

HYDROACOUSTIC METHODS OF FISH SURVEYS

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ENVIRONMENT AGENCY



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SUMMARY

This document contains raw acoustic data collected during the National R&D NRA Project 250 on Hydroacoustic Methods of Fish Survey together with working tables, diagrams and printouts of computer analyses.

The Project Record 250/1/T is structured in the same way as the R&D Note 196, where data are interpreted. Only chapters 3, 4, 5, 6 and 8 contain original data and these are the only chapters for which records have been provided. Some attempt has been made to link directly the records in the R&D Project Record with figures in the R&D Note.

The Project Record ends with a series of appendices containing manuscripts of unpublished scientific papers for the studies reported in chapter 7 as well as other published and unpublished material generated during the course of the study.

The Project Record is rather bulky and has been split into two volumes:

Volume I contains records for chapters 3, 4 & 5

Volume II contains records for chapters 7, 8 & Appendices.

PROJECT RECORD

3. FISH ACOUSTIC SIZE IN RELATION TO ASPECT AND REAL SIZE

The Project Record for this chapter contains the listing of targets strengths in different aspect and body tilt for individual fish measured by carousel belonging to four species of fish: carp, trout, roach and rudd. The size of each fish is given as standard length (mm) and weight (g). In addition, target strengths predicted from the COS and COS³ regressions of target strength on body aspect given in 3.2.2 of the R&D Note.

Record 3.1

Table 3.1. Lengths, weights and different target strengths of trout from Alderhurst Pond experiments (n=19)

Table 3.2. Lengths, weights and different target strengths of carp from Alderhurst Pond experiments (n=15).

Table 3.3. Lengths, weights and different target strengths of roach from Alderhurst Pond experiments (n=21).

Table 3.4. Lengths, weights and different target strengths of rudd from Alderhurst Pond experiments (n=11).

Notation

LC: standard length (mm)

LT: total length (mm)

W: weight (g)

Side TS: target strength of fish insonified in side aspect

ventral TS: target strength of fish insonified in ventral aspect

dorsal TS: target strength of fish insonified in dorsal aspect

all-aspect Turn Av TS (turn): average TS calculated from a fish insonified horizontally whilst being turned on the carousel frame continuously 2 to 7 times through 360° and processed by the standard post-processing ESPTS software. This TS value should represent an average all-aspect horizontal TS (Appendix a).

Tilt P15 (tp15): fish insonified in near dorsal aspect, tilted by 15° with head up and tail down, giving a positive tilt (P).

Tilt N15 (tn15): fish insonified in near dorsal aspect, tilted by 15° with head down and tail up, giving a negative tilt (N).

Av TS cos rec (av TS COS³ rec): an average all-aspect TS predicted (reconstructed) from the COS(COS³) models which is equivalent to the above all-aspect horizontal TS measured by continuous carousel turning.

b: the difference in TS between average all-aspect TS predicted from the COS(COS³) models and the strongest side-aspect TS as predicted by the same models (given as COS side rec and COS³ side rec).

Vec Av TS COS(COS³) rec: average TS predicted by the COS(COS³) models of a fish being turned continuously whilst suspended in vertical plane in front of the transducer (Appendix A).

b: the difference in TS between the average all-aspect VEC TS and the strongest VEC TS as predicted from the COS(COS³) models.

V/D COS(COS³) rec: the strongest dorsal and ventral aspect TS of the vertical circling as predicted from the COS(COS³) models.

Vec TS: average VEC TS from vertical circling as estimated by the standard post-processing ESPTS software.

Table 5.1

Lengths and different target strengths of trouts from Aldehurst pond experiments																			
	Trout number																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
LC	250	252	238	380	375	395	240	235	72	75	108	105	110	121	116	122	78	69	80
LogLC	2.4	2.4	2.38	2.58	2.57	2.6	2.3802	2.371	1.86	1.88	2.03	2.02	2.04	2.08	2.06	2.09	1.89	1.84	1.9
Side TS	-34.8	-34.2	-34.3	-25.9	-25.2	-24.9	-32.1	-28.9	-49.7	-48.9	-44.8	-41.9	-45	-48.7	-45.7	-45.1	-49.9	-50.1	-49.3
All asp. turn AV TS	-35.8	-36	-35.6	-31.3	-30.9	-31	-36.2	-36	-50.4	-50.8	-46.1	-45.3	-47	-46.1	-45	-45.5	-48.9	-51.2	-49.7
ven TS	-39	-37.4	-37.5	-28.1	-28.2	-26.1	-32.3	-31.6	-43.2	-43.8	-42.9	-42.1	-41	-44.6	-43.8		-46.9	-47.3	
dors TS	-37.6	-38.2	-39	-33.7	-32.2		-34.8	-37.4	-42.3	-43	-47.5					-46.5	-44	-44.4	-45.1
vec TS	-38.4	-38.3		-33.6			-37.8		-46.7		-45.6			-44.6			-47.4	-46.6	-47
AV TS Cos REC.	-41		-41.4	-35.7	-37.1		-41.7		-53.9	-54	-49.7	-49.3	-51.9	-52.7	-49.4	-51.6	-53	-55.7	-53.6
b	5.6		5.2	6.2	7		6.9		3.5	3.4	4.8	5.8	4.6	4.1	4.8	5.7	4.4	5.6	4.4
Av TS Cos^3 REC.	-40.9	-41.4	-41.3	-35.5	-37.2	-36.1	-41.5	-42	-53.9	-54.5	-49.8	-49.3	-52	-52.8	-49.6	-52	-53.2	-55.7	-53.5
b	7.4		6.8	8.2	8.9		8.5		4.8	4.8	5.9	8	6.1	5.4	6.5	8.1	5.7	6.6	5.5
cos side rec.	-35.4		-37.1	-29.5	-30.1		-35.7		-50.4	-50.6	-44.9	-43.5	47.3	-48.6	-44.6	-45.9	-48.6	50.1	-49.2
cos^3 side rec.	-32.6		-34.5	-27.3	-29.2		-33		-49.1	-49.7	-43.9	-41.3	-45.1	-47.4	-43.1	-43.9	-47.5	-49.1	-48
vec AvTS cos rec.	-43.3	-43.5		-39.9			-43.2		-51.1		-50.9			-50.6			-51.5	-52.3	-52.1
b	4.81	5.4		5.6			4.9		4.3		5			5.6			4.8	5.8	5.1
V/D cos reconst	-38.5	-38.1		-34.3			-38.3		-46.8		-45.9			-45			-46.7	-46.5	-47
vec AvTS Cos^3 Rec	-43.3	-43.5		-39.7			-43.2		-51.1		-50.9			-50.8			-51.2	-52.2	-51.9
b	6.2	6.8		6.8			6.2		5.1		6.4			7.4			5.2	7.2	5.9
V/D cos^3 reconst	-37.1	-36.7		-32.9			-37		-46		-44.5			-43.7			-46	-45	-46
Weight (g)	267	270	215	810	790	850	200	200	7.7	8	19.5	18	20	30	27	29	8	7.5	8.3

Table 5.2

Lengths, weights and different aspect TS of carps from Aldehurst pond experiments.											
	Carp number										
	1	2	3	4	5	6	7	8	9	10	11
LC	135	210	195	130	145	145	220	126	365	368	385
LT					168	159	295	143	405	395	415
W	73	280	205	73	94.5	94	276	61	1785	1157	1170
side	-38.2	-33.4	-37	-40.8	-36	-39	-31.1	-43.9	-27.7	-27.8	-30.9
vent	-49.4	-38.5	-37.3	-49	-41.2	-45.2	-43.9	-39.1	-34.5	-33.4	-33.7
dors	-51.1	-37.5	-46.8	-54.5	-40.5	-50.3	-43.6	-44.2	-36.4	-39.7	-38.5
turn				-48.7	-41.4	-42.2	-36.8	-43.4	-32.8	-34.9	-35.3
tp15	-46.1	-38.3	-40.7	-50.4	-42	-45.6	-42.2	-42.9			
tn15	-52	-41.1	-50.4	-52.9	-42.7	-41.8	-40.4	-47.2			

				regression parameters				
12	13	14	15	a	b	r ²	F	
355	370	355	340					
380	400	380	372					
1165	1138	1260	1054					
-27.7	-30.2	-30.2	-29.6	24.63	-91.9	0.864	82.7	13
-35.2	-34.3	-33.2	-33.6	24.68	-97.2	0.727	34.5	13
-40	-43.1	-39.1	-39.6	20.02	-90.4	0.528	14.5	13
-37.5	-37.6	-34.8	-34.9	19.94	-86.2	0.78	35.4	10

TCAR 4

Table 3.3

Table 3.3 Length, weight and different aspect target strength of roach (Aldehurst, 1991 experiments)																			
	Ro1	Ro2	Ro3	Ro4	Ro5	Ro6	Ro7	Ro8	Ro9	Ro10	Ro11	Ro12	Ro15	Ro16	Ro17	ro18	ro19	ro20	ro21
Standard length (mm)	150	167	140	154	140	162	157	120	98	195	179	161	163	160	158	106	127	97	109
log L	2.1761	2.2227	2.1461	2.1875	2.1461	2.2095	2.1959	2.0792	1.9912	2.29	2.2529	2.2068	2.2122	2.2041	2.1987	2.0253	2.1038	1.9868	2.0374
Weight (g)	80	110	65	160	56	110	83	53	40	213	128	88	84	78	80	13	34	10	15
Side TS	-37.8	-37.8	-43.7	-36.4	-39.4	-41.1	-37.3	-44.5	-47.2	-36.8	-36.2	-39.3	-39.3	-42.3	-41.3	-49.4	-44.0	-48.3	-49.4
Ventral TS			-39.3	-47.7	-36.6	-36.7	-43.3						-41.1			-56.3	-43.1		
Dorsal TS			-50.3	-43.4	-41.8	-36.3	-43.9						-43.0	-42.7	-43.1	-60.9	-43.5		
Tilt P15				-46.8	-52.1	-49.6	-49.8												
Tilt N15				-48.8	-50.3	-42.2	-46.6												
All-aspect Turn Av TS							-41.5						-44.7	-42.7	-44.7	-51.7	-56.4	-57.0	-50.9
Av TS cos rec	-52.6	-48.1	-52.5	-50.5	-50.5	-48.5	-46.8						-50.4	-51.1	-51.2	-55.3	-48.7	-55.7	
b	9.4	8.9	7.7	10.8	8.3	7.0	7.9						6.1	7.0	8.1	3.4	3.0	5.7	
Side TS Rec.	-43.2	-39.2	-44.8	-39.7	-42.2	-41.5	-36.9						-44.3	-44.1	-43.1	-51.9	-45.7	-50.0	
Av TS cos^3 rec	-52.6	-48.1	-52.5	-50.5	-50.5	-48.5	-46.8						-50.5	-51.1	-51.2	-55.2	-48.7	-55.5	
b	12.0	11.6	9.3	13.4	10.7	9.4	9.8						7.7	8.8	9.9	4.2	3.9	7.2	
Side TS rec.	-40.6	-36.5	-43.2	-37.1	-39.8	-39.1	-37.0						-42.8	-42.3	-41.3	-51.0	-44.8	-48.3	
Vec Av TS cos rec.													-51.8			-57.0	-47.4		
b													3.4			1.6	3.1		
V/D TS cos rec													-48.7			-55.4	-44.3		
Vec Av TS cos^3 rec													-51.7			-57.0	-53.4		
b													3.7			2.3	3.9		
V/D TS cos^3 rec													-48.0			-54.7	-49.0		

Table 3.4

[illegible]

4. CARP IN ALDERHURST POND

This chapter as well as the subsequent chapters 5 and 6 contains two categories of records from Alderhurst Pond: (1) summary tables listing the numbers of recorded fish, sampled volumes, fish densities per 100m³ for different files and the fish size composition determined acoustically and by netting; and (2) the "raw data" of acoustic size distributions and fish densities as estimated by ESP_TS software.

Record 4.1

Table 4.1 Target strengths and the equivalent length frequency distribution of different ways of reconstructing carp lengths in Alderhurst Pond.

This contains the numerical data illustrated graphically in Figure 4.3a,b & c of the R&D Note 196.

(a) This gives the measured length frequency of all the fish present when the pond was emptied in March 1991.

(b) This gives the length equivalents of carp calculated from the all-aspect TS relationship with length given by regression 4 in Table 3.2 of the R&D Note 196 as well as the numbers and percentage frequency of different sized fish.

(c) This gives the length equivalents of carp calculated from the side-aspect TS relationship with length given regression 1 of the R&D Note 196, together with the numbers of side-aspect sizes and the percentage composition by side-aspect tracking and by deconvolution.

Record 4.2

Table 4.2 The file numbers, sampling hours, numbers of accepted fish, sampled volumes, estimated densities per 100m³ and average acoustic size of carp in Alderhurst Pond on July 27th/28th and August 10th/11th 1990.

This contains the numerical data illustrated graphically in Figures 4.1 and 4.2 in the R&D Note 196.

Record 4.3

Table 4.3 Deconvolution table of Alderhurst carp from all-aspect acoustic records

This contains the length frequency distribution of carp in Alderhurst Pond as estimated by the application of the deconvolution procedure on the frequency distribution of measured all-aspect target strengths. See Appendix B for explanation of procedure.

Record 4.4

This contains printouts of the results from post-processing by ESP_TS of 38 data files for Alderhurst Pond carp with the same file names and run numbers as used in Table 4.2.

Other information available in these printouts but not used in the R&D Note 196 are (1) the TS frequency distribution at different ranges from the transducers (here labelled as 'depths') and (2) the number of targets with beam pattern factors (BPF) > 0 , the total number of echoes, the number of echoes of accepted fish, the average back-scattering cross section (used in EI for scaling) with a standard deviation and given in m^2 and in dB, the angle of cone where targets were accepted, estimates of sampled volume and fish density - a mine of information!

Table 4.1 Target strength and equivalent length frequency distributions of different ways of reconstruction of carp lengths in Alderhurst pond

TS (dB)	side aspect length(mm)	ALLside			
-56	28.68	n	%	%	
-54	34.58		Side aspect tracking	Deconvolution	
-52	41.68	0	0.000	3.245	
-50	50.25	1	0.139	2.408	
-48	60.59	28	3.900	1.614	
-46	73.04	76	10.585	14.439	
-44	88.06	123	17.131	14.204	
-42	106.17	152	21.170	15.692	
-40	127.99	104	14.485	10.296	
-38	154.31	88	12.256	8.375	
-36	186.03	56	7.799	9.89	
-34	224.28	39	5.432	7.194	
-32	270.39	14	1.950	5.06	
-30	325.98	33	4.596	4.794	
-28	393.00	4	0.557	2.178	
-26	473.80	1	0.139	0.377	
-24	571.22		0.000	0	
-22	688.66				
sum		718		99.766	
TS (dB)	All aspect length		ALL ASPECT FILM		
-56	32.70				
-54	41.20	% comp.	comp (n)		
-52	51.90	4.98763996	343		
-50	65.38	10.1061509	695		
-48	82.37	12.8253599	882		
-46	103.76	15.7917697	1086		
-44	130.72	14.5412244	1000		
-42	164.68	12.4909117	859		
-40	207.47	9.7280791	669		
-38	261.37	7.18336484	494		
-36	329.27	5.32208812	366		
-34	414.81	3.34448161	230		
-32	522.58	2.03577141	140		
-30	658.35	1.1923804	82		
-28	829.39	0.39261306	27		
-26	1044.86	0.0581649	4		
-24	1316.31				
-22	1658.28				
sum			6877		

CONTINUATION OF TAB. 4.1

(A)

Length group		meas. ured. fish(Mar. 1991)	all fish	
63.00		0	0.00	
73.00		0.6	0.57	
83.00		0	0.00	
103.00		0	0.00	
113.00		6.1	5.80	
123.00		17.1	16.25	
133.00		34.1	32.41	
143.00		23.8	22.62	
153.00		4.9	4.66	
163.00		3.6	3.42	
173.00		0	0.00	
183.00		0	0.00	
283.00		0	0.00	
295.00		1	0.95	
303.00		1	0.95	
313.00		0	0.00	
323.00		1	0.95	
333.00		1.2	1.14	
343.00		2.4	2.28	
353.00		3.6	3.42	
363.00		2.4	2.28	
373.00		1.2	1.14	
383.00		0.6	0.57	
393.00		0	0.00	
403.00		0.6	0.57	
413.00		0	0.00	
		105.2	100	
		carps only = 100%	all fish	

Table 4.2

FILE	Time hours		Site	Fish	Volume m ³	Density inds/100m ³	Aver. TS dB
		10/11.8.1990					
1302	10.2	10.2	a	653	2930	22.287	-35.7
1304	10.33	10.33	b	346	1590	21.761	-36.5
1306	10.55	10.55	c	974	2390	40.753	-33.8
1308	12.4	12.4	c	726	3000	24.200	-34.4
1310	12.65	12.65	b	443	2220	19.955	-38.3
1312	12.85	12.85	a	1504	5070	29.665	-36.3
1314	20.25	20.25	c	249	2124	11.723	-37
1316	20.45	20.45	a	661	2440	27.090	-35.4
1318	20.65	20.65	b	219	1530	14.314	-37.7
1321	21.08	21.08	b	68	1410	4.823	-41.8
1323	21.38	21.38	c	165	1710	9.649	-37.7
1325	21.5	21.5	a	55	1080	5.093	-37.2
1402	21.8	21.8	b	36	707	5.092	-39.5
1404	21.92	21.92	c	40	1020	3.922	-40.3
1406	22.02	22.02	a	11	941	1.169	-40.3
1408	22.16	22.16	c	54	1160	4.655	-36.9
1413	6.75	30.75	c	246	1250	19.680	-37.3
1416	6.97	30.97	b	256	2170	11.797	-34.4
1417	7.05	31.05	a	407	2230	18.251	-35.67
1419	8.08	32.08	b	54	2080	2.596	-36.2
1421	8.44	32.44	c	244	2970	8.215	-36.4
1423	8.61	32.61	a	121	2620	4.618	-40.5
1425	9	33	a	175	2620	6.679	-38.9
1427	9.25	33.25	c	526	2970	17.710	-35.4
1429	9.5	33.5	b	334	2890	11.557	-36.7
			27.7.1990				
1102	19.25			141	4360	3.234	-39.2
1104	21			4	4240	0.094	-47
1106	21.33			3	3130	0.096	-45
1107	21.78			6	1020	0.588	-45.5
1109	22			0	1680	0.000	
1111	6.72			2	4020	0.050	-46.6
1113	7.57			1	3820	0.026	-42.3
1115	8.5			2	4100	0.049	-38.9
1202	9.25			141	4360	3.234	-39.1
1204	13.62			153	3580	4.274	-38.6
1206	15.42			347	5300	6.547	-38.9
1208	16.42			169	5060	3.340	-39.3
1210	17.38			297	4140	7.174	-38.8

Table 4.2

File numbers, sampling times, numbers of accepted fish, sampled volume, estimated density and average TS of carps in Alderhurst pond in 1990

TABLE 4.3

Deconvolution table of Aldehurst carp all-aspect acoustic records															
		Side aspect target strength													
All-aspect		-26	-28	-30	-32	-34	-36	-38	-40	-42	-44	-46	-48	-50	-52
TS(db)	%freq.														
-52	4.988												0.538	1.204	3.245
-50	10.106										3.551	4.813	0.538	1.204	
-48	12.825									3.923	3.551	4.813	0.538		
-46	15.792							0.931	2.574	3.923	3.551	4.813			
-44	14.541					0.654	1.978	1.861	2.574	3.923	3.551				
-42	12.491				0.844	1.308	1.978	1.861	2.574	3.923					
-40	9.728		0.168	0.799	0.844	1.308	1.978	1.861	2.574						
-38	7.183	0.029	0.335	0.799	0.844	1.308	1.978	1.861							
-36	5.322	0.058	0.335	0.799	0.844	1.308	1.978								
-34	3.344	0.058	0.335	0.799	0.844	1.308									
-32	2.036	0.058	0.335	0.799	0.844										
-30	1.192	0.058	0.335	0.799											
-28	0.393	0.058	0.335												
-26	0.058	0.058													
Total		0.377	2.178	4.794	5.064	7.194	9.89	8.375	10.3	15.69	14.2	14.439	1.614	2.408	3.245
length midpoint(mm)		473.8	393	325.98	270.4	224.3	186.03	154.3	128	106.2	88.06	73.043	60.587	50.25	41.68

Postprocessing printouts

***** TS Version 2.00 *****

Dual Beam Data Reduction Program
For ESP 281 V1.0x & V2.0x data files

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for BioSonics Scientific Hydroacoustic Applications
Serial Number 5205-V2.00-91-000

ALDERHURST POND CARPS
(Figure 4.2 RHD Note 196)

Reading file D:\esp_nra\all202.dat

Analyzing Run # 1

Reading file D:\esp_nra\all202.dat

Analyzing Run # 2

FILE NUMBER 1 =	D:\esp_nra\all202.dat
FILE NUMBER 2 =	D:\esp_nra\all204.dat
FILE NUMBER 3 =	D:\esp_nra\all206.dat
FILE NUMBER 4 =	D:\esp_nra\all208.dat
FILE NUMBER 5 =	D:\esp_nra\all210.dat
FILE NUMBER 6 =	D:\esp_nra\all1111.dat
FILE NUMBER 7 =	D:\esp_nra\all302.dat
FILE NUMBER 8 =	D:\esp_nra\all304.dat
FILE NUMBER 9 =	D:\esp_nra\all306.dat
FILE NUMBER 10 =	D:\esp_nra\all308.dat
FILE NUMBER 11 =	D:\esp_nra\all310.dat
FILE NUMBER 12 =	D:\esp_nra\all312.dat
FILE NUMBER 13 =	D:\esp_nra\all314.dat
FILE NUMBER 14 =	D:\esp_nra\all316.dat
FILE NUMBER 15 =	D:\esp_nra\all318.dat
FILE NUMBER 16 =	D:\esp_nra\all411.dat
FILE NUMBER 17 =	D:\esp_nra\all416.dat
FILE NUMBER 18 =	D:\esp_nra\all417.dat
FILE NUMBER 19 =	D:\esp_nra\all419.dat
FILE NUMBER 20 =	D:\esp_nra\all421.dat
FILE NUMBER 21 =	D:\esp_nra\all423.dat
FILE NUMBER 22 =	D:\esp_nra\all425.dat
FILE NUMBER 23 =	D:\esp_nra\all427.dat
FILE NUMBER 24 =	D:\esp_nra\all429.dat
FILE NUMBER 25 =	D:\esp_nra\all102.dat

RECORDING
DATE TIME

27/7/90	9.25
	13.62
	15.42
	16.42
	17.35
28/7/90	6.72
10.8.90	10.11
"	10.20
	10.27
	12.25
	12.38
	12.51
	20.15
	20.27
	20.39
11.8.90	6.45
	6.58
	7.03
	8.05
	8.25
	8.37
	9.00
	9.15
	9.30
27/7/90	19.25

FILES ACCORDING TO
ALDES XLS

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 4565

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 8.0

DEPTH INTERVALS

FROM	1.00	1.70	2.40	3.10	3.80	4.50	5.20	5.90	6.60	7.30
TO	1.70	2.40	3.10	3.80	4.50	5.20	5.90	6.60	7.30	8.00

TS.

SUN

-74	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	0	0	0	0	0	0	0	0	0	0	0
-56	0	0	0	0	0	0	0	0	0	0	0
-54	0	0	0	0	0	0	0	0	0	0	0
-52	0	0	0	0	0	0	0	0	0	0	0
-50	0	0	0	0	0	0	0	0	0	0	0
-48	0	0	0	0	0	0	2	3	2	0	7
-46	0	0	1	0	0	0	8	5	1	0	15
-44	0	0	0	0	1	6	12	3	2	0	24
-42	0	0	0	0	0	5	10	2	5	0	22
-40	0	0	5	0	0	2	14	3	4	0	28
-38	0	0	1	0	0	1	11	1	8	0	22
-36	0	0	0	0	0	1	6	0	3	0	10
-34	0	0	0	0	2	3	4	0	1	0	10
-32	0	0	0	0	0	1	1	0	1	0	3
-30	0	0	0	0	0	0	0	0	0	0	0
-28	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	0	0	7	0	3	19	68	17	27	0	141

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 24
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 12
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 13

1702

TOTAL NUMBER OF RECORDED ECHOES = 599
NUMBER OF ECHOES USED FOR STATISTICS = 141
AVERAGE BACKSCATTERING CROSS SECTION = .1232E-03 IN dB = -39.10
BACKSCATTERING CROSS SECTION STD DEV = .1244E-03
AVERAGE TARGET STRENGTH IN dB = -40.83
TARGET STRENGTH STD DEV IN dB = 3.87
ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 49
NUMBER OF FISH USED = 141
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .436E+04
DENSITY IN FISH PER CUBIC METER = .324E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

Reading file D:/esp_nra/all202.dat

Analyzing Run # 3

Reading file D:/esp_nra/all204.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 3674

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 8.0

DEPTH INTERVALS

FROM TO	1.00 1.70	1.70 2.40	2.40 3.10	3.10 3.80	3.80 4.50	4.50 5.20	5.20 5.90	5.90 6.60	6.60 7.30	7.30 8.00	SUM
	1.70	2.40	3.10	3.80	4.50	5.20	5.90	6.60	7.30	8.00	
TS											
-74	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	0	0	0	0	0	0	0	0	0	0	0
-56	0	0	0	0	0	0	0	0	0	0	0
-54	0	0	0	0	0	0	0	0	0	0	0
-52	0	0	0	0	0	0	0	0	0	0	0
-50	0	0	0	0	0	0	0	0	0	0	0
-48	1	1	1	0	2	2	1	1	0	0	9
-46	1	2	0	0	3	10	2	3	1	0	22
-44	5	2	0	0	5	7	2	3	1	0	25
-42	1	6	0	0	4	10	0	5	4	0	30
-40	3	1	1	1	3	3	1	1	5	0	19
-38	0	1	0	2	2	5	1	1	3	0	15
-36	0	5	3	3	0	3	2	1	3	0	20
-34	0	3	1	0	0	0	0	0	2	0	6
-32	0	1	2	1	0	1	0	0	0	0	5
-30	0	1	1	0	0	0	0	0	0	0	2
-28	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	11	23	9	7	19	41	9	15	19	0	153

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 19
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 13
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 15

TOTAL NUMBER OF RECORDED ECHOES = 470

NUMBER OF ECHOES USED FOR STATISTICS = 153

AVERAGE BACKSCATTERING CROSS SECTION = .1383E-03 IN dB = -38.59

BACKSCATTERING CROSS SECTION STD DEV = .1790E-03

AVERAGE TARGET STRENGTH IN dB = -40.95

TARGET STRENGTH STD DEV IN dB = 4.36

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 47

NUMBER OF FISH USED = 153
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .358E+04
 DENSITY IN FISH PER CUBIC METER = .428E-01
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

Reading file D:\esp_nra\all206.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 5447

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 8.0

DEPTH INTERVALS

	FROM	1.00	1.70	2.40	3.10	3.80	4.50	5.20	5.90	6.60	7.30	
	TO	1.70	2.40	3.10	3.80	4.50	5.20	5.90	6.60	7.30	8.00	
TS												SUM
-74		0	0	0	0	0	0	0	0	0	0	0
-72		0	0	0	0	0	0	0	0	0	0	0
-70		0	0	0	0	0	0	0	0	0	0	0
-68		0	0	0	0	0	0	0	0	0	0	0
-66		0	0	0	0	0	0	0	0	0	0	0
-64		0	0	0	0	0	0	0	0	0	0	0
-62		0	0	0	0	0	0	0	0	0	0	0
-60		0	0	0	0	0	0	0	0	0	0	0
-58		0	0	0	0	0	0	0	0	0	0	0
-56		0	0	0	0	0	0	0	0	0	0	0
-54		0	0	0	0	0	0	0	0	0	0	0
-52		0	0	0	0	0	0	0	0	0	0	0
-50		0	0	0	0	0	0	0	0	0	0	0
-48		0	4	2	8	1	6	2	4	2	0	29
-46		5	3	2	8	12	8	1	10	0	0	49

-44	2	3	0	8	9	12	5	5	3	0	47
-42	1	2	6	11	5	17	8	18	4	0	72
-40	1	4	3	14	1	18	1	14	4	0	60
-38	0	3	1	12	3	9	3	5	6	0	42
-36	0	2	2	4	0	3	1	6	3	0	21
-34	0	0	0	1	0	3	4	3	1	0	12
-32	0	0	0	4	1	2	0	1	1	0	9
-30	0	0	0	0	0	2	1	1	0	0	4
-28	0	0	0	0	0	1	0	0	1	0	2
-26	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	9	21	16	70	32	81	26	67	25	0	347

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 62
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 51
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 23

TOTAL NUMBER OF RECORDED ECHOES = 1090

NUMBER OF ECHOES USED FOR STATISTICS = 347

AVERAGE BACKSCATTERING CROSS SECTION = .1280E-03 IN dB = -38.93

BACKSCATTERING CROSS SECTION STD DEV = .1938E-03

AVERAGE TARGET STRENGTH IN dB = -41.35

TARGET STRENGTH STD DEV IN dB = 4.22

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 136

NUMBER OF FISH USED = 347
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .530E+04
DENSITY IN FISH PER CUBIC METER = .655E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

Reading file D:\esp_nra\all208.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 5232

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 8.0

DEPTH INTERVALS

FROM TO	1.00 1.70	1.70 2.40	2.40 3.10	3.10 3.80	3.80 4.50	4.50 5.20	5.20 5.90	5.90 6.60	6.60 7.30	7.30 8.00	
TS											SUM
-74	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	0	0	0	0	0	0	0	0	0	0	0
-56	0	0	0	0	0	0	0	0	0	0	0
-54	0	0	0	0	0	0	0	0	0	0	0
-52	0	0	0	0	0	0	0	0	0	0	0
-50	0	0	0	0	0	0	0	0	0	0	0
-48	2	1	3	4	2	0	0	2	1	0	15
-46	1	3	2	6	2	3	0	4	4	0	25
-44	2	6	4	0	1	6	3	6	1	0	29
-42	0	1	2	6	2	5	4	3	5	0	28
-40	3	0	7	6	0	6	3	4	4	0	33
-38	0	0	4	3	1	2	3	3	4	0	20
-36	0	0	2	2	0	1	2	0	0	0	7
-34	0	0	3	0	0	1	0	3	0	0	7
-32	0	0	1	0	1	0	0	0	0	0	2
-30	0	0	1	1	0	0	0	0	0	0	2
-28	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	1	0	0	0	0	0	0	0	1
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	8	11	30	28	9	24	15	25	19	0	169

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 30
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 25
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 14

TOTAL NUMBER OF RECORDED ECHOES = 505

NUMBER OF ECHOES USED FOR STATISTICS = 169

AVERAGE BACKSCATTERING CROSS SECTION = .1180E-03 IN dB = -39.28

BACKSCATTERING CROSS SECTION STD DEV = .2128E-03

AVERAGE TARGET STRENGTH IN dB = -41.68

TARGET STRENGTH STD DEV IN dB = 4.10

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 69

NUMBER OF FISH USED = 169
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .506E+04
 DENSITY IN FISH PER CUBIC METER = .334E-01
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

Reading file D:\esp_nra\all210.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 4203

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 8.0

DEPTH INTERVALS

	FROM	1.00	1.70	2.40	3.10	3.80	4.50	5.20	5.90	6.60	7.30	
	TO	1.70	2.40	3.10	3.80	4.50	5.20	5.90	6.60	7.30	8.00	
TS												SUM
-74		0	0	0	0	0	0	0	0	0	0	0
-72		0	0	0	0	0	0	0	0	0	0	0
-70		0	0	0	0	0	0	0	0	0	0	0
-68		0	0	0	0	0	0	0	0	0	0	0
-66		0	0	0	0	0	0	0	0	0	0	0
-64		0	0	0	0	0	0	0	0	0	0	0
-62		0	0	0	0	0	0	0	0	0	0	0
-60		0	0	0	0	0	0	0	0	0	0	0
-58		0	0	0	0	0	0	0	0	0	0	0
-56		0	0	0	0	0	0	0	0	0	0	0
-54		0	0	0	0	0	0	0	0	0	0	0
-52		0	0	0	0	0	0	0	0	0	0	0
-50		0	0	0	0	0	0	0	0	0	0	0
-48		6	0	0	7	2	0	2	5	0	0	22
-46		3	3	3	10	6	5	4	9	1	0	44
-44		2	5	2	11	3	2	6	11	5	0	47
-42		5	5	7	13	6	5	7	13	1	0	62
-40		2	3	1	6	2	3	8	15	2	0	42
-38		5	2	0	2	6	7	11	5	1	0	39
-36		1	1	1	2	0	2	8	2	0	0	17
-34		0	0	0	0	0	1	1	5	2	0	9
-32		0	0	0	0	0	0	4	2	1	0	7
-30		0	0	0	0	0	3	2	0	0	0	5
-28		0	0	0	0	1	0	1	1	0	0	3
-26		0	0	0	0	0	0	0	0	0	0	0
-24		0	0	0	0	0	0	0	0	0	0	0
-22		0	0	0	0	0	0	0	0	0	0	0
-20		0	0	0	0	0	0	0	0	0	0	0
-18		0	0	0	0	0	0	0	0	0	0	0
-16		0	0	0	0	0	0	0	0	0	0	0
SUM		24	19	14	51	26	28	54	68	13	0	297

B = 0 dB TO B = 1 dB	NUMBER OF ECHOES =	41
B = 1 dB TO B = 2 dB	NUMBER OF ECHOES =	37
B = 2 dB TO B = 3 dB	NUMBER OF ECHOES =	29

NUMBER OF ECHOES USED FOR STATISTICS = 297

BACKSCATTERING CROSS SECTION STD DEV = .2142E-03

TARGET STRENGTH STD DEV IN dB = 4.28

NUMBER OF FISH USED = 297
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .414E+04
DENSITY IN FISH PER CUBIC METER = .717E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

TOTAL NUMBER OF PINGS = 5178

SUMMARY OF DATA FROM DEPTH 1.0 TO 8.0

[illegible][illegible]

-50	0	0	0	0	0	0	0	0	0	0	0
-48	0	0	0	0	0	0	0	0	0	0	0
-46	0	0	0	0	0	0	2	0	0	0	2
-44	0	0	0	0	0	0	0	0	0	0	0
-42	0	0	0	0	0	0	0	0	0	0	0
-40	0	0	0	0	0	0	0	0	0	0	0
-38	0	0	0	0	0	0	0	0	0	0	0
-36	0	0	0	0	0	0	0	0	0	0	0
-34	0	0	0	0	0	0	0	0	0	0	0
-32	0	0	0	0	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0	0	0	0	0
-28	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	0	0	0	0	0	0	2	0	0	0	2

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 0
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 0
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 16

NUMBER OF ECHOES USED FOR STATISTICS = 2

AVERAGE BACKSCATTERING CROSS SECTION = .2208E-04 IN dB = -46.56

BACKSCATTERING CROSS SECTION STD DEV = .2556E-05

AVERAGE TARGET STRENGTH IN dB = -46.57

TARGET STRENGTH STD DEV IN dB = .50

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 0

NUMBER OF FISH USED = 2
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .402E+04
DENSITY IN FISH PER CUBIC METER = .498E-03
EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

Reading file D:\esp_nra\all302.dat
Analyzing Run # 1
DATA GROUP REPORT FOR TRANSDUCER 1
TOTAL NUMBER OF PINGS = 2222

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 8.0

DEPTH INTERVALS

	FROM 1.00	1.70	2.40	3.10	3.80	4.50	5.20	5.90	6.60	7.30	
	TO 1.70	2.40	3.10	3.80	4.50	5.20	5.90	6.60	7.30	8.00	
TS											SUM
-74	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	0	0	0	0	0	0	0	0	0	0	0
-56	0	0	0	0	0	0	0	0	0	0	0
-54	0	0	0	0	0	0	0	0	0	0	0
-52	0	0	0	0	0	0	0	0	0	0	0
-50	0	0	0	0	0	0	0	0	0	0	0
-48	0	1	3	0	6	2	0	2	3	2	19
-46	0	3	4	8	7	13	7	4	6	8	60
-44	0	0	1	4	10	7	9	10	16	10	67
-42	0	0	6	9	24	21	12	12	14	18	116
-40	0	1	9	10	13	20	16	11	15	9	104
-38	0	0	5	4	16	17	16	7	16	11	92
-36	0	0	3	3	8	11	14	1	16	5	61
-34	0	0	2	2	3	7	9	2	10	8	43
-32	0	0	4	4	3	10	9	2	9	4	45
-30	0	0	3	2	0	3	1	1	8	2	20
-28	0	0	2	0	0	0	1	1	9	3	16
-26	0	0	0	0	0	0	0	0	5	1	6
-24	0	0	0	0	0	0	0	0	1	2	3
-22	0	0	0	0	0	0	0	0	1	0	1
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	0	5	42	46	90	111	94	53	129	83	653

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 91
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 85
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 67

TOTAL NUMBER OF RECORDED ECHOES = 1794

NUMBER OF ECHOES USED FOR STATISTICS = 653

AVERAGE BACKSCATTERING CROSS SECTION = .2687E-03 IN dB = -35.71

BACKSCATTERING CROSS SECTION STD DEV = .5165E-03

AVERAGE TARGET STRENGTH IN dB = -39.12

TARGET STRENGTH STD DEV IN dB = 5.03

243

653

5.00

3E+04

RF+M

10

2484

2484

2484

2484

[illegible]

-56	0	0	0	0	0	0	0	0	0	0	0
-54	0	0	0	0	0	0	0	0	0	0	0
-52	0	0	0	0	0	0	0	0	0	0	0
-50	0	0	0	0	0	0	0	0	0	0	0
-48	1	2	6	2	1	8	12	7	0	0	39
-46	6	4	6	8	14	8	19	10	1	0	76
-44	7	11	16	8	21	22	16	18	1	0	120
-42	3	6	26	16	14	14	23	11	3	0	116
-40	2	10	14	22	22	8	16	19	5	0	118
-38	2	8	15	14	20	19	20	18	3	0	119
-36	2	7	12	16	19	8	12	14	0	0	90
-34	0	1	5	13	20	8	14	18	0	0	79
-32	0	1	5	9	11	14	13	17	1	0	71
-30	0	2	1	6	6	12	12	17	0	0	56
-28	0	1	2	2	4	9	15	17	0	0	50
-26	0	0	0	1	5	3	3	10	0	0	22
-24	0	0	0	0	5	3	1	7	0	0	16
-22	0	0	0	0	1	0	1	0	0	0	2
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	23	53	108	117	163	136	177	183	14	0	974

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 148
B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 115
B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 90

TOTAL NUMBER OF RECORDED ECHOES = 2516

NUMBER OF ECHOES USED FOR STATISTICS = 974

AVERAGE BACKSCATTERING CROSS SECTION = .4175E-03 IN dB = -33.79

BACKSCATTERING CROSS SECTION STD DEV = .7348E-03

AVERAGE TARGET STRENGTH IN dB = -38.03

TARGET STRENGTH STD DEV IN dB = 5.95

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 353

NUMBER OF FISH USED = 974
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .239E+04
DENSITY IN FISH PER CUBIC METER = .407E+00
EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

Reading file D:\esp_nra\al1308.dat
Analyzing Run # 1
DATA GROUP REPORT FOR TRANSDUCER 1
TOTAL NUMBER OF PINGS = 3044

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 8.0

DEPTH INTERVALS

FROM	1.00	1.70	2.40	3.10	3.80	4.50	5.20	5.90	6.60	7.30	
TO	1.70	2.40	3.10	3.80	4.50	5.20	5.90	6.60	7.30	8.00	
TS											SUM
-74	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	0	0	0	0	0	0	0	0	0	0	0
-56	0	0	0	0	0	0	0	0	0	0	0
-54	0	0	0	0	0	0	0	0	0	0	0
-52	0	0	0	0	0	0	0	0	0	0	0
-50	0	0	0	0	0	0	0	0	0	0	0
-48	7	2	7	3	3	4	12	9	0	0	47
-46	8	3	2	4	7	10	26	14	1	0	75
-44	8	3	6	4	9	9	22	15	1	0	77
-42	2	3	7	6	8	18	21	18	0	0	83
-40	3	4	9	3	11	15	21	17	1	0	84
-38	2	4	5	5	11	19	20	19	2	0	87
-36	0	0	3	8	16	7	21	16	1	0	72
-34	2	2	5	2	7	8	24	14	1	0	65
-32	0	0	4	2	4	11	17	11	0	0	49
-30	0	0	1	0	5	7	19	8	0	0	40
-28	0	0	1	0	1	2	6	7	0	0	17
-26	0	0	1	0	0	3	7	14	0	0	25
-24	0	0	0	0	0	0	1	4	0	0	5
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	32	21	51	37	82	113	217	166	7	0	726

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 108
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 101
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 74

TOTAL NUMBER OF RECORDED ECHOES = 1738

NUMBER OF ECHOES USED FOR STATISTICS = 726

AVERAGE BACKSCATTERING CROSS SECTION = .3605E-03 IN dB = -34.43

BACKSCATTERING CROSS SECTION STD DEV = .6356E-03

-38.62

5.92

283

726

6.00

= .300E+04

Σ .242E+00

1.0000

Analyzing Run # 1

TOTAL NUMBER OF PINGS =

TOTAL NUMBER OF PINGS = 3205

DEPTH INTERVALS

SDH

[illegible]

-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	0	0	0	0	0	0	0	0	0	0	0
-56	0	0	0	0	0	0	0	0	0	0	0
-54	0	0	0	0	0	0	0	0	0	0	0
-52	0	0	0	0	0	0	0	0	0	0	0
-50	0	0	0	0	0	0	0	0	0	0	0
-48	2	2	5	5	5	3	16	9	6	2	55
-46	6	8	17	21	15	10	27	15	14	6	139
-44	6	7	21	21	21	18	37	41	19	4	195
-42	8	12	16	23	16	22	61	42	35	11	246
-40	2	10	13	19	22	23	45	44	37	14	229
-38	6	4	13	10	25	20	42	31	17	22	190
-36	0	5	14	14	21	27	42	29	13	11	176
-34	0	5	6	12	16	14	34	25	5	8	125
-32	3	3	4	5	8	7	19	13	4	6	72
-30	0	3	5	0	5	3	7	14	3	3	43
-28	0	1	1	0	1	2	8	4	0	4	21
-26	0	1	0	0	3	1	3	1	0	2	11
-24	0	0	0	0	0	1	0	1	0	0	2
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	33	61	115	130	158	151	341	269	153	93	1504

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 229
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 185
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 146

TOTAL NUMBER OF RECORDED ECHOES = 3532

NUMBER OF ECHOES USED FOR STATISTICS = 1504

AVERAGE BACKSCATTERING CROSS SECTION = .2206E-03 IN dB = -36.56

BACKSCATTERING CROSS SECTION STD DEV = .3525E-03

AVERAGE TARGET STRENGTH IN dB = -39.50

TARGET STRENGTH STD DEV IN dB = 4.80

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 560

NUMBER OF FISH USED = 1504
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .507E+04
DENSITY IN FISH PER CUBIC METER = .296E+00
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

Reading file D:\esp_nra\al1314.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 1326

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 8.0

DEPTH INTERVALS											
FROM	1.00	1.70	2.40	3.10	3.80	4.50	5.20	5.90	6.60	7.30	
TO	1.70	2.40	3.10	3.80	4.50	5.20	5.90	6.60	7.30	8.00	
TS											SUM
-74	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	0	0	0	0	0	0	0	0	0	0	0
-56	0	0	0	0	0	0	0	0	0	0	0
-54	0	0	0	0	0	0	0	0	0	0	0
-52	0	0	0	0	0	0	0	0	0	0	0
-50	0	0	0	0	0	0	0	0	0	0	0
-48	0	0	3	2	2	3	0	1	1	0	12
-46	0	0	6	1	2	2	1	0	1	0	13
-44	0	0	4	0	0	3	3	1	1	0	12
-42	0	0	11	0	1	6	5	2	1	0	26
-40	0	0	4	1	0	4	6	2	0	0	17
-38	0	0	5	0	0	2	9	8	1	0	25
-36	0	0	0	0	0	3	3	6	1	0	13
-34	0	0	0	1	0	2	4	7	1	0	15
-32	0	0	0	0	0	1	4	3	0	0	8
-30	0	0	0	0	0	0	8	0	0	0	8
-28	0	0	0	0	0	0	3	1	0	0	4
-26	0	0	0	0	0	0	3	0	1	0	4
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	0	0	33	5	5	26	49	31	8	0	157

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 24
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 20
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 20

TOTAL NUMBER OF RECORDED ECHOES = 360

NUMBER OF ECHOES USED FOR STATISTICS = 157

AVERAGE BACKSCATTERING CROSS SECTION = .3018E-03 IN dB = -35.20

BACKSCATTERING CROSS SECTION STD DEV = .4925E-03

AVERAGE TARGET STRENGTH IN dB = -38.89

TARGET STRENGTH STD DEV IN dB = 5.52

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 64

NUMBER OF FISH USED = 157

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .131E+04

DENSITY IN FISH PER CUBIC METER = .120E+00

EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

Reading file D:\esp_nra\all1314.dat

Analyzing Run # 2

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 842

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 8.0

DEPTH INTERVALS

	FROM	1.00	1.70	2.40	3.10	3.80	4.50	5.20	5.90	6.60	7.30	
	TO	1.70	2.40	3.10	3.80	4.50	5.20	5.90	6.60	7.30	8.00	
FS												SUM
-74		0	0	0	0	0	0	0	0	0	0	0
-72		0	0	0	0	0	0	0	0	0	0	0
-70		0	0	0	0	0	0	0	0	0	0	0
-68		0	0	0	0	0	0	0	0	0	0	0
-66		0	0	0	0	0	0	0	0	0	0	0
-64		0	0	0	0	0	0	0	0	0	0	0
-62		0	0	0	0	0	0	0	0	0	0	0
-60		0	0	0	0	0	0	0	0	0	0	0
-58		0	0	0	0	0	0	0	0	0	0	0
-56		0	0	0	0	0	0	0	0	0	0	0
-54		0	0	0	0	0	0	0	0	0	0	0
-52		0	0	0	0	0	0	0	0	0	0	0
-50		0	0	0	0	0	0	0	0	0	0	0
-48		0	0	3	0	0	0	0	0	0	0	3
-46		0	0	6	2	1	2	1	1	0	0	13
-44		1	0	8	1	2	4	2	1	0	0	19
-42		0	0	10	0	7	2	0	2	1	0	22
-40		1	0	11	1	2	2	1	2	0	0	20
-38		0	0	6	0	1	0	1	0	0	0	8
-36		0	0	3	0	0	0	1	0	0	0	4
-34		0	0	1	0	0	0	1	0	0	0	2
-32		0	0	0	0	0	0	0	0	0	0	0
-30		0	0	0	0	0	0	0	0	0	0	0
-28		0	0	0	0	0	0	0	1	0	0	1

[illegible]

-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	0	0	0	0	0	0	0	0	0	0	0
-56	0	0	0	0	0	0	0	0	0	0	0
-54	0	0	0	0	0	0	0	0	0	0	0
-52	0	0	0	0	0	0	0	0	0	0	0
-50	0	0	0	0	0	0	0	0	0	0	0
-48	1	5	2	3	3	7	5	2	0	0	28
-46	6	4	7	8	17	13	9	3	0	0	67
-44	10	5	8	8	9	13	12	7	0	0	72
-42	0	8	5	8	18	13	6	7	0	0	65
-40	4	6	8	8	14	21	19	5	0	0	85
-38	3	2	3	10	20	14	19	9	0	0	80
-36	2	3	7	7	18	37	7	12	0	0	93
-34	0	3	4	3	6	32	12	3	0	0	63
-32	0	1	3	4	6	27	7	3	0	0	51
-30	0	0	0	2	1	18	5	2	0	0	28
-28	0	0	0	1	1	13	1	3	0	0	19
-26	0	0	0	0	0	9	0	0	0	0	9
-24	0	0	0	0	0	1	0	0	0	0	1
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	26	37	47	62	113	218	102	56	0	0	661

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 88
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 97
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 69

TOTAL NUMBER OF RECORDED ECHOES = 1556

NUMBER OF ECHOES USED FOR STATISTICS = 661

AVERAGE BACKSCATTERING CROSS SECTION = .2921E-03 IN dB = -35.35

BACKSCATTERING CROSS SECTION STD DEV = .4475E-03

AVERAGE TARGET STRENGTH IN dB = -38.63

TARGET STRENGTH STD DEV IN dB = 5.34

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 254

NUMBER OF FISH USED = 661
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .244E+04
DENSITY IN FISH PER CUBIC METER = .271E+00
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

Reading file D:\esp_nra\all318.dat
Analyzing Run # 1
DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS =

2622

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 8.0

DEPTH INTERVALS											
FROM	1.00	1.70	2.40	3.10	3.80	4.50	5.20	5.90	6.60	7.30	
TO	1.70	2.40	3.10	3.80	4.50	5.20	5.90	6.60	7.30	8.00	
TS											SUM
-74	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	0	0	0	0	0	0	0	0	0	0	0
-56	0	0	0	0	0	0	0	0	0	0	0
-54	0	0	0	0	0	0	0	0	0	0	0
-52	0	0	0	0	0	0	0	0	0	0	0
-50	0	0	0	0	0	0	0	0	0	0	0
-48	0	2	0	1	3	0	1	0	0	0	7
-46	2	6	4	5	4	3	3	0	0	0	27
-44	2	6	7	7	9	0	1	0	0	0	32
-42	1	11	7	11	9	4	0	0	0	0	43
-40	2	6	7	5	11	2	1	0	0	0	34
-38	1	5	1	6	7	1	0	0	0	0	21
-36	1	9	1	3	4	6	0	0	0	0	24
-34	1	6	1	2	4	1	0	0	0	0	15
-32	0	3	1	0	3	2	0	0	0	0	9
-30	0	2	0	0	1	1	0	0	0	0	4
-28	0	1	0	0	1	1	0	0	0	0	3
-26	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	10	57	29	40	56	21	6	0	0	0	219

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 33
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 28
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 13

TOTAL NUMBER OF RECORDED ECHOES =

495

NUMBER OF ECHOES USED FOR STATISTICS = 219
 AVERAGE BACKSCATTERING CROSS SECTION = .1708E-03 IN dB = -37.67
 BACKSCATTERING CROSS SECTION STD DEV = .2464E-03
 AVERAGE TARGET STRENGTH IN dB = -40.25
 TARGET STRENGTH STD DEV IN dB = 4.47
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 74

NUMBER OF FISH USED = 219
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .153E+04
 DENSITY IN FISH PER CUBIC METER = .143E+00
 EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

Reading file D:\esp_nra\all1411.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 1836

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 8.0

DEPTH INTERVALS

	FROM TO	1.00 1.70	1.70 2.40	2.40 3.10	3.10 3.80	3.80 4.50	4.50 5.20	5.20 5.90	5.90 6.60	6.60 7.30	7.30 8.00	
TS												SUM
-74		0	0	0	0	0	0	0	0	0	0	0
-72		0	0	0	0	0	0	0	0	0	0	0
-70		0	0	0	0	0	0	0	0	0	0	0
-68		0	0	0	0	0	0	0	0	0	0	0
-66		0	0	0	0	0	0	0	0	0	0	0
-64		0	0	0	0	0	0	0	0	0	0	0
-62		0	0	0	0	0	0	0	0	0	0	0
-60		0	0	0	0	0	0	0	0	0	0	0
-58		0	0	0	0	0	0	0	0	0	0	0
-56		0	0	0	0	0	0	0	0	0	0	0
-54		0	0	0	0	0	0	0	0	0	0	0
-52		0	0	0	0	0	0	0	0	0	0	0
-50		0	0	0	0	0	0	0	0	0	0	0
-48		0	2	2	5	5	0	0	0	0	0	14
-46		1	3	1	6	8	1	0	0	0	0	20
-44		0	4	9	5	12	2	2	2	0	0	36
-42		0	1	4	8	9	8	3	3	0	0	36
-40		0	3	5	12	8	3	4	2	0	0	37
-38		1	1	3	7	12	5	4	1	0	0	34
-36		0	0	1	8	12	3	3	4	0	0	31
-34		0	0	0	2	10	5	1	1	0	0	19

-32	0	0	0	2	6	2	0	3	0	0	13
-30	0	0	0	0	2	2	0	0	0	0	4
-28	0	0	0	0	0	1	0	0	0	0	1
-26	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	1	0	0	0	0	0	0	1
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	2	14	25	56	84	32	17	16	0	0	246

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 36
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 27
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 11

TOTAL NUMBER OF RECORDED ECHOES = 627

NUMBER OF ECHOES USED FOR STATISTICS = 246

AVERAGE BACKSCATTERING CROSS SECTION = .1880E-03 IN dB = -37.26

BACKSCATTERING CROSS SECTION STD DEV = .2886E-03

AVERAGE TARGET STRENGTH IN dB = -39.82

TARGET STRENGTH STD DEV IN dB = 4.58

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 74

NUMBER OF FISH USED = 246
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .125E+04
DENSITY IN FISH PER CUBIC METER = .197E+00
EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

Reading file D:\esp_nra\all1416.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 2205

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 8.0

DEPTH INTERVALS

FROM 1.00 1.70 2.40 3.10 3.80 4.50 5.20 5.90 6.60 7.30
TO 1.70 2.40 3.10 3.80 4.50 5.20 5.90 6.60 7.30 8.00

TS

SUN

-74	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	0	0	0	0	0	0	0	0	0	0	0
-56	0	0	0	0	0	0	0	0	0	0	0
-54	0	0	0	0	0	0	0	0	0	0	0
-52	0	0	0	0	0	0	0	0	0	0	0
-50	0	0	0	0	0	0	0	0	0	0	0
-48	0	0	1	2	0	1	0	0	0	0	4
-46	0	0	0	3	5	2	1	2	0	0	13
-44	1	0	0	8	3	2	1	1	0	0	16
-42	0	0	0	11	9	4	0	3	0	0	27
-40	1	0	0	16	14	5	0	1	0	0	37
-38	1	0	0	12	15	6	0	4	0	0	38
-36	0	0	0	7	10	10	1	1	0	0	29
-34	0	0	0	15	4	9	0	1	0	0	29
-32	0	0	0	8	6	10	0	8	0	0	32
-30	1	0	0	8	4	3	0	4	0	0	20
-28	0	0	0	4	0	2	1	1	0	0	8
-26	0	0	0	1	0	0	0	0	0	0	1
-24	0	0	0	0	0	0	2	0	0	0	2
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	4	0	1	95	70	54	6	26	0	0	256

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 33
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 34
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 24

TOTAL NUMBER OF RECORDED ECHOES = 716

NUMBER OF ECHOES USED FOR STATISTICS = 256

AVERAGE BACKSCATTERING CROSS SECTION = .3644E-03 IN dB = -34.38

BACKSCATTERING CROSS SECTION STD DEV = .5002E-03

AVERAGE TARGET STRENGTH IN dB = -37.14

TARGET STRENGTH STD DEV IN dB = 4.99

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 91

NUMBER OF FISH USED = 256
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .217E+04
DENSITY IN FISH PER CUBIC METER = .118E+00
EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

Reading file D:\esp_nra\all1417.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 2264

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 8.0

DEPTH INTERVALS

	FROM TO	1.00 1.70	1.70 2.40	2.40 3.10	3.10 3.80	3.80 4.50	4.50 5.20	5.20 5.90	5.90 6.60	6.60 7.30	7.30 8.00	SUM
TS												
-74		0	0	0	0	0	0	0	0	0	0	0
-72		0	0	0	0	0	0	0	0	0	0	0
-70		0	0	0	0	0	0	0	0	0	0	0
-68		0	0	0	0	0	0	0	0	0	0	0
-66		0	0	0	0	0	0	0	0	0	0	0
-64		0	0	0	0	0	0	0	0	0	0	0
-62		0	0	0	0	0	0	0	0	0	0	0
-60		0	0	0	0	0	0	0	0	0	0	0
-58		0	0	0	0	0	0	0	0	0	0	0
-56		0	0	0	0	0	0	0	0	0	0	0
-54		0	0	0	0	0	0	0	0	0	0	0
-52		0	0	0	0	0	0	0	0	0	0	0
-50		0	0	0	0	0	0	0	0	0	0	0
-48		0	0	4	2	3	5	4	1	0	0	19
-46		2	0	8	1	11	4	4	6	0	0	36
-44		0	2	8	3	13	4	10	6	0	0	46
-42		3	1	14	4	15	7	12	6	0	0	62
-40		0	0	5	6	8	13	11	11	0	0	54
-38		0	1	2	7	6	14	8	21	0	0	59
-36		0	1	2	2	7	12	5	12	0	0	41
-34		0	1	1	5	6	10	5	9	0	0	37
-32		0	1	0	2	6	5	1	3	0	0	18
-30		0	1	1	2	2	1	1	8	0	0	16
-28		0	0	0	2	5	2	0	3	0	0	12
-26		0	0	0	0	4	2	0	0	0	0	6
-24		0	0	0	0	1	0	0	0	0	0	1
-22		0	0	0	0	0	0	0	0	0	0	0
-20		0	0	0	0	0	0	0	0	0	0	0
-18		0	0	0	0	0	0	0	0	0	0	0
-16		0	0	0	0	0	0	0	0	0	0	0
SUM		5	8	45	36	87	79	61	86	0	0	407

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB	TO B = 1 dB	NUMBER OF ECHOES =	64
B= 1 dB	TO B = 2 dB	NUMBER OF ECHOES =	35
B= 2 dB	TO B = 3 dB	NUMBER OF ECHOES =	27

TOTAL NUMBER OF RECORDED ECHOES = 960
 NUMBER OF ECHOES USED FOR STATISTICS = 407
 AVERAGE BACKSCATTERING CROSS SECTION = .2712E-03 IN dB = -35.67
 BACKSCATTERING CROSS SECTION STD DEV = .4529E-03
 AVERAGE TARGET STRENGTH IN dB = -39.09
 TARGET STRENGTH STD DEV IN dB = 5.22
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 126

NUMBER OF FISH USED = 407
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .223E+04
 DENSITY IN FISH PER CUBIC METER = .182E+00
 EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

Reading file D:\esp_nra\all1419.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 2313

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 8.0

DEPTH INTERVALS

	FROM	1.00	1.70	2.40	3.10	3.80	4.50	5.20	5.90	6.60	7.30	
	TO	1.70	2.40	3.10	3.80	4.50	5.20	5.90	6.60	7.30	8.00	
TS												SUM
-74		0	0	0	0	0	0	0	0	0	0	0
-72		0	0	0	0	0	0	0	0	0	0	0
-70		0	0	0	0	0	0	0	0	0	0	0
-68		0	0	0	0	0	0	0	0	0	0	0
-66		0	0	0	0	0	0	0	0	0	0	0
-64		0	0	0	0	0	0	0	0	0	0	0
-62		0	0	0	0	0	0	0	0	0	0	0
-60		0	0	0	0	0	0	0	0	0	0	0
-58		0	0	0	0	0	0	0	0	0	0	0
-56		0	0	0	0	0	0	0	0	0	0	0
-54		0	0	0	0	0	0	0	0	0	0	0
-52		0	0	0	0	0	0	0	0	0	0	0
-50		0	0	0	0	0	0	0	0	0	0	0
-48		0	0	1	0	0	0	0	0	0	0	1
-46		0	0	2	0	1	0	0	0	0	0	3
-44		0	0	6	0	2	0	0	0	0	0	8
-42		0	0	6	0	2	0	0	0	0	0	8
-40		0	0	6	0	2	1	0	2	0	0	11

-38	0	0	6	0	4	0	0	0	0	0	10
-36	0	0	1	0	2	1	0	0	0	0	4
-34	0	0	0	0	1	3	0	0	0	0	4
-32	0	0	0	0	0	2	0	0	0	0	2
-30	0	0	0	0	0	0	0	0	0	0	0
-28	0	0	0	0	0	2	0	0	0	0	2
-26	0	0	0	0	1	0	0	0	0	0	1
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	0	0	28	0	15	9	0	2	0	0	54

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 11
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 6
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 3

TOTAL NUMBER OF RECORDED ECHOES = 139

NUMBER OF ECHOES USED FOR STATISTICS = 54

AVERAGE BACKSCATTERING CROSS SECTION = .2376E-03 IN dB = -36.24

BACKSCATTERING CROSS SECTION STD DEV = .4227E-03

AVERAGE TARGET STRENGTH IN dB = -39.26

TARGET STRENGTH STD DEV IN dB = 4.56

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 20

NUMBER OF FISH USED = 54
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .208E+04
DENSITY IN FISH PER CUBIC METER = .260E-01
EQUIVALENT STRATON LENGTH (1/100) = 1.0000

Reading file D:\esp_nra\all421.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 3018

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 8.0

DEPTH INTERVALS

FROM 1.00 1.70 2.40 3.10 3.80 4.50 5.20 5.90 6.60 7.30

TS	TO	1.70	2.40	3.10	3.80	4.50	5.20	5.90	6.60	7.30	8.00	SUM
-74		0	0	0	0	0	0	0	0	0	0	0
-72		0	0	0	0	0	0	0	0	0	0	0
-70		0	0	0	0	0	0	0	0	0	0	0
-68		0	0	0	0	0	0	0	0	0	0	0
-66		0	0	0	0	0	0	0	0	0	0	0
-64		0	0	0	0	0	0	0	0	0	0	0
-62		0	0	0	0	0	0	0	0	0	0	0
-60		0	0	0	0	0	0	0	0	0	0	0
-58		0	0	0	0	0	0	0	0	0	0	0
-56		0	0	0	0	0	0	0	0	0	0	0
-54		0	0	0	0	0	0	0	0	0	0	0
-52		0	0	0	0	0	0	0	0	0	0	0
-50		0	0	0	0	0	0	0	0	0	0	0
-48		0	0	1	0	1	2	1	1	0	0	6
-46		2	0	2	1	1	4	3	4	0	0	17
-44		1	1	5	3	5	5	10	3	0	0	33
-42		1	1	11	6	9	6	4	3	0	0	41
-40		5	2	10	2	7	3	5	3	0	0	37
-38		1	0	9	4	4	1	7	4	0	0	30
-36		2	1	11	1	3	3	2	0	0	0	23
-34		6	0	8	3	3	1	4	0	0	0	25
-32		2	0	10	0	1	1	2	1	0	0	17
-30		0	0	5	4	1	0	2	0	0	0	12
-28		0	0	1	1	0	0	0	0	0	0	2
-26		0	0	1	0	0	0	0	0	0	0	1
-24		0	0	0	0	0	0	0	0	0	0	0
-22		0	0	0	0	0	0	0	0	0	0	0
-20		0	0	0	0	0	0	0	0	0	0	0
-18		0	0	0	0	0	0	0	0	0	0	0
-16		0	0	0	0	0	0	0	0	0	0	0
SUM		20	5	74	25	35	26	40	19	0	0	244

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 35
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 20
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 22

TOTAL NUMBER OF RECORDED ECHOES = 721

NUMBER OF ECHOES USED FOR STATISTICS = 244

AVERAGE BACKSCATTERING CROSS SECTION = .2315E-03 IN dB = -36.35

BACKSCATTERING CROSS SECTION STD DEV = .3030E-03

AVERAGE TARGET STRENGTH IN dB = -39.03

TARGET STRENGTH STD DEV IN dB = 4.76

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 77

NUMBER OF FISH USED = 244

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .297E+04

DENSITY IN FISH PER CUBIC METER = .822E-01
 EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

Reading file D:\esp_nra\all423.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 2656

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 8.0

DEPTH INTERVALS

TS	FROM TO										SUM
	1.00 1.70	1.70 2.40	2.40 3.10	3.10 3.80	3.80 4.50	4.50 5.20	5.20 5.90	5.90 6.60	6.60 7.30	7.30 8.00	
-74	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	0	0	0	0	0	0	0	0	0	0	0
-56	0	0	0	0	0	0	0	0	0	0	0
-54	0	0	0	0	0	0	0	0	0	0	0
-52	0	0	0	0	0	0	0	0	0	0	0
-50	0	0	0	0	0	0	0	0	0	0	0
-48	0	0	1	0	3	0	3	1	2	0	10
-46	0	0	3	1	2	1	1	11	5	0	24
-44	0	0	3	3	3	2	4	8	6	0	29
-42	0	0	1	4	7	0	2	10	2	0	26
-40	0	0	1	4	2	0	2	6	3	0	18
-38	0	0	0	1	0	0	0	2	0	0	3
-36	0	0	1	1	0	0	1	3	0	0	6
-34	0	0	0	1	0	0	0	0	0	0	1
-32	0	0	0	3	0	0	0	0	0	0	3
-30	0	0	0	1	0	0	0	0	0	0	1
-28	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	0	0	10	19	17	3	13	41	18	0	121

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 19
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 16
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 10

TOTAL NUMBER OF RECORDED ECHOES = 448

NUMBER OF ECHOES USED FOR STATISTICS = 121

AVERAGE BACKSCATTERING CROSS SECTION = .8884E-04 IN dB = -40.51

BACKSCATTERING CROSS SECTION STD DEV = .1292E-03

AVERAGE TARGET STRENGTH IN dB = -42.51

TARGET STRENGTH STD DEV IN dB = 3.66

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 45

NUMBER OF FISH USED = 121
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .262E+04
 DENSITY IN FISH PER CUBIC METER = .462E-01
 EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

Reading file D:\esp_nra\all425.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 2657

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 8.0

DEPTH INTERVALS

	FROM	1.00	1.70	2.40	3.10	3.80	4.50	5.20	5.90	6.60	7.30	
	TO	1.70	2.40	3.10	3.80	4.50	5.20	5.90	6.60	7.30	8.00	
TS												SUM
-74		0	0	0	0	0	0	0	0	0	0	0
-72		0	0	0	0	0	0	0	0	0	0	0
-70		0	0	0	0	0	0	0	0	0	0	0
-68		0	0	0	0	0	0	0	0	0	0	0
-66		0	0	0	0	0	0	0	0	0	0	0
-64		0	0	0	0	0	0	0	0	0	0	0
-62		0	0	0	0	0	0	0	0	0	0	0
-60		0	0	0	0	0	0	0	0	0	0	0
-58		0	0	0	0	0	0	0	0	0	0	0
-56		0	0	0	0	0	0	0	0	0	0	0
-54		0	0	0	0	0	0	0	0	0	0	0
-52		0	0	0	0	0	0	0	0	0	0	0
-50		0	0	0	0	0	0	0	0	0	0	0
-48		0	0	0	1	0	5	1	2	1	0	10
-46		1	0	0	0	1	2	1	10	6	0	21

-44	0	1	0	3	10	3	2	6	2	0	27
-42	0	3	4	5	3	3	3	5	7	0	33
-40	0	2	2	1	12	1	4	4	6	0	32
-38	1	2	2	1	7	1	5	3	0	0	22
-36	0	1	0	3	4	1	2	4	1	0	16
-34	0	1	0	0	1	2	0	1	0	0	5
-32	0	1	0	0	1	3	1	1	0	0	7
-30	0	0	0	0	0	0	2	0	0	0	2
-28	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	2	11	8	14	39	21	21	36	23	0	175

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 23
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 17
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 16

TOTAL NUMBER OF RECORDED ECHOES = 612

NUMBER OF ECHOES USED FOR STATISTICS = 175

AVERAGE BACKSCATTERING CROSS SECTION = .1304E-03 IN dB = -38.85

BACKSCATTERING CROSS SECTION STD DEV = .1569E-03

AVERAGE TARGET STRENGTH IN dB = -40.90

TARGET STRENGTH STD DEV IN dB = 4.09

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 56

NUMBER OF FISH USED = 175
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .262E+04
DENSITY IN FISH PER CUBIC METER = .668E-01
EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

Reading file D:\esp_nra\all1427.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 3015

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 8.0

DEPTH INTERVALS

	FROM	1.00	1.70	2.40	3.10	3.80	4.50	5.20	5.90	6.60	7.30	
	TO	1.70	2.40	3.10	3.80	4.50	5.20	5.90	6.60	7.30	8.00	
TS												SUM
-74	0	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0	0
-58	0	0	0	0	0	0	0	0	0	0	0	0
-56	0	0	0	0	0	0	0	0	0	0	0	0
-54	0	0	0	0	0	0	0	0	0	0	0	0
-52	0	0	0	0	0	0	0	0	0	0	0	0
-50	0	0	0	0	0	0	0	0	0	0	0	0
-48	1	2	1	0	7	6	3	10	2	0	0	32
-46	1	1	3	3	5	7	9	14	6	0	0	49
-44	0	2	0	2	12	11	11	27	13	0	0	78
-42	1	3	1	7	16	11	13	26	13	0	0	91
-40	1	1	0	7	11	13	12	15	13	0	0	73
-38	0	2	0	5	15	19	8	15	14	0	0	78
-36	0	3	0	1	12	8	9	15	2	0	0	50
-34	0	3	0	1	5	7	7	2	7	0	0	32
-32	0	0	0	0	3	3	4	0	4	0	0	14
-30	0	0	0	2	4	1	2	1	3	0	0	13
-28	0	2	0	0	1	0	0	2	1	0	0	6
-26	0	0	0	0	2	0	1	1	0	0	0	4
-24	0	0	0	0	1	0	0	0	1	0	0	2
-22	0	1	0	0	0	0	0	0	0	0	0	1
-20	0	1	0	0	0	0	0	0	0	0	0	1
-18	0	2	0	0	0	0	0	0	0	0	0	2
-16	0	0	0	0	0	0	0	0	0	0	0	0
SUM		4	23	5	28	94	86	79	128	79	0	526

