should be time-synchronized using a GPS receiver against a common standard (e.g. GMT time).
- Ping synchronization is also critical to acoustic instruments. In general, the master synchronization pulse should be provided by the scientific echosounder, and all other acoustic instruments should be set up as slaves. Custom electronics may be required to address specific timing or pulse form needs. It may be necessary to turn off some vessel acoustic instruments during scientific data collection.
- Potential sources of interference by other on-board acoustic systems should be identified. In many cases, interfering sounders will need to be either synchronized with the survey sounder or turned off when collecting survey data.
- Vessel characteristics may preclude the collection of scientifically useful data under some weather and/or operating conditions. Guidelines for sea state, survey speed, etc. should be provided in the operations manual and amended as appropriate.
- Biological sampling must be consistent with survey objectives. Gear selectivity and temporal and spatial resolution will be of particular concern in this regard. It is important to ensure that sampling gear and protocols for fishing are consistent with the research/survey information needs.

4. Cooperative (industry/agency) and survey considerations

- Scientists should clearly communicate the objectives of the proposed survey and the potential benefits to industry participants and other stakeholders.
- Scientific and industry stakeholders should strive to achieve a shared vision for the survey and to identify the roles and responsibilities of the various participants. Care should be taken to ensure that used terminology is understood by all participants.
- Vessel requirements should be defined and communicated as early and as clearly as possible in the process.
- Written protocols for all sampling and related operations should be drafted and agreed upon well in advance of the survey of fishing trips.
- A comprehensive and clear legal contract or working agreement must be developed that defines the duties and responsibilities of all partners before, during, and after a survey or specific scientific study.
- Responsibilities for drafting and publishing survey results should be understood in advance. Opportunities to review draft reports and recommendations should be provided to all stakeholders. When appropriate, weekly/monthly progress reports should be provided to participants and stakeholder organizations.
- Industry participants must be assured that proprietary information they provide will not be released without consent.
- Cooperative research agreements should encourage evaluation of performance by industry and scientific participants with a focus on the development and implementation of future projects.

5. Classification of fishing vessels as data collectors by levels

There is a need of an inventory of fishing vessels deploying acoustic systems operating in the SPRFMO area. All vessels should contribute information regardless of its technical sophistication. The fishing vessels have been classified according to its main echosounder and type of omnidirectional sonar:

Level 1, vessels equipped with digital systems (digital echosounders of at least 2 frequencies split beam, scientific sounders or similar; and a sonar). “Level 1+” will be assigned if the sonar is of a digital grade.

Level 2, vessels equipped with digital systems (digital echosounders of 1 frequency split beam or similar; and a sonar). “Level 2+” will be assigned if the sonar is of a digital grade.

Level 3, vessels equipped with digital systems (digital echosounders that are problematic to be calibrated; and a sonar). “Level 3+” will be assigned if the sonar is of a digital grade.

Level 4, vessels with digital systems (digital or analogue echosounders of 1 frequency single beam; and a sonar). “Level 4+” will be assigned if the sonar is of a digital grade.

There are minimum conditions to keep for Levels 1 and 2 (need of an annual calibration and noise measurement, need of using a datalogger etc) and possibilities of use (e.g. fish stock biomass, habitat characterization etc).

There are 99 registered vessels among Chile and Peru. The number of vessels in the levels 1 and 2, which deploy the best acoustic technology at the moment, are 66 (2/3 of the total), 19 in Chile and 47 in Peru (Table 1).

Table 1. Summary of number of vessels by classes

Levels	1+	1	2+	2	3+	3	4+	4	Total
Chile	8		3	8			7	3	29
Peru	1	1	22	23	7	4	2	10	70
Total	9	1	25	31	7	4	9	13	99

The complete list of classified vessels is shown in Table 2.

