

Annex V Instruments and fishing gear used.

ACOUSTIC INSTRUMENTS

A SIMRAD scientific echo sounder, EK 500/38kHz, was used during the survey for estimation of fish density.

Based on a calibration experiment using a standard copper sphere in Harbour of Las Palmas on 1st February 1992, the following settings were used:

Absorption Coeff.	10 dB/km
Pulse length	Medium
Bandwidth	Wide
Max. Power	2000 W
Angle sensitivity	21.9
2-way Beam Angle	-21.0 Db
Sv Transd. Gain	27.9 dB
Ts Transd. Gain	28.0 dB
3 dB Beamwidth	6.9°
Along-ship Offset	0°
Athwart-ship	0°

HYDROGRAPHY

Temperature and salinity and oxygen were sampled at standard depths with a mini CTD sonde model SD202. Surface temperature was registrated by a Furuno Temperature Indicator model TI-20, and logged on PC every nautical mile sailed.

FISHING GEAR

Bottom trawl: High opening shrimp and fish trawl with net headline 31m (floatline), foot-rope 47m, gear with 12 cm diameter roller disks, 40 m sweeps, estimated headline height 6m and distance between wings during towing 18-20m. This gear was also used for some of the mid-water trawls.

Pelagic trawl: Swedish type mid-water trawl with a vertical opening of 20-25m.

Cod ends of trawls with fine meshed inner lining.

DATA PROCESSING

The biological and acoustic data were stored into and analyzed by the Nansen Survey Information System, NAN-SIS.

Annex VI Processed length data by species.

FAMILY/SPECIES	STATION	LENGTHS IN SAMPLE				N	MEAN W.	COND.
		LOWEST	HIGHEST	MEAN	VARIANCE			
CARANGIDAE								
Chloroscombrus chrysurus	188	13.00	20.00	16.86	2.03	63	0.0730	1.49
	196	12.00	19.00	15.97	2.22	32	0.0875	2.10
	197	13.00	21.00	17.25	1.80	73	0.0767	1.47
	203	12.00	20.00	16.43	3.91	54	0.0667	1.44
Decapterus rhonchus	92	23.00	30.00	25.55	2.34	49	0.2245	1.33
	93	23.50	34.00	25.84	5.79	16	0.2625	1.48
	95	14.00	36.00	27.00	79.37	5	0.3400	1.38
	96	30.00	33.50	31.83	3.08	3	0.4333	1.34
	99	20.00	30.00	24.79	4.62	79	0.2329	1.49
	102	23.00	25.50	23.95	0.80	10	0.1900	1.38
	113	26.00	31.00	29.14	3.56	7	0.3429	1.37
	116	30.00	35.00	32.20	4.07	5	0.4800	1.42
	130	23.50	31.50	29.39	3.40	18	0.3333	1.30
	157	11.50	14.50	13.31	0.41	54	0.0324	1.36
	174	23.00	28.00	24.88	1.74	17	0.2294	1.48
	175	23.00	29.50	25.92	3.14	39	0.2462	1.39
	181	24.00	30.00	25.86	2.27	95	0.2589	1.48
	182	30.00	36.00	32.17	2.14	65	0.4538	1.35
	184	23.00	31.00	26.59	3.33	115	0.2852	1.50
	185	22.00	26.00	24.47	0.74	75	0.2267	1.54
	187	10.00	18.00	16.30	2.64	20	0.0650	1.46
	191	23.00	31.00	24.59	1.64	101	0.2366	1.58
	192	11.00	17.00	15.86	1.84	22	0.0636	1.56
	196	19.00	30.00	22.71	6.21	31	0.2516	2.07
	197	17.00	31.00	22.43	4.09	51	0.1765	1.53
	201	25.00	31.00	27.89	2.21	19	0.3211	1.47
Selene dorsalis	93	22.00	29.50	26.16	2.90	34	0.3353	1.85
Trachurus trachurus	96	14.00	19.00	16.91	1.20	28	0.0607	1.24
	113	17.00	28.00	21.99	1.82	99	0.1263	1.17
	119	14.00	25.00	16.08	3.89	32	0.0500	1.15
	125	22.50	36.50	32.05	14.36	10	0.4300	1.26
	126	13.00	36.50	31.26	14.72	49	0.4429	1.40
	145	12.50	25.50	15.84	3.51	51	0.0490	1.18
Trachurus trecae	92	18.00	24.00	21.10	0.99	77	0.1169	1.24
	93	19.50	23.00	21.16	0.70	19	0.1211	1.27
	95	16.50	36.50	23.91	21.44	17	0.1941	1.27
	96	22.50	35.00	29.71	24.74	7	0.3571	1.27
	97	11.50	26.00	14.94	15.46	126	0.0508	1.24
	98	20.50	24.00	21.86	0.88	18	0.1389	1.32
	102	20.00	23.50	22.58	1.74	6	0.1500	1.29
	104	19.00	36.00	29.34	19.08	22	0.3545	1.32
	106	14.00	27.00	21.90	2.97	105	0.1352	1.26
	108	20.00	25.00	22.26	1.30	116	0.1405	1.26
	109	21.00	33.50	24.65	3.76	141	0.1936	1.27
	111	22.50	28.50	25.58	1.76	36	0.2111	1.25
	112	23.00	27.00	24.90	0.89	48	0.2021	1.30
	115	11.50	28.00	14.49	8.20	103	0.0427	1.23
	116	22.50	34.50	25.88	7.59	25	0.2240	1.25
	117	20.50	26.50	23.05	4.25	21	0.1571	1.25
	118	11.00	33.00	21.79	42.91	109	0.1596	1.22
	119	13.50	34.50	30.50	12.32	64	0.3797	1.29
	120	31.00	41.50	34.76	3.59	43	0.5488	1.30
	121	11.00	15.50	13.63	0.68	54	0.0278	1.09
	123	12.00	25.50	17.79	30.16	31	0.0935	1.28
	125	24.00	33.50	26.04	3.34	40	0.2325	1.30
	126	23.50	28.50	25.81	0.95	140	0.2171	1.26
	129	32.00	35.00	33.71	1.16	12	0.4917	1.28
	131	19.00	26.00	21.57	1.41	98	0.1316	1.30
	133	13.00	19.50	15.20	1.52	88	0.0477	1.33
	136	12.50	27.00	14.44	4.85	67	0.0388	1.19
	140	11.00	15.00	13.39	0.41	133	0.0308	1.27
	142	13.00	16.00	14.02	0.53	129	0.0337	1.21

