3FMProject

Bringing
Dublin Port
To 2040

Environmental Impact Assessment Report

Appendix 7.3

Volume 3 Part 3

COMHLACHT CHALAFORT ÁTHA CLIATH
DUBLIN PORT COMPANY

RPS
A TETRA TECH COMPANY

Third & Final
Masterplan
Project

Contents

7.3.1a Species Abundance – Dublin Port

	NOTES	B_01	B_02	B_03	B_04	B_05	B_06	B_07	B_08	B_09
PORIFERA		-	-	-	-	-	-	P	-	-
ACTINIARIA		-	-	-	-	-	-	3	-	-
NEMERTEA		-	-	-	-	-	-	1	-	-
NEMATODA		-	1	-	-	-	-	14	-	-
BARENTSIA		-	-	-	-	-	-	-	-	-
NAIDIDAE		10	-	-	-	-	2	32	-	-
TUBIFICOIDES BENEDII		-	-	-	-	-	-	-	-	1
TUBIFICOIDES PSEUDOGASTER AGG.		4	-	7	9	4	-	1	-	-
PHOLOE INORNATA		-	1	-	-	-	-	4	-	-
POLYNOIDAE		-	1	-	-	-	-	-	-	-
HARMOTHOE		-	-	-	-	-	-	2	-	-
LEPIDONOTUS SQUAMATUS		-	3	-	-	-	-	-	-	-
GLYCERA		-	-	-	-	-	-	-	-	-
WEBSTERINEREIS GLAUCA		-	-	-	-	-	-	2	-	-
EUSYLLIS BLOMSTRANDI		-	1	-	-	-	-	-	-	-
SYLLIS COLUMBRETENSIS		-	-	-	-	-	-	1	-	-
SYLLIS GRACILIS		-	-	-	-	-	-	2	-	-
ETEONE		-	-	-	-	-	-	-	-	1
ETEONE CF. LONGA		-	-	-	-	-	-	-	1	-
EUMIDA		-	1	-	-	-	-	3	-	-
PHYLLODOCE MUCOSA		-	-	-	-	-	-	5	-	1
NEPHTYS		-	-	-	-	-	-	5	-	-
NEPHTYS HOMBERGII		-	-	2	-	-	-	-	-	1
OPHRYOTROCHA		-	-	-	-	-	-	-	-	-
CAPITELLA		2	1	-	1	6	54	46	42	14
CAPITELLA	Eggs	-	P	-	P	-	P	P	P	P
MALACOCEROS		2	-	-	-	-	13	1	3	6
POLYDORA CORNUTA		-	-	2	-	3	1	-	-	-
CIRRATULIDAE		-	-	-	-	-	-	2	-	-

