An Example of the use of Biodiversity Data in EIAs

Workshop on Unlocking Biodiversity Data from EIAs

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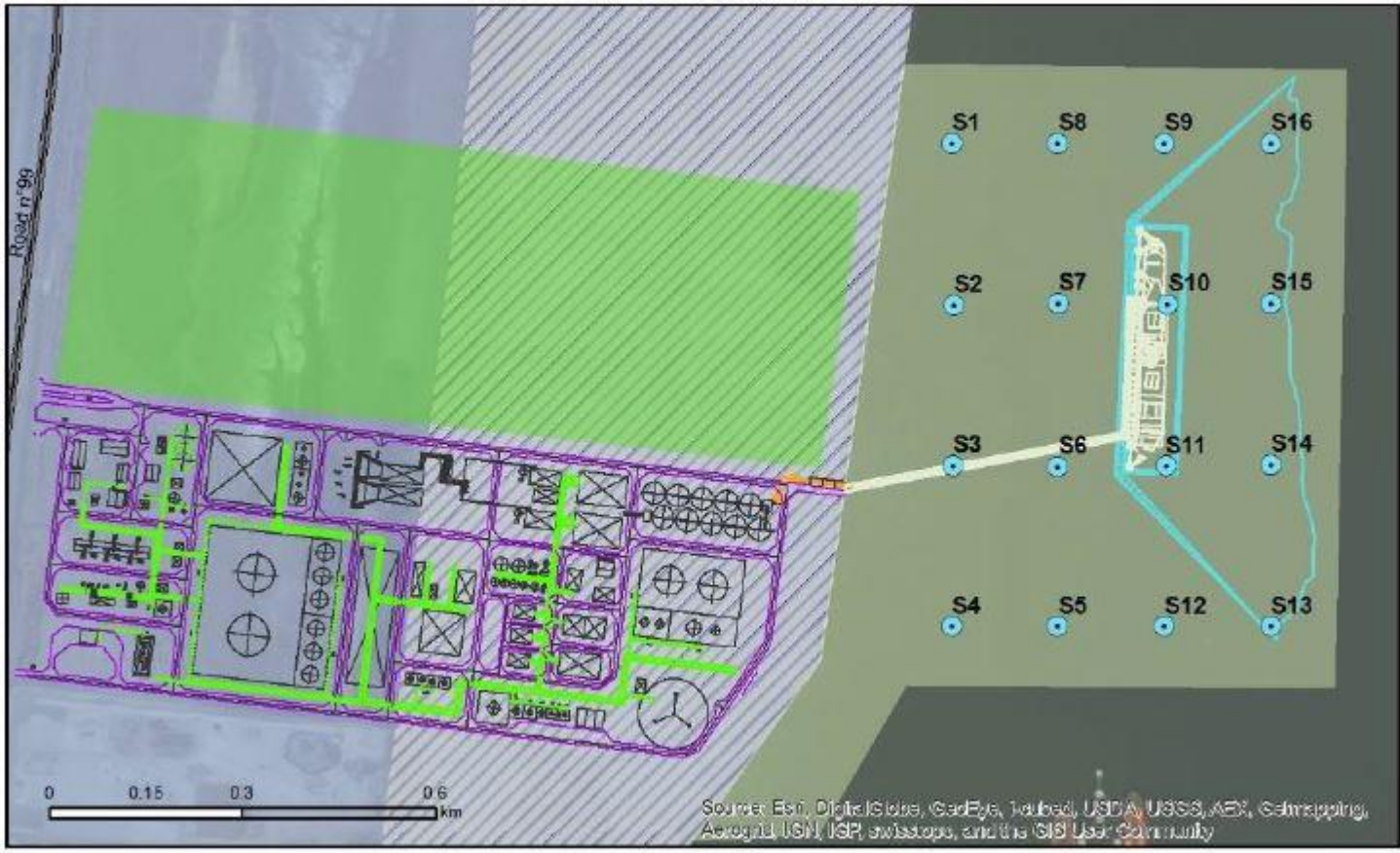
City Seasons Hotel, Muscat