FAMILY/SPECIES	STATION	LENGTHS IN SAMPLE				N	MEAN W.	COND.
		LOWEST	HIGHEST	MEAN	VARIANCE			
	143	14.50	27.00	20.61	1.96	126	0.1143	1.29
	145	14.00	27.00	24.65	2.30	75	0.1960	1.30
	146	25.50	31.00	26.50	3.00	9	0.2667	1.42
	150	31.50	39.50	35.70	12.07	5	0.5400	1.16
	151	11.00	14.00	11.91	0.29	98	0.0224	1.32
	155	13.50	16.00	14.69	0.26	104	0.0442	1.39
	156	11.00	16.50	13.64	1.17	123	0.0341	1.32
	158	14.00	21.00	17.68	2.01	95	0.0779	1.38
	159	14.00	27.00	23.15	14.67	41	0.1707	1.28
	161	12.00	23.00	13.89	3.57	110	0.0355	1.25
	169	9.00	18.50	14.71	1.67	168	0.0476	1.46
	172	10.00	15.00	13.43	1.10	53	0.0358	1.45
	173	12.00	21.00	18.49	2.66	65	0.0908	1.41
	174	18.00	28.00	22.94	2.56	69	0.1797	1.47
	175	22.00	31.00	24.33	1.02	118	0.1932	1.33
	180	12.00	15.00	13.62	0.68	74	0.0365	1.43
	181	22.00	29.00	25.19	3.30	43	0.2209	1.36
	182	18.00	37.00	31.85	26.97	13	0.4615	1.34
	184	28.00	38.00	30.36	3.51	45	0.3911	1.38
	185	26.00	32.00	28.93	1.07	95	0.2947	1.21
	186	11.00	16.00	12.81	1.72	70	0.0286	1.32
	187	11.00	16.00	13.39	2.02	18	0.0278	1.12
	189	11.00	19.00	14.82	1.91	67	0.0493	1.48
	191	25.00	36.00	28.70	6.13	47	0.3255	1.35
	192	13.00	15.00	14.18	0.56	11	0.0455	1.58
	196	11.00	15.00	12.82	0.97	33	0.0455	2.12
	198	26.00	32.00	29.11	3.05	18	0.3333	1.34
	201	11.00	16.00	12.86	0.74	139	0.0237	1.10