	NOTES	B_01	B_02	B_03	B_04	B_05	B_06	B_07	B_08	B_09
PROTOCIRRINERIS		-	-	-	-	-	-	1	-	-
THARYX		-	-	-	2	8	-	-	-	-
THARYX KILLARIENSIS		29	-	-	-	-	-	-	-	-
AMPHARETIDAE		1	-	-	-	-	-	-	-	-
AMPHARETE LINDSTROEMI AGG.		-	-	-	-	-	-	-	-	-
MELINNA		1	-	-	1	-	-	-	-	-
LAGIS KORENI		-	-	-	-	-	-	1	-	-
SABELLIDAE		1	-	-	-	-	-	8	-	-
EUCHONE LIMNICOLA		-	-	1	-	2	-	-	-	-
SPIROBRANCHUS LAMARCKI		1	6	-	-	-	-	-	-	-
SABELLARIA SPINULOSA		-	2	-	-	-	-	-	-	-
ANOPLODACTYLUS PYGMAEUS		-	-	-	-	-	-	-	-	-
THORACICA		-	2	-	-	-	-	1	-	-
COPEPODA	Parasitic	-	1	-	-	-	-	-	-	-
AUSTROMINIUS MODESTUS	Non-native	-	1	-	-	-	-	1	-	-
IPHINOE TRISPINOSA		1	-	-	-	-	-	-	-	-
AORIDAE		-	1	-	-	-	-	-	-	-
COROPHIIDAE		-	4	-	-	-	-	-	-	-
PISIDIA LONGICORNIS		-	1	-	-	-	-	5	-	-
NUDIBRANCHIA		-	1	-	-	-	-	-	-	-
BRACHYSTOMIA		-	8	-	-	-	-	-	-	-
HIATELLA ARCTICA		-	1	-	-	-	-	-	-	-
ABRA ALBA		-	-	3	2	3	5	6	1	-
THYASIRIDAE		-	-	-	-	-	1	-	-	-
MYTILIDAE	Juvenile	-	2	-	-	-	-	1	-	-
ANOMIIDAE		-	7	-	-	-	-	-	-	-
CALLOPORA DUMERILII		-	-	-	-	-	-	P	-	-
CANDIDAE		-	-	-	-	-	-	P	-	-
ELECTRIDAE		-	P	-	-	-	-	-	-	-
HAPLOPOMA		-	P	-	-	-	-	-	-	-
ALCYONIDIIDAE		-	-	-	-	-	-	-	-	-
ANTEDON BIFIDA		-	4	-	-	-	-	-	-	-
OPHIUROIDEA		-	-	-	-	-	-	1	-	-

	NOTES	B_01	B_02	B_03	B_04	B_05	B_06	B_07	B_08	B_09
OPHIOTHRIX FRAGILIS		-	1	-	-	-	-	4	-	-
ASCIDIELLA ASPERSA		-	-	-	-	-	-	6	-	-
ARACEAE		-	-	-	-	-	-	P	-	-
FOLLICULINIDAE		-	P	-	-	-	-	-	-	-

TAXON NAME	NOTES	B_11	B_12	B_13	B_14	B_15	B_16	B_17	B_18	B_19
PORIFERA		-	-	-	-	-	-	-	-	-
ACTINIARIA		-	-	-	-	-	-	-	-	-
NEMERTEA		-	-	-	-	-	-	-	-	-
NEMATODA		-	-	-	-	1	4	38	-	17
BARENTSIA		-	-	-	-	-	P	-	-	-
NAIDIDAE		-	-	-	-	-	-	22	1	-
TUBIFICOIDES BENEDII		-	-	-	-	1	2	1	-	-
TUBIFICOIDES PSEUDOGASTER AGG.		-	-	-	-	-	-	-	-	-
PHOLOE INORNATA		-	-	-	-	-	-	1	-	-
POLYNOIDAE		-	-	-	-	-	-	-	-	-
HARMOTHOE		-	-	-	-	-	-	-	-	-
LEPIDONOTUS SQUAMATUS		-	-	-	-	-	-	-	-	-
GLYCERA		-	-	-	-	-	-	1	-	-
WEBSTERINEREIS GLAUCA		-	-	-	-	-	-	-	-	-
EUSYLLIS BLOMSTRANDI		-	-	-	-	-	-	-	-	-
SYLLIS COLUMBRETENSIS		-	-	-	-	-	-	-	-	-
SYLLIS GRACILIS		-	-	-	-	-	-	-	-	-
ETEONE		-	-	-	-	-	-	-	-	-
ETEONE CF. LONGA		-	-	-	-	-	-	-	-	-
EUMIDA		-	-	-	-	-	-	-	-	-
PHYLLODOCE MUCOSA		-	-	-	-	-	-	-	-	-
NEPHTYS		-	-	-	-	1	1	-	-	1
NEPHTYS HOMBERGII		-	-	-	-	-	-	-	-	-
OPHRYOTROCHA		-	-	-	-	-	-	-	-	65
CAPITELLA		30	40	31	8	49	105	101	53	181
CAPITELLA	Eggs	P	P	-	P	P	P	P	-	P
MALACOCEROS		1	5	1	-	7	6	9	4	20
POLYDORA CORNUTA		-	-	-	-	1	-	-	-	-
CIRRATULIDAE		-	-	-	-	-	-	-	-	5
PROTOCIRRINERIS		-	-	-	-	-	-	-	-	-
THARYX		-	-	-	-	-	-	4	-	5
THARYX KILLARIENSIS		-	-	-	-	-	-	-	-	-
AMPHARETIDAE		-	-	-	-	-	-	-	-	-