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 85
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 66
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 46

TOTAL NUMBER OF RECORDED ECHOES = 1500

NUMBER OF ECHOES USED FOR STATISTICS = 526

AVERAGE BACKSCATTERING CROSS SECTION = .2877E-03 IN dB = -35.41

BACKSCATTERING CROSS SECTION STD DEV = .1137E-02

AVERAGE TARGET STRENGTH IN dB = -40.00

TARGET STRENGTH STD DEV IN dB = 5.04

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 197

NUMBER OF FISH USED = 526
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .297E+04
 DENSITY IN FISH PER CUBIC METER = .177E+00
 EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

Reading file D:\esp_nra\all1429.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 2957

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 8.0

DEPTH INTERVALS

	FROM TO	1.00 1.70	1.70 2.40	2.40 3.10	3.10 3.80	3.80 4.50	4.50 5.20	5.20 5.90	5.90 6.60	6.60 7.30	7.30 8.00	SUM
TS												
-74	0	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0	0
-58	0	0	0	0	0	0	0	0	0	0	0	0
-56	0	0	0	0	0	0	0	0	0	0	0	0
-54	0	0	0	0	0	0	0	0	0	0	0	0
-52	0	0	0	0	0	0	0	0	0	0	0	0
-50	0	0	0	0	0	0	0	0	0	0	0	0
-48	0	1	0	1	3	3	2	4	0	0	0	14
-46	0	3	1	4	5	7	5	5	2	0	0	32
-44	1	3	1	8	10	9	8	6	2	0	0	48
-42	2	7	1	6	8	7	15	11	0	0	0	57
-40	0	6	1	8	3	6	9	5	4	0	0	42
-38	6	7	4	5	8	6	6	8	2	0	0	52
-36	1	7	1	3	3	2	2	5	4	0	0	28
-34	1	2	5	1	3	7	3	1	6	0	0	29
-32	0	3	1	3	1	0	0	0	4	0	0	12
-30	0	2	4	2	0	1	1	1	3	0	0	14
-28	0	0	1	1	0	1	0	0	1	0	0	4
-26	0	0	0	0	0	0	0	0	1	0	0	1
-24	0	0	0	0	0	1	0	0	0	0	0	1
-22	0	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0	0
SUM	11	41	20	42	44	50	51	46	29	0	0	334

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	51
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	38
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	28

TOTAL NUMBER OF RECORDED ECHOES = 969

NUMBER OF ECHOES USED FOR STATISTICS = 334

AVERAGE BACKSCATTERING CROSS SECTION = .2133E-03 IN dB = -36.71

BACKSCATTERING CROSS SECTION STD DEV = .3511E-03

AVERAGE TARGET STRENGTH IN dB = -39.63

TARGET STRENGTH STD DEV IN dB = 4.78

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 117

NUMBER OF FISH USED = 334

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .289E+04

DENSITY IN FISH PER CUBIC METER = .115E+00

EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

Reading file D:\esp_nra\all1102.dat

Analyzing Run # 1

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 0

NUMBER OF FISH USED = 2
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .410E+04
DENSITY IN FISH PER CUBIC METER = .488E-03
EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

***** TS Version 2.00 *****
Dual Beam Data Reduction Program
For ESP 281 V1.0x & V2.0x data files

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Serial Number 5205-V2.00-91-000

Reading file D:/esp_nra/all321.dat

Analyzing Run # 1

FILE NUMBER 1 =	D:/esp_nra/all321.dat	10/8/90	21.08
FILE NUMBER 2 =	D:\esp_nra\all323.dat		21.38
FILE NUMBER 3 =	D:\esp_nra\all325.dat		21.50
FILE NUMBER 4 =	D:\esp_nra\all402.dat		21.80
FILE NUMBER 5 =	D:\esp_nra\all404.dat		21.92
FILE NUMBER 6 =	D:\esp_nra\all406.dat		22.02
FILE NUMBER 7 =	D:\esp_nra\all408.dat		22.16

DATA GROUP REPORT FOR TRANSDUCER 1

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	24	18	15	7	1	1	0	0	0	0	0	0	0	0	

†

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	10
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	12
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	10

TOTAL NUMBER OF RECORDED ECHOES = 434

NUMBER OF ECHOES USED FOR STATISTICS = 68

AVERAGE BACKSCATTERING CROSS SECTION = .7797E-04 IN dB = -41.08

BACKSCATTERING CROSS SECTION STD DEV = .6133E-04
 AVERAGE TARGET STRENGTH IN dB = -41.91
 TARGET STRENGTH STD DEV IN dB = 2.52

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 32

NUMBER OF FISH USED = 68
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .141E+04
 DENSITY IN FISH PER CUBIC METER = .483E-01
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

Reading file D:\esp_nra\all323.dat
 Analyzing Run # 1
 DATA GROUP REPORT FOR TRANSDUCER 1

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	31	41	32	28	15	5	4	0	1	1	1	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	30
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	20
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	12

TOTAL NUMBER OF RECORDED ECHOES = 583
 NUMBER OF ECHOES USED FOR STATISTICS = 165
 AVERAGE BACKSCATTERING CROSS SECTION = .1711E-03 IN dB = -37.67
 BACKSCATTERING CROSS SECTION STD DEV = .3880E-03
 AVERAGE TARGET STRENGTH IN dB = -40.11
 TARGET STRENGTH STD DEV IN dB = 3.72
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 62

NUMBER OF FISH USED = 165
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .171E+04
 DENSITY IN FISH PER CUBIC METER = .962E-01

EQUIVALENT STRATUM LENGTH (‡/100) = 1.0000

Reading file D:\esp_nra\all1325.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
‡	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	10	14	8	4	4	8	3	2	0	0	0	0	0	0	0

‡

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 14

B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 9

B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 4

TOTAL NUMBER OF RECORDED ECHOES = 254

NUMBER OF ECHOES USED FOR STATISTICS = 55

AVERAGE BACKSCATTERING CROSS SECTION = .1912E-03 IN dB = -37.19

BACKSCATTERING CROSS SECTION STD DEV = .2084E-03

AVERAGE TARGET STRENGTH IN dB = -39.34

TARGET STRENGTH STD DEV IN dB = 4.24

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 27

NUMBER OF FISH USED = 55

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .108E+04

DENSITY IN FISH PER CUBIC METER = .508E-01

EQUIVALENT STRATUM LENGTH (‡/100) = 1.0000

Reading file D:\esp_nra\all1402.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	6	9	9	2	4	2	0	0	0	0	0	0	0	0	0

;

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	8
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	3
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	2

TOTAL NUMBER OF RECORDED ECHOES = 144

NUMBER OF ECHOES USED FOR STATISTICS = 36

AVERAGE BACKSCATTERING CROSS SECTION = .1127E-03 IN dB = -39.48

BACKSCATTERING CROSS SECTION STD DEV = .1010E-03

AVERAGE TARGET STRENGTH IN dB = -40.81

TARGET STRENGTH STD DEV IN dB = 3.34

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 13

NUMBER OF FISH USED = 36
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .707E+03
 DENSITY IN FISH PER CUBIC METER = .509E-01
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

Reading file D:\esp_nra\all1404.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	8	11	8	7	3	0	0	0	0	0	0	0	0	0	0

;

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	11
---------------------	--------------------	----

B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 5
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 4

 TOTAL NUMBER OF RECORDED ECHOES = 231
 NUMBER OF ECHOES USED FOR STATISTICS = 40
 AVERAGE BACKSCATTERING CROSS SECTION = .9362E-04 IN dB = -40.29
 BACKSCATTERING CROSS SECTION STD DEV = .6200E-04
 AVERAGE TARGET STRENGTH IN dB = -41.13
 TARGET STRENGTH STD DEV IN dB = 2.72
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 20

NUMBER OF FISH USED = 40
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .102E+04
 DENSITY IN FISH PER CUBIC METER = .390E-01
 EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

Reading file D:\esp_nra\all1406.dat
 Analyzing Run # 1
 DATA GROUP REPORT FOR TRANSDUCER 1

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1
 TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 2 1 5 1 1 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 2
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 1
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 0

 TOTAL NUMBER OF RECORDED ECHOES = 47
 NUMBER OF ECHOES USED FOR STATISTICS = 11
 AVERAGE BACKSCATTERING CROSS SECTION = .9268E-04 IN dB = -40.33
 BACKSCATTERING CROSS SECTION STD DEV = .5124E-04
 AVERAGE TARGET STRENGTH IN dB = -40.96

TARGET STRENGTH STD DEV IN dB =

2.52

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 3

NUMBER OF FISH USED = 11
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .941E+03
DENSITY IN FISH PER CUBIC METER = .117E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

Reading file D:\esp_nra\all1408.dat
Analysing Run # 1
DATA GROUP REPORT FOR TRANSDUCER 1

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	10	11	12	4	5	6	1	1	0	1	0	0	0	0	0

†

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	12
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	8
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	5

TOTAL NUMBER OF RECORDED ECHOES = 240

NUMBER OF ECHOES USED FOR STATISTICS = 54

AVERAGE BACKSCATTERING CROSS SECTION = .2033E-03 IN dB = -36.92

BACKSCATTERING CROSS SECTION STD DEV = .3791E-03

AVERAGE TARGET STRENGTH IN dB = -39.73

TARGET STRENGTH STD DEV IN dB = 4.34

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 25

NUMBER OF FISH USED = 54
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .116E+04
DENSITY IN FISH PER CUBIC METER = .466E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

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Analyzing Run # 1

FILE NUMBER 1 =	D:\esp_nra\all1104.dat	21/7/90	21.00
FILE NUMBER 2 =	D:\esp_nra\all1106.dat		21.33
FILE NUMBER 3 =	D:\esp_nra\all1107.dat		21.78
FILE NUMBER 4 =	D:\esp_nra\all1109.dat		22.00
FILE NUMBER 5 =	D:\esp_nra\all1113.dat	28/7/90	-07.27
FILE NUMBER 6 =	D:\esp_nra\all1115.dat		08.50

TOTAL NUMBER OF PINGS = 4577

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 8.0

DEPTH INTERVALS

FROM	1.00	1.70	2.40	3.10	3.80	4.50	5.20	5.90	6.60	7.30
TO	1.70	2.40	3.10	3.80	4.50	5.20	5.90	6.60	7.30	8.00

TS

SDM

[illegible]

-34	0	0	0	0	0	0	0	0	0	0	0	0
-32	0	0	0	0	0	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0	0	0	0	0	0
-28	0	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0	0
SUM	0	0	0	0	0	0	1	3	0	0	0	4

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 0
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 0
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 4

TOTAL NUMBER OF RECORDED ECHOES = 178

NUMBER OF ECHOES USED FOR STATISTICS = 4

AVERAGE BACKSCATTERING CROSS SECTION = .1917E-04 IN dB = -47.17

BACKSCATTERING CROSS SECTION STD DEV = .9972E-06

AVERAGE TARGET STRENGTH IN dB = -47.18

TARGET STRENGTH STD DEV IN dB = .22

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 4

NUMBER OF FISH USED = 4

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .424E+04

DENSITY IN FISH PER CUBIC METER = .944E-03

EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

Reading file D:\esp_nra\all1106.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 3220

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 8.0

DEPTH INTERVALS

FROM	1.00	1.70	2.40	3.10	3.80	4.50	5.20	5.90	6.60	7.30
TO	1.70	2.40	3.10	3.80	4.50	5.20	5.90	6.60	7.30	8.00

TS

SUM

-74	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	0	0	0	0	0	0	0	0	0	0	0
-56	0	0	0	0	0	0	0	0	0	0	0
-54	0	0	0	0	0	0	0	0	0	0	0
-52	0	0	0	0	0	0	0	0	0	0	0
-50	0	0	0	0	0	0	0	0	0	0	0
-48	0	0	0	0	0	0	0	1	0	0	1
-46	0	0	0	0	0	0	0	0	0	0	0
-44	0	0	0	0	0	0	0	2	0	0	2
-42	0	0	0	0	0	0	0	0	0	0	0
-40	0	0	0	0	0	0	0	0	0	0	0
-38	0	0	0	0	0	0	0	0	0	0	0
-36	0	0	0	0	0	0	0	0	0	0	0
-34	0	0	0	0	0	0	0	0	0	0	0
-32	0	0	0	0	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0	0	0	0	0
-28	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	0	0	0	0	0	0	0	3	0	0	3

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 0
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 1
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 1

TOTAL NUMBER OF RECORDED ECHOES = 340

NUMBER OF ECHOES USED FOR STATISTICS = 3

AVERAGE BACKSCATTERING CROSS SECTION = .3409E-04 IN dB = -44.67

BACKSCATTERING CROSS SECTION STD DEV = .1356E-04

AVERAGE TARGET STRENGTH IN dB = -44.95

TARGET STRENGTH STD DEV IN dB = 1.97

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 2

NUMBER OF FISH USED = 3

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .313E+04

DENSITY IN FISH PER CUBIC METER = .958E-03

EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

Reading file D:\esp_nra\all107.dat

Analyzing Run # 1

Reading file D:\esp_nra\all107.dat

Analyzing Run # 2

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 1659

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 8.0

DEPTH INTERVALS

TS	FROM	1.00	1.70	2.40	3.10	3.80	4.50	5.20	5.90	6.60	7.30	SUM
	TO	1.70	2.40	3.10	3.80	4.50	5.20	5.90	6.60	7.30	8.00	
-74		0	0	0	0	0	0	0	0	0	0	0
-72		0	0	0	0	0	0	0	0	0	0	0
-70		0	0	0	0	0	0	0	0	0	0	0
-68		0	0	0	0	0	0	0	0	0	0	0
-66		0	0	0	0	0	0	0	0	0	0	0
-64		0	0	0	0	0	0	0	0	0	0	0
-62		0	0	0	0	0	0	0	0	0	0	0
-60		0	0	0	0	0	0	0	0	0	0	0
-58		0	0	0	0	0	0	0	0	0	0	0
-56		0	0	0	0	0	0	0	0	0	0	0
-54		0	0	0	0	0	0	0	0	0	0	0
-52		0	0	0	0	0	0	0	0	0	0	0
-50		0	0	0	0	0	0	0	0	0	0	0
-48		0	0	0	0	0	0	1	1	0	0	2
-46		0	0	0	0	0	0	0	1	0	0	1
-44		1	1	0	0	0	0	0	1	0	0	3
-42		0	0	0	0	0	0	0	0	0	0	0
-40		0	0	0	0	0	0	0	0	0	0	0
-38		0	0	0	0	0	0	0	0	0	0	0
-36		0	0	0	0	0	0	0	0	0	0	0
-34		0	0	0	0	0	0	0	0	0	0	0
-32		0	0	0	0	0	0	0	0	0	0	0
-30		0	0	0	0	0	0	0	0	0	0	0
-28		0	0	0	0	0	0	0	0	0	0	0
-26		0	0	0	0	0	0	0	0	0	0	0
-24		0	0	0	0	0	0	0	0	0	0	0
-22		0	0	0	0	0	0	0	0	0	0	0
-20		0	0	0	0	0	0	0	0	0	0	0
-18		0	0	0	0	0	0	0	0	0	0	0
-16		0	0	0	0	0	0	0	0	0	0	0
SUM		1	1	0	0	0	0	1	3	0	0	6

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

[illegible]

-48	0	0	0	0	0	0	0	0	0	0	0
-46	0	0	0	0	0	0	0	0	0	0	0
-44	0	0	0	0	0	0	0	0	0	0	0
-42	0	0	0	0	0	0	0	1	0	0	1
-40	0	0	0	0	0	0	0	0	0	0	0
-38	0	0	0	0	0	0	0	0	0	0	0
-36	0	0	0	0	0	0	0	0	0	0	0
-34	0	0	0	0	0	0	0	0	0	0	0
-32	0	0	0	0	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0	0	0	0	0
-28	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	0	0	0	0	0	0	0	1	0	0	1

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 0
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 0
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 68

NUMBER OF ECHOES USED FOR STATISTICS = 1

AVERAGE BACKSCATTERING CROSS SECTION = .5343E-04 IN dB = -42.72

BACKSCATTERING CROSS SECTION STD DEV = .0000E+00

AVERAGE TARGET STRENGTH IN dB = -42.72

TARGET STRENGTH STD DEV IN dB = .00

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 0

NUMBER OF FISH USED = 1
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .382E+04
DENSITY IN FISH PER CUBIC METER = .261E-03
EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

Reading file D:\esp_nra\all1115.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 4547

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 8.0

DEPTH INTERVALS

TS	FROM	1.00	1.70	2.40	3.10	3.80	4.50	5.20	5.90	6.60	7.30	SUM
	TO	1.70	2.40	3.10	3.80	4.50	5.20	5.90	6.60	7.30	8.00	
-74		0	0	0	0	0	0	0	0	0	0	0
-72		0	0	0	0	0	0	0	0	0	0	0
-70		0	0	0	0	0	0	0	0	0	0	0
-68		0	0	0	0	0	0	0	0	0	0	0
-66		0	0	0	0	0	0	0	0	0	0	0
-64		0	0	0	0	0	0	0	0	0	0	0
-62		0	0	0	0	0	0	0	0	0	0	0
-60		0	0	0	0	0	0	0	0	0	0	0
-58		0	0	0	0	0	0	0	0	0	0	0
-56		0	0	0	0	0	0	0	0	0	0	0
-54		0	0	0	0	0	0	0	0	0	0	0
-52		0	0	0	0	0	0	0	0	0	0	0
-50		0	0	0	0	0	0	0	0	0	0	0
-48		0	0	0	0	0	0	0	0	0	0	0
-46		0	0	0	0	0	0	0	0	0	0	0
-44		0	0	0	0	0	0	0	0	0	0	0
-42		0	0	0	0	0	0	0	1	0	0	1
-40		0	0	0	0	0	0	0	0	0	0	0
-38		0	0	0	0	0	0	0	1	0	0	1
-36		0	0	0	0	0	0	0	0	0	0	0
-34		0	0	0	0	0	0	0	0	0	0	0
-32		0	0	0	0	0	0	0	0	0	0	0
-30		0	0	0	0	0	0	0	0	0	0	0
-28		0	0	0	0	0	0	0	0	0	0	0
-26		0	0	0	0	0	0	0	0	0	0	0
-24		0	0	0	0	0	0	0	0	0	0	0
-22		0	0	0	0	0	0	0	0	0	0	0
-20		0	0	0	0	0	0	0	0	0	0	0
-18		0	0	0	0	0	0	0	0	0	0	0
-16		0	0	0	0	0	0	0	0	0	0	0
SUM		0	0	0	0	0	0	0	2	0	0	2

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 0
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 0
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 23

NUMBER OF ECHOES USED FOR STATISTICS = 2

AVERAGE BACKSCATTERING CROSS SECTION = .1289E-03 IN dB = -38.90

BACKSCATTERING CROSS SECTION STD DEV = .8979E-04

AVERAGE TARGET STRENGTH IN dB = -39.50

TARGET STRENGTH STD DEV IN dB = 3.31

5. FIXED LOCATION STUDIES IN THE RIVERS THAMES AND WEY

This chapter contains summary tables and post-processing printouts for all the fixed location studies 1991 and 1992. In all cases where acoustic sizes were converted to equivalent standard lengths, regression 12 in Table 3.2 (R&D Note 196) was used.

Record 5.1 River Wey, Old Woking, 3rd-6th June 1991

Table 5.1 (2 pages) gives the number of accepted fish, the sampled volumes and fish densities per 100m³ at four ranges from the transducer for two experimental situations: (1) before and after removal of fish by electrofishing within stop-netted areas at two sites, below and above the Woking Sewage outfall and (2) the acoustic monitoring of day and night fish densities in the site above the sewage outfall before fish removal by electrofishing. Note the level of replication. This provides the numerical data illustrated in Figures 5.2c and 5.6 and the data for the River Wey in table 5.1.

Table 5.2 (2 pages). Size frequency distributions of fish above and below the Woking sewage outfall, given in acoustic sizes and standard lengths of electroshocked fish. This is the basic data for Figures 5.3a and b.

Printouts of results from ESPTS processing of the 13 River Wey files listed in Table 5.1

Record 5.2 Summarised data for the River Thames

Table 5.3 lists the dates, geographical situation, number of sites worked, the number of quantitative seining undertaken and whether day and/or night acoustics were conducted during the fixed location studies of the River Thames, largely the upper Thames near Clifton Hampden, during 1991 and 1992.. These studies provided the basic data listed in Table 5.1 and illustrated in Figure 5.6 of the R&D Note 196.

Table 5.4 lists the frequency composition of fish species caught by quantitative seine netting, largely in the upper River Thames near Clifton Hampden, during 1991 and 1992.

Record 5.3 River Thames Didcot Power Station July 1991

Table 5.5 Numbers of accepted fish, sampled volumes and fish densities per 100 m³ at four sonar ranges and at two sites in the River Thames near the intake and outlet of the Didcot Power Station. Note the level of replication. This table contributes data to Table 5.1 and Figure 5.6 in the R&D Note 196.

Table 5.6 lists the numbers and size frequency distributions of both captured and acoustically surveyed fish near the outlet of the Didcot Power Station, given as target strengths and measured lengths. This is the data for Figure 5.3c of the R&D Note 196.

Printouts of results from ESPTS processing of 4 River Thames Didcot files, incorporating about 10 runs.

Record 5.4 River Thames Clifton Hampden July 1991

Table 5.7 Numbers of accepted fish, sampled volumes and fish densities per 100 m³ at four sonar ranges at a shallow and deep site in the River Thames near Clifton Hampden on July 22nd 1991. Two replicates at each site. This table contributes to the data in Table 5.1 and Figure 5.6 in the R&D Note 196.

Table 5.8 (3 pages) lists the numbers and size frequency distributions of both captured and acoustically surveyed fish from a shallow and a deep site in the River Thames near Clifton Hampden on July 22nd 1991. This is the data for Figure 5.3d of the R&D Note 196.

Printouts of results from ESPTS processing of two River Thames Clifton Hampden July 22nd 1991 files, with several runs.

Record 5.5 River Thames Clifton Hampden August 1991

Table 5.9 Numbers of accepted fish, sampled volumes and fish densities per 100m³ at four sonar ranges at four sites in the River Thames near Clifton Hampden during August 1st/2nd 1991. The first three sites were sampled during the day, with replication, and the fourth relatively shallow site was sampled at night. Data from all four sites contribute to Table 5.1 and Figure 5.6 in the R&D Note 196.

Table 5.10 (2 pages) lists the numbers and size frequency distributions of sites 3 and 4 in the River Thames near Clifton Hampden on August 1st/2nd 1991. This is the data for Figure 5.4a,b of the R&D Note 196.

Printouts of results from ESPTS processing of six River Thames Clifton Hampden August 1st/2nd 1991 files, with several runs.

Record 5.6 River Thames Ham Island August 1991

Table 5.11 Numbers of accepted fish, sampled volumes and fish densities per 100m³ at Ham Island, where the River Thames is wider and deeper than in its upper course. Densities were recorded for five ranges from the transducer but the fish from the 10-15m range were excluded from the overall density calculations. This data contributed to Table 5.1 and Figure 5.6 in the R&D Note 196.

Table 5.12 gives the acoustic size and length frequency distributions of fish caught during the 3rd seine netting which, unlike the two earlier inshore seining, attempted a "whole river" seining in order to get a record of the size composition of the larger "distant" fish. This table compares the acoustic size composition of fish from the 10-15m range of the sonar run accompanying seining number 2 with the measured length composition of the seining number 3. This data contributed to Figure 5.4c of the R&D Note 196.

Printouts of results from ESPTS processing of one Ham Island file with 3 runs.

Record 5.7 River Thames Didcot September 1991

Table 5.13 Numbers of accepted fish, sampled volumes and fish densities per 100m³ in the Didcot region of the River Thames during an acoustic survey of three sites on September 7th 1991. At these three sites between September 4th-6th, mark-recapture

censuses were conducted in areas enclosed by net. These results contribute to Table 5.1 and Figure 5.6 of the R&D Note 196.

Table 5.14 (3 pages) gives the acoustic size and measured fish length frequency distribution for the three sites subject to acoustic survey and mark-recapture census and provides the basic data for Figure 5.5a,b and c in the R&D Note 196.

Table 5.15 Petersen estimate of fish density at site 1.

Table 5.16 Schnabel estimate of fish density at site 2.

Table 5.17 Schnabel estimate of fish density at site 3

Printouts of results from ESPTS processing of three files with several runs from River Thames Didcot on September 7th 1991.

Record 5.8 River Thames Chertsey Meads June 1992

The data contributing to Figure 5.7 of the R&D Note 196 on the vertical distribution of fish targets over 24 hours in the River Thames at Chertsey Meads on June 22nd/23rd 1992 exists wholly as printouts of results of ESPTS processing of 28 files some with several runs. The files are labelled as CHE1 to CHE11 which refers to time periods within the 24 hours and CHE1s, CHE1m and CHE1d refers to surface, middle and deep depths in the water column of the transducer beam.

Table 5.1.

WEYDEN.XLS

Sampled volumes, numbers of accepted fish and densities in different sonar runs and in different ranges from transducer, R. Wey, Old Woking, June 1991									
The numbers not accepted for final calculation of density in italics (none here)									
Numbers of accepted fish targets									
Below Sew. Outflow, Bef. removing									
Above Sew. outflow; before fish removing									
Range/run	W30#03a	W30#04a	W30#05a	W30#06a	W30#09b	W30#10a	W30#11a	W30#12a	W30#13a
2-3.	93	45	2	4	3	3	5	9	3
3-4.	78	20	6	3	6	1	4	9	12
4-5.	79	26	42	6	3	5	16	16	9
5-6.	37	70	51	2	6	47	45	9	7
Sampled volume (m ³)									
2-3.	492	395	222	159	228	66.3	195	209	278
3-4.	1060	851	485	340	490	143	420	451	599
4-5.	1860	1490	847	593	855	250	735	788	1050
5-6.	2880	2310	1310	914	1320	388	1140	1220	1620
Fish density (inds/100 m ³)									
2-3.	18.90	11.39	0.90	2.52	1.32	4.52	2.56	4.31	1.08
3-4.	7.36	2.35	1.24	0.88	1.22	0.70	0.95	2.00	2.00
4-5.	4.25	1.74	4.96	1.01	0.35	2.00	2.18	2.03	0.86
5-6.	1.28	3.03	3.89	0.22	0.45	12.11	3.95	0.74	0.43
Total fish	549.00			233.00					
Total volume	14202.00			14451.30					
Average density	3.87			1.61					

Table 5.1 continued

[illegible]

[illegible]

ACOUSTIC ELECTROSHOCKER

Table 5.2

River Wey:

Ts and fish length frequency distributions bellow and above Woking sewage outflow

TS	mm	Bellow Tgts	Above Tgts	Bellow fish	Above fish
-58	46.1	14.00	14.00		
-56	51.9	26.00	18.00		
-54	58.4	20.00	25.00		
-52	65.7	38.00	26.00		
-50	74	43.00	19.00		
-48	83.4	54.00	18.00		
-46	93.9	52.00	22.00		
-44	106	51.00	23.00		
-42	119	38.00	17.00		
-40	134	29.00	14.00		
-38	151	28.00	10.00		
-36	170	22.00	7.00		
-34	191	11.00	2.00		
-32	215	4.00	3.00		
-30	242	1.00	1.00		
-28	273				
-26	307				
-24	346				
	45			14.00	8.00
	53			15.00	4.00
	63			5.00	4.00
	73			14.00	18.00
	83			26.00	9.00
	93			12.00	4.00
	103			10.00	6.00
	113			14.00	5.00
	123			12.00	5.00
	133			5.00	8.00
	143			8.00	9.00
	153			2.00	6.00
	163			1.00	5.00
	173			1.00	5.00
	183			2.00	2.00
	193				6.00
	203				6.00
	213			1.00	3.00
	223				1.00
	233				1.00
	330			1.00	
	340			1.00	
sum		431.00	220.00	144.00	115.00
TS	mm	% frequency			
-58	46.1	3.25	6.36		
-56	51.9	6.03	8.18		
-54	58.4	4.64	11.36		
-52	65.7	8.82	11.82		

Table 5.2 continued

-50	74	9.98	8.64		
-48	83.4	12.53	8.64		
-46	93.9	12.06	10.00		
-44	106	11.83	10.45		
-42	119	8.82	7.73		
-40	134	6.73	6.36		
-38	151	6.50	4.55		
-36	170	5.10	3.18		
-34	191	2.55	0.91		
-32	215	0.93	1.36		
-30	242	0.23	0.45		
-28	273	0.00	0.00		
-26	307	0.00	0.00		
-24	346	0.00	0.00		
	45			9.72	6.96
	53			10.42	3.48
	63			3.47	3.48
	73			9.72	15.65
	83			18.06	7.83
	93			8.33	3.48
	103			6.94	5.22
	113			9.72	4.35
	123			8.33	4.35
	133			3.47	6.96
	143			5.56	7.83
	153			1.39	5.22
	163			0.69	4.35
	173			0.69	4.35
	183			1.39	1.74
	193			0.00	5.22
	203			0.00	5.22
	213			0.69	2.61
	223			0.00	0.87
	233			0.00	0.87
	330			0.69	0.00
	340			0.69	0.00
sum		100.00	100.00	100.00	100.00

RIVER WIZY, JUNE 1991

13 files

W33 02a -

***** TS Version 2.00 *****
Dual Beam Data Reduction Program
For ESP 281 V1.0x & V2.0x data files

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for BioSonics Scientific Hydroacoustic Applications
Serial Number 5205-V2.00-91-000

Reading file D:\ESP_NRA\W33#02A.DAT

Analyzing Run # 1

FILE NUMBER 1 = D:\ESP_NRA\W33#02A.DAT

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 5037

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 3.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	1	2	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	3
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	1

TOTAL NUMBER OF RECORDED ECHOES = 118

NUMBER OF ECHOES USED FOR STATISTICS = 8

AVERAGE BACKSCATTERING CROSS SECTION = .6570E-05 IN dB = -51.82

BACKSCATTERING CROSS SECTION STD DEV = .3264E-05

AVERAGE TARGET STRENGTH IN dB = -52.27

TARGET STRENGTH STD DEV IN dB = 2.10

ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 4

NUMBER OF FISH USED = 8

ESTIMATED VOLUME IN CUBIC METERS = .375E+03
DENSITY IN FISH PER CUBIC METER = .213E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 3.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 0 0 0 2 0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 0
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 0
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 86

NUMBER OF ECHOES USED FOR STATISTICS = 5

AVERAGE BACKSCATTERING CROSS SECTION = .2163E-04 IN dB = -46.65

BACKSCATTERING CROSS SECTION STD DEV = .1917E-04

AVERAGE TARGET STRENGTH IN dB = -48.20

TARGET STRENGTH STD DEV IN dB = 4.21

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 0

NUMBER OF FISH USED = 5
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .807E+03
DENSITY IN FISH PER CUBIC METER = .619E-02
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 4.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 1 2 1 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 2
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 0
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 1

TOTAL NUMBER OF RECORDED ECHOES = 57

NUMBER OF ECHOES USED FOR STATISTICS = 5

AVERAGE BACKSCATTERING CROSS SECTION = .2398E-04 IN dB = -46.20

BACKSCATTERING CROSS SECTION STD DEV = .1775E-04

-47-80

4.95

3

5

6.00

= .141E+04

= .354E-02

$$= 1.0000$$

5.0 TO 6.0

4

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16

0 0 0 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HE

NUMBER OF ECHOES = 0

NUMBER OF ECHOES = 0

NUMBER OF ECHOES = 0

39

2

.4027E-05 IN dB = -53.95

1491E-05

-54.10

1.65

Q

2.

6.00

= .219E+04

$$= .913E-03$$
$$= 1.0000$$

2.0 TO 6.0

DEPTH INTERVALS

FROM	2.00	2.40	2.80	3.20	3.60	4.00	4.40	4.80	5.20	5.60
TO	2.40	2.80	3.20	3.60	4.00	4.40	4.80	5.20	5.60	6.00

75

[illegible]

-60	0	0	0	0	0	0	0	0	0	0	0
-58	0	0	0	0	0	0	0	0	0	0	0
-56	1	0	0	0	0	1	0	0	0	0	1
-54	1	1	0	0	0	0	0	0	0	0	0
-52	3	0	0	1	1	0	0	0	0	0	1
-50	0	1	0	0	0	0	0	0	0	0	0
-48	1	0	0	1	0	1	0	0	0	0	0
-46	0	0	0	0	0	0	2	0	0	0	0
-44	0	0	0	1	0	0	1	0	0	0	0
-42	0	0	0	0	1	0	0	0	0	0	0
-40	0	0	0	0	0	0	0	0	0	0	0
-38	0	0	0	0	0	0	0	0	0	0	0
-36	0	0	0	0	0	0	0	0	0	0	0
-34	0	0	0	0	0	0	0	0	0	0	0
-32	0	0	0	0	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0	0	0	0	0
-28	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	6	2	0	3	2	2	3	0	0	2	2

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 5
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 0
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 2

TOTAL NUMBER OF RECORDED ECHOES = 351

NUMBER OF ECHOES USED FOR STATISTICS = 20

AVERAGE BACKSCATTERING CROSS SECTION = .1443E-04 IN dB = -48.41

BACKSCATTERING CROSS SECTION STD DEV = .1492E-04

AVERAGE TARGET STRENGTH IN dB = -50.32

TARGET STRENGTH STD DEV IN dB = 4.08

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 7

NUMBER OF FISH USED = 20
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .310E+04
DENSITY IN FISH PER CUBIC METER = .645E-02
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

W33 # 13a

***** TS Version 2.00 *****
Dual Beam Data Reduction Program
For ESP 281 V1.0x & V2.0x data files

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for BioSonics Scientific Hydroacoustic Applications
Serial Number 5205-V2.00-91-000

Reading file D:\esp_nra\w33#13a.dat

Analyzing Run # 1

FILE NUMBER 1 = D:\esp_nra\w33#13a.dat

FILE NUMBER 2 = D:\esp_nra\w33#14a.dat

DATA GROUP REPORT FOR TRANSDUCER 1
TOTAL NUMBER OF PINGS = 1014

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 3.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 3 1 0 3 1 0 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB	TO B = 1 dB	NUMBER OF ECHOES =	0
B= 1 dB	TO B = 2 dB	NUMBER OF ECHOES =	1
B= 2 dB	TO B = 3 dB	NUMBER OF ECHOES =	2

TOTAL NUMBER OF RECORDED ECHOES = 13

NUMBER OF ECHOES USED FOR STATISTICS = 12

AVERAGE BACKSCATTERING CROSS SECTION = .2722E-05 IN dB = -55.65

AVERAGE TARGET STRENGTH IN dB =

-57.64

TARGET STRENGTH STD DEV IN dB =

4.66

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 3

NUMBER OF FISH USED = 12
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .723E+02
DENSITY IN FISH PER CUBIC METER = .166E+00
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 3.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 2 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 0
B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 0
B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 4

NUMBER OF ECHOES USED FOR STATISTICS = 3

AVERAGE BACKSCATTERING CROSS SECTION = .1692E-05 IN dB = -57.72

BACKSCATTERING CROSS SECTION STD DEV = .1105E-05

AVERAGE TARGET STRENGTH IN dB = -58.30

TARGET STRENGTH STD DEV IN dB = 2.69

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 0

NUMBER OF FISH USED = 3
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .154E+03
DENSITY IN FISH PER CUBIC METER = .194E-01
EQUIVALENT STRATUM LENGTH (%/100) = .9907

SUMMARY OF DATA FROM DEPTH 4.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 0 1 2 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 0
B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 6
 NUMBER OF ECHOES USED FOR STATISTICS = 4
 AVERAGE BACKSCATTERING CROSS SECTION = .5790E-05 IN dB = -52.37
 BACKSCATTERING CROSS SECTION STD DEV = .4165E-05
 AVERAGE TARGET STRENGTH IN dB = -53.11
 TARGET STRENGTH STD DEV IN dB = 2.83
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 0
 NUMBER OF FISH USED = 4
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .268E+03
 DENSITY IN FISH PER CUBIC METER = .149E-01
 EQUIVALENT STRATUM LENGTH (%/100) = .9819

SUMMARY OF DATA FROM DEPTH 5.0 TO 6.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 0
 B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 0
 B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 3
 NUMBER OF ECHOES USED FOR STATISTICS = 2
 AVERAGE BACKSCATTERING CROSS SECTION = .2658E-05 IN dB = -55.75
 BACKSCATTERING CROSS SECTION STD DEV = .1862E-06
 AVERAGE TARGET STRENGTH IN dB = -55.76
 TARGET STRENGTH STD DEV IN dB = .31
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 0
 NUMBER OF FISH USED = 2
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .412E+03
 DENSITY IN FISH PER CUBIC METER = .486E-02
 EQUIVALENT STRATUM LENGTH (%/100) = .9732

SUMMARY OF DATA FROM DEPTH 2.0 TO 6.0

DEPTH INTERVALS

TS	1.0	2.40	2.80	3.20	3.60	4.00	4.40	4.80	5.20	5.60	6.00	SU
-74	0	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0	0
-64	0	2	1	0	0	0	0	0	0	0	0	3
-62	0	0	1	0	0	0	0	0	0	0	0	1
-60	0	0	1	1	0	0	0	0	0	0	0	2
-58	0	2	1	0	0	0	0	0	0	0	0	3
-56	0	1	0	0	1	0	1	0	1	1	1	5
-54	0	0	0	0	0	0	1	1	0	0	0	2
-52	0	4	0	0	0	0	0	0	0	0	0	4
-50	0	0	0	0	0	0	1	0	0	0	0	1
-48	0	0	0	0	0	0	0	0	0	0	0	0
-46	0	0	0	0	0	0	0	0	0	0	0	0
-44	0	0	0	0	0	0	0	0	0	0	0	0
-42	0	0	0	0	0	0	0	0	0	0	0	0
-40	0	0	0	0	0	0	0	0	0	0	0	0
-38	0	0	0	0	0	0	0	0	0	0	0	0
-36	0	0	0	0	0	0	0	0	0	0	0	0
-34	0	0	0	0	0	0	0	0	0	0	0	0
-32	0	0	0	0	0	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0	0	0	0	0	0
-28	0	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0	0
SUM	0	9	4	1	1	0	3	1	1	1	1	21

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 0
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 1
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 2

TOTAL NUMBER OF RECORDED ECHOES = 29

NUMBER OF ECHOES USED FOR STATISTICS = 21

AVERAGE BACKSCATTERING CROSS SECTION = .3153E-05 IN dB = -55.01

BACKSCATTERING CROSS SECTION STD DEV = .2774E-05

AVERAGE TARGET STRENGTH IN dB = -56.69

TARGET STRENGTH STD DEV IN dB = 4.18

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 3

NUMBER OF FISH USED = 21
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .586E+03
DENSITY IN FISH PER CUBIC METER = .359E-01
EQUIVALENT STRATUM LENGTH (%/100) = .9865

Reading file D:\esp_nra\w33#14a.dat
Analyzing Run # 1
DATA GROUP REPORT FOR TRANSDUCER 1
TOTAL NUMBER OF PINGS =

2002

W33144

SUMMARY OF DATA FROM DEPTH 2.0 TO 3.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	1	0	0	2	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	0
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 27

NUMBER OF ECHOES USED FOR STATISTICS = 7

AVERAGE BACKSCATTERING CROSS SECTION = .1161E-04 IN dB = -49.35

BACKSCATTERING CROSS SECTION STD DEV = .1639E-04

AVERAGE TARGET STRENGTH IN dB = -52.58

TARGET STRENGTH STD DEV IN dB = 5.87

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 0

NUMBER OF FISH USED = 7
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .149E+03
 DENSITY IN FISH PER CUBIC METER = .470E-01
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 3.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	2	1	1	2	1	3	0	0	1	2	0	1	0	0	1	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	2
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	2
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	2

TOTAL NUMBER OF RECORDED ECHOES = 33

NUMBER OF ECHOES USED FOR STATISTICS = 15

AVERAGE BACKSCATTERING CROSS SECTION = .4273E-04 IN dB = -43.6

BACKSCATTERING CROSS SECTION STD DEV = .1010E-03

AVERAGE TARGET STRENGTH IN dB = -51.1

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 6

NUMBER OF FISH USED = 15
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .320E+03
DENSITY IN FISH PER CUBIC METER = .468E-01
EQUIVALENT STRATUM LENGTH (%/100) = .9990

SUMMARY OF DATA FROM DEPTH 4.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 0 1 0 2 0 1 2 0 0 1 1 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 1
B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 1
B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 28
NUMBER OF ECHOES USED FOR STATISTICS = 8
AVERAGE BACKSCATTERING CROSS SECTION = .4247E-04 IN dB = -43.72
BACKSCATTERING CROSS SECTION STD DEV = .5669E-04
AVERAGE TARGET STRENGTH IN dB = -47.34
TARGET STRENGTH STD DEV IN dB = 6.29

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 2

NUMBER OF FISH USED = 8
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .560E+03
DENSITY IN FISH PER CUBIC METER = .143E-01
EQUIVALENT STRATUM LENGTH (%/100) = .9980

SUMMARY OF DATA FROM DEPTH 5.0 TO 6.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 0 0 2 1 1 0 1 3 2 0 2 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 0
B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 1
B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 38

NUMBER OF ECHOES USED FOR STATISTICS = 12
 AVERAGE BACKSCATTERING CROSS SECTION = .4801E-04 IN dB = -43.19
 BACKSCATTERING CROSS SECTION STD DEV = .5246E-04
 AVERAGE TARGET STRENGTH IN dB = -46.05
 TARGET STRENGTH STD DEV IN dB = 5.80
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 1
 NUMBER OF FISH USED = 12
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .868E+03
 DENSITY IN FISH PER CUBIC METER = .138E-01
 EQUIVALENT STRATUM LENGTH (%/100) = .9970

SUMMARY OF DATA FROM DEPTH 2.0 TO 6.0

DEPTH INTERVALS											
FROM	2.00	2.40	2.80	3.20	3.60	4.00	4.40	4.80	5.20	5.60	
TO	2.40	2.80	3.20	3.60	4.00	4.40	4.80	5.20	5.60	6.00	
TS											S
-74	0	0	0	0	0	0	0	0	0	0	
-72	0	0	0	0	0	0	0	0	0	0	
-70	0	0	0	0	0	0	0	0	0	0	
-68	0	0	0	0	0	0	0	0	0	0	
-66	0	0	0	0	0	0	0	0	0	0	
-64	0	0	0	0	0	0	0	0	0	0	
-62	1	0	0	2	0	0	0	0	0	0	
-60	0	0	0	0	1	0	0	0	0	0	
-58	0	0	0	0	1	0	0	0	0	0	
-56	1	0	1	0	2	1	0	0	0	0	
-54	0	0	0	1	0	0	0	1	0	1	
-52	0	0	1	1	2	0	2	0	1	0	
-50	0	1	0	0	0	0	0	1	0	0	
-48	0	0	1	0	0	0	1	0	0	0	
-46	0	0	0	1	0	2	0	0	1	0	
-44	0	1	0	0	2	0	0	0	2	1	
-42	0	0	0	0	0	0	0	1	0	1	
-40	0	0	0	1	0	0	1	0	0	0	
-38	0	0	0	0	0	0	1	0	2	0	
-36	0	0	0	0	0	0	0	0	0	0	
-34	0	0	0	1	0	0	0	0	0	0	
-32	0	0	0	0	0	0	0	0	0	0	
-30	0	0	0	0	0	0	0	0	0	0	
-28	0	0	0	0	0	0	0	0	0	0	
-26	0	0	0	0	0	0	0	0	0	0	
-24	0	0	0	0	0	0	0	0	0	0	
-22	0	0	0	0	0	0	0	0	0	0	
-20	0	0	0	0	0	0	0	0	0	0	
-18	0	0	0	0	0	0	0	0	0	0	
-16	0	0	0	0	0	0	0	0	0	0	
SUM	2	2	3	7	8	3	5	3	6	3	42

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

BEAM 0 dB
 NUMBER OF ECHOES
 NUMBER OF ECHOES

-22	:	0	0	0	0	0	0	0	0	0	0	0	0
-20	:	0	0	0	0	0	0	0	0	0	0	0	0
-18	:	0	0	0	0	0	0	0	0	0	0	0	0
-16	:	0	0	0	0	0	0	0	0	0	0	0	0
SUM		2	2	3	7	8	3	5	3	6	3		42

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 3
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 4
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 2

TOTAL NUMBER OF RECORDED ECHOES = 134

NUMBER OF ECHOES USED FOR STATISTICS = 42

AVERAGE BACKSCATTERING CROSS SECTION = .3900E-04 IN dB = -44.09

BACKSCATTERING CROSS SECTION STD DEV = .7047E-04

AVERAGE TARGET STRENGTH IN dB = -49.29

TARGET STRENGTH STD DEV IN dB = 7.16

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 9

NUMBER OF FISH USED = 42
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .123E+04
 DENSITY IN FISH PER CUBIC METER = .342E-01
 EQUIVALENT STRATUM LENGTH (%/100) = .9985

Reading file D:\esp_nra\W30#03a.dat

Analyzing Run # 1

FILE NUMBER 1 =	D:\esp_nra\W30#03a.dat
FILE NUMBER 2 =	d:\esp_nra\W30#04a.dat
FILE NUMBER 3 =	d:\esp_nra\W30#05a.dat
FILE NUMBER 4 =	d:\esp_nra\W30#06a.dat
FILE NUMBER 5 =	d:\esp_nra\W30#09b.dat
FILE NUMBER 6 =	d:\esp_nra\W30#10a.dat
FILE NUMBER 7 =	d:\esp_nra\W30#11a.dat
FILE NUMBER 8 =	d:\esp_nra\W30#12a.dat
FILE NUMBER 9 =	d:\esp_nra\W30#13A.DAT
FILE NUMBER 10 =	D:\ESP_NRA\W31#05A.DAT

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 6594

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 3.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	3	4	3	11	7	6	14	12	10	9	7	4	1	2	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB	NUMBER OF ECHOES =	7
B= 1 dB TO B= 2 dB	NUMBER OF ECHOES =	6
B= 2 dB TO B= 3 dB	NUMBER OF ECHOES =	6

TOTAL NUMBER OF RECORDED ECHOES = 213

NUMBER OF ECHOES USED FOR STATISTICS = 93

AVERAGE BACKSCATTERING CROSS SECTION = .2654E-04 IN dB = -45.76

BACKSCATTERING CROSS SECTION STD DEV = .3933E-04

AVERAGE TARGET STRENGTH IN dB = -49.50

TARGET STRENGTH STD DEV IN dB = 6.10

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 19

NUMBER OF FISH USED = 93

FULL ANGLE OF CONE = 6.00

SUMMARY OF DATA FROM DEPTH 3.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	4	3	3	5	8	8	11	15	6	7	3	2	3	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	7
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	5
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	9

TOTAL NUMBER OF RECORDED ECHOES =	197
NUMBER OF ECHOES USED FOR STATISTICS =	78
AVERAGE BACKSCATTERING CROSS SECTION =	.3600E-04 IN dB = -44.44
BACKSCATTERING CROSS SECTION STD DEV =	.5587E-04
AVERAGE TARGET STRENGTH IN dB =	-48.01
TARGET STRENGTH STD DEV IN dB =	5.81
# ECHOES WITH BEAM PATTERN FACTORS > 0 dB=	21
NUMBER OF FISH USED =	78
FULL ANGLE OF CONE =	6.00
ESTIMATED VOLUME IN CUBIC METERS =	.106E+04
DENSITY IN FISH PER CUBIC METER =	.736E-01
EQUIVALENT STRATUM LENGTH (%/100) =	1.0000

SUMMARY OF DATA FROM DEPTH 4.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	1	1	2	9	4	9	8	11	5	10	5	8	4	2	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	2
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	1
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	4

TOTAL NUMBER OF RECORDED ECHOES =	227
NUMBER OF ECHOES USED FOR STATISTICS =	79
AVERAGE BACKSCATTERING CROSS SECTION =	.9747E-04 IN dB = -40.11
BACKSCATTERING CROSS SECTION STD DEV =	.1364E-03
AVERAGE TARGET STRENGTH IN dB =	-43.85
TARGET STRENGTH STD DEV IN dB =	6.11

TARGET STRENGTH STD DEV IN dB =

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 7

NUMBER OF FISH USED = 79
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .186E+04
DENSITY IN FISH PER CUBIC METER = .426E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 5.0 TO 6.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 0 2 3 3 3 5 5 2 2 5 3 3 1 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 8
B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 3
B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 177

NUMBER OF ECHOES USED FOR STATISTICS = 37

AVERAGE BACKSCATTERING CROSS SECTION = .1103E-03 IN dB = -39.57

BACKSCATTERING CROSS SECTION STD DEV = .1449E-03

AVERAGE TARGET STRENGTH IN dB = -43.37

TARGET STRENGTH STD DEV IN dB = 6.22

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 11

NUMBER OF FISH USED = 37
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .288E+04
DENSITY IN FISH PER CUBIC METER = .129E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 2.0 TO 6.0

DEPTH INTERVALS

	FROM TO	2.00 2.40	2.40 2.80	2.80 3.20	3.20 3.60	3.60 4.00	4.00 4.40	4.40 4.80	4.80 5.20	5.20 5.60	5.60 6.00	SI
TS												
-74	:	0	0	0	0	0	0	0	0	0	0	:
-72	:	0	0	0	0	0	0	0	0	0	0	:
-70	:	0	0	0	0	0	0	0	0	0	0	:
-68	:	0	0	0	0	0	0	0	0	0	0	:
-66	:	0	0	0	0	0	0	0	0	0	0	:
-64	:	0	0	0	0	0	0	0	0	0	0	:
-62	:	3	0	0	0	0	0	0	0	0	0	:
-60	:	2	1	1	3	1	0	0	0	0	0	:
--	:	2	1	2	1	0	0	1	0	0	0	:

-50	:	3	6	10	2	1	2	2	0	2	1	26
-48	:	4	7	8	4	0	3	4	4	1	0	29
-46	:	3	5	12	4	1	4	3	2	2	2	35
-44	:	1	6	7	0	1	2	6	3	1	4	38
-42	:	0	5	8	0	1	3	2	1	0	1	31
-40	:	1	1	2	1	2	4	5	1	0	2	21
-38	:	0	0	3	0	0	3	0	2	1	4	19
-36	:	0	0	3	0	2	1	5	2	0	3	13
-34	:	0	0	0	0	0	1	2	1	2	1	16
-32	:	0	0	0	0	0	0	1	1	0	1	7
-30	:	0	0	0	0	0	0	0	0	0	0	3
-28	:	0	0	0	0	0	0	0	0	0	0	0
-26	:	0	0	0	0	0	0	0	0	0	0	0
-24	:	0	0	0	0	0	0	0	0	0	0	0
-22	:	0	0	0	0	0	0	0	0	0	0	0
-20	:	0	0	0	0	0	0	0	0	0	0	0
-18	:	0	0	0	0	0	0	0	0	0	0	0
-16	:	0	0	0	0	0	0	0	0	0	0	0

SUM	:	27	42	70	21	11	26	39	20	10	21	287

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 24
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 15
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 19

TOTAL NUMBER OF RECORDED ECHOES = 834

NUMBER OF ECHOES USED FOR STATISTICS = 287

AVERAGE BACKSCATTERING CROSS SECTION = .5943E-04 IN dB = -42.26

BACKSCATTERING CROSS SECTION STD DEV = .1015E-03

AVERAGE TARGET STRENGTH IN dB = -46.75

TARGET STRENGTH STD DEV IN dB = 6.54

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 58

NUMBER OF FISH USED = 287

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .407E+04

DENSITY IN FISH PER CUBIC METER = .705E-01

EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

Reading file d:\esp_nra\W30#04a.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 5302

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 3.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 1 1 4 0 2 5 8 3 7 5 4 2 1 1 0 1 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	5
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	5
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	4

TOTAL NUMBER OF RECORDED ECHOES =	144
NUMBER OF ECHOES USED FOR STATISTICS =	45
AVERAGE BACKSCATTERING CROSS SECTION =	.7009E-04 IN dB = -41.54
BACKSCATTERING CROSS SECTION STD DEV =	.1381E-03
AVERAGE TARGET STRENGTH IN dB =	-45.97
TARGET STRENGTH STD DEV IN dB =	6.39
# ECHOES WITH BEAM PATTERN FACTORS > 0 dB=	14

NUMBER OF FISH USED =	45
FULL ANGLE OF CONE =	6.00
ESTIMATED VOLUME IN CUBIC METERS =	.395E+03
DENSITY IN FISH PER CUBIC METER =	.114E+00
EQUIVALENT STRATUM LENGTH (%/100) =	1.0000

SUMMARY OF DATA FROM DEPTH 3.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	1	3	1	3	3	1	2	1	0	0	2	2	1	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	2
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	2
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES =	117
NUMBER OF ECHOES USED FOR STATISTICS =	20
AVERAGE BACKSCATTERING CROSS SECTION =	.6362E-04 IN dB = -41.96
BACKSCATTERING CROSS SECTION STD DEV =	.1024E-03
AVERAGE TARGET STRENGTH IN dB =	-47.88
TARGET STRENGTH STD DEV IN dB =	7.52
# ECHOES WITH BEAM PATTERN FACTORS > 0 dB=	4

NUMBER OF FISH USED =	20
FULL ANGLE OF CONE =	6.00
ESTIMATED VOLUME IN CUBIC METERS =	.851E+03
DENSITY IN FISH PER CUBIC METER =	.235E-01
EQUIVALENT STRATUM LENGTH (%/100) =	.9998

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	4	3	1	4	1	1	3	4	3	1	1	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	3
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	1
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	1

TOTAL NUMBER OF RECORDED ECHOES = 98

NUMBER OF ECHOES USED FOR STATISTICS = 26

AVERAGE BACKSCATTERING CROSS SECTION = .2887E-04 IN dB = -45.40

BACKSCATTERING CROSS SECTION STD DEV = .3529E-04

AVERAGE TARGET STRENGTH IN dB = -49.18

TARGET STRENGTH STD DEV IN dB = 6.39

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 5

NUMBER OF FISH USED = 26
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .149E+04
 DENSITY IN FISH PER CUBIC METER = .175E-01
 EQUIVALENT STRATUM LENGTH (%/100) = .9996

SUMMARY OF DATA FROM DEPTH 5.0 TO 6.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	1	1	2	7	5	9	6	9	9	5	10	3	2	1	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	9
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	8
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	4

TOTAL NUMBER OF RECORDED ECHOES = 287

NUMBER OF ECHOES USED FOR STATISTICS = 70

AVERAGE BACKSCATTERING CROSS SECTION = .7772E-04 IN dB = -41.09

BACKSCATTERING CROSS SECTION STD DEV = .1054E-03

AVERAGE TARGET STRENGTH IN dB = -44.50

TARGET STRENGTH STD DEV IN dB = 5.87

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 21

NUMBER OF FISH USED = 70
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .074E+04

ESTIMATED VOLUME IN CUBIC METERS = .231E+04
 DENSITY IN FISH PER CUBIC METER = .303E-01
 EQUIVALENT STRATUM LENGTH (%/100) = .9994

SUMMARY OF DATA FROM DEPTH 2.0 TO 6.0

DEPTH INTERVALS

FROM TO	2.00 2.40	2.40 2.80	2.80 3.20	3.20 3.60	3.60 4.00	4.00 4.40	4.40 4.80	4.80 5.20	5.20 5.60	5.60 6.00	SUM
TS											
-74	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	1	0	0	0	0	0	0	0	0	0	1
-58	0	1	1	0	0	0	3	2	0	0	7
-56	2	1	1	3	0	1	2	0	1	0	11
-54	0	0	0	1	0	1	0	0	1	1	4
-52	0	2	1	2	0	2	2	0	3	4	16
-50	2	3	0	1	2	1	0	1	2	2	14
-48	1	6	1	1	0	0	0	2	3	5	19
-46	0	0	3	2	0	1	1	1	1	5	14
-44	3	2	2	1	0	0	1	4	1	7	21
-42	1	3	1	0	0	0	1	2	2	7	17
-40	2	1	1	0	0	0	0	1	2	3	10
-38	0	2	1	1	0	0	0	1	1	9	15
-36	0	1	0	1	1	0	0	0	0	3	6
-34	0	0	1	1	0	0	0	0	0	2	4
-32	0	0	0	0	0	0	0	0	0	1	1
-30	0	1	0	0	0	0	0	0	0	0	1
-28	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	12	23	13	14	3	6	10	14	17	49	161

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 19
 B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 16
 B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 9

TOTAL NUMBER OF RECORDED ECHOES = 715

NUMBER OF ECHOES USED FOR STATISTICS = 161

AVERAGE BACKSCATTERING CROSS SECTION = .6594E-04 IN dB = -41.81

BACKSCATTERING CROSS SECTION STD DEV = .1085E-03

AVERAGE TARGET STRENGTH IN dB = -46.09

TARGET STRENGTH STD DEV IN dB = 6.50

ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .327E+04
DENSITY IN FISH PER CUBIC METER = .493E-01
EQUIVALENT STRATUM LENGTH (%/100) = .9997

Reading file d:\esp_nra\W30#05a.dat
Analyzing Run # 1
DATA GROUP REPORT FOR TRANSDUCER 1
TOTAL NUMBER OF PINGS =

3043

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 3.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 1 1 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 0
B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 1
B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 1

TOTAL NUMBER OF RECORDED ECHOES = 8

NUMBER OF ECHOES USED FOR STATISTICS = 2

AVERAGE BACKSCATTERING CROSS SECTION = .8067E-06 IN dB = -60.93

BACKSCATTERING CROSS SECTION STD DEV = .2438E-06

AVERAGE TARGET STRENGTH IN dB = -61.03

TARGET STRENGTH STD DEV IN dB = 1.33

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 2

NUMBER OF FISH USED = 2
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .226E+03
DENSITY IN FISH PER CUBIC METER = .885E-02
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 3.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 1 1 0 0 0 2 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 1

B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	3

TOTAL NUMBER OF RECORDED ECHOES = 20
 NUMBER OF ECHOES USED FOR STATISTICS = 6
 AVERAGE BACKSCATTERING CROSS SECTION = .1043E-04 IN dB = -49.82
 BACKSCATTERING CROSS SECTION STD DEV = .1435E-04
 AVERAGE TARGET STRENGTH IN dB = -53.40
 TARGET STRENGTH STD DEV IN dB = 6.62
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 4
 NUMBER OF FISH USED = 6
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .485E+03
 DENSITY IN FISH PER CUBIC METER = .124E-01
 EQUIVALENT STRATUM LENGTH (%/100) = .9970

SUMMARY OF DATA FROM DEPTH 4.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	1	3	1	4	4	4	5	7	3	6	1	2	1	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	5
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	4
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	3

TOTAL NUMBER OF RECORDED ECHOES = 105
 NUMBER OF ECHOES USED FOR STATISTICS = 42
 AVERAGE BACKSCATTERING CROSS SECTION = .5303E-04 IN dB = -42.75
 BACKSCATTERING CROSS SECTION STD DEV = .7093E-04
 AVERAGE TARGET STRENGTH IN dB = -46.06
 TARGET STRENGTH STD DEV IN dB = 5.86
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 12
 NUMBER OF FISH USED = 42
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .847E+03
 DENSITY IN FISH PER CUBIC METER = .496E-01
 EQUIVALENT STRATUM LENGTH (%/100) = .9940

SUMMARY OF DATA FROM DEPTH 5.0 TO 6.0

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	4
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	3
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	4

SUMMARY OF DATA FROM DEPTH 2.0 TO 6.0

[illegible]

-20	0	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0	0
SUM	0	2	1	1	4	3	31	12	33	15	102	

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 10
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 8
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 11

TOTAL NUMBER OF RECORDED ECHOES = 338

NUMBER OF ECHOES USED FOR STATISTICS = 102

AVERAGE BACKSCATTERING CROSS SECTION = .6070E-03 IN dB = -32.17

BACKSCATTERING CROSS SECTION STD DEV = .1160E-02

AVERAGE TARGET STRENGTH IN dB = -40.16

TARGET STRENGTH STD DEV IN dB = 9.78

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 29

NUMBER OF FISH USED = 102
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .186E+04
 DENSITY IN FISH PER CUBIC METER = .549E-01
 EQUIVALENT STRATUM LENGTH (%/100) = .9955

Reading file d:\esp_nra\W30#06a.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 2171

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 3.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 3 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	2
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 12

NUMBER OF ECHOES USED FOR STATISTICS = 4

AVERAGE BACKSCATTERING CROSS SECTION = .1933E-05 IN dB = -57.14

BACKSCATTERING CROSS SECTION STD DEV = .1572E-05

AVERAGE TARGET STRENGTH IN dB = -57.97

TARGET STRENGTH STD DEV IN dB = 2.87

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 2

NUMBER OF FISH USED = 4

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .159E+03

DENSITY IN FISH PER CUBIC METER = .252E-01

EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 3.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	0
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	2

TOTAL NUMBER OF RECORDED ECHOES = 9

NUMBER OF ECHOES USED FOR STATISTICS = 3

AVERAGE BACKSCATTERING CROSS SECTION = .2419E-05 IN dB = -56.16

BACKSCATTERING CROSS SECTION STD DEV = .1956E-05

AVERAGE TARGET STRENGTH IN dB = -57.08

TARGET STRENGTH STD DEV IN dB = 3.38

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 2

NUMBER OF FISH USED = 3

FULL ANGLE OF CONE = 6.00

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AVERAGE BACKSCATTERING CROSS SECTION =          .2419E-05      IN dB = -56.16
BACKSCATTERING CROSS SECTION STD DEV =          .1956E-05
AVERAGE TARGET STRENGTH IN dB =                                     -57.08
TARGET STRENGTH STD DEV IN dB =                                     3.38
# ECHOES WITH BEAM PATTERN FACTORS > 0 dB=          2
NUMBER OF FISH USED =          3
FULL ANGLE OF CONE =          6.00
ESTIMATED VOLUME IN CUBIC METERS = .340E+03
DENSITY IN FISH PER CUBIC METER = .881E-02
EQUIVALENT STRATUM LENGTH (%/100) =          .9944

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SUMMARY OF DATA FROM DEPTH 4.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

[illegible]

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B = 0 dB	TO B = 1 dB	NUMBER OF ECHOES = 2
B = 1 dB	TO B = 2 dB	NUMBER OF ECHOES = 1
B = 2 dB	TO B = 3 dB	NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 25

NUMBER OF ECHOES USED FOR STATISTICS = 6

AVERAGE BACKSCATTERING CROSS SECTION = .4619E-05 IN dB = -53.35

BACKSCATTERING CROSS SECTION STD DEV = .2579E-05

AVERAGE TARGET STRENGTH IN dB = -54.07

TARGET STRENGTH STD DEV IN dB = 2.88

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 3

NUMBER OF FISH USED =	6
FULL ANGLE OF CONE =	6.00
ESTIMATED VOLUME IN CUBIC METERS =	.593E+03
DENSITY IN FISH PER CUBIC METER =	.101E-01
EQUIVALENT STRATUM LENGTH (%/100) =	.9890

SUMMARY OF DATA FROM DEPTH 5.0 TO 6.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

[illegible]

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 0
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 0
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 6
 NUMBER OF ECHOES USED FOR STATISTICS = 2
 AVERAGE BACKSCATTERING CROSS SECTION = .7694E-05 IN dB = -51.14
 BACKSCATTERING CROSS SECTION STD DEV = .1231E-05
 AVERAGE TARGET STRENGTH IN dB = -51.17
 TARGET STRENGTH STD DEV IN dB = .70
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 0

NUMBER OF FISH USED = 2
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .914E+03
 DENSITY IN FISH PER CUBIC METER = .219E-02
 EQUIVALENT STRATUM LENGTH (%/100) = .9835

SUMMARY OF DATA FROM DEPTH 2.0 TO 6.0

DEPTH INTERVALS											
FROM	2.00	2.40	2.80	3.20	3.60	4.00	4.40	4.80	5.20	5.60	
TO	2.40	2.80	3.20	3.60	4.00	4.40	4.80	5.20	5.60	6.00	
TS											SU
-74	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	1	0	3	0	0	0	0	0	0	0	0
-58	0	0	1	0	0	0	0	1	0	0	0
-56	0	0	0	0	0	1	0	0	0	0	0
-54	1	0	1	0	0	1	0	0	0	0	0
-52	0	0	0	0	0	3	0	1	0	0	0
-50	0	0	0	0	0	0	0	0	1	0	0
-48	0	0	0	0	0	0	0	0	0	0	0
-46	0	0	0	0	0	0	0	0	0	0	0
-44	0	0	0	0	0	0	0	0	0	0	0
-42	0	0	0	0	0	0	0	0	0	0	0
-40	0	0	0	0	0	0	0	0	0	0	0
-38	0	0	0	0	0	0	0	0	0	0	0
-36	0	0	0	0	0	0	0	0	0	0	0
-34	0	0	0	0	0	0	0	0	0	0	0
-32	0	0	0	0	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0	0	0	0	0
-28	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	2	0	5	0	0	5	0	2	1	0	15

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	4
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	1
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	2

TOTAL NUMBER OF RECORDED ECHOES = 55

NUMBER OF ECHOES USED FOR STATISTICS = 15

AVERAGE BACKSCATTERING CROSS SECTION = .3873E-05 IN dB = -54.12

BACKSCATTERING CROSS SECTION STD DEV = .2723E-05

AVERAGE TARGET STRENGTH IN dB = -55.32

TARGET STRENGTH STD DEV IN dB = 3.49

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 7

NUMBER OF FISH USED = 15
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .130E+04
 DENSITY IN FISH PER CUBIC METER = .116E-01
 EQUIVALENT STRATUM LENGTH (%/100) = .9917

Reading file d:\esp_nra\W30#06a.dat

Analyzing Run # 2

Reading file d:\esp_nra\W30#09b.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF FINGS = 3058

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 3.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	0
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	1
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 19

NUMBER OF ECHOES USED FOR STATISTICS = 3

AVERAGE BACKSCATTERING CROSS SECTION = .2297E-05 IN dB = -56.39

BACKSCATTERING CROSS SECTION STD DEV = .5921E-06

AVERAGE TARGET STRENGTH IN dB = -56.48

TARGET STRENGTH STD DEV IN dB = 1.11

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 1

----- FOR STATISTICS =

NUMBER OF FISH USED = 3
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .228E+03
 DENSITY IN FISH PER CUBIC METER = .132E-01
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

 SUMMARY OF DATA FROM DEPTH 3.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 0 2 1 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 2
 B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 1
 B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 24
 NUMBER OF ECHOES USED FOR STATISTICS = 6
 AVERAGE BACKSCATTERING CROSS SECTION = .3910E-05 IN dB = -54.08
 BACKSCATTERING CROSS SECTION STD DEV = .2783E-05
 AVERAGE TARGET STRENGTH IN dB = -55.15
 TARGET STRENGTH STD DEV IN dB = 3.46
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 3

NUMBER OF FISH USED = 6
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .490E+03
 DENSITY IN FISH PER CUBIC METER = .123E-01
 EQUIVALENT STRATUM LENGTH (%/100) = .9985

 SUMMARY OF DATA FROM DEPTH 4.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 0 1 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 0
 B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 2
 B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 14
 NUMBER OF ECHOES USED FOR STATISTICS = 3

[illegible]

	1	0	0	0	2	0	0	0	0	0	0
-54	2	0	0	0	1	0	0	1	0	0	0
-52	0	0	0	0	1	0	1	0	0	0	0
-50	0	0	0	0	0	0	1	1	0	0	0
-48	0	0	0	0	0	0	0	0	0	1	1
-46	0	0	0	0	0	0	0	0	0	0	1
-44	0	0	0	0	0	0	0	0	0	0	1
-42	0	0	0	0	0	0	0	0	0	0	0
-40	0	0	0	0	0	0	0	0	0	0	0
-38	0	0	0	0	0	0	0	0	0	0	0
-36	0	0	0	0	0	0	0	0	0	0	0
-34	0	0	0	0	0	0	0	0	0	0	0
-32	0	0	0	0	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0	0	0	0	0
-28	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0

SUM	3	0	0	0	6	0	2	2	1	5
-----	---	---	---	---	---	---	---	---	---	---

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB	NUMBER OF ECHOES =	2
B= 1 dB TO B= 2 dB	NUMBER OF ECHOES =	4
B= 2 dB TO B= 3 dB	NUMBER OF ECHOES =	1

TOTAL NUMBER OF RECORDED ECHOES = 506

NUMBER OF ECHOES USED FOR STATISTICS = 19

AVERAGE BACKSCATTERING CROSS SECTION = .8074E-05 IN dB = -50.93

BACKSCATTERING CROSS SECTION STD DEV = .8970E-05

AVERAGE TARGET STRENGTH IN dB = -52.84

TARGET STRENGTH STD DEV IN dB = 4.08

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 7

NUMBER OF FISH USED =	19
FULL ANGLE OF CONE =	6.00
ESTIMATED VOLUME IN CUBIC METERS =	.188E+04
DENSITY IN FISH PER CUBIC METER =	.101E-01
EQUIVALENT STRATUM LENGTH (%/100) =	.9978

Reading file d:\esp_nra\W30#10a.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 894

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 3.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 1 1 1 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 0
B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 2
B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 7

NUMBER OF ECHOES USED FOR STATISTICS = 3

AVERAGE BACKSCATTERING CROSS SECTION = .1077E-05 IN dB = -59.68

BACKSCATTERING CROSS SECTION STD DEV = .5171E-06

AVERAGE TARGET STRENGTH IN dB = -60.06

TARGET STRENGTH STD DEV IN dB = 2.30

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 2

NUMBER OF FISH USED = 3
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .663E+02
DENSITY IN FISH PER CUBIC METER = .452E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 3.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 0
B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 0
B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 24

NUMBER OF ECHOES USED FOR STATISTICS = 1

AVERAGE BACKSCATTERING CROSS SECTION = .1269E-04 IN dB = -48.96

BACKSCATTERING CROSS SECTION STD DEV = .0000E+00

AVERAGE TARGET STRENGTH IN dB = -48.96

TARGET STRENGTH STD DEV IN dB = .00

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 0

EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 4.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 0 0 2 0 1 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 1
B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 0
B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 19
NUMBER OF ECHOES USED FOR STATISTICS = 5
AVERAGE BACKSCATTERING CROSS SECTION = .3075E-04 IN dB = -45.12
BACKSCATTERING CROSS SECTION STD DEV = .3465E-04
AVERAGE TARGET STRENGTH IN dB = -48.22
TARGET STRENGTH STD DEV IN dB = 6.06
ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 1
NUMBER OF FISH USED = 5
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .250E+03
DENSITY IN FISH PER CUBIC METER = .200E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 5.0 TO 6.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 0 0 3 1 1 2 7 8 6 8 4 2 1 3 1 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 11
B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 2
B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 1

TOTAL NUMBER OF RECORDED ECHOES = 90
NUMBER OF ECHOES USED FOR STATISTICS = 47
AVERAGE BACKSCATTERING CROSS SECTION = .1310E-03 IN dB = -38.83
BACKSCATTERING CROSS SECTION STD DEV = .2003E-03
AVERAGE TARGET STRENGTH IN dB =

TARGET STRENGTH STD DEV IN dB =

5.60

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 14

NUMBER OF FISH USED = 47
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .388E+03
 DENSITY IN FISH PER CUBIC METER = .121E+00
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 2.0 TO 6.0

DEPTH INTERVALS											
FROM	2.00	2.40	2.80	3.20	3.60	4.00	4.40	4.80	5.20	5.60	
TO	2.40	2.80	3.20	3.60	4.00	4.40	4.80	5.20	5.60	6.00	
TS											SI
-74	:	0	0	0	0	0	0	0	0	0	0
-72	:	0	0	0	0	0	0	0	0	0	0
-70	:	0	0	0	0	0	0	0	0	0	0
-68	:	0	0	0	0	0	0	0	0	0	0
-66	:	0	0	0	0	0	0	0	0	0	0
-64	:	0	0	0	0	0	0	0	0	0	0
-62	:	1	0	0	0	0	0	0	0	0	1
-60	:	0	1	0	0	0	0	0	0	0	1
-58	:	0	0	1	0	0	0	0	0	0	1
-56	:	0	0	0	0	0	0	0	0	0	0
-54	:	0	0	0	0	0	1	1	1	1	5
-52	:	0	0	0	0	0	0	1	0	0	1
-50	:	0	0	0	0	0	0	1	0	1	2
-48	:	0	0	1	0	0	0	1	1	0	3
-46	:	0	0	0	0	0	0	2	1	4	7
-44	:	0	0	0	0	0	0	2	4	2	8
-42	:	0	0	0	0	0	1	2	0	5	8
-40	:	0	0	0	0	0	0	1	2	5	8
-38	:	0	0	0	0	0	0	1	1	4	6
-36	:	0	0	0	0	0	0	1	1	0	2
-34	:	0	0	0	0	0	0	0	1	0	1
-32	:	0	0	0	0	0	0	2	1	0	3
-30	:	0	0	0	0	0	0	0	1	0	1
-28	:	0	0	0	0	0	0	0	0	0	0
-26	:	0	0	0	0	0	0	0	0	0	0
-24	:	0	0	0	0	0	0	0	0	0	0
-22	:	0	0	0	0	0	0	0	0	0	0
-20	:	0	0	0	0	0	0	0	0	0	0
-18	:	0	0	0	0	0	0	0	0	0	0
-16	:	0	0	0	0	0	0	0	0	0	0
SUM		1	1	2	0	0	1	2	15	14	58

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 13
 B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 4
 B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 1

TOTAL NUMBER OF RECORDED ECHOES = 304

NUMBER OF ECHOES USED FOR STATISTICS = 58

AVERAGE BACKSCATTER COEFFICIENT = 1.0000

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16 -14 -12 -10 -8 -6 -4 -2 0 11-

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 1
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 1
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 1

TOTAL NUMBER OF RECORDED ECHOES = 16

NUMBER OF ECHOES USED FOR STATISTICS = 4

AVERAGE BACKSCATTERING CROSS SECTION = .1581E-05 IN dB = -58.01

BACKSCATTERING CROSS SECTION STD DEV = .1353E-05

AVERAGE TARGET STRENGTH IN dB = -58.98

TARGET STRENGTH STD DEV IN dB = 3.15

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 3

NUMBER OF FISH USED = 4
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .420E+03
 DENSITY IN FISH PER CUBIC METER = .952E-02
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 4.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 0 0 0 2 3 5 2 0 1 2 0 1 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 0
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 2
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 42

NUMBER OF ECHOES USED FOR STATISTICS = 16

AVERAGE BACKSCATTERING CROSS SECTION = .2565E-04 IN dB = -45.91

BACKSCATTERING CROSS SECTION STD DEV = .3472E-04

AVERAGE TARGET STRENGTH IN dB = -48.52

TARGET STRENGTH STD DEV IN dB = 4.51

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 2

NUMBER OF FISH USED = 16
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .735E+03
 DENSITY IN FISH PER CUBIC METER = .218E-01
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

-30	:	0	0	0	0	0	0	0	0	0	0	0	0
-28	:	0	0	0	0	0	0	0	0	0	0	0	0
-26	:	0	0	0	0	0	0	0	0	0	0	0	0
-24	:	0	0	0	0	0	0	0	0	0	0	0	0
-22	:	0	0	0	0	0	0	0	0	0	0	0	0
-20	:	0	0	0	0	0	0	0	0	0	0	0	0
-18	:	0	0	0	0	0	0	0	0	0	0	0	0
-16	:	0	0	0	0	0	0	0	0	0	0	0	0

SUM		3	0	4	2	0	3	9	5	24	21	71	

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 4
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 5
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 3

TOTAL NUMBER OF RECORDED ECHOES = 322

NUMBER OF ECHOES USED FOR STATISTICS = 71

AVERAGE BACKSCATTERING CROSS SECTION = .5056E-04 IN dB = -42.96

BACKSCATTERING CROSS SECTION STD DEV = .8036E-04

AVERAGE TARGET STRENGTH IN dB = -47.39

TARGET STRENGTH STD DEV IN dB = 6.77

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 12

NUMBER OF FISH USED = 71
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .161E+04
 DENSITY IN FISH PER CUBIC METER = .440E-01
 EQUIVALENT STRATUM LENGTH (%/100) = .9999

Reading file d:\esp_nra\W30#12a.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 2834

N DATA FOR FREQUENCY 420.