CLUPEIDAE
Sardinella aurita

	93	22.00	26.50	23.50	6.75	3	0.1333	1.00
	99	24.50	28.00	25.78	0.73	16	0.2750	1.60
	101	25.00	29.50	27.25	1.75	12	0.3250	1.60
	102	22.00	30.00	26.70	4.46	10	0.3000	1.55
	103	24.00	30.50	27.64	2.41	67	0.3433	1.61
	105	26.00	30.00	28.38	2.55	8	0.3625	1.57
	116	26.50	29.50	28.50	1.83	4	0.3500	1.50
	136	24.50	30.00	26.86	3.81	7	0.3143	1.60
	140	13.50	18.00	16.00	3.00	14	0.0571	1.35
	142	13.00	17.00	14.75	1.51	18	0.0500	1.53
	151	11.00	18.50	14.90	1.39	55	0.0455	1.35
	158	17.00	21.50	19.33	1.16	21	0.1095	1.50
	161	11.00	16.00	13.80	1.23	80	0.0388	1.45
	173	15.00	18.00	16.35	0.61	86	0.0547	1.24
	178	23.00	32.00	26.29	3.13	134	0.3284	1.78
	187	16.00	17.00	16.33	0.25	9	0.0667	1.53
	191	22.00	28.00	24.96	1.41	23	0.2652	1.70
	194	16.00	18.00	17.14	0.75	14	0.0714	1.41
	195	16.00	28.00	20.51	11.96	35	0.1486	1.59
	204	17.00	20.00	18.81	1.00	27	0.1037	1.54
	209	24.00	32.00	26.86	2.53	93	0.3226	1.65

Sardinella maderensis

	93	22.50	29.50	25.11	1.26	120	0.2717	1.71
	101	21.00	28.50	24.79	1.19	114	0.2632	1.72
	102	22.00	27.50	24.91	1.21	109	0.2615	1.68
	103	23.50	27.50	25.16	0.84	90	0.2778	1.74
	105	23.50	27.50	25.58	0.81	30	0.3033	1.80
	113	26.00	27.50	26.71	0.40	7	0.4000	2.10
	116	24.00	26.00	25.10	0.43	10	0.2800	1.77
	136	25.00	28.50	26.33	1.10	27	0.3074	1.68
	178	25.00	29.00	27.00	3.60	6	0.3000	1.51
	187	10.00	18.00	15.92	2.91	39	0.0718	1.72
	195	14.00	22.00	18.49	1.50	86	0.1151	1.80
	196	18.00	20.00	19.20	0.62	10	0.0700	0.98
	197	21.00	26.00	23.55	2.47	11	0.2091	1.58
	201	10.00	15.00	12.06	0.91	111	0.0243	1.36
	203	17.00	24.00	19.98	2.59	92	0.1359	1.67
	204	17.00	22.00	19.08	1.46	131	0.1260	1.79
	209	19.00	25.00	21.93	6.23	14	0.1714	1.57
	210	17.00	24.00	19.59	2.51	69	0.1420	1.85

MERLUCCIIDAE
Merluccius senegalensis

	96	27.00	59.00	34.46	52.92	28	0.3464	0.74
	104	24.00	64.00	31.82	31.12	118	0.2703	0.76
	109	28.00	34.00	31.13	3.84	8	0.2250	0.74
	118	27.00	46.00	33.47	19.04	19	0.2842	0.72
	119	27.00	45.00	32.90	23.99	20	0.2900	0.76