Table 2. List of classified vessels according to their acoustic capabilities

ID	Country	Company	Vessel_name	Main echosounder	Model	Freq(Khz) 1	Freq(Khz) 2	Sonar	Model	Classification
1	Chile	CAMANCHACA	CORSARIO	SIMRAD	ES70	38		SIMRAD	SX90	2+
2	Chile	CAMANCHACA	BUCANERO	SIMRAD	ES70	38		SIMRAD	SX90	2+
3	Chile	CAMANCHACA	MARIA JOSE	FURUNO	FCV-1000	28	50	SIMRAD	SX90	4+
4	Chile	CAMANCHACA	PELICANO	SIMRAD	ES70	38		KAIJO DENKI	KCS220 Z	2
5	Chile	CAMANCHACA	PEHUENCO	FURUNO	FCV292	28	50	SIMRAD	SP90	4
6	Chile	LOTA PROTEIN	SANTA MARIA II	SIMRAD	EK60	38		FURUNO	FSV24	2
7	Chile	BAHIA CORONEL	FRANCISCO	FURUNO	FCV551	38		SIMRAD	SP90	4+
8	Chile	BAHIA CORONEL	JAVIER	FURUNO	FCV292	38		SIMRAD	SX90	4+
9	Chile	FOODCORP	CAZADOR	SIMRAD	EK60	38	120	SIMRAD	SX90	1+
10	Chile	FOODCORP	DON MANUEL	SIMRAD	EK60	38	120	SIMRAD	SP90	1+
11	Chile	FOODCORP	RUTH	SIMRAD	EK60	38	120	SIMRAD	SP90	1+
12	Chile	ALIMAR	VICHUQUEN II	FURUNO	FCV582	38		FURUNO	CSH5 MK2	4
13	Chile	ALIMAR	QUERELEMA	SIMRAD	ES70	38		KAIJO DENKI	KCS207	2
14	Chile	ALIMAR	PANILONCO	SIMRAD	ES70	38		KAIJO DENKI	KCS220 OZ	2
15	Chile	LANDES	DON BORIS	FURUNO	FCV551	38		SIMRAD	SP90	4+