----- SUMMARY OF DATA FROM DEPTH 2.0 TO 3.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 1 2 3 1 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 0
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 1
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 1

TOTAL NUMBER OF RECORDED ECHOES = 48

AVERAGE BACKSCATTERING CROSS SECTION = .9954E-05 IN dB = -50.
 BACKSCATTERING CROSS SECTION STD DEV = .2018E-04
 AVERAGE TARGET STRENGTH IN dB = -54.
 TARGET STRENGTH STD DEV IN dB = 5.
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 2
 NUMBER OF FISH USED = 9
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .209E+03
 DENSITY IN FISH PER CUBIC METER = .430E-01
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 3.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	1	2	3	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B	0 dB TO B	B	1 dB TO B	B	2 dB TO B	B	3 dB TO B	NUMBER OF ECHOES
B	0 dB	TO B	1 dB	NUMBER OF ECHOES	1			
B	1 dB	TO B	2 dB	NUMBER OF ECHOES	1			
B	2 dB	TO B	3 dB	NUMBER OF ECHOES	1			

TOTAL NUMBER OF RECORDED ECHOES = 40
 NUMBER OF ECHOES USED FOR STATISTICS = 9
 AVERAGE BACKSCATTERING CROSS SECTION = .1026E-04 IN dB = -49.
 BACKSCATTERING CROSS SECTION STD DEV = .1656E-04
 AVERAGE TARGET STRENGTH IN dB = -54.
 TARGET STRENGTH STD DEV IN dB = 5.
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 3
 NUMBER OF FISH USED = 9
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .451E+03
 DENSITY IN FISH PER CUBIC METER = .200E-01
 EQUIVALENT STRATUM LENGTH (%/100) = .9989

SUMMARY OF DATA FROM DEPTH 4.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	1	1	4	1	1	5	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	3
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	2

TOTAL NUMBER OF RECORDED ECHOES = 46

NUMBER OF ECHOES USED FOR STATISTICS = 16

AVERAGE BACKSCATTERING CROSS SECTION = .2300E-04 IN dB = -46.1

BACKSCATTERING CROSS SECTION STD DEV = .2710E-04

AVERAGE TARGET STRENGTH IN dB = -48.5

TARGET STRENGTH STD DEV IN dB = 4.5

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 5

NUMBER OF FISH USED = 16
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .788E+03
 DENSITY IN FISH PER CUBIC METER = .203E-01
 EQUIVALENT STRATUM LENGTH (%/100) = .9980

SUMMARY OF DATA FROM DEPTH 5.0 TO 6.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 0 1 2 2 0 0 1 0 1 0 1 1 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	2
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	2
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	1

TOTAL NUMBER OF RECORDED ECHOES = 40

NUMBER OF ECHOES USED FOR STATISTICS = 9

AVERAGE BACKSCATTERING CROSS SECTION = .3564E-04 IN dB = -44.48

BACKSCATTERING CROSS SECTION STD DEV = .5112E-04

AVERAGE TARGET STRENGTH IN dB = -49.61

TARGET STRENGTH STD DEV IN dB = 7.46

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 5

NUMBER OF FISH USED = 9
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .122E+04
 DENSITY IN FISH PER CUBIC METER = .737E-02
 EQUIVALENT STRATUM LENGTH (%/100) = .9971

SUMMARY OF DATA FROM DEPTH

	FROM TO	2.00 2.40	2.40 2.80	2.80 3.20	3.20 3.60	3.60 4.00	4.00 4.40	4.40 4.80	4.80 5.20	5.20 5.60	5.60 6.00	SUM
TS												
-74	:	0	0	0	0	0	0	0	0	0	0	0
-72	:	0	0	0	0	0	0	0	0	0	0	0
-70	:	0	0	0	0	0	0	0	0	0	0	0
-68	:	0	0	0	0	0	0	0	0	0	0	0
-66	:	0	0	0	0	0	0	0	0	0	0	0
-64	:	0	0	0	0	0	0	0	0	0	0	0
-62	:	0	0	0	0	0	0	0	0	0	0	0
-60	:	1	0	0	1	0	0	0	0	0	0	2
-58	:	0	2	1	1	0	0	0	1	0	0	5
-56	:	0	1	2	1	2	1	0	0	2	0	9
-54	:	1	0	0	0	1	0	1	0	1	1	5
-52	:	0	0	0	0	0	1	2	1	0	0	4
-50	:	0	1	0	0	0	0	1	0	0	0	2
-48	:	0	0	0	0	0	0	1	0	1	0	2
-46	:	0	0	0	1	0	2	2	1	0	0	6
-44	:	0	0	0	1	0	1	0	1	1	0	4
-42	:	0	0	1	0	0	0	0	0	0	0	1
-40	:	0	0	0	0	0	0	0	1	1	0	2
-38	:	0	0	0	0	0	0	0	1	0	0	1
-36	:	0	0	0	0	0	0	0	0	0	0	0
-34	:	0	0	0	0	0	0	0	0	0	0	0
-32	:	0	0	0	0	0	0	0	0	0	0	0
-30	:	0	0	0	0	0	0	0	0	0	0	0
-28	:	0	0	0	0	0	0	0	0	0	0	0
-26	:	0	0	0	0	0	0	0	0	0	0	0
-24	:	0	0	0	0	0	0	0	0	0	0	0
-22	:	0	0	0	0	0	0	0	0	0	0	0
-20	:	0	0	0	0	0	0	0	0	0	0	0
-18	:	0	0	0	0	0	0	0	0	0	0	0
-16	:	0	0	0	0	0	0	0	0	0	0	0
SUM		2	4	4	5	3	5	7	6	6	1	43

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 6
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 4
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 5

TOTAL NUMBER OF RECORDED ECHOES = 317

NUMBER OF ECHOES USED FOR STATISTICS = 43

AVERAGE BACKSCATTERING CROSS SECTION = .2025E-04 IN dB = -46.94

BACKSCATTERING CROSS SECTION STD DEV = .3143E-04

AVERAGE TARGET STRENGTH IN dB = -51.12

TARGET STRENGTH STD DEV IN dB = 6.06

ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 15

NUMBER OF FISH USED = 43
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .173E+04
 DENSITY IN FISH PER CUBIC METER = .249E-01
 EQUIVALENT STRATUM LENGTH (%/100) = .9985

Reading file d:\esp_nra\w30#13A.DAT

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 3735

DATA GROUP REPORT FOR TRANSDUCER 1
TOTAL NUMBER OF PINGS =

3735

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 3.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	0
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 28

NUMBER OF ECHOES USED FOR STATISTICS = 3

AVERAGE BACKSCATTERING CROSS SECTION = .3985E-05 IN dB = -54.00

BACKSCATTERING CROSS SECTION STD DEV = .1906E-05

AVERAGE TARGET STRENGTH IN dB = -54.41

TARGET STRENGTH STD DEV IN dB = 2.44

ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 0

NUMBER OF FISH USED = 3
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .278E+03
DENSITY IN FISH PER CUBIC METER = .108E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 3.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	2	1	3	4	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	4
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	1
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	1

TOTAL NUMBER OF RECORDED ECHOES = 28

NUMBER OF ECHOES USED FOR STATISTICS = 12

AVERAGE BACKSCATTERING CROSS SECTION = .4710E-05 IN dB = -52.27

AVERAGE TARGET STRENGTH IN dB =

-55.11

TARGET STRENGTH STD DEV IN dB =

3.48

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 6

NUMBER OF FISH USED = 12
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .599E+03
DENSITY IN FISH PER CUBIC METER = .200E-01
EQUIVALENT STRATUM LENGTH (%/100) = .9993

SUMMARY OF DATA FROM DEPTH 4.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 0 0 1 2 1 0 1 1 1 2 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 1
B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 1
B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 46

NUMBER OF ECHOES USED FOR STATISTICS = 9

AVERAGE BACKSCATTERING CROSS SECTION = .3966E-04 IN dB = -44.02

BACKSCATTERING CROSS SECTION STD DEV = .3821E-04

AVERAGE TARGET STRENGTH IN dB = -46.63

TARGET STRENGTH STD DEV IN dB = 5.55

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 2

NUMBER OF FISH USED = 9
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .105E+04
DENSITY IN FISH PER CUBIC METER = .860E-02
EQUIVALENT STRATUM LENGTH (%/100) = .9987

SUMMARY OF DATA FROM DEPTH 5.0 TO 6.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 0 1 1 1 1 2 0 0 1 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 0
B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 1
B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES =

47

NUMBER OF ECHOES USED FOR STATISTICS =

7

AVERAGE BACKSCATTERING CROSS SECTION =

.1518E-04

IN dB = -48.19

BACKSCATTERING CROSS SECTION STD DEV =

.1736E-04

AVERAGE TARGET STRENGTH IN dB =

-50.25

TARGET STRENGTH STD DEV IN dB =

4.51

ECHOES WITH BEAM PATTERN FACTORS > 0 dB=

1

NUMBER OF FISH USED =

7

FULL ANGLE OF CONE =

6.00

ESTIMATED VOLUME IN CUBIC METERS =

.162E+04

DENSITY IN FISH PER CUBIC METER =

.431E-02

EQUIVALENT STRATUM LENGTH (%/100) =

.9978

SUMMARY OF DATA FROM DEPTH 2.0 TO 6.0

DEPTH INTERVALS

	FROM TO	2.00 2.40	2.40 2.80	2.80 3.20	3.20 3.60	3.60 4.00	4.00 4.40	4.40 4.80	4.80 5.20	5.20 5.60	5.60 6.00	
TS												SL
-74	:	0	0	0	0	0	0	0	0	0	0	0
-72	:	0	0	0	0	0	0	0	0	0	0	0
-70	:	0	0	0	0	0	0	0	0	0	0	0
-68	:	0	0	0	0	0	0	0	0	0	0	0
-66	:	0	0	0	0	0	0	0	0	0	0	0
-64	:	0	0	0	0	0	0	0	0	0	0	0
-62	:	0	0	0	0	0	0	0	0	0	0	0
-60	:	0	0	1	0	1	0	0	0	0	0	2
-58	:	0	1	0	0	1	0	0	0	0	0	2
-56	:	0	0	0	3	0	0	0	1	0	0	4
-54	:	0	1	1	2	1	1	0	0	1	0	7
-52	:	1	0	0	1	0	1	0	1	0	1	5
-50	:	0	0	0	0	0	1	0	0	1	0	2
-48	:	0	0	0	0	1	0	0	0	2	0	3
-46	:	0	0	0	0	0	0	1	0	0	0	1
-44	:	0	0	0	0	0	0	0	1	0	0	1
-42	:	0	0	0	0	0	0	1	0	1	0	2
-40	:	0	0	0	0	0	0	1	1	0	0	2
-38	:	0	0	0	0	0	0	0	0	0	0	0
-36	:	0	0	0	0	0	0	0	0	0	0	0
-34	:	0	0	0	0	0	0	0	0	0	0	0
-32	:	0	0	0	0	0	0	0	0	0	0	0
-30	:	0	0	0	0	0	0	0	0	0	0	0
-28	:	0	0	0	0	0	0	0	0	0	0	0
-26	:	0	0	0	0	0	0	0	0	0	0	0
-24	:	0	0	0	0	0	0	0	0	0	0	0
-22	:	0	0	0	0	0	0	0	0	0	0	0
-20	:	0	0	0	0	0	0	0	0	0	0	0
-18	:	0	0	0	0	0	0	0	0	0	0	0
-16	:	0	0	0	0	0	0	0	0	0	0	0
SUM		1	2	2	6	4	3	3	4	5	1	3

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	5
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	3
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	1

TOTAL NUMBER OF RECORDED ECHOES = 395

NUMBER OF ECHOES USED FOR STATISTICS = 31

AVERAGE BACKSCATTERING CROSS SECTION = .1700E-04 IN dB = -47.70

BACKSCATTERING CROSS SECTION STD DEV = .2635E-04

AVERAGE TARGET STRENGTH IN dB = -51.48

TARGET STRENGTH STD DEV IN dB = 5.54

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 9

NUMBER OF FISH USED = 31
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .230E+04
 DENSITY IN FISH PER CUBIC METER = .135E-01
 EQUIVALENT STRATUM LENGTH (%/100) = .9990

Reading file D:\ESF_NRA\w31#05A.DAT
 Analyzing Run # 1

FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .539E+04
DENSITY IN FISH PER CUBIC METER = .222E+00
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

Reading file d:\esp_nra\w31#09a.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 7342

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 3.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1.

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
B 0 0 0 0 13 9 13 23 24 18 21 14 13 4 6 1 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 22
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 21
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 13

TOTAL NUMBER OF RECORDED ECHOES = 540

NUMBER OF ECHOES USED FOR STATISTICS = 161

AVERAGE BACKSCATTERING CROSS SECTION = .5146E-05 IN dB = -52.89

BACKSCATTERING CROSS SECTION STD DEV = .2266E-04

AVERAGE TARGET STRENGTH IN dB = -58.60

TARGET STRENGTH STD DEV IN dB = 5.84

ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 56

NUMBER OF FISH USED = 161
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .549E+03
DENSITY IN FISH PER CUBIC METER = .293E+00
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 3.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
B 0 0 0 0 0 8 21 14 17 15 14 19 16 27 15 10 9 2 3 2 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 33
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 17

NUMBER OF ECHOES USED FOR STATISTICS = 192
 AVERAGE BACKSCATTERING CROSS SECTION = .1119E-04 IN dB = -49.51
 BACKSCATTERING CROSS SECTION STD DEV = .2209E-04
 AVERAGE TARGET STRENGTH IN dB = -54.53
 TARGET STRENGTH STD DEV IN dB = 6.81
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 62
 NUMBER OF FISH USED = 192
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .118E+04
 DENSITY IN FISH PER CUBIC METER = .162E+00
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 4.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 3 14 16 10 16 7 16 12 16 10 9 3 2 3 8 3 2 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 19
 B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 18
 B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 18

TOTAL NUMBER OF RECORDED ECHOES = 254
 NUMBER OF ECHOES USED FOR STATISTICS = 150
 AVERAGE BACKSCATTERING CROSS SECTION = .4221E-04 IN dB = -43.75
 BACKSCATTERING CROSS SECTION STD DEV = .1001E-03
 AVERAGE TARGET STRENGTH IN dB = -51.39
 TARGET STRENGTH STD DEV IN dB = 8.00
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 55

NUMBER OF FISH USED = 150
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .207E+04
 DENSITY IN FISH PER CUBIC METER = .725E-01
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 5.0 TO 6.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 1 3 7 10 11 15 6 8 9 4 2 2 2 0 1 1 0 0 0 0 0 0 0 0

TOTAL NUMBER OF RECORDED ECHOES =

SUM 59 69 66 77 82 72 53 48 28 32 586

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 90
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 66
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 51

TOTAL NUMBER OF RECORDED ECHOES = 1700

NUMBER OF ECHOES USED FOR STATISTICS = 586

AVERAGE BACKSCATTERING CROSS SECTION = .1862E-04 IN dB = -47.30

BACKSCATTERING CROSS SECTION STD DEV = .5884E-04

AVERAGE TARGET STRENGTH IN dB = -54.57

TARGET STRENGTH STD DEV IN dB = 7.32

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 207

NUMBER OF FISH USED = 586
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .454E+04
 DENSITY IN FISH PER CUBIC METER = .129E+00
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

Reading file d:\esp_nra\w31#12a.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 2864

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 3.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 3 4 8 4 16 9 13 11 11 9 2 1 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 10
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 11
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 10

TOTAL NUMBER OF RECORDED ECHOES = 291

NUMBER OF ECHOES USED FOR STATISTICS = 91

AVERAGE BACKSCATTERING CROSS SECTION = .9049E-05 IN dB = -50.43

BACKSCATTERING CROSS SECTION STD DEV = .1064E-04

AVERAGE TARGET STRENGTH IN dB = -53.16

TARGET STRENGTH STD DEV IN dB = 5.20

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 31

NUMBER OF FISH USED = 91
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .214E+03
DENSITY IN FISH PER CUBIC METER = .425E+00
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 3.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 7 6 8 10 5 6 3 5 4 6 4 4 4 4 3 2 2 2 2 6 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 9
B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 6
B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 11

TOTAL NUMBER OF RECORDED ECHOES = 149

NUMBER OF ECHOES USED FOR STATISTICS = 93

AVERAGE BACKSCATTERING CROSS SECTION = .4245E-03 IN dB = -33.72

BACKSCATTERING CROSS SECTION STD DEV = .1073E-02

AVERAGE TARGET STRENGTH IN dB = -46.72

TARGET STRENGTH STD DEV IN dB = 11.53

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 26

NUMBER OF FISH USED = 93
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .461E+03
DENSITY IN FISH PER CUBIC METER = .202E+00
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 4.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 1 5 5 11 1 3 3 2 2 2 2 1 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 8
B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 2
B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 3

TOTAL NUMBER OF RECORDED ECHOES = 76

NUMBER OF ECHOES USED FOR STATISTICS

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BACKSCATTERING CROSS SECTION STD DEV =          .1951E-04
AVERAGE TARGET STRENGTH IN dB =                  -53.40
TARGET STRENGTH STD DEV IN dB =                    5.73
# ECHOES WITH BEAM PATTERN FACTORS > 0 dB=         13
NUMBER OF FISH USED =                             38
FULL ANGLE OF CONE =                             6.00
ESTIMATED VOLUME IN CUBIC METERS = .806E+03
DENSITY IN FISH PER CUBIC METER = .471E-01
EQUIVALENT STRATUM LENGTH (%/100) =             1.0000

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SUMMARY OF DATA FROM DEPTH 5.0 TO 6.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

[illegible]

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	6
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	8
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	5

TOTAL NUMBER OF RECORDED ECHOES = 64

NUMBER OF ECHOES USED FOR STATISTICS = 38

AVERAGE BACKSCATTERING CROSS SECTION = .1930E-04 IN dB = -47.14

BACKSCATTERING CROSS SECTION STD DEV = .4105E-04

AVERAGE TARGET STRENGTH IN dB = -52.44

TARGET STRENGTH STD DEV IN dB = 6.29

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 19

NUMBER OF FISH USED =	38
FULL ANGLE OF CONE =	6.00
ESTIMATED VOLUME IN CUBIC METERS =	.125E+04
DENSITY IN FISH PER CUBIC METER =	.304E-01
EQUIVALENT STRATUM LENGTH (%/100) =	1.0000

SUMMARY OF DATA FROM DEPTH 2.0 TO 6.0

DEPTH INTERVALS

[illegible]

-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	1	1	1	0	0	0	0	0	0	0	0
-62	0	4	3	3	1	0	0	1	0	0	1
-60	2	4	3	5	0	2	0	5	1	3	2
-58	1	1	4	3	3	2	2	3	0	0	1
-56	3	8	5	7	3	7	4	2	3	3	4
-54	1	3	5	4	1	1	0	0	2	2	1
-52	1	7	7	0	4	1	2	0	4	2	2
-50	0	3	11	0	0	1	2	0	0	3	2
-48	0	1	11	3	1	0	0	2	0	2	2
-46	0	4	7	1	1	0	2	0	0	2	1
-44	0	0	3	4	1	0	2	0	0	1	1
-42	0	0	2	3	0	0	2	0	0	2	1
-40	0	0	0	1	3	0	1	0	0	0	1
-38	0	0	0	1	3	0	0	0	0	2	2
-36	0	0	0	3	1	0	0	0	0	0	2
-34	0	0	0	1	2	0	0	0	0	0	2
-32	0	0	0	0	2	0	0	0	0	0	2
-30	0	0	0	0	2	0	0	0	0	0	2
-28	0	0	0	0	2	0	0	0	0	0	2
-26	0	0	0	0	2	0	0	0	0	0	2
-24	0	0	0	0	6	0	0	0	0	0	2
-22	0	0	0	0	0	0	0	0	0	0	2
-20	0	0	0	0	0	0	0	0	0	0	2
-18	0	0	0	0	0	0	0	0	0	0	2
-16	0	0	0	0	0	0	0	0	0	0	2

SUM	9	36	62	39	38	14	17	13	10	22	26
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HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	33
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	27
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	29

TOTAL NUMBER OF RECORDED ECHOES = 588

NUMBER OF ECHOES USED FOR STATISTICS = 260

AVERAGE BACKSCATTERING CROSS SECTION = .1596E-03 IN dB = -37.97

BACKSCATTERING CROSS SECTION STD DEV = .6698E-03

AVERAGE TARGET STRENGTH IN dB = -50.79

TARGET STRENGTH STD DEV IN dB = 8.73

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 89

NUMBER OF FISH USED =	260
FULL ANGLE OF CONE =	6.00
ESTIMATED VOLUME IN CUBIC METERS =	.177E+04
DENSITY IN FISH PER CUBIC METER =	.147E+00
EQUIVALENT STRATUM LENGTH (%/100) =	1.0000

Reading file d:\esp_nra\w32#01a.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 1181

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 3.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 4 6 2 4 7 6 7 1 4 0 7 2 1 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 9
 B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 8
 B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 5

TOTAL NUMBER OF RECORDED ECHOES = 141

NUMBER OF ECHOES USED FOR STATISTICS = 51

AVERAGE BACKSCATTERING CROSS SECTION = .1406E-04 IN dB = -48.52

BACKSCATTERING CROSS SECTION STD DEV = .2205E-04

AVERAGE TARGET STRENGTH IN dB = -53.39

TARGET STRENGTH STD DEV IN dB = 6.78

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 22

NUMBER OF FISH USED = 51
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .881E+02
 DENSITY IN FISH PER CUBIC METER = .579E+00
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 3.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 4 2 5 5 2 4 1 0 4 1 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 5
 B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 3
 B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 4

TOTAL NUMBER OF RECORDED ECHOES = 81

NUMBER OF ECHOES USED FOR STATISTICS = 28

AVERAGE BACKSCATTERING CROSS SECTION = .1202E-04 IN dB = -49.20

BACKSCATTERING CROSS SECTION STD DEV = .1744E-04

AVERAGE TARGET STRENGTH IN dB = -52.71

TARGET STRENGTH STD DEV IN dB = 5.51

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 12

NUMBER OF FISH USED = 28

NUMBER OF FISH USED = 20
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .190E+03
 DENSITY IN FISH PER CUBIC METER = .148E+00
 EQUIVALENT STRATUM LENGTH (%/100) = .9996

SUMMARY OF DATA FROM DEPTH 4.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 1 1 2 3 2 0 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 2
 B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 0
 B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 26
 NUMBER OF ECHOES USED FOR STATISTICS = 12
 AVERAGE BACKSCATTERING CROSS SECTION = .6422E-05 IN dB = -51.92
 BACKSCATTERING CROSS SECTION STD DEV = .5839E-05
 AVERAGE TARGET STRENGTH IN dB = -53.59
 TARGET STRENGTH STD DEV IN dB = 4.05
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 2

NUMBER OF FISH USED = 12
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .332E+03
 DENSITY IN FISH PER CUBIC METER = .362E-01
 EQUIVALENT STRATUM LENGTH (%/100) = .9992

SUMMARY OF DATA FROM DEPTH 5.0 TO 6.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 2 5 0 1 3 3 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 7
 B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 1
 B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 21
 NUMBER OF ECHOES USED FOR STATISTICS = 15
 AVERAGE BACKSCATTERING CROSS SECTION = .4971E-05 IN dB = -53.04

AVERAGE TARGET STRENGTH IN dB =

-34.65

TARGET STRENGTH STD DEV IN dB =

4.09

ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 8

NUMBER OF FISH USED = 15
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .515E+03
 DENSITY IN FISH PER CUBIC METER = .292E-01
 EQUIVALENT STRIP LENGTH (%/100) = .9992

SUMMARY OF DATA FROM DEPTH 2.0 TO 6.0

DEPTH INTERVALS

	FROM TO	2.00 2.40	2.40 2.80	2.80 3.20	3.20 3.60	3.60 4.00	4.00 4.40	4.40 4.80	4.80 5.20	5.20 5.60	5.60 6.00	
TS												
-74		0	0	0	0	0	0	0	0	0	0	
-72		0	0	0	0	0	0	0	0	0	0	
-70		0	0	0	0	0	0	0	0	0	0	
-68		0	0	0	0	0	0	0	0	0	0	
-66		0	0	0	0	0	0	0	0	0	0	
-64		2	1	1	0	0	0	0	0	0	0	
-62		3	2	1	0	0	0	0	0	0	0	
-60		1	0	1	3	1	0	1	0	0	2	
-58		2	1	2	1	0	0	1	1	3	1	
-56		1	3	5	1	2	1	1	0	0	0	
-54		2	4	0	3	2	1	1	1	0	1	
-52		1	2	4	2	0	0	1	2	2	0	
-50		0	1	0	4	0	0	0	0	3	0	
-48		1	3	0	1	0	1	1	1	0	1	
-46		0	0	0	0	0	0	0	0	0	0	
-44		0	7	0	3	1	0	0	0	0	0	
-42		0	2	0	0	1	0	0	0	0	0	
-40		0	1	0	0	0	0	0	0	0	0	
-38		0	0	0	0	0	0	0	0	0	0	
-36		0	0	0	0	0	0	0	0	0	0	
-34		0	0	0	0	0	0	0	0	0	0	
-32		0	0	0	0	0	0	0	0	0	0	
-30		0	0	0	0	0	0	0	0	0	0	
-28		0	0	0	0	0	0	0	0	0	0	
-26		0	0	0	0	0	0	0	0	0	0	
-24		0	0	0	0	0	0	0	0	0	0	
-22		0	0	0	0	0	0	0	0	0	0	
-20		0	0	0	0	0	0	0	0	0	0	
-18		0	0	0	0	0	0	0	0	0	0	
-16		0	0	0	0	0	0	0	0	0	0	
SUM		13	27	14	18	7	3	6	5	8	5	10

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB 10 B = 1 dB NUMBER OF ECHOES = 23
 B= 1 dB 10 B = 2 dB NUMBER OF ECHOES = 12
 B= 2 dB 10 B = 3 dB NUMBER OF ECHOES = 9

TOTAL NUMBER OF RECORDED ECHOES = 272

NUMBER OF LINES USED FOR STATISTICS = 106

AVERAGE BACKSCATTERING CROSS SECTION = .1137E-04 IN dB = -49.44

BACKSCATTERING CROSS SECTION STD DEV = .1810E-04
 AVERAGE TARGET STRENGTH IN dB = -53.41
 TARGET STRENGTH STD DEV IN dB = 5.84
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 44
 NUMBER OF FISH USED = 106
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .728E+03
 DENSITY IN FISH PER CUBIC METER = .146E+00
 EQUIVALENT STRATUM LENGTH (%/100) = .9995

Reading file d:\esp_nra\w32#02a.dat
 Analyzing Run # 1
 DATA GROUP REPORT FOR TRANSDUCER 1
 TOTAL NUMBER OF PINGS = 1681

DATA FOR FREQUENCY 420.

 SUMMARY OF DATA FROM DEPTH 2.0 TO 3.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 2 3 7 5 3 4 2 2 5 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 5
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 4
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 8

TOTAL NUMBER OF RECORDED ECHOES = 113
 NUMBER OF ECHOES USED FOR STATISTICS = 37
 AVERAGE BACKSCATTERING CROSS SECTION = .7372E-05 IN dB = -51.32
 BACKSCATTERING CROSS SECTION STD DEV = .9583E-05
 AVERAGE TARGET STRENGTH IN dB = -54.97
 TARGET STRENGTH STD DEV IN dB = 5.86
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 17

NUMBER OF FISH USED = 37
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .125E+03
 DENSITY IN FISH PER CUBIC METER = .296E+00
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

 SUMMARY OF DATA FROM DEPTH 3.0 TO 4.0

PROJECT RECORDS

Record 6.1 RIVER WEY, OLD WOKING, 3rd-6th JUNE 1991

(a) Sampled volumes, numbers of accepted fish and densities in different sonar runs and in different ranges from transducer, both above and below the outlet and before and after elctro-fishing and including a night study (2 pages).

(b) Frequency distributions of sizes of captured fish and predicted lengths from measured target strengths from above and below the Sewage Outlet, given as numbers and as percentage frequencies (2 pages).

Record 6.2 RIVER THAMES, DIDCOT POWER STATION, JULY 9TH 1991.

(a) Sampled volumes, numbers of accepted fish and densities in different sonar runs and in different ranges from the transducer in Intake and Outlet areas of Didcot Power Station, River Thames (1 page)

(b) Frequency distribution of sizes of captured fish and of predicted lengths from measured target strengths in Intake and Outlet areas, given as numbers and percentage frequencies (2 pages).

(c) Echogram from ESP_ECHO showing 200 targets and 38 tracked fish during ping interval 1800-3785 (1 page).

Record 6.3 RIVER THAMES, CLIFTON HAMPDEN, JULY 22ND 1991

(a) Sampled volumes, numbers of accepted fish and densities in different sonar runs and in different ranges at three sites (two shallow and one deep) in the River Thames, Clifton Hampden (1 page).

(b) Frequency distribution of sizes of captured fish and of predicted lengths from measured target strengths in two shallow and one deep site in the River Thames (3 pages).

Record 6.4 RIVER THAMES, CLIFTON HAMPDEN, AUGUST 1ST 1991

(a) Sampled volumes, numbers of accepted fish and densities in different sonar runs and in different ranges from the transducer at four sites in the River Thames. Sites 1, 2 and 3 were seined in daytime and the much shallower site 4 at night (1 page).

(b) Frequenecy distribution of sizes of captured fish and of predicted lengths from measured target strengths in four sites in the River Thames (2 pages).

Record 6.5 RIVER THAMES, HAM ISLAND, OLD WINDSOR, AUGUST
8TH 1991

(a) Sampled volumes, numbers of accepted fish and densities in different sonar runs and in different ranges from the transducer at a deep site in the River Thames Ham Island. Two inshore seining and one "whole river" seining were undertaken accompanied by acoustic surveying (1 page)

(b) Frequency distribution of sizes of captured fish from the 3rd seine haul and of predicted lengths from measured target strengths of the "distant targets (10-15m)" recorded with the 2nd seine haul (1 page).

Record 6.6 RIVER THAMES DIDCOT REACH, SEPTEMBER 4TH-7TH
1991

(a) Sampled volumes, numbers of accepted fish and densities in different sonar runs and in different ranges from the transducer at three sites in the River Thames Didcot on September 7th 1991 (1 page).

(b) Frequency distribution of sizes of fish captured from three sites on September 4th, 5th and 6th and of predicted lengths from target strengths measured at three sites on September 7th (3 pages).

(c) Three tables of data from mark-recapture trials at three sites on September 4th, 5th and 6th and estimates of fish density according to Petersen () and Schnabel ().

Record 6.7 RIVER THAMES, CHERTSEY MEADS, MAY 19TH 1992.

Record 6.8 DATA AND REGRESSION STATISTICS FOR THE
RELATIONSHIP OF ACOUSTIC VERSUS NETTED FISH
DENSITIES

Table 53

TABLE 1. FISH STUDIES IN THE RIVER THAMES DURING 1991

DATE	NUMBER OF SITES	NUMBER OF SEININGS	ECHOLOCATION
June 6 '91	2	-	day
✓ July 9 '91 RT Didcot	2	3	day
✓ July 22 '91 RT CH.	4	4	day
✓ August 1 '91 RT C. Redd.	4	4 day 1 night	day night
✓ August 8 '91 RT Hamels	3	3	day
✓ September 3-7 '91 RT Didcot	3	12 quantitative	day night

May 19 1992 RT Charlton

5.4

TABLE 2. THE PERCENTAGE FREQUENCY OF FISH SPECIES IN THE RIVER THAMES AT HAM ISLAND (***) AND ABOVE AND BELOW CLIFTON LOCK DURING THE SUMMER 1991.

SPECIES	9.VII	22.VII	1.VIII	3-7.IX	8.VIII ***
Pike	-	-	0.2	0.1	-
Carp	-	-	-	+	-
Gudgeon	0.2	17.2	7.4	37.0	-
Silver Bream	-	-	-	1.7	-
Bream	15.9	4.6	5.5	12.0	1.9
Bleak	68.4	41.0	25.6	5.1	0.9
Roach	3.7	19.6	47.0	16.2	48.6
Chub	0.5	-	1.2	0.7	-
Dace	1.2	6.4	3.3	1.6	23.4
Perch	9.4	10.7	7.1	16.8	15.9
Ruffe	0.2	0.3	2.2	7.8	7.9
Hybrid	0.5	0.3	0.4	1.0	-
Eel	-	-	-	-	1.4
Stickle- back	-	-	0.2	-	-
Numbers caught	593	373	511	1343	214

Table 5.5

Sampled volumes, numbers of accepted fish and densities in different sonar runs and in different ranges from transducer, R.Thames, Didcot outflow area 9.7.1991						
The numbers not accepted for final calculation of density in italics						
	Numbers of accepted fish targets					
	EXPERIMENT 1 (INTAKE)				EXPERIMENT 2 (OUTFLOW)	
range/run:	Di1r2	Di1r3	Di1r4	Di2r1	Di4r1	Di4r2
2-4.	0	8	4	12	133	22
4-8.	17	59	57	29	169	98
8-10.	15		57	22	15	2
10-12.	15		8			
	Sampled volume (m ³)					
2-4.	180	313	179	182	720	160
4-8.	1330	2410	1380	1400	2050	1390
8-10.	1800		1780	1890	11900	2830
10-12.	2730		2630			
	Density (fish/100m ³)					
2-4.	0	2.555911	2.234637	6.593407	18.47222	13.75
4-8.	1.278195	2.448133	4.130435	2.071429	8.243902	7.05036
8-10.	0.833333		3.202247	1.164021	0.12605	0.070671
10-12.	0.549451		0.304183			

[illegible]

Table 5.6

TS and length frequency distributions of targets and fish recorded 9.7.1991
in the outflow of Didcot power-station

TS	mm	Did.outfl.	Did.fish	%Did.outfl.	%Did.Outfl.Fish
-58	46.05936	14		9.859155	
-56	51.86062	17		11.97183	
-54	58.39256	20		14.08451	
-52	65.74722	22		15.49296	
-50	74.0282	22		15.49296	
-48	83.3522	14		9.859155	
-46	93.85056	13		9.15493	
-44	105.6712	5		3.521127	
-42	118.9807	5		3.521127	
-40	133.9666	4		2.816901	
-38	150.8399	3		2.112676	
-36	169.8385	2		1.408451	
-34	191.2299	1		0.704225	
-32	215.3157	0			
-30	242.4351	0			
-28	272.9703				
-26	307.3514				
-24	346.0629				
	48		0		
	53		11		2.98102981
	63		36		9.75609756
	73		84		22.7642276
	83		96		26.0162602
	93		67		18.1571816
	103		33		8.94308943
	113		19		5.14905149
	123		12		3.25203252
	133		4		1.08401084
	143		3		0.81300813
	153				0
	163				0
	173		2		0.54200542
	183		2		0.54200542
	193				0

	203				0
	213				0
	330				0
					0
sum		142	369	100	100

RIVER THAMES DIDCOT POWER STATION

July 9 1991.

D1 1 4 runs
D2 1 4 runs
D3 1 1 run
D4 1 1 run

***** TS Version 2.00 *****
Beam Data Reduction Program
For ISI V1.0x & V2.0x data files

Copyright Biosonix Inc. 1 April, 1991
Biosonix Corp. Hydroacoustic Applications
Tel: 408-3201-1000-91-000

File: D:\Data\es.dat

Run #

CALIBRATION DATE (MO/DA/YR)

11/17/89

TRANSDUCER SERIAL NUMBER

105-84-001

SYSTEM OPERATING FREQUENCY

420.00

STARTUP RANGE IN METERS

1.00

ABSORPTION COEFFICIENT AT CALIBRATION (dB/km)

.0000

RECEIVER RANGE AT CALIBRATION

10.00

RECEIVING SENSITIVITY AT CAL RANGE CHANNEL 1, 40logR: -124.90

RECEIVING SENSITIVITY AT CAL RANGE CHANNEL 1, 20logR: -123.20

RECEIVING SENSITIVITY AT CAL RANGE SIMULTANEOUS 20logR: -120.10

RECEIVING SENSITIVITY AT CAL RANGE CHANNEL 2, 40logR: -125.20

RECEIVING SENSITIVITY AT CAL RANGE CHANNEL 2, 20logR: -123.30

BE LEVEL FOR EACH TRANSMIT POWER SETTING:

00: Enter <0> for settings other than ZERO

01: If not measured, enter estimate as a negative value

0 TRANSMIT POWER 217.00

-3 TRANSMIT POWER .00

-6 TRANSMIT POWER .00

-10 TRANSMIT POWER .00

-13 TRANSMIT POWER .00

TRANSDUCER SERIAL NUMBER:

09-420-061

CABLE LENGTH AT CALIBRATION (METERS):

50.00

TRANSDUCER IS SIDE BY SIDE CIRCULAR DUAL BEAM

NOMINAL BEAMWIDTHS WHERE APPLICABLE

NARROW BEAMWIDTH, OR LONG AXIS OF NARROW ELLIPSE: 6.00

SHORT AXIS OF NARROW BEAM ELLIPSE: .00

WIDE BEAMWIDTH, OR LONG AXIS OF WIDE ELLIPSE: 15.00

SHORT AXIS OF WIDE BEAM ELLIPSE: .00

WIDE BEAM DROPOFF IN dB: 1.150

COEFFICIENT FOR POWER EQUATION: 1.668

COEFFICIENT FOR POWER EQUATION: .502

A1. SCALED NARROW BEAM PATTERN FACTOR: .9815E-03

A2. SCALED COMPOSITE BEAM PATTERN FACTOR: .1722E-02

THE PROCESSING PARAMETER FILE CONTAINS THE FOLLOWING PARAMETERS

(1)	NARROW BEAM CHANNEL NUMBER	1
(2)	NARROW BEAM CORRECTION MULTIPLIER	1.000
(3)	WIDE BEAM CORRECTION MULTIPLIER	1.035
(4)	NARROW BEAM THRESHOLD IN mV (BEFORE CORRECTION)	200.0
(5)	WIDE BEAM THRESHOLD IN mV (BEFORE CORRECTION)	200.0
(6)	MINIMUM DEPTH TO PROCESS IN METERS	2.0
(7)	MAXIMUM DEPTH TO PROCESS IN METERS	15.0
(8)	BOTTOM THRESHOLD IN mV (BEFORE CORRECTION)	2000.0
(9)	MINIMUM -4 dB PULSE WIDTH IN msec	.400
	MAXIMUM -6 dB PULSE WIDTH IN msec	.640
	MINIMUM -10dB PULSE WIDTH IN msec	.440
	MAXIMUM -12dB PULSE WIDTH IN msec	.720
	MINIMUM -18dB PULSE WIDTH IN msec	.000
	MAXIMUM -18dB PULSE WIDTH IN msec	9.999
(10)	RECEIVER GAIN USED TO COLLECT DATA	-6.0
(11)	TRANSMIT POWER USED TO COLLECT DATA	0
(12)	MAXIMUM HALF-ANGLE FOR PROCESSING TARGETS	3.0
(13)	HISTOGRAM CENTERED ABOUT WHAT TS VALUE:	-45.00
(14)	BEAM PATTERN FACTOR > ZERO THRESHOLD IN dB	4

FILE NUMBER 1 =	D:\esp\di1.dat
FILE NUMBER 2 =	D:\esp\di2.dat
FILE NUMBER 3 =	d:\esp\di3.dat
FILE NUMBER 4 =	d:\esp\di4.dat

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 1138

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 4.0
NO TARGETS FOUND

SUMMARY OF DATA FROM DEPTH 4.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	1	1	3	5	3	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	1
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	5
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	4	1	0	2	4	1	3	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	1
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	1
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	1
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	1
TOTAL NUMBER OF RECORDED ECHOES =				158	
NUMBER OF ECHOES USED FOR STATISTICS =				14	
AVERAGE BACKSCATTERING CROSS SECTION =				.2477	IN dB = -36.95
BACKSCATTERING CROSS SECTION STD DEV =				.2311	
AVERAGE TARGET STRENGTH IN dB =					-38.29
TARGET STRENGTH STD DEV IN dB =					4.96
# ECHOES WITH BEAM PATTERN FACTORS > 0 dB=				3	
NUMBER OF FISH USED =				16	
FULL ANGLE OF CONE =				6.00	
ESTIMATED VOLUME IN CUBIC METERS =				.325E+04	
DENSITY IN FISH PER CUBIC METER =				.493E-02	
EQUIVALENT STRATUM LENGTH (%/100) =				1.0000	

SUMMARY OF DATA FROM DEPTH 12.0 TO 15.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 5

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	2	4	4	6	1	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	3
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	3
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0
TOTAL NUMBER OF RECORDED ECHOES =				208	
NUMBER OF ECHOES USED FOR STATISTICS =				20	
AVERAGE BACKSCATTERING CROSS SECTION =				.1548E-02	IN dB = -28.10
BACKSCATTERING CROSS SECTION STD DEV =				.9500E-03	
AVERAGE TARGET STRENGTH IN dB =					-29.35
TARGET STRENGTH STD DEV IN dB =					4.05
# ECHOES WITH BEAM PATTERN FACTORS > 0 dB=				6	
NUMBER OF FISH USED =				20	
FULL ANGLE OF CONE =				6.00	
ESTIMATED VOLUME IN CUBIC METERS =				.664E+04	
DENSITY IN FISH PER CUBIC METER =				.301E-02	
EQUIVALENT STRATUM LENGTH (%/100) =				1.0000	

SUMMARY OF DATA FROM DEPTH 2.0 TO 15.0

DEPTH INTERVAL

FROM TO	2.00 3.30	3.30 4.60	4.60 5.90	5.90 7.20	7.20 8.50	8.50 9.80	9.80 11.10	11.10 12.40	12.40 13.70	13.70 15.00	SL
TS											
-74	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	0	0	0	0	0	0	0	0	0	0	0
-56	0	1	0	0	0	0	0	0	0	0	1
-54	0	0	0	0	0	0	0	0	0	0	2
-52	0	2	1	0	0	0	0	0	0	0	3
-50	0	1	3	0	1	0	0	0	0	0	5
-48	0	0	1	0	2	0	0	1	0	0	4
-46	0	0	0	0	0	1	0	0	0	0	1
-44	0	0	0	0	4	1	4	0	0	0	9
-42	0	0	1	0	2	0	1	0	0	0	4
-40	0	0	0	0	2	1	0	1	0	1	4
-38	0	0	0	0	1	0	1	1	0	0	3
-36	0	0	0	0	3	0	1	3	0	1	8
-34	0	0	0	0	2	0	0	1	0	1	4
-32	0	0	0	0	0	0	2	1	1	1	5
-30	0	0	0	0	0	0	0	0	3	1	4
-28	0	0	0	0	1	0	0	0	2	2	5
-26	0	0	0	0	0	0	0	0	2	4	6
-24	0	0	0	0	0	0	0	0	0	1	1
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	0	4	4	0	20	3	9	5	12	69	

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 6
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 9
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 12
 B= 3 dB TO B = 4 dB NUMBER OF ECHOES = 18

TOTAL NUMBER OF RECORDED ECHOES = 705

NUMBER OF ECHOES USED FOR STATISTICS = 69

AVERAGE BACKSCATTERING CROSS SECTION = .5706E-07 IN dB = -32.44

BACKSCATTERING CROSS SECTION STD DEV = .8431E-07

AVERAGE TARGET STRENGTH IN dB = -38.58

TARGET STRENGTH STD DEV IN dB = 0.56

ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 18

NUMBER OF FISH USED = 69

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .110E+05

SENSITIVITY TO TARGET SIZE

EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

Reading file D:\esp\dl1.dat

Analyzing Run # 2

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 937

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 4.0
NO TARGETS FOUND

SUMMARY OF DATA FROM DEPTH 4.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	1	1	2	5	3	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB TO B =	1 dB	NUMBER OF ECHOES =	2
B=	1 dB TO B =	2 dB	NUMBER OF ECHOES =	4
B=	2 dB TO B =	3 dB	NUMBER OF ECHOES =	0
B=	3 dB TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 165

NUMBER OF ECHOES USED FOR STATISTICS = 17

AVERAGE BACKSCATTERING CROSS SECTION = .2434E-04 IN dB = -46.14

BACKSCATTERING CROSS SECTION STD DEV = .2761E-04

AVERAGE TARGET STRENGTH IN dB = -48.28

TARGET STRENGTH STD DEV IN dB = 4.44

ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 6

NUMBER OF FISH USED = 17
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .133E+04
DENSITY IN FISH PER CUBIC METER = .128E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 8.0 TO 10.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2	2	2	1	2	3	0	0	1	0	0	0	0	0

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	1
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	1
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 187

NUMBER OF ECHOES USED FOR STATISTICS = 15

AVERAGE BACKSCATTERING CROSS SECTION = .2765E-03 IN dB = -35.58

BACKSCATTERING CROSS SECTION STD DEV = .4742E-03

AVERAGE TARGET STRENGTH IN dB = -39.29

TARGET STRENGTH STD DEV IN dB = 6.03

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 2

NUMBER OF FISH USED = 15

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .180E+04

DENSITY IN FISH PER CUBIC METER = .835E-02

EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 10.0 TO 12.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	0	2	4	1	3	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	0
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	1
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	1
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 148

NUMBER OF ECHOES USED FOR STATISTICS = 15

AVERAGE BACKSCATTERING CROSS SECTION = .2573E-03 IN dB = -35.90

BACKSCATTERING CROSS SECTION STD DEV = .2307E-03

AVERAGE TARGET STRENGTH IN dB = -38.11

TARGET STRENGTH STD DEV IN dB = 5.07

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 2

NUMBER OF FISH USED = 15

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .273E+04

DENSITY IN FISH PER CUBIC METER = .549E-02

EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

TARGET STRENGTH DISTRIBUTION FOR STRATUM 5

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 1 0 2 3 5 4 1 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 3
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 0
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 2
B= 3 dB TO B = 4 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 333

NUMBER OF ECHOES USED FOR STATISTICS = 18

AVERAGE BACKSCATTERING CROSS SECTION = .1517E-02 IN dB = -28.19

BACKSCATTERING CROSS SECTION STD DEV = .8901E-03

AVERAGE TARGET STRENGTH IN dB = -29.68

TARGET STRENGTH STD DEV IN dB = 5.13

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 5

NUMBER OF FISH USED = 18
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .559E+04
DENSITY IN FISH PER CUBIC METER = .322E-02
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 2.0 TO 15.0

DEPTH INTERVALS

	FROM	2.00	3.30	4.60	5.90	7.20	8.50	9.80	11.10	12.40	13.70	
	TO	3.30	4.60	5.90	7.20	8.50	9.80	11.10	12.40	13.70	15.00	
TS												Sub
-74	:	0	0	0	0	0	0	0	0	0	0	0
-72	:	0	0	0	0	0	0	0	0	0	0	0
-70	:	0	0	0	0	0	0	0	0	0	0	0
-68	:	0	0	0	0	0	0	0	0	0	0	0
-66	:	0	0	0	0	0	0	0	0	0	0	0
-64	:	0	0	0	0	0	0	0	0	0	0	0
-62	:	0	0	0	0	0	0	0	0	0	0	0
-60	:	0	0	0	0	0	0	0	0	0	0	0
-58	:	0	0	0	0	0	0	0	0	0	0	0
-56	:	0	1	0	0	0	0	0	0	0	0	1
-54	:	0	0	1	0	0	0	0	0	0	0	1
-52	:	0	1	0	0	1	1	0	0	0	0	3
-50	:	0	1	3	0	1	0	0	0	0	0	5
-48	:	0	0	1	0	2	0	0	0	0	0	3
-46	:	0	0	0	0	1	1	0	1	1	0	4
-44	:	0	0	0	0	3	1	4	0	0	0	8
-42	:	0	0	1	0	2	0	0	0	0	0	3
-40	:	0	0	0	0	2	1	0	0	0	0	3
-38	:	0	0	0	0	1	0	1	1	0	0	3
-36	:	0	0	0	0	2	0	2	2	0	1	7

-28	0	0	0	0	1	0	0	0	2	4
-26	0	0	0	0	0	0	0	0	0	4
-24	0	0	0	0	0	0	0	0	0	1
-22	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0
SUM	0	3	6	0	19	4	9	6	6	12

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 6
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 6
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 3
 B= 3 dB TO B = 4 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 1715

NUMBER OF ECHOES USED FOR STATISTICS = 65

AVERAGE BACKSCATTERING CROSS SECTION = .5497E-03 IN dB = -32.60

BACKSCATTERING CROSS SECTION STD DEV = .8034E-03

AVERAGE TARGET STRENGTH IN dB = -38.71

TARGET STRENGTH STD DEV IN dB = 8.54

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 15

NUMBER OF FISH USED = 65

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .923E+04

DENSITY IN FISH PER CUBIC METER = .704E-02

EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

Reading file D:\esp\dl1.dat

Analyzing Run # 3

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 1846

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 0 0 0 0 1 2 3 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 1
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 0
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 0
 B= 3 dB TO B = 4 dB NUMBER OF ECHOES = 0

AVERAGE BACKSCATTERING CROSS SECTION = .1529E-04 IN dB = -48.16
 BACKSCATTERING CROSS SECTION STD DEV = .6021E-05
 AVERAGE TARGET STRENGTH IN dB = -48.51
 TARGET STRENGTH STD DEV IN dB = 1.95
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 1
 NUMBER OF FISH USED = 8
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .3135E+03
 DENSITY IN FISH PER CUBIC METER = .255E-01
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 4.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	3	7	9	9	12	7	4	5	2	1	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	6
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	3
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	2
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 511
 NUMBER OF ECHOES USED FOR STATISTICS = 59
 AVERAGE BACKSCATTERING CROSS SECTION = .2201E-04 IN dB = -46.57
 BACKSCATTERING CROSS SECTION STD DEV = .2520E-04
 AVERAGE TARGET STRENGTH IN dB = -46.69
 TARGET STRENGTH STD DEV IN dB = 4.25
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 11

NUMBER OF FISH USED = 59
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .241E+04
 DENSITY IN FISH PER CUBIC METER = .245E-01
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 8.0 TO 10.0
NO TARGETS FOUND

SUMMARY OF DATA FROM DEPTH 10.0 TO 12.0

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 12

NUMBER OF FISH USED = 67
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .254E+04
DENSITY IN FISH PER CUBIC METER = .264E-01
EQUIVALENT STRATUM LENGTH (%/100) = .5000

Reading file D:\esp\dl11.dat
Analyzing Run # 4
DATA GROUP REPORT FOR TRANSDUCER 1
TOTAL NUMBER OF PINGS = 987

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	0
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 19

NUMBER OF ECHOES USED FOR STATISTICS = 4

AVERAGE BACKSCATTERING CROSS SECTION = .3454E-04 IN dB = -44.62

BACKSCATTERING CROSS SECTION STD DEV = .2870E-04

AVERAGE TARGET STRENGTH IN dB = -45.87

TARGET STRENGTH STD DEV IN dB = 4.02

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 0

NUMBER OF FISH USED = 4
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .179E+03
DENSITY IN FISH PER CUBIC METER = .224E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 4.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	1	1	3	7	10	4	11	9	3	2	3	2	1	0	0	0	0	0	0	0	0	

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	8
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	4
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	3
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	2

TOTAL NUMBER OF RECORDED ECHOES = 404

NUMBER OF ECHOES USED FOR STATISTICS = 57

AVERAGE BACKSCATTERING CROSS SECTION = .4710E-04 IN dB = -43.27

BACKSCATTERING CROSS SECTION STD DEV = .7436E-04

AVERAGE TARGET STRENGTH IN dB = -46.71

TARGET STRENGTH STD DEV IN dB = 5.33

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 17

NUMBER OF FISH USED = 57

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .138E+04

DENSITY IN FISH PER CUBIC METER = .414E-01

EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 8.0 TO 10.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	1	2	4	6	6	8	12	6	4	4	1	1	2	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	9
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	1
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	7
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	1

TOTAL NUMBER OF RECORDED ECHOES = 333

NUMBER OF ECHOES USED FOR STATISTICS = 57

AVERAGE BACKSCATTERING CROSS SECTION = .1159E-03 IN dB = -39.34

BACKSCATTERING CROSS SECTION STD DEV = .2094E-03

AVERAGE TARGET STRENGTH IN dB = -42.85

TARGET STRENGTH STD DEV IN dB = 5.28

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 18

NUMBER OF FISH USED = 57

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .178E+04

DENSITY IN FISH PER CUBIC METER = .320E-01

EQUIVALENT STRATUM LENGTH (%/100) = .9608

SUMMARY OF DATA FROM DEPTH 10.0 TO 12.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	0
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	2
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 113

NUMBER OF ECHOES USED FOR STATISTICS = 6

AVERAGE BACKSCATTERING CROSS SECTION = .1468E-03 IN dB = -38.33

BACKSCATTERING CROSS SECTION STD DEV = .7764E-04

AVERAGE TARGET STRENGTH IN dB = -38.98

TARGET STRENGTH STD DEV IN dB = 2.68

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 2

NUMBER OF FISH USED =	8
FULL ANGLE OF CONE =	6.00
ESTIMATED VOLUME IN CUBIC METERS =	.263E+04
DENSITY IN FISH PER CUBIC METER =	.304E-02
EQUIVALENT STRATUM LENGTH (%/100) =	.9281

SUMMARY OF DATA FROM DEPTH 12.0 TO 15.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 5

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	0
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	1
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	1

TOTAL NUMBER OF RECORDED ECHOES = 171

NUMBER OF ECHOES USED FOR STATISTICS = 5

AVERAGE BACKSCATTERING CROSS SECTION = .6723E-04 IN dB = -41.72

BACKSCATTERING CROSS SECTION STD DEV = .7821E-04

AVERAGE TARGET STRENGTH IN dB = -45.70

TARGET STRENGTH STD DEV IN dB = 7.37

NUMBER OF FISH USED = 5
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .535E+04
 DENSITY IN FISH PER CUBIC METER = .934E-03
 EQUIVALENT STRATUM LENGTH (%/100) = .9233

SUMMARY OF DATA FROM DEPTH 2.0 TO 15.0

TS	DEPTH INTERVALS										SUM
	FROM TO	2.00 3.30	3.30 4.60	4.60 5.90	5.90 7.20	7.20 8.50	8.50 9.80	9.80 11.10	11.10 12.40	12.40 13.70	
-74		0	0	0	0	0	0	0	0	0	0
-72		0	0	0	0	0	0	0	0	0	0
-70		0	0	0	0	0	0	0	0	0	0
-68		0	0	0	0	0	0	0	0	0	0
-66		0	0	0	0	0	0	0	0	0	0
-64		0	0	0	0	0	0	0	0	0	0
-62		0	0	0	0	0	0	0	0	0	0
-60		0	0	0	0	0	0	0	0	0	0
-58		0	0	1	0	0	0	0	0	0	1
-56		0	0	0	1	0	0	0	1	0	2
-54		0	0	2	1	0	1	0	0	0	4
-52		0	3	2	3	1	1	0	0	0	10
-50		0	0	4	3	4	3	0	0	0	14
-48		0	0	1	1	6	2	0	1	1	12
-46		0	2	5	3	7	2	0	0	0	19
-44		0	0	2	5	6	4	1	0	0	18
-42		0	1	3	0	4	8	1	0	0	17
-40		0	0	2	0	0	6	2	0	0	10
-38		0	0	2	0	1	4	2	1	1	11
-36		0	0	2	0	1	3	2	0	0	8
-34		0	0	1	0	0	1	0	0	0	2
-32		0	0	0	0	0	1	0	0	0	1
-30		0	0	0	0	0	2	0	0	0	2
-28		0	0	0	0	0	0	0	0	0	0
-26		0	0	0	0	0	0	0	0	0	0
-24		0	0	0	0	0	0	0	0	0	0
-22		0	0	0	0	0	0	0	0	0	0
-20		0	0	0	0	0	0	0	0	0	0
-18		0	0	0	0	0	0	0	0	0	0
-16		0	0	0	0	0	0	0	0	0	0
SUM		0	6	27	17	30	38	8	2	3	131

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB	NUMBER OF ECHOES =	17
B= 1 dB TO B= 2 dB	NUMBER OF ECHOES =	8
B= 2 dB TO B= 3 dB	NUMBER OF ECHOES =	10
B= 3 dB TO B= 4 dB	NUMBER OF ECHOES =	4

TOTAL NUMBER OF RECORDED ECHOES = 1044

NUMBER OF ECHOES USED FOR STATISTICS = 131

AVERAGE BACKSCATTERING CROSS SECTION = .8350E-04 IN dB = -40.78

BACKSCATTERING CROSS SECTION STD DEV = .1522E-03

TARGET STRENGTH STD DEV IN dB =

5.66

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 39

NUMBER OF FISH USED = 131
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .898E+04
DENSITY IN FISH PER CUBIC METER = .146E-01
EQUIVALENT STRATUM LENGTH (%/100) = .9646

Reading file D:\esp\di2.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 1009

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 1 0 5 3 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 0
B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 1
B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 0
B= 3 dB TO B= 4 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 14

NUMBER OF ECHOES USED FOR STATISTICS = 12

AVERAGE BACKSCATTERING CROSS SECTION = .1127E-04 IN dB = -49.48

BACKSCATTERING CROSS SECTION STD DEV = .1367E-04

AVERAGE TARGET STRENGTH IN dB = -51.68

TARGET STRENGTH STD DEV IN dB = 4.26

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 1

NUMBER OF FISH USED = 12
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .182E+03
DENSITY IN FISH PER CUBIC METER = .658E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 4.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 1 1 5 2 5 2 3 1 3 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	2
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	1
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	3
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	1

TOTAL NUMBER OF RECORDED ECHOES = 99

NUMBER OF ECHOES USED FOR STATISTICS = 29

AVERAGE BACKSCATTERING CROSS SECTION = .1758E-04 IN dB = -47.55

BACKSCATTERING CROSS SECTION STD DEV = .1841E-04

AVERAGE TARGET STRENGTH IN dB = -49.36

TARGET STRENGTH STD DEV IN dB = 4.04

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 7

NUMBER OF FISH USED = 29

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .140E+04

DENSITY IN FISH PER CUBIC METER = .207E-01

EQUIVALENT STRATUM LENGTH (%/100) = .9980

SUMMARY OF DATA FROM DEPTH 8.0 TO 10.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	1	1	0	4	4	2	6	4	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	2
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	4
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	1
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	1

TOTAL NUMBER OF RECORDED ECHOES = 63

NUMBER OF ECHOES USED FOR STATISTICS = 22

AVERAGE BACKSCATTERING CROSS SECTION = .4942E-04 IN dB = -43.06

BACKSCATTERING CROSS SECTION STD DEV = .3614E-04

AVERAGE TARGET STRENGTH IN dB = -44.48

TARGET STRENGTH STD DEV IN dB = 3.97

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 8

NUMBER OF FISH USED = 22

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .189E+04

DENSITY IN FISH PER CUBIC METER = .116E-01

EQUIVALENT STRATUM LENGTH (%/100) = .9960

SUMMARY OF DATA FROM DEPTH 10.0 TO 12.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	0	0	2	9	1	4	4	5	6	2	1	0	0	0	0	0	0	0	0	

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	4
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	3
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 44

NUMBER OF ECHOES USED FOR STATISTICS = 25

AVERAGE BACKSCATTERING CROSS SECTION = .1088E-03 IN dB = -39.63

BACKSCATTERING CROSS SECTION STD DEV = .8507E-04

AVERAGE TARGET STRENGTH IN dB = -41.01

TARGET STRENGTH STD DEV IN dB = 3.84

ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 7

NUMBER OF FISH USED = 25

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .288E+04

DENSITY IN FISH PER CUBIC METER = .869E-02

EQUIVALENT STRATUM LENGTH (%/100) = .9947

SUMMARY OF DATA FROM DEPTH 12.0 TO 15.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 5

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	5	3	1	1	0	1	1	0	0	0	0	

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	5
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	2
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 30

NUMBER OF ECHOES USED FOR STATISTICS = 17

AVERAGE BACKSCATTERING CROSS SECTION = .4139E-03 IN dB = -33.83

BACKSCATTERING CROSS SECTION STD DEV = .6429E-03

AVERAGE TARGET STRENGTH IN dB = -36.72

ECHOES WITH BEAM PATTERN FACTORS > 0 dB=

7

NUMBER OF FISH USED = 17
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .588E+04
 DENSITY IN FISH PER CUBIC METER = .289E-02
 EQUIVALENT STRATUM LENGTH (%/100) = .9928