FAMILY/SPECIES	STATION	LENGTHS IN SAMPLE				N	MEAN W.	COND.
		LOWEST	HIGHEST	MEAN	VARIANCE			
<i>Merluccius polli</i>	120	29.00	58.00	41.50	124.57	8	0.6250	0.73
	125	29.00	43.00	36.59	22.26	17	0.3765	0.73
	126	32.00	46.00	35.38	14.92	13	0.3385	0.74
	137	18.00	41.00	24.38	15.65	106	0.1160	0.74
	109	15.00	36.00	22.31	15.20	48	0.0896	0.74
	110	20.00	44.00	29.34	29.48	149	0.2027	0.73
	119	15.00	38.00	24.17	31.06	36	0.1278	0.78
	122	20.00	44.00	29.22	16.98	95	0.1979	0.75
	125	21.00	32.00	26.33	11.50	9	0.1444	0.76
	128	19.00	45.00	34.87	42.17	38	0.3289	0.71
	147	20.00	41.00	25.33	14.86	58	0.1259	0.72
	148	17.00	38.00	25.23	12.56	48	0.1354	0.80
MULLIDAE								
<i>Pseudupeneus prayensis</i>	160	10.00	22.50	17.15	11.65	87	0.0966	1.72
	165	11.00	22.00	16.34	8.25	92	0.0870	1.83
	179	12.00	22.00	17.14	8.73	37	0.1054	1.93
POLYNEMIDAE								
<i>Galeoides decadactylus</i>	163	17.00	41.00	28.72	23.68	89	0.2865	1.11
	167	11.00	23.50	16.32	7.23	72	0.0861	1.83
	168	13.50	27.00	19.42	12.51	43	0.1558	1.94
POMADASYIDAE (HAEMULIDAE)								
<i>Brachydeuterus auritus</i>	94	7.00	20.50	10.56	10.36	120	0.0258	1.66
	98	10.00	22.00	19.46	4.66	66	0.1394	1.83
	99	9.50	20.50	18.13	3.31	62	0.1032	1.68
	101	15.50	20.50	17.64	2.00	50	0.0980	1.75
	102	15.50	21.00	17.94	2.33	71	0.1000	1.70
	113	17.00	21.50	19.78	0.93	81	0.1407	1.81
	117	9.50	21.50	17.40	19.10	82	0.1073	1.74
	151	12.50	19.00	15.16	2.04	64	0.0609	1.70
	167	11.00	20.00	15.48	3.23	131	0.0702	1.82
	168	13.50	20.50	17.65	2.60	96	0.1042	1.85
	169	8.00	19.00	13.91	8.08	117	0.0564	1.87
	170	7.50	18.00	11.35	10.78	68	0.0338	1.84
	172	10.00	19.00	14.32	3.00	60	0.0550	1.80
	186	10.00	19.00	15.00	2.46	118	0.0644	1.85
<i>Pomadasys jubelini</i>	163	20.00	38.00	30.10	13.64	73	0.4247	1.49
	171	24.00	45.00	30.54	23.50	41	0.4220	1.37
SCIAENIDAE								
<i>Pseudotolithus elongatus</i>	163	27.00	54.00	33.90	34.29	21	0.3857	0.90
	187	36.00	40.00	38.00	2.22	10	0.6400	1.16
SCOMBRIDAE								
<i>Scomber japonicus</i>	108	21.50	27.50	24.19	2.19	13	0.1615	1.13
	112	24.50	30.00	27.47	1.80	17	0.2471	1.18
	131	22.00	28.00	24.06	2.29	18	0.1667	1.18
	146	27.50	31.50	30.00	2.64	8	0.3500	1.29
	161	17.00	21.00	18.70	0.91	40	0.0775	1.18
	181	24.00	31.00	26.88	1.41	67	0.2567	1.31
	182	17.00	21.00	18.37	0.93	79	0.0646	1.03
	189	18.00	22.00	19.83	1.68	18	0.0944	1.20
	201	16.00	32.00	24.24	22.36	148	0.0878	0.55
SHRIMPS								
<i>Penaeus notialis</i>	114	25.00	54.00	31.62	52.14	39	0.0256	0.07
	156	28.00	37.00	33.25	20.25	4	0.0025	0.01
	167	1.80	4.20	2.98	0.40	41	0.0220	73.39
	169	2.80	3.50	3.17	0.12	3	0.0200	61.48
	170	29.00	42.00	32.50	19.71	8	0.0250	0.07
	171	25.00	44.00	34.78	32.09	23	0.0278	0.06
	187	19.00	31.00	23.14	27.14	7	0.0271	0.19
	193	26.00	43.00	33.17	34.15	12	0.0275	0.07
	194	14.00	44.00	32.36	65.42	28	0.0271	0.07
	195	27.00	43.00	33.56	28.13	16	0.0288	0.07
	204	23.00	43.00	32.28	35.39	18	0.0267	0.07
	205	26.00	43.00	34.21	36.95	14	0.0393	0.09
	208	20.00	45.00	30.52	26.78	290	0.0207	0.07
	210	25.00	41.00	34.54	28.27	13	0.0331	0.08