TAXON NAME	NOTES	B_11	B_12	B_13	B_14	B_15	B_16	B_17	B_18	B_19
AMPHARETE LINDSTROEMI AGG.		-	-	-	-	-	-	-	-	1
MELINNA		-	-	-	-	-	-	-	-	-
LAGIS KORENI		-	-	-	-	-	-	-	-	-
SABELLIDAE		-	-	-	-	-	-	-	-	-
EUCHONE LIMNICOLA		-	-	-	-	-	-	-	-	1
SPIROBRANCHUS LAMARCKI		-	-	-	-	-	-	-	-	-
SABELLARIA SPINULOSA		-	-	-	-	-	-	-	-	-
ANOPLODACTYLUS PYGMAEUS		-	-	-	-	-	1	1	-	-
THORACICA		-	-	-	-	-	-	-	-	-
COPEPODA	Parasitic	-	-	-	-	-	-	-	-	-
AUSTROMINIUS MODESTUS	Non-native	-	-	-	-	-	-	-	-	-
IPHINOE TRISPINOSA		-	-	-	-	-	-	-	-	-
AORIDAE		-	-	-	-	-	-	-	-	-
COROPHIIDAE		-	-	-	-	-	-	-	-	-
PISIDIA LONGICORNIS		-	-	-	-	-	-	-	-	-
NUDIBRANCHIA		-	-	-	-	-	-	-	-	-
BRACHYSTOMIA		-	-	-	-	-	-	-	-	-
HIATELLA ARCTICA		-	-	-	-	-	-	-	-	-
ABRA ALBA		-	1	-	-	1	4	8	-	15
THYASIRIDAE		-	-	-	-	-	-	-	-	-
MYTILIDAE	Juvenile	-	-	-	-	-	-	-	-	-
ANOMIIDAE		-	-	-	-	-	-	-	-	-
CALLOPORA DUMERILII		-	-	-	-	-	-	-	-	-
CANDIDAE		-	-	-	-	-	-	-	-	-
ELECTRIDAE		-	-	-	-	-	-	-	-	-
HAPLOPOMA		-	-	-	-	-	-	-	-	-
ALCYONIDIIDAE		-	-	-	-	-	P	-	-	-
ANTEDON BIFIDA		-	-	-	-	-	-	-	-	-
OPHIUROIDEA		-	-	-	-	-	-	-	-	-
OPHIOTHRIX FRAGILIS		-	-	-	-	-	-	-	-	1
ASCIDIELLA ASPERSA		-	-	-	-	-	-	-	-	-
ARACEAE		-	-	P	-	-	-	-	-	P
FOLLICULINIDAE		-	-	-	-	-	-	-	-	-