SUMMARY OF DATA FROM DEPTH 2.0 TO 15.0

DEPTH INTERVALS

	FROM TO	2.00 3.30	3.30 4.60	4.60 5.90	5.90 7.20	7.20 8.50	8.50 9.80	9.80 11.10	11.10 12.40	12.40 13.70	13.70 15.00	SUM
TS												
-74	:	0	0	0	0	0	0	0	0	0	0	0
-72	:	0	0	0	0	0	0	0	0	0	0	0
-70	:	0	0	0	0	0	0	0	0	0	0	0
-68	:	0	0	0	0	0	0	0	0	0	0	0
-66	:	0	0	0	0	0	0	0	0	0	0	0
-64	:	0	0	0	0	0	0	0	0	0	0	0
-62	:	0	0	0	0	0	0	0	0	0	0	0
-60	:	0	0	0	0	0	0	0	0	0	0	0
-58	:	1	1	0	0	0	0	0	0	0	0	2
-56	:	0	0	1	0	0	0	0	0	0	0	1
-54	:	5	1	2	2	1	0	0	0	0	0	11
-52	:	3	0	1	0	1	1	0	0	0	0	6
-50	:	0	0	2	2	1	0	2	0	0	0	7
-48	:	1	0	1	6	4	1	0	0	0	0	13
-46	:	0	0	0	0	5	2	1	0	0	0	8
-44	:	2	0	0	1	1	1	3	1	1	0	10
-42	:	0	0	0	2	3	3	5	1	1	0	15
-40	:	0	0	0	0	1	2	3	4	1	0	11
-38	:	0	0	0	0	0	0	4	3	4	0	11
-36	:	0	0	0	0	0	0	2	2	1	0	5
-34	:	0	0	0	0	0	0	1	0	1	0	2
-32	:	0	0	0	0	0	0	0	1	0	0	1
-30	:	0	0	0	0	0	0	0	0	0	0	0
-28	:	0	0	0	0	0	0	0	0	1	0	1
-26	:	0	0	0	0	0	0	0	0	1	0	1
-24	:	0	0	0	0	0	0	0	0	0	0	0
-22	:	0	0	0	0	0	0	0	0	0	0	0
-20	:	0	0	0	0	0	0	0	0	0	0	0
-18	:	0	0	0	0	0	0	0	0	0	0	0
-16	:	0	0	0	0	0	0	0	0	0	0	0
SUM		12	2	7	13	17	10	21	12	11	0	105

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 13
 B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 11
 B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 4
 B= 3 dB TO B= 4 dB NUMBER OF ECHOES = 2

TOTAL NUMBER OF RECORDED ECHOES = 250

NUMBER OF ECHOES USED FOR STATISTICS = 105

AVERAGE BACKSCATTERING CROSS SECTION = .1094E-03 IN dB = -39.61

BACKSCATTERING CROSS SECTION STD DEV = .2915E-03

AVERAGE TARGET STRENGTH IN dB = -44.57

TARGET STRENGTH STD DEV IN dB = 6.45

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 30

NUMBER OF FISH USED = 105
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .971E+04
DENSITY IN FISH PER CUBIC METER = .108E-01
EQUIVALENT STRATUM LENGTH (%/100) = .9963

Reading file D:\esp\di2.dat

Analyzing Run # 2

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 1009

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 0 0 2 1 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB	TO B = 1 dB	NUMBER OF ECHOES =	1
B= 1 dB	TO B = 2 dB	NUMBER OF ECHOES =	0
B= 2 dB	TO B = 3 dB	NUMBER OF ECHOES =	0
B= 3 dB	TO B = 4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 6

NUMBER OF ECHOES USED FOR STATISTICS = 6

AVERAGE BACKSCATTERING CROSS SECTION = .1905E-04 IN dB = -47.20

BACKSCATTERING CROSS SECTION STD DEV = .1849E-04

AVERAGE TARGET STRENGTH IN dB = -49.15

TARGET STRENGTH STD DEV IN dB = 4.61

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 1

NUMBER OF FISH USED = 6
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .182E+03
DENSITY IN FISH PER CUBIC METER = .330E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 4.0 TO 8.0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	1
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	2
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	1

TOTAL NUMBER OF RECORDED ECHOES = 51

NUMBER OF ECHOES USED FOR STATISTICS = 18

AVERAGE BACKSCATTERING CROSS SECTION = .2358E-04 IN dB = -46.27

BACKSCATTERING CROSS SECTION STD DEV = .2068E-04

AVERAGE TARGET STRENGTH IN dB = -47.59

TARGET STRENGTH STD DEV IN dB = 3.42

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 4

NUMBER OF FISH USED = 18

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .139E+04

DENSITY IN FISH PER CUBIC METER = .130E-01

EQUIVALENT STRATUM LENGTH (%/100) = .9930

SUMMARY OF DATA FROM DEPTH 8.0 TO 10.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	1	1	1	4	5	2	7	5	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	3
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	4
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	2

TOTAL NUMBER OF RECORDED ECHOES = 54

NUMBER OF ECHOES USED FOR STATISTICS = 26

AVERAGE BACKSCATTERING CROSS SECTION = .4871E-04 IN dB = -43.12

BACKSCATTERING CROSS SECTION STD DEV = .3503E-04

AVERAGE TARGET STRENGTH IN dB = -44.50

TARGET STRENGTH STD DEV IN dB = 3.85

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 9

NUMBER OF FISH USED = 26

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .187E+04

DENSITY IN FISH PER CUBIC METER = .139E-01

SUMMARY OF DATA FROM DEPTH 10.0 TO 12.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 0 0 0 0 2 0 2 5 4 5 6 2 1 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	5
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	2
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 39

NUMBER OF ECHOES USED FOR STATISTICS = 27

AVERAGE BACKSCATTERING CROSS SECTION = .1034E-03 IN dB = -39.85

BACKSCATTERING CROSS SECTION STD DEV = .8362E-04

AVERAGE TARGET STRENGTH IN dB = -41.27

TARGET STRENGTH STD DEV IN dB = 3.82

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 7

NUMBER OF FISH USED = 27

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .283E+04

DENSITY IN FISH PER CUBIC METER = .954E-02

EQUIVALENT STRATUM LENGTH (%/100) = .9814

SUMMARY OF DATA FROM DEPTH 12.0 TO 15.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 5

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 3 2 5 5 1 1 0 1 1 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	5
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	2
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 30

NUMBER OF ECHOES USED FOR STATISTICS = 21

AVERAGE BACKSCATTERING CROSS SECTION = .3638E-03 IN dB = -34.39

BACKSCATTERING CROSS SECTION STD DEV = .5923E-03

TARGET STRENGTH STD DEV IN dB =

4.71

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 7

NUMBER OF FISH USED = 21
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .576E+04
 DENSITY IN FISH PER CUBIC METER = .365E-02
 EQUIVALENT STRATUM LENGTH (%/100) = .9758

SUMMARY OF DATA FROM DEPTH 2.0 TO 15.0

DEPTH INTERVALS

FROM TO	2.00 3.30	3.30 4.60	4.60 5.90	5.90 7.20	7.20 8.50	8.50 9.80	9.80 11.10	11.10 12.40	12.40 13.70	13.70 15.00	SUM
TS											
-74	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	0	0	0	0	0	0	0	0	0	0	0
-56	0	0	0	0	0	0	0	0	0	0	0
-54	2	0	0	1	1	0	0	0	0	0	4
-52	1	0	1	0	1	1	0	0	0	0	4
-50	0	0	0	2	2	0	2	0	0	0	6
-48	1	0	1	4	3	2	0	0	0	0	11
-46	0	0	0	1	3	3	1	1	1	0	10
-44	2	0	0	1	1	1	3	2	1	0	11
-42	0	0	0	2	4	3	5	3	0	0	17
-40	0	0	0	0	1	3	3	4	1	0	12
-38	0	0	0	0	0	0	4	4	3	0	11
-36	0	0	0	0	0	0	2	3	2	0	7
-34	0	0	0	0	0	0	1	0	1	0	2
-32	0	0	0	0	0	0	0	1	0	0	1
-30	0	0	0	0	0	0	0	0	0	0	0
-28	0	0	0	0	0	0	0	0	1	0	1
-26	0	0	0	0	0	0	0	0	1	0	1
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	6	0	2	11	16	13	21	18	11	0	98

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 15
 B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 8
 B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 2
 B= 3 dB TO B= 4 dB NUMBER OF ECHOES = 3

TOTAL NUMBER OF RECORDED ECHOES = 180

NUMBER OF ECHOES USED FOR STATISTICS = 98

AVERAGE BACKSCATTERING CROSS SECTION = .1249E-03 IN dB = -39.04

BACKSCATTERING CROSS SECTION STD DEV =

.3021E-03

AVERAGE TARGET STRENGTH IN dB =

-42.92

TARGET STRENGTH STD DEV IN dB =

5.49

ECHOES WITH BEAM PATTERN FACTORS > 0 dB=

28

NUMBER OF FISH USED =

98

FULL ANGLE OF CONE =

6.00

ESTIMATED VOLUME IN CUBIC METERS =

.955E+04

DENSITY IN FISH PER CUBIC METER =

.103E-01

EQUIVALENT STRATUM LENGTH (%/100) =

.9873

~~Reading file D:\esp\dl2.dat~~

~~Analyzing Run #~~

Reading file D:\esp\dl2.dat

Analyzing Run #

4

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS =

1009

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 4.0

ARGET STRENGTH DISTRIBUTION FOR STRATUM 1

S -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 0 0 2 1 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	1
=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0
=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES =

6

NUMBER OF ECHOES USED FOR STATISTICS =

6

AVERAGE BACKSCATTERING CROSS SECTION =

.1824E-04 IN dB = -47.39

BACKSCATTERING CROSS SECTION STD DEV =

.1756E-04

AVERAGE TARGET STRENGTH IN dB =

-49.23

TARGET STRENGTH STD DEV IN dB =

4.45

ECHOES WITH BEAM PATTERN FACTORS > 0 dB=

1

NUMBER OF FISH USED =

6

FULL ANGLE OF CONE =

6.00

ESTIMATED VOLUME IN CUBIC METERS =

.175E+03

DENSITY IN FISH PER CUBIC METER =

.342E-01

EQUIVALENT STRATUM LENGTH (%/100) =

1.0000

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	1	0	3	6	6	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	1
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	2
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	2

TOTAL NUMBER OF RECORDED ECHOES = 56

NUMBER OF ECHOES USED FOR STATISTICS = 19

AVERAGE BACKSCATTERING CROSS SECTION = .2532E-04 IN dB = -45.97

BACKSCATTERING CROSS SECTION STD DEV = .1961E-04

AVERAGE TARGET STRENGTH IN dB = -47.02

TARGET STRENGTH STD DEV IN dB = 3.10

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 5

NUMBER OF FISH USED = 19

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .134E+04

DENSITY IN FISH PER CUBIC METER = .142E-01

EQUIVALENT STRATUM LENGTH (%/100) = .9928

SUMMARY OF DATA FROM DEPTH 8.0 TO 10.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	1	0	0	5	5	2	7	6	0	0	0	0	0	0	0	0	0	0	0	

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	3
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	4
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	1

TOTAL NUMBER OF RECORDED ECHOES = 56

NUMBER OF ECHOES USED FOR STATISTICS = 26

AVERAGE BACKSCATTERING CROSS SECTION = .5176E-04 IN dB = -42.86

BACKSCATTERING CROSS SECTION STD DEV = .3437E-04

AVERAGE TARGET STRENGTH IN dB = -44.03

TARGET STRENGTH STD DEV IN dB = 3.57

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 8

FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .180E+04
 DENSITY IN FISH PER CUBIC METER = .144E-01
 EQUIVALENT STRATUM LENGTH (%/100) = .9856

SUMMARY OF DATA FROM DEPTH 10.0 TO 12.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 0 0 0 0 2 0 1 5 4 5 7 2 1 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	4
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	3
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 45
 NUMBER OF ECHOES USED FOR STATISTICS = 27
 AVERAGE BACKSCATTERING CROSS SECTION = .1082E-03 IN dB = -39.66
 BACKSCATTERING CROSS SECTION STD DEV = .8338E-04
 AVERAGE TARGET STRENGTH IN dB = -41.01
 TARGET STRENGTH STD DEV IN dB = 3.79
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 7

NUMBER OF FISH USED = 27
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .273E+04
 DENSITY IN FISH PER CUBIC METER = .989E-02
 EQUIVALENT STRATUM LENGTH (%/100) = .9807

SUMMARY OF DATA FROM DEPTH 12.0 TO 15.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 5

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 3 2 2 3 5 1 1 0 1 1 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	6
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	2
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 32
 NUMBER OF ECHOES USED FOR STATISTICS = 20

BACKSCATTERING CROSS SECTION STD DEV =

.6142E-03

AVERAGE TARGET STRENGTH IN dB =

-37.56

TARGET STRENGTH STD DEV IN dB =

5.10

ECHOES WITH BEAM PATTERN FACTORS > 0 dB=

8

NUMBER OF FISH USED =

20

FULL ANGLE OF CONE =

6.00

ESTIMATED VOLUME IN CUBIC METERS =

.555E+04

DENSITY IN FISH PER CUBIC METER =

.360E-02

EQUIVALENT STRATUM LENGTH (%/100) =

.9750

SUMMARY OF DATA FROM DEPTH 2.0 TO 15.0

DEPTH INTERVALS

FROM TO	2.00 3.30	3.30 4.60	4.60 5.90	5.90 7.20	7.20 8.50	8.50 9.80	9.80 11.10	11.10 12.40	12.40 13.70	13.70 15.00	SUM
TS											
-74	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	0	0	0	0	0	0	0	0	0	0	0
-56	0	0	0	0	0	0	0	0	0	0	0
-54	2	0	0	1	1	0	0	0	0	0	4
-52	1	0	0	0	0	0	0	0	0	0	1
-50	0	0	1	2	0	0	2	0	0	0	5
-48	1	0	1	3	5	2	0	0	0	0	12
-46	0	0	0	3	5	3	1	0	1	0	13
-44	2	0	0	0	1	1	3	2	3	0	12
-42	0	0	0	2	4	3	5	2	0	0	16
-40	0	0	0	0	1	4	3	4	1	0	13
-38	0	0	0	0	0	0	5	2	3	0	10
-36	0	0	0	0	0	0	2	3	2	0	7
-34	0	0	0	0	0	0	1	0	1	0	2
-32	0	0	0	0	0	0	0	1	0	0	1
-30	0	0	0	0	0	0	0	0	0	0	0
-28	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0	0	1	0	1
-24	0	0	0	0	0	0	0	0	1	0	1
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	6	0	2	11	17	13	22	14	13	0	98

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB	TO B= 1 dB	NUMBER OF ECHOES =	15
B= 1 dB	TO B= 2 dB	NUMBER OF ECHOES =	9
B= 2 dB	TO B= 3 dB	NUMBER OF ECHOES =	2
B= 3 dB	TO B= 4 dB	NUMBER OF ECHOES =	3

NUMBER OF ECHOES USED FOR STATISTICS = 98
 AVERAGE BACKSCATTERING CROSS SECTION = .1253E-03 IN dB = -39.02
 BACKSCATTERING CROSS SECTION STD DEV = .3046E-03
 AVERAGE TARGET STRENGTH IN dB = -42.77
 TARGET STRENGTH STD DEV IN dB = 5.30
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 29

NUMBER OF FISH USED = 98
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .921E+04
 DENSITY IN FISH PER CUBIC METER = .106E-01
 EQUIVALENT STRATUM LENGTH (%/100) = .9868

Reading file D:\esp\di2.dat

Analyzing Run # 5

DATA GROUP REPORT FOR TRANSDUCER 1
 TOTAL NUMBER OF PINGS = 1009

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	2	1	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB TO B =	1 dB	NUMBER OF ECHOES =
B=	1 dB TO B =	2 dB	NUMBER OF ECHOES =
	2 dB TO B =	3 dB	NUMBER OF ECHOES =
B=	3 dB TO B =	4 dB	NUMBER OF ECHOES =

TOTAL NUMBER OF RECORDED ECHOES = 6
 NUMBER OF ECHOES USED FOR STATISTICS = 6
 AVERAGE BACKSCATTERING CROSS SECTION = .1889E-04 IN dB = -47.24
 BACKSCATTERING CROSS SECTION STD DEV = .1831E-04
 AVERAGE TARGET STRENGTH IN dB = -49.16
 TARGET STRENGTH STD DEV IN dB = 4.55
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 1

NUMBER OF FISH USED = 6
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .183E+03
 DENSITY IN FISH PER CUBIC METER = .329E-01
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 4.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	1	1	5	4	6	0	3	0	0	0	0	0	0	0	0	0	0	0	0	

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	1
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	1
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	1
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	1

TOTAL NUMBER OF RECORDED ECHOES = 58

NUMBER OF ECHOES USED FOR STATISTICS = 20

AVERAGE BACKSCATTERING CROSS SECTION = .2446E-04 IN dB = -46.12

BACKSCATTERING CROSS SECTION STD DEV = .1940E-04

AVERAGE TARGET STRENGTH IN dB = -47.25

TARGET STRENGTH STD DEV IN dB = 3.25

ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 4

NUMBER OF FISH USED = 20

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .141E+04

DENSITY IN FISH PER CUBIC METER = .142E-01

EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH, 8.0 TO 10.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	2	1	1	4	5	2	6	7	0	0	0	0	0	0	0	0	0	0	0	

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	4
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	4
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	2

TOTAL NUMBER OF RECORDED ECHOES = 56

NUMBER OF ECHOES USED FOR STATISTICS = 28

AVERAGE BACKSCATTERING CROSS SECTION = .4812E-04 IN dB = -43.18

BACKSCATTERING CROSS SECTION STD DEV = .3541E-04

AVERAGE TARGET STRENGTH IN dB = -44.72

NUMBER OF FISH USED = 28
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .190E+04
 DENSITY IN FISH PER CUBIC METER = .147E-01
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 10.0 TO 12.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 0 0 0 0 0 2 0 2 4 4 4 7 2 1 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 4
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 4
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 0
 B= 3 dB TO B = 4 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 42
 NUMBER OF ECHOES USED FOR STATISTICS = 26
 AVERAGE BACKSCATTERING CROSS SECTION = .1028E-03 IN dB = -39.63
 BACKSCATTERING CROSS SECTION STD DEV = .8622E-04
 AVERAGE TARGET STRENGTH IN dB = -41.09
 TARGET STRENGTH STD DEV IN dB = 3.95
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 8

NUMBER OF FISH USED = 26
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .290E+04
 DENSITY IN FISH PER CUBIC METER = .898E-02
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 12.0 TO 15.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 5

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 2 2 5 4 1 1 0 1 1 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 4
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 2
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 0
 B= 3 dB TO B = 4 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 29

AVERAGE BACKSCATTERING CROSS SECTION = .3986E-03 IN dB = -33.99
 BACKSCATTERING CROSS SECTION STD DEV = .6097E-03
 AVERAGE TARGET STRENGTH IN dB = -36.71
 TARGET STRENGTH STD DEV IN dB = 4.55
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 6
 NUMBER OF FISH USED = 18
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .593E+04
 DENSITY IN FISH PER CUBIC METER = .304E-02
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 2.0 TO 15.0

DEPTH INTERVALS

	FROM TO	2.00 3.30	3.30 4.60	4.60 5.90	5.90 7.20	7.20 8.50	8.50 9.80	9.80 11.10	11.10 12.40	12.40 13.70	13.70 15.00	SUM
TS												
-74		0	0	0	0	0	0	0	0	0	0	0
-72		0	0	0	0	0	0	0	0	0	0	0
-70		0	0	0	0	0	0	0	0	0	0	0
-68		0	0	0	0	0	0	0	0	0	0	0
-66		0	0	0	0	0	0	0	0	0	0	0
-64		0	0	0	0	0	0	0	0	0	0	0
-62		0	0	0	0	0	0	0	0	0	0	0
-60		0	0	0	0	0	0	0	0	0	0	0
-58		0	0	0	0	0	0	0	0	0	0	0
-56		0	0	0	0	0	0	0	0	0	0	0
-54		2	0	0	1	1	0	1	0	0	0	5
-52		1	0	0	0	1	1	0	0	0	0	3
-50		0	0	2	2	2	0	2	0	0	0	8
-48		1	0	0	3	3	2	0	0	0	0	9
-46		0	0	0	4	4	3	1	1	0	0	13
-44		2	0	0	0	1	1	2	2	1	0	9
-42		0	0	0	2	3	3	5	2	0	0	15
-40		0	0	0	0	2	4	2	4	1	0	13
-38		0	0	0	0	0	0	5	4	3	0	12
-36		0	0	0	0	0	0	2	2	2	0	6
-34		0	0	0	0	0	0	1	0	1	0	2
-32		0	0	0	0	0	0	0	1	0	0	1
-30		0	0	0	0	0	0	0	0	0	0	0
-28		0	0	0	0	0	0	0	0	0	0	0
-26		0	0	0	0	0	0	0	0	1	0	1
-24		0	0	0	0	0	0	0	0	1	0	1
-22		0	0	0	0	0	0	0	0	0	0	0
-20		0	0	0	0	0	0	0	0	0	0	0
-18		0	0	0	0	0	0	0	0	0	0	0
-16		0	0	0	0	0	0	0	0	0	0	0
SUM		6	0	2	12	17	14	21	16	10	0	98

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 14
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 11
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 1
 B= 3 dB TO B = 4 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 191
 NUMBER OF ECHOES USED FOR STATISTICS = 98
 AVERAGE BACKSCATTERING CROSS SECTION = .1220E-03 IN dB = -39.14
 BACKSCATTERING CROSS SECTION STD DEV = .2932E-03
 AVERAGE TARGET STRENGTH IN dB = -43.07
 TARGET STRENGTH STD DEV IN dB = 5.55
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 29
 NUMBER OF FISH USED = 98
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .978E+04
 DENSITY IN FISH PER CUBIC METER = .100E-01
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

Reading file d:\esp\di3.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 589

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	0	2	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	1
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	1
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 13
 NUMBER OF ECHOES USED FOR STATISTICS = 5
 AVERAGE BACKSCATTERING CROSS SECTION = .1933E-04 IN dB = -47.14
 BACKSCATTERING CROSS SECTION STD DEV = .1439E-04
 AVERAGE TARGET STRENGTH IN dB = -48.27
 TARGET STRENGTH STD DEV IN dB = 3.65
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 2

NUMBER OF FISH USED = 5
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .903E+02
 DENSITY IN FISH PER CUBIC METER = .554E-01
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 4.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	0	0	1	3	2	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	0
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	1
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	1
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 27

NUMBER OF ECHOES USED FOR STATISTICS = 9

AVERAGE BACKSCATTERING CROSS SECTION = .3918E-04 IN dB = -44.07

BACKSCATTERING CROSS SECTION STD DEV = .3075E-04

AVERAGE TARGET STRENGTH IN dB = -45.34

TARGET STRENGTH STD DEV IN dB = 3.57

ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 2

NUMBER OF FISH USED = 9

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .610E+03

DENSITY IN FISH PER CUBIC METER = .148E-01

EQUIVALENT STRATUM LENGTH (%/100) = .8276

SUMMARY OF DATA FROM DEPTH 8.0 TO 10.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	0
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	1
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 7

NUMBER OF ECHOES USED FOR STATISTICS = 2

AVERAGE BACKSCATTERING CROSS SECTION = .2175E-02 IN dB = -26.63

BACKSCATTERING CROSS SECTION STD DEV = .3066E-02

AVERAGE TARGET STRENGTH IN dB = -37.70

1

12.0

[illegible] $> 0 \text{ dB}$

o

10

7

1452E-03

9088E-04

-39.29

3.34

1

7

NO TARGETS FOUND

2.0 TO 15.0

DEPTH INTERVALS

SLIM

-68	0	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0	0
-58	0	0	0	0	0	0	0	0	0	0	0	0
-56	0	0	0	0	0	0	0	0	0	0	0	0
-54	0	0	0	0	0	0	0	0	0	0	0	0
-52	0	2	0	0	1	0	0	0	0	0	0	3
-50	0	0	0	1	0	0	0	0	0	0	0	1
-48	0	1	1	2	0	0	0	0	0	0	0	4
-46	0	1	2	0	0	0	1	0	0	0	0	4
-44	1	0	0	0	0	0	0	0	0	0	0	1
-42	0	0	2	0	0	0	0	0	0	0	0	2
-40	0	0	0	0	1	0	0	2	0	0	0	3
-38	0	0	0	0	0	0	0	3	0	0	0	3
-36	0	0	0	0	0	0	0	1	0	0	0	1
-34	0	0	0	0	0	0	0	0	0	0	0	0
-32	0	0	0	0	0	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0	0	0	0	0	0
-28	0	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	1	0	0	0	0	0	1
-22	0	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0	0

SUM	1	4	5	3	2	1	1	6	0	0	23
-----	---	---	---	---	---	---	---	---	---	---	----

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	1
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	2
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	2
B= 3 dB TO B = 4 dB	NUMBER OF ECHOES =	1

TOTAL NUMBER OF RECORDED ECHOES = 74

NUMBER OF ECHOES USED FOR STATISTICS = 23

AVERAGE BACKSCATTERING CROSS SECTION = .2528E-03 IN dB = -35.97

BACKSCATTERING CROSS SECTION STD DEV = .8946E-03

AVERAGE TARGET STRENGTH IN dB = -43.47

TARGET STRENGTH STD DEV IN dB = 6.59

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 6

NUMBER OF FISH USED = 23

FULL ANGLE OF CONE = 5.00

ESTIMATED VOLUME IN CUBIC METERS = .398E+04

DENSITY IN FISH PER CUBIC METER = .578E-02

EQUIVALENT STRATUM LENGTH (%/100) = .8367

Reading file d:\esp\014\dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 6474

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 2 12 19 24 29 21 12 9 4 0 2 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 23
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 13
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 0
 B= 3 dB TO B = 4 dB NUMBER OF ECHOES = 4

TOTAL NUMBER OF RECORDED ECHOES = 207

NUMBER OF ECHOES USED FOR STATISTICS = 133

AVERAGE BACKSCATTERING CROSS SECTION = .9612E-05 IN dB = -50.17

BACKSCATTERING CROSS SECTION STD DEV = .1233E-04

AVERAGE TARGET STRENGTH IN dB = -52.13

TARGET STRENGTH STD DEV IN dB = 3.91

ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 40

NUMBER OF FISH USED = 133
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .116E+04
 DENSITY IN FISH PER CUBIC METER = .114E+00
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 4.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 0 2 2 4 10 7 9 15 4 6 4 5 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 7
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 3
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 2
 B= 3 dB TO B = 4 dB NUMBER OF ECHOES = 4

TOTAL NUMBER OF RECORDED ECHOES = 185

NUMBER OF ECHOES USED FOR STATISTICS = 169

AVERAGE BACKSCATTERING CROSS SECTION = .3574E-04 IN dB = -44.47

BACKSCATTERING CROSS SECTION STD DEV = .4263E-04

AVERAGE TARGET STRENGTH IN dB = -47.12

TARGET STRENGTH STD DEV IN dB = 4.95

NUMBER OF FISH USED = 169
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .895E+04
DENSITY IN FISH PER CUBIC METER = .771E-02
EQUIVALENT STRATUM LENGTH (%/100) = .9994

SUMMARY OF DATA FROM DEPTH 8.0 TO 10.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 1 0 0 2 0 1 4 1 3 1 2 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 1
B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 2
B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 0
B= 3 dB TO B= 4 dB NUMBER OF ECHOES = 1

TOTAL NUMBER OF RECORDED ECHOES = 74
NUMBER OF ECHOES USED FOR STATISTICS = 15
AVERAGE BACKSCATTERING CROSS SECTION = .5566E-04 IN dB = -42.54
BACKSCATTERING CROSS SECTION STD DEV = .6240E-04
AVERAGE TARGET STRENGTH IN dB = -45.30
TARGET STRENGTH STD DEV IN dB = 3.66
ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 4

NUMBER OF FISH USED = 15
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .119E+05
DENSITY IN FISH PER CUBIC METER = .126E-02
EQUIVALENT STRATUM LENGTH (%/100) = .9827

SUMMARY OF DATA FROM DEPTH 10.0 TO 12.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 3 0 1 2 1 1 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 2
B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 0
B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 1
B= 3 dB TO B= 4 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 75

AVERAGE BACKSCATTERING CROSS SECTION = .1138E-03 IN dB = -39.44
 BACKSCATTERING CROSS SECTION STD DEV = .1108E-03
 AVERAGE TARGET STRENGTH IN dB = -41.58
 TARGET STRENGTH STD DEV IN dB = 4.85
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 3
 NUMBER OF FISH USED = 10
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .162E+05
 DENSITY IN FISH PER CUBIC METER = .619E-03
 EQUIVALENT STRATUM LENGTH (%/100) = .8860

SUMMARY OF DATA FROM DEPTH 12.0 TO 15.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 5

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	1	3	2	2	4	3	3	1	2	0	0	0	0	

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	4
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	1
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	1

TOTAL NUMBER OF RECORDED ECHOES = 142
 NUMBER OF ECHOES USED FOR STATISTICS = 27
 AVERAGE BACKSCATTERING CROSS SECTION = .5213E-03 IN dB = -32.83
 BACKSCATTERING CROSS SECTION STD DEV = .7137E-03
 AVERAGE TARGET STRENGTH IN dB = -36.42
 TARGET STRENGTH STD DEV IN dB = 6.04
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 6
 NUMBER OF FISH USED = 27
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .290E+05
 DENSITY IN FISH PER CUBIC METER = .932E-03
 EQUIVALENT STRATUM LENGTH (%/100) = .7700

SUMMARY OF DATA FROM DEPTH 2.0 TO 15.0

DEPTH INTERVALS

FROM	2.00	3.30	4.60	5.90	7.20	8.50	9.80	11.10	12.40	13.70
TO	3.30	4.60	5.90	7.20	8.50	9.80	11.10	12.40	13.70	15.00

-72	0	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0	0
-60	1	1	0	0	0	0	0	0	0	0	0	2
-58	11	3	0	0	1	0	0	0	0	0	0	15
-56	17	2	2	0	0	0	0	0	0	0	0	21
-54	20	5	1	2	0	0	0	0	0	0	0	28
-52	22	9	6	1	2	0	0	0	0	0	0	40
-50	18	4	4	2	0	0	0	1	0	0	0	29
-48	8	5	5	2	1	1	0	0	0	0	0	22
-46	4	9	8	2	2	3	1	1	1	0	0	31
-44	3	2	1	0	2	1	1	3	0	3	0	16
-42	0	2	2	1	1	3	0	0	1	0	0	10
-40	1	4	1	0	0	1	0	1	1	2	0	11
-38	0	4	0	1	1	1	3	0	2	0	0	12
-36	0	0	0	0	0	0	0	2	1	0	0	3
-34	0	0	0	0	0	0	0	2	1	2	0	5
-32	0	0	0	0	0	0	0	1	2	0	0	3
-30	0	0	0	0	0	0	0	0	0	3	0	3
-28	0	0	0	0	0	0	0	0	1	0	0	1
-26	0	0	0	0	0	0	0	0	2	0	0	2
-24	0	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0	0
SUM	105	50	30	11	10	10	5	11	12	10		254

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 37
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 19
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 3
B= 3 dB TO B = 4 dB NUMBER OF ECHOES = 10

TOTAL NUMBER OF RECORDED ECHOES = 867

NUMBER OF ECHOES USED FOR STATISTICS = 254

AVERAGE BACKSCATTERING CROSS SECTION = .7792E-04 IN dB = -41.08

BACKSCATTERING CROSS SECTION STD DEV = .2785E-03

AVERAGE TARGET STRENGTH IN dB = -48.28

TARGET STRENGTH STD DEV IN dB = 6.81

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 69

NUMBER OF FISH USED = 254
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .528E+05
DENSITY IN FISH PER CUBIC METER = .481E-02
EQUIVALENT STRATUM LENGTH (%/100) = .9243

Reading file d:\esp\014.dat

Analyzing Run # 2

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 1532

DATA FOR FREQUENCY 420.

Table 5.7.

Sampled volumes , numbers of accepted fish and densities in different sonar runs and in different ranges from transducer , R.Thames, Clifton Hampden area, 22.7.1991						
The numbers not accepted for final calculation of density in italics						
	Numbers of accepted fish targets					
	2 shallow runs			Deep record		
range/run	Di12r2	Di12r3	range/run	Di13r1	Di13r2	
2-4.	165	111	2-8.	486	1604	
4-6.	74	106	8-12.	152	144	
6-8.	18	15	12-20.	12	0	
	Sampled volume (m ³)					
2-4.	886	764	2-8.	13200	20600	
4-6.	2630	2290	8-12.	34500	40800	
6-8.	5370	4680	12-20.	27300	0	
	Density (fish/100 m ³)					
2-4.	18.62302	14.5288	2-8.	3.681818	7.786408	
4-6.	2.813688	4.628821	8-12.	0.44058	0.352941	
6-8.	0.335196	0.320513	12-20.	0.043956	0	
						Sum Di13
Tot.tgts	239	217	Tot.tgts	638	1748	2386
Tot.Volume	3516	3054	Tot.Volume	47700	61400	109100
Av dens.	6.797497	7.105435	Av dens.	1.337526	2.846906	2.186984

Table 5.8

TS and length frequency distributions of targets and fish recorded 22.7.1991
R.Thames, Clifton Hampden area, summed for shallow sites and deep site

TS	mm	ts-2 shallow	shallow	deep	fish shallow	Fish deep
-58	46.1					
-56	51.9	2	2	4	45	
-54	58.4	6	16	22	80	
-52	65.7	20	24	44	110	
-50	74	26	26	52	135	
-48	83.4	34	36	70	203	
-46	93.9	56	36	92	206	
-44	106	41	33	74	218	
-42	119	32	28	60	209	
-40	134	20	15	35	209	
-38	151	12	9	21	133	
-36	170	8	4	12	85	
-34	191		2	2	58	
-32	215		1	1	35	
-30	242				13	
-28	273				7	
-26	307				2	
-24	346				1	
	48					
	53					
	63				2	1
	73				13	5
	83				94	25
	93				45	10
	103				9	13
	113				8	13
	123				1	8
	133					20
	143					14
	153				3	13
	163					11
	173					4
	183					1
	193					

Table 5.8 continued

	203						
	213						
	330						
sum		257	232	489	1749	175	138
-58	46.1	0	0	0	0	0	0
-56	51.9	0.8	0.9	0.8	2.573	0	0
-54	58.4	2.3	6.9	4.5	4.574	0	0
-52	65.7	7.8	10	9	6.289	0	0
-50	74	10	11	11	7.719	0	0
-48	83.4	13	16	14	11.61	0	0
-46	93.9	22	16	19	11.78	0	0
-44	106	16	14	15	12.46	0	0
-42	119	12	12	12	11.95	0	0
-40	134	7.8	6.5	7.2	11.95	0	0
-38	151	4.7	3.9	4.3	7.604	0	0
-36	170	3.1	1.7	2.5	4.86	0	0
-34	191	0	0.9	0.4	3.316	0	0
-32	215	0	0.4	0.2	2.001	0	0
-30	242	0	0	0	0.743	0	0
-28	273	0	0	0	0.4	0	0
-26	307	0	0	0	0.114	0	0
-24	346	0	0	0	0.057	0	0
		0	0	0	0	0	0
	48	0	0	0	0	0	0
	53	0	0	0	0	0	0
	63	0	0	0	0	1.14	0.7
	73	0	0	0	0	7.43	3.6
	83	0	0	0	0	53.7	18
	93	0	0	0	0	25.7	7.2
	103	0	0	0	0	5.14	9.4
	113	0	0	0	0	4.57	9.4
	123	0	0	0	0	0.57	5.8
	133	0	0	0	0	0	14
	143	0	0	0	0	0	10



Table 5.8 Continued

	153	0	0	0	0	1.71	9.4	
	163	0	0	0	0	0	8	
	173	0	0	0	0	0	2.9	
	183	0	0	0	0	0	0.7	
	193	0	0	0	0	0	0	
	203	0	0	0	0	0	0	
	213	0	0	0	0	0	0	
	330	0	0	0	0	0	0	
sum		100	100	100	100	100	100	

Postprocessing printouts

279
RIVER THAMES CLIFTON HAMPTON

JULY 22 1991

A12
A13

***** TS Version 2.00 *****
Dual Beam Data Reduction Program
For ESP 281 V1.0x & V2.0x data files

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for BioSonics Scientific Hydroacoustic Applications
Serial Number 5205-V2.00-91-000

Reading file d:\esp\dl12.dat

Analyzing Run # 1

Reading file d:\esp\dl12.dat

Analyzing Run # 2

FILE NUMBER 1 = d:\esp\dl12.dat

FILE NUMBER 2 = d:\esp\dl13.dat

DATA GROUP REPORT FOR TRANSDUCER 1
TOTAL NUMBER OF PINGS =

2346

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	2	6	18	21	27	32	25	21	7	4	2	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	18
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	17
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	4
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	1

TS	-74	-72	-70	-69	-68	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	9	5	2	1	:	:	6	1	0	0	0	0	0	0	0

continued

202

19

951-1

$$IN_{dB} = -46.21$$

8077E-4

-41.25

4.06

5

15

4.00

```

= 537E+04

```

335E-02

9848

2.0 TO 8.0

DEPTH INTERVALS

FROM	2.00	2.60	3.20	3.80	4.40	5.00	5.60	6.20	6.80	7.40
TO	2.60	3.20	3.80	4.40	5.00	5.60	6.20	6.80	7.40	8.00

15

SLIP:

[illegible]

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	32
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	22
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	7
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	2

TOTAL NUMBER OF RECORDED ECHOES = 925

NUMBER OF ECHOES USED FOR STATISTICS = 257

AVERAGE BACKSCATTERING CROSS SECTION = .4618E-04 IN dB = -40.

BACKSCATTERING CROSS SECTION STD DEV = .5133E-04

AVERAGE TARGET STRENGTH IN dB = -43.4

TARGET STRENGTH STD DEV IN dB = 1.1

ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 63

NUMBER OF FISH USED = 257

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .710E+04

DENSITY IN FISH PER CUBIC METER = .362E-01

EQUIVALENT STRATUM LENGTH (%/100) = .9917

Reading file d:\esp\di12.dat

Analyzing Run # 3

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 4231

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	1	11	13	17	20	16	12	10	5	2	4	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	11
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 334

NUMBER OF ECHOES USED FOR STATISTICS = 111

AVERAGE BACKSCATTERING CROSS SECTION = .3533E-04 IN dB = -44.5

BACKSCATTERING CROSS SECTION STD DEV = .5208E-04

AVERAGE TARGET STRENGTH IN dB =

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 11

NUMBER OF FISH USED = 111
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .764E+03
DENSITY IN FISH PER CUBIC METER = .145E+00
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 4.0 TO 6.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 0 1 3 5 7 15 17 19 17 5 3 0 1 1 2 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 9
B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 6
B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 0
B= 3 dB TO B= 4 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 312

NUMBER OF ECHOES USED FOR STATISTICS = 106

AVERAGE BACKSCATTERING CROSS SECTION = .5024E-04 IN dB = -42.99

BACKSCATTERING CROSS SECTION STD DEV = .8375E-04

AVERAGE TARGET STRENGTH IN dB = -45.40

TARGET STRENGTH STD DEV IN dB = 4.48

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 15

NUMBER OF FISH USED = 106
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .229E+04
DENSITY IN FISH PER CUBIC METER = .463E-01
EQUIVALENT STRATUM LENGTH (%/100) = .9994

SUMMARY OF DATA FROM DEPTH 6.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 0 0 0 2 2 1 3 2 1 1 2 0 1 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 0
B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 1
B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 0
B= 3 dB TO B= 4 dB NUMBER OF ECHOES = 1

TOTAL NUMBER OF RECORDED ECHOES =

NUMBER OF ECHOES USED FOR STATISTICS = 15
 AVERAGE BACKSCATTERING CROSS SECTION = .7938E-04 IN dB = -41.06
 BACKSCATTERING CROSS SECTION STD DEV = .1153E-03
 AVERAGE TARGET STRENGTH IN dB = -14.2
 TARGET STRENGTH STD DEV IN dB = 5.41
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 2
 NUMBER OF FISH USED = 15
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .468E+04
 DENSITY IN FISH PER CUBIC METER = .320E-02
 EQUIVALENT STRATUM LENGTH (%/100) = .9982

SUMMARY OF DATA FROM DEPTH 2.0 TO 8.0

DEPTH INTERVALS

	FROM TO	2.00 2.40	2.40 3.20	3.20 3.80	3.80 4.40	4.40 5.00	5.00 5.60	5.60 6.20	6.20 6.80	6.80 7.40	7.40 8.00	
TS	0.00	2.40	3.20	3.80	4.40	5.00	5.60	6.20	6.80	7.40	8.00	
-74		0	0	0	0	0	0	0	0	0	0	
-72		0	0	0	0	0	0	0	0	0	0	
-70		0	0	0	0	0	0	0	0	0	0	
-68		0	0	0	0	0	0	0	0	0	0	
-66		0	0	0	0	0	0	0	0	0	0	
-64		0	0	0	0	0	0	0	0	0	0	
-62		0	0	0	0	0	0	0	0	0	0	
-60		0	0	0	0	0	0	0	0	0	0	
-58		0	0	0	0	0	0	0	0	0	0	
-56		0	0	1	1	0	0	0	0	0	0	
-54		1	7	3	3	1	0	0	0	0	0	
-52		4	6	1	5	4	2	0	0	2	0	
-50		1	12	1	5	2	3	1	1	0	0	
-48		0	7	10	11	5	2	0	1	0	0	
-46		0	9	6	8	7	3	0	2	1	0	
-44		0	4	6	9	3	6	4	0	1	0	
-42		0	5	3	8	7	4	1	0	0	0	
-40		1	3	0	1	8	1	0	1	0	0	
-38		0	1	1	2	2	1	2	0	0	0	
-36		3	0	0	1	0	0	0	0	0	0	
-34		0	0	0	0	1	0	1	0	0	0	
-32		0	0	0	0	1	0	0	0	0	0	
-30		0	0	0	0	0	0	0	0	0	0	
-28		0	0	0	0	0	0	0	0	0	0	
-26		0	0	0	0	0	0	0	0	0	0	
-24		0	0	0	0	0	0	0	0	0	0	
-22		0	0	0	0	0	0	0	0	0	0	
-20		0	0	0	0	0	0	0	0	0	0	
-18		0	0	0	0	0	0	0	0	0	0	
-16		0	0	0	0	0	0	0	0	0	0	
SUM		10	54	32	54	41	23	9	5	4	0	2

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 20
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 7

NUMBER OF RECORDED ECHOES = 836
 OF ECHOES USED FOR STATISTICS = 232
 BACKSCATTERING CROSS SECTION = .4493E-04 IN dB = -43.47
 ATTERING CROSS SECTION STD DEV = .7359E-04
 TARGET STRENGTH IN dB = -46.19
 STRENGTH STD DEV IN dB = 4.57
 DES WITH BEAM PATTERN FACTORS > 0 dB = 28
 R OF FISH USED = 232
 ANGLE OF CONE = 6.00
 MATED VOLUME IN CUBIC METERS = .619E+04
 TY IN FISH PER CUBIC METER = .375E-01
 VALENT STRATUM LENGTH (%/100) = .9991

***** TS Version 2.00 *****
 Dual Beam Data Reduction Program
 For ESP 281 V1.0x & V2.0x data files

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 BioSonics Scientific Hydroacoustic Applications
 Serial Number 5205-V2.00-91-000

ding file D:\ESP\di13.dat
 Analyzing Run # 1
 FILE NUMBER 1 = D:\ESP\di13.dat

A GROUP REPORT FOR TRANSDUCER 1
 TOTAL NUMBER OF PINGS = 9001

A FOR FREQUENCY 420.

ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 0

IBER OF FISH USED = 1
 L ANGLE OF CONE = 6.00
 MATED VOLUME IN CUBIC METERS = .264E+05
 ISITY IN FISH PER CUBIC METER = .379E-04
 JIVALENT STRATUM LENGTH (%/100) = 1.0000

INCL. BIO
 READER

SUMMARY OF DATA FROM DEPTH 2.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 0 0 1 25 52 69 52 19 76 57 31 13 12 1 1 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 46
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 52
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 23
 B= 3 dB TO B = 4 dB NUMBER OF ECHOES = 9

TOTAL NUMBER OF RECORDED ECHOES = 1548

NUMBER OF ECHOES USED FOR STATISTICS = 498

AVERAGE BACKSCATTERING CROSS SECTION = .3990E-04 IN dB = -43.99

BACKSCATTERING CROSS SECTION STD DEV = .5436E-04

AVERAGE TARGET STRENGTH IN dB = -46.45

TARGET STRENGTH STD DEV IN dB = 4.54

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 130

NUMBER OF FISH USED = 498

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .132E+05

DENSITY IN FISH PER CUBIC METER = .378E-01

EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 8.0 TO 10.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 0 0 1 5 5 4 11 13 11 12 11 11 5 13 5 2 2 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 19
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 11
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 6
 B= 3 dB TO B = 4 dB NUMBER OF ECHOES = 3

TOTAL NUMBER OF RECORDED ECHOES = 249

NUMBER OF ECHOES USED FOR STATISTICS = 111

AVERAGE BACKSCATTERING CROSS SECTION = .1764E-03 IN dB = -37.53

BACKSCATTERING CROSS SECTION STD DEV = .2921E-03

AVERAGE TARGET STRENGTH IN dB = -41.83

SENSE STD DEV IN dB =

ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 39

NUMBER OF FISH USED = 111
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .169E+05
 DENSITY IN FISH PER CUBIC METER = .656E-02
 EQUIVALENT STRATUM LENGTH (% 100) = 1.0000

SUMMARY OF DATA FROM DEPTH 10.0 TO 15.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 0 0 0 0 1 1 5 2 2 5 9 5 5 8 0 2 3 4 1 1 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B = 0 dB TO B = 1 dB NUMBER OF ECHOES = 5
 B = 1 dB TO B = 2 dB NUMBER OF ECHOES = 2
 B = 2 dB TO B = 3 dB NUMBER OF ECHOES = 9
 B = 3 dB TO B = 4 dB NUMBER OF ECHOES = 2

TOTAL NUMBER OF RECORDED ECHOES = 142

NUMBER OF ECHOES USED FOR STATISTICS = 63

AVERAGE BACKSCATTERING CROSS SECTION = .5311E-03 IN dB = -12.5

BACKSCATTERING CROSS SECTION STD DEV = .1070E-02

AVERAGE TARGET STRENGTH IN dB = -18.65

TARGET STRENGTH STD DEV IN dB = 7.7

ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 18

NUMBER OF FISH USED = 63
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .428E+05
 DENSITY IN FISH PER CUBIC METER = .147E-02
 EQUIVALENT STRATUM LENGTH (%/100) = .7008

SUMMARY OF DATA FROM DEPTH 15.0 TO 20.0

NO TARGETS FOUND

SUMMARY OF DATA FROM DEPTH 2.0 TO 20.0

DEPTH INTERVALS

FROM 2.00 3.80 5.60 7.40 9.20 11.00 12.80 14.60 16.40 18.20
 TO 3.80 5.60 7.40 9.20 11.00 12.80 14.60 16.40 18.20 20.00

TS

-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	0	0	0	0	0	0	0	0	0	0	0
-56	4	1	1	1	0	0	0	0	0	0	0
-54	21	8	0	4	1	0	0	0	0	0	0
-52	37	11	3	5	2	2	0	0	0	0	0
-50	38	19	9	5	2	1	0	0	0	0	0
-48	45	27	6	11	7	2	0	0	0	0	0
-46	31	21	13	10	5	2	0	0	0	0	0
-44	23	26	22	12	11	1	0	0	0	0	0
-42	17	16	16	18	5	2	0	0	0	0	0
-40	4	10	11	9	12	5	0	0	0	0	0
-38	2	3	6	8	8	2	0	0	0	0	0
-36	2	0	9	4	6	1	0	0	0	0	0
-34	0	1	0	9	9	2	1	0	0	0	0
-32	0	0	0	2	4	0	0	0	0	0	0
-30	0	0	0	0	4	0	0	0	0	0	0
-28	0	0	0	0	5	0	0	0	0	0	0
-26	0	0	0	0	2	2	0	0	0	0	0
-24	0	0	0	0	1	0	0	0	0	0	0
-22	0	0	0	0	0	1	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	224	143	98	98	85	23	1	0	0	0	6

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 70
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 65
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 38
 B= 3 dB TO B = 4 dB NUMBER OF ECHOES = 14

TOTAL NUMBER OF RECORDED ECHOES = 2059

NUMBER OF ECHOES USED FOR STATISTICS = 672

AVERAGE BACKSCATTERING CROSS SECTION = .1085E-03 IN dB = -39.65

BACKSCATTERING CROSS SECTION STD DEV = .3761E-03

AVERAGE TARGET STRENGTH IN dB = -44.99

TARGET STRENGTH STD DEV IN dB = 5.84

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 187

NUMBER OF FISH USED = 672

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .616E+05

DENSITY IN FISH PER CUBIC METER = .109E-01

EQUIVALENT STRATUM LENGTH (%/100) = .6424

Reading file D:\ESP\di13.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 14043

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	0	1	2	1	4	3	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS

B=	0 dB TO B =	1 dB	NUMBER OF ECHOES =
B=	1 dB TO B =	2 dB	NUMBER OF ECHOES =
B=	2 dB TO B =	3 dB	NUMBER OF ECHOES =
B=	3 dB TO B =	4 dB	NUMBER OF ECHOES =

TOTAL NUMBER OF RECORDED ECHOES = 2844

NUMBER OF ECHOES USED FOR STATISTICS = 15

AVERAGE BACKSCATTERING CROSS SECTION = .2705E-03 IN dB = -35.57

BACKSCATTERING CROSS SECTION STD DEV = .2072E-03

AVERAGE TARGET STRENGTH IN dB = -39.54

TARGET STRENGTH STD DEV IN dB = 4.71

ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 1

NUMBER OF FISH USED = 15
 FULL ANGLE OF CONE = 5.00
 ESTIMATED VOLUME IN CUBIC METERS = .205E+05
 DENSITY IN FISH PER CUBIC METER = 731E-03
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 8.0 TO 12.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB TO B =	1 dB	NUMBER OF ECHOES =
B=	1 dB TO B =	2 dB	NUMBER OF ECHOES =
B=	2 dB TO B =	3 dB	NUMBER OF ECHOES =
B=	3 dB TO B =	4 dB	NUMBER OF ECHOES =

TOTAL NUMBER OF RECORDED ECHOES = 276

NUMBER OF ECHOES USED FOR STATISTICS = 1

AVERAGE BACKSCATTERING CROSS SECTION = .1174E-03 IN dB = -39.30

BACKSCATTERING CROSS SECTION STD DEV = .0000E+00

AVERAGE TARGET STRENGTH IN dB = -39.30

-70	0	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0	0
-58	0	0	0	0	0	0	0	0	0	0	0	0
-56	4	1	1	1	0	0	0	0	0	0	0	0
-54	21	8	0	4	1	0	0	0	0	0	0	3
-52	37	11	3	5	3	2	0	0	0	0	0	6
-50	38	19	9	5	2	1	0	0	0	0	0	7
-48	45	27	6	11	7	2	0	0	0	0	0	9
-46	31	21	15	10	5	2	0	0	0	0	0	8
-44	23	26	22	12	11	1	0	0	0	0	0	9
-42	17	16	16	18	5	2	0	0	0	0	0	7
-40	4	10	11	9	12	5	0	0	0	0	0	5
-38	2	3	6	8	8	2	0	0	0	0	0	3
-36	2	0	9	4	6	1	0	0	0	0	0	2
-34	0	1	0	9	9	2	0	0	0	0	0	2
-32	0	0	0	2	4	0	0	0	0	0	0	0
-30	0	0	0	0	4	0	0	0	0	0	0	0
-28	0	0	0	0	5	0	0	0	0	0	0	0
-26	0	0	0	0	2	2	0	0	0	0	0	0
-24	0	0	0	0	1	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0	0
SUM	224	143	98	98	85	23	1	0	0	0	0	64

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	71
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	65
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	35
B= 3 dB TO B = 4 dB	NUMBER OF ECHOES =	14

TOTAL NUMBER OF RECORDED ECHOES = 2069

NUMBER OF ECHOES USED FOR STATISTICS = 672

AVERAGE BACKSCATTERING CROSS SECTION = .1187E+03 IN dB = -29.64

BACKSCATTERING CROSS SECTION STD DEV = .271E+03

AVERAGE TARGET STRENGTH IN dB = -14.71

TARGET STRENGTH STD DEV IN dB = 5.64

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 187

NUMBER OF FISH USED = 672
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .616E+05
DENSITY IN FISH PER CUBIC METER = .109E+01
EQUIVALENT STRATUM LENGTH (%/100) = .6424

Reading file D:\ESP\dl13.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 14043

DATA FOR FREQUENCY 420.

Table 5.9.

Sampled volumes, numbers of accepted fish and densities in different sonar runs and in different ranges from transducer, R. Thames, Clifton Hampden area, 1.8.1991												
The numbers not accepted for final calculation of density in italics												
Numbers of accepted fish targets												
	EXPERIMENT 1			EXPERIMENT 2		EXPERIMENT 3			EXPERIMENT 4			
range/run	Di6r1	Di7r2	Di7r3	Di8r2	Di8r3	Dir1	Dir2	Di10r1	Di10r2	Di10r3	Di11	
2-4.	1	30	0	8	0	0	4	34	62	0	1	
4-6.	13	8	7	4	2	3	0	11	18	6	108	
6-8.	112	8	22	55	25	2	5	73	25	3	175	
8-10.	128	35	6	29	48	0	11	255	76	7	94	
Sampled volume (m ³)												
2-4.	1450	1700	0	2470	400	0	738	1420	491	0	1540	
4-6.	4360	5110	3530	7410	1410	387	0	4250	1470	1030	4620	
6-8.	8910	10500	7210	15200	2820	790	7700	8700	3020	2100	9470	
8-10.	14700	17800	12200	25800	4660	0	31000	14800	5120	3560	16100	
Accepted fish density (inds/100m ³)												
2-4.	0.069	1.765		0.324	0		0.542	2.3944	12.63		0.064935	
4-6.	0.298	0.157	0.198	0.054	0.14	0.7752		0.2588	1.224	0.5825	2.337662	
6-8.	1.257	0.076	0.305	0.362	0.89	0.2532	0.0649	0.8391	0.828	0.1429	1.847941	
8-10.	0.871	0.197	0.049	0.112	1.03		0.0355	1.723	1.484	0.197	0.583851	
Tot. Volume	87470			60170		32096					15630	
Total targets	370			171		246					284	

Table 5.10

2	mm	S3Tgt	S3fish (exp3)	%tg (exp.3)	%fish(e.3)	Tgts(e.4)	Fish(e.4)	%.Tgts(e.4)	%Fish(e.4)
-58	46.1	12		6.4516129		7		1.6949153	
-56	51.9	32		17.2043011		14		3.3898305	
-54	58.4	29		15.5913978		26		6.2953995	
-52	65.7	36		19.3548387		29		7.0217918	
-50	74	22		11.827957		58		14.043584	
-48	83.4	32		17.2043011		54		13.075061	
-46	93.9	13		6.98924731		57		13.801453	
-44	106	7		3.76344086		74		17.917676	
-42	119	3		1.61290323		48		11.622276	
-40	134			0		25		6.0532688	
-38	151					10		2.4213075	
-36	170					7		1.6949153	
-34	191					2		0.4842615	
-32	215					2		0.4842615	
-30	242							0	
-28	273								
-26	307								
-24	346								
	48				0				
	53		10		9.803922		0		
	63		26		25.4902		1		0.952381
	73		10		9.803922		4		3.8095238
	83		11		10.78431		15		14.285714
	93		18		17.64706		27		25.714286
	103		11		10.78431		11		10.47619
	113		8		7.843137		9		8.5714286
	123		3		2.941176		20		19.047619
	133		3		2.941176		5		4.7619048
	143		0		0		4		3.8095238
	153				0		1		0.952381
	163				0		2		1.9047619
	173		2		1.960784		3		2.8571429
	183						1		0.952381
	193								0

Table 5.10

TS and length frequency distributions of targets and fish recorded 1.8.1991
R. Thames, Clifton Hampden area.

Table 5.10 continued

	203						1		0.952381
	213								0
	330						1		0.952381
sum		186	102	100	100	413	105	100	100

RIVER THAMES CLIFTON HAMPTON

AUGUST 1/2 1991 11 files.

Site 1 Di 6, Di 7, Di 8
Site 3 Di Di 10 Di 11

Several runs each.

***** TS Version 2.00 *****
Dual Beam Data Reduction Program
For ESP 2B1 V1.0x & V2.0x data files

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for BioSonics Scientific Hydroacoustic Applications
Serial Number 5205-V2.00-91-000

1.8.91
THAME
S. J

Reading file D:\ESP\DI6.dat

Analyzing Run # 1

FILE NUMBER 1 = D:\ESP\DI6.dat

FILE NUMBER 2 = D:\ESP\DI7.dat

FILE NUMBER 3 = D:\ESP\DI8.dat

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 8214

DATA FOR FREQUENCY 420.

Di 16

SUMMARY OF DATA FROM DEPTH 2.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 1 0

BEAM PATTERN FACTORS > 0 dB

1 dB

NUMBER OF PINGS

SUMMARY OF DATA FROM DEPTH 2.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 1 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 1
B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 0
B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 0
B= 3 dB TO B= 4 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 7

NUMBER OF ECHOES USED FOR STATISTICS = 1

AVERAGE BACKSCATTERING CROSS SECTION = .1093E-06 IN dB = -69.61

BACKSCATTERING CROSS SECTION STD DEV = .0000E+00

AVERAGE TARGET STRENGTH IN dB = -69.61

TARGET STRENGTH STD DEV IN dB = .00

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 1

NUMBER OF FISH USED = 1
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .145E+04
DENSITY IN FISH PER CUBIC METER = .687E-03
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 4.0 TO 6.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 3 1 3 0 3 2 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 2
B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 5
B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 2
B= 3 dB TO B= 4 dB NUMBER OF ECHOES = 1

TOTAL NUMBER OF RECORDED ECHOES = 36

NUMBER OF ECHOES USED FOR STATISTICS = 13

AVERAGE BACKSCATTERING CROSS SECTION = .5443E-06 IN dB = -62.64

BACKSCATTERING CROSS SECTION STD DEV = .5443E-06

AVERAGE TARGET STRENGTH IN dB = -64.43

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 10

NUMBER OF FISH USED = 13
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .436E+04
 DENSITY IN FISH PER CUBIC METER = .298E-02
 EQUIVALENT STRATUM LENGTH (%/100) = .9983

SUMMARY OF DATA FROM DEPTH 6.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 3 8 12 23 27 20 12 6 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 19
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 9
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 3
 B= 3 dB TO B = 4 dB NUMBER OF ECHOES = 3

TOTAL NUMBER OF RECORDED ECHOES = 208
 NUMBER OF ECHOES USED FOR STATISTICS = 112
 AVERAGE BACKSCATTERING CROSS SECTION = .6060E-06 IN dB = -60.94
 BACKSCATTERING CROSS SECTION STD DEV = .6784E-06
 AVERAGE TARGET STRENGTH IN dB = -62.25
 TARGET STRENGTH STD DEV IN dB = 3.46
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 34

NUMBER OF FISH USED = 112
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .291E+04
 DENSITY IN FISH PER CUBIC METER = .126E-01
 EQUIVALENT STRATUM LENGTH (%/100) = .9964

SUMMARY OF DATA FROM DEPTH 8.0 TO 10.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 7 10 14 23 9 11 16 16 6 8 1 0 0 2 2 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 28
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 25
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 13
 B= 3 dB TO B = 4 dB NUMBER OF ECHOES = 8

TOTAL NUMBER OF RECORDED ECHOES = 196
 NUMBER OF ECHOES USED FOR STATISTICS = 139
 AVERAGE BACKSCATTERING CROSS SECTION = .5150E+02 1: 01 -55.87
 BACKSCATTERING CROSS SECTION STD DEV = .1482E+01
 AVERAGE TARGET STRENGTH IN dB = -58.11
 TARGET STRENGTH STD DEV IN dB = 8.7
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 77
 NUMBER OF FISH USED = 128
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .147E+05
 DENSITY IN FISH PER CUBIC METER = .870E-02
 EQUIVALENT STRATUM LENGTH (Z/100) = .9725

SUMMARY OF DATA FROM DEPTH 2.0 TO 10.0

DEPTH INTERVALS											
FROM	2.00	2.80	3.60	4.40	5.20	6.00	6.80	7.60	8.40	9.20	10.00
TO	2.80	3.60	4.40	5.20	6.00	6.80	7.60	8.40	9.20	10.00	
TS											
-74	1	0	0	0	0	0	0	0	0	0	1
-72	1	0	0	0	0	0	0	0	0	0	0
-70	1	0	1	1	2	0	2	1	0	0	7
-68	1	0	0	0	1	0	5	3	1	3	16
-66	1	0	0	2	0	1	4	3	1	2	25
-64	1	0	0	0	0	0	9	7	5	5	37
-62	1	0	0	3	0	0	8	10	28	4	57
-60	1	0	0	1	1	0	8	8	7	4	31
-58	1	0	0	0	0	0	3	4	1	3	21
-56	1	0	0	1	0	0	1	3	3	2	21
-54	1	0	0	0	0	0	0	0	1	2	4
-52	1	0	0	0	0	0	0	0	1	0	2
-50	1	0	0	0	0	0	0	0	1	3	8
-48	1	0	0	0	0	0	0	6	3	3	14
-46	1	0	0	0	0	0	0	0	1	0	0
-44	1	0	0	0	0	0	0	0	0	0	0
-42	1	0	0	0	0	0	0	0	0	2	2
-40	1	0	0	0	0	0	0	0	0	0	0
-38	1	0	0	0	0	0	0	0	0	0	0
-36	1	0	0	0	0	0	0	0	0	0	0
-34	1	0	0	0	0	0	0	0	0	0	0
-32	1	0	0	0	0	0	0	0	0	0	0
-30	1	0	0	0	0	0	0	0	0	0	0
-28	1	0	0	0	0	0	0	0	0	0	0
-26	1	0	0	0	0	0	0	0	0	0	0
-24	1	0	0	0	0	0	0	0	0	0	0
-22	1	0	0	0	0	0	0	0	0	0	0
-20	1	0	0	0	0	0	0	0	0	0	0
-18	1	0	0	0	0	0	0	0	0	0	0
-16	1	0	0	0	0	0	0	0	0	0	0
SUM	0	1	8	4	1	40	39	80	66	15	254

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

0- 0.45 TO 0.45 1.45 2.45 3.45 4.45 5.45 6.45 7.45 8.45 9.45 10.45 11.45 12.45 13.45 14.45 15.45 16.45 17.45 18.45 19.45 20.45 21.45 22.45 23.45 24.45 25.45 26.45 27.45 28.45 29.45 30.45 31.45 32.45 33.45 34.45 35.45 36.45 37.45 38.45 39.45 40.45 41.45 42.45 43.45 44.45 45.45 46.45 47.45 48.45 49.45 50.45 51.45 52.45 53.45 54.45 55.45 56.45 57.45 58.45 59.45 60.45 61.45 62.45 63.45 64.45 65.45 66.45 67.45 68.45 69.45 70.45 71.45 72.45 73.45 74.45 75.45 76.45 77.45 78.45 79.45 80.45 81.45 82.45 83.45 84.45 85.45 86.45 87.45 88.45 89.45 90.45 91.45 92.45 93.45 94.45 95.45 96.45 97.45 98.45 99.45 100.45 101.45 102.45 103.45 104.45 105.45 106.45 107.45 108.45 109.45 110.45 111.45 112.45 113.45 114.45 115.45 116.45 117.45 118.45 119.45 120.45 121.45 122.45 123.45 124.45 125.45 126.45 127.45 128.45 129.45 130.45 131.45 132.45 133.45 134.45 135.45 136.45 137.45 138.45 139.45 140.45 141.45 142.45 143.45 144.45 145.45 146.45 147.45 148.45 149.45 150.45 151.45 152.45 153.45 154.45 155.45 156.45 157.45 158.45 159.45 160.45 161.45 162.45 163.45 164.45 165.45 166.45 167.45 168.45 169.45 170.45 171.45 172.45 173.45 174.45 175.45 176.45 177.45 178.45 179.45 180.45 181.45 182.45 183.45 184.45 185.45 186.45 187.45 188.45 189.45 190.45 191.45 192.45 193.45 194.45 195.45 196.45 197.45 198.45 199.45 200.45 201.45 202.45 203.45 204.45 205.45 206.45 207.45 208.45 209.45 210.45 211.45 212.45 213.45 214.45 215.45 216.45 217.45 218.45 219.45 220.45 221.45 222.45 223.45 224.45 225.45 226.45 227.45 228.45 229.45 230.45 231.45 232.45 233.45 234.45 235.45 236.45 237.45 238.45 239.45 240.45 241.45 242.45 243.45 244.45 245.45 246.45 247.45 248.45 249.45 250.45 251.45 252.45 253.45 254.45 255.45 256.45 257.45 258.45 259.45 260.45 261.45 262.45 263.45 264.45 265.45 266.45 267.45 268.45 269.45 270.45 271.45 272.45 273.45 274.45 275.45 276.45 277.45 278.45 279.45 280.45 281.45 282.45 283.45 284.45 285.45 286.45 287.45 288.45 289.45 290.45 291.45 292.45 293.45 294.45 295.45 296.45 297.45 298.45 299.45 300.45 301.45 302.45 303.45 304.45 305.45 306.45 307.45 308.45 309.45 310.45 311.45 312.45 313.45 314.45 315.45 316.45 317.45 318.45 319.45 320.45 321.45 322.45 323.45 324.45 325.45 326.45 327.45 328.45 329.45 330.45 331.45 332.45 333.45 334.45 335.45 336.45 337.45 338.45 339.45 340.45 341.45 342.45 343.45 344.45 345.45 346.45 347.45 348.45 349.45 350.45 351.45 352.45 353.45 354.45 355.45 356.45 357.45 358.45 359.45 360.45 361.45 362.45 363.45 364.45 365.45 366.45 367.45 368.45 369.45 370.45 371.45 372.45 373.45 374.45 375.45 376.45 377.45 378.45 379.45 380.45 381.45 382.45 383.45 384.45 385.45 386.45 387.45 388.45 389.45 390.45 391.45 392.45 393.45 394.45 395.45 396.45 397.45 398.45 399.45 400.45 401.45 402.45 403.45 404.45 405.45 406.45 407.45 408.45 409.45 410.45 411.45 412.45 413.45 414.45 415.45 416.45 417.45 418.45 419.45 420.45 421.45 422.45 423.45 424.45 425.45 426.45 427.45 428.45 429.45 430.45 431.45 432.45 433.45 434.45 435.45 436.45 437.45 438.45 439.45 440.45 441.45 442.45 443.45 444.45 445.45 446.45 447.45 448.45 449.45 450.45 451.45 452.45 453.45 454.45 455.45 456.45 457.45 458.45 459.45 460.45 461.45 462.45 463.45 464.45 465.45 466.45 467.45 468.45 469.45 470.45 471.45 472.45 473.45 474.45 475.45 476.45 477.45 478.45 479.45 480.45 481.45 482.45 483.45 484.45 485.45 486.45 487.45 488.45 489.45 490.45 491.45 492.45 493.45 494.45 495.45 496.45 497.45 498.45 499.45 500.45 501.45 502.45 503.45 504.45 505.45 506.45 507.45 508.45 509.45 510.45 511.45 512.45 513.45 514.45 515.45 516.45 517.45 518.45 519.45 520.45 521.45 522.45 523.45 524.45 525.45 526.45 527.45 528.45 529.45 530.45 531.45 532.45 533.45 534.45 535.45 536.45 537.45 538.45 539.45 540.45 541.45 542.45 543.45 544.45 545.45 546.45 547.45 548.45 549.45 550.45 551.45 552.45 553.45 554.45 555.45 556.45 557.45 558.45 559.45 560.45 561.45 562.45 563.45 564.45 565.45 566.45 567.45 568.45 569.45 570.45 571.45 572.45 573.45 574.45 575.45 576.45 577.45 578.45 579.45 580.45 581.45 582.45 583.45 584.45 585.45 586.45 587.45 588.45 589.45 590.45 591.45 592.45 593.45 594.45 595.45 596.45 597.45 598.45 599.45 600.45 601.45 602.45 603.45 604.45 605.45 606.45 607.45 608.45 609.45 610.45 611.45 612.45 613.45 614.45 615.45 616.45 617.45 618.45 619.45 620.45 621.45 622.45 623.45 624.45 625.45 626.45 627.45 628.45 629.45 630.45 631.45 632.45 633.45 634.45 635.45 636.45 637.45 638.45 639.45 640.45 641.45 642.45 643.45 644.45 645.45 646.45 647.45 648.45 649.45 650.45 651.45 652.45 653.45 654.45 655.45 656.45 657.45 658.45 659.45 660.45 661.45 662.45 663.45 664.45 665.45 666.45 667.45 668.45 669.45 670.45 671.45 672.45 673.45 674.45 675.45 676.45 677.45 678.45 679.45 680.45 681.45 682.45 683.45 684.45 685.45 686.45 687.45 688.45 689.45 690.45 691.45 692.45 693.45 694.45 695.45 696.45 697.45 698.45 699.45 700.45 701.45 702.45 703.45 704.45 705.45 706.45 707.45 708.45 709.45 710.45 711.45 712.45 713.45 714.45 715.45 716.45 717.45 718.45 719.45 720.45 721.45 722.45 723.45 724.45 725.45 726.45 727.45 728.45 729.45 730.45 731.45 732.45 733.45 734.45 735.45 736.45 737.45 738.45 739.45 740.45 741.45 742.45 743.45 744.45 745.45 746.45 747.45 748.45 749.45 750.45 751.45 752.45 753.45 754.45 755.45 756.45 757.45 758.45 759.45 760.45 761.45 762.45 763.45 764.45 765.45 766.45 767.45 768.45 769.45 770.45 771.45 772.45 773.45 774.45 775.45 776.45 777.45 778.45 779.45 780.45 781.45 782.45 783.45 784.45 785.45 786.45 787.45 788.45 789.45 790.45 791.45 792.45 793.45 794.45 795.45 796.45 797.45 798.45 799.45 800.45 801.45 802.45 803.45 804.45 805.45 806.45 807.45 808.45 809.45 810.45 811.45 812.45 813.45 814.45 815.45 816.45 817.45 818.45 819.45 820.45 821.45 822.45 823.45 824.45 825.45 826.45 827.45 828.45 829.45 830.45 831.45 832.45 833.45 834.45 835.45 836.45 837.45 838.45 839.45 840.45 841.45 842.45 843.45 844.45 845.45 846.45 847.45 848.45 849.45 850.45 851.45 852.45 853.45 854.45 855.45 856.45 857.45 858.45 859.45 860.45 861.45 862.45 863.45 864.45 865.45 866.45 867.45 868.45 869.45 870.45 871.45 872.45 873.45 874.45 875.45 876.45 877.45 878.45 879.45 880.45 881.45 882.45 883.45 884.45 885.45 886.45 887.45 888.45 889.45 890.45 891.45 892.45 893.45 894.45 895.45 896.45 897.45 898.45 899.45 900.45 901.45 902.45 903.45 904.45 905.45 906.45 907.45 908.45 909.45 910.45 911.45 912.45 913.45 914.45 915.45 916.45 917.45 918.45 919.45 920.45 921.45 922.45 923.45 924.45 925.45 926.45 927.45 928.45 929.45 930.45 931.45 932.45 933.45 934.45 935.45 936.45 937.45 938.45 939.45 940.45 941.45 942.45 943.45 944.45 945.45 946.45 947.45 948.45 949.45 950.45 951.45 952.45 953.45 954.45 955.45 956.45 957.45 958.45 959.45 960.45 961.45 962.45 963.45 964.45 965.45 966.45 967.45 968.45 969.45 970.45 971.45 972.45 973.45 974.45 975.45 976.45 977.45 978.45 979.45 980.45 981.45 982.45 983.45 984.45 985.45 986.45 987.45 988.45 989.45 990.45 991.45 992.45 993.45 994.45 995.45 996.45 997.45 998.45 999.45 1000.45 1001.45 1002.45 1003.45 1004.45 1005.45 1006.45 1007.45 1008.45 1009.45 1010.45 1011.45 1012.45 1013.45 1014.45 1015.45 1016.45 1017.45 1018.45 1019.45 1020.45 1021.45 1022.45 1023.45 1024.45 1025.45 1026.45 1027.45 1028.45 1029.45 1030.45 1031.45 1032.45 1033.45 1034.45 1035.45 1036.45 1037.45 1038.45 1039.45 1040.45 1041.45 1042.45 1043.45 1044.45 1045.45 1046.45 1047.45 1048.45 1049.45 1050.45 1051.45 1052.45 1053.45 1054.45 1055.45 1056.45 1057.45 1058.45 1059.45 1060.45 1061.45 1062.45 1063.45 1064.45 1065.45 1066.45 1067.45 1068.45 1069.45 1070.45 1071.45 1072.45 1073.45 1074.45 1075.45 1076.45 1077.45 1078.45 1079.45 1080.45 1081.45 1082.45 1083.45 1084.45 1085.45 1086.45 1087.45 1088.45 1089.45 1090.45 1091.45 1092.45 1093.45 1094.45 1095.45 1096.45 1097.45 1098.45 1099.45 1100.45 1101.45 1102.45 1103.45 1104.45 1105.45 1106.45 1107.45 1108.45 1109.45 1110.45 1111.45 1112.45 1113.45 1114.45 1115.45 1116.45 1117.45 1118.45 1119.45 1120.45 1121.45 1122.45 1123.45 1124.45 1125.45 1126.45 1127.45 1128.45 1129.45 1130.45 1131.45 1132.45 1133.45 1134.45 1135.45 1136.45 1137.45 1138.45 1139.45 1140.45 1141.45 1142.45 1143.45 1144.45 1145.45 1146.45 1147.45 1148.45 1149.45 1150.45 1151.45 1152.45 1153.45 1154.45 1155.45 1156.45 1157.45 1158.45 1159.45 1160.45 1161.45 1162.45 1163.45 1164.45 1165.45 1166.45 1167.45 1168.45 1169.45 1170.45 1171.45 1172.45 1173.45 1174.45 1175.45 1176.45 1177.45 1178.45 1179.45 1180.45 1181.45 1182.45 1183.45 1184.45 1185.45 1186.45 1187.45 1188.45 1189.45 1190.45 1191.45 1192.45 1193.45 1194.45 1195.45 1196.45 1197.45 1198.45 1199.45 1200.45 1201.45 1202.45 1203.45 1204.45 1205.45 1206.45 1207.45 1208.45 1209.45 1210.45 1211.45 1212.45 1213.45 1214.45 1215.45 1216.45 1217.45 1218.45 1219.45 1220.45 1221.45 1222.45 1223.45 1224.45 1225.45 1226.45 1227.45 1228.45 1229.45 1230.45 1231.45 1232.45 1233.45 1234.45 1235.45 1236.45 1237.45 1238.45 1239.45 1240.45 1241.45 1242.45 1243.45 1244.45 1245.45 1246.45 1247.45 1248.45 1249.45 1250.45 1251.45 1252.45 1253.45 1254.45 1255.45 1256.45 1257.45 1258.45 1259.45 1260.45 1261.45 1262.45 1263.45 1264.45 1265.45 1266.45 1267.45 1268.45 1269.4

B= 2 dB TO B = 3 dB
B= 3 dB TO B = 4 dB

NUMBER OF ECHOES = 18
NUMBER OF ECHOES = 12

TOTAL NUMBER OF RECORDED ECHOES = 498
NUMBER OF ECHOES USED FOR STATISTICS = 254
AVERAGE BACKSCATTERING CROSS SECTION = .2984E-05 IN dB = -55.25
BACKSCATTERING CROSS SECTION STD DEV = .1073E-04
AVERAGE TARGET STRENGTH IN dB = -60.41
TARGET STRENGTH STD DEV IN dB = 5.48
ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 119

NUMBER OF FISH USED = 254
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .226E+05
DENSITY IN FISH PER CUBIC METER = .112E-01
EQUIVALENT STRATUM LENGTH (%/100) = .9899

Reading file D:\ESP\017.dat

Analyzing Run # 1

Reading file D:\ESP\017.dat

Analyzing Run # 2

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 7907

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 4 9 9 4 4 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 4
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 12
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 4
B= 3 dB TO B = 4 dB NUMBER OF ECHOES = 2

TOTAL NUMBER OF RECORDED ECHOES = 37
NUMBER OF ECHOES USED FOR STATISTICS = 30
AVERAGE BACKSCATTERING CROSS SECTION = .2669E-06 IN dB = -65.74
BACKSCATTERING CROSS SECTION STD DEV = .1700E-06
AVERAGE TARGET STRENGTH IN dB = -66.46
TARGET STRENGTH STD DEV IN dB = 2.49
ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 22

ESTIMATED VOLUME IN CUBIC METERS = .170E+04
DENSITY IN FISH PER CUBIC METER = .176E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 4.0 TO 6.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 3 0 2 1 1 1 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB	TO B= 1 dB	NUMBER OF ECHOES =	0
B= 1 dB	TO B= 2 dB	NUMBER OF ECHOES =	0
B= 2 dB	TO B= 3 dB	NUMBER OF ECHOES =	3
B= 3 dB	TO B= 4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 19

NUMBER OF ECHOES USED FOR STATISTICS = 8

AVERAGE BACKSCATTERING CROSS SECTION = .5933E-06 IN dB = -62.27

BACKSCATTERING CROSS SECTION STD DEV = .5893E-06

AVERAGE TARGET STRENGTH IN dB = -63.96

TARGET STRENGTH STD DEV IN dB = 4.07

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 3

NUMBER OF FISH USED = 8
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .511E+04
DENSITY IN FISH PER CUBIC METER = .157E-02
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 6.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 2 1 1 3 1 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB	TO B= 1 dB	NUMBER OF ECHOES =	2
B= 1 dB	TO B= 2 dB	NUMBER OF ECHOES =	1
B= 2 dB	TO B= 3 dB	NUMBER OF ECHOES =	0
B= 3 dB	TO B= 4 dB	NUMBER OF ECHOES =	1

TOTAL NUMBER OF RECORDED ECHOES = 12

NUMBER OF ECHOES USED FOR STATISTICS = 8

1.773E-06

-66.11

3. 18

4.