Use of Biodiversity in EIA



Use of Biodiversity in EIA

Seawater Quality

Parameter	Detection Limit (µg/L)	Lab Result																		AMWQOs-EAD Legislation (µg/L)	Dubai Municipali ty-ty Limits (µg/L)	US EPA Recommended WQ Criteria	
		S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	SC3	SC4			Chronic	Acute
Aluminium	5	17	15	37	12	11	17	13	11	50	12	10	9	11	11	11	10	8	9	-	200	-	-
Arsenic	1	4.7	4.9	4.7	5.2	5.2	5.4	5.3	5.1	5.3	5.5	5.4	4.9	4.9	5.1	5.2	5.0	5.1	5.4	5	10	36	69
Cadmium	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	3	8.8	40
Chromium	3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	10	10	50	1100
Copper	3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	10	5	3.1	4.8
Lead	0.5	<0.5	<0.5	0.51	1.6	<0.5	<0.5	<0.5	0.77	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	10	-	8.1	210
Mercury	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	0.94	1.8
Nickel	3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	20	-	8.2	74
Vanadium	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	9	-	-	-
Zinc	10	20	20	20	20	20	20	10	20	20	10	<10	<10	<10	<10	<10	10	10	<10	10	20	85.6	90
Iron	5	40	30	40	20	30	30	20	30	40	20	40	20	20	20	20	20	20	20	300	200	50	3000
Manganese	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
Selenium	5	20	10	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	-	-	71	290

Above Threshold

Detected values

Detected values

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Marine Sediment Quality

		Lab Result																	NOAA SQuiRTS (Buchmann 2008)		Dutch List (2000)		Dutch Soil Remediation Circular (2009)
Parameter	Detection Limit (mg/kg)	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	SC3	SC4	ERM	ERL	Optimum	Action	Intervention Value
Aluminium	0.1	8200	9000	11000	9800	3500	5800	9800	3800	5200	6100	3900	5200	5400	9900	16000	11000	12000	6400	18000	18000	-	-	-
Arsenic	0.1	8.9	8.8	8.2	8	6.6	7.4	7.8	4.4	7.9	8.2	9.2	7.4	9.6	9	11	11	14	14	70	7.24	29	55	70
Cadmium	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	9.6	0.38	0.8	12	13
Chromium	0.1	83	98	86	75	43	68	82	45	82	72	47	58	72	83	100	120	72	45	370	49	100	380	180, 78*
Copper	0.1	9.6	9.4	9.5	7.2	4.3	6.7	7.5	4.2	6.5	9	3.2	5.7	7.2	7.6	6.5	7.7	11	8.8	390	18.7	36	190	190
Lead	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	400	-	85	530	530
Mercury	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.13	0.71	0.3	10	36, 4*
Nickel	0.1	430	450	560	340	210	300	490	180	330	340	240	240	310	570	810	540	830	420	110	15	35	210	100
Vanadium	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.1	<0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.1	-	-	42	-	-
Zinc	0.1	19.2	15.6	14	11.2	7.2	12.2	11.8	7.3	11.8	16.9	9.2	12.1	12.4	14.6	14.7	14.7	21.1	18.8	410	94	140	720	720
Boron	0.1	8.2	9.5	8.7	9.6	9.5	8.7	7.7	4.7	7.7	8.5	9.3	10	10	8.8	8.6	9.1	11	8	-	-	-	-	-
Manganese	0.1	180	170	170	150	92	140	140	83	160	150	75	120	140	170	160	170	92	74	-	260	-	-	
Tin	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	3.4	-	-	-	-

Above Threshold

Detected values

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Marine Infauna: Van veen grab, 1mm sieve, Rose Bengal

Species	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	SC3	SC4
Porifera (brown)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Actiniaria	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Phoronis sp.	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Sipunculidae	1	1	0	1	1	0	0	0	0	0	0	2	0	1	0	0	0	2
Aspidosiphonidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Platyhelminthes	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0
Nemertea	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cerebratulus sp.	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0
Aphroditidae	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Amphinomidae	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1
Sigalionidae	0	0	1	1	0	0	0	0	1	2	0	1	4	4	0	1	0	0
Phyllodocidae	0	0	0	0	2	0	0	0	0	0	0	1	0	0	3	0	0	0
Hesionidae	1	0	0	0	1	0	0	0	1	1	0	1	0	0	0	0	0	0
Glycera sp.	2	0	0	0	0	0	0	0	0	0	0	5	0	0	1	0	1	0
Cirratulidae	2	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0
Nephtys tulearensis	6	6	2	1	2	6	1	6	7	4	1	6	6	7	10	1	1	1
Poecilochaetidae	1	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	2
Eunice indica	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
Chaetopteridae	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0
Phyllochaetopterus socialis	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Onuphidae	0	0	0	2	0	1	0	0	0	0	2	7	1	0	1	0	0	0

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Marine Infauna: Statistical Analysis