7.3.1b Species Abundance – Burford Bank

	NOTES	S1	S2	S3A	S3B	S3C	S4	S5	S6	S7A	S7B	S7C
ANIMALIA	Eggs	-	-	-	-	-	-	-	-	-	-	-
ACTINIARIA		-	1	-	-	-	-	-	-	-	-	1
LEPTOTHECATA		-	P	-	-	-	P	-	-	-	-	-
CAMPANULARIIDAE		-	-	P	-	-	-	-	P	P	-	-
SERTULARIIDAE		-	P	P	-	-	-	-	P	-	-	-
PLATYHELMINTHES		-	-	-	-	-	-	-	-	-	-	-
NEMERTEA		-	2	1	-	-	1	-	-	-	-	2
NEMATODA		-	-	-	-	-	-	-	-	-	-	-
PEDICELLINA		-	-	-	-	-	-	-	-	-	-	-
PHOLOE BALTICA		-	2	1	-	-	1	-	-	-	-	-
HARMOTHOE		-	-	-	-	-	-	-	-	-	-	-
HARMOTHOE GLABRA		-	1	-	-	-	-	-	-	-	-	-
STHENELAIS LIMICOLA		-	-	-	-	-	-	-	2	1	-	1
GLYCERA ALBA		-	-	-	-	-	1	-	-	-	-	-
GLYCERA LAPIDUM		1	-	-	1	-	-	-	-	-	-	-
GLYCERA TRIDACTYLA		-	-	-	-	-	-	-	-	-	2	-
GONIADA MACULATA		-	-	-	-	-	-	-	-	-	-	-
EUNEREIS LONGISSIMA		-	-	-	-	-	-	-	-	-	-	-
EUSYLLIS BLOMSTRANDI		-	-	-	-	-	-	-	-	-	-	-
MYRIANIDA		-	-	-	-	-	-	-	-	-	-	-
ETEONE CF. LONGA		-	2	-	-	-	-	-	1	-	-	-
EUMIDA		-	2	1	-	-	-	-	-	-	1	-
PHYLLODOCE MACULATA		-	-	-	-	-	-	-	-	-	-	-
PHYLLODOCE ROSEA		-	-	-	-	-	1	-	-	1	-	-
NEPHTYS		2	-	1	5	1	-	2	-	3	2	-
NEPHTYS ASSIMILIS		-	-	-	-	-	-	-	-	-	-	-
NEPHTYS HOMBERGII		-	-	-	-	-	-	-	-	-	-	-
NEPHTYS LONGOSETOSA		-	1	-	-	-	-	-	-	-	1	-
LUMBRINERIS ANIARA AGG.		1	13	-	-	-	1	-	-	-	2	-
CAPITELLA		-	-	-	-	-	-	-	-	-	-	-
MEDIOMASTUS FRAGILIS		-	-	-	-	-	-	-	-	-	-	-

	NOTES	S1	S2	S3A	S3B	S3C	S4	S5	S6	S7A	S7B	S7C
EUCLYMENE LOMBRICOIDES		-	2	-	-	-	-	-	-	-	-	-
OPHELIA BOREALIS		-	-	-	-	-	-	1	-	-	-	-
SCOLOPLOS ARMIGER		1	-	-	-	-	-	-	-	-	-	-
SCALIBREGMA INFLATUM		-	1	-	-	-	1	-	-	-	-	-
POECILOCHAETUS SERPENS		-	-	-	-	-	-	-	-	-	-	-
POLYDORA		-	-	-	-	-	-	-	-	-	-	-
PRIONOSPIO FALLAX		-	-	-	-	-	-	-	1	-	-	-
SPIO		1	-	1	-	-	-	1	-	-	-	-
SPIOPHANES BOMBYX		-	2	1	-	-	3	-	1	1	1	1
CAULLERIELLA ALATA		3	2	-	-	-	-	-	-	1	1	-
CHAETOZONE CHRISTIEI		-	-	-	-	-	-	-	11	-	-	3
CHAETOZONE GIBBER		-	-	-	-	-	-	-	-	-	-	-
CHAETOZONE ZETLANDICA		-	2	-	-	-	-	-	2	2	2	-
THARYX KILLARIENSIS		-	-	-	-	-	1	-	-	-	-	-
AMPHARETE		-	-	-	-	-	-	-	-	-	-	-
LAGIS KORENI		1	1	1	1	-	13	-	8	-	-	2
POLYCIRRUS		-	-	2	-	1	-	-	-	-	-	-
POLYCIRRUS LATIDENS		33	-	-	-	-	-	-	-	1	-	-
LANICE CONCHILEGA		-	-	-	-	-	-	-	1	-	-	-
TEREBELLIDES EUROPAEA AGG.		-	-	-	-	-	1	-	-	-	-	-
SABELLA PAVONINA		-	-	-	-	-	-	-	-	-	-	-
SPIROBRANCHUS LAMARCKI		-	-	-	-	-	-	-	-	-	-	-
GALATHOWENIA		-	-	-	-	-	2	-	-	-	-	-
OWENIA		-	-	-	-	-	-	-	1	1	-	-
SABELLARIA SPINULOSA		-	-	-	-	-	-	-	-	-	-	-
MAGELONA ALLENI		-	-	-	-	-	1	-	-	-	-	-
MAGELONA JOHNSTONI		-	-	-	-	-	-	-	-	-	-	-
PYCNOGONIDA		-	-	-	-	-	-	-	-	-	-	-
THORACICA		-	-	-	-	-	-	-	-	-	-	-
CHIRONA HAMERI		-	-	-	-	-	-	-	-	-	-	-
BODOTRIA SCORPIOIDES		-	1	-	-	-	-	-	-	-	-	1
STENOTHOE MARINA		-	-	-	-	-	-	-	1	-	-	-
PERIOCULODES LONGIMANUS		-	-	-	-	-	-	-	1	-	-	-