29

6.00

= .105E+05

765E-00

1.0000

8.0 TO 10.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

[illegible]

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	2
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	2
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	1

TOTAL NUMBER OF RECORDED ECHOES = 94.

NUMBER OF ECHDES USED FOR STATISTICS = 35

AVERAGE BACKSCATTERING CROSS SECTION = .4016E-05 IN dB = -53.96

BACKSCATTERING CROSS SECTION STD DEV = .8206E-05

AVERAGE TARGET STRENGTH IN dB = -59.25

TARGET STRENGTH STD DEV IN dB = 6.84

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# ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 5
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35

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178E+05

197F-02

1.0000

SUMMARY OF DATA FROM DEPTH 2.0 TO 10.0

DEPTH INTERVALS

[illegible]

-66	1	4	4	0	0	0	1	0	0	3	13
-64	2	2	2	0	0	0	3	0	0	5	14
-62	0	3	2	0	0	0	1	0	0	4	10
-60	0	0	1	0	0	0	0	0	1	3	5
-58	0	0	0	0	1	0	0	0	1	2	4
-56	0	0	0	0	0	0	0	0	0	2	2
-54	0	0	0	0	0	0	0	0	0	1	1
-52	0	0	0	0	0	0	0	0	0	4	4
-50	0	0	0	0	0	0	0	0	0	3	3
-48	0	0	0	0	0	0	0	0	0	1	1
-46	0	0	0	0	0	0	0	0	0	0	0
-44	0	0	0	0	0	0	0	0	0	1	1
-42	0	0	0	0	0	0	0	0	0	0	0
-40	0	0	0	0	0	0	0	0	0	0	0
-38	0	0	0	0	0	0	0	0	0	0	0
-36	0	0	0	0	0	0	0	0	0	0	0
-34	0	0	0	0	0	0	0	0	0	0	0
-32	0	0	0	0	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0	0	0	0	0
-28	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0

SUM	9	14	13	1	1	0	8	0	2	33	81
-----	---	----	----	---	---	---	---	---	---	----	----

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB	NUMBER OF ECHOES =	8
B= 1 dB TO B= 2 dB	NUMBER OF ECHOES =	15
B= 2 dB TO B= 3 dB	NUMBER OF ECHOES =	7
B= 3 dB TO B= 4 dB	NUMBER OF ECHOES =	4

TOTAL NUMBER OF RECORDED ECHOES = 169

NUMBER OF ECHOES USED FOR STATISTICS = 81

AVERAGE BACKSCATTERING CROSS SECTION = .1923E-05 TN dB = -57.16

BACKSCATTERING CROSS SECTION STD DEV = .5661E-05

AVERAGE TARGET STRENGTH IN dB = -63.06

TARGET STRENGTH STD DEV IN dB = 6.01

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 34

NUMBER OF FISH USED = 81
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .270E+05
DENSITY IN FISH PER CUBIC METER = .300E-02
EQUIVALENT STRATUM LENGTH (Z/100) = 1.0000

Reading file D:\ESPY017.dat

Analyzing Run # 3

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 6604

DATA FOR FREQUENCY 420.

17

SUMMARY OF DATA FROM DEPTH 2.0 TO 4.0
NO TARGETS FOUND

SUMMARY OF DATA FROM DEPTH 4.0 TO 6.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	3	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	0
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	3
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 19

NUMBER OF ECHOES USED FOR STATISTICS = 7

AVERAGE BACKSCATTERING CROSS SECTION = .3794E-06 IN dB = -64.21

BACKSCATTERING CROSS SECTION STD DEV = .2908E-06

AVERAGE TARGET STRENGTH IN dB = -65.21

TARGET STRENGTH STD DEV IN dB = 3.10

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 3

NUMBER OF FISH USED = 7
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .353E+04
DENSITY IN FISH PER CUBIC METER = .198E-02
EQUIVALENT STRATUM LENGTH (%/100) = .9975

SUMMARY OF DATA FROM DEPTH 6.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	4	0	1	7	7	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	3
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	1
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 27

NUMBER OF ECHOES USED FOR STATISTICS = 22

AVERAGE BACKSCATTERING CROSS SECTION = .4956E-06 IN dB = -63.05

AVERAGE TARGET STRENGTH IN dB =

-63.98

TARGET STRENGTH STD DEV IN dB =

3.20

ECHOES WITH BEAM PATTERN FACTORS > 0 dB=

4

NUMBER OF FISH USED =

22

FULL ANGLE OF CONE =

6.00

ESTIMATED VOLUME IN CUBIC METERS = .721E+04

DENSITY IN FISH PER CUBIC METER = .305E-02

EQUIVALENT STRATUM LENGTH (%/100) = .9949

SUMMARY OF DATA FROM DEPTH 8.0 TO 10.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	2	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	2
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	1

TOTAL NUMBER OF RECORDED ECHOES = 14

NUMBER OF ECHOES USED FOR STATISTICS = 6

AVERAGE BACKSCATTERING CROSS SECTION = .2790E-06 IN dB = -65.54

BACKSCATTERING CROSS SECTION STD DEV = .1572E-06

AVERAGE TARGET STRENGTH IN dB = -66.31

TARGET STRENGTH STD DEV IN dB = 3.03

ECHOES WITH BEAM PATTERN FACTORS > 0 dB=

3

NUMBER OF FISH USED =

6

FULL ANGLE OF CONE =

6.00

ESTIMATED VOLUME IN CUBIC METERS = .122E+05

DENSITY IN FISH PER CUBIC METER = .491E-03

EQUIVALENT STRATUM LENGTH (%/100) = .9925

SUMMARY OF DATA FROM DEPTH 2.0 TO 10.0

DEPTH INTERVALS

FROM	2.00	2.80	3.60	4.40	5.20	6.00	6.80	7.60	8.40	9.20
TO	2.80	3.60	4.40	5.20	6.00	6.80	7.60	8.40	9.20	10.00

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SI

-60	0	0	1	0	0	0	3	0	0	0	0
-58	0	0	0	0	0	0	0	0	0	0	0
-56	0	0	0	0	0	0	0	0	0	0	0
-54	0	0	0	0	0	0	0	0	0	0	0
-52	0	0	0	0	0	0	0	0	0	0	0
-50	0	0	0	0	0	0	0	0	0	0	0
-48	0	0	0	0	0	0	0	0	0	0	0
-46	0	0	0	0	0	0	0	0	0	0	0
-44	0	0	0	0	0	0	0	0	0	0	0
-42	0	0	0	0	0	0	0	0	0	0	0
-40	0	0	0	0	0	0	0	0	0	0	0
-38	0	0	0	0	0	0	0	0	0	0	0
-36	0	0	0	0	0	0	0	0	0	0	0
-34	0	0	0	0	0	0	0	0	0	0	0
-32	0	0	0	0	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0	0	0	0	0
-28	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	0	0	5	1	1	5	17	0	0	6	35

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	5
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	0
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	4
B= 3 dB TO B = 4 dB	NUMBER OF ECHOES =	1

TOTAL NUMBER OF RECORDED ECHOES = 64

NUMBER OF ECHOES USED FOR STATISTICS = 35

AVERAGE BACKSCATTERING CROSS SECTION = .4352E-06 IN dB = -63.61

BACKSCATTERING CROSS SECTION STD DEV = .2836E-06

AVERAGE TARGET STRENGTH IN dB = -64.62

AT STRENGTH STD DEV IN dB = 3.20

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 10

NUMBER OF FISH USED = 35

ULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .186E+05

DENSITY IN FISH PER CUBIC METER = .188E-02

EQUIVALENT STRATUM LENGTH (%/100) = .9962

reading file D:\ESP\DI8.dat
Analyzing Run # 1
DATA GROUP REPORT FOR TRANSDUCER 1
TOTAL NUMBER OF PINGS=

791

DI8

1.8.91

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 4.0 TO 6.0
NO TARGETS FOUND

SUMMARY OF DATA FROM DEPTH 6.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	5	7	4	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	4
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	6
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	1
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 33

NUMBER OF ECHOES USED FOR STATISTICS = 22

AVERAGE BACKSCATTERING CROSS SECTION = .5267E-06 IN dB = -62.78

BACKSCATTERING CROSS SECTION STD DEV = .3124E-06

AVERAGE TARGET STRENGTH IN dB = -63.44

TARGET STRENGTH STD DEV IN dB = 2.39

ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 11

NUMBER OF FISH USED = 22

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .812E+03

DENSITY IN FISH PER CUBIC METER = .271E-01

EQUIVALENT STRATUM LENGTH (%/100) = .9803

SUMMARY OF DATA FROM DEPTH 8.0 TO 10.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	0
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 2

AVERAGE BACKSCATTERING CROSS SECTION = .3633E-06 IN dB = -64.40
 BACKSCATTERING CROSS SECTION STD DEV = .0000E+00
 AVERAGE TARGET STRENGTH IN dB = -64.40
 TARGET STRENGTH STD DEV IN dB = .00
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 0
 NUMBER OF FISH USED = 1
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .136E+04
 DENSITY IN FISH PER CUBIC METER = .735E-03
 EQUIVALENT STRATUM LENGTH (%/100) = .9674

SUMMARY OF DATA FROM DEPTH 2.0 TO 10.0

DEPTH INTERVALS

	FROM TO	2.00 2.80	2.80 3.60	3.60 4.40	4.40 5.20	5.20 6.00	6.00 6.80	6.80 7.60	7.60 8.40	8.40 9.20	9.20 10.00	SUM
TS												
-74	:	0	0	0	0	0	0	0	0	0	0	0
-72	:	0	0	0	0	0	0	0	0	0	0	0
-70	:	0	0	0	0	0	0	0	0	0	0	0
-68	:	0	0	0	0	0	0	0	0	0	0	0
-66	:	0	0	0	0	0	3	1	2	0	0	6
-64	:	0	0	0	0	0	5	1	2	0	0	8
-62	:	0	0	0	0	0	4	0	0	0	0	4
-60	:	0	0	0	0	0	3	2	0	0	0	5
-58	:	0	0	0	0	0	0	0	0	0	0	0
-56	:	0	0	0	0	0	0	0	0	0	0	0
-54	:	0	0	0	0	0	0	0	0	0	0	0
-52	:	0	0	0	0	0	0	0	0	0	0	0
-50	:	0	0	0	0	0	0	0	0	0	0	0
-48	:	0	0	0	0	0	0	0	0	0	0	0
-46	:	0	0	0	0	0	0	0	0	0	0	0
-44	:	0	0	0	0	0	0	0	0	0	0	0
-42	:	0	0	0	0	0	0	0	0	0	0	0
-40	:	0	0	0	0	0	0	0	0	0	0	0
-38	:	0	0	0	0	0	0	0	0	0	0	0
-36	:	0	0	0	0	0	0	0	0	0	0	0
-34	:	0	0	0	0	0	0	0	0	0	0	0
-32	:	0	0	0	0	0	0	0	0	0	0	0
-30	:	0	0	0	0	0	0	0	0	0	0	0
-28	:	0	0	0	0	0	0	0	0	0	0	0
-26	:	0	0	0	0	0	0	0	0	0	0	0
-24	:	0	0	0	0	0	0	0	0	0	0	0
-22	:	0	0	0	0	0	0	0	0	0	0	0
-20	:	0	0	0	0	0	0	0	0	0	0	0
-18	:	0	0	0	0	0	0	0	0	0	0	0
-16	:	0	0	0	0	0	0	0	0	0	0	0
SUM		0	0	0	0	0	15	4	4	0	0	23

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 4
 B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 6
 B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 1

NUMBER OF ECHOES USED FOR STATISTICS = 23
 AVERAGE BACKSCATTERING CROSS SECTION = .5196E-06 IN dB = -62.84
 BACKSCATTERING CROSS SECTION STD DEV = .3071E-06
 AVERAGE TARGET STRENGTH IN dB = -63.48
 TARGET STRENGTH STD DEV IN dB = 2.33
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 11

NUMBER OF FISH USED = 23
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .208E+04
 DENSITY IN FISH PER CUBIC METER = .110E-01
 EQUIVALENT STRATUM LENGTH (%/100) = .9842

Reading file D:\ESF\DIS.dat
 Analyzing Run # 2
 DATA GROUP REPORT FOR TRANSDUCER 1
 TOTAL NUMBER OF RINGS = 13650

48

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 1 0 0 3 2 2 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 1
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 0
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 1
 B= 3 dB TO B = 4 dB NUMBER OF ECHOES = 2

TOTAL NUMBER OF RECORDED ECHOES = 11
 NUMBER OF ECHOES USED FOR STATISTICS = 8
 AVERAGE BACKSCATTERING CROSS SECTION = .6066E-06 IN dB = -62.17
 BACKSCATTERING CROSS SECTION STD DEV = .3017E-06
 AVERAGE TARGET STRENGTH IN dB = -62.96
 TARGET STRENGTH STD DEV IN dB = 3.29
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 4

NUMBER OF FISH USED = 8
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .247E+04
 DENSITY IN FISH PER CUBIC METER = .324E-02
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 4.0 TO 6.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 4 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 1
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 1
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 1
B= 3 dB TO B = 4 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 6

NUMBER OF ECHOES USED FOR STATISTICS = 4

AVERAGE BACKSCATTERING CROSS SECTION = .1527E-06 IN dB = -68.16

BACKSCATTERING CROSS SECTION STD DEV = .2368E-07

AVERAGE TARGET STRENGTH IN dB = -68.20

TARGET STRENGTH STD DEV IN dB = .63

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 3

NUMBER OF FISH USED = 4
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .741E+04
DENSITY IN FISH PER CUBIC METER = .540E-03
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 6.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 3 3 17 15 7 8 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 13
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 10
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 6
B= 3 dB TO B = 4 dB NUMBER OF ECHOES = 4

TOTAL NUMBER OF RECORDED ECHOES = 83

NUMBER OF ECHOES USED FOR STATISTICS = 55

AVERAGE BACKSCATTERING CROSS SECTION = .5108E-06 IN dB = -62.92

BACKSCATTERING CROSS SECTION STD DEV = .4891E-06

AVERAGE TARGET STRENGTH IN dB = -64.10

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 33

NUMBER OF FISH USED = 55
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .152E+05
DENSITY IN FISH PER CUBIC METER = .363E-02
EQUIVALENT STRATUM LENGTH (%/100) = .9999

SUMMARY OF DATA FROM DEPTH 8.0 TO 10.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	3	5	8	8	2	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	2
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	4
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	8
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	3

TOTAL NUMBER OF RECORDED ECHOES = 53

NUMBER OF ECHOES USED FOR STATISTICS = 29

AVERAGE BACKSCATTERING CROSS SECTION = .4862E-06 IN dB = -63.13

BACKSCATTERING CROSS SECTION STD DEV = .6084E-06

AVERAGE TARGET STRENGTH IN dB = -64.95

TARGET STRENGTH STD DEV IN dB = 3.58

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 17

NUMBER OF FISH USED = 29
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .258E+05
DENSITY IN FISH PER CUBIC METER = .113E-02
EQUIVALENT STRATUM LENGTH (%/100) = .9999

SUMMARY OF DATA FROM DEPTH 2.0 TO 10.0

DEPTH INTERVALS

	FROM	2.00	2.80	3.60	4.40	5.20	6.00	6.80	7.60	8.40	9.20	
	TO	2.80	3.60	4.40	5.20	6.00	6.80	7.60	8.40	9.20	10.00	
TS												
-74	:	0	0	0	0	0	0	0	0	0	0	
-72	:	0	0	0	0	0	0	0	0	0	0	
-70	:	0	1	0	0	0	1	2	1	0	2	
-68	:	0	0	0	0	4	1	2	1	1	3	1
-66	:	0	0	0	0	0	7	7	7	2	2	2
-64	:	0	3	0	0	0	8	5	6	3	1	2
-62	:	0	2	0	0	0	5	2	0	0	2	1

-54	0	0	0	0	0	0	0	0	0	0	0	0
-52	0	0	0	0	0	0	0	0	0	0	0	0
-50	0	0	0	0	0	0	0	0	0	0	0	0
-48	0	0	0	0	0	0	0	0	0	0	0	0
-46	0	0	0	0	0	0	0	0	0	0	0	0
-44	0	0	0	0	0	0	0	0	0	0	0	0
-42	0	0	0	0	0	0	0	0	0	0	0	0
-40	0	0	0	0	0	0	0	0	0	0	0	0
-38	0	0	0	0	0	0	0	0	0	0	0	0
-36	0	0	0	0	0	0	0	0	0	0	0	0
-34	0	0	0	0	0	0	0	0	0	0	0	0
-32	0	0	0	0	0	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0	0	0	0	0	0
-28	0	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0	0

SUM	0	8	0	0	4	27	21	18	8	10	96
-----	---	---	---	---	---	----	----	----	---	----	----

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	17
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	15
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	16
B= 3 dB TO B = 4 dB	NUMBER OF ECHOES =	9

TOTAL NUMBER OF RECORDED ECHOES = 938

NUMBER OF ECHOES USED FOR STATISTICS = 96

AVERAGE BACKSCATTERING CROSS SECTION = .4964E-06 IN dB = -63.04

BACKSCATTERING CROSS SECTION STD DEV = .5079E-06

AVERAGE TARGET STRENGTH IN dB = -64.43

TARGET STRENGTH STD DEV IN dB = 3.28

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 57

NUMBER OF FISH USED = 96
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .392E+05
DENSITY IN FISH PER CUBIC METER = .245E-02
EQUIVALENT STRATUM LENGTH (Z/100) = 1.0000

Reading file D:\ESP\DIS.dat

Analyzing Run # 3
DATA GROUP REPORT FOR TRANSDUCER 1
TOTAL NUMBER OF PINGS = 2783

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 4.0
NO TARGETS FOUND

SUMMARY OF DATA FROM DEPTH 4.0 TO 6.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 1 0 1 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 0
B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 0
B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 0
B= 3 dB TO B= 4 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 3
NUMBER OF ECHOES USED FOR STATISTICS = 2
AVERAGE BACKSCATTERING CROSS SECTION = .1766E-06 IN dB = -67.53
BACKSCATTERING CROSS SECTION STD DEV = .1269E-06
AVERAGE TARGET STRENGTH IN dB = -68.18
TARGET STRENGTH STD DEV IN dB = 3.44
ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 0

NUMBER OF FISH USED = 2
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .141E+04
DENSITY IN FISH PER CUBIC METER = .142E-02
EQUIVALENT STRATUM LENGTH (%/100) = .9760

SUMMARY OF DATA FROM DEPTH 6.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 3 3 3 9 5 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 3
B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 8
B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 6
B= 3 dB TO B= 4 dB NUMBER OF ECHOES = 1

TOTAL NUMBER OF RECORDED ECHOES = 36
NUMBER OF ECHOES USED FOR STATISTICS = 25
AVERAGE BACKSCATTERING CROSS SECTION = .6724E-06 IN dB = -61.72
BACKSCATTERING CROSS SECTION STD DEV = .4673E-06
AVERAGE TARGET STRENGTH IN dB = -62.69
TARGET STRENGTH STD DEV IN dB = 3.02

NUMBER OF FISH USED = 25
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .282E+04
 DENSITY IN FISH PER CUBIC METER = .888E-02
 EQUIVALENT STRATUM LENGTH (%/100) = .9517

SUMMARY OF DATA FROM DEPTH 8.0 TO 10.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 1 0 2 3 4 4 3 6 5 11 6 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 6
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 7
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 11
 B= 3 dB TO B = 4 dB NUMBER OF ECHOES = 10

TOTAL NUMBER OF RECORDED ECHOES = 91
 NUMBER OF ECHOES USED FOR STATISTICS = 48
 AVERAGE BACKSCATTERING CROSS SECTION = .4415E-05 IN dB = -53.55
 BACKSCATTERING CROSS SECTION STD DEV = .4207E-05
 AVERAGE TARGET STRENGTH IN dB = -56.03
 TARGET STRENGTH STD DEV IN dB = 5.39
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 34

NUMBER OF FISH USED = 48
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .466E+04
 DENSITY IN FISH PER CUBIC METER = .103E-01
 EQUIVALENT STRATUM LENGTH (%/100) = .9276

SUMMARY OF DATA FROM DEPTH 2.0 TO 10.0

DEPTH INTERVALS

FROM TO	TS	2.00 2.80	2.80 3.60	3.60 4.40	4.40 5.20	5.20 6.00	6.00 6.80	6.80 7.60	7.60 8.40	8.40 9.20	9.20 10.00	ST
-74	:	0	0	0	0	0	0	0	0	0	0	0
-72	:	0	0	0	0	0	0	0	0	0	0	0
-70	:	0	0	0	1	0	0	0	0	1	0	2
-68	:	0	0	0	0	0	3	0	0	0	0	3
-66	:	0	0	0	0	1	2	0	1	1	1	6
-64	:	0	0	0	0	0	3	0	0	3	0	6
-62	:	0	0	0	0	0	9	0	0	4	0	13
-60	:	0	0	0	0	0	5	0	0	4	0	9
-58	:	0	0	0	0	0	1	0	0	3	0	4
-56	:	0	0	0	0	0	1	0	0	2	0	3

-48	0	0	0	0	0	0	0	0	0	3	0	6
-46	0	0	0	0	0	0	0	0	0	0	0	3
-44	0	0	0	0	0	0	0	0	0	0	0	0
-42	0	0	0	0	0	0	0	0	0	0	0	0
-40	0	0	0	0	0	0	0	0	0	0	0	0
-38	0	0	0	0	0	0	0	0	0	0	0	0
-36	0	0	0	0	0	0	0	0	0	0	0	0
-34	0	0	0	0	0	0	0	0	0	0	0	0
-32	0	0	0	0	0	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0	0	0	0	0	0
-28	0	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0	0
SUM	0	0	0	1	1	24	0	1	46	2	75	

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 9
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 15
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 17
B= 3 dB TO B = 4 dB NUMBER OF ECHOES = 11

TOTAL NUMBER OF RECORDED ECHOES = 179

NUMBER OF ECHOES USED FOR STATISTICS = 75

AVERAGE BACKSCATTERING CROSS SECTION = .3054E-05 IN dB = -55.15

BACKSCATTERING CROSS SECTION STD DEV = .3828E-05

AVERAGE TARGET STRENGTH IN dB = -58.58

TARGET STRENGTH STD DEV IN dB = 5.83

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 52

NUMBER OF FISH USED = 75
ULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .720E+04
DENSITY IN FISH PER CUBIC METER = .104E-01
EQUIVALENT STRATUM LENGTH (%/100) = .9638

Di, Di 10, Di 11

*1.8.91
SITE 3*

***** TS Version 2.00 *****
Dual Beam Data Reduction Program
For ESP 2B1 V1.0x & V2.0x data files

AVERAGE TARGET STRENGTH IN dB =

-40.22

FILE NUMBER 1 = D:\esp\di.dat

FILE NUMBER 2 = d:\esp\di10.dat

FILE NUMBER 3 = d:\esp\di11.dat

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 984

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 4.0
NO TARGETS FOUND

SUMMARY OF DATA FROM DEPTH 4.0 TO 6.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =
B=	1 dB	TO B =	2 dB	1
B=	2 dB	TO B =	3 dB	1
B=	3 dB	TO B =	4 dB	0
B=	4 dB	TO B =	5 dB	0

TOTAL NUMBER OF RECORDED ECHOES = 5

NUMBER OF ECHOES USED FOR STATISTICS = 3

AVERAGE BACKSCATTERING CROSS SECTION = .5547E-06 IN dB = -62.56

BACKSCATTERING CROSS SECTION STD DEV = .2683E-06

AVERAGE TARGET STRENGTH IN dB = -62.87

TARGET STRENGTH STD DEV IN dB = 1.95

ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 2

NUMBER OF FISH USED = 3
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .387E+03
DENSITY IN FISH PER CUBIC METER = .775E-02
EQUIVALENT STRATUM LENGTH (%/100) = .9972

SUMMARY OF DATA FROM DEPTH 6.0 TO 8.0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

[illegible]

-58	0	0	0	0	0	0	0	0	0	0
-56	0	0	0	1	0	0	0	0	0	0
-54	0	0	0	0	0	0	0	0	0	0
-52	0	0	0	0	0	0	0	0	0	0
-50	0	0	0	0	0	0	0	0	0	0
-48	0	0	0	0	0	0	0	0	0	0
-46	0	0	0	0	0	0	0	0	0	0
-44	0	0	0	0	0	0	0	0	0	0
-42	0	0	0	0	0	0	0	0	0	0
-40	0	0	0	0	0	0	0	0	0	0
-38	0	0	0	0	0	0	0	0	0	0
-36	0	0	0	0	0	0	0	0	0	0
-34	0	0	0	0	0	0	0	0	0	0
-32	0	0	0	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0	0	0	0
-28	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0

SUM	0	3	1	1	0	0	0	0	0	0
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HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB	NUMBER OF ECHOES =	1
B= 1 dB TO B= 2 dB	NUMBER OF ECHOES =	1
B= 2 dB TO B= 3 dB	NUMBER OF ECHOES =	0
B= 3 dB TO B= 4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOS = 9

NUMBER OF ECHOES USED FOR STATISTICS = 5

AVERAGE BACKSCATTERING CROSS SECTION = .9109E-06 IN dB = -60.41

BACKSCATTERING CROSS SECTION STD DEV = .7121E-06

AVERAGE TARGET STRENGTH IN dB = -51.70

TARGET STRENGTH STD DEV IN dB = 3.00

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 2

NUMBER OF FISH USED = 5

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .394E+04

DENSITY IN FISH PER CUBIC METER = .127E-02

EQUIVALENT STRATUM LENGTH (%/100) = .5782

Reading file D:\espydi.dat

Analyzing Run # 2

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 4255

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 4.0

74 72 70 68 66 64 62 60 58 56 54 52 50 48 46 44 42 40 38 36 34 32 30 28 26 24 22 20 18 16
 # 0 0 0 0 1 2 1 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	1
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	1
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	2
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0
TOTAL NUMBER OF RECORDED ECHOES =				10	
NUMBER OF ECHOES USED FOR STATISTICS =				4	
AVERAGE BACKSCATTERING CROSS SECTION =				.4804E-06	IN dB = -63.18
BACKSCATTERING CROSS SECTION STD DEV =				.1921E-06	
AVERAGE TARGET STRENGTH IN dB =					-63.42
TARGET STRENGTH STD DEV IN dB =					1.61

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 4

NUMBER OF FISH USED = 4
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .738E+03
 DENSITY IN FISH PER CUBIC METER = .542E-02
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 4.0 TO 6.0
 NO TARGETS FOUND

SUMMARY OF DATA FROM DEPTH 6.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 2 1 1 1 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	1
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	1
TOTAL NUMBER OF RECORDED ECHOES =				6	
NUMBER OF ECHOES USED FOR STATISTICS =				5	
AVERAGE BACKSCATTERING CROSS SECTION =				.7936E-06	IN dB = -61.00
BACKSCATTERING CROSS SECTION STD DEV =				.5110E-06	
AVERAGE TARGET STRENGTH IN dB =					-61.77
TARGET STRENGTH STD DEV IN dB =					

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 2

NUMBER OF FISH USED = 5
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .454E+04
DENSITY IN FISH PER CUBIC METER = .110E-02
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 8.0 TO 10.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	3	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	0
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	2
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	3

TOTAL NUMBER OF RECORDED ECHOES = 15

NUMBER OF ECHOES USED FOR STATISTICS = 11

AVERAGE BACKSCATTERING CROSS SECTION = .5775E-06 IN dB = -62.38

BACKSCATTERING CROSS SECTION STD DEV = .1035E-06

AVERAGE TARGET STRENGTH IN dB = -62.45

TARGET STRENGTH STD DEV IN dB = .80

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 5

NUMBER OF FISH USED = 11
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .770E+04
DENSITY IN FISH PER CUBIC METER = .143E-02
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 10.0 TO 15.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 5

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	3	2	1	4	9	14	20	20	21	32	36	13	15	11	11	3	4	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	27
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	34
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	48
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	49

NUMBER OF ECHOES USED FOR STATISTICS = 219
 AVERAGE BACKSCATTERING CROSS SECTION = .1539E-03 IN dB = -38.13
 BACKSCATTERING CROSS SECTION STD DEV = .2665E-03
 AVERAGE TARGET STRENGTH IN dB = -42.42
 TARGET STRENGTH STD DEV IN dB = 6.44
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 158
 NUMBER OF FISH USED = 219
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .310E+05
 DENSITY IN FISH PER CUBIC METER = .706E-02
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 15.0 TO 20.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 6

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 0 0 0 4 7 1 20 20 18 33 37 20 14 7 2 2 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB	TO B = 1 dB	NUMBER OF ECHOES = 26
B= 1 dB	TO B = 2 dB	NUMBER OF ECHOES = 36
B= 2 dB	TO B = 3 dB	NUMBER OF ECHOES = 40
B= 3 dB	TO B = 4 dB	NUMBER OF ECHOES = 46

TOTAL NUMBER OF RECORDED ECHOES = 443
 NUMBER OF ECHOES USED FOR STATISTICS = 185
 AVERAGE BACKSCATTERING CROSS SECTION = .1063E-03 IN dB = -39.74
 BACKSCATTERING CROSS SECTION STD DEV = .1360E-03
 AVERAGE TARGET STRENGTH IN dB = -42.13
 TARGET STRENGTH STD DEV IN dB = 4.77
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 148

NUMBER OF FISH USED = 185
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .312E+05
 DENSITY IN FISH PER CUBIC METER = .593E-02
 EQUIVALENT STRATUM LENGTH (%/100) = .5825

SUMMARY OF DATA FROM DEPTH 2.0 TO 20.0

DEPTH INTERVALS

FROM	2.00	3.80	5.60	7.40	9.20	11.00	12.80	14.60	16.40	18.20
TO	3.80	5.60	7.40	9.20	11.00	12.80	14.60	16.40	18.20	20.00

# ECHOES WITH BEAM PATTERN FACTORS > 0 dB=	2											
-74	0	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0	0
-66	1	0	0	0	0	0	0	0	0	0	0	1
-64	2	0	1	2	2	0	0	0	0	0	0	7
-62	1	0	0	6	3	0	0	0	0	0	0	10
-60	0	0	1	0	0	3	0	0	0	0	0	4
-58	0	0	0	1	0	1	1	0	0	0	0	3
-56	0	0	0	0	0	1	0	0	0	0	0	1
-54	0	0	0	0	0	4	0	1	3	0	0	8
-52	0	0	0	0	0	1	5	4	6	0	0	16
-50	0	0	0	0	0	1	4	9	1	0	0	15
-48	0	0	0	0	0	3	11	20	6	0	0	40
-46	0	0	0	0	0	0	15	15	10	0	0	40
-44	0	0	0	0	0	3	14	7	15	0	0	39
-42	0	0	0	0	0	3	19	26	15	2	0	65
-40	0	0	0	0	0	1	18	37	17	0	0	73
-38	0	0	0	0	0	0	8	19	4	2	0	33
-36	0	0	0	0	0	1	12	9	3	4	0	29
-34	0	0	0	0	0	0	9	8	1	0	0	18
-32	0	0	0	0	0	1	7	5	0	0	0	13
-30	0	0	0	0	0	0	3	2	0	0	0	5
-28	0	0	0	0	0	0	3	1	0	0	0	4
-26	0	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0	0
SUM	4	0	2	9	5	23	129	163	81	8		424

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	55
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	71
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	92
B= 3 dB TO B = 4 dB	NUMBER OF ECHOES =	99

TOTAL NUMBER OF RECORDED ECHOES = 1011

NUMBER OF ECHOES USED FOR STATISTICS = 424

AVERAGE BACKSCATTERING CROSS SECTION = .1259E-03 IN dB = -39.00

BACKSCATTERING CROSS SECTION STD DEV = .2144E-03

AVERAGE TARGET STRENGTH IN dB = -43.24

TARGET STRENGTH STD DEV IN dB = 7.05

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 317

NUMBER OF FISH USED = 424

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .634E+05

DENSITY IN FISH PER CUBIC METER = .669E-02

EQUIVALENT STRATUM LENGTH (%/100) = .8682

Reading file d:\esp\m10.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 7814

8 10

SUMMARY OF DATA FROM DEPTH 2.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 2 2 7 8 6 3 2 3 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	3
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	3
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	4
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	8

TOTAL NUMBER OF RECORDED ECHOES = 51

NUMBER OF ECHOES USED FOR STATISTICS = 34

AVERAGE BACKSCATTERING CROSS SECTION = .3087E-05 IN dB = -55.11

BACKSCATTERING CROSS SECTION STD DEV = .3657E-05

AVERAGE TARGET STRENGTH IN dB = -57.03

TARGET STRENGTH STD DEV IN dB = 3.92

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 18

NUMBER OF FISH USED = 34
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .142E+04
 DENSITY IN FISH PER CUBIC METER = .240E-01
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 4.0 TO 6.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 1 0 0 2 4 1 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	2
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	2
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	2
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 14

NUMBER OF ECHOES USED FOR STATISTICS = 11

AVERAGE BACKSCATTERING CROSS SECTION = .3282E-05 IN dB = -54.84

BACKSCATTERING CROSS SECTION STD DEV = .2131E-05

TARGET STRENGTH STD DEV IN dB =

3.35

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 6

NUMBER OF FISH USED = 11
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .425E+04
DENSITY IN FISH PER CUBIC METER = .259E-02
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 6.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 2 1 9 8 17 19 14 6 3 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 12
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 21
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 9
B= 3 dB TO B = 4 dB NUMBER OF ECHOES = 4

TOTAL NUMBER OF RECORDED ECHOES = 91

NUMBER OF ECHOES USED FOR STATISTICS = 73

AVERAGE BACKSCATTERING CROSS SECTION = .5122E-05 IN dB = -52.91

BACKSCATTERING CROSS SECTION STD DEV = .5114E-05

AVERAGE TARGET STRENGTH IN dB = -54.72

TARGET STRENGTH STD DEV IN dB = 4.07

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 46

NUMBER OF FISH USED = 73
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .870E+04
DENSITY IN FISH PER CUBIC METER = .839E-02
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 8.0 TO 10.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 2 2 4 9 6 7 18 30 43 36 23 29 24 14 2 6 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 48
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 50
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 22

NUMBER OF ECHOES USED FOR STATISTICS = 255
 AVERAGE BACKSCATTERING CROSS SECTION = .4881E-04 IN dB = -43.12
 BACKSCATTERING CROSS SECTION STD DEV = .7365E-04
 AVERAGE TARGET STRENGTH IN dB = -46.59
 TARGET STRENGTH STD DEV IN dB = 5.93
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 186
 NUMBER OF FISH USED = 255
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .148E+05
 DENSITY IN FISH PER CUBIC METER = .173E-01
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 10.0 TO 15.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 5

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 5 9 7 5 19 33 64 122 123 131 147 134 131 63 32 25 2 1 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 122
 B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 177
 B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 267
 B= 3 dB TO B= 4 dB NUMBER OF ECHOES = 318

TOTAL NUMBER OF RECORDED ECHOES = 1596
 NUMBER OF ECHOES USED FOR STATISTICS = 1053
 AVERAGE BACKSCATTERING CROSS SECTION = .1525E-03 IN dB = -38.17
 BACKSCATTERING CROSS SECTION STD DEV = .2068E-03
 AVERAGE TARGET STRENGTH IN dB = -41.23
 TARGET STRENGTH STD DEV IN dB = 5.57
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 884
 NUMBER OF FISH USED = 1053
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .588E+05
 DENSITY IN FISH PER CUBIC METER = .179E-01
 EQUIVALENT STRATUM LENGTH (%/100) = .9912

SUMMARY OF DATA FROM DEPTH 15.0 TO 20.0
 NO TARGETS FOUND

SUMMARY OF DATA FROM DEPTH 2.0 TO 20.0

DEPTH INTERVALS

	FROM	2.00	3.80	5.60	7.40	9.20	11.00	12.80	14.60	16.40	18.20	
	TO	3.80	5.60	7.40	9.20	11.00	12.80	14.60	16.40	18.20	20.00	
TS												SU
-74	:	0	0	0	0	0	0	0	0	0	0	0
-72	:	0	0	0	0	0	0	0	0	0	0	0
-70	:	0	0	0	0	0	0	0	0	0	0	0
-68	:	0	0	0	0	0	0	0	0	0	0	0
-66	:	0	0	0	0	0	0	0	0	0	0	0
-64	:	2	0	1	4	0	0	0	0	0	0	7
-62	:	2	0	1	2	0	0	0	0	0	0	5
-60	:	7	0	8	2	4	4	0	0	0	0	25
-58	:	8	0	10	5	6	6	1	0	0	0	36
-56	:	6	0	19	7	2	4	2	0	0	0	40
-54	:	3	0	9	7	4	2	1	0	0	0	28
-52	:	2	0	16	14	12	6	6	0	0	0	56
-50	:	3	0	4	22	21	12	10	0	0	0	72
-48	:	1	0	0	32	34	23	18	3	0	0	111
-46	:	0	0	1	26	61	42	30	1	0	0	161
-44	:	0	0	0	2	51	47	45	1	0	0	146
-42	:	0	0	0	6	52	53	49	0	0	0	160
-40	:	0	0	0	4	45	63	59	0	0	0	171
-38	:	0	0	0	0	38	58	52	0	0	0	148
-36	:	0	0	0	0	35	20	78	0	0	0	133
-34	:	0	0	0	0	16	9	44	0	0	0	69
-32	:	0	0	0	0	1	6	25	0	0	0	32
-30	:	0	0	0	0	0	0	25	0	0	0	25
-28	:	0	0	0	0	0	0	2	0	0	0	2
-26	:	0	0	0	0	0	0	1	0	0	0	1
-24	:	0	0	0	0	0	0	0	0	0	0	0
-22	:	0	0	0	0	0	0	0	0	0	0	0
-20	:	0	0	0	0	0	0	0	0	0	0	0
-18	:	0	0	0	0	0	0	0	0	0	0	0
-16	:	0	0	0	0	0	0	0	0	0	0	0
SUM		34	0	69	133	382	355	448	5	0	0	1426

STOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	167
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	253
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	322
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	378

TOTAL NUMBER OF RECORDED ECHOES = 2067

NUMBER OF ECHOES USED FOR STATISTICS = 1426

AVERAGE BACKSCATTERING CROSS SECTION = .1217E-03 IN dB = -39.15

BACKSCATTERING CROSS SECTION STD DEV = .1879E-03

AVERAGE TARGET STRENGTH IN dB = -43.37

TARGET STRENGTH STD DEV IN dB = 6.92

ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 1140

NUMBER OF FISH USED = 1426

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .756E+05

DENSITY IN FISH PER CUBIC METER = 1.00E+01

Analyzing Run # 2
 DATA GROUP REPORT FOR TRANSDUCER 1
 TOTAL NUMBER OF PINGS =

2711

D: 10

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	2	9	12	12	8	5	11	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	13
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	9
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	5
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	8

TOTAL NUMBER OF RECORDED ECHOES = 98

NUMBER OF ECHOES USED FOR STATISTICS = 62

AVERAGE BACKSCATTERING CROSS SECTION = .2987E-05 IN dB = -55.25

BACKSCATTERING CROSS SECTION STD DEV = .3417E-05

AVERAGE TARGET STRENGTH IN dB = -57.20

TARGET STRENGTH STD DEV IN dB = 4.03

ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 35

NUMBER OF FISH USED = 62
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .491E+03
 DENSITY IN FISH PER CUBIC METER = .126E+00
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 4.0 TO 6.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	4	5	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	0
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	5
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	4
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	7

TOTAL NUMBER OF RECORDED ECHOES =

NUMBER OF ECHOES USED FOR STATISTICS = 18
 AVERAGE BACKSCATTERING CROSS SECTION = .2011E-05 IN dB = -56.97
 BACKSCATTERING CROSS SECTION STD DEV = .1138E-05
 AVERAGE TARGET STRENGTH IN dB = -57.53
 TARGET STRENGTH STD DEV IN dB = 2.22
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 16
 NUMBER OF FISH USED = 18
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .147E+04
 DENSITY IN FISH PER CUBIC METER = .122E-01
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 6.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 2 0 4 1 5 4 5 3 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB	TO B = 1 dB	NUMBER OF ECHOES =	5
B= 1 dB	TO B = 2 dB	NUMBER OF ECHOES =	3
B= 2 dB	TO B = 3 dB	NUMBER OF ECHOES =	4
B= 3 dB	TO B = 4 dB	NUMBER OF ECHOES =	3

TOTAL NUMBER OF RECORDED ECHOES = 50
 NUMBER OF ECHOES USED FOR STATISTICS = 25
 AVERAGE BACKSCATTERING CROSS SECTION = .4270E-05 IN dB = -53.70
 BACKSCATTERING CROSS SECTION STD DEV = .3564E-05
 AVERAGE TARGET STRENGTH IN dB = -55.41
 TARGET STRENGTH STD DEV IN dB = 4.36
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 15
 NUMBER OF FISH USED = 25
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .302E+04
 DENSITY IN FISH PER CUBIC METER = .829E-02
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 8.0 TO 10.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0

WDB
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 r

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	13
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	15
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	17
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	20

TOTAL NUMBER OF RECORDED ECHOES = 97

NUMBER OF ECHOES USED FOR STATISTICS = 76

AVERAGE BACKSCATTERING CROSS SECTION = .4360E-04 IN dB = -43.61

BACKSCATTERING CROSS SECTION STD DEV = .5062E-04

AVERAGE TARGET STRENGTH IN dB = -46.62

TARGET STRENGTH STD DEV IN dB = 6.11

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 65

NUMBER OF FISH USED = 76

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .512E+04

DENSITY IN FISH PER CUBIC METER = .148E-01

EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 10.0 TO 15.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 5

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	1	0	6	8	4	14	22	52	57	61	83	63	36	23	7	2	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	45
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	89
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	103
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	121

TOTAL NUMBER OF RECORDED ECHOES = 647

NUMBER OF ECHOES USED FOR STATISTICS = 439

AVERAGE BACKSCATTERING CROSS SECTION = .7202E-04 IN dB = -41.43

BACKSCATTERING CROSS SECTION STD DEV = .8103E-04

AVERAGE TARGET STRENGTH IN dB = -43.80

TARGET STRENGTH STD DEV IN dB = 4.97

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 358

NUMBER OF FISH USED = 439

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .186E+05

DENSITY IN FISH PER CUBIC METER = .236E-01

EQUIVALENT STRATUM LENGTH (%/100) = .9317

SUMMARY OF DATA FROM DEPTH 15.0 TO 20.0
NO TARGETS FOUND

SUMMARY OF DATA FROM DEPTH 2.0 TO 20.0

DEPTH INTERVALS

TS	FROM TO	2.00	3.80	5.60	7.40	9.20	11.00	12.80	14.60	16.40	18.20	SUM
		3.80	5.60	7.40	9.20	11.00	12.80	14.60	16.40	18.20	20.00	
-74	:	0	0	0	0	0	0	0	0	0	0	0
-72	:	0	0	0	0	0	0	0	0	0	0	0
-70	:	0	0	0	0	0	0	0	0	0	0	0
-68	:	0	0	0	0	0	0	0	0	0	0	0
-66	:	0	0	0	0	0	0	0	0	0	0	0
-64	:	2	0	2	1	0	0	0	0	0	0	5
-62	:	9	0	0	2	1	0	0	0	0	0	13
-60	:	11	7	3	1	1	0	0	0	0	0	23
-58	:	11	6	1	1	3	4	2	0	0	0	28
-56	:	8	3	5	1	2	4	3	0	0	0	26
-54	:	5	3	4	0	0	3	1	0	0	0	16
-52	:	11	1	5	0	5	10	2	0	0	0	34
-50	:	1	0	3	0	6	13	9	0	0	0	32
-48	:	2	0	1	0	14	30	17	0	0	0	64
-46	:	0	0	0	0	17	35	19	0	0	0	71
-44	:	0	0	0	0	27	36	11	1	0	0	75
-42	:	0	0	0	0	26	45	20	0	0	0	91
-40	:	0	0	0	0	23	22	25	0	0	0	70
-38	:	0	0	0	0	12	16	9	2	0	0	39
-36	:	0	0	0	0	4	9	7	5	0	0	25
-34	:	0	0	0	0	1	1	3	2	0	0	7
-32	:	0	0	0	0	0	0	1	1	0	0	2
-30	:	0	0	0	0	0	0	0	0	0	0	0
-28	:	0	0	0	0	0	0	0	0	0	0	0
-26	:	0	0	0	0	0	0	0	0	0	0	0
-24	:	0	0	0	0	0	0	0	0	0	0	0
-22	:	0	0	0	0	0	0	0	0	0	0	0
-20	:	0	0	0	0	0	0	0	0	0	0	0
-18	:	0	0	0	0	0	0	0	0	0	0	0
-16	:	0	0	0	0	0	0	0	0	0	0	0
SUM		60	20	24	6	142	228	129	11	0	0	620

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	76
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	121
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	133
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	159

TOTAL NUMBER OF RECORDED ECHOES = 929

NUMBER OF ECHOES USED FOR STATISTICS = 620

AVERAGE BACKSCATTERING CROSS SECTION = .5687E-04 IN dB = -42.45

BACKSCATTERING CROSS SECTION STD DEV = .7505E-04

AVERAGE TARGET STRENGTH IN dB = -46.35

NUMBER OF FISH USED = 620
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .243E+05
DENSITY IN FISH PER CUBIC METER = .255E-01
EQUIVALENT STRATUM LENGTH (%/100) = .7153

Reading file d:\esp\0110.dat
Analyzing Run # 3
DATA GROUP REPORT FOR TRANSDUCER 1
TOTAL NUMBER OF PINGS = 1933

10

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 4.0
NO TARGETS FOUND

SUMMARY OF DATA FROM DEPTH 4.0 TO 6.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	0
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	3
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	1
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	1

TOTAL NUMBER OF RECORDED ECHOES = 10

NUMBER OF ECHOES USED FOR STATISTICS = 6

AVERAGE BACKSCATTERING CROSS SECTION = .7371E-06 IN dB = -61.32

BACKSCATTERING CROSS SECTION STD DEV = .1644E-06

AVERAGE TARGET STRENGTH IN dB = -61.42

TARGET STRENGTH STD DEV IN dB = 1.01

ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 5

NUMBER OF FISH USED = 6
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .103E+04
DENSITY IN FISH PER CUBIC METER = .584E-02
EQUIVALENT STRATUM LENGTH (%/100) = .9982

SUMMARY OF DATA FROM DEPTH 6.0 TO 8.0

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 1 2 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	1
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	2

TOTAL NUMBER OF RECORDED ECHOES = 5

NUMBER OF ECHOES USED FOR STATISTICS = 3

AVERAGE BACKSCATTERING CROSS SECTION = .5322E-06 IN dB = -62.74

BACKSCATTERING CROSS SECTION STD DEV = .1569E-06

AVERAGE TARGET STRENGTH IN dB = -62.87

TARGET STRENGTH STD DEV IN dB = 1.32

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 3

NUMBER OF FISH USED = 3
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .210E+04
DENSITY IN FISH PER CUBIC METER = .143E-02
EQUIVALENT STRATUM LENGTH (%/100) = .9965

SUMMARY OF DATA FROM DEPTH 8.0 TO 10.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 2 1 1 1 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	0
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	2
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	1
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 8

NUMBER OF ECHOES USED FOR STATISTICS = 7

AVERAGE BACKSCATTERING CROSS SECTION = .1989E-05 IN dB = -57.01

BACKSCATTERING CROSS SECTION STD DEV = .2368E-05

AVERAGE TARGET STRENGTH IN dB = -59.09

TARGET STRENGTH STD DEV IN dB = 4.35

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 3

NUMBER OF FISH USED = 7
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .210E+04
DENSITY IN FISH PER CUBIC METER = .143E-02
EQUIVALENT STRATUM LENGTH (%/100) = .9965

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 1 2 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	1
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	2

TOTAL NUMBER OF RECORDED ECHOES = 5

NUMBER OF ECHOES USED FOR STATISTICS = 3

AVERAGE BACKSCATTERING CROSS SECTION = .5322E-06 IN dB = -62.74

BACKSCATTERING CROSS SECTION STD DEV = .1568E-06

AVERAGE TARGET STRENGTH IN dB = -62.67

TARGET STRENGTH STD DEV IN dB = 1.32

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 3

NUMBER OF FISH USED = 3
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .210E+04
DENSITY IN FISH PER CUBIC METER = .143E-02
EQUIVALENT STRATUM LENGTH (%/100) = .9965

SUMMARY OF DATA FROM DEPTH 8.0 TO 10.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 2 1 1 1 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	0
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	2
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	1
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 8

NUMBER OF ECHOES USED FOR STATISTICS = 7

AVERAGE BACKSCATTERING CROSS SECTION = .1989E-05 IN dB = -57.01

BACKSCATTERING CROSS SECTION STD DEV = .2368E-05

AVERAGE TARGET STRENGTH IN dB = -59.09

TARGET STRENGTH STD DEV IN dB = 4.35

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 3

NUMBER OF FISH USED = 7
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .210E+04
DENSITY IN FISH PER CUBIC METER = .143E-02
EQUIVALENT STRATUM LENGTH (%/100) = .9965

AVERAGE TARGET STRENGTH IN dB =

-40.22

TARGET STRENGTH STD DEV IN dB =

2.75

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 16

NUMBER OF FISH USED = 19

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .209E+04

DENSITY IN FISH PER CUBIC METER = .911E-02

EQUIVALENT STRATUM LENGTH (%/100) = .0989

SUMMARY OF DATA FROM DEPTH 2.0 TO 20.0

DEPTH INTERVALS

FROM TO	2.00 3.80	3.80 5.60	5.60 7.40	7.40 9.20	9.20 11.00	11.00 12.80	12.80 14.60	14.60 16.40	16.40 18.20	18.20 20.00	SUM
TS											
-74	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	2	1	0	0	0	0	0	3
-62	0	3	1	2	0	0	0	0	0	0	6
-60	0	3	0	1	1	0	0	0	0	0	5
-58	0	0	0	0	2	0	0	0	0	0	2
-56	0	0	0	1	2	1	1	0	0	0	5
-54	0	0	0	0	4	3	1	0	0	0	8
-52	0	0	0	0	7	3	2	0	0	0	12
-50	0	0	0	0	4	3	2	1	0	0	10
-48	0	0	0	0	5	1	8	0	0	0	14
-46	0	0	0	0	5	6	18	1	0	0	30
-44	0	0	0	0	2	4	26	6	0	0	38
-42	0	0	0	0	0	6	27	8	0	0	41
-40	0	0	0	0	0	11	30	8	0	0	49
-38	0	0	0	0	0	12	27	15	0	0	54
-36	0	0	0	0	0	13	13	4	0	0	30
-34	0	0	0	0	0	3	12	4	0	0	19
-32	0	0	0	0	0	2	0	0	0	0	2
-30	0	0	0	0	0	1	0	0	0	0	1
-28	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	0	6	1	6	33	69	167	47	0	0	329

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB	TO B = 1 dB	NUMBER OF ECHOES =	53
B= 1 dB	TO B = 2 dB	NUMBER OF ECHOES =	61
B= 2 dB	TO B = 3 dB	NUMBER OF ECHOES =	34
B= 3 dB	TO B = 4 dB	NUMBER OF ECHOES =	18

TOTAL NUMBER OF RECORDED ECHOES = 390

BACKSCATTERING CROSS SECTION STD DEV = .1193E-03
 AVERAGE TARGET STRENGTH IN dB = -42.86
 TARGET STRENGTH STD DEV IN dB = 6.60
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 166
 NUMBER OF FISH USED = 329
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .144E+05
 DENSITY IN FISH PER CUBIC METER = .229E-01
 EQUIVALENT STRATUM LENGTH (%/100) = .6623

Reading file d:\esp\0111.dat
 Analyzing Run # 1
 DATA GROUP REPORT FOR TRANSDUCER 1
 TOTAL NUMBER OF PINGS = 8528

DATA FOR FREQUENCY 420.

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 THAN. SITE
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SUMMARY OF DATA FROM DEPTH 2.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	1
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 5

NUMBER OF ECHOES USED FOR STATISTICS = 1

AVERAGE BACKSCATTERING CROSS SECTION = .4082E-06 IN dB = -63.89

BACKSCATTERING CROSS SECTION STD DEV = .0000E+00

AVERAGE TARGET STRENGTH IN dB = -63.89

TARGET STRENGTH STD DEV IN dB = .00

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 1

NUMBER OF FISH USED = 1
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .154E+04
 DENSITY IN FISH PER CUBIC METER = .649E-03
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

B= 3 dB TO B = 4 dB

NUMBER OF ECHOES = 10

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	1	4	6	12	17	26	15	12	10	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	23
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	19
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	15
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	21

TOTAL NUMBER OF RECORDED ECHOES = 174

NUMBER OF ECHOES USED FOR STATISTICS = 108

AVERAGE BACKSCATTERING CROSS SECTION = .6565E-05 IN dB = -51.83

BACKSCATTERING CROSS SECTION STD DEV = .7752E-05

AVERAGE TARGET STRENGTH IN dB = -53.86

TARGET STRENGTH STD DEV IN dB = 4.17

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 78

NUMBER OF FISH USED =	108
FULL ANGLE OF CONE =	6.00
ESTIMATED VOLUME IN CUBIC METERS =	.462E+04
DENSITY IN FISH PER CUBIC METER =	.234E-01
EQUIVALENT STRATUM LENGTH (%/100) =	.9992

SUMMARY OF DATA FROM DEPTH 6.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	3	6	8	10	23	25	29	30	27	7	4	3	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	20
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	33
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	37
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	45

TOTAL NUMBER OF RECORDED ECHOES = 381

NUMBER OF ECHOES USED FOR STATISTICS = 175

AVERAGE BACKSCATTERING CROSS SECTION = .1497E-04 IN dB = -48.25

BACKSCATTERING CROSS SECTION STD DEV = .1769E-04

AVERAGE TARGET STRENGTH IN dB = -50.48

TARGET STRENGTH STD DEV IN dB = 4.62

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 135

ESTIMATED VOLUME IN CUBIC METERS = .947E+04
 DENSITY IN FISH PER CUBIC METER = .185E-01
 EQUIVALENT STRATUM LENGTH (%/100) = .9997

SUMMARY OF DATA FROM DEPTH 8.0 TO 10.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 2 6 2 4 8 11 25 13 12 4 3 2 2 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	9
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	19
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	18
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	26

TOTAL NUMBER OF RECORDED ECHOES = 216
 NUMBER OF ECHOES USED FOR STATISTICS = 94
 AVERAGE BACKSCATTERING CROSS SECTION = .3017E-04 IN dB = -45.20
 BACKSCATTERING CROSS SECTION STD DEV = .4579E-04
 AVERAGE TARGET STRENGTH IN dB = -48.10
 TARGET STRENGTH STD DEV IN dB = 5.14
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 72
 NUMBER OF FISH USED = 94
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .161E+05
 DENSITY IN FISH PER CUBIC METER = .585E-02
 EQUIVALENT STRATUM LENGTH (%/100) = .9995

SUMMARY OF DATA FROM DEPTH 10.0 TO 15.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 5

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 0 0 0 5 6 5 9 6 3 2 1 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	3
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	7
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	6
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	11

TOTAL NUMBER OF RECORDED ECHOES = 62
 NUMBER OF ECHOES USED FOR STATISTICS = 37

BACKSCATTERING CROSS SECTION STD DEV = .1862E-04

AVERAGE TARGET STRENGTH IN dB =

-48.70

TARGET STRENGTH STD DEV IN dB =

3.62

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 27

NUMBER OF FISH USED = 37

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .149E+05

DENSITY IN FISH PER CUBIC METER = .249E-02

EQUIVALENT STRATUM LENGTH (%/100) = .3352

SUMMARY OF DATA FROM DEPTH 15.0 TO 20.0
NO TARGETS FOUND

SUMMARY OF DATA FROM DEPTH 2.0 TO 20.0

DEPTH INTERVALS

FROM TO	2.00 3.80	3.80 5.60	5.60 7.40	7.40 9.20	9.20 11.00	11.00 12.80	12.80 14.60	14.60 16.40	16.40 18.20	18.20 20.00	SUM
TS											
-74	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	2	0	0	0	0	0	0	0	0	0
-62	0	3	4	0	0	0	0	0	0	0	7
-60	0	5	6	2	1	0	0	0	0	0	14
-58	0	6	12	4	4	0	0	0	0	0	26
-56	0	13	14	2	0	0	0	0	0	0	29
-54	0	10	37	2	9	0	0	0	0	0	58
-52	0	6	33	4	11	0	0	0	0	0	54
-50	0	3	34	8	12	0	0	0	0	0	57
-48	0	3	29	19	23	0	0	0	0	0	74
-46	0	1	22	14	11	0	0	0	0	0	48
-44	0	2	7	8	8	0	0	0	0	0	25
-42	0	0	2	2	6	0	0	0	0	0	10
-40	0	0	3	2	2	0	0	0	0	0	7
-38	0	0	0	0	2	0	0	0	0	0	2
-36	0	0	0	0	2	0	0	0	0	0	2
-34	0	0	0	0	0	0	0	0	0	0	0
-32	0	0	0	0	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0	0	0	0	0
-28	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	0	54	203	67	91	0	0	0	0	0	415

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 76
B= 3 dB TO B = 4 dB NUMBER OF ECHOES = 103

TOTAL NUMBER OF RECORDED ECHOES = 858
NUMBER OF ECHOES USED FOR STATISTICS = 415
AVERAGE BACKSCATTERING CROSS SECTION = .1657E-04 IN dB = -47.81
BACKSCATTERING CROSS SECTION STD DEV = .2681E-04
AVERAGE TARGET STRENGTH IN dB = -50.69
TARGET STRENGTH STD DEV IN dB = 5.05
ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 313
NUMBER OF FISH USED = 415
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .327E+05
DENSITY IN FISH PER CUBIC METER = .127E-01
EQUIVALENT STRATUM LENGTH (%/100) = .5268

Reading file d:\esp\0111.dat

Analyzing Run # 2
DATA GROUP REPORT FOR TRANSDUCER 1
TOTAL NUMBER OF PINGS = 8530

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 1 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 0
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 0
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 0
B= 3 dB TO B = 4 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 79
NUMBER OF ECHOES USED FOR STATISTICS = 1
AVERAGE BACKSCATTERING CROSS SECTION = .3042E-06 IN dB = -65.17
BACKSCATTERING CROSS SECTION STD DEV = .0000E+00
AVERAGE TARGET STRENGTH IN dB = -65.17
TARGET STRENGTH STD DEV IN dB = .00
ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 0
NUMBER OF FISH USED = 1
FULL ANGLE OF CONE = 6.00

EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 4.0 TO 6.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 3 3 11 19 17 16 12 11 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	23
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	10
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	17
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	19

TOTAL NUMBER OF RECORDED ECHOES = 1095

NUMBER OF ECHOES USED FOR STATISTICS = 96

AVERAGE BACKSCATTERING CROSS SECTION = .6937E-05 IN dB = -51.59

BACKSCATTERING CROSS SECTION STD DEV = .7798E-05

AVERAGE TARGET STRENGTH IN dB = -53.43

TARGET STRENGTH STD DEV IN dB = 3.95

ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 69

NUMBER OF FISH USED = 96

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .463E+04

DENSITY IN FISH PER CUBIC METER = .207E-01

EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 6.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 1 1 2 5 7 13 26 21 27 26 31 8 5 2 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	21
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	28
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	37
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	51

TOTAL NUMBER OF RECORDED ECHOES = 1804

NUMBER OF ECHOES USED FOR STATISTICS = 175

AVERAGE BACKSCATTERING CROSS SECTION = .1502E-04 IN dB = -48.23

AVERAGE TARGET STRENGTH IN dB =

-50.55

TARGET STRENGTH STD DEV IN dB =

4.77

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 137

NUMBER OF FISH USED = 175
 FULL ANGLE OF CONE = 61.00
 ESTIMATED VOLUME IN CUBIC METERS = .949E+04
 DENSITY IN FISH PER CUBIC METER = .184E-01
 EQUIVALENT STRATUM LENGTH (Z/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 8.0 TO 10.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	2	5	5	3	6	15	20	13	11	5	4	2	2	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	13
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	18
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	15
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	23

TOTAL NUMBER OF RECORDED ECHOES = 1308

NUMBER OF ECHOES USED FOR STATISTICS = 93

AVERAGE BACKSCATTERING CROSS SECTION = .3161E-04 IN dB = -45.00

BACKSCATTERING CROSS SECTION STD DEV = .4727E-04

AVERAGE TARGET STRENGTH IN dB = -48.03

TARGET STRENGTH STD DEV IN dB = 5.28

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 69

NUMBER OF FISH USED = 93
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .161E+05
 DENSITY IN FISH PER CUBIC METER = .577E-02
 EQUIVALENT STRATUM LENGTH (Z/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 10.0 TO 15.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 5

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	1	2	6	4	4	9	6	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	3
----	------	--------	------	--------------------	---

SUMMARY OF DATA FROM DEPTH 15.0 TO 20.0
NO TARGETS FOUND

DEPTH INTERVALS

[illegible]

SUM	1	50	192	70	90	0	0	0	0	0	403
-----	---	----	-----	----	----	---	---	---	---	---	-----

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	60
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	63
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	74
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	103

TOTAL NUMBER OF RECORDED ECHOES =	4771	
NUMBER OF ECHOES USED FOR STATISTICS =	403	
AVERAGE BACKSCATTERING CROSS SECTION =	.1722E-04	IN dB = -47.64
BACKSCATTERING CROSS SECTION STD DEV =	.2774E-04	
AVERAGE TARGET STRENGTH IN dB =		-50.56
TARGET STRENGTH STD DEV IN dB =		5.07

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 300

NUMBER OF FISH USED =	403
FULL ANGLE OF CONE =	6.00
ESTIMATED VOLUME IN CUBIC METERS =	.326E+05
DENSITY IN FISH PER CUBIC METER =	.124E-01
EQUIVALENT STRATUM LENGTH (%/100) =	.5263

Table 5.11

Sampled volumes, numbers of accepted fish and densities in different sonar runs
and in different ranges from transducer, R. Thames, Ham Island, Old Windsor, 8.8.1991
The numbers not accepted for final calculation of density in italics

range/run	Numbers of accepted fish targets		
	Experiment 1	Experiment 2	
	Ham1r1	Ham1r2	Ham1r3
2-4.	93	27	59
4-6.	11	19	14
6-8.	7	2	2
8-10.	1	3	4
10-15.	<i>13</i>	<i>37</i>	<i>12</i>
Sampled volumes (m ³)			
2-4.	1810	1220	1200
4-6.	5440	3650	3600
6-8.	11100	7460	7370
8-10.	18900	12700	12500
10-15.	<i>76100</i>	<i>51000</i>	<i>50400</i>
Fish densities (Inds/100m ³)			
2-4.	5.138122	2.213115	4.916667
4-6.	0.202206	0.520548	0.388889
6-8.	0.063063	0.02681	0.027137
8-10.	0.005291	0.023622	0.032
10-15.	<i>0.017083</i>	<i>0.072549</i>	<i>0.02381</i>
Tot.accept.tgts	163	79	
Tot.volume	62280	24670	

Table 5.12 TS and length frequency distributions of targets and fish recorded 8.8.1991
R.Thames, Ham Island area

TS	mm	Targets	Fish					
-58	46.06	5						
-56	51.86	5						
-54	58.39	2		Note: Sounding targets 10-15 m away of seining 2				
-52	65.75	1		compared with catch composition of seining 3				
-50	74.03	6						
-48	83.35	5						
-46	93.85	7						
-44	105.7	10						
-42	119	20						
-40	134	24						
-38	150.8	23						
-36	169.8	18						
-34	191.2	14						
-32	215.3	6						
-30	242.4	4						
-28	273							
-26	307.4							
-24	346.1							
	48							
	53							
	63							
	73							
	83							
	93		2					
	103		5					
	113		13					
	123		17					
	133		33					
	143		21					
	153		22					
	163		16					
	173		7					
	183		6					
	193		4					
	203							
	213							
	330							
sum		150	146					

RIVER THAMES HAM ISLAND
August 8 1991

Ham 1 SC.
818.91

***** TS Version 2.00 *****
Dual Beam Data Reduction Program
For ESP 2B1 V1.0x & V2.0x data files

(c) Copyright BioSonics, Inc. 1 April, 1991
for BioSonics Scientific Hydroacoustic Applications
Serial Number 5205-V2.00-91-000

Reading file D:\ESP\Ham1.dat
Analyzing Run # 1
FILE NUMBER 1 = D:\ESP\Ham1.dat

Ham 1. 3 runs

DATA GROUP REPORT FOR TRANSDUCER 1
TOTAL NUMBER OF PINGS = 10051

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	3	7	12	21	22	15	9	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB TO B =	1 dB	NUMBER OF ECHOES =
B=	1 dB TO B =	2 dB	NUMBER OF ECHOES =
B=	2 dB TO B =	3 dB	NUMBER OF ECHOES =
B=	3 dB TO B =	4 dB	NUMBER OF ECHOES =

TOTAL NUMBER OF RECORDED ECHOES = 215

NUMBER OF ECHOES USED FOR STATISTICS = 93

AVERAGE BACKSCATTERING CROSS SECTION = .4412E-05 IN dB = -53.55

BACKSCATTERING CROSS SECTION STD DEV = .3378E-05

AVERAGE TARGET STRENGTH IN dB = -54.74

TARGET STRENGTH STD DEV IN dB = 3.29

ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 28

NUMBER OF FISH USED = 93
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .181E+04
DENSITY IN FISH PER CUBIC METER = .513E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 4.0 TO 6.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 4 3 2 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 2
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 2
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 0
B= 3 dB TO B = 4 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 52
NUMBER OF ECHOES USED FOR STATISTICS = 11
AVERAGE BACKSCATTERING CROSS SECTION = .3054E-05 IN dB = -55.11
BACKSCATTERING CROSS SECTION STD DEV = .4279E-05
AVERAGE TARGET STRENGTH IN dB = -57.01
TARGET STRENGTH STD DEV IN dB = 3.62
ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 4
NUMBER OF FISH USED = 11
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .544E+04
DENSITY IN FISH PER CUBIC METER = .202E-02
EQUIVALENT STRATUM LENGTH (%/100) = .9998

SUMMARY OF DATA FROM DEPTH 6.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 0 1 4 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 1
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 0
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 0
B= 3 dB TO B = 4 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 69
NUMBER OF ECHOES USED FOR STATISTICS = 7
AVERAGE BACKSCATTERING CROSS SECTION = .2890E-05 IN dB = -55.39
BACKSCATTERING CROSS SECTION STD DEV = .1080E-05
AVERAGE TARGET STRENGTH IN dB = -55.60

1

7

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0

```

NUMBER OF ECHOES = 0
NUMBER OF ECHOES = 0
NUMBER OF ECHOES = 0
NUMBER OF ECHOES = 0

```

34.