ID	Country	Company	Vessel_name	Main echosounder	Model	Freq(Khz) 1	Freq(Khz) 2	Sonar	Model	Classification
16	Chile	LANDES	DON TITO	FURUNO	FCV552	38		SIMRAD	SP90	4+
17	Chile	LANDES	CORAL I	FURUNO	FCV553	38		SIMRAD	SP90	4+
18	Chile	ORIZON	SAN JOSE	SIMRAD	ES80	38	120	SIMRAD	SP90	1+
19	Chile	ORIZON	VENTISQUERO	SIMRAD	ES80	38	120	SIMRAD	SX90	1+
20	Chile	ORIZON	DON JULIO	SIMRAD	EK60	38		SIMRAD	SX90	2
21	Chile	ORIZON	LIDER	SIMRAD	ES80	38	120	SIMRAD	SP90	1+
22	Chile	ORIZON	LONCO	SIMRAD	ES80	38	120	SIMRAD	SX90	1+
23	Chile	ORIZON	VESTERVEG	SIMRAD	ES80	38	120	SIMRAD	SP90	1+
24	Chile	BLUMAR	ERIKA	FURUNO	FCV780	50	200	KAIJO DENKI	KCS2500	4
25	Chile	BLUMAR	COBRA	KAIJO DENKI	KSE200	38		SIMRAD	SX90	4+
26	Chile	BLUMAR	YELCHO I	SIMRAD	ES80	120		KAIJO DENKI	KCS2200Z	2
27	Chile	BLUMAR	RAPANUI	SIMRAD	ES70	120		SIMRAD	SU93	2
28	Chile	BLUMAR	DON EDMUNDO	SIMRAD	EK60	38		SIMRAD	SX90	2
29	Chile	BLUMAR	DON ALFONSO	SIMRAD	ES70	38		SIMRAD	SX90	2+
30	Peru	AUSTRAL	JUANCHO	SIMRAD	ES-70	120		SIMRAD	SU-93	2+
31	Peru	AUSTRAL	KIANA	SIMRAD	ES-60	120		SIMRAD	SX93	2+
32	Peru	AUSTRAL	MARIA PIA	KAIJO	KSE-200	120		SIMRAD	SX93	4+
33	Peru	AUSTRAL	NVA OFELITA	SIMRAD	ES-70	120		FURUNO	CSH-5L	2
34	Peru	AUSTRAL	NVA. RESBALOSA	SIMRAD	ES-70	120		SIMRAD	SX93	2+
35	Peru	AUSTRAL	PITI	SIMRAD	ES-70	120		KAIJO	KCS-5221Z	2
36	Peru	AUSTRAL	SIMON	SIMRAD	ES-70	120		SIMRAD	SX93	2+
37	Peru	AUSTRAL	LIGRUNN	SIMRAD	ES-70	120		KAIJO	KCS-3221Z	2
38	Peru	AUSTRAL	DON OLE	SIMRAD	ES-70	38	120	SIMRAD	SU90	1+
39	Peru	CFG-COPEINCA	CHIMBOTE 1	FURUNO	FCV-582L	50	200	FURUNO	CSH-5L	4
40	Peru	CFG-COPEINCA	CRISTINA	FURUNO	FCV-588	50	200	FURUNO	FSV-30	4+
41	Peru	CFG-COPEINCA	INCAMAR 1	SIMRAD	ES-80	120		FURUNO	FSV-30	2+
42	Peru	CFG-COPEINCA	INCAMAR 2	FURUNO	FCV-30	38		FURUNO	FSV-30	3+
43	Peru	CFG-COPEINCA	INCAMAR 3	FURUNO	FCV-30	38		FURUNO	FSV-30	3+
44	Peru	CFG-COPEINCA	MARU	SIMRAD	ES-80	120		SIMRAD	SX93	2+
45	Peru	CFG-COPEINCA	MATTY	FURUNO	FCV-588	50	200	FURUNO	CSH-5L	4
46	Peru	CFG-COPEINCA	RIBAR IX	FURUNO	FCV-30	38		FURUNO	FSV-30	3+
47	Peru	CFG-COPEINCA	RIBAR VI	FURUNO	FCV-30	38		FURUNO	FSV-30	3+
48	Peru	CFG-COPEINCA	RIBAR XVI	FURUNO	FCV-30	38		FURUNO	FSV-30	3+
49	Peru	CFG-COPEINCA	RIBAR XVIII	FURUNO	FCV-30	38		SIMRAD	SU 93	3+
50	Peru	CFG-COPEINCA	SAN FERNANDO	FURUNO	FCV-588	50	200	KAIJO	KCS-2500	4
51	Peru	DIAMANTE	ALESSANDRO	SIMRAD	ES-60	120		FURUNO	CSH-5L	2
52	Peru	DIAMANTE	CONSTANZA	SIMRAD	ES-70	120		FURUNO	CSH-5L	2