	NOTES	S1	S2	S3A	S3B	S3C	S4	S5	S6	S7A	S7B	S7C
SYNCHELIDIUM MACULATUM		-	-	-	-	-	-	-	-	-	-	-
NOTOTROPIS FALCATUS		-	-	-	-	-	-	-	-	-	1	-
AMPELISCA SPINIPES		-	2	-	-	-	-	-	-	-	-	-
UROTHOE ELEGANS		-	3	-	-	-	-	-	-	-	-	-
UROTHOE MARINA		7	-	-	-	-	-	-	-	-	-	-
BATHYPOREIA ELEGANS		-	-	-	-	-	-	-	-	-	-	-
BATHYPOREIA TENUIPES		-	-	-	-	-	-	-	-	1	-	-
OTHOMAERA OTHONIS		-	1	-	-	-	-	-	-	-	-	-
ABLUDOMELITA OBTUSATA		-	-	-	-	-	-	-	-	-	-	-
AORIDAE		-	-	-	-	-	-	-	-	-	-	-
AORA GRACILIS		-	-	-	-	-	-	-	-	-	-	-
COROPHIIDAE		-	-	-	-	-	-	-	-	-	-	-
COROPHIUM VOLUTATOR		-	-	-	-	-	-	-	-	-	-	-
CENTRALOECETES		-	-	-	-	-	-	-	-	-	1	-
ERICTHONIUS PUNCTATUS		-	-	-	-	-	-	-	-	-	-	-
GAMMAROPSIS MACULATA		-	-	-	-	-	-	-	-	-	-	-
PARIAMBUS TYPICUS		-	-	-	-	-	-	-	1	-	-	-
PSEUDOPROTELLA PHASMA		-	-	-	-	-	-	-	-	-	-	-
TANAOPSIS GRACILOIDES		-	-	-	-	-	3	-	-	-	-	-
PISIDIA LONGICORNIS		-	-	-	-	-	-	-	-	-	-	-
PISIDIA LONGICORNIS	Megalopa	-	-	-	-	-	-	-	-	-	-	-
PAGURIDAE	Megalopa	-	-	-	-	-	-	-	-	-	-	-
ATELECYCLUS ROTUNDATUS	Juvenile	-	-	-	-	-	-	-	-	-	-	-
LIOCARCINUS	Juvenile	-	-	-	-	-	-	-	-	-	-	-
GASTROPODA		-	-	-	-	-	-	-	-	-	-	-
AEOLIDIOIDEA		-	-	-	-	-	-	-	-	-	-	-
ONCHIDORIS BILAMELLATA		-	-	-	-	-	-	-	-	-	-	-
EUSPIRA CATENA		1	-	-	-	-	-	-	-	-	-	-
EUSPIRA NITIDA		-	-	-	-	-	-	-	-	-	-	-
BIVALVIA		1	1	3	-	-	-	-	-	1	-	-
HIATELLA ARCTICA		-	-	-	-	-	-	-	-	-	-	-
PHARIDAE		1	-	-	-	-	-	-	-	-	-	-
ENSIS		-	-	-	-	-	-	-	-	-	-	1