3

86-63- BP NL 30-34001

0000E+00

-39.98

200

1

DEPTH INTERVALS

DEPTH INTERVALS

3.

○

-56	4	8	9	2	0	2	1	1	0	0	2
-54	1	14	7	0	1	1	0	0	0	0	2
-52	0	8	7	0	0	1	0	0	0	0	1
-50	0	4	5	0	0	0	0	0	0	0	
-48	0	3	1	1	0	0	0	0	0	0	
-46	0	0	0	0	0	0	0	0	0	0	
-44	0	0	0	0	0	0	0	0	0	0	
-42	0	0	0	0	0	0	0	0	0	0	
-40	0	0	0	0	0	0	0	1	0	0	
-38	0	0	0	0	0	0	0	0	0	0	
-36	0	0	0	0	0	0	0	0	0	0	
-34	0	0	0	0	0	0	0	0	0	0	
-32	0	0	0	0	0	0	0	0	0	0	
-30	0	0	0	0	0	0	0	0	0	0	
-28	0	0	0	0	0	0	0	0	0	0	
-26	0	0	0	0	0	0	0	0	0	0	
-24	0	0	0	0	0	0	0	0	0	0	
-22	0	0	0	0	0	0	0	0	0	0	
-20	0	0	0	0	0	0	0	0	0	0	
-18	0	0	0	0	0	0	0	0	0	0	
-16	0	0	0	0	0	0	0	0	0	0	
SUM	14	47	34	7	2	4	1	3	0	0	1

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 17
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 10
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 5
 B= 3 dB TO B = 4 dB NUMBER OF ECHOES = 1

TOTAL NUMBER OF RECORDED ECHOES = 530

NUMBER OF ECHOES USED FOR STATISTICS = 112

AVERAGE BACKSCATTERING CROSS SECTION = .5044E-05 IN dB = -52.97

BACKSCATTERING CROSS SECTION STD DEV = .9702E-05

AVERAGE TARGET STRENGTH IN dB = -54.88

TARGET STRENGTH STD DEV IN dB = 3.57

ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 33

NUMBER OF FISH USED = 112
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .288E+05
 DENSITY IN FISH PER CUBIC METER = .389E-02
 EQUIVALENT STRATUM LENGTH (%/100) = .9997

Reading file D:\ESP\ham1.dat

Analyzing Run # 2

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 6896

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 4.0

NUMBER OF FISH USED = 19
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = 3.5510

SUMMARY OF DATA FROM DEPTH 6.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	0
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 23

NUMBER OF ECHOES USED FOR STATISTICS = 2

AVERAGE BACKSCATTERING CROSS SECTION = .4737E-05 IN dB = -53.24

BACKSCATTERING CROSS SECTION STD DEV = .1251E-05

AVERAGE TARGET STRENGTH IN dB = -53.32

TARGET STRENGTH STD DEV IN dB = 1.16

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 0

NUMBER OF FISH USED = 2
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .744E+04
 DENSITY IN FISH PER CUBIC METER = .268E-03
 EQUIVALENT STRATUM LENGTH (%/100) = .9993

SUMMARY OF DATA FROM DEPTH 8.0 TO 10.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	0
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 29

NUMBER OF ECHOES USED FOR STATISTICS = 3

AVERAGE BACKSCATTERING CROSS SECTION = .1451E-04 IN dB = -48.36

BACKSCATTERING CROSS SECTION STD DEV = .8129E-05

TARGET STRENGTH STD DEV IN dB =

3.30

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 0

NUMBER OF FISH USED = 3
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .127E+05
 DENSITY IN FISH PER CUBIC METER = .237E-03
 EQUIVALENT STRATUM LENGTH (%/100) = .9989

SUMMARY OF DATA FROM DEPTH 2.0 TO 10.0

DEPTH INTERVALS

TS	FROM	2.00	2.80	3.60	4.40	5.20	6.00	6.80	7.60	8.40	9.20	SU
	TO	2.80	3.60	4.40	5.20	6.00	6.80	7.60	8.40	9.20	10.00	
-74		0	0	0	0	0	0	0	0	0	0	0
-72		0	0	0	0	0	0	0	0	0	0	0
-70		0	0	0	0	0	0	0	0	0	0	0
-68		0	0	0	0	0	0	0	0	0	0	0
-66		0	0	0	0	0	0	0	0	0	0	0
-64		0	0	0	0	0	0	0	0	0	0	0
-62		1	2	0	0	0	0	0	0	0	0	1
-60		0	7	0	1	1	0	0	0	0	0	9
-58		3	10	0	1	1	0	0	0	0	0	15
-56		1	2	0	1	0	0	0	0	0	0	4
-54		1	0	0	0	2	0	0	1	0	0	4
-52		0	0	0	0	0	1	0	0	0	1	2
-50		0	0	0	0	0	0	0	0	0	0	0
-48		0	0	0	1	1	0	0	0	0	2	4
-46		0	0	0	0	1	0	0	0	0	0	1
-44		0	0	0	1	2	0	0	0	0	0	3
-42		0	0	0	0	3	0	0	0	0	0	3
-40		0	0	0	0	1	0	0	0	0	0	1
-38		0	0	0	0	2	0	0	0	0	0	2
-36		0	0	0	0	0	0	0	0	0	0	0
-34		0	0	0	0	0	0	0	0	0	0	0
-32		0	0	0	0	0	0	0	0	0	0	0
-30		0	0	0	0	0	0	0	0	0	0	0
-28		0	0	0	0	0	0	0	0	0	0	0
-26		0	0	0	0	0	0	0	0	0	0	0
-24		0	0	0	0	0	0	0	0	0	0	0
-22		0	0	0	0	0	0	0	0	0	0	0
-20		0	0	0	0	0	0	0	0	0	0	0
-18		0	0	0	0	0	0	0	0	0	0	0
-16		0	0	0	0	0	0	0	0	0	0	0
SUM		6	21	0	5	14	1	0	1	0	3	51

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 6
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 0
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 0
 B= 3 dB TO B = 4 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 597

NUMBER OF ECHOES USED FOR STATISTICS = 51

BACKSCATTERING CROSS SECTION STD DEV = .3137E-04
 AVERAGE TARGET STRENGTH IN dB = -53.99
 TARGET STRENGTH STD DEV IN dB = 6.90
 ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 6
 NUMBER OF FISH USED = 51
 HALF ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .193E+03
 DENSITY IN FISH PER CUBIC METER = .265E-02
 EQUIVALENT STRATUM LENGTH (%/100) = .9995
 Loading file D:\ESF\Ham1.dat
 Analyzing Run # 3
 DATA GROUP REPORT FOR TRANSDUCER 1
 TOTAL NUMBER OF RINGS = 6626

DATA FOR FREQUENCY 420.

PRIMARY OF DATA FROM DEPTH 2.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
0	0	0	0	0	0	5	11	16	10	4	5	4	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

0 dB TO B =	1 dB	NUMBER OF ECHOES =	3
1 dB TO B =	2 dB	NUMBER OF ECHOES =	1
2 dB TO B =	3 dB	NUMBER OF ECHOES =	0
3 dB TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 110
 NUMBER OF ECHOES USED FOR STATISTICS = 59
 AVERAGE BACKSCATTERING CROSS SECTION = .3719E-05 IN dB = -54.30
 BACKSCATTERING CROSS SECTION STD DEV = .4464E-05
 AVERAGE TARGET STRENGTH IN dB = -56.31
 TARGET STRENGTH STD DEV IN dB = 3.88
 ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 6
 NUMBER OF FISH USED = 59
 HALF ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .120E+04
 DENSITY IN FISH PER CUBIC METER = .492E-01
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

PRIMARY OF DATA FROM DEPTH 4.0 TO 6.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	0	3	4	1	1	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	0
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 36

NUMBER OF ECHOES USED FOR STATISTICS = 14

AVERAGE BACKSCATTERING CROSS SECTION = .2715E-04 IN dB = -45.66

BACKSCATTERING CROSS SECTION STD DEV = .2446E-04

AVERAGE TARGET STRENGTH IN dB = -47.45

TARGET STRENGTH STD DEV IN dB = 4.17

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 0

NUMBER OF FISH USED = 14

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .360E+04

DENSITY IN FISH PER CUBIC METER = .389E-02

EQUIVALENT STRATUM LENGTH (%/100) = .9999

SUMMARY OF DATA FROM DEPTH 6.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	0
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 38

NUMBER OF ECHOES USED FOR STATISTICS = 2

AVERAGE BACKSCATTERING CROSS SECTION = .5840E-04 IN dB = -42.34

BACKSCATTERING CROSS SECTION STD DEV = .7705E-04

AVERAGE TARGET STRENGTH IN dB = -46.77

TARGET STRENGTH STD DEV IN dB = 10.32

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 0

NUMBER OF FISH USED =

DENSITY IN FISH PER CUBIC METER = .272E-03
EQUIVALENT STRATUM LENGTH (%/100) = .9998

SUMMARY OF DATA FROM DEPTH 8.0 TO 10.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 1 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 2
B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 0
B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 0
B= 3 dB TO B= 4 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 35

NUMBER OF ECHOES USED FOR STATISTICS = 4

AVERAGE BACKSCATTERING CROSS SECTION = .9208E-05 IN dB = -50.36

BACKSCATTERING CROSS SECTION STD DEV = .9958E-05

AVERAGE TARGET STRENGTH IN dB = -52.83

TARGET STRENGTH STD DEV IN dB = 5.84

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 2

NUMBER OF FISH USED = 4

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .125E+05

DENSITY IN FISH PER CUBIC METER = .320E-03

EQUIVALENT STRATUM LENGTH (%/100) = .9998

SUMMARY OF DATA FROM DEPTH 2.0 TO 10.0

DEPTH INTERVALS

	FROM	2.00	2.80	3.60	4.40	5.20	6.00	6.80	7.60	8.40	9.20	
	TO	2.80	3.60	4.40	5.20	6.00	6.80	7.60	8.40	9.20	10.00	
TS												SUM
-74	:	0	0	0	0	0	0	0	0	0	0	0
-72	:	0	0	0	0	0	0	0	0	0	0	0
-70	:	0	0	0	0	0	0	0	0	0	0	0
-68	:	0	0	0	0	0	0	0	0	0	0	0
-66	:	0	0	0	0	0	0	0	0	0	0	0
-64	:	0	0	0	0	0	0	0	0	0	0	0
-62	:	5	0	0	0	0	0	0	0	0	0	5
-60	:	9	2	0	0	0	0	0	0	0	1	12
-58	:	7	9	0	0	0	0	0	0	0	0	16
-56	:	7	3	0	0	0	0	0	0	0	0	10
-54	:	1	3	0	0	0	0	0	1	0	1	6
-52	:	3	2	0	2	1	0	0	0	0	0	8
-50	:	1	3	0	2	2	0	0	1	0	0	9

-44	0	0	0	0	3	0	0	0	0	0	3
-42	0	0	0	0	1	0	0	0	0	0	1
-40	0	0	0	0	1	0	1	0	0	0	2
-38	0	0	0	0	0	0	0	0	0	0	0
-36	0	0	0	0	0	0	0	0	0	0	0
-34	0	0	0	0	0	0	0	0	0	0	0
-32	0	0	0	0	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0	0	0	0	0
-28	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	33	26	0	4	10	0	1	2	1	2	79

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	7
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	1
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	0
B= 3 dB TO B = 4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 981

NUMBER OF ECHOES USED FOR STATISTICS = 79

AVERAGE BACKSCATTERING CROSS SECTION = .9533E-05 IN dB = -50.21

BACKSCATTERING CROSS SECTION STD DEV = .1836E-04

AVERAGE TARGET STRENGTH IN dB = -54.32

TARGET STRENGTH STD DEV IN dB = 5.46

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 8

NUMBER OF FISH USED = 79

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .190E+05

DENSITY IN FISH PER CUBIC METER = .415E-02

EQUIVALENT STRATUM LENGTH (%/100) = .9999

***** - TS Version 2.00 *****

Dual Beam Data Reduction Program

For ESP 281 V1.0x & V2.0x data files

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for BioSonics Scientific Hydroacoustic Applications

Serial Number 5205-V2.00-91-000

Reading file D:\ESP\HAM1.dat

Analyzing Run # 1

FILE NUMBER 1 = D:\ESP\HAM1.dat

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 10051

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 10.0 TO 15.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	4	4	1	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	0
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 120

NUMBER OF ECHOES USED FOR STATISTICS = 13

AVERAGE BACKSCATTERING CROSS SECTION = .7095E-04 IN dB = -41.49

BACKSCATTERING CROSS SECTION STD DEV = .4464E-04

AVERAGE TARGET STRENGTH IN dB = -42.28

TARGET STRENGTH STD DEV IN dB = 2.89

ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 0

NUMBER OF FISH USED = 13

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .761E+05

DENSITY IN FISH PER CUBIC METER = .171E-03

EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 15.0 TO 20.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	0
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 39

NUMBER OF ECHOES USED FOR STATISTICS = 2

AVERAGE BACKSCATTERING CROSS SECTION = .5237E-04 IN dB = -42.81

BACKSCATTERING CROSS SECTION STD DEV = .4292E-04

AVERAGE TARGET STRENGTH IN dB = -43.70

TARGET STRENGTH STD DEV IN dB = 4.06

NUMBER OF FISH USED = 2
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .888E+05
 DENSITY IN FISH PER CUBIC METER = .225E-04
 EQUIVALENT STRATUM LENGTH (%/100) = .6660

SUMMARY OF DATA FROM DEPTH 2.0 TO 20.0

DEPTH INTERVALS

	FROM	2.00	3.80	5.60	7.40	9.20	11.00	12.80	14.60	16.40	18.20	
	TO	3.80	5.60	7.40	9.20	11.00	12.80	14.60	16.40	18.20	20.00	
TS												
-74	:	0	0	0	0	0	0	0	0	0	0	
-72	:	0	0	0	0	0	0	0	0	0	0	
-70	:	0	0	0	0	0	0	0	0	0	0	
-68	:	0	0	0	0	0	0	0	0	0	0	
-66	:	0	0	0	0	0	0	0	0	0	0	
-64	:	0	0	0	0	0	0	0	0	0	0	
-62	:	3	0	0	0	0	0	0	0	0	0	
-60	:	7	4	0	0	0	0	0	0	0	0	
-58	:	12	2	1	1	0	0	0	0	0	0	
-56	:	20	3	3	1	0	0	0	0	0	0	
-54	:	22	0	2	0	0	0	0	0	0	0	
-52	:	15	0	1	0	0	0	0	0	0	0	
-50	:	9	0	0	0	0	0	0	0	0	0	
-48	:	4	1	0	0	0	1	0	0	0	0	
-46	:	0	0	0	0	0	2	0	0	1	0	
-44	:	0	0	0	0	0	1	0	0	0	0	
-42	:	0	0	0	0	0	2	2	0	0	0	
-40	:	0	0	0	1	0	4	0	1	0	0	
-38	:	0	0	0	0	0	1	0	0	0	0	
-36	:	0	0	0	0	0	0	0	0	0	0	
-34	:	0	0	0	0	0	0	0	0	0	0	
-32	:	0	0	0	0	0	0	0	0	0	0	
-30	:	0	0	0	0	0	0	0	0	0	0	
-28	:	0	0	0	0	0	0	0	0	0	0	
-26	:	0	0	0	0	0	0	0	0	0	0	
-24	:	0	0	0	0	0	0	0	0	0	0	
-22	:	0	0	0	0	0	0	0	0	0	0	
-20	:	0	0	0	0	0	0	0	0	0	0	
-18	:	0	0	0	0	0	0	0	0	0	0	
-16	:	0	0	0	0	0	0	0	0	0	0	
SUM		92	10	7	3	0	11	2	1	1	0	11

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB	NUMBER OF ECHOES =	17
B= 1 dB TO B= 2 dB	NUMBER OF ECHOES =	10
B= 2 dB TO B= 3 dB	NUMBER OF ECHOES =	5
B= 3 dB TO B= 4 dB	NUMBER OF ECHOES =	1

TOTAL NUMBER OF RECORDED ECHOES = 530

NUMBER OF ECHOES USED FOR STATISTICS = 127

AVERAGE BACKSCATTERING CROSS SECTION = .1254E-04 IN dB = -49.02

BACKSCATTERING CROSS SECTION STD DEV = .2673E-04

TARGET STRENGTH STD DEV IN dB =

5.33

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 33

NUMBER OF FISH USED = 127
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .168E+06
DENSITY IN FISH PER CUBIC METER = .757E-03
EQUIVALENT STRATUM LENGTH (%/100) = .8949

Reading file D:\ESP\HAM1.dat

Analyzing Run #

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 6896

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 10.0 TO 15.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 0 1 1 0 1 1 3 2 1 7 8 7 3 2 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB	TO B = 1 dB	NUMBER OF ECHOES =	3
B= 1 dB	TO B = 2 dB	NUMBER OF ECHOES =	3
B= 2 dB	TO B = 3 dB	NUMBER OF ECHOES =	1
B= 3 dB	TO B = 4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 151

NUMBER OF ECHOES USED FOR STATISTICS = 37

AVERAGE BACKSCATTERING CROSS SECTION = .1803E-03 IN dB = -37.44

BACKSCATTERING CROSS SECTION STD DEV = .1653E-03

AVERAGE TARGET STRENGTH IN dB = -39.73

TARGET STRENGTH STD DEV IN dB = 5.51

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 7

NUMBER OF FISH USED = 37
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .510E+05
DENSITY IN FISH PER CUBIC METER = .726E-03
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 15.0 TO 20.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16

```

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 7
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 1
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 2
B= 3 dB TO B = 4 dB NUMBER OF ECHOES = 1

TOTAL NUMBER OF RECORDED ECHOES = 270

NUMBER OF ECHOES USED FOR STATISTICS = 89

AVERAGE BACKSCATTERING CROSS SECTION = .3777E-03 IN dB = -34.23

BACKSCATTERING CROSS SECTION STD DEV = .3617E-03

AVERAGE TARGET STRENGTH IN dB = -35.06

TARGET STRENGTH STD DEV IN dB = 4.23

# ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 14

NUMBER OF FISH USED = 89
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .101E+06
DENSITY IN FISH PER CUBIC METER = .881E-03
EQUIVALENT STRATUM LENGTH (%/100) = .9975

```

DEPTH INTERVALS

[illegible]

-16	1	0	0	0	0	0	0	0	0	0	0	0
SUM	27	15	5	1	3	4	29	20	42	31	177	

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB	TO B = 1 dB	NUMBER OF ECHOES =	16
B= 1 dB	TO B = 2 dB	NUMBER OF ECHOES =	7
B= 2 dB	TO B = 3 dB	NUMBER OF ECHOES =	3
B= 3 dB	TO B = 4 dB	NUMBER OF ECHOES =	1

TOTAL NUMBER OF RECORDED ECHOES = 597

NUMBER OF ECHOES USED FOR STATISTICS = 177

AVERAGE BACKSCATTERING CROSS SECTION = .2323E-03 IN dB = -36.34

BACKSCATTERING CROSS SECTION STD DEV = .3100E-03

AVERAGE TARGET STRENGTH IN dB = -41.99

TARGET STRENGTH STD DEV IN dB = 9.45

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 27

NUMBER OF FISH USED = 177

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .154E+06

DENSITY IN FISH PER CUBIC METER = .115E-02

EQUIVALENT STRATUM LENGTH (%/100) = .9998

Reading file D:\ESP\HAM1.dat

Analyzing Run # 3

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 6626

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 10.0 TO 15.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
B	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	3	2	1	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB	TO B = 1 dB	NUMBER OF ECHOES =	1
B= 1 dB	TO B = 2 dB	NUMBER OF ECHOES =	0
B= 2 dB	TO B = 3 dB	NUMBER OF ECHOES =	0
B= 3 dB	TO B = 4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 683

NUMBER OF ECHOES USED FOR STATISTICS = 12

AVERAGE BACKSCATTERING CROSS SECTION = .5818E-04 IN dB = -42.35

BACKSCATTERING CROSS SECTION STD DEV = .4143E-04

3.72

1

12

6.00

= .504E+05

239E-07

1.0000

15.0 TO 20.0

2.2

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16

B 0 0 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 2 0 0 1 0 0 0 0 0 0 0 0

STOGRAM OF BEAM PATTERN FACTORS > 0 dB

R= 0 dB TO R = 1 dB NUMBER OF ECHOES = 0

B = 1 dB TO B = 2 dB NUMBER OF ECHOES = 0

NUMBER OF ECHDES = 0

R= 3 dB TO R = 4 dB NUMBER OF ECHOES = 0

65

4

.2302E-03 IN dB = -36.38

.1907E-03

-37.26

2.95

0

4

6.00

ESTIMATED VOLUME IN CUBIC METERS = .303E+05

DENSITY IN FISH PER CUBIC METER = .132E-03

EQUIVALENT STRATUM LENGTH (%/100) = .3788

2.0 TO 20.0

DEPTH INTERVALS

314

0

○



0

-58	11	0	0	0	0	0	0	0	0	0	0	12
-56	16	0	0	0	0	0	0	0	0	0	0	16
-54	10	0	0	0	0	0	0	0	0	0	0	10
-52	4	0	0	1	1	0	0	0	0	0	0	6
-50	5	3	0	0	0	0	0	0	0	0	0	7
-48	4	2	2	1	0	0	1	0	0	0	0	11
-46	3	1	0	0	1	0	0	0	0	0	0	5
-44	1	1	0	1	0	2	0	0	0	0	0	5
-42	0	3	0	0	0	0	1	1	0	0	0	5
-40	0	0	1	0	0	1	2	0	0	0	0	4
-38	0	1	1	0	0	0	1	1	1	0	0	5
-36	0	0	0	0	0	0	0	2	1	0	0	3
-34	0	0	0	0	0	0	0	0	0	0	0	0
-32	0	0	0	0	0	0	0	0	0	1	0	1
-30	0	0	0	0	0	0	0	0	0	0	0	0
-28	0	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0	0
SUM	59	11	4	3	3	3	5	4	3	0		95

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	8
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	1
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0
B=	3 dB	TO B =	4 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 981

NUMBER OF ECHOES USED FOR STATISTICS = 95

AVERAGE BACKSCATTERING CROSS SECTION = .2497E-04 IN dB = -46.03

BACKSCATTERING CROSS SECTION STD DEV = .6144E-04

AVERAGE TARGET STRENGTH IN dB = -52.25

TARGET STRENGTH STD DEV IN dB = 7.03

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 9

NUMBER OF FISH USED = 95
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .825E+05
 DENSITY IN FISH PER CUBIC METER = .115E-02
 EQUIVALENT STRATUM LENGTH (%/100) = .8039

Table 5.13

Sampled volumes, numbers of accepted fish and densities in different sonar runs and in different ranges from transducer, R. Thames, Didcot reach, 5-7.9.1991				
The numbers not accepted for final calculation of density in <i>italics</i>				
	Numbers of accepted fish targets			
	Experiment 1		Exper.2	Exper. 3
Range/run	Di13r2	Di14	Di16r1	Di16r2
2-4.	85	66	4	217
4-6.	496	212	8	180
6-8.	646	313	68	63
8-10.	131	303	6	57
	Sampled volume (m ³)			
2-4.	2530	545	842	1330
4-6.	7590	1640	2530	3980
6-8.	15500	3350	5170	8150
8-10.	26400	5690	6910	13800
	Density (fish/100 m ³)			
2-4.	3.359684	12.11009	0.475059	16.31579
4-6.	6.534914	12.92683	0.316206	4.522613
6-8.	4.167742	9.343284	1.31528	0.773006
8-10.	0.496212	5.325132	0.086831	0.413043
Tot Volume	31155		8542	13460
Tot accept tgts	1818		80	460
Density	5.835339		0.936549	3.417533



Table 5.14

Length frequency composition of Sept. 1991 Fixed location surveys							
(R.Thames, Didcot reach)							
TS	mm	Site1 Tgts	Site1 Fish	Site2 tgts	Site 2 fish	Site 3 Tgts	Site 3 Fish
-58	46.1	31		5		78	
-56	51.9	59		1		72	
-54	58.4	70		4		66	
-52	65.7	125		2		99	
-50	74	153		4		88	
-48	83.4	191		4		74	
-46	93.9	197		2		61	
-44	106	180		0		43	
-42	119	182		1		27	
-40	134	159		7		12	
-38	151	105		13		6	
-36	170	54		23		1	
-34	191	46		16			
-32	215	26		1			
-30	242	8					
-28	273	5					
-26	307						
-24	346						
	48						
	53						
	63		4				
	73		33		13		14
	83		59		37		70
	93		74		33		81
	103		87		19		117
	113		51		14		55
	123		44		4		29
	133		18		12		11
	143		13		6		6
	153		5		4		2
	163		6		1		1
	173		4				
	183		5				
	193				1		
	203		6				
	213		1				
	223						
	233		4				
	243		2				
	253						
	263						
	273		1				
	283		2				
	293						
	303						

Table 5.14 continued

	313		1				
	323		2				
	333		2				
	353						
	400		1				
SUM		1591	425	83	144	627	386
			% Frequency				
-58	46.1	1.95		6.02		12.44	
-56	51.9	3.71		1.20		11.48	
-54	58.4	4.40		4.82		10.53	
-52	65.7	7.86		2.41		15.79	
-50	74	9.62		4.82		14.04	
-48	83.4	12.01		4.82		11.80	
-46	93.9	12.38		2.41		9.73	
-44	106	11.31		0.00		6.86	
-42	119	11.44		1.20		4.31	
-40	134	9.99		8.43		1.91	
-38	151	6.60		15.86		0.96	
-36	170	3.39		27.71		0.16	
-34	191	2.89		19.28		0.00	
-32	215	1.63		1.20		0.00	
-30	242	0.50		0.00		0.00	
-28	273	0.31		0.00		0.00	
-26	307	0.00		0.00		0.00	
-24	346	0.00		0.00		0.00	
	48		0.00		0.00		0.00
	53		0.00		0.00		0.00
	63		0.94		0.00		0.00
	73		7.76		9.03		3.63
	83		13.88		25.69		18.13
	93		17.41		22.92		20.98
	103		20.47		13.19		30.31
	113		12.00		9.72		14.25
	123		10.35		2.78		7.51
	133		4.24		8.33		2.85
	143		3.06		4.17		1.55
	153		1.18		2.78		0.52
	163		1.41		0.69		0.26
	173		0.94		0.00		0.00
	183		1.18		0.00		0.00
	193		0.00		0.69		0.00
	203		1.41		0.00		0.00
	213		0.24		0.00		0.00
	223		0.00		0.00		0.00
	233		0.94		0.00		0.00
	243		0.47		0.00		0.00
	253		0.00		0.00		0.00

SUM		100	100	100	100	100	100
263							
273							
283							
293							
303							
313							
323							
333							
353							
400							

Table 5.14 (continued)

Table 5.17 : Schnabel's estimate of fish density, right bank of Thames north of Appleford (site 3 in map). Surface area 2240 m², date 5.9. 1991, 4 seinings, explanations see Tab. 1)

species	seining							
	I	II		III		IV		
	C	C	R	C	R	C	R	N
Roach	16	20(1D)		4	3	97	19	177
breem	1			27		4	1	112
ruffe						1		1
perch	4	24	1	11		43	6	290
dace		5		1		7	2	21
bleak	2	16		40	1	74	51	120
gudgeon		3				92	1	276
Hybrid								
roachxbream	1	1				6	1	12
total								4504

RIVER THAMES AIDLOT
SEPTEMBER 7, 1991.

7 9.1991

***** TS Version 2.00 *****
Dual Beam Data Reduction Program
For ESP 281 V1.0x & V2.0x data files

11015E CORRECTED
CUT BY -18!
IGNORE OVEREAX

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Serial Number 5205-V2.00-91-000

Reading file A:/di13.dat

Analyzing Run # 1

FILE NUMBER 1 =

A:/di13.dat

FILE NUMBER 2 =

A:/di14.dat

FILE NUMBER 3 =

D:/esp/di16.dat

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS =

9001

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 2 1 1 11 25 39 40 46 33 24 18 4 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	25
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	18
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	4

TOTAL NUMBER OF RECORDED ECHOES =

743

BACKSCATTERING CROSS SECTION STD DEV =

.7652E-05

AVERAGE TARGET STRENGTH IN dB =

-54.70

TARGET STRENGTH STD DEV IN dB =

4.34

ECHOES WITH BEAM PATTERN FACTORS > 0 dB=

47

NUMBER OF FISH USED =

247

FULL ANGLE OF CONE =

6.00

ESTIMATED VOLUME IN CUBIC METERS =

.162E+04

DENSITY IN FISH PER CUBIC METER =

.152E+00

EQUIVALENT STRATUM LENGTH (%/100) =

1.0000

SUMMARY OF DATA FROM DEPTH 4.0 TO 6.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	2	4	6	8	14	28	22	32	19	12	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	16
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	21
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	10

TOTAL NUMBER OF RECORDED ECHOES =

532

NUMBER OF ECHOES USED FOR STATISTICS =

152

AVERAGE BACKSCATTERING CROSS SECTION =

.9517E-05

IN dB = -50.21

BACKSCATTERING CROSS SECTION STD DEV =

.1033E-04

AVERAGE TARGET STRENGTH IN dB =

-52.15

TARGET STRENGTH STD DEV IN dB =

4.33

ECHOES WITH BEAM PATTERN FACTORS > 0 dB=

47

NUMBER OF FISH USED =

152

FULL ANGLE OF CONE =

6.00

ESTIMATED VOLUME IN CUBIC METERS =

.487E+04

DENSITY IN FISH PER CUBIC METER =

.312E-01

EQUIVALENT STRATUM LENGTH (%/100) =

1.0000

SUMMARY OF DATA FROM DEPTH 6.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	2	0	3	12	6	12	19	20	15	7	10	0	1	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

TOTAL NUMBER OF RECORDED ECHOES = 273
 NUMBER OF ECHOES USED FOR STATISTICS = 107
 AVERAGE BACKSCATTERING CROSS SECTION = .1932E-04 IN dB = -47.14
 BACKSCATTERING CROSS SECTION STD DEV = .2134E-04
 AVERAGE TARGET STRENGTH IN dB = -49.40
 TARGET STRENGTH STD DEV IN dB = 4.77
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 31
 NUMBER OF FISH USED = 107
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .997E+04
 DENSITY IN FISH PER CUBIC METER = .107E-01
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 8.0 TO 10.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 1 5 5 4 10 13 11 12 9 11 4 14 5 2 2 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 19
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 11
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 6

TOTAL NUMBER OF RECORDED ECHOES = 249
 NUMBER OF ECHOES USED FOR STATISTICS = 108
 AVERAGE BACKSCATTERING CROSS SECTION = .4515E-04 IN dB = -43.45
 BACKSCATTERING CROSS SECTION STD DEV = .7428E-04
 AVERAGE TARGET STRENGTH IN dB = -47.99
 TARGET STRENGTH STD DEV IN dB = 6.58
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 36
 NUMBER OF FISH USED = 108
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .169E+05
 DENSITY IN FISH PER CUBIC METER = .638E-02
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 10.0 TO 20.0

0 0 0 0 0 0 0 0 4 1 5 2 9 4 9 5 5 8 0 2 3 1 1 0 0 0 0 0

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	3
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	2
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	2

TOTAL NUMBER OF RECORDED ECHOES = 142

NUMBER OF ECHOES USED FOR STATISTICS = 62

AVERAGE BACKSCATTERING CROSS SECTION = .1255E-03 IN dB = -39.02

BACKSCATTERING CROSS SECTION STD DEV = .2636E-03

AVERAGE TARGET STRENGTH IN dB = -45.09

TARGET STRENGTH STD DEV IN dB = 7.37

```
# ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 16
```

```

NUMBER OF FISH USED = 62
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .428E+05
DENSITY IN FISH PER CUBIC METER = .145E-02
EQUIVALENT STRATUM LENGTH (%/100) = .3823

```

SUMMARY OF DATA FROM DEPTH 2.0 TO 20.0

DEPTH INTERVALS

[illegible]

TOTAL NUMBER OF RECORDED ECHOES =	282		
NUMBER OF ECHOES USED FOR STATISTICS =	105		
AVERAGE BACKSCATTERING CROSS SECTION =	.5120E-04	IN dB =	-42.91
BACKSCATTERING CROSS SECTION STD DEV =	.4143E-04		

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 16

NUMBER OF FISH USED = 105
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .253E+04
DENSITY IN FISH PER CUBIC METER = .415E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 4.0 TO 6.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 3 6 19 31 39 75 77 84 88 55 47 34 19 13 4 2 3 1 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 55
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 29
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 11

TOTAL NUMBER OF RECORDED ECHOES = 1309
NUMBER OF ECHOES USED FOR STATISTICS = 600
AVERAGE BACKSCATTERING CROSS SECTION = .4450E-04 IN dB = -43.52
BACKSCATTERING CROSS SECTION STD DEV = .1101E-03
AVERAGE TARGET STRENGTH IN dB = -47.64
TARGET STRENGTH STD DEV IN dB = 5.69

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 95

NUMBER OF FISH USED = 600
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .759E+04
DENSITY IN FISH PER CUBIC METER = .791E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 6.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 1 3 6 8 25 29 43 70 104 102 108 103 111 79 41 42 24 5 4 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 143
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 75
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 34

SUMMARY OF DATA FROM DEPTH 10.0 TO 20.0
NO TARGETS FOUND

	FROM	2.00	3.80	5.60	7.40	9.20	11.00	12.80	14.60	16.40	18.20	
TS	TO	3.80	5.60	7.40	9.20	11.00	12.80	14.60	16.40	18.20	20.00	SUM
-74	:	0	0	0	0	0	0	0	0	0	0	0
-72	:	0	0	0	0	0	0	0	0	0	0	0
-70	:	0	0	0	0	0	0	0	0	0	0	0
-68	:	0	0	0	0	0	0	0	0	0	0	0
-66	:	0	0	0	0	0	0	0	0	0	0	0
-64	:	1	0	0	1	0	0	0	0	0	0	2
-62	:	3	4	3	0	0	0	0	0	0	0	10
-60	:	0	4	8	0	0	0	0	0	0	0	12
-58	:	4	12	13	3	0	0	0	0	0	0	32
-56	:	3	21	26	14	0	0	0	0	0	0	64
-54	:	2	23	36	17	0	0	0	0	0	0	78
-52	:	6	47	62	20	3	0	0	0	0	0	138
-50	:	5	49	90	12	2	0	0	0	0	0	158
-48	:	3	60	105	26	6	0	0	0	0	0	200
-46	:	5	70	111	22	11	0	0	0	0	0	219
-44	:	17	47	100	36	7	0	0	0	0	0	207
-42	:	32	43	96	30	3	0	0	0	0	0	204
-40	:	14	33	96	25	6	0	0	0	0	0	174
-38	:	7	18	73	14	2	0	0	0	0	0	114
-36	:	0	13	33	10	1	0	0	0	0	0	57
-34	:	0	3	39	7	1	0	0	0	0	0	50
-32	:	0	2	19	5	0	0	0	0	0	0	26
-30	:	0	3	5	0	0	0	0	0	0	0	8
-28	:	0	1	4	0	0	0	0	0	0	0	5
-26	:	0	0	0	0	0	0	0	0	0	0	0
-24	:	0	0	0	0	0	0	0	0	0	0	0
-22	:	0	0	0	0	0	0	0	0	0	0	0
-20	:	0	0	0	0	0	0	0	0	0	0	0
-18	:	0	0	0	0	0	0	0	0	0	0	0
-16	:	0	0	0	0	0	0	0	0	0	0	0
SUM		102	453	919	242	42	0	0	0	0	0	1758

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 220
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 108
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 49

TOTAL NUMBER OF RECORDED ECHOES = 3158

NUMBER OF ECHOES USED FOR STATISTICS = 1758

AVERAGE BACKSCATTERING CROSS SECTION = .7572E-04 IN dB = -41.21

BACKSCATTERING CROSS SECTION STD DEV = .1453E-03

AVERAGE TARGET STRENGTH IN dB = -45.40

TARGET STRENGTH STD DEV IN dB = 6.20

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 377

NUMBER OF FISH USED = 1758
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .545E+05
DENSITY IN FISH PER CUBIC METER = .322E-01
EQUIVALENT STRATUM LENGTH (Z/100) = .5301

Reading file A:/dl14.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF RINGS =

3010

```

TOTAL NUMBER OF RECORDED ECHOES =                1442
NUMBER OF ECHOES USED FOR STATISTICS =              656
AVERAGE BACKSCATTERING CROSS SECTION =  .2585E-04   IN dB =  -45.86

```

TARGET STRENGTH STD DEV IN dB =

7.20

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 157

NUMBER OF FISH USED = 656
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .164E+04
 DENSITY IN FISH PER CUBIC METER = .401E+00
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 6.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	3	4	19	38	63	67	103	127	128	137	122	113	91	68	43	29	24	5	4	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	195
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	130
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	83

TOTAL NUMBER OF RECORDED ECHOES = 1873

NUMBER OF ECHOES USED FOR STATISTICS = 1188

AVERAGE BACKSCATTERING CROSS SECTION = .7385E-04 IN dB = -41.32

BACKSCATTERING CROSS SECTION STD DEV = .1499E-03

AVERAGE TARGET STRENGTH IN dB = -46.26

TARGET STRENGTH STD DEV IN dB = 6.62

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 408

NUMBER OF FISH USED = 1188
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .335E+04
 DENSITY IN FISH PER CUBIC METER = .355E+00
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 8.0 TO 10.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	1	4	10	12	28	51	50	43	49	49	39	38	17	4	2	3	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	28
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	24
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	31

[illegible]

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	315
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	207
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	143

TOTAL NUMBER OF RECORDED ECHOES =	4398
NUMBER OF ECHOES USED FOR STATISTICS =	2357
AVERAGE BACKSCATTERING CROSS SECTION =	.5121E-04 IN dB = -42.91
BACKSCATTERING CROSS SECTION STD DEV =	.1196E-03
AVERAGE TARGET STRENGTH IN dB =	-48.45
TARGET STRENGTH STD DEV IN dB =	7.23

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 668

NUMBER OF FISH USED =	2357
FULL ANGLE OF CONE =	6.00
ESTIMATED VOLUME IN CUBIC METERS =	.115E+05
DENSITY IN FISH PER CUBIC METER =	.205E+00
EQUIVALENT STRATUM LENGTH (%/100) =	.5263

Reading file D:/esp/8116.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 4656

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

75	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
1	0	0	0	0	0	0	1	1	2	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	0
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES =	20
NUMBER OF ECHOES USED FOR STATISTICS =	6
AVERAGE BACKSCATTERING CROSS SECTION =	.2756E-05 IN dB = -55.60
BACKSCATTERING CROSS SECTION STD DEV =	.2902E-05
AVERAGE TARGET STRENGTH IN dB =	-57.35
TARGET STRENGTH STD DEV IN dB =	4.15

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 0

NUMBER OF FISH USED = 6
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .842E+03
 DENSITY IN FISH PER CUBIC METER = .713E-02
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 4.0 TO 6.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 1 3 1 1 1 0 2 2 0 0 1 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 1
 B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 0
 B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 122
 NUMBER OF ECHOES USED FOR STATISTICS = 12
 AVERAGE BACKSCATTERING CROSS SECTION = .1825E-04 IN dB = -47.39
 BACKSCATTERING CROSS SECTION STD DEV = .3412E-04
 AVERAGE TARGET STRENGTH IN dB = -52.11
 TARGET STRENGTH STD DEV IN dB = 6.54
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 1

NUMBER OF FISH USED = 12
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .253E+04
 DENSITY IN FISH PER CUBIC METER = .475E-02
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 6.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 0 0 0 2 1 3 2 0 0 1 6 13 23 16 1 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 0
 B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 0
 B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 271
 NUMBER OF ECHOES USED FOR STATISTICS = 68

AVERAGE TARGET STRENGTH IN dB = -38.03
 TARGET STRENGTH STD DEV IN dB = 5.13
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 0
 NUMBER OF FISH USED = 68
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .517E+04
 DENSITY IN FISH PER CUBIC METER = .131E-01
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 8.0 TO 10.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 0 0 0 1 0 3 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 0
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 0
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 23
 NUMBER OF ECHOES USED FOR STATISTICS = 6
 AVERAGE BACKSCATTERING CROSS SECTION = .1647E-04 IN dB = -47.83
 BACKSCATTERING CROSS SECTION STD DEV = .1372E-04
 AVERAGE TARGET STRENGTH IN dB = -49.01
 TARGET STRENGTH STD DEV IN dB = 3.56
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 0

NUMBER OF FISH USED = 6
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .691E+04
 DENSITY IN FISH PER CUBIC METER = .869E-03
 EQUIVALENT STRATUM LENGTH (%/100) = .8089

SUMMARY OF DATA FROM DEPTH 10.0 TO 20.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 5

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 0 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 0

18
 16
 0 0 0 0 0 0 0 0 0 0 0 0
 0 0 0 0 0 0 0 0 0 0 0 0
 2 dB 10 dB 5 dB NUMBER OF ECHOES = 0
 TOTAL NUMBER OF RECORDED ECHOES = 18
 NUMBER OF ECHOES USED FOR STATISTICS = 2
 AVERAGE BACKSCATTERING CROSS SECTION = .7525E-05 IN dB = -51.23
 BACKSCATTERING CROSS SECTION STD DEV = .7125E-05
 AVERAGE TARGET STRENGTH IN dB = -52.53
 TARGET STRENGTH STD DEV IN dB = 4.97
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 0
 NUMBER OF FISH USED = 2
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .112E+05
 DENSITY IN FISH PER CUBIC METER = .178E-03
 EQUIVALENT STRATUM LENGTH (%/100) = .1999

SUMMARY OF DATA FROM DEPTH 2.0 TO 20.0

DEPTH INTERVALS

	FROM TO	2.00 3.80	3.80 5.60	5.60 7.40	7.40 9.20	9.20 11.00	11.00 12.80	12.80 14.60	14.60 16.40	16.40 18.20	18.20 20.00	SU
TS												
-74		0	0	0	0	0	0	0	0	0	0	0
-72		0	0	0	0	0	0	0	0	0	0	0
-70		0	0	0	0	0	0	0	0	0	0	0
-68		0	0	0	0	0	0	0	0	0	0	0
-66		0	0	0	0	0	0	0	0	0	0	0
-64		0	0	0	0	0	0	0	0	0	0	0
-62		1	0	0	0	0	0	0	0	0	0	1
-60		1	1	0	0	0	0	0	0	0	0	2
-58		2	3	0	0	0	0	0	0	0	0	5
-56		0	1	0	0	0	0	1	0	0	0	2
-54		1	1	2	1	0	0	0	0	0	0	5
-52		0	1	1	0	0	0	0	0	0	0	2
-50		0	1	1	3	0	1	0	0	0	0	6
-48		0	2	2	0	0	0	0	0	0	0	4
-46		0	2	0	1	0	0	0	0	0	0	3
-44		0	0	0	1	0	0	0	0	0	0	1
-42		0	0	1	0	0	0	0	0	0	0	1
-40		0	1	6	0	0	0	0	0	0	0	7
-38		0	0	13	0	0	0	0	0	0	0	13
-36		0	0	23	0	0	0	0	0	0	0	23
-34		0	0	16	0	0	0	0	0	0	0	16
-32		0	0	1	0	0	0	0	0	0	0	1
-30		0	0	0	0	0	0	0	0	0	0	0
-28		0	0	0	0	0	0	0	0	0	0	0
-26		0	0	0	0	0	0	0	0	0	0	0
-24		0	0	0	0	0	0	0	0	0	0	0
-22		0	0	0	0	0	0	0	0	0	0	0
-20		0	0	0	0	0	0	0	0	0	0	0
-18		0	0	0	0	0	0	0	0	0	0	0
-16		0	0	0	0	0	0	0	0	0	0	0
SUM		5	13	66	8	0	1	1	0	0	0	94

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	0
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 460

NUMBER OF ECHOES USED FOR STATISTICS = 94

AVERAGE BACKSCATTERING CROSS SECTION = .1665E-03 IN dB = -37.79

BACKSCATTERING CROSS SECTION STD DEV = .1395E-03

AVERAGE TARGET STRENGTH IN dB = -42.07

TARGET STRENGTH STD DEV IN dB = 8.45

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 1

NUMBER OF FISH USED = 94

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .202E+05

DENSITY IN FISH PER CUBIC METER = .466E-02

EQUIVALENT STRATUM LENGTH (%/100) = .5220

Reading file D:/esp/di16.dat

Analyzing Run # 2

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 7325

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 2.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
N	0	0	0	0	1	10	17	28	45	40	34	55	45	34	21	17	13	7	2	1	0	0	0	0	0	0	0	0	0	

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	42
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	28
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	27

TOTAL NUMBER OF RECORDED ECHOES = 959

NUMBER OF ECHOES USED FOR STATISTICS = 370

AVERAGE BACKSCATTERING CROSS SECTION = .1355E-04 IN dB = -48.68

BACKSCATTERING CROSS SECTION STD DEV = .2537E-04

AVERAGE TARGET STRENGTH IN dB = -52.77

TARGET STRENGTH STD DEV IN dB = 5.91

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 97

NUMBER OF FISH USED = 370

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .133E+04

SUMMARY OF DATA FROM DEPTH 4.0 TO 6.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 2 5 3 16 21 18 24 33 36 29 30 18 10 3 3 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 30
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 11
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 4

TOTAL NUMBER OF RECORDED ECHOES = 629

NUMBER OF ECHOES USED FOR STATISTICS = 257

AVERAGE BACKSCATTERING CROSS SECTION = .1588E-04 IN dB = -47.99

BACKSCATTERING CROSS SECTION STD DEV = .2323E-04

AVERAGE TARGET STRENGTH IN dB = -51.45

TARGET STRENGTH STD DEV IN dB = 5.88

ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 45

NUMBER OF FISH USED = 257
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .398E+04
DENSITY IN FISH PER CUBIC METER = .646E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 6.0 TO 8.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 1 6 11 19 12 14 8 11 7 11 10 8 4 2 1 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 14
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 7
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 2

TOTAL NUMBER OF RECORDED ECHOES = 1178

NUMBER OF ECHOES USED FOR STATISTICS = 125

AVERAGE BACKSCATTERING CROSS SECTION = .1247E-04 IN dB = -49.04

BACKSCATTERING CROSS SECTION STD DEV = .2105E-04

AVERAGE TARGET STRENGTH IN dB =

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 23

NUMBER OF FISH USED = 125
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .815E+04
 DENSITY IN FISH PER CUBIC METER = .153E-01
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 8.0 TO 10.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 4 4 8 15 11 9 7 5 5 5 6 3 1 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 4
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 4
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 2

TOTAL NUMBER OF RECORDED ECHOES = 1762

NUMBER OF ECHOES USED FOR STATISTICS = 83

AVERAGE BACKSCATTERING CROSS SECTION = .1062E-04 IN dB = -49.74

BACKSCATTERING CROSS SECTION STD DEV = .1635E-04

AVERAGE TARGET STRENGTH IN dB = -53.94

TARGET STRENGTH STD DEV IN dB = 6.07

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 10

NUMBER OF FISH USED = 83
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .138E+05
 DENSITY IN FISH PER CUBIC METER = .600E-02
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 10.0 TO 12.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 5

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 7 11 10 14 20 8 7 2 1 5 4 1 1 1 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 4
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 5
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 2

TOTAL NUMBER OF RECORDED ECHOES = 1019

***** TS Version 2.00 *****
 Dual Beam Data Reduction Program
 For ESP 281 V1.0x & V2.0x data files

CHE 1

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 for BioSonics Scientific Hydroacoustic Applications
 Serial Number 5205-V2.00-91-000

RIVER THAMES
 CHERTSBY MEADS
 JUNE 22/23 1992
 24 hour fixed
 location study

Reading file D:\esp_nra\cheld.dat *Run*
 Analyzing Run # 1

FILE NUMBER 1 =	<i>CHE1</i>	D:\esp_nra\cheld.dat	1, 2, 3
FILE NUMBER 2 =		D:\esp_nra\chelm.dat	1, 2
FILE NUMBER 3 =		D:\esp_nra\chels.dat	1, 2, 3
FILE NUMBER 4 =		D:\esp_nra\che3n.dat	1,
FILE NUMBER 5 =	<i>CHE3</i>	D:\esp_nra\che4d.dat	1,
FILE NUMBER 6 =	<i>CHE4</i>	D:\esp_nra\che4n.dat	1,
FILE NUMBER 7 =		D:\esp_nra\che4s.dat	1, 2
FILE NUMBER 8 =		D:\esp_nra\che5d.dat	1
FILE NUMBER 9 =	<i>CHE5</i>	D:\esp_nra\che5n.dat	1
FILE NUMBER 10 =		D:\esp_nra\che5s.dat	1
FILE NUMBER 11 =	<i>CHE6</i>	D:\esp_nra\che6s.dat	1, 2

+ move. CHE6

DATA GROUP REPORT FOR TRANSDUCER 1
 TOTAL NUMBER OF PINGS = 2030

R1

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 5.0
 NO TARGETS FOUND

SUMMARY OF DATA FROM DEPTH 5.0 TO 9.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	2	1	2	4	2	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB	NUMBER OF ECHOES =	2
B= 1 dB TO B= 2 dB	NUMBER OF ECHOES =	3
B= 2 dB TO B= 3 dB	NUMBER OF ECHOES =	2

TOTAL NUMBER OF RECORDED ECHOES = 53

NUMBER OF ECHOES USED FOR STATISTICS = 15
 AVERAGE BACKSCATTERING CROSS SECTION = .1285E-04 IN dB = -48.91
 BACKSCATTERING CROSS SECTION STD DEV = .9495E-05
 AVERAGE TARGET STRENGTH IN dB = -50.16
 TARGET STRENGTH STD DEV IN dB = 3.62

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 7

NUMBER OF FISH USED = 15
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .537E+03
 DENSITY IN FISH PER CUBIC METER = .279E-01
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 9.0 TO 13.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 0
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 0
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 2

NUMBER OF ECHOES USED FOR STATISTICS = 2

AVERAGE BACKSCATTERING CROSS SECTION = .4171E-05 IN dB = -53.80

BACKSCATTERING CROSS SECTION STD DEV = .3252E-05

AVERAGE TARGET STRENGTH IN dB = -54.58

TARGET STRENGTH STD DEV IN dB = 3.81

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 0

NUMBER OF FISH USED = 2
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .662E+03
 DENSITY IN FISH PER CUBIC METER = .302E-02
 EQUIVALENT STRATUM LENGTH (%/100) = .6000

SUMMARY OF DATA FROM DEPTH 13.0 TO 25.0
NO TARGETS FOUND

SUMMARY OF DATA FROM DEPTH 1.0 TO 25.0

DEPTH INTERVALS

FROM 1.00 3.40 5.80 8.20 10.60 13.00 15.40 17.80 20.20 22.60
TO 3.40 5.80 8.20 10.60 13.00 15.40 17.80 20.20 22.60 25.00

TS	13.00	15.40	17.80	20.20	22.60	25.00	SUM
-74	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0
-58	0	0	0	1	0	0	1
-56	0	0	1	1	0	0	2
-54	0	0	1	0	0	0	1
-52	0	0	1	2	0	0	3
-50	0	0	3	1	0	0	4
-48	0	0	1	1	0	0	2
-46	0	0	1	2	0	0	3
-44	0	0	1	0	0	0	1
-42	0	0	0	0	0	0	0
-40	0	0	0	0	0	0	0
-38	0	0	0	0	0	0	0
-36	0	0	0	0	0	0	0
-34	0	0	0	0	0	0	0
-32	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0
-28	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0
SUM	0	0	9	7	1	0	17

HISTOGRAM OF BEAM PATTERN FACTORS > 0 DB

B= 0 DB TO B = 1 DB NUMBER OF ECHOES = 2
B= 1 DB TO B = 2 DB NUMBER OF ECHOES = 3
B= 2 DB TO B = 3 DB NUMBER OF ECHOES = 2

TOTAL NUMBER OF RECORDED ECHOES = 55

NUMBER OF ECHOES USED FOR STATISTICS = 17

AVERAGE BACKSCATTERING CROSS SECTION = .1183E-04 IN DB = -49.27

BACKSCATTERING CROSS SECTION STD DEV = .9373E-05
AVERAGE TARGET STRENGTH IN dB = -50.68
TARGET STRENGTH STD DEV IN dB = 3.82
ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 7

NUMBER OF FISH USED = 17
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .108E+04
DENSITY IN FISH PER CUBIC METER = .158E-01
EQUIVALENT STRATUM LENGTH (1/100) = .4400

Reading file D:/esp_nra/cheld.dat

Analyzing Run # 2

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 3782

DOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 5.0
NO TARGETS FOUND

SUMMARY OF DATA FROM DEPTH 5.0 TO 9.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	5	16	25	46	46	44	27	15	8	1	1	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	24
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	35
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	21

TOTAL NUMBER OF RECORDED ECHOES = 754

NUMBER OF ECHOES USED FOR STATISTICS = 234

AVERAGE BACKSCATTERING CROSS SECTION = .1537E-04 IN dB = -48.13

BACKSCATTERING CROSS SECTION STD DEV = .1632E-04

AVERAGE TARGET STRENGTH IN dB = -49.81

TARGET STRENGTH STD DEV IN dB = 3.77

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 80

NUMBER OF FISH USED = 234
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .722E+04
DENSITY IN FISH PER CUBIC METER = .324E-01
EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 9.0 TO 13.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	21	35	50	35	19	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0

GRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	29
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	25
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	20

TOTAL NUMBER OF RECORDED ECHOES = 254
NUMBER OF ECHOES USED FOR STATISTICS = 168
AVERAGE BACKSCATTERING CROSS SECTION = .5087E-05 IN dB = -52.93
BACKSCATTERING CROSS SECTION STD DEV = .4053E-05
AVERAGE TARGET STRENGTH IN dB = -53.83
TARGET STRENGTH STD DEV IN dB = 2.63

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 74

NUMBER OF FISH USED = 168
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .182E+05
DENSITY IN FISH PER CUBIC METER = .925E-02
EQUIVALENT STRATUM LENGTH (1/100) = .9943

SUMMARY OF DATA FROM DEPTH 13.0 TO 25.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	29	67	51	55	53	33	22	8	6	3	4	2	4	0	0	0	0	0	0	0	0

NUMBER OF FISH USED =	826
FULL ANGLE OF CONE =	6.00
ESTIMATED VOLUME IN CUBIC METERS =	.147E+06
DENSITY IN FISH PER CUBIC METER =	.564E-02
EQUIVALENT STRATUM LENGTH (1/100) =	.4201

DEPTH INTERVALS

[illegible]

-32	0	0	0	0	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0	0	0	0	0
-28	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	0	0	142	165	95	62	129	146	0	0	739

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 101
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 88
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 73

TOTAL NUMBER OF RECORDED ECHOES = 1682

NUMBER OF ECHOES USED FOR STATISTICS = 739

AVERAGE BACKSCATTERING CROSS SECTION = .1420E-04 IN dB = -48.48

BACKSCATTERING CROSS SECTION STD DEV = .3547E-04

AVERAGE TARGET STRENGTH IN dB = -51.54

TARGET STRENGTH STD DEV IN dB = 4.32

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 262

NUMBER OF FISH USED = 739
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .856E+05
DENSITY IN FISH PER CUBIC METER = .864E-02
EQUIVALENT STRATUM LENGTH (%/100) = .7939

Reading file D:/esp_nra/cheld.dat

Analyzing Run # 3
GROUP REPORT FOR TRANSDUCER 1
TOTAL NUMBER OF PINGS = 3479

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	4	3	7	43	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 12
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 8
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 2

TOTAL NUMBER OF RECORDED ECHOES = 75

NUMBER OF ECHOES USED FOR STATISTICS = 67

AVERAGE BACKSCATTERING CROSS SECTION = .9680E-05 IN dB = -50.14

BACKSCATTERING CROSS SECTION STD DEV = .3441E-05

AVERAGE TARGET STRENGTH IN dB = -50.50

TARGET STRENGTH STD DEV IN dB = 1.98

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 22

NUMBER OF FISH USED = 67
 ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .126E+04
 DENSITY IN FISH PER CUBIC METER = .534E-01
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 5.0 TO 9.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	2	42	42	31	42	17	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 30
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 17
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 9

TOTAL NUMBER OF RECORDED ECHOES = 486

NUMBER OF ECHOES USED FOR STATISTICS = 185

AVERAGE BACKSCATTERING CROSS SECTION = .7415E-05 IN dB = -51.30

BACKSCATTERING CROSS SECTION STD DEV = .5618E-05

AVERAGE TARGET STRENGTH IN dB = -52.35

TARGET STRENGTH STD DEV IN dB = 2.98

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 56

NUMBER OF FISH USED = 185
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .668E+04
DENSITY IN FISH PER CUBIC METER = .277E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 9.0 TO 13.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 22 35 28 30 32 10 8 2 4 1 1 1 1 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 34
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 21
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 17

TOTAL NUMBER OF RECORDED ECHOES = 305
NUMBER OF ECHOES USED FOR STATISTICS = 175
AVERAGE BACKSCATTERING CROSS SECTION = .1356E-04 IN dB = -48.68
BACKSCATTERING CROSS SECTION STD DEV = .4260E-04
AVERAGE TARGET STRENGTH IN dB = -52.32
TARGET STRENGTH STD DEV IN dB = 4.36
ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 72

NUMBER OF FISH USED = 175
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .169E+05
DENSITY IN FISH PER CUBIC METER = .103E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 13.0 TO 25.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 1 2 3 7 6 6 3 1 0 2 1 1 3 6 4 6 1 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 7
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 8
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 13

TOTAL NUMBER OF RECORDED ECHOES = 140
 NUMBER OF ECHOES USED FOR STATISTICS = 53
 AVERAGE BACKSCATTERING CROSS SECTION = .4281E-03 IN dB = -33.68
 BACKSCATTERING CROSS SECTION STD DEV = .6384E-03
 AVERAGE TARGET STRENGTH IN dB = -41.97
 TARGET STRENGTH STD DEV IN dB = 10.10

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 28

NUMBER OF FISH USED = 53
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .116E+05
 DENSITY IN FISH PER CUBIC METER = .458E-02
 EQUIVALENT STRATUM LENGTH (%/100) = .1408

SUMMARY OF DATA FROM DEPTH 1.0 TO 25.0

DEPTH INTERVALS

	FROM 1.00	3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	
	TO 3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	25.00	
TS											SUM
-74	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	0	0	1	11	12	0	0	1	0	0	25
-56	2	2	28	32	17	1	0	1	0	0	83
-54	1	2	26	21	23	2	0	1	0	0	76
-52	0	7	16	28	17	3	1	3	0	0	75
-50	0	43	24	30	20	4	2	0	0	0	123
-48	0	9	6	12	9	0	4	2	0	0	42
-46	0	1	6	3	8	0	2	1	0	0	21
-44	0	0	0	0	2	0	1	0	0	0	3
-42	0	0	0	0	4	0	0	0	0	0	4
-40	0	0	0	0	1	1	1	0	0	0	3
-38	0	0	0	0	1	1	0	0	0	0	2
-36	0	0	0	0	1	0	1	0	0	0	2
-34	0	0	0	0	1	0	1	2	0	0	4
-32	0	0	0	0	0	0	6	0	0	0	6
-30	0	0	0	0	0	0	4	0	0	0	4
-28	0	0	0	0	0	0	6	0	0	0	6

-26	0	0	0	0	0	0	1	0	0	0	1
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	3	64	107	137	116	12	30	11	0	0	480

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 83
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 54
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 41

TOTAL NUMBER OF RECORDED ECHOES = 1006

NUMBER OF ECHOES USED FOR STATISTICS = 480

AVERAGE BACKSCATTERING CROSS SECTION = .5643E-04 IN dB = -42.49

BACKSCATTERING CROSS SECTION STD DEV = .2492E-03

AVERAGE TARGET STRENGTH IN dB = -50.93

TARGET STRENGTH STD DEV IN dB = 5.69

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 178

NUMBER OF FISH USED = 480
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .289E+05
DENSITY IN FISH PER CUBIC METER = .166E-01
EQUIVALENT STRATUM LENGTH (1/100) = .5532

Reading file D:\esp_nra\chelm.dat

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Analyzing Run # 1
DATA GROUP REPORT FOR TRANSDUCER 1
TOTAL NUMBER OF PINGS = 13301

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	16	34	15	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	19
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	14
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	9

TOTAL NUMBER OF RECORDED ECHOES = 80

NUMBER OF ECHOES USED FOR STATISTICS = 71

AVERAGE BACKSCATTERING CROSS SECTION = .3094E-05 IN dB = -55.09

BACKSCATTERING CROSS SECTION STD DEV = .1792E-05

AVERAGE TARGET STRENGTH IN dB = -55.57

TARGET STRENGTH STD DEV IN dB = 1.87

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 42

NUMBER OF FISH USED = 71
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .479E+04
 DENSITY IN FISH PER CUBIC METER = .148E-01
 EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 5.0 TO 9.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	33	101	128	150	158	104	47	24	2	2	0	0	0	0	0	0	0	0	0	0	0

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HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	92
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	78
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	56

TOTAL NUMBER OF RECORDED ECHOES = 1821

NUMBER OF ECHOES USED FOR STATISTICS = 749

AVERAGE BACKSCATTERING CROSS SECTION = .9868E-05 IN dB = -50.06

BACKSCATTERING CROSS SECTION STD DEV = .9621E-05

AVERAGE TARGET STRENGTH IN dB = -51.47

TARGET STRENGTH STD DEV IN dB = 3.43

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 226

NUMBER OF FISH USED = 749
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .255E+05

DENSITY IN FISH PER CUBIC METER = .294E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 9.0 TO 13.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	37	99	115	96	77	24	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	74
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	64
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	46

NUMBER OF RECORDED ECHOES = 756

NUMBER OF ECHOES USED FOR STATISTICS = 459

AVERAGE BACKSCATTERING CROSS SECTION = .6086E-05 IN dB = -52.16

BACKSCATTERING CROSS SECTION STD DEV = .4640E-05

AVERAGE TARGET STRENGTH IN dB = -53.14

TARGET STRENGTH STD DEV IN dB = 2.84

ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 184

NUMBER OF FISH USED = 459
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .622E+05
DENSITY IN FISH PER CUBIC METER = .738E-02
EQUIVALENT STRATUM LENGTH (%/100) = .9699

SUMMARY OF DATA FROM DEPTH 13.0 TO 25.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	101	188	184	168	107	42	16	12	4	3	1	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	122
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	126
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	96