PRIMER-E

Multivariate Statistics for Ecologists

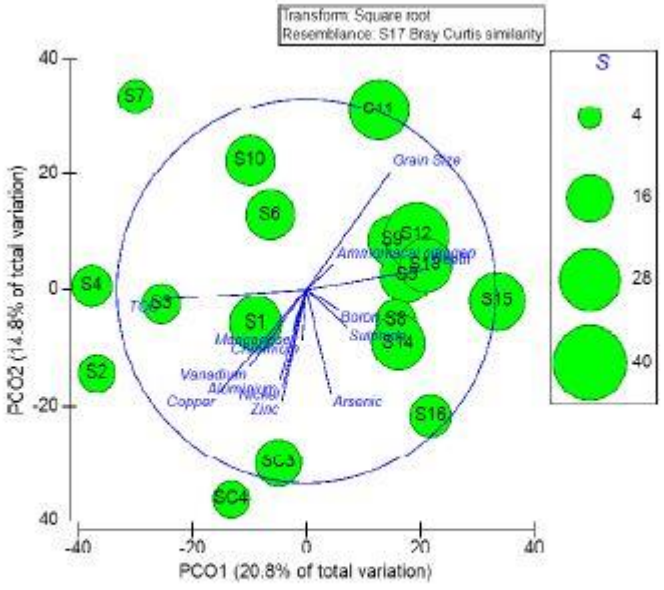

Figure 17. Diversity, species richness, and abundance of infauna at the surveyed loca
imposed by all the environmental variables.

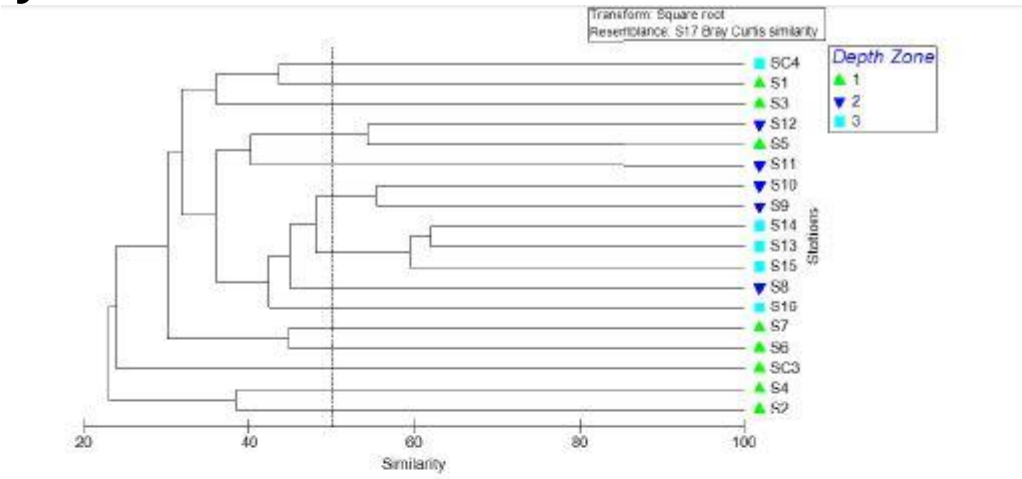

Figure 14. Cluster graph based on the infauna abundance data collected form surveyed stations, superimposed by different depth zones (1: 11-13 m, 2: 13-15 m, 3: 15-17 m).

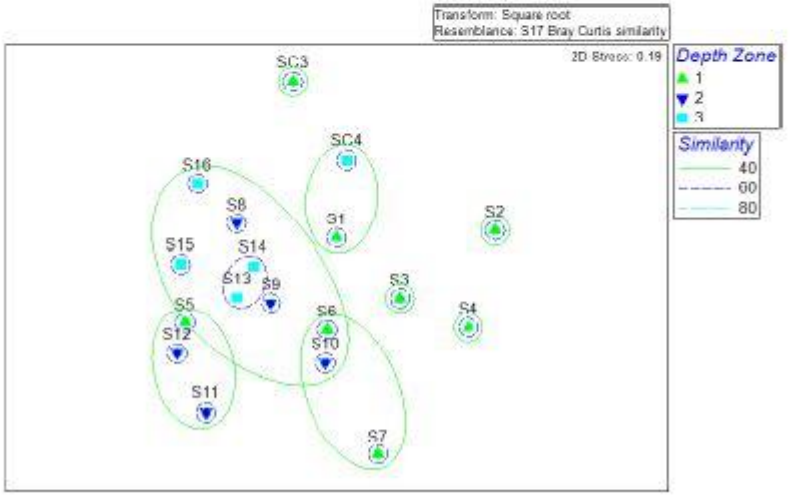

Figure 15. MDS graph based on the infauna abundance data collected form surveyed stations, superimposed by different depth zones (1: 11-13 m, 2: 13-15 m, 3: 15-17 m)

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Marine Habitat Mapping

Figure 21. Schematic habitat map constructed from the drop down video, side scan sonar data, and sediment grain size data. It is clear that the majority of the surveyed area is composed of fine sand substrates and there were some sections composed of gravelly fine sand.