	NOTES	S1	S2	S3A	S3B	S3C	S4	S5	S6	S7A	S7B	S7C
PHAXAS PELLUCIDUS		-	-	-	-	-	2	-	-	-	-	-
ABRA		-	-	-	-	-	-	-	-	2	-	-
ABRA ALBA		-	-	-	-	-	-	-	3	-	-	1
ABRA PRISMATICA		-	-	-	-	-	-	-	-	-	1	-
FABULINA FABULA		-	-	-	-	-	-	-	1	-	-	1
KURTIELLA BIDENTATA		-	3	8	-	-	2	-	1	-	-	-
MYIDAE		-	-	-	-	-	-	-	-	-	-	-
BARNEA CANDIDA		-	-	-	-	-	-	-	-	-	-	-
MYTILUS EDULIS AGG.	Juvenile	-	-	-	-	-	-	-	1	-	-	1
NUCULA		-	2	2	-	-	-	-	-	-	-	-
NUCULA NITIDOSA		-	-	-	-	-	-	-	-	-	-	-
ANOMIIDAE		-	-	-	-	-	-	-	-	-	-	-
AEQUIPECTEN OPERCULARIS	Juvenile	-	-	-	-	-	-	-	-	-	-	-
MACTRA		-	-	1	-	-	-	-	-	-	-	-
SPISULA		18	-	-	1	-	-	-	-	-	-	1
SPISULA ELLIPTICA		-	-	-	-	-	-	-	-	3	-	-
TAPETINAE		-	-	-	-	-	-	-	-	-	-	-
CHAMELEA STRIATULA		-	-	-	-	-	-	-	-	-	-	-
DOSINIA		2	-	-	-	-	-	-	-	-	-	-
THRACIA		-	1	-	-	-	2	-	-	-	1	-
CONOPEUM RETICULUM		-	-	-	-	-	-	-	-	-	-	-
ELECTRA MONOSTACHYS		-	-	-	-	-	-	-	-	-	-	-
ELECTRA PILOSA		-	P	P	-	-	-	-	P	-	-	-
EUCRATEA LORICATA		-	-	-	-	-	-	-	-	P	-	-
ALCYONIDIUM PARASITICUM		-	P	-	-	-	-	-	P	-	-	-
PHORONIS		-	-	-	-	-	1	-	-	-	-	-
ASTEROIDEA	Juvenile	-	-	-	-	-	-	-	-	-	-	-
ASTERIAS RUBENS		-	-	-	-	-	-	-	-	-	-	-
ECHINIDEA	Juvenile	-	-	-	-	-	-	-	-	-	-	-
SPATANGOIDA	Juvenile	-	-	-	-	-	-	-	-	-	-	-
ECHINOCARDIUM CORDATUM		-	-	-	-	-	-	-	-	-	-	-
ACROCNIDA BRACHIATA		-	-	-	-	-	6	-	-	-	-	-
AMPHIURA FILIFORMIS		-	2	2	-	-	6	-	-	-	-	-

	NOTES	S1	S2	S3A	S3B	S3C	S4	S5	S6	S7A	S7B	S7C
OPHIOTHRIX FRAGILIS		-	-	-	-	-	-	-	1	-	-	-
OPHIURA ALBIDA		-	-	-	-	-	-	-	1	-	-	-
POLYCARPA FIBROSA		-	-	-	-	-	-	-	-	-	-	-