-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	48	23	666	187	355	397	216	213	0	0	2105

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 307
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 282
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 207

TOTAL NUMBER OF RECORDED ECHOES = 4555

NUMBER OF ECHOES USED FOR STATISTICS = 2105

AVERAGE BACKSCATTERING CROSS SECTION = .7679E-05 IN dB = -51.15

BACKSCATTERING CROSS SECTION STD DEV = .9582E-05

AVERAGE TARGET STRENGTH IN dB = -52.68

TARGET STRENGTH STD DEV IN dB = 3.37

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 796

NUMBER OF FISH USED = 2105
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .211E+06
 DENSITY IN FISH PER CUBIC METER = .996E-02
 EQUIVALENT STRATUM LENGTH (1/100) = .6945

Reading file D:\esp_nra/cheln.dat
 Analyzing Run # 2
 DATA GROUP REPORT FOR TRANSDUCER 1
 TOTAL NUMBER OF PINGS = 1062

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 5.0
 NO TARGETS FOUND

SUMMARY OF DATA FROM DEPTH 5.0 TO 9.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 0 0 2 6 17 12 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0

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HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 7
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 7
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 4

TOTAL NUMBER OF RECORDED ECHOES = 104
 NUMBER OF ECHOES USED FOR STATISTICS = 41
 AVERAGE BACKSCATTERING CROSS SECTION = .5228E-05 IN dB = -52.82
 BACKSCATTERING CROSS SECTION STD DEV = .3525E-05
 AVERAGE TARGET STRENGTH IN dB = -53.47
 TARGET STRENGTH STD DEV IN dB = 2.28
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 18

NUMBER OF FISH USED = 41
 ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .205E+04
 DENSITY IN FISH PER CUBIC METER = .200E-01
 EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 9.0 TO 13.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 0 4 5 10 12 6 6 5 7 3 1 6 4 1 2 1 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 4
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 6
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 5

TOTAL NUMBER OF RECORDED ECHOES = 262
 NUMBER OF ECHOES USED FOR STATISTICS = 73
 AVERAGE BACKSCATTERING CROSS SECTION = .7930E-04 IN dB = -41.01
 BACKSCATTERING CROSS SECTION STD DEV = .1737E-03
 AVERAGE TARGET STRENGTH IN dB = -47.50
 TARGET STRENGTH STD DEV IN dB = 7.32
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 15

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TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

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TOTAL NUMBER OF RECORDED ECHOES =	1367	
NUMBER OF ECHOES USED FOR STATISTICS =	839	
AVERAGE BACKSCATTERING CROSS SECTION =	.1705E-03	IN dB = -37.68
BACKSCATTERING CROSS SECTION STD DEV =	.3237E-03	
AVERAGE TARGET STRENGTH IN dB =		-43.49
TARGET STRENGTH STD DEV IN dB =		7.59
# ECHOES WITH BEAM PATTERN FACTORS > 0 dB=	285	

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DEPTH INTERVALS

[illegible]

-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	0	2	0	1	3	8	6	1	0	0	21
-56	0	5	1	0	5	12	24	6	0	0	53
-54	0	17	0	2	8	12	29	11	0	0	79
-52	0	12	0	1	11	20	19	18	0	0	81
-50	0	2	0	0	6	12	22	21	0	0	63
-48	0	1	1	0	6	12	21	38	0	0	79
-46	0	0	0	0	5	17	28	28	2	0	80
-44	0	0	0	0	7	17	24	31	3	0	82
-42	0	0	0	0	3	10	28	38	1	0	80
-40	0	0	0	0	1	1	20	42	1	0	65
-38	0	0	0	0	6	3	26	34	2	0	71
-36	0	0	0	0	4	0	16	42	0	0	62
-34	0	0	0	0	1	0	20	30	0	0	51
-32	0	0	0	0	2	0	10	33	0	0	45
-30	0	0	0	0	1	0	3	20	0	0	24
-28	0	0	0	0	0	0	2	11	0	0	13
-26	0	0	0	0	0	0	1	3	0	0	4
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	0	39	2	4	69	124	299	407	9	0	953

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 147
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 102
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 69

TOTAL NUMBER OF RECORDED ECHOES = 1733

NUMBER OF ECHOES USED FOR STATISTICS = 953

AVERAGE BACKSCATTERING CROSS SECTION = .1564E-03 IN dB = -38.06

BACKSCATTERING CROSS SECTION STD DEV = .3100E-03

AVERAGE TARGET STRENGTH IN dB = -44.22

TARGET STRENGTH STD DEV IN dB = 7.74

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 318

NUMBER OF FISH USED = 953
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .246E+05
DENSITY IN FISH PER CUBIC METER = .387E-01
EQUIVALENT STRATUM LENGTH (%/100) = .8000

Reading file D:\esp_nra\chels.dat
Analyzing Run # 1
DATA GROUP REPORT FOR TRANSDUCER 1



TOTAL NUMBER OF PINGS = 1912

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	0
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 5

NUMBER OF ECHOES USED FOR STATISTICS = 2

AVERAGE BACKSCATTERING CROSS SECTION = .3478E-05 IN dB = -54.59

BACKSCATTERING CROSS SECTION STD DEV = .1785E-05

AVERAGE TARGET STRENGTH IN dB = -54.89

TARGET STRENGTH STD DEV IN dB = 2.34

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 0

NUMBER OF FISH USED = 2
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .691E+03
DENSITY IN FISH PER CUBIC METER = .289E-02
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 5.0 TO 9.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	4	25	20	30	33	16	11	4	2	2	0	0	0	0	0	0	0	0	0	0	0

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HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 20
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 15
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 18

TOTAL NUMBER OF RECORDED ECHOES = 391

NUMBER OF ECHOES USED FOR STATISTICS = 147

AVERAGE BACKSCATTERING CROSS SECTION = .1119E-04 IN dB = -49.51

BACKSCATTERING CROSS SECTION STD DEV = .1373E-04

AVERAGE TARGET STRENGTH IN dB = -51.26

TARGET STRENGTH STD DEV IN dB = 3.64

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 53

NUMBER OF FISH USED = 147
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .368E+04
 DENSITY IN FISH PER CUBIC METER = .400E-01
 EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 9.0 TO 13.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16	
#	0	0	0	0	0	0	0	0	0	11	36	24	41	28	32	17	14	9	14	10	11	10	5	6	3	5	0	0	0	0	0

†

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 33
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 19
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 11

TOTAL NUMBER OF RECORDED ECHOES = 663

NUMBER OF ECHOES USED FOR STATISTICS = 276

AVERAGE BACKSCATTERING CROSS SECTION = .1396E-03 IN dB = -38.55

BACKSCATTERING CROSS SECTION STD DEV = .3911E-03

AVERAGE TARGET STRENGTH IN dB = -47.14

TARGET STRENGTH STD DEV IN dB = 7.98

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 63

NUMBER OF FISH USED = 276
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .931E+04

[illegible]

-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	0	3	1	4	7	10	11	8	0	0	44
-56	0	20	4	10	28	30	38	29	0	0	159
-54	0	13	2	11	19	36	41	49	0	0	171
-52	0	19	5	15	32	33	35	42	0	0	181
-50	0	22	5	13	21	49	41	38	0	0	189
-48	0	15	0	6	27	38	22	40	1	0	149
-46	0	7	0	7	14	35	19	12	0	0	94
-44	0	2	0	2	14	42	9	16	1	0	86
-42	0	1	0	2	8	44	9	8	0	0	72
-40	0	1	0	2	13	45	2	1	0	0	64
-38	0	0	0	0	10	46	0	0	0	0	56
-36	0	0	0	0	11	32	1	0	0	0	44
-34	0	0	0	0	10	31	0	0	0	0	41
-32	0	0	0	0	5	27	0	0	0	0	32
-30	0	0	0	0	6	14	0	0	0	0	20
-28	0	0	0	0	3	10	0	0	0	0	13
-26	0	0	0	0	5	6	0	0	0	0	11
-24	0	0	0	0	0	1	0	0	0	0	1
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0

SUM	0	103	17	72	233	529	228	243	2	0	1427
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HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	192
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	157
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	100

TOTAL NUMBER OF RECORDED ECHOES = 2979

NUMBER OF ECHOES USED FOR STATISTICS = 1427

AVERAGE BACKSCATTERING CROSS SECTION = .1050E-03 IN dB = -39.79

BACKSCATTERING CROSS SECTION STD DEV = .3089E-03

AVERAGE TARGET STRENGTH IN dB = -47.50

TARGET STRENGTH STD DEV IN dB = 7.36

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 449

NUMBER OF FISH USED =	1427
FULL ANGLE OF CONE =	6.00
ESTIMATED VOLUME IN CUBIC METERS =	.442E+05
DENSITY IN FISH PER CUBIC METER =	.323E-01
EQUIVALENT STRATUM LENGTH (%/100) =	.8000

Reading file D:\esp_nra\chels.dat
Analyzing Run # 2
DATA GROUP REPORT FOR TRANSDUCER 1
TOTAL NUMBER OF PINGS = 1438

*

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

‡

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	0
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	1
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	3

T NUMBER OF RECORDED ECHOES = 13

NUMBER OF ECHOES USED FOR STATISTICS = 5

AVERAGE BACKSCATTERING CROSS SECTION = .2395E-05 IN dB = -56.21

BACKSCATTERING CROSS SECTION STD DEV = .8743E-06

AVERAGE TARGET STRENGTH IN dB = -56.41

TARGET STRENGTH STD DEV IN dB = 1.46

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 4

NUMBER OF FISH USED = 5
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .522E+03
 DENSITY IN FISH PER CUBIC METER = .958E-02
 EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 5.0 TO 9.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	5	6	13	17	22	14	7	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0

‡

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	12
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	10
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	7

TOTAL NUMBER OF RECORDED ECHOES = 290
 NUMBER OF ECHOES USED FOR STATISTICS = 91
 AVERAGE BACKSCATTERING CROSS SECTION = .1464E-04 IN dB = -48.34
 BACKSCATTERING CROSS SECTION STD DEV = .2127E-04
 AVERAGE TARGET STRENGTH IN dB = -50.48
 TARGET STRENGTH STD DEV IN dB = 3.98

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 29

NUMBER OF FISH USED = 91
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .264E+04
 DENSITY IN FISH PER CUBIC METER = .344E-01
 EQUIVALENT STRATUM LENGTH (‡/100) = .9709

SUMMARY OF DATA FROM DEPTH 9.0 TO 13.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	4	3	3	8	9	16	16	24	27	19	14	7	0	0	0	4	1	2	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	10
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	11
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	9

TOTAL NUMBER OF RECORDED ECHOES = 302
 NUMBER OF ECHOES USED FOR STATISTICS = 157
 AVERAGE BACKSCATTERING CROSS SECTION = .1733E-03 IN dB = -37.61
 BACKSCATTERING CROSS SECTION STD DEV = .5850E-03
 AVERAGE TARGET STRENGTH IN dB = -43.61
 TARGET STRENGTH STD DEV IN dB = 6.26

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 30

NUMBER OF FISH USED = 157
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .598E+04
 DENSITY IN FISH PER CUBIC METER = .263E-01
 EQUIVALENT STRATUM LENGTH (‡/100) = .8504

SUMMARY OF DATA FROM DEPTH 13.0 TO 25.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 0 0 4 30 46 27 26 16 7 9 5 4 2 2 2 1 1 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 25
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 22
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 12

TOTAL NUMBER OF RECORDED ECHOES = 326

NUMBER OF ECHOES USED FOR STATISTICS = 182

AVERAGE BACKSCATTERING CROSS SECTION = .7080E-04 IN dB = -41.50

BACKSCATTERING CROSS SECTION STD DEV = .2185E-03

AVERAGE TARGET STRENGTH IN dB = -46.78

TARGET STRENGTH STD DEV IN dB = 5.33

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 59

NUMBER OF FISH USED = 182
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .221E+05
DENSITY IN FISH PER CUBIC METER = .823E-02
EQUIVALENT STRATUM LENGTH (#/100) = .5201

SUMMARY OF DATA FROM DEPTH 1.0 TO 25.0

DEPTH INTERVALS

	FROM 1.00	3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	
	TO 3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	25.00	
TS											SUM
-74	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	1	3	4	4	0	0	0	0	0	0	12

-56	0	4	1	5	0	0	0	0	0	0	10
-54	0	13	1	3	0	1	2	1	0	0	21
-52	0	15	2	1	7	14	13	3	0	0	55
-50	0	16	5	1	9	8	27	11	0	0	77
-48	0	10	4	0	16	3	17	7	0	0	57
-46	0	6	1	0	16	3	20	3	0	0	49
-44	0	1	1	0	24	3	10	3	0	0	42
-42	0	0	2	0	27	6	1	0	0	0	36
-40	0	1	1	0	19	6	2	1	0	0	30
-38	0	0	1	0	14	5	0	0	0	0	20
-36	0	0	0	1	6	4	0	0	0	0	11
-34	0	0	0	0	0	2	0	0	0	0	2
-32	0	0	0	0	0	2	0	0	0	0	2
-30	0	0	0	0	0	0	2	0	0	0	2
-28	0	0	0	4	0	0	1	0	0	0	5
-26	0	0	0	1	0	0	1	0	0	0	2
-24	0	0	0	2	0	0	0	0	0	0	2
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0

1	69	23	22	138	57	96	29	0	0	435
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HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	47
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	44
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	31

TOTAL NUMBER OF RECORDED ECHOES = 931

NUMBER OF ECHOES USED FOR STATISTICS = 435

AVERAGE BACKSCATTERING CROSS SECTION = .9527E-04 IN dB = -40.21

BACKSCATTERING CROSS SECTION STD DEV = .3833E-03

AVERAGE TARGET STRENGTH IN dB = -46.52

TARGET STRENGTH STD DEV IN dB = 6.06

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 122

NUMBER OF FISH USED =	435
FULL ANGLE OF CONE =	6.00
ESTIMATED VOLUME IN CUBIC METERS =	.286E+05
DENSITY IN FISH PER CUBIC METER =	.152E-01
EQUIVALENT STRATUM LENGTH (3/100) =	.7266

Reading file D:\esp_nra\chels.dat

Analysing Run # 3

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 8079

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	3	15	25	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

:

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	9
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	4
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	1

TOTAL NUMBER OF RECORDED ECHOES = 47

NUMBER OF ECHOES USED FOR STATISTICS = 45

AVERAGE BACKSCATTERING CROSS SECTION = .5431E-05 IN dB = -52.65

BACKSCATTERING CROSS SECTION STD DEV = .1522E-05

AVERAGE TARGET STRENGTH IN dB = -52.83

TARGET STRENGTH STD DEV IN dB = 1.30

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 14

NUMBER OF FISH USED = 45

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .290E+04

DENSITY IN FISH PER CUBIC METER = .155E-01

EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 5.0 TO 9.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	26	86	80	125	82	79	44	16	7	1	1	0	0	0	0	0	0	0	0	0	0	0

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HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	79
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	64
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	47

TOTAL NUMBER OF RECORDED ECHOES = 1536

NUMBER OF ECHOES USED FOR STATISTICS = 547
 AVERAGE BACKSCATTERING CROSS SECTION = .1070E-04 IN dB = -49.71
 BACKSCATTERING CROSS SECTION STD DEV = .1218E-04
 AVERAGE TARGET STRENGTH IN dB = -51.41
 TARGET STRENGTH STD DEV IN dB = 3.71
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 190

NUMBER OF FISH USED = 547
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .154E+05
 DENSITY IN FISH PER CUBIC METER = .356E-01
 EQUIVALENT STRATUM LENGTH (1/100) = .9970

SUMMARY OF DATA FROM DEPTH 9.0 TO 13.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	6	14	17	21	10	10	0	0	3	6	3	1	0	0	0	0	0	0	0	0	0	0

†

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	18
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	15
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	11

TOTAL NUMBER OF RECORDED ECHOES = 186
 NUMBER OF ECHOES USED FOR STATISTICS = 91
 AVERAGE BACKSCATTERING CROSS SECTION = .2310E-04 IN dB = -46.36
 BACKSCATTERING CROSS SECTION STD DEV = .4548E-04
 AVERAGE TARGET STRENGTH IN dB = -50.91
 TARGET STRENGTH STD DEV IN dB = 5.43
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 44

NUMBER OF FISH USED = 91
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .384E+05
 DENSITY IN FISH PER CUBIC METER = .237E-02
 EQUIVALENT STRATUM LENGTH (1/100) = .9828

SUMMARY OF DATA FROM DEPTH 13.0 TO 25.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	11	52	43	31	26	4	6	3	2	0	0	0	0	1	1	1	0	0	0	0

†

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	36
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	26
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	25

TOTAL NUMBER OF RECORDED ECHOES = 340

NUMBER OF ECHOES USED FOR STATISTICS = 181

AVERAGE BACKSCATTERING CROSS SECTION = .6479E-04 IN dB = -41.88

BACKSCATTERING CROSS SECTION STD DEV = .3946E-03

AVERAGE TARGET STRENGTH IN dB = -48.77

TARGET STRENGTH STD DEV IN dB = 4.38

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 87

NUMBER OF FISH USED =	181
FULL ANGLE OF CONE =	6.00
ESTIMATED VOLUME IN CUBIC METERS =	.693E+05
DENSITY IN FISH PER CUBIC METER =	.261E-02
EQUIVALENT STRATUM LENGTH (%/100) =	.3491

SUMMARY OF DATA FROM DEPTH 1.0 TO 25.0

DEPTH INTERVALS

	FROM	1.00	3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	
	TO	3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	25.00	
TS												SUM
-74		0	0	0	0	0	0	0	0	0	0	0
-72		0	0	0	0	0	0	0	0	0	0	0
-70		0	0	0	0	0	0	0	0	0	0	0
-68		0	0	0	0	0	0	0	0	0	0	0
-66		0	0	0	0	0	0	0	0	0	0	0
-64		0	0	0	0	0	0	0	0	0	0	0
-62		0	0	0	0	0	0	0	0	0	0	0
-60		0	0	0	0	0	0	0	0	0	0	0
-58		0	13	12	7	0	0	0	0	0	0	32
-56		0	24	55	24	0	0	0	0	0	0	103
-54		0	25	66	20	1	8	3	0	0	0	123
-52		0	37	104	20	10	34	18	0	0	0	223

-50	0	13	67	12	2	27	16	0	0	0	137
-48	0	8	70	4	7	24	7	0	0	0	120
-46	0	5	39	0	0	16	10	0	0	0	70
-44	0	1	14	1	0	2	2	0	0	0	20
-42	0	0	7	0	3	1	5	0	0	0	16
-40	0	0	1	0	6	0	3	0	0	0	10
-38	0	0	1	0	3	1	1	0	0	0	6
-36	0	0	0	0	1	0	0	0	0	0	1
-34	0	0	0	0	0	0	0	0	0	0	0
-32	0	0	0	0	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0	0	0	0	0
-28	0	0	0	0	0	1	0	0	0	0	1
-26	0	0	0	0	0	1	0	0	0	0	1
-24	0	0	0	0	0	1	0	0	0	0	1
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0

SUM	0	126	436	88	33	116	65	0	0	0	864
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HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	142
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	109
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	84

TOTAL NUMBER OF RECORDED ECHOES = 2109

NUMBER OF ECHOES USED FOR STATISTICS = 864

AVERAGE BACKSCATTERING CROSS SECTION = .2306E-04 IN dB = -46.37

BACKSCATTERING CROSS SECTION STD DEV = .1824E-03

AVERAGE TARGET STRENGTH IN dB = -50.88

TARGET STRENGTH STD DEV IN dB = 4.15

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 335

NUMBER OF FISH USED =	864
FULL ANGLE OF CONE =	6.00
ESTIMATED VOLUME IN CUBIC METERS =	.109E+06
DENSITY IN FISH PER CUBIC METER =	.793E-02
EQUIVALENT STRATUM LENGTH (1/100) =	.6588

Reading file D:\esp_nra\che3m.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 2197

DATA FOR FREQUENCY 420.

CHB 3.
CHB 4.

SUMMARY OF DATA FROM DEPTH 1.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

:

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	0
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	0
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	0

TOTAL NUMBER OF RECORDED ECHOES = 7

NUMBER OF ECHOES USED FOR STATISTICS = 5

AVERAGE BACKSCATTERING CROSS SECTION = .6738E-05 IN dB = -51.71

BACKSCATTERING CROSS SECTION STD DEV = .2131E-05

AVERAGE TARGET STRENGTH IN dB = -51.90

TARGET STRENGTH STD DEV IN dB = 1.47

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 0

NUMBER OF FISH USED =	5
FULL ANGLE OF CONE =	6.00
ESTIMATED VOLUME IN CUBIC METERS =	.788E+03
DENSITY IN FISH PER CUBIC METER =	.634E-02
EQUIVALENT STRATUM LENGTH (%/100) =	1.0000

SUMMARY OF DATA FROM DEPTH 5.0 TO 9.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	8	19	29	38	45	39	23	13	2	0	0	0	0	0	0	0	0	0	0	0	0

:

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	28
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	23
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	21

TOTAL NUMBER OF RECORDED ECHOES = 591

NUMBER OF ECHOES USED FOR STATISTICS = 216

AVERAGE BACKSCATTERING CROSS SECTION = .1274E-04 IN dB = -48.95

BACKSCATTERING CROSS SECTION STD DEV = .1119E-04
AVERAGE TARGET STRENGTH IN dB = -50.42
TARGET STRENGTH STD DEV IN dB = 3.64
ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 72

NUMBER OF FISH USED = 216
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .419E+04
DENSITY IN FISH PER CUBIC METER = .515E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 9.0 TO 13.0

TS STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	2	10	6	14	9	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	3
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	7
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	7

TOTAL NUMBER OF RECORDED ECHOES = 66
NUMBER OF ECHOES USED FOR STATISTICS = 44
AVERAGE BACKSCATTERING CROSS SECTION = .6198E-05 IN dB = -52.08
BACKSCATTERING CROSS SECTION STD DEV = .3772E-05
AVERAGE TARGET STRENGTH IN dB = -52.87
TARGET STRENGTH STD DEV IN dB = 2.69
ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 17

NUMBER OF FISH USED = 44
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .104E+05
DENSITY IN FISH PER CUBIC METER = .424E-02
EQUIVALENT STRATUM LENGTH (%/100) = .9818

SUMMARY OF DATA FROM DEPTH 13.0 TO 25.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	2	16	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB	NUMBER OF ECHOES =	3
B= 1 dB TO B= 2 dB	NUMBER OF ECHOES =	6
B= 2 dB TO B= 3 dB	NUMBER OF ECHOES =	7

TOTAL NUMBER OF RECORDED ECHOES = 47

NUMBER OF ECHOES USED FOR STATISTICS = 22

AVERAGE BACKSCATTERING CROSS SECTION = .7401E-05 IN dB = -51.31

BACKSCATTERING CROSS SECTION STD DEV = .4636E-05

AVERAGE TARGET STRENGTH IN dB = -51.78

TARGET STRENGTH STD DEV IN dB = 1.82

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 16

NUMBER OF FISH USED =	22
FULL ANGLE OF CONE =	6.00
ESTIMATED VOLUME IN CUBIC METERS =	.529E+05
DENSITY IN FISH PER CUBIC METER =	.416E-03
EQUIVALENT STRATUM LENGTH (1/100) =	.7257

SUMMARY OF DATA FROM DEPTH 1.0 TO 25.0

DEPTH INTERVALS

FROM	1.00	3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	
TO	3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	25.00	
TS											SUM
-74	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	0	0	4	6	0	0	0	0	0	0	10
-56	0	3	15	11	0	0	0	0	0	0	29
-54	1	1	26	8	0	0	2	0	0	0	38
-52	2	1	36	12	3	1	2	5	8	0	70
-50	2	0	45	5	4	0	0	0	2	0	58
-48	0	0	39	1	2	0	0	1	0	0	43
-46	0	0	23	0	0	0	0	0	1	0	24

-44	0	0	13	0	0	0	0	0	0	0	13
-42	0	0	2	0	0	0	0	0	0	0	2
-40	0	0	0	0	0	0	0	0	0	0	0
-38	0	0	0	0	0	0	0	0	0	0	0
-36	0	0	0	0	0	0	0	0	0	0	0
-34	0	0	0	0	0	0	0	0	0	0	0
-32	0	0	0	0	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0	0	0	0	0
-28	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	5	5	203	43	9	1	4	6	11	0	287

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 34
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 36
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 35

TOTAL NUMBER OF RECORDED ECHOES = 711
NUMBER OF ECHOES USED FOR STATISTICS = 287
AVERAGE BACKSCATTERING CROSS SECTION = .1122E-04 IN dB = -49.50
BACKSCATTERING CROSS SECTION STD DEV = .1025E-04
AVERAGE TARGET STRENGTH IN dB = -50.92
TARGET STRENGTH STD DEV IN dB = 3.49
ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 105

NUMBER OF FISH USED = 287
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .637E+05
DENSITY IN FISH PER CUBIC METER = .451E-02
EQUIVALENT STRATUM LENGTH (1/100) = .8555

Reading file D:\esp_nra\che4d.dat
Analyzing Run # 1
DATA GROUP REPORT FOR TRANSDUCER 1
TOTAL NUMBER OF PINGS = 6117

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	3	10	6	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	5
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	1
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	2

TOTAL NUMBER OF RECORDED ECHOES = 24

NUMBER OF ECHOES USED FOR STATISTICS = 23

AVERAGE BACKSCATTERING CROSS SECTION = .3635E-05 IN dB = -54.39

BACKSCATTERING CROSS SECTION STD DEV = .2320E-05

AVERAGE TARGET STRENGTH IN dB = -55.00

TARGET STRENGTH STD DEV IN dB = 2.18

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 8

NUMBER OF FISH USED =	23
FULL ANGLE OF CONE =	6.00
ESTIMATED VOLUME IN CUBIC METERS =	.221E+04
DENSITY IN FISH PER CUBIC METER =	.104E-01
EQUIVALENT STRATUM LENGTH (1/100) =	1.0000

SUMMARY OF DATA FROM DEPTH 5.0 TO 9.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	14	25	31	78	106	95	60	33	10	4	0	1	0	1	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	62
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	55
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	43

TOTAL NUMBER OF RECORDED ECHOES = 1306

NUMBER OF ECHOES USED FOR STATISTICS = 458

AVERAGE BACKSCATTERING CROSS SECTION = .1778E-04 IN dB = -47.50

BACKSCATTERING CROSS SECTION STD DEV = .3599E-04

AVERAGE TARGET STRENGTH IN dB = -49.39

TARGET STRENGTH STD DEV IN dB = 3.74

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 160

NUMBER OF FISH USED = 458
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .118E+05
DENSITY IN FISH PER CUBIC METER = .389E-01
EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 9.0 TO 13.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 1 2 15 30 21 13 8 7 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 11
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 20
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 10

TOTAL NUMBER OF RECORDED ECHOES = 262

NUMBER OF ECHOES USED FOR STATISTICS = 97

AVERAGE BACKSCATTERING CROSS SECTION = .1144E-04 IN dB = -49.42

BACKSCATTERING CROSS SECTION STD DEV = .8702E-05

AVERAGE TARGET STRENGTH IN dB = -50.43

TARGET STRENGTH STD DEV IN dB = 2.90

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 41

NUMBER OF FISH USED = 97
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .299E+05
DENSITY IN FISH PER CUBIC METER = .325E-02
EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 13.0 TO 25.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16

0 0 0 0 0 0 0 0 0 0 0 17 85 66 61 50 24 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 40
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 34
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 30

TOTAL NUMBER OF RECORDED ECHOES = 870

NUMBER OF ECHOES USED FOR STATISTICS = 306

AVERAGE BACKSCATTERING CROSS SECTION = .1496E-04 IN dB = -48.25

BACKSCATTERING CROSS SECTION STD DEV = .1082E-04

AVERAGE TARGET STRENGTH IN dB = -49.20

TARGET STRENGTH STD DEV IN dB = 2.81

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 104

NUMBER OF FISH USED = 306
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .158E+06
 DENSITY IN FISH PER CUBIC METER = .194E-02
 EQUIVALENT STRATUM LENGTH (1/100) = .7692

SUMMARY OF DATA FROM DEPTH 1.0 TO 25.0

DEPTH INTERVALS

FROM 1.00 3.40 5.80 8.20 10.60 13.00 15.40 17.80 20.20 22.60
 TO 3.40 5.80 8.20 10.60 13.00 15.40 17.80 20.20 22.60 25.00

TS SUM

	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	2	1	14	1	0	0	0	0	0	0	18
-56	4	11	15	7	0	0	0	0	0	0	37
-54	3	5	7	32	5	4	2	11	0	0	69
-52	3	0	12	85	11	13	12	60	0	0	196
-50	1	1	17	105	4	11	21	34	0	0	194
-48	0	3	6	99	0	5	28	26	2	0	169
-46	0	3	4	60	1	1	33	15	1	0	118
-44	0	1	2	37	0	1	13	9	1	0	64
-42	0	1	0	9	0	0	0	3	0	0	13
-40	0	1	0	3	0	0	0	0	0	0	4

-38	0	0	0	0	0	0	0	0	0	0	0
-36	0	0	0	1	0	0	0	0	0	0	1
-34	0	0	0	0	0	0	0	0	0	0	0
-32	0	1	0	0	0	0	0	0	0	0	1
-30	0	0	0	0	0	0	0	0	0	0	0
-28	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0

SUM	13	28	77	439	21	35	109	158	4	0	884
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HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 118
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 110
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 85

NUMBER OF RECORDED ECHOES = 2462

NUMBER OF ECHOES USED FOR STATISTICS = 884

AVERAGE BACKSCATTERING CROSS SECTION = .1574E-04 IN dB = -48.03

BACKSCATTERING CROSS SECTION STD DEV = .2697E-04

AVERAGE TARGET STRENGTH IN dB = -49.58

TARGET STRENGTH STD DEV IN dB = 3.45

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 313

NUMBER OF FISH USED = 884
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .189E+06
DENSITY IN FISH PER CUBIC METER = .469E-02
EQUIVALENT STRATUM LENGTH (1/100) = .8800

Reading file D:\esp_nra\che4m.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 5791

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16

1

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	8
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	10
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	2

OF DES WITH BEAM PATTERN FACTORS > 0 dB= 20

NUMBER OF FISH USED = 35
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .209E+04
DENSITY IN FISH PER CUBIC METER = .168E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	55
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	38
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	34

TOTAL NUMBER OF RECORDED ECHOES =	1039	
NUMBER OF ECHOES USED FOR STATISTICS =	394	
AVERAGE BACKSCATTERING CROSS SECTION =	.1647E-04	IN dB = -47.83
BACKSCATTERING CROSS SECTION STD DEV =	.1742E-04	
AVERAGE TARGET STRENGTH IN dB =		-49.57
TARGET STRENGTH STD DEV IN dB =		3.91

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 127

NUMBER OF FISH USED = 394
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .111E+05
DENSITY IN FISH PER CUBIC METER = .355E-01
EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 9.0 TO 13.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	3	17	21	25	28	24	9	4	3	2	1	6	3	1	0	0	1	0	0	0	0	0

Histogram of BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	23
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	17
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	20

TOTAL NUMBER OF RECORDED ECHOES = 278
NUMBER OF ECHOES USED FOR STATISTICS = 148
AVERAGE BACKSCATTERING CROSS SECTION = .5139E-04 IN dB = -42.89
BACKSCATTERING CROSS SECTION STD DEV = .2239E-03
AVERAGE TARGET STRENGTH IN dB = -49.45
TARGET STRENGTH STD DEV IN dB = 5.73

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 60

NUMBER OF FISH USED = 148
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .281E+05
DENSITY IN FISH PER CUBIC METER = .526E-02
EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 13.0 TO 25.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	0	7	37	14	12	6	5	12	8	6	4	5	0	2	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 14
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 22
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 9

TOTAL NUMBER OF RECORDED ECHOES = 198
NUMBER OF ECHOES USED FOR STATISTICS = 118
AVERAGE BACKSCATTERING CROSS SECTION = .6781E-04 IN dB = -41.69
BACKSCATTERING CROSS SECTION STD DEV = .1346E-03
AVERAGE TARGET STRENGTH IN dB = -46.75
TARGET STRENGTH STD DEV IN dB = 6.26

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 45

NUMBER OF FISH USED = 118
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .149E+06
DENSITY IN FISH PER CUBIC METER = .793E-03
EQUIVALENT STRATUM LENGTH (%/100) = .7692

SUMMARY OF DATA FROM DEPTH 1.0 TO 25.0

DEPTH INTERVALS

FROM	1.00	3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	
TO	3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	25.00	
TS											SUM
-74	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	1	9	5	6	0	0	0	0	0	0	21
-56	0	18	20	24	0	0	0	0	0	0	62
-54	0	12	29	28	3	3	0	3	1	0	79
-52	0	8	48	25	7	10	1	21	5	0	125
-50	0	3	72	24	7	1	2	7	4	0	120
-48	0	2	59	22	4	2	1	6	3	0	99
-46	0	0	61	6	4	2	1	2	1	0	77
-44	0	0	33	4	0	0	0	0	5	0	42
-42	0	0	12	2	1	0	1	0	11	0	27
-40	0	0	2	0	2	0	0	0	8	0	12
-38	0	0	2	0	1	0	0	0	6	0	9
-36	0	0	0	0	6	0	0	0	4	0	10
-34	0	0	0	0	3	0	0	0	5	0	8

-32	0	0	0	0	1	0	0	0	0	0	1
-30	0	0	0	0	0	0	0	0	2	0	2
-28	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	1	0	0	0	0	0	1
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0

SUM	1	52	343	141	40	18	6	39	55	0	695
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HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 100
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 87
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 65

TOTAL NUMBER OF RECORDED ECHOES = 1557

NUMBER OF ECHOES USED FOR STATISTICS = 695

AVERAGE BACKSCATTERING CROSS SECTION = .3195E-04 IN dB = -44.96

BACKSCATTERING CROSS SECTION STD DEV = .1197E-03

AVERAGE TARGET STRENGTH IN dB = -49.37

TARGET STRENGTH STD DEV IN dB = 5.05

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 252

NUMBER OF FISH USED = 695

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .178E+06

DENSITY IN FISH PER CUBIC METER = .391E-02

EQUIVALENT STRATUM LENGTH (1/100) = .8800

Reading file D:\esp_nra\che4s.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 540

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	3	6	7	11	7	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0

↓

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 10
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 6
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 4

TOTAL NUMBER OF RECORDED ECHOES = 50
 NUMBER OF ECHOES USED FOR STATISTICS = 36
 AVERAGE BACKSCATTERING CROSS SECTION = .9329E-05 IN dB = -50.30
 BACKSCATTERING CROSS SECTION STD DEV = .5061E-05
 AVERAGE TARGET STRENGTH IN dB = -50.98
 TARGET STRENGTH STD DEV IN dB = 2.57
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 20

NUMBER OF FISH USED = 36
 FISH ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .198E+03
 DENSITY IN FISH PER CUBIC METER = .182E+00
 EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 5.0 TO 9.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 0 0 0 8 15 13 6 6 3 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 6
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 8
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 4

TOTAL NUMBER OF RECORDED ECHOES = 153
 NUMBER OF ECHOES USED FOR STATISTICS = 51
 AVERAGE BACKSCATTERING CROSS SECTION = .1192E-04 IN dB = -49.24
 BACKSCATTERING CROSS SECTION STD DEV = .8595E-05
 AVERAGE TARGET STRENGTH IN dB = -50.17
 TARGET STRENGTH STD DEV IN dB = 2.80
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 18

NUMBER OF FISH USED = 51
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .105E+04
DENSITY IN FISH PER CUBIC METER = .484E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 9.0 TO 13.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 0 0 0 1 0 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 0
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 0
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 9

NUMBER OF ECHOES USED FOR STATISTICS = 4

AVERAGE BACKSCATTERING CROSS SECTION = .2057E-04 IN dB = -46.87

BACKSCATTERING CROSS SECTION STD DEV = .7608E-05

AVERAGE TARGET STRENGTH IN dB = -47.16

TARGET STRENGTH STD DEV IN dB = 1.95

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 0

NUMBER OF FISH USED = 4
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .267E+04
DENSITY IN FISH PER CUBIC METER = .150E-02
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 13.0 TO 25.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 0 0 4 19 17 26 33 25 12 10 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 18

TOTAL NUMBER OF RECORDED ECHOES = 232

NUMBER OF ECHOES USED FOR STATISTICS = 146

AVERAGE BACKSCATTERING CROSS SECTION = .2873E-04 IN dB = -45.42

BACKSCATTERING CROSS SECTION STD DEV = .2373E-04

AVERAGE TARGET STRENGTH IN dB = -46.77

TARGET STRENGTH STD DEV IN dB = 3.50

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 60

NUMBER OF FISH USED = 146

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .141E+05

DENSITY IN FISH PER CUBIC METER = .103E-01

EQUIVALENT STRUTUM LENGTH (1/100) = .7692

SUMMARY OF DATA FROM DEPTH 1.0 TO 25.0

DEPTH INTERVALS

TO	3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	25.00
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TS SOW[illegible]

-26	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	0	86	0	1	4	2	14	115	15	0	237

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

>= 0 dB TO B = 1 dB NUMBER OF ECHOES = 41
 >= 1 dB TO B = 2 dB NUMBER OF ECHOES = 31
 >= 2 dB TO B = 3 dB NUMBER OF ECHOES = 26

TOTAL NUMBER OF RECORDED ECHOES = 444

NUMBER OF ECHOES USED FOR STATISTICS = 237

AVERAGE BACKSCATTERING CROSS SECTION = .2203E-04 IN dB = -46.57

BACKSCATTERING CROSS SECTION STD DEV = .2099E-04

AVERAGE TARGET STRENGTH IN dB = -48.15

TARGET STRENGTH STD DEV IN dB = 3.68

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 98

NUMBER OF FISH USED = 237

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .169E+05

DENSITY IN FISH PER CUBIC METER = .140E-01

EQUIVALENT STRATUM LENGTH (1/100) = .8800

Reading file D:\esp_nra\che4s.dat

Analyzing Run # 2

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 7745

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

ST	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	7	17	25	84	215	175	219	120	24	20	8	1	3	0	1	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 93
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 63
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 51

TOTAL NUMBER OF RECORDED ECHOES = 3056
 NUMBER OF ECHOES USED FOR STATISTICS = 919
 AVERAGE BACKSCATTERING CROSS SECTION = .2481E-04 IN dB = -46.05
 BACKSCATTERING CROSS SECTION STD DEV = .4149E-04
 AVERAGE TARGET STRENGTH IN dB = -47.71
 TARGET STRENGTH STD DEV IN dB = 3.51
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 207

NUMBER OF FISH USED = 919
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .279E+04
 DENSITY IN FISH PER CUBIC METER = .329E+00
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

 SUMMARY OF DATA FROM DEPTH 5.0 TO 9.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 0 40 80 113 101 112 94 75 34 35 37 46 32 22 15 19 14 7 2 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 112
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 71
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 63

TOTAL NUMBER OF RECORDED ECHOES = 1573
 NUMBER OF ECHOES USED FOR STATISTICS = 878
 AVERAGE BACKSCATTERING CROSS SECTION = .1253E-03 IN dB = -39.02
 BACKSCATTERING CROSS SECTION STD DEV = .3631E-03
 AVERAGE TARGET STRENGTH IN dB = -47.24
 TARGET STRENGTH STD DEV IN dB = 7.72
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 246

NUMBER OF FISH USED = 878
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .149E+05

DENSITY IN FISH PER CUBIC METER = .591E-01
EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 9.0 TO 13.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 11 42 44 59 52 38 29 14 5 1 0 0 0 0 0 0 0 0 0 0 0

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HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 46
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 40
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 30

TOTAL NUMBER OF RECORDED ECHOES = 570

NUMBER OF ECHOES USED FOR STATISTICS = 295

AVERAGE BACKSCATTERING CROSS SECTION = .1167E-04 IN dB = -49.33

BACKSCATTERING CROSS SECTION STD DEV = .1210E-04

AVERAGE TARGET STRENGTH IN dB = -51.05

TARGET STRENGTH STD DEV IN dB = 3.79

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 116

NUMBER OF FISH USED = 295
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .377E+05
DENSITY IN FISH PER CUBIC METER = .783E-02
EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 13.0 TO 25.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 0 0 19 128 82 77 53 44 22 12 10 3 4 5 2 1 1 1 0 0 0 0

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HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

3= 0 dB TO B = 1 dB NUMBER OF ECHOES = 64
3= 1 dB TO B = 2 dB NUMBER OF ECHOES = 71
3= 2 dB TO B = 3 dB NUMBER OF ECHOES = 48

[illegible]

-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0

SUM	0	1027	615	377	73	105	157	151	51	0	2556

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 315
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 245
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 192

TOTAL NUMBER OF RECORDED ECHOES = 6130
 NUMBER OF ECHOES USED FOR STATISTICS = 2556
 AVERAGE BACKSCATTERING CROSS SECTION = .6359E-04 IN dB = -41.97
 BACKSCATTERING CROSS SECTION STD DEV = .2455E-03
 AVERAGE TARGET STRENGTH IN dB = -47.96
 TARGET STRENGTH STD DEV IN dB = 5.67

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 752

NUMBER OF FISH USED = 2556
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .238E+06
 DENSITY IN FISH PER CUBIC METER = .107E-01
 EQUIVALENT STRATUM LENGTH (%/100) = .8800

Reading file D:\esp_nra\che5d.dat
 Analyzing Run # 1
 DATA GROUP REPORT FOR TRANSDUCER 1
 TOTAL NUMBER OF PINGS = 5197

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ChE5

DATA FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	1	12	11	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 14
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 3
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 5

TOTAL NUMBER OF RECORDED ECHOES = 30
NUMBER OF ECHOES USED FOR STATISTICS = 29
AVERAGE BACKSCATTERING CROSS SECTION = .3699E-05 IN dB = -54.32
BACKSCATTERING CROSS SECTION STD DEV = .1859E-05
AVERAGE TARGET STRENGTH IN dB = -54.72
TARGET STRENGTH STD DEV IN dB = 1.79

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 22

NUMBER OF FISH USED = 29
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .187E+04
DENSITY IN FISH PER CUBIC METER = .155E-01
EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 5.0 TO 9.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	4	13	24	21	106	192	157	165	30	4	2	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	89
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	55
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	38

TOTAL NUMBER OF RECORDED ECHOES = 2915
NUMBER OF ECHOES USED FOR STATISTICS = 718
AVERAGE BACKSCATTERING CROSS SECTION = .2431E-04 IN dB = -46.14
BACKSCATTERING CROSS SECTION STD DEV = .1645E-04
AVERAGE TARGET STRENGTH IN dB = -47.11
TARGET STRENGTH STD DEV IN dB = 3.12

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 182

NUMBER OF FISH USED = 718
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .996E+04
DENSITY IN FISH PER CUBIC METER = .721E-01
EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 9.0 TO 13.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	3	5	12	6	8	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	7
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	4
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	7

TOTAL NUMBER OF RECORDED ECHOES = 61

NUMBER OF ECHOES USED FOR STATISTICS = 42

AVERAGE BACKSCATTERING CROSS SECTION = .1300E-04 IN dB = -48.86

BACKSCATTERING CROSS SECTION STD DEV = .1029E-04

AVERAGE TARGET STRENGTH IN dB = -50.11

TARGET STRENGTH STD DEV IN dB = 3.38

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 18

NUMBER OF FISH USED = 42

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .252E+05

DENSITY IN FISH PER CUBIC METER = .166E-02

EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 13.0 TO 25.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	0	4	31	13	15	9	4	2	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	16
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	11
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	7

TOTAL NUMBER OF RECORDED ECHOES = 376

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 34

SUM OF DATA FROM DEPTH 1.0 TO 25.0

FROM	1.00	3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60
TO	3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	25.00

TS SUN

[illegible]

SUM 13 16 62 668 30 16 25 9 28 0 867

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 126
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 73
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 57

TOTAL NUMBER OF RECORDED ECHOES = 3382

NUMBER OF ECHOES USED FOR STATISTICS = 867

AVERAGE BACKSCATTERING CROSS SECTION = .2213E-04 IN dB = -46.55

BACKSCATTERING CROSS SECTION STD DEV = .1631E-04

AVERAGE TARGET STRENGTH IN dB = -47.74

TARGET STRENGTH STD DEV IN dB = 3.47

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 256

NUMBER OF FISH USED = 867
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .182E+06
DENSITY IN FISH PER CUBIC METER = .476E-02
EQUIVALENT STRATUM LENGTH (1/100) = .9200

Reading file D:\esp_nra\che5m.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 7327

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 0 3 8 11 15 16 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0

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HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 13
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 2
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 0

TOTAL NUMBER OF RECORDED ECHOES = 58

NUMBER OF ECHOES USED FOR STATISTICS = 55
AVERAGE BACKSCATTERING CROSS SECTION = .9931E-05 IN dB = -50.03
BACKSCATTERING CROSS SECTION STD DEV = .4931E-05
AVERAGE TARGET STRENGTH IN dB = -50.64
TARGET STRENGTH STD DEV IN dB = 2.47

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 15

NUMBER OF FISH USED = 55
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .264E+04
DENSITY IN FISH PER CUBIC METER = .209E-01
EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUM OF DATA FROM DEPTH 5.0 TO 9.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 9 24 21 29 12 7 3 5 1 1 1 3 1 0 0 0 0 0 0 0 0 0

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HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 17
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 10
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 11

TOTAL NUMBER OF RECORDED ECHOES = 335
NUMBER OF ECHOES USED FOR STATISTICS = 117
AVERAGE BACKSCATTERING CROSS SECTION = .1935E-04 IN dB = -47.13
BACKSCATTERING CROSS SECTION STD DEV = .5390E-04
AVERAGE TARGET STRENGTH IN dB = -51.83
TARGET STRENGTH STD DEV IN dB = 4.91

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 38

NUMBER OF FISH USED = 117
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .140E+05
DENSITY IN FISH PER CUBIC METER = .834E-02
EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 9.0 TO 13.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	4	17	25	42	29	21	27	31	17	13	15	6	2	4	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB TO B = 1 dB	NUMBER OF ECHOES =	27
B=	1 dB TO B = 2 dB	NUMBER OF ECHOES =	32
B=	2 dB TO B = 3 dB	NUMBER OF ECHOES =	19

TOTAL NUMBER OF RECORDED ECHOES = 434

NUMBER OF ECHOES USED FOR STATISTICS = 253

AVERAGE BACKSCATTERING CROSS SECTION = .4890E-04 IN dB = -43.11

BACKSCATTERING CROSS SECTION STD DEV = .9291E-04

AVERAGE TARGET STRENGTH IN dB = -47.44

TARGET STRENGTH STD DEV IN dB = 5.94

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 78

NUMBER OF FISH USED = 253

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .356E+05

DENSITY IN FISH PER CUBIC METER = .712E-02

EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 13.0 TO 25.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	0	57	395	530	622	690	575	497	407	283	213	147	58	10	1	1	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB TO B = 1 dB	NUMBER OF ECHOES =	731
B=	1 dB TO B = 2 dB	NUMBER OF ECHOES =	545
B=	2 dB TO B = 3 dB	NUMBER OF ECHOES =	368

TOTAL NUMBER OF RECORDED ECHOES = 6671

NUMBER OF ECHOES USED FOR STATISTICS = 4486

AVERAGE BACKSCATTERING CROSS SECTION = .7438E-04 IN dB = -41.29

BACKSCATTERING CROSS SECTION STD DEV = .1183E-03

AVERAGE TARGET STRENGTH IN dB = -44.53

TARGET STRENGTH STD DEV IN dB = 5.13

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 1644

NUMBER OF FISH USED = 4486

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .220E+06

DENSITY IN FISH PER CUBIC METER = .204E-01

EQUIVALENT STRATUM LENGTH (%/100) = .8462

SUMMARY OF DATA FROM DEPTH 1.0 TO 25.0

DEPTH INTERVALS

	FROM	1.00	3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	
	TO	3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	25.00	
TS												SUM
-74		0	0	0	0	0	0	0	0	0	0	0
-72		0	0	0	0	0	0	0	0	0	0	0
-70		0	0	0	0	0	0	0	0	0	0	0
-68		0	0	0	0	0	0	0	0	0	0	0
-66		0	0	0	0	0	0	0	0	0	0	0
-64		0	0	0	0	0	0	0	0	0	0	0
-62		0	0	0	0	0	0	0	0	0	0	0
-60		0	0	0	0	0	0	0	0	0	0	0
-58		0	6	1	6	0	0	0	0	0	0	13
-56		2	9	6	27	0	0	0	0	0	0	44
-54		0	19	4	29	2	16	19	17	5	0	111
-52		5	14	13	34	16	110	113	94	78	0	477
-50		2	16	5	21	12	139	139	157	95	0	586
-48		4	13	4	13	10	133	169	216	104	0	666
-46		0	2	2	16	12	128	213	248	101	0	722
-44		0	0	3	12	21	96	149	234	96	0	611
-42		0	0	1	6	11	60	143	228	66	0	515
-40		0	0	1	1	12	29	155	190	33	0	421
-38		0	0	0	1	15	25	94	151	13	0	299
-36		0	0	1	2	6	10	56	136	11	0	222
-34		0	0	0	1	2	1	65	76	5	0	150
-32		0	0	0	0	4	0	30	28	0	0	62
-30		0	0	0	0	0	0	3	7	0	0	10
-28		0	0	0	0	0	0	0	1	0	0	1
-26		0	0	0	0	0	0	0	1	0	0	1
-24		0	0	0	0	0	0	0	0	0	0	0
-22		0	0	0	0	0	0	0	0	0	0	0
-20		0	0	0	0	0	0	0	0	0	0	0
-18		0	0	0	0	0	0	0	0	0	0	0
-16		0	0	0	0	0	0	0	0	0	0	0
SUM		13	79	41	169	123	747	1348	1784	607	0	4911

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

3= 0 dB TO B = 1 dB NUMBER OF ECHOES = 788
 3= 1 dB TO B = 2 dB NUMBER OF ECHOES = 589
 3= 2 dB TO B = 3 dB NUMBER OF ECHOES = 398

TOTAL NUMBER OF RECORDED ECHOES = 7498

NUMBER OF ECHOES USED FOR STATISTICS = 4911

AVERAGE BACKSCATTERING CROSS SECTION = .7103E-04 IN dB = -41.49

BACKSCATTERING CROSS SECTION STD DEV = .1159E-03

AVERAGE TARGET STRENGTH IN dB = -44.92

TARGET STRENGTH STD DEV IN dB = 5.33

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 1775

NUMBER OF FISH USED = 4911
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .257E+06
 DENSITY IN FISH PER CUBIC METER = .191E-01
 EQUIVALENT STRATUM LENGTH (%/100) = .9200

Reading file D:\esp_nra\che5s.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 5131

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 0 9 18 24 15 20 44 90 123 4 0 1 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 9
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 7
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 4

TOTAL NUMBER OF RECORDED ECHOES = 2225

NUMBER OF ECHOES USED FOR STATISTICS = 348

AVERAGE BACKSCATTERING CROSS SECTION = .2469E-04 IN dB = -46.08

BACKSCATTERING CROSS SECTION STD DEV = .1513E-04
 AVERAGE TARGET STRENGTH IN dB = -47.36
 TARGET STRENGTH STD DEV IN dB = 3.97
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 20
 NUMBER OF FISH USED = 348
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .185E+04
 DENSITY IN FISH PER CUBIC METER = .188E+00
 EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 5.0 TO 9.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	28	117	181	207	197	154	125	69	107	70	33	10	5	1	1	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB	NUMBER OF ECHOES =	222
B= 1 dB TO B= 2 dB	NUMBER OF ECHOES =	168
B= 2 dB TO B= 3 dB	NUMBER OF ECHOES =	103

TOTAL NUMBER OF RECORDED ECHOES = 1936
 NUMBER OF ECHOES USED FOR STATISTICS = 1305
 AVERAGE BACKSCATTERING CROSS SECTION = .2864E-04 IN dB = -45.43
 BACKSCATTERING CROSS SECTION STD DEV = .5198E-04
 AVERAGE TARGET STRENGTH IN dB = -48.92
 TARGET STRENGTH STD DEV IN dB = 5.20

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 493

NUMBER OF FISH USED = 1305
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .983E+04
 DENSITY IN FISH PER CUBIC METER = .133E+00
 EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 9.0 TO 13.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	5	12	18	25	16	15	4	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B	0 dB TO B = 1 dB	NUMBER OF ECHOES =	10
B	1 dB TO B = 2 dB	NUMBER OF ECHOES =	13
B	2 dB TO B = 3 dB	NUMBER OF ECHOES =	11

TOTAL NUMBER OF RECORDED ECHOES = 257

NUMBER OF ECHOES USED FOR STATISTICS = 99

AVERAGE BACKSCATTERING CROSS SECTION = .9560E-05 IN dB = -50.20

BACKSCATTERING CROSS SECTION STD DEV = .9615E-05

AVERAGE TARGET STRENGTH IN dB = -51.62

TARGET STRENGTH STD DEV IN dB = 3.40

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 34

NUMBER OF FISH USED =	99
FULL ANGLE OF CONE =	6.00
ESTIMATED VOLUME IN CUBIC METERS =	.249E+05
DENSITY IN FISH PER CUBIC METER =	.398E-02
EQUIVALENT STRATUM LENGTH (1/100) =	1.0000

SUMMARY OF DATA FROM DEPTH 13.0 TO 25.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	6	71	45	68	56	31	17	7	1	1	0	2	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B	0 dB TO B = 1 dB	NUMBER OF ECHOES =	45
B	1 dB TO B = 2 dB	NUMBER OF ECHOES =	47
B	2 dB TO B = 3 dB	NUMBER OF ECHOES =	33

TOTAL NUMBER OF RECORDED ECHOES = 594

NUMBER OF ECHOES USED FOR STATISTICS = 305

AVERAGE BACKSCATTERING CROSS SECTION = .2576E-04 IN dB = -45.89

BACKSCATTERING CROSS SECTION STD DEV = .5053E-04

AVERAGE TARGET STRENGTH IN dB = -47.93

TARGET STRENGTH STD DEV IN dB = 3.62

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 125

NUMBER OF FISH USED = 305
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .154E+06
DENSITY IN FISH PER CUBIC METER = .198E-02
EQUIVALENT STRATUM LENGTH (%/100) = .8462

SUMMARY OF DATA FROM DEPTH 1.0 TO 25.0

DEPTH INTERVALS

	FROM 1.00	3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	
	TO 3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	25.00	SUM
-74	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	0	12	23	7	0	0	0	0	0	0	42
-56	0	25	92	30	0	0	0	0	0	0	147
-54	0	28	149	43	3	2	1	3	0	0	229
-52	0	24	152	62	9	16	15	10	30	0	318
-50	2	28	144	56	3	8	4	8	25	0	278
-48	0	47	106	57	3	26	1	8	33	0	281
-46	0	90	84	42	3	26	3	5	22	0	275
-44	0	123	43	29	0	16	0	1	14	0	226
-42	0	9	68	35	0	10	0	1	6	0	129
-40	0	10	47	13	0	6	0	1	0	0	77
-38	0	3	27	4	0	1	0	0	0	0	35
-36	0	0	10	0	0	1	0	0	0	0	11
-34	0	0	5	0	0	0	0	0	0	0	5
-32	0	0	1	0	0	0	0	2	0	0	3
-30	0	0	1	0	0	0	0	0	0	0	1
-28	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	2	399	952	378	21	112	24	39	130	0	2057

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 286
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 235
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 151

TOTAL NUMBER OF RECORDED ECHOES = 5012
NUMBER OF ECHOES USED FOR STATISTICS = 2057
AVERAGE BACKSCATTERING CROSS SECTION = .2663E-04 IN dB = -45.75
BACKSCATTERING CROSS SECTION STD DEV = .4638E-04
AVERAGE TARGET STRENGTH IN dB = -48.64
TARGET STRENGTH STD DEV IN dB = 4.81

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 672

NUMBER OF FISH USED = 2057
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .180E+06
DENSITY IN FISH PER CUBIC METER = .114E-01
EQUivalent STRATUM LENGTH (1/100) = .9200

Reading file D:\esp_nra\che6s.dat
Analyzing Run # 1
DATA GROUP REPORT FOR TRANSDUCER 1
TOTAL NUMBER OF PINGS = 5228

Ch 6

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1
TS -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 6 2 2 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 3
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 1
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 1

TOTAL NUMBER OF RECORDED ECHOES = 19
NUMBER OF ECHOES USED FOR STATISTICS = 14
AVERAGE BACKSCATTERING CROSS SECTION = .3611E-05 IN dB = -54.42
BACKSCATTERING CROSS SECTION STD DEV = .2197E-05

AVERAGE TARGET STRENGTH IN dB = -55.13

TARGET STRENGTH STD DEV IN dB = 2.51

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 5

NUMBER OF FISH USED = 14
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .188E+04
DENSITY IN FISH PER CUBIC METER = .745E-02
EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 5.0 TO 9.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 3 7 7 62 70 112 107 19 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

3= 0 dB TO B = 1 dB NUMBER OF ECHOES = 30
3= 1 dB TO B = 2 dB NUMBER OF ECHOES = 14
3= 2 dB TO B = 3 dB NUMBER OF ECHOES = 11

TOTAL NUMBER OF RECORDED ECHOES = 2087

NUMBER OF ECHOES USED FOR STATISTICS = 387

AVERAGE BACKSCATTERING CROSS SECTION = .1631E-04 IN dB = -47.87

BACKSCATTERING CROSS SECTION STD DEV = .8532E-05

AVERAGE TARGET STRENGTH IN dB = -48.59

TARGET STRENGTH STD DEV IN dB = 2.69

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 55

NUMBER OF FISH USED = 387
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .100E+05
DENSITY IN FISH PER CUBIC METER = .387E-01
EQUIVALENT STRATUM LENGTH (1/100) = .9998

SUMMARY OF DATA FROM DEPTH 9.0 TO 13.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16

0 0 0 0 0 0 0 0 0 3 4 14 27 18 5 3 2 1 2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

= 0 dB TO B = 1 dB NUMBER OF ECHOES = 21
= 1 dB TO B = 2 dB NUMBER OF ECHOES = 20
= 2 dB TO B = 3 dB NUMBER OF ECHOES = 11

TOTAL NUMBER OF RECORDED ECHOES = 131

NUMBER OF ECHOES USED FOR STATISTICS = 80

AVERAGE BACKSCATTERING CROSS SECTION = .1284E-04 IN dB = -48.92

BACKSCATTERING CROSS SECTION STD DEV = .2120E-04

AVERAGE TARGET STRENGTH IN dB = -51.09

TARGET STRENGTH STD DEV IN dB = 3.65

ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 52

NUMBER OF FISH USED = 80

TULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .253E+05

DENSITY IN FISH PER CUBIC METER = .316E-02

EQUIVALENT STRATUM LENGTH (%/100) = .9997

SUMMARY OF DATA FROM DEPTH 13.0 TO 25.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

S -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 0 0 0 7 34 21 22 9 1 0 1 0 2 0 2 1 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

= 0 dB TO B = 1 dB NUMBER OF ECHOES = 15
= 1 dB TO B = 2 dB NUMBER OF ECHOES = 21
= 2 dB TO B = 3 dB NUMBER OF ECHOES = 14

TOTAL NUMBER OF RECORDED ECHOES = 353

NUMBER OF ECHOES USED FOR STATISTICS = 100

AVERAGE BACKSCATTERING CROSS SECTION = .3912E-04 IN dB = -44.08

BACKSCATTERING CROSS SECTION STD DEV = .1301E-03

AVERAGE TARGET STRENGTH IN dB = -49.16

TARGET STRENGTH STD DEV IN dB = 4.46

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 50

NUMBER OF FISH USED = 100
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .157E+06
 DENSITY IN FISH PER CUBIC METER = .638E-03
 EQUIVALENT STRATUM LENGTH (%/100) = .8456

SUMMARY OF DATA FROM DEPTH 1.0 TO 25.0

DEPTH INTERVALS

	FROM 1.00	3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	
	TO 3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	25.00	
TS											SUM
-74	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	2	4	2	4	0	0	0	0	0	0	12
-56	2	1	1	9	0	0	0	0	0	0	13
-54	2	0	3	8	10	2	1	2	2	0	30
-52	4	6	55	1	27	4	12	8	10	0	127
-50	0	11	59	0	18	3	10	6	2	0	109
-48	0	23	89	0	5	0	5	10	7	0	139
-46	0	34	73	0	3	1	1	2	5	0	119
-44	0	13	6	0	2	0	0	1	0	0	22
-42	0	0	0	0	1	0	0	0	0	0	1
-40	0	0	0	0	2	0	1	0	0	0	3
-38	0	0	0	0	1	0	0	0	0	0	1
-36	0	0	0	0	0	0	2	0	0	0	2
-34	0	0	0	0	0	0	0	0	0	0	0
-32	0	0	0	0	0	0	2	0	0	0	2
-30	0	0	0	0	0	0	1	0	0	0	1
-28	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	10	92	288	22	69	10	35	29	26	0	581

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

≥ 0 dB TO B = 1 dB NUMBER OF ECHOES = 69
 ≥ 1 dB TO B = 2 dB NUMBER OF ECHOES = 56
 ≥ 2 dB TO B = 3 dB NUMBER OF ECHOES = 37

TOTAL NUMBER OF RECORDED ECHOES = 2590
 NUMBER OF ECHOES USED FOR STATISTICS = 581
 AVERAGE BACKSCATTERING CROSS SECTION = .1946E-04 IN dB = -47.11
 BACKSCATTERING CROSS SECTION STD DEV = .5552E-04
 AVERAGE TARGET STRENGTH IN dB = -49.19
 TARGET STRENGTH STD DEV IN dB = 3.43
 ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 162

NUMBER OF FISH USED = 581
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .183E+06
 DENSITY IN FISH PER CUBIC METER = .318E-02
 EQUIVALENT STRATUM LENGTH (%/100) = .9196

Reading file D:\esp_nra\che6s.dat
 Analyzing Run # 2
 DATA GROUP REPORT FOR TRANSDUCER 1
 TOTAL NUMBER OF PINGS = 3883

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	230	1029	720	257	96	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	306
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	103
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	34

TOTAL NUMBER OF RECORDED ECHOES = 2551
 NUMBER OF ECHOES USED FOR STATISTICS = 2348
 AVERAGE BACKSCATTERING CROSS SECTION = .3670E-05 IN dB = -54.35
 BACKSCATTERING CROSS SECTION STD DEV = .2031E-05
 AVERAGE TARGET STRENGTH IN dB = -54.83
 TARGET STRENGTH STD DEV IN dB = 1.90

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 443

NUMBER OF FISH USED = 2348
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .140E+04
DENSITY IN FISH PER CUBIC METER = .168E+01
EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 5.0 TO 9.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

S -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 24 71 80 118 136 88 91 59 55 69 81 46 30 39 25 27 5 1 0 0 0 0

LIST OF BEAM PATTERN FACTORS > 0 dB

= 0 dB TO B = 1 dB NUMBER OF ECHOES = 189
= 1 dB TO B = 2 dB NUMBER OF ECHOES = 110
= 2 dB TO B = 3 dB NUMBER OF ECHOES = 62

TOTAL NUMBER OF RECORDED ECHOES = 1583

NUMBER OF ECHOES USED FOR STATISTICS = 1045

AVERAGE BACKSCATTERING CROSS SECTION = .1565E-03 IN dB = -38.06

BACKSCATTERING CROSS SECTION STD DEV = .3610E-03

AVERAGE TARGET STRENGTH IN dB =

-45.30

TARGET STRENGTH STD DEV IN dB =

7.84

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 361

NUMBER OF FISH USED = 1045
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .745E+04
DENSITY IN FISH PER CUBIC METER = .140E+00
EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 9.0 TO 13.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

S -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 6 26 47 104 169 216 219 212 189 191 131 105 101 80 62 52 46 12 1 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

= 0 dB TO B = 1 dB NUMBER OF ECHOES = 231
 = 1 dB TO B = 2 dB NUMBER OF ECHOES = 140
 = 2 dB TO B = 3 dB NUMBER OF ECHOES = 86

TOTAL NUMBER OF RECORDED ECHOES = 3153

NUMBER OF ECHOES USED FOR STATISTICS = 1969

AVERAGE BACKSCATTERING CROSS SECTION = .2502E-03 IN dB = -36.02

BACKSCATTERING CROSS SECTION STD DEV = .5538E-03

AVERAGE TARGET STRENGTH IN dB = -42.24

TARGET STRENGTH STD DEV IN dB = 7.20

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 457

NUMBER OF FISH USED = 1969
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .189E+05
 DENSITY IN FISH PER CUBIC METER = .104E+00
 EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 13.0 TO 25.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	7	111	123	126	152	122	78	43	21	11	12	7	4	1	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

= 0 dB TO B = 1 dB NUMBER OF ECHOES = 90
 = 1 dB TO B = 2 dB NUMBER OF ECHOES = 74
 = 2 dB TO B = 3 dB NUMBER OF ECHOES = 70

TOTAL NUMBER OF RECORDED ECHOES = 2025

NUMBER OF ECHOES USED FOR STATISTICS = 818

AVERAGE BACKSCATTERING CROSS SECTION = .5264E-04 IN dB = -42.79

BACKSCATTERING CROSS SECTION STD DEV = .1240E-03

AVERAGE TARGET STRENGTH IN dB = -46.06

TARGET STRENGTH STD DEV IN dB = 4.55

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 234

NUMBER OF FISH USED = 818
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .117E+06
 DENSITY IN FISH PER CUBIC METER = .700E-02
 EQUIVALENT STRATUM LENGTH (%/100) = .8462

SUMMARY OF DATA FROM DEPTH 1.0 TO 25.0

DEPTH INTERVALS

FROM	1.00	3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	
TO	3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	25.00	
TS											SUM
-74	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	0	231	12	17	0	0	0	0	0	0	260
-56	0	1029	39	58	0	0	0	0	0	0	1126
-54	0	721	39	84	3	3	3	0	1	0	854
-52	0	257	57	129	36	42	19	24	26	0	590
-50	0	97	72	181	51	52	24	21	26	0	524
-48	0	17	55	168	80	42	24	24	36	0	446
-46	0	0	64	144	102	66	25	36	25	0	462
-44	0	0	43	125	103	59	13	30	20	0	393
-42	0	0	39	103	102	30	4	30	14	0	322
-40	0	0	33	108	119	23	1	17	2	0	303
-38	0	0	38	109	65	16	0	5	0	0	233
-36	0	0	13	79	59	8	2	1	0	0	162
-34	0	0	8	52	71	7	0	5	0	0	143
-32	0	0	10	52	57	3	0	4	0	0	126
-30	0	0	10	35	42	4	0	0	0	0	91
-28	0	0	13	27	39	0	0	1	0	0	80
-26	0	0	1	7	43	0	0	0	0	0	51
-24	0	0	1	1	11	0	0	0	0	0	13
-22	0	0	0	0	1	0	0	0	0	0	1
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	0	2352	547	1479	984	355	115	198	150	0	6180

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 816
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 427
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 252

TOTAL NUMBER OF RECORDED ECHOES = 9312

NUMBER OF ECHOES USED FOR STATISTICS = 6180
AVERAGE BACKSCATTERING CROSS SECTION = .1145E-03 IN dB = -39.41
BACKSCATTERING CROSS SECTION STD DEV = .3648E-03
AVERAGE TARGET STRENGTH IN dB = -48.04
TARGET STRENGTH STD DEV IN dB = 7.81
ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 1495
NUMBER OF FISH USED = 6180
BULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .136E+06
DENSITY IN FISH PER CUBIC METER = .454E-01
EQUIVALENT STRATUM LENGTH (%/100) = .9200

***** TS Version 2.00 *****
Dual Beam Data Reduction Program
For ESP 281 V1.0x & V2.0x data files

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Serial Number 5205-V2.00-91-000

Reading file E:/esp_nra/che6d.dat

Analyzing Run # 1

FILE NUMBER 1 =	CHE6	E:/esp_nra/che6d.dat	
FILE NUMBER 2 =		E:/esp_nra/che6m.dat	
FILE NUMBER 3 =		E:/esp_nra/che7d.dat	
FILE NUMBER 4 =	CHE7	E:/esp_nra/che7m.dat	
FILE NUMBER 5 =		E:/esp_nra/che7s.dat	
FILE NUMBER 6 =		E:/esp_nra/che8d.dat	
FILE NUMBER 7 =	CHE8	E:/esp_nra/che8m.dat	
FILE NUMBER 8 =		E:/esp_nra/che8s.dat	

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 7424

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	7	26	31	16	15	12	18	16	20	10	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	32
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	15
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	8

TOTAL NUMBER OF RECORDED ECHOES = 197

NUMBER OF ECHOES USED FOR STATISTICS = 171

AVERAGE BACKSCATTERING CROSS SECTION = .2277E-04 IN dB = -46.43

BACKSCATTERING CROSS SECTION STD DEV = .2631E-04

AVERAGE TARGET STRENGTH IN dB = -49.51

TARGET STRENGTH STD DEV IN dB = 5.37

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 55

NUMBER OF FISH USED = 171
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .267E+04
DENSITY IN FISH PER CUBIC METER = .640E-01
EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 5.0 TO 9.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	11	26	41	58	88	122	115	119	55	30	24	13	15	1	1	0	0	0	0	0	0	