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53	Peru	DIAMANTE	CHIARA	SIMRAD	ES-60	120		FURUNO	CSH-5L	2
54	Peru	DIAMANTE	DANIELLA	SIMRAD	ES-80	120		FURUNO	CSH-5L	2
55	Peru	DIAMANTE	DON JUAN	SIMRAD	EK-60	120	38	FURUNO	CSH-5L	1
56	Peru	DIAMANTE	GRACIELA	FURUNO	FCV-585	50	200	FURUNO	CSH-5L	4
57	Peru	DIAMANTE	MARIA JOSE	SIMRAD	ES-70	120		FURUNO	CSH-5L	2
58	Peru	DIAMANTE	OLGA	SIMRAD	ES-70	120		FURUNO	CSH-5L	2
59	Peru	DIAMANTE	PATRICIA	SIMRAD	ES-60	120		FURUNO	CSH-5L	2
60	Peru	DIAMANTE	POLAR IV	SIMRAD	ES-60	120		FURUNO	CSH-5L	2
61	Peru	DIAMANTE	POLAR VII	SIMRAD	ES-60	120		FURUNO	CSH-5L	2
62	Peru	DIAMANTE	SEBASTIAN	SIMRAD	ES-70	120		FURUNO	CSH-5L	2
63	Peru	DIAMANTE	STEFANO	SIMRAD	ES-60	120		FURUNO	CSH-5L	2
64	Peru	CENTILENA	MARIA I	FURUNO	FCV - 1000	50	200	FURUNO	CSH-5L	4
65	Peru	CENTILENA	MARY	FURUNO	FCV-588	50	200	FURUNO	CSH-5L	4
66	Peru	CENTILENA	POLAR I	FURUNO	FCV-588	50	200	FURUNO	CSH-5LMK2	4
67	Peru	CENTILENA	SANTA ADELA II	FURUNO	FCV-588	50	200	FURUNO	CSH-5LMK2	4
68	Peru	EXALMAR	ANCASH 2	FURUNO	FCV-30	38		FURUNO	CSH-5L	4
69	Peru	EXALMAR	CARMENCITA	FURUNO	FCV-30	38		FURUNO	CH-37	3
70	Peru	EXALMAR	CRETA	FURUNO	FCV-30	38		FURUNO	CSH-5L	3
71	Peru	EXALMAR	CUZCO 4	FURUNO	FCV-30	38		FURUNO	CSH-5L	3
72	Peru	EXALMAR	DON ALFREDO	FURUNO	FCV-30	38		FURUNO	CSH-5L	3
73	Peru	EXALMAR	RODAS	SIMRAD	ES-80	120		FURUNO	CSH-5L	2
74	Peru	HAYDUK	BAMAR I	SIMRAD	ES-70	120		FURUNO	FSV-30	2+
75	Peru	HAYDUK	BAMAR II	SIMRAD	ES-80	120		KAIJO	KCS-3221Z	2
76	Peru	HAYDUK	BAMAR IV	FURUNO	FCV-30	38		KAIJO	KCS-3221Z	2
77	Peru	HAYDUK	BAMAR VIII	KAIJO	KSE-100	38				4
78	Peru	HAYDUK	CHAVELI II	SIMRAD	ES-70	120		SIMRAD	SU90	2+
79	Peru	HAYDUK	ISABELITA	FURUNO	FCV-30	38		SIMRAD	SU90	3+
80	Peru	HAYDUK	IVANA B	SIMRAD	ES-70	120		FURUNO	CSH-5L	2
81	Peru	HAYDUK	JADRANKA B	SIMRAD	ES-70	120		SIMRAD	SU90	2+
82	Peru	HAYDUK	KIARA B	SIMRAD	ES-70	120		FURUNO	CSH-5L	2
83	Peru	HAYDUK	MARIANA B	SIMRAD	ES-70	120		FURUNO	CSH-5L	2
84	Peru	HAYDUK	MARYLIN II	SIMRAD	ES-70	120		FURUNO	CSH-5L	2
85	Peru	HAYDUK	YAGODA B	SIMRAD	ES-70	120		FURUNO	CSH-5L	2
86	Peru	TASA	TASA 41	SIMRAD	ES-70	120		FURUNO	FSV-30	2+
87	Peru	TASA	TASA 42	SIMRAD	ES-70	120		FURUNO	FSV-30	2+
88	Peru	TASA	TASA 427	SIMRAD	ES-70	120		FURUNO	FSV-35	2+
89	Peru	TASA	TASA 51	SIMRAD	ES-70	120		SIMRAD	SX 90	2+
90	Peru	TASA	TASA 52	SIMRAD	ES-70	120		SIMRAD	SX 90	2+
91	Peru	TASA	TASA 53	SIMRAD	ES-70	120		SIMRAD	SX 90	2+
92	Peru	TASA	TASA 54	SIMRAD	ES-70	120		FURUNO	FSV-25	2
93	Peru	TASA	TASA 55	SIMRAD	ES-70	120		SIMRAD	SU90	2+

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94	Peru	TASA	TASA 56	SIMRAD	ES-70	120		FURUNO	FSV-30	2+
95	Peru	TASA	TASA 57	SIMRAD	ES-70	120		FURUNO	FSV-35	2+
96	Peru	TASA	TASA 58	SIMRAD	ES-70	120		FURUNO	FSV-30	2+
97	Peru	TASA	TASA 59	SIMRAD	ES-70	120		SIMRAD	SX 90	2+
98	Peru	TASA	TASA 71	SIMRAD	ES-70	120		SIMRAD	SX 90	2+
99	Peru	TASA	TASA 419	SIMRAD	ES-70	120		SIMRAD	SX 90	2+