FAMILY/SPECIES	STATION	LENGTHS IN SAMPLE				N	MEAN W.	COND.
		LOWEST	HIGHEST	MEAN	VARIANCE			
Penaeus kerathurus	156	24.00	46.00	35.40	79.30	5	0.0020	
	157	19.00	40.00	28.70	44.90	10	0.0100	0.04
	166	23.00	49.00	35.36	49.67	22	0.0250	0.05
	169	1.90	4.30	3.04	0.29	22	0.0159	51.95
	170	30.00	37.00	34.18	3.56	11	0.0200	0.05
	171	23.00	44.00	31.29	52.99	14	0.0150	0.04
	193	25.00	46.00	34.16	16.14	38	0.0197	0.05
	194	28.00	46.00	34.64	22.43	22	0.0227	0.05
	195	28.00	30.00	29.00	1.00	3	0.0100	0.04
SPARIDAE								
Dentex angolensis	177	18.00	21.00	19.81	0.58	77	0.1688	2.16
	199	12.00	19.00	15.24	4.12	58	0.0810	2.17
	200	15.00	26.00	19.17	7.15	35	0.1629	2.18
Dentex canariensis	94	27.00	30.50	28.70	2.32	5	0.2300	0.97
Dentex macrophthalmus	104	14.50	23.00	16.75	3.63	104	0.0952	1.95
	111	15.00	29.50	21.32	17.84	31	0.2323	2.15
	112	19.00	28.50	23.67	7.73	21	0.2905	2.11
	124	15.50	26.00	20.00	4.90	21	0.1619	1.95
	129	13.00	26.50	21.26	8.73	68	0.2044	2.02
	150	14.00	27.00	19.75	9.29	90	0.1733	2.10
Dentex maroccanus	97	13.00	20.00	14.31	1.81	109	0.0606	2.01
	123	14.50	21.00	19.15	1.70	58	0.1552	2.18
	124	13.50	23.00	20.19	2.29	64	0.1797	2.15
	126	14.00	23.00	18.92	4.56	51	0.1422	2.02
	138	13.00	21.00	18.28	2.99	72	0.1194	1.91
	144	10.00	23.00	14.98	5.34	83	0.0711	1.97
	153	13.00	23.00	17.98	3.46	94	0.1245	2.08
	177	15.00	22.00	18.77	2.49	111	0.1333	1.97
	199	7.00	19.00	12.04	10.76	103	0.0427	2.00
	200	9.00	26.00	15.39	6.83	166	0.0783	1.97
Pagellus bellottii	139	10.00	21.00	15.93	13.09	37	0.0946	2.04
	154	8.00	25.00	14.13	29.95	125	0.0800	1.91
	158	13.50	23.50	18.52	4.20	116	0.1310	1.99
	160	10.00	21.50	16.96	14.01	35	0.0971	1.75
	164	8.50	21.00	11.67	8.09	85	0.0388	2.04
	165	10.00	22.00	18.00	8.84	44	0.1250	1.99
	169	5.50	20.00	14.21	11.56	39	0.0692	2.09
	172	8.00	20.00	12.36	7.44	94	0.0500	2.29
	173	13.00	22.00	17.65	4.48	34	0.1118	1.95
	174	16.00	24.00	18.83	3.60	23	0.1478	2.15
	179	10.00	23.00	17.85	9.45	54	0.1148	1.86
	180	10.00	24.00	16.34	13.92	59	0.0932	1.85
	181	14.00	22.00	18.40	5.42	25	0.1600	2.46
	189	11.00	20.00	15.56	3.66	52	0.1135	2.89
	198	9.00	25.00	19.53	13.84	94	0.1617	1.97
Sparus pagrus africanus	152	18.00	42.00	29.61	33.99	41	0.6463	2.23