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	97
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	67
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	32

TOTAL NUMBER OF RECORDED ECHOES = 2510

NUMBER OF ECHOES USED FOR STATISTICS = 719

AVERAGE BACKSCATTERING CROSS SECTION = .4492E-04 IN dB = -43.48

BACKSCATTERING CROSS SECTION STD DEV = .7873E-04

AVERAGE TARGET STRENGTH IN dB = -46.67

TARGET STRENGTH STD DEV IN dB = 5.04

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 196

NUMBER OF FISH USED = 719
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .142E+05
DENSITY IN FISH PER CUBIC METER = .506E-01
EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 9.0 TO 13.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	2	14	24	48	50	47	57	61	62	41	25	15	7	0	1	0	0	0	0	0	0	

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 97
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 52
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 21

TOTAL NUMBER OF RECORDED ECHOES = 673

NUMBER OF ECHOES USED FOR STATISTICS = 454

AVERAGE BACKSCATTERING CROSS SECTION = .5542E-04 IN dB = -42.56

BACKSCATTERING CROSS SECTION STD DEV = .8781E-04

AVERAGE TARGET STRENGTH IN dB = -45.73

TARGET STRENGTH STD DEV IN dB = 5.36

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 170

NUMBER OF FISH USED = 454
 FISH ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .360E+05
 DENSITY IN FISH PER CUBIC METER = .126E-01
 EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 13.0 TO 25.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 0 0 0 0 33 244 291 372 384 346 333 243 200 129 87 58 30 19 19 27 2 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 348
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 304
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 215

TOTAL NUMBER OF RECORDED ECHOES = 5375

NUMBER OF ECHOES USED FOR STATISTICS = 2817

AVERAGE BACKSCATTERING CROSS SECTION = .1558E-03 IN dB = -38.07

BACKSCATTERING CROSS SECTION STD DEV = .4871E-03

AVERAGE TARGET STRENGTH IN dB = -43.72

TARGET STRENGTH STD DEV IN dB = 6.04

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 867

NUMBER OF FISH USED = 2817
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .223E+06
 DENSITY IN FISH PER CUBIC METER = .126E-01
 EQUIVALENT STRATUM LENGTH (%/100) = .8462

SUMMARY OF DATA FROM DEPTH 1.0 TO 25.0

DEPTH INTERVALS

FROM 1.00 3.40 5.80 8.20 10.60 13.00 15.40 17.80 20.20 22.60
 TO 3.40 5.80 8.20 10.60 13.00 15.40 17.80 20.20 22.60 25.00

TS											SUM
-74	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	3	10	4	3	0	0	0	0	0	0	20
-56	11	22	18	15	0	0	0	0	0	0	66
-54	15	24	20	33	4	2	9	16	6	0	129
-52	2	31	22	52	15	22	74	74	74	0	366
-50	4	31	40	62	16	21	75	88	107	0	444
-48	0	27	66	68	20	25	100	116	131	0	553
-46	3	33	68	72	14	15	104	90	175	0	574
-44	5	47	55	68	21	16	75	84	171	0	542
-42	11	16	35	65	10	21	56	71	185	0	470
-40	5	10	16	32	18	7	28	53	155	0	324
-38	0	1	20	22	6	21	15	29	135	0	249
-36	0	0	9	18	1	6	5	15	103	0	157
-34	0	0	15	6	1	2	4	11	70	0	109
-32	0	0	0	1	0	1	0	9	48	0	59
-30	0	0	0	2	0	1	0	3	26	0	32
-28	0	0	0	0	0	0	0	4	15	0	19
-26	0	0	0	0	0	0	0	0	19	0	19
-24	0	0	0	0	0	0	0	0	27	0	27
-22	0	0	0	0	0	0	0	0	2	0	2
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	59	252	388	519	126	160	545	663	1449	0	4161

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 574
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 438
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 276

TOTAL NUMBER OF RECORDED ECHOES = 8755

NUMBER OF ECHOES USED FOR STATISTICS = 4161
 AVERAGE BACKSCATTERING CROSS SECTION = .1202E-03 IN dB = -39.20
 BACKSCATTERING CROSS SECTION STD DEV = .4065E-03
 AVERAGE TARGET STRENGTH IN dB = -44.69
 TARGET STRENGTH STD DEV IN dB = 5.98

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 1288

NUMBER OF FISH USED = 4161
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .260E+06
 DENSITY IN FISH PER CUBIC METER = .160E-01
 EQUIVALENT STRATUM LENGTH (1/100) = .9200

Reading file E:/esp_nra/che6n.dat
 Analyzing Run # 1
 DATA GROUP REPORT FOR TRANSDUCER 1
 TOTAL NUMBER OF PINGS = 6376

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	2	4	14	31	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	17
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	8
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	2

TOTAL NUMBER OF RECORDED ECHOES = 57
 NUMBER OF ECHOES USED FOR STATISTICS = 52
 AVERAGE BACKSCATTERING CROSS SECTION = .5233E-05 IN dB = -52.81
 BACKSCATTERING CROSS SECTION STD DEV = .1605E-05
 AVERAGE TARGET STRENGTH IN dB = -53.06
 TARGET STRENGTH STD DEV IN dB = 1.57
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 27

NUMBER OF FISH USED = 52
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .230E+04
DENSITY IN FISH PER CUBIC METER = .227E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 5.0 TO 9.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 5 23 42 84 66 29 26 17 8 4 1 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 42
B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 36
B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 47

TOTAL NUMBER OF RECORDED ECHOES = 627

NUMBER OF ECHOES USED FOR STATISTICS = 305

AVERAGE BACKSCATTERING CROSS SECTION = .1380E-04 IN dB = -48.60

BACKSCATTERING CROSS SECTION STD DEV = .1686E-04

AVERAGE TARGET STRENGTH IN dB = -50.40

TARGET STRENGTH STD DEV IN dB = 3.66

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 125

NUMBER OF FISH USED = 305
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .122E+05
DENSITY IN FISH PER CUBIC METER = .250E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 9.0 TO 13.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 11 31 50 72 55 40 46 17 8 4 1 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	59
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	42
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	29

TOTAL NUMBER OF RECORDED ECHOES =	612
NUMBER OF ECHOES USED FOR STATISTICS =	335
AVERAGE BACKSCATTERING CROSS SECTION =	.1434E-04 IN dB = -48.43
BACKSCATTERING CROSS SECTION STD DEV =	.1753E-04
AVERAGE TARGET STRENGTH IN dB =	-50.38
TARGET STRENGTH STD DEV IN dB =	3.95

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 130

NUMBER OF FISH USED =	335
FULL ANGLE OF CONE =	6.00
ESTIMATED VOLUME IN CUBIC METERS =	.309E+05
DENSITY IN FISH PER CUBIC METER =	.108E-01
EQUVALENT STRATUM LENGTH (L/100) =	1.0000

SUMMARY OF DATA FROM DEPTH 13.0 TO 25.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16	
#	0	0	0	0	0	0	0	0	0	0	0	25	151	212	315	372	380	340	339	321	248	181	138	114	78	49	7	1	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	531
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	382
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	276

TOTAL NUMBER OF RECORDED ECHOES =	6391
NUMBER OF ECHOES USED FOR STATISTICS =	3271
AVERAGE BACKSCATTERING CROSS SECTION =	.2281E-03 IN dB = -36.42
BACKSCATTERING CROSS SECTION STD DEV =	.4518E-03
AVERAGE TARGET STRENGTH IN dB =	-41.38
TARGET STRENGTH STD DEV IN dB =	6.45

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 1189

NUMBER OF FISH USED =	3271
FULL ANGLE OF CONE =	6.00
ESTIMATED VOLUME IN CUBIC METERS =	.192E+06

DENSITY IN FISH PER CUBIC METER = .171E-01
EQUIVALENT STRATUM LENGTH (1/100) = .8462

SUMMARY OF DATA FROM DEPTH 1.0 TO 25.0

DEPTH INTERVALS

FROM	1.00	3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	
TO	3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	25.00	
TS											SUM
-74	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	2	0	3	13	0	0	0	0	0	0	18
-56	2	11	11	34	0	0	0	0	0	0	58
-54	4	12	32	54	4	7	6	11	1	0	131
-52	3	36	49	71	28	39	59	49	4	0	338
-50	0	2	49	50	21	49	102	40	21	0	334
-48	0	0	24	23	22	67	149	64	35	0	384
-46	0	0	22	21	29	75	164	90	43	0	444
-44	0	2	14	6	12	58	151	77	94	0	414
-42	0	0	6	4	6	45	112	89	94	0	356
-40	0	0	3	2	3	52	74	102	111	0	347
-38	0	0	1	1	0	53	68	112	88	0	323
-36	0	0	0	0	0	29	58	88	73	0	248
-34	0	0	0	0	0	14	55	50	62	0	181
-32	0	0	0	0	0	21	28	32	57	0	138
-30	0	0	0	0	0	40	20	8	46	0	114
-28	0	0	0	0	0	44	8	3	23	0	78
-26	0	0	0	0	0	42	2	2	3	0	49
-24	0	0	0	0	0	7	0	0	0	0	7
-22	0	0	0	0	0	1	0	0	0	0	1
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	11	63	214	279	125	643	1056	817	755	0	3963

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 649
B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 468
B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 354

TOTAL NUMBER OF RECORDED ECHOES = 7687

NUMBER OF ECHOES USED FOR STATISTICS = 3963

CROSS SECTION STD DEV = .4186E-03

AVERAGE TARGET STRENGTH IN dB = -42.99

TARGET STRENGTH STD DEV IN dB = 7.00

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 1471

NUMBER OF FISH USED = 3963

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .223E+06

Reading file E:/esp_nra/che7d.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS =

11311

CHE 7

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	12	35	42	9	8	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	30
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	12
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	6

TOTAL NUMBER OF RECORDED ECHOES = 112

NUMBER OF ECHOES USED FOR STATISTICS = 111

AVERAGE BACKSCATTERING CROSS SECTION = .4556E-05 IN dB = -53.41

BACKSCATTERING CROSS SECTION STD DEV = .3830E-05

AVERAGE TARGET STRENGTH IN dB = -54.29

TARGET STRENGTH STD DEV IN dB = 2.49

ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 48

NUMBER OF FISH USED = 111

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .407E+04

DENSITY IN FISH PER CUBIC METER = .273E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 5.0 TO 9.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	12	36	59	28	31	54	36	40	24	8	4	1	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	58
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	45
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	29

NUMBER OF RECORDED ECHOES = 1675

NUMBER OF ECHOES USED FOR STATISTICS = 333

AVERAGE BACKSCATTERING CROSS SECTION = .2161E-04 IN dB = -46.65

BACKSCATTERING CROSS SECTION STD DEV = .2718E-04

AVERAGE TARGET STRENGTH IN dB = -49.34

TARGET STRENGTH STD DEV IN dB = 4.93

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 132

NUMBER OF FISH USED = 333
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .216E+05
DENSITY IN FISH PER CUBIC METER = .154E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 9.0 TO 13.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	3	9	18	24	26	17	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	15
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	22
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	9

TOTAL NUMBER OF RECORDED ECHOES = 162
 NUMBER OF ECHOES USED FOR STATISTICS = 107
 AVERAGE BACKSCATTERING CROSS SECTION = .9551E-05 IN dB = -50.20
 BACKSCATTERING CROSS SECTION STD DEV = .6474E-05
 AVERAGE TARGET STRENGTH IN dB = -51.17
 TARGET STRENGTH STD DEV IN dB = 2.98

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 46

NUMBER OF FISH USED = 107
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .548E+05
 DENSITY IN FISH PER CUBIC METER = .195E-02
 EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 13.0 TO 25.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	26	217	282	426	518	563	671	699	700	718	674	556	457	334	131	42	3	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB	NUMBER OF ECHOES =	1139
B= 1 dB TO B= 2 dB	NUMBER OF ECHOES =	835
B= 2 dB TO B= 3 dB	NUMBER OF ECHOES =	611

TOTAL NUMBER OF RECORDED ECHOES = 11873
 NUMBER OF ECHOES USED FOR STATISTICS = 7017
 AVERAGE BACKSCATTERING CROSS SECTION = .3635E-03 IN dB = -34.40
 BACKSCATTERING CROSS SECTION STD DEV = .5713E-03
 AVERAGE TARGET STRENGTH IN dB = -38.86
 TARGET STRENGTH STD DEV IN dB = 6.71

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 2585

NUMBER OF FISH USED = 7017
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .340E+06
 DENSITY IN FISH PER CUBIC METER = .207E-01
 EQUIVALENT STRATUM LENGTH (1/100) = .8462

SUMMARY OF DATA FROM DEPTH 1.0 TO 25.0

DEPTH INTERVALS

FROM	1.00	3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	
TO	3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	25.00	
TS											SUM
-74	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	6	13	5	3	0	0	0	0	0	0	27
-56	3	50	15	12	0	0	0	0	0	0	80
-54	0	47	44	27	1	4	7	13	2	0	145
-52	0	9	19	29	4	35	48	122	12	0	278
-50	0	8	23	33	1	22	55	174	31	0	347
-48	0	4	42	29	0	20	80	247	79	0	501
-46	0	1	31	14	0	13	87	286	132	0	564
-44	0	0	39	2	0	5	50	335	173	0	604
-42	0	0	24	0	0	0	47	360	264	0	695
-40	0	0	8	0	0	0	28	351	320	0	707
-38	0	0	4	0	0	0	31	334	335	0	704
-36	0	0	1	0	0	0	17	316	385	0	719
-34	0	0	0	0	0	0	17	253	404	0	674
-32	0	0	0	0	0	0	5	188	363	0	556
-30	0	0	0	0	0	0	10	155	292	0	457
-28	0	0	0	0	0	0	6	137	191	0	334
-26	0	0	0	0	0	0	3	49	79	0	131
-24	0	0	0	0	0	0	1	21	20	0	42
-22	0	0	0	0	0	0	0	1	2	0	3
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
SUM	9	132	255	149	6	99	492	3342	3084	0	7568

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 1242
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 914
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 655

TOTAL NUMBER OF RECORDED ECHOES = 13822

NUMBER OF ECHOES USED FOR STATISTICS = 7568

AVERAGE BACKSCATTERING CROSS SECTION = .3382E-03 IN dB = -34.71

BACKSCATTERING CROSS SECTION STD DEV = .5575E-03

AVERAGE TARGET STRENGTH IN dB = -39.72

TARGET STRENGTH STD DEV IN dB = 7.27

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 2811

NUMBER OF FISH USED = 7568
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .396E+06
DENSITY IN FISH PER CUBIC METER = .191E-01
EQUIVALENT STRATUM LENGTH (%/100) = .9200

Reading file E:/esp_nra/che7m.dat

X

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 7492

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 1 14 26 7 2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

;

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 7
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 3
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 4

TOTAL NUMBER OF RECORDED ECHOES = 60

NUMBER OF ECHOES USED FOR STATISTICS = 51

AVERAGE BACKSCATTERING CROSS SECTION = .4293E-05 IN dB = -53.67

BACKSCATTERING CROSS SECTION STD DEV = .2589E-05

AVERAGE TARGET STRENGTH IN dB = -54.12

TARGET STRENGTH STD DEV IN dB = 1.82

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 14

NUMBER OF FISH USED = 51
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .270E+04
DENSITY IN FISH PER CUBIC METER = .189E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 5.0 TO 9.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	10	32	24	20	25	3	3	1	1	2	0	2	1	0	0	0	0	0	0	0	0	0

†

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	15
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	11
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	15

TOTAL NUMBER OF RECORDED ECHOES = 523

NUMBER OF ECHOES USED FOR STATISTICS = 124

AVERAGE BACKSCATTERING CROSS SECTION = .1585E-04 IN dB = -48.00

BACKSCATTERING CROSS SECTION STD DEV = .5117E-04

AVERAGE TARGET STRENGTH IN dB = -52.49

TARGET STRENGTH STD DEV IN dB = 4.49

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 41

NUMBER OF FISH USED =	124
FULL ANGLE OF CONE =	6.00
ESTIMATED VOLUME IN CUBIC METERS =	.143E+05
DENSITY IN FISH PER CUBIC METER =	.864E-02
EQUIVALENT STRATUM LENGTH (‡/100) =	1.0000

SUMMARY OF DATA FROM DEPTH 9.0 TO 13.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	9	21	35	108	103	117	109	116	95	79	88	62	63	60	47	20	10	3	0	0	0	0

†

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	165
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	128
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	69

TOTAL NUMBER OF RECORDED ECHOES = 1962

NUMBER OF ECHOES USED FOR STATISTICS = 1145
 AVERAGE BACKSCATTERING CROSS SECTION = .2019E-03 IN dB = -36.95
 BACKSCATTERING CROSS SECTION STD DEV = .4145E-03
 AVERAGE TARGET STRENGTH IN dB = -42.95
 TARGET STRENGTH STD DEV IN dB = 7.34
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 362
 NUMBER OF FISH USED = 1145
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .364E+05
 DENSITY IN FISH PER CUBIC METER = .315E-01
 EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SELECTION OF DATA FROM DEPTH 13.0 TO 25.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16	
#	0	0	0	0	0	0	0	0	0	0	0	32	301	405	495	548	472	355	268	206	182	152	96	44	19	14	6	0	0	0	0

†

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	507
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	321
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	216

TOTAL NUMBER OF RECORDED ECHOES = 7781
 NUMBER OF ECHOES USED FOR STATISTICS = 3595
 AVERAGE BACKSCATTERING CROSS SECTION = .1190E-03 IN dB = -39.24
 BACKSCATTERING CROSS SECTION STD DEV = .2885E-03
 AVERAGE TARGET STRENGTH IN dB = -43.92
 TARGET STRENGTH STD DEV IN dB = 5.79
 # ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 1044

NUMBER OF FISH USED = 3595
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .225E+06
 DENSITY IN FISH PER CUBIC METER = .160E-01
 EQUIVALENT STRATUM LENGTH (1/100) = .8462

SUMMARY OF DATA FROM DEPTH 1.0 TO 25.0

DEPTH INTERVALS

	FROM	1.00	3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	
	TO	3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	25.00	
TS												SUM
-74	0	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0	0
-58	0	2	7	11	0	0	0	0	0	0	0	20
-56	0	17	16	34	0	0	0	0	0	0	0	67
-54	0	26	9	37	13	9	12	7	4	0	0	117
-52	0	8	12	35	80	94	94	65	48	0	0	436
-50	0	2	14	26	88	162	131	60	52	0	0	535
-48	0	1	2	14	104	215	163	73	44	0	0	616
-46	0	0	1	16	95	230	179	84	55	0	0	660
-44	0	0	0	25	92	204	167	72	29	0	0	589
-42	0	0	0	21	75	148	121	48	38	0	0	451
-40	0	0	0	21	60	101	109	39	19	0	0	349
-38	0	0	0	23	65	90	79	29	8	0	0	294
-36	0	0	0	13	51	108	55	18	1	0	0	246
-34	0	0	0	6	58	76	61	10	5	0	0	216
-32	0	0	0	3	57	48	41	6	1	0	0	156
-30	0	0	0	2	45	26	17	1	0	0	0	91
-28	0	0	0	1	19	12	5	1	1	0	0	39
-26	0	0	0	1	9	11	3	0	0	0	0	24
-24	0	0	0	0	3	5	1	0	0	0	0	9
-22	0	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0	0
SUM	0	56	61	289	914	1539	1238	513	305	0	0	4915

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 694
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 463
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 304

TOTAL NUMBER OF RECORDED ECHOES = 10326

NUMBER OF ECHOES USED FOR STATISTICS = 4915

AVERAGE BACKSCATTERING CROSS SECTION = .1346E-03 IN dB = -38.71

BACKSCATTERING CROSS SECTION STD DEV = .3205E-03

AVERAGE TARGET STRENGTH IN dB = -44.02

TARGET STRENGTH STD DEV IN dB = 6.38

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 1461

NUMBER OF FISH USED = 4915
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .263E+06
DENSITY IN FISH PER CUBIC METER = .187E-01
EQUIVALENT STRATUM LENGTH (%/100) = .9200

Reading file E:/esp_nra/che7s.dat
Analyzing Run # 1
DATA GROUP REPORT FOR TRANSDUCER 1
TOTAL NUMBER OF PINGS = 7677

DATA FOR FREQUENCY 420.

STORY OF DATA FROM DEPTH 1.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	1	8	58	130	298	378	67	11	7	1	3	4	0	4	0	0	0	0	0	0	0

†

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	31
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	13
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	9

TOTAL NUMBER OF RECORDED ECHOES = 2788

NUMBER OF ECHOES USED FOR STATISTICS = 970

AVERAGE BACKSCATTERING CROSS SECTION = .2669E-04 IN dB = -45.74

BACKSCATTERING CROSS SECTION STD DEV = .6242E-04

AVERAGE TARGET STRENGTH IN dB = -47.22

TARGET STRENGTH STD DEV IN dB = 2.69

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 53

NUMBER OF FISH USED = 970
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .276E+04
DENSITY IN FISH PER CUBIC METER = .351E+00
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 5.0 TO 9.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16	
#	0	0	0	0	0	0	0	0	0	36	97	138	146	203	190	199	165	118	99	97	107	48	48	21	11	9	0	1	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	258
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	158
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	98

TOTAL NUMBER OF RECORDED ECHOES = 2843

NUMBER OF ECHOES USED FOR STATISTICS = 1733

AVERAGE BACKSCATTERING CROSS SECTION = .1094E-03 IN dB = -39.61

BACKSCATTERING CROSS SECTION STD DEV = .2853E-03

AVERAGE TARGET STRENGTH IN dB = -45.64

TARGET STRENGTH STD DEV IN dB = 6.97

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 514

NUMBER OF FISH USED =	1733
FULL ANGLE OF CONE =	6.00
ESTIMATED VOLUME IN CUBIC METERS =	.147E+05
DENSITY IN FISH PER CUBIC METER =	.118E+00
EQUIVALENT STRATUM LENGTH (%/100) =	1.0000

SUMMARY OF DATA FROM DEPTH 9.0 TO 13.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16	
#	0	0	0	0	0	0	0	0	0	8	27	58	110	97	112	138	125	99	95	72	71	44	28	15	9	2	1	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	93
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	80
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	56

TOTAL NUMBER OF RECORDED ECHOES = 2566

NUMBER OF ECHOES USED FOR STATISTICS = 1111

AVERAGE BACKSCATTERING CROSS SECTION = .1173E-03 IN dB = -39.31

BACKSCATTERING CROSS SECTION STD DEV = .2733E-03
AVERAGE TARGET STRENGTH IN dB = -44.39
TARGET STRENGTH STD DEV IN dB = 6.52

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 229

NUMBER OF FISH USED = 1111
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .373E+05
DENSITY IN FISH PER CUBIC METER = .298E-01
EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 13.0 TO 25.0

TS STRENGTH DISTRIBUTION FOR STRATUM 4

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	0	28	190	185	175	141	93	55	52	13	9	5	2	1	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	164
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	137
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	139

TOTAL NUMBER OF RECORDED ECHOES = 2081
NUMBER OF ECHOES USED FOR STATISTICS = 949
AVERAGE BACKSCATTERING CROSS SECTION = .3165E-04 IN dB = -45.00
BACKSCATTERING CROSS SECTION STD DEV = .5720E-04
AVERAGE TARGET STRENGTH IN dB = -47.52
TARGET STRENGTH STD DEV IN dB = 4.12

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 440

NUMBER OF FISH USED = 949
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .231E+06
DENSITY IN FISH PER CUBIC METER = .411E-02
EQUIVALENT STRATUM LENGTH (1/100) = .8462

SUMMARY OF DATA FROM DEPTH 1.0 TO 25.0

DEPTH INTERVALS

FROM	1.00	3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	
TO	3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	25.00	
TS											SUM
-74	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	0	0	25	19	0	0	0	0	0	0	44
-56	0	1	58	66	0	0	0	0	0	0	125
-54	1	7	79	106	11	7	4	6	11	0	232
-52	3	55	93	119	44	37	50	55	48	0	504
-50	2	130	109	144	45	43	38	54	50	0	615
-48	2	298	116	136	48	44	20	55	56	0	775
-46	0	382	129	137	67	47	25	27	42	0	856
-44	0	68	95	136	58	38	10	15	30	0	450
-42	2	12	69	114	31	26	5	8	16	0	283
-40	2	8	47	117	27	21	3	9	19	0	253
-38	0	3	65	83	19	7	2	3	1	0	183
-36	1	5	77	92	6	5	0	2	2	0	190
-34	0	5	35	52	4	4	0	1	0	0	101
-32	0	1	32	39	4	2	0	0	0	0	78
-30	0	4	10	26	0	1	0	0	0	0	41
-28	0	0	5	15	0	0	0	0	0	0	20
-26	0	0	3	8	0	0	0	0	0	0	11
-24	0	0	0	1	0	0	0	0	0	0	1
-22	0	0	1	0	0	0	0	0	0	0	1
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	13	979	1048	1410	364	282	157	235	275	0	4763

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

0 dB TO B = 1 dB NUMBER OF ECHOES = 546
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 388
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 302

TOTAL NUMBER OF RECORDED ECHOES = 10278

NUMBER OF ECHOES USED FOR STATISTICS = 4763

AVERAGE BACKSCATTERING CROSS SECTION = .7890E-04 IN dB = -41.03

BACKSCATTERING CROSS SECTION STD DEV = .2240E-03

AVERAGE TARGET STRENGTH IN dB = -46.05

TARGET STRENGTH STD DEV IN dB = 5.82

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 1236

NUMBER OF FISH USED = 4763
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .269E+06

Reading file E:/esp_nra/che8d.dat
Analyzing Run # 1
DATA GROUP REPORT FOR TRANSDUCER 1
TOTAL NUMBER OF PINGS =

7395

ChE 8

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	1	5	7	9	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	3
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	5
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	1

TOTAL NUMBER OF RECORDED ECHOES = 32

NUMBER OF ECHOES USED FOR STATISTICS = 26

AVERAGE BACKSCATTERING CROSS SECTION = .5642E-05 IN dB = -52.49

BACKSCATTERING CROSS SECTION STD DEV = .3423E-05

AVERAGE TARGET STRENGTH IN dB = -53.15

TARGET STRENGTH STD DEV IN dB = 2.40

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 9

NUMBER OF FISH USED = 26
ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .266E+04
DENSITY IN FISH PER CUBIC METER = .977E-02
EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 5.0 TO 9.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	25	48	41	84	153	149	123	96	33	4	0	2	1	0	0	0	0	0	0	0	0

†

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	109
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	86
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	80

TOTAL NUMBER OF RECORDED ECHOES = 1981

NUMBER OF ECHOES USED FOR STATISTICS = 759

AVERAGE BACKSCATTERING CROSS SECTION = .1966E-04 IN dB = -47.06

BACKSCATTERING CROSS SECTION STD DEV = .2270E-04

AVERAGE TARGET STRENGTH IN dB = -48.82

TARGET STRENGTH STD DEV IN dB = 4.02

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 275

NUMBER OF FISH USED =	759
FULL ANGLE OF CONE =	6.00
ESTIMATED VOLUME IN CUBIC METERS =	.142E+05
DENSITY IN FISH PER CUBIC METER =	.536E-01
EQUIVALENT STRATUM LENGTH (‡/100) =	1.0000

SUMMARY OF DATA FROM DEPTH 9.0 TO 13.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	0	1	6	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

†

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	2
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	0
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	2

TOTAL NUMBER OF RECORDED ECHOES = 12

NUMBER OF ECHOES USED FOR STATISTICS = 9

AVERAGE BACKSCATTERING CROSS SECTION = .8665E-05 IN dB = -50.62

BACKSCATTERING CROSS SECTION STD DEV = .7297E-05

AVERAGE TARGET STRENGTH IN dB = -51.42
TARGET STRENGTH STD DEV IN dB = 2.42
ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 4
NUMBER OF FISH USED = 9
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .359E+05
DENSITY IN FISH PER CUBIC METER = .251E-03
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 13.0 TO 25.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4
TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 0 0 0 8 40 38 27 10 5 5 3 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 28
B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 16
B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 23
TOTAL NUMBER OF RECORDED ECHOES = 253
NUMBER OF ECHOES USED FOR STATISTICS = 136
AVERAGE BACKSCATTERING CROSS SECTION = .1559E-04 IN dB = -48.07
BACKSCATTERING CROSS SECTION STD DEV = .1720E-04
AVERAGE TARGET STRENGTH IN dB = -49.43
TARGET STRENGTH STD DEV IN dB = 3.06
ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 67

NUMBER OF FISH USED = 136
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .222E+06
DENSITY IN FISH PER CUBIC METER = .612E-03
EQUIVALENT STRATUM LENGTH (%/100) = .8462

SUMMARY OF DATA FROM DEPTH 1.0 TO 25.0

DEPTH INTERVALS

FROM 1.00 3.40 5.80 8.20 10.60 13.00 15.40 17.80 20.20 22.60

TS	TO	3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	25.00	SUM
-74	0	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0	0
-58	0	9	17	0	0	0	0	0	0	0	0	26
-56	0	19	32	2	0	0	0	0	0	0	0	53
-54	0	19	20	9	1	2	3	2	1	0	0	57
-52	1	25	24	46	3	9	8	17	6	0	0	139
-50	1	6	23	126	0	4	22	9	3	0	0	194
-48	2	2	14	133	0	1	17	8	1	0	0	178
-46	0	0	16	107	1	1	7	1	1	0	0	134
-44	0	0	8	88	0	0	4	1	0	0	0	101
-42	0	0	0	33	0	0	5	0	0	0	0	38
-40	0	0	0	4	0	0	3	0	0	0	0	7
-38	0	0	0	0	0	0	0	0	0	0	0	0
-36	0	0	0	2	0	0	0	0	0	0	0	2
-34	0	0	0	1	0	0	0	0	0	0	0	1
-32	0	0	0	0	0	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0	0	0	0	0	0
-28	0	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0	0
SUM	4	80	154	551	5	17	69	38	12	0	0	930

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 142
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 107
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 106

TOTAL NUMBER OF RECORDED ECHOES = 2278

NUMBER OF ECHOES USED FOR STATISTICS = 930

AVERAGE BACKSCATTERING CROSS SECTION = .1857E-04 IN dB = -47.31

BACKSCATTERING CROSS SECTION STD DEV = .2172E-04

AVERAGE TARGET STRENGTH IN dB = -49.05

TARGET STRENGTH STD DEV IN dB = 3.92

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 355

NUMBER OF FISH USED = 930
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .259E+06

DENSITY IN FISH PER CUBIC METER = .359E-02
EQUIVALENT STRATUM LENGTH (1/100) = .9200

Reading file E:/esp_nra/che8m.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 7215

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	7	16	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	11
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	5
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	2

TOTAL NUMBER OF RECORDED ECHOES = 29

NUMBER OF ECHOES USED FOR STATISTICS = 28

AVERAGE BACKSCATTERING CROSS SECTION = .2869E-05 IN dB = -55.42

BACKSCATTERING CROSS SECTION STD DEV = .1394E-05

AVERAGE TARGET STRENGTH IN dB = -55.76

TARGET STRENGTH STD DEV IN dB = 1.61

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 18

NUMBER OF FISH USED = 28
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .260E+04
DENSITY IN FISH PER CUBIC METER = .108E-01
EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 5.0 TO 9.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

0 0 0 0 0 0 0 0 0 10 29 70 115 115 87 49 17 2 1 2 1 1 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 56
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 59
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 40

TOTAL NUMBER OF RECORDED ECHOES = 1269

NUMBER OF ECHOES USED FOR STATISTICS = 499

AVERAGE BACKSCATTERING CROSS SECTION = .1333E-04 IN dB = -48.75

BACKSCATTERING CROSS SECTION STD DEV = .2484E-04

AVERAGE TARGET STRENGTH IN dB = -50.46

TARGET STRENGTH STD DEV IN dB = 3.41

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 155

NUMBER OF FISH USED = 499
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .137E+05
 DENSITY IN FISH PER CUBIC METER = .364E-01
 EQUIVALENT STRATUM LENGTH (1/100) = .9951

SUMMARY OF DATA FROM DEPTH 9.0 TO 13.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 0 0 0 0 4 16 14 7 9 4 6 6 2 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 13
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 9
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 5

TOTAL NUMBER OF RECORDED ECHOES = 125

NUMBER OF ECHOES USED FOR STATISTICS = 68

AVERAGE BACKSCATTERING CROSS SECTION = .3015E-04 IN dB = -45.21

BACKSCATTERING CROSS SECTION STD DEV = .3609E-04

AVERAGE TARGET STRENGTH IN dB = -47.71

TARGET STRENGTH STD DEV IN dB = 4.53

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 27

NUMBER OF FISH USED = 68
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .345E+05
DENSITY IN FISH PER CUBIC METER = .197E-02
EQUIVALENT STRATUM LENGTH (1/100) = .9873

SUMMARY OF DATA FROM DEPTH 13.0 TO 25.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 0 0 49 284 374 516 556 564 559 551 428 274 195 115 81 62 79 16 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 643
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 499
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 341

TOTAL NUMBER OF RECORDED ECHOES = 8371
NUMBER OF ECHOES USED FOR STATISTICS = 4703
AVERAGE BACKSCATTERING CROSS SECTION = .1828E-03 IN dB = -37.38
BACKSCATTERING CROSS SECTION STD DEV = .4368E-03
AVERAGE TARGET STRENGTH IN dB = -42.49
TARGET STRENGTH STD DEV IN dB = 6.16

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 1483

NUMBER OF FISH USED = 4703
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .213E+06
DENSITY IN FISH PER CUBIC METER = .220E-01
EQUIVALENT STRATUM LENGTH (1/100) = .8332

SUMMARY OF DATA FROM DEPTH 1.0 TO 25.0

DEPTH INTERVALS

FROM 1.00 3.40 5.80 8.20 10.60 13.00 15.40 17.80 20.20 22.60
TO 3.40 5.80 8.20 10.60 13.00 15.40 17.80 20.20 22.60 25.00

TS SUM

-74	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	0	13	1	3	0	0	0	0	0	0	17
-56	0	23	11	11	0	0	0	0	0	0	45
-54	0	4	42	26	4	6	16	23	4	0	125
-52	1	5	89	26	12	17	93	141	33	0	417
-50	1	0	100	24	5	12	125	191	46	0	504
-48	0	0	80	10	4	22	146	269	79	0	610
-46	0	0	48	3	7	20	174	277	85	0	614
-44	0	0	17	0	4	31	168	267	98	0	585
-42	0	0	2	0	6	14	141	286	118	0	567
-40	0	0	0	1	6	19	143	282	107	0	558
-38	0	0	0	2	2	9	98	244	77	0	432
-36	0	0	0	1	0	1	65	141	67	0	275
-34	0	0	0	1	0	7	25	106	57	0	196
-32	0	0	0	0	0	1	12	69	33	0	115
-30	0	0	0	0	0	5	5	43	28	0	81
-28	0	0	0	0	0	4	20	15	23	0	62
-26	0	0	0	0	0	7	54	7	11	0	79
-24	0	0	0	0	0	10	4	0	2	0	16
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0

SUM	2	45	390	108	50	185	1289	2361	868	0	5298
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HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	723
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	572
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	388

TOTAL NUMBER OF RECORDED ECHOES = 9794

NUMBER OF ECHOES USED FOR STATISTICS = 5298

AVERAGE BACKSCATTERING CROSS SECTION = .1639E-03 IN dB = -37.85

BACKSCATTERING CROSS SECTION STD DEV = .4150E-03

AVERAGE TARGET STRENGTH IN dB = -43.38

TARGET STRENGTH STD DEV IN dB = 6.44

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 1683

NUMBER OF FISH USED = 5298

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .249E+06

DENSITY IN FISH PER CUBIC METER = .213E-01

EQUIVALENT STRATUM LENGTH (1/100) = .9108

Reading file E:/esp_nra/che8s.dat
Analyzing Run # 1
DATA GROUP REPORT FOR TRANSDUCER 1
TOTAL NUMBER OF PINGS =

7382

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	1	23	128	209	264	250	195	42	3	1	0	0	0	0	0	0	0	0	0	0	0	0

Histogram of BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	106
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	102
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	71

TOTAL NUMBER OF RECORDED ECHOES = 2473

NUMBER OF ECHOES USED FOR STATISTICS = 1116

AVERAGE BACKSCATTERING CROSS SECTION = .1367E-04 IN dB = -48.64

BACKSCATTERING CROSS SECTION STD DEV = .9341E-05

AVERAGE TARGET STRENGTH IN dB = -49.56

TARGET STRENGTH STD DEV IN dB = 2.87

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 279

NUMBER OF FISH USED =	1116
FULL ANGLE OF CONE =	6.00
ESTIMATED VOLUME IN CUBIC METERS =	.266E+04
DENSITY IN FISH PER CUBIC METER =	.420E+00
EQUIVALENT STRATUM LENGTH (%/100) =	1.0000

SUMMARY OF DATA FROM DEPTH 5.0 TO 9.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	40	146	163	196	258	236	190	157	97	55	28	29	23	14	8	1	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 302
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 204
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 127

TOTAL NUMBER OF RECORDED ECHOES = 2514

NUMBER OF ECHOES USED FOR STATISTICS = 1641

AVERAGE BACKSCATTERING CROSS SECTION = .4297E-04 IN dB = -43.67

BACKSCATTERING CROSS SECTION STD DEV = .1113E-03

AVERAGE TARGET STRENGTH IN dB = -48.27

TARGET STRENGTH STD DEV IN dB = 5.58

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 633

NUMBER OF FISH USED = 1641
 ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .141E+05
 DENSITY IN FISH PER CUBIC METER = .116E+00
 EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 9.0 TO 13.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
 # 0 0 0 0 0 0 0 0 0 9 26 38 71 98 125 139 108 70 50 43 55 63 82 68 35 47 15 1 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 118
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 56
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 39

TOTAL NUMBER OF RECORDED ECHOES = 1947

NUMBER OF ECHOES USED FOR STATISTICS = 1143

AVERAGE BACKSCATTERING CROSS SECTION = .3648E-03 IN dB = -34.38

BACKSCATTERING CROSS SECTION STD DEV = .7012E-03

AVERAGE TARGET STRENGTH IN dB = -41.73

TARGET STRENGTH STD DEV IN dB = 8.47

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 213

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

⋮

B = 0 dB	TO B = 1 dB	NUMBER OF ECHOES =	47
B = 1 dB	TO B = 2 dB	NUMBER OF ECHOES =	35
B = 2 dB	TO B = 3 dB	NUMBER OF ECHOES =	47

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 129

=====

[illegible]

-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	0	1	23	26	0	0	0	0	0	0	50
-56	0	29	101	65	0	0	0	0	0	0	195
-54	0	137	113	78	1	8	3	7	0	0	347
-52	0	227	150	76	23	21	8	42	3	0	550
-50	0	298	184	111	27	20	9	27	9	0	685
-48	0	282	180	102	47	21	10	11	10	0	663
-46	0	209	154	108	53	28	9	5	10	0	576
-44	0	54	127	91	35	13	5	4	8	0	337
-42	0	10	82	46	32	5	2	0	2	0	179
-40	0	2	51	25	28	2	9	2	0	0	119
-38	0	0	28	17	26	6	7	0	0	0	84
-36	0	0	29	18	37	3	1	0	0	0	88
-34	0	0	23	30	33	3	1	3	0	0	93
-32	0	0	14	41	41	0	1	0	0	0	97
-30	0	0	8	40	28	1	0	0	0	0	77
-28	0	0	1	10	25	0	1	0	0	0	37
-26	0	0	0	15	32	0	1	0	0	0	48
-24	0	0	0	0	15	1	0	0	0	0	16
-22	0	0	0	0	1	0	0	0	0	0	1
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0

SUM	0	1249	1268	899	484	132	67	101	42	0	4242
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HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	573
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	397
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	284

TOTAL NUMBER OF RECORDED ECHOES = 8092

NUMBER OF ECHOES USED FOR STATISTICS = 4242

AVERAGE BACKSCATTERING CROSS SECTION = .1235E-03 IN dB = -39.08

BACKSCATTERING CROSS SECTION STD DEV = .4052E-03

AVERAGE TARGET STRENGTH IN dB = -46.77

TARGET STRENGTH STD DEV IN dB = 6.74

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 1254

NUMBER OF FISH USED =	4242
FULL ANGLE OF CONE =	6.00
ESTIMATED VOLUME IN CUBIC METERS =	.200E+06
DENSITY IN FISH PER CUBIC METER =	.212E-01
EQUIVALENT STRATUM LENGTH (%/100) =	.8438

***** TS Version 2.00 *****
 Dual Beam Data Reduction Program
 For ESP 281 V1.0x & V2.0x data files

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 for BioSonics Scientific Hydroacoustic Applications
 Serial Number 5205-V2.00-91-000

ChE9

Reading file E:\esp_nra\che9d.dat

Analyzing Run # 1
 FILE NUMBER 1 = E:\esp_nra\che9d.dat 1
 FILE NUMBER 2 = CHE9. E:\esp_nra\che9m.dat 1, 2
 FILE NUMBER 3 = E:\esp_nra\cneys.dat 1
 FILE NUMBER 4 = E:\esp_nra\chelld.dat
 FILE NUMBER 5 = e:\esp_nra\chellm.dat
 FILE NUMBER 6 = E:\esp_nra\chells.dat
 FILE NUMBER 7 = E:\esp_nra\chells2.dat

DATA GROUP REPORT FOR TRANSDUCER 1
 TOTAL NUMBER OF PINGS = 4253

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	105	201	164	122	108	41	40	22	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	139
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	137
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	120

TOTAL NUMBER OF RECORDED ECHOES = 1383

NUMBER OF ECHOES USED FOR STATISTICS = 812

AVERAGE BACKSCATTERING CROSS SECTION = .4876E-06 IN dB = -63.12

BACKSCATTERING CROSS SECTION STD DEV = .6337E-06

AVERAGE TARGET STRENGTH IN dB = -65.06

TARGET STRENGTH STD DEV IN dB = 3.69

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 396

NUMBER OF FISH USED = 812 71
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .153E+04
DENSITY IN FISH PER CUBIC METER = .530E+00
EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 5.0 TO 9.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 27 77 94 118 115 98 86 59 59 143 195 159 158 102 30 2 1 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 199
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 171
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 121

TOTAL NUMBER OF RECORDED ECHOES = 3988
NUMBER OF ECHOES USED FOR STATISTICS = 1523
AVERAGE BACKSCATTERING CROSS SECTION = .1073E-04 IN dB = -49.69
BACKSCATTERING CROSS SECTION STD DEV = .1392E-04
AVERAGE TARGET STRENGTH IN dB = -54.68
TARGET STRENGTH STD DEV IN dB = 7.83

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 491

NUMBER OF FISH USED = 1523
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .815E+04
DENSITY IN FISH PER CUBIC METER = .187E+00
EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 9.0 TO 13.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 1 4 27 93 162 121 123 77 53 25 8 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 107
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 78
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 61

TOTAL NUMBER OF RECORDED ECHOES = 1412
NUMBER OF ECHOES USED FOR STATISTICS = 696
AVERAGE BACKSCATTERING CROSS SECTION = .1599E-05 IN dB = -57.96
BACKSCATTERING CROSS SECTION STD DEV = .1743E-05
AVERAGE TARGET STRENGTH IN dB = -59.65
TARGET STRENGTH STD DEV IN dB = 3.67

/ ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 246

NUMBER OF FISH USED = 696
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .100E+05
DENSITY IN FISH PER CUBIC METER = .693E-01
EQUIVALENT STRATUM LENGTH (%/100) = .6000

SUMMARY OF DATA FROM DEPTH 13.0 TO 25.0
NO TARGETS FOUND

SUMMARY OF DATA FROM DEPTH 1.0 TO 25.0

DEPTH INTERVALS											
FROM	1.00	3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	
TO	3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	25.00	SUM
-74	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
-70	22	109	1	1	0	0	0	0	0	0	133
-68	46	229	3	4	0	0	0	0	0	0	282
-66	42	188	24	29	2	0	0	0	0	0	285
-64	41	134	51	94	13	0	0	0	0	0	333
-62	19	127	68	121	50	0	0	0	0	0	385
-60	11	54	62	106	27	0	0	0	0	0	260
-58	21	35	62	95	36	0	0	0	0	0	249
-56	7	27	44	58	22	0	0	0	0	0	158
-54	0	12	55	42	11	0	0	0	0	0	120
-52	1	5	138	23	2	0	0	0	0	0	169
-50	0	1	194	8	0	0	0	0	0	0	203
-48	0	0	159	2	0	0	0	0	0	0	161
-46	0	0	158	0	0	0	0	0	0	0	158
-44	0	0	102	0	0	0	0	0	0	0	102

-42	0	0	30	0	0	0	0	0	0	0	30
-40	0	0	2	0	0	0	0	0	0	0	2
-38	0	0	1	0	0	0	0	0	0	0	1
-36	0	0	0	0	0	0	0	0	0	0	0
-34	0	0	0	0	0	0	0	0	0	0	0
-32	0	0	0	0	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0	0	0	0	0
-28	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0

SUM	210	921	1154	583	163	0	0	0	0	0	3031

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 445
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 386
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 302

TOTAL NUMBER OF RECORDED ECHOES = 6783

NUMBER OF ECHOES USED FOR STATISTICS = 3031

AVERAGE BACKSCATTERING CROSS SECTION = .5888E-05 IN dB = -52.30

BACKSCATTERING CROSS SECTION STD DEV = .1104E-04

AVERAGE TARGET STRENGTH IN dB = -58.60

TARGET STRENGTH STD DEV IN dB = 7.53

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 1133

NUMBER OF FISH USED = 3031
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .163E+05
DENSITY IN FISH PER CUBIC METER = .186E+00
EQUVALENT STRATUM LENGTH (1/100) = .4400

Reading file E:\esp_nra\che9m.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 2533

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	2	97	23	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

‡

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	14
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	31
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	65

TOTAL NUMBER OF RECORDED ECHOES = 2483

NUMBER OF ECHOES USED FOR STATISTICS = 128

AVERAGE BACKSCATTERING CROSS SECTION = .2996E-05 IN dB = -55.23

BACKSCATTERING CROSS SECTION STD DEV = .1041E-05

AVERAGE TARGET STRENGTH IN dB = -55.43

TARGET STRENGTH STD DEV IN dB = 1.21

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 110

NUMBER OF FISH USED = 128
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .929E+03
 DENSITY IN FISH PER CUBIC METER = .138E+00
 EQUIVALENT STRATUM LENGTH (‡/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 5.0 TO 9.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	2	21	45	44	50	26	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0

‡

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	27
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	14
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	11

TOTAL NUMBER OF RECORDED ECHOES = 425

NUMBER OF ECHOES USED FOR STATISTICS = 193

AVERAGE BACKSCATTERING CROSS SECTION = .8066E-05 IN dB = -50.93

BACKSCATTERING CROSS SECTION STD DEV = .4925E-05

AVERAGE TARGET STRENGTH IN dB = -51.70

TARGET STRENGTH STD DEV IN dB = 2.60

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 52

NUMBER OF FISH USED = 193
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .494E+04
DENSITY IN FISH PER CUBIC METER = .390E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 9.0 TO 13.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	0	2	19	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	4
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	6
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	4

TOTAL NUMBER OF RECORDED ECHOES = 61

NUMBER OF ECHOES USED FOR STATISTICS = 28

AVERAGE BACKSCATTERING CROSS SECTION = .6846E-05 IN dB = -51.65

BACKSCATTERING CROSS SECTION STD DEV = .1615E-05

AVERAGE TARGET STRENGTH IN dB = -51.75

TARGET STRENGTH STD DEV IN dB = .96

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 14

NUMBER OF FISH USED = 28
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .125E+05
DENSITY IN FISH PER CUBIC METER = .224E-02
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 13.0 TO 25.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	0	20	161	183	185	175	110	61	61	51	65	41	70	39	2	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 168
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 136
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 104

TOTAL NUMBER OF RECORDED ECHOES = 1941

NUMBER OF ECHOES USED FOR STATISTICS = 1224

AVERAGE BACKSCATTERING CROSS SECTION = .1233E-03 IN dB = -39.09

BACKSCATTERING CROSS SECTION STD DEV = .2279E-03

AVERAGE TARGET STRENGTH IN dB = -44.55

TARGET STRENGTH STD DEV IN dB = 6.50

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 408

NUMBER OF FISH USED = 1224
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .776E+05
 DENSITY IN FISH PER CUBIC METER = .158E-01
 EQUIVALENT STRATUM LENGTH (1/100) = .8462

SUMMARY OF DATA FROM DEPTH 1.0 TO 25.0

DEPTH INTERVALS

	FROM 1.00	3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	
	TO 3.40	5.80	8.20	10.60	13.00	15.40	17.80	20.20	22.60	25.00	
TS											SUM
-74	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	1	1	2	0	0	0	0	0	0	0	4
-56	95	2	19	2	0	0	0	0	0	0	118
-54	6	17	43	4	0	2	6	8	4	0	90
-52	2	3	42	21	0	6	79	58	18	0	229
-50	1	0	49	8	0	8	67	78	30	0	241
-48	0	0	26	0	0	5	71	79	30	0	211
-46	0	0	5	0	0	4	62	72	37	0	180
-44	0	0	0	0	0	5	31	44	30	0	110
-42	0	0	0	0	0	7	15	21	18	0	61
-40	0	0	0	0	0	10	12	6	33	0	61
-38	0	0	0	0	0	7	12	2	30	0	51

-36	0	0	0	0	0	10	20	0	35	0	65
-34	0	0	0	0	0	8	21	0	12	0	41
-32	0	0	0	0	0	16	52	0	2	0	70
-30	0	0	0	0	0	5	34	0	0	0	39
-28	0	0	0	0	0	0	2	0	0	0	2
-26	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	105	23	186	35	0	93	484	368	279	0	1573

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 213
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 187
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 184

TOTAL NUMBER OF RECORDED ECHOES = 4910

NUMBER OF ECHOES USED FOR STATISTICS = 1573

AVERAGE BACKSCATTERING CROSS SECTION = .9733E-04 IN dB = -40.12

BACKSCATTERING CROSS SECTION STD DEV = .2069E-03

AVERAGE TARGET STRENGTH IN dB = -46.44

TARGET STRENGTH STD DEV IN dB = 6.86

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 584

NUMBER OF FISH USED = 1573
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .905E+05
DENSITY IN FISH PER CUBIC METER = .174E-01
EQUIVALENT STRATUM LENGTH (%/100) = .9200

Reopening file E:\esp_nra\che9m.dat

Analyzing Run # 2

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 4294

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 5.0
NO TARGETS FOUND

SUMMARY OF DATA FROM DEPTH 5.0 TO 9.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	7	40	48	45	53	33	18	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0

;

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB TO B = 1 dB	NUMBER OF ECHOES =	31
B=	1 dB TO B = 2 dB	NUMBER OF ECHOES =	29
B=	2 dB TO B = 3 dB	NUMBER OF ECHOES =	14

TOTAL NUMBER OF RECORDED ECHOES = 872

NUMBER OF ECHOES USED FOR STATISTICS = 247

AVERAGE BACKSCATTERING CROSS SECTION = .8861E-05 IN dB = -50.52

BACKSCATTERING CROSS SECTION STD DEV = .7018E-05

AVERAGE TARGET STRENGTH IN dB = -51.72

TARGET STRENGTH STD DEV IN dB = 3.23

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 74

NUMBER OF FISH USED =	247
FULL ANGLE OF CONE =	6.00
ESTIMATED VOLUME IN CUBIC METERS =	.824E+04
DENSITY IN FISH PER CUBIC METER =	.300E-01
EQUIVALENT STRATUM LENGTH (%/100) =	1.0000

SUMMARY OF DATA FROM DEPTH 9.0 TO 13.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	0	1	14	2	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

;

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB TO B = 1 dB	NUMBER OF ECHOES =	4
B=	1 dB TO B = 2 dB	NUMBER OF ECHOES =	4
B=	2 dB TO B = 3 dB	NUMBER OF ECHOES =	4

TOTAL NUMBER OF RECORDED ECHOES = 29

NUMBER OF ECHOES USED FOR STATISTICS = 24

AVERAGE BACKSCATTERING CROSS SECTION = .9201E-05 IN dB = -50.36

BACKSCATTERING CROSS SECTION STD DEV = .5257E-05
AVERAGE TARGET STRENGTH IN dB = -50.91
TARGET STRENGTH STD DEV IN dB = 2.12
ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 12

NUMBER OF FISH USED = 24
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .209E+05
DENSITY IN FISH PER CUBIC METER = .115E-02
EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 13.0 TO 25.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4

T	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16	
f	0	0	0	0	0	0	0	0	0	0	0	25	211	257	346	416	377	310	221	133	104	62	48	36	17	18	8	2	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	354
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	275
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	199

TOTAL NUMBER OF RECORDED ECHOES = 4173
NUMBER OF ECHOES USED FOR STATISTICS = 2591
AVERAGE BACKSCATTERING CROSS SECTION = .1241E-03 IN dB = -39.06
BACKSCATTERING CROSS SECTION STD DEV = .3695E-03
AVERAGE TARGET STRENGTH IN dB = -44.04
TARGET STRENGTH STD DEV IN dB = 5.61

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 828

NUMBER OF FISH USED = 2591
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .129E+06
DENSITY IN FISH PER CUBIC METER = .200E-01
EQUIVALENT STRATUM LENGTH (1/100) = .8462

SUMMARY OF DATA FROM DEPTH 1.0 TO 25.0

DEPTH INTERVALS

FROM 1.00 3.40 5.80 8.20 10.60 13.00 15.40 17.80 20.20 22.60
 TO 3.40 5.80 8.20 10.60 13.00 15.40 17.80 20.20 22.60 25.00

TS											SUM
-74	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	0	0	3	4	0	0	0	0	0	0	7
-56	0	1	38	1	0	0	0	0	0	0	40
-54	0	0	46	3	0	4	4	14	3	0	74
-52	0	0	45	14	0	33	57	81	40	0	270
-50	0	0	53	2	0	34	77	121	25	0	312
-48	0	0	33	6	0	48	71	186	41	0	385
-46	0	0	18	1	0	64	89	195	68	0	435
-44	0	0	3	0	0	66	110	141	60	0	380
-42	0	0	0	0	0	76	117	80	37	0	310
-40	0	0	0	0	0	85	97	26	13	0	221
-38	0	0	0	0	0	66	66	0	1	0	133
-36	0	0	0	0	0	43	61	0	0	0	104
-34	0	0	0	0	0	34	28	0	0	0	62
-32	0	0	0	0	0	36	11	1	0	0	48
-30	0	0	0	0	0	20	15	1	0	0	36
-28	0	0	0	0	0	5	12	0	0	0	17
-26	0	0	0	0	0	0	11	7	0	0	18
-24	0	0	0	0	0	0	7	1	0	0	8
-22	0	0	0	0	0	0	2	0	0	0	2
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	0	1	239	31	0	614	835	854	288	0	2862

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 389
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 308
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 217

TOTAL NUMBER OF RECORDED ECHOES = 5074

NUMBER OF ECHOES USED FOR STATISTICS = 2862

AVERAGE BACKSCATTERING CROSS SECTION = .1132E-03 IN dB = -39.46

BACKSCATTERING CROSS SECTION STD DEV = .3531E-03

AVERAGE TARGET STRENGTH IN dB = -44.76

TARGET STRENGTH STD DEV IN dB = 5.87

/ ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 914

NUMBER OF FISH USED = 2862

FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .151E+06
DENSITY IN FISH PER CUBIC METER = .190E-01
EQUIVALENT STRATUM LENGTH (%/100) = .9200

Reading file E:\esp_nra\che9s.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 6342

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 5.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	2	18	23	26	28	24	8	21	14	11	7	4	7	1	1	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB	TO B = 1 dB	NUMBER OF ECHOES =	22
B= 1 dB	TO B = 2 dB	NUMBER OF ECHOES =	13
B= 2 dB	TO B = 3 dB	NUMBER OF ECHOES =	10

TOTAL NUMBER OF RECORDED ECHOES = 621

NUMBER OF ECHOES USED FOR STATISTICS = 195

AVERAGE BACKSCATTERING CROSS SECTION = .5181E-04 IN dB = -42.86

BACKSCATTERING CROSS SECTION STD DEV = .1064E-03

AVERAGE TARGET STRENGTH IN dB = -47.73

TARGET STRENGTH STD DEV IN dB = 6.13

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 45

NUMBER OF FISH USED = 195
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .229E+04
DENSITY IN FISH PER CUBIC METER = .853E-01
EQUIVALENT STRATUM LENGTH (%/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 5.0 TO 9.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 25 89 118 131 158 116 81 76 45 46 31 32 9 3 3 0 0 0 0 0 0 0

;

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 132
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 120
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 60

TOTAL NUMBER OF RECORDED ECHOES = 1858

NUMBER OF ECHOES USED FOR STATISTICS = 963

AVERAGE BACKSCATTERING CROSS SECTION = .4002E-04 IN dB = -43.98

BACKSCATTERING CROSS SECTION STD DEV = .8915E-04

AVERAGE TARGET STRENGTH IN dB = -48.50

TA STRENGTH STD DEV IN dB = 5.75

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 312

NUMBER OF FISH USED = 963
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .122E+05
DENSITY IN FISH PER CUBIC METER = .792E-01
EQUIVALENT STRATUM LENGTH (L/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 9.0 TO 13.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 3

TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 0 0 14 148 216 238 279 181 132 101 52 42 34 26 23 17 8 2 0 0 0 0

;

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 246
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 184
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 118

TOTAL NUMBER OF RECORDED ECHOES = 2086

NUMBER OF ECHOES USED FOR STATISTICS = 1513

AVERAGE BACKSCATTERING CROSS SECTION = .1091E-03 IN dB = -39.62

BACKSCATTERING CROSS SECTION STD DEV = .3131E-03

AVERAGE TARGET STRENGTH IN dB = -44.90

TARGET STRENGTH STD DEV IN dB = 5.60

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 548

NUMBER OF FISH USED = 1513
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .308E+05
DENSITY IN FISH PER CUBIC METER = .491E-01
EQUIVALENT STRATUM LENGTH (1/100) = 1.0000

SUMMARY OF DATA FROM DEPTH 13.0 TO 25.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 4
TS -74 -72 -70 -68 -66 -64 -62 -60 -58 -56 -54 -52 -50 -48 -46 -44 -42 -40 -38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16
0 0 0 0 0 0 0 0 0 0 0 14 105 99 88 87 49 20 11 9 16 15 12 8 9 12 7 0 0 0 0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 72
B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 66
B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 39

TOTAL NUMBER OF RECORDED ECHOES = 1479
NUMBER OF ECHOES USED FOR STATISTICS = 561
AVERAGE BACKSCATTERING CROSS SECTION = .1899E-03 IN dB = -37.21
BACKSCATTERING CROSS SECTION STD DEV = .5883E-03
AVERAGE TARGET STRENGTH IN dB = -45.66
TARGET STRENGTH STD DEV IN dB = 6.92

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 177

NUMBER OF FISH USED = 561
FULL ANGLE OF CONE = 6.00
ESTIMATED VOLUME IN CUBIC METERS = .191E+06
DENSITY IN FISH PER CUBIC METER = .294E-02
EQUIVALENT STRATUM LENGTH (1/100) = .8462

SUMMARY OF DATA FROM DEPTH 1.0 TO 25.0

DEPTH INTERVALS

FROM 1.00 3.40 5.80 8.20 10.60 13.00 15.40 17.80 20.20 22.60
TO 3.40 5.80 8.20 10.60 13.00 15.40 17.80 20.20 22.60 25.00

TS											SUM
-74	0	0	0	0	0	0	0	0	0	0	0
-72	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0
-68	0	0	0	0	0	0	0	0	0	0	0
-66	0	0	0	0	0	0	0	0	0	0	0
-64	0	0	0	0	0	0	0	0	0	0	0
-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	0	2	18	7	0	0	0	0	0	0	27
-56	5	27	45	30	0	0	0	0	0	0	107
-54	6	51	46	45	7	4	3	4	3	0	169
-52	6	56	48	124	71	26	25	19	35	0	410
-50	9	48	79	140	126	25	28	14	32	0	501
-48	11	40	60	124	143	22	26	8	32	0	466
-46	7	10	37	128	186	19	32	11	25	0	455
-44	15	10	32	109	112	10	19	6	14	0	327
-42	11	4	23	86	67	1	14	1	4	0	211
-40	11	0	29	84	34	0	6	4	1	0	169
-38	6	2	18	51	13	0	2	4	3	0	99
-36	4	1	20	41	12	1	0	14	1	0	94
-34	6	1	2	35	6	1	0	14	0	0	65
-32	1	0	0	26	3	4	0	8	0	0	42
-30	1	0	0	17	9	7	0	1	0	0	35
-28	0	0	0	1	16	9	0	0	0	0	26
-26	0	0	0	0	8	12	0	0	0	0	20
-24	0	0	0	0	2	7	0	0	0	0	9
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	99	252	457	1048	815	148	155	108	150	0	3232

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B= 1 dB NUMBER OF ECHOES = 472
B= 1 dB TO B= 2 dB NUMBER OF ECHOES = 383
B= 2 dB TO B= 3 dB NUMBER OF ECHOES = 227

TOTAL NUMBER OF RECORDED ECHOES = 6044

NUMBER OF ECHOES USED FOR STATISTICS = 3232

AVERAGE BACKSCATTERING CROSS SECTION = .9908E-04 IN dB = -40.04

BACKSCATTERING CROSS SECTION STD DEV = .3340E-03

AVERAGE TARGET STRENGTH IN dB = -46.27

TARGET STRENGTH STD DEV IN dB = 6.14

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 1082

NUMBER OF FISH USED = 3232

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .222E+06

DENSITY IN FISH PER CUBIC METER = .145E-01

***** TS Version 2.00 *****
 Dual Beam Data Reduction Program
 For ESP 281 V1.0x & V2.0x data files

CHE 95/115

NEAR 2 NOV 95

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 Serial Number 5205-V2.00-91-000

Reading file E:\esp_nra\che9s.dat

Analyzing Run # 1
 FILE NUMBER 1 = E:\esp_nra\che9s.dat
 FILE NUMBER 2 = E:\esp_nra\chells.dat

DATA GROUP REPORT FOR TRANSDUCER 1
 TOTAL NUMBER OF PINGS = 6342

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	0	0	6	6	6	10	12	7	18	12	11	7	4	6	1	1	0	0	0	0	0	0

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	16
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	9
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	6

TOTAL NUMBER OF RECORDED ECHOES = 201

NUMBER OF ECHOES USED FOR STATISTICS = 107

AVERAGE BACKSCATTERING CROSS SECTION = .8296E-04 IN dB = -40.81

BACKSCATTERING CROSS SECTION STD DEV = .1313E-03

AVERAGE TARGET STRENGTH IN dB = -44.75

TARGET STRENGTH STD DEV IN dB = 6.09

ECHOES WITH BEAM PATTERN FACTORS > 0 dB = 31

NUMBER OF FISH USED = 107
 FULL ANGLE OF CONE = 6.00
 ESTIMATED VOLUME IN CUBIC METERS = .117E+04

[illegible]

-62	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0
-58	0	0	0	1	1	0	2	6	10	7	27
-56	1	2	2	2	11	14	9	7	29	30	107
-54	3	1	2	1	16	34	12	9	25	38	141
-52	1	1	4	2	18	36	15	6	27	47	157
-50	3	3	3	2	17	29	29	36	14	50	186
-48	4	2	5	2	11	27	25	25	10	29	140
-46	2	2	3	0	1	9	12	19	6	35	89
-44	3	5	7	3	3	4	7	18	7	40	97
-42	4	3	4	2	1	1	6	13	4	21	59
-40	0	5	6	0	0	0	3	24	2	17	57
-38	2	2	2	1	0	1	6	12	0	12	38
-36	0	1	3	0	0	1	0	20	0	11	36
-34	1	0	5	0	1	0	1	1	0	7	16
-32	0	0	1	0	0	0	0	0	0	3	4
-30	0	0	1	0	0	0	0	0	0	3	4
-28	0	0	0	0	0	0	0	0	0	0	0
-26	0	0	0	0	0	0	0	0	0	0	0
-24	0	0	0	0	0	0	0	0	0	0	0
-22	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0

SUM	24	27	48	16	80	156	127	196	134	350	1158
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HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB	NUMBER OF ECHOES =	154
B= 1 dB TO B = 2 dB	NUMBER OF ECHOES =	133
B= 2 dB TO B = 3 dB	NUMBER OF ECHOES =	70

TOTAL NUMBER OF RECORDED ECHOES = 6044

NUMBER OF ECHOES USED FOR STATISTICS = 1158

AVERAGE BACKSCATTERING CROSS SECTION = .4200E-04 IN dB = -43.77

BACKSCATTERING CROSS SECTION STD DEV = .9233E-04

AVE TARGET STRENGTH IN dB = -48.37

TARGET STRENGTH STD DEV IN dB = 5.82

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 357

NUMBER OF FISH USED =	1158
FULL ANGLE OF CONE =	6.00
ESTIMATED VOLUME IN CUBIC METERS =	.133E+05
DENSITY IN FISH PER CUBIC METER =	.869E-01
EQUIVALENT STRATUM LENGTH (%/100) =	1.0000

Reading file E:\esp_nra\chells.dat

Analyzing Run # 1

DATA GROUP REPORT FOR TRANSDUCER 1

TOTAL NUMBER OF PINGS = 3697

DATA FOR FREQUENCY 420.

SUMMARY OF DATA FROM DEPTH 1.0 TO 4.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 1

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	8	6	9	18	16	14	12	9	3	0	4	0	0	0	0	0	0	0	0	0	0	0

‡

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	16
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	14
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	5

TO NUMBER OF RECORDED ECHOES = 135

NUMBER OF ECHOES USED FOR STATISTICS = 99

AVERAGE BACKSCATTERING CROSS SECTION = .2044E-04 IN dB = -46.90

BACKSCATTERING CROSS SECTION STD DEV = .3060E-04

AVERAGE TARGET STRENGTH IN dB = -49.64

TARGET STRENGTH STD DEV IN dB = 4.71

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 35

NUMBER OF FISH USED =	99
FULL ANGLE OF CONE =	6.00
ESTIMATED VOLUME IN CUBIC METERS =	.681E+03
DENSITY IN FISH PER CUBIC METER =	.145E+00
EQUIVALENT STRATUM LENGTH (‡/100) =	1.0000

SUMMARY OF DATA FROM DEPTH 6.0 TO 9.0

TARGET STRENGTH DISTRIBUTION FOR STRATUM 2

TS	-74	-72	-70	-68	-66	-64	-62	-60	-58	-56	-54	-52	-50	-48	-46	-44	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16
#	0	0	0	0	0	0	0	0	8	23	26	31	38	32	25	12	9	6	1	0	1	0	0	0	0	0	0	0	0	0

‡

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B=	0 dB	TO B =	1 dB	NUMBER OF ECHOES =	34
B=	1 dB	TO B =	2 dB	NUMBER OF ECHOES =	22
B=	2 dB	TO B =	3 dB	NUMBER OF ECHOES =	17

NUMBER OF FISH USED =	212
FULL ANGLE OF CONE =	6.00
ESTIMATED VOLUME IN CUBIC METERS =	.524E+04
DENSITY IN FISH PER CUBIC METER =	.405E-01
EQUIVALENT STRATUM LENGTH (%/100) =	.8541

DEPTH INTERVALS

[illegible]

-20	0	0	0	0	0	0	0	0	0	0	0
-18	0	0	0	0	0	0	0	0	0	0	0
-16	0	0	0	0	0	0	0	0	0	0	0
SUM	0	9	83	11	86	118	41	38	63	71	520

HISTOGRAM OF BEAM PATTERN FACTORS > 0 dB

B= 0 dB TO B = 1 dB NUMBER OF ECHOES = 77
 B= 1 dB TO B = 2 dB NUMBER OF ECHOES = 64
 B= 2 dB TO B = 3 dB NUMBER OF ECHOES = 32

TOTAL NUMBER OF RECORDED ECHOES = 1344

NUMBER OF ECHOES USED FOR STATISTICS = 520

AVERAGE BACKSCATTERING CROSS SECTION = .1636E-04 IN dB = -47.86

BACKSCATTERING CROSS SECTION STD DEV = .2592E-04

AVERAGE TARGET STRENGTH IN dB = -50.29

TARGET STRENGTH STD DEV IN dB = 4.30

ECHOES WITH BEAM PATTERN FACTORS > 0 dB= 173

NUMBER OF FISH USED = 520

FULL ANGLE OF CONE = 6.00

ESTIMATED VOLUME IN CUBIC METERS = .657E+04

DENSITY IN FISH PER CUBIC METER = .792E-01

EQUIVALENT STRATUM LENGTH (1/100) = .9351