Use of Biodiversity in EIA

Marine Infauna: Diagnostic Power of Marine Infauna

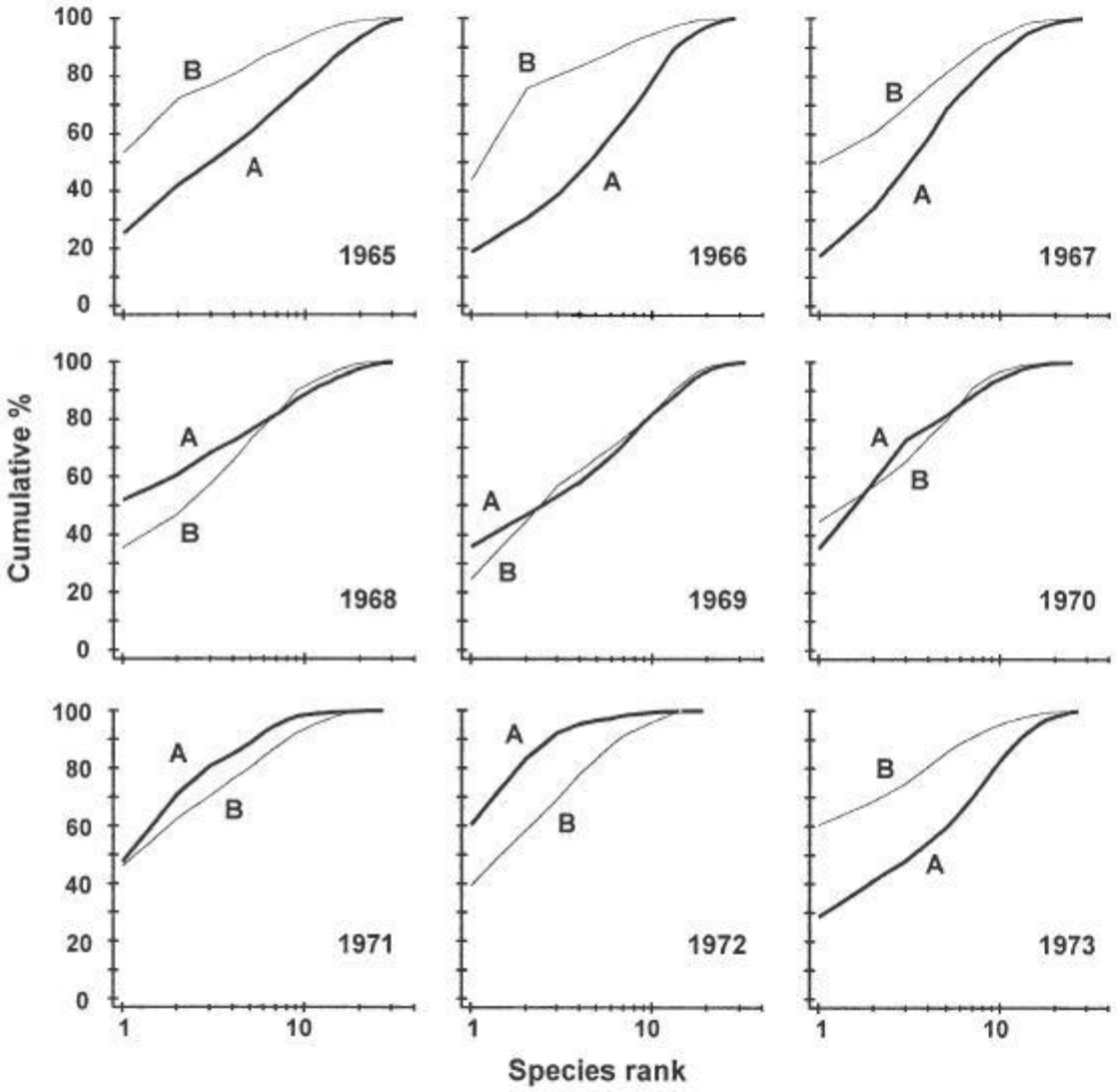

Fig. 10.7. Loch Linnhe macrofauna (L). Shannon diversity (H') and ABC plots over the 11 years, 1963 to 1973, for data aggregated to family level (c.f. Fig. 8.7). Abundance = thick line, biomass = thin line.