	NOTES	S8	S9	S10A	S10B	S10C	S11A	S11B	S11C	S12A	S12B	S12C
ANIMALIA	Eggs	-	-	-	-	-	-	P	P	-	-	-
ACTINIARIA		-	-	-	-	-	-	52	5	-	-	-
LEPTOTHECATA		-	-	-	-	-	-	-	-	-	-	-
CAMPANULARIIDAE		-	P	P	-	-	-	P	P	-	-	-
SERTULARIIDAE		-	-	-	-	-	-	P	-	-	P	-
PLATYHELMINTHES		-	-	-	-	-	-	8	2	-	-	-
NEMERTEA		-	-	3	1	1	-	1	-	-	1	2
NEMATODA		-	-	-	-	-	-	5	-	-	-	-
PEDICELLINA		-	P	-	-	-	-	-	-	-	-	-
PHOLOE BALTICA		-	-	-	-	1	-	-	-	-	-	-
HARMOTHOE		-	-	-	-	-	-	10	2	-	-	-
HARMOTHOE GLABRA		-	1	-	-	-	-	-	-	-	-	-
STHENELAIS LIMICOLA		-	-	1	-	1	-	-	-	2	-	-
GLYCERA ALBA		-	-	-	-	-	1	-	-	-	-	-
GLYCERA LAPIDUM		-	1	-	-	-	-	-	-	-	-	-
GLYCERA TRIDACTYLA		-	-	-	-	-	-	-	-	-	-	-
GONIADA MACULATA		-	-	-	-	-	-	-	-	-	-	1
EUNEREIS LONGISSIMA		-	-	-	-	-	-	8	-	-	-	-
EUSYLLIS BLOMSTRANDI		-	-	-	-	-	-	8	1	-	-	-
MYRIANIDA		-	-	-	-	-	-	-	1	-	-	-
ETEONE CF. LONGA		-	-	1	-	-	-	-	-	-	-	-
EUMIDA		-	-	-	-	-	-	2	-	1	-	-
PHYLLODOCE MACULATA		-	-	-	-	-	-	19	3	-	-	-
PHYLLODOCE ROSEA		-	-	-	1	-	-	-	-	1	-	-
NEPHTYS		1	-	1	-	-	2	-	-	-	7	4
NEPHTYS ASSIMILIS		-	-	1	-	-	-	-	-	-	-	-
NEPHTYS HOMBERGII		-	-	-	-	2	-	-	-	-	-	-
NEPHTYS LONGOSETOSA		-	-	-	-	-	-	-	-	-	-	-
LUMBRINERIS ANIARA AGG.		-	3	3	-	3	-	-	-	-	-	-
CAPITELLA		-	-	-	-	-	-	30	-	-	-	-
MEDIOMASTUS FRAGILIS		-	-	-	-	-	-	-	1	-	-	-
EUCLYMENE LOMBRICOIDES		-	-	-	-	-	-	-	-	-	-	-
OPHELIA BOREALIS		-	-	-	-	-	-	-	-	-	-	1

	NOTES	S8	S9	S10A	S10B	S10C	S11A	S11B	S11C	S12A	S12B	S12C
SCOLOPLOS ARMIGER		-	-	-	-	-	-	-	-	-	-	-
SCALIBREGMA INFLATUM		-	-	2	-	4	-	-	-	1	-	-
POECILOCHAETUS SERPENS		-	-	1	-	-	-	-	-	-	-	-
POLYDORA		-	-	-	-	-	-	-	1	-	-	-
PRIONOSPIO FALLAX		-	-	-	-	-	-	-	-	-	-	-
SPIO		-	-	-	-	-	-	-	-	-	-	-
SPIOPHANES BOMBYX		1	-	1	1	2	-	-	8	4	4	2
CAULLERIELLA ALATA		-	1	-	-	-	-	-	-	-	-	-
CHAETOZONE CHRISTIEI		1	-	2	3	-	-	-	-	-	1	1
CHAETOZONE GIBBER		-	-	-	-	1	-	-	-	-	-	-
CHAETOZONE ZETLANDICA		-	-	-	-	1	-	-	-	1	1	-
THARYX KILLARIENSIS		-	-	-	-	-	-	-	-	-	-	-
AMPHARETE		-	-	-	-	-	-	1	-	-	-	-
LAGIS KORENI		-	2	1	-	-	-	-	3	2	-	-
POLYCIRRUS		-	-	-	-	-	-	-	-	-	-	-
POLYCIRRUS LATIDENS		-	-	-	-	-	-	-	1	-	5	-
LANICE CONCHILEGA		-	-	-	-	1	-	1	-	-	-	-
TEREBELLIDES EUROPAEA AGG.		-	-	-	-	-	-	-	-	-	-	-
SABELLA PAVONINA		-	-	-	-	-	-	1	-	-	-	-
SPIROBRANCHUS LAMARCKI		-	1	-	1	-	-	1	4	-	-	-
GALATHOWENIA		-	-	-	-	-	-	-	-	-	-	-
OWENIA		-	-	1	-	-	-	-	-	-	-	-
SABELLARIA SPINULOSA		-	-	-	-	-	-	2	2	-	-	-
MAGELONA ALLENI		-	-	-	-	-	-	-	-	-	-	-
MAGELONA JOHNSTONI		-	-	-	-	-	-	-	-	-	1	-
PYCNOGONIDA		-	-	-	-	-	-	1	-	-	-	-
THORACICA		-	5	4	-	-	-	-	-	-	-	-
CHIRONA HAMERI		-	-	-	-	-	-	127	8	-	-	-
BODOTRIA SCORPIOIDES		1	-	-	-	-	-	-	1	-	-	-
STENOTHOE MARINA		-	-	-	-	-	-	-	-	-	-	-
PERIOCULODES LONGIMANUS		-	-	-	-	-	-	-	-	-	-	-
SYNCHELIDIUM MACULATUM		-	-	-	-	-	-	-	-	-	1	-
NOTOTROPIS FALCATUS		-	-	-	1	-	-	-	-	-	1	-

	NOTES	S8	S9	S10A	S10B	S10C	S11A	S11B	S11C	S12A	S12B	S12C
AMPELISCA SPINIPES		-	1	-	1	1	-	-	2	-	-	-
UROTHOE ELEGANS		-	1	-	-	-	-	-	-	-	-	-
UROTHOE MARINA		-	-	-	-	-	-	-	-	-	-	-
BATHYPOREIA ELEGANS		-	-	-	-	-	2	-	-	-	-	2
BATHYPOREIA TENUIPES		-	-	1	-	1	-	-	-	-	-	1
OTHOMAERA OTHONIS		-	-	-	-	-	-	-	-	-	-	-
ABLUDOMELITA OBTUSATA		-	2	-	2	-	-	-	1	-	-	-
AORIDAE		-	2	-	-	-	-	-	-	-	-	-
AORA GRACILIS		-	-	-	-	-	-	3	1	-	-	-
COROPHIIDAE		-	-	-	-	-	-	1	-	-	-	-
COROPHIUM VOLUTATOR		-	1	-	-	-	-	-	-	-	-	-
CENTRALOECETES		-	-	-	-	-	-	-	-	-	-	-
ERICTHONIUS PUNCTATUS		-	-	-	-	-	-	3	-	-	-	-
GAMMAROPSIS MACULATA		-	-	-	-	-	-	-	3	-	-	-
PARIAMBUS TYPICUS		-	-	-	-	-	-	-	-	-	-	-
PSEUDOPROTELLA PHASMA		-	-	-	1	-	-	-	-	-	-	-
TANAOPSIS GRACILOIDES		-	-	-	-	-	-	-	-	-	-	-
PISIDIA LONGICORNIS		-	1	-	-	-	-	9	2	-	-	-
PISIDIA LONGICORNIS	Megalopa	-	1	-	-	-	-	6	1	-	-	-
PAGURIDAE	Megalopa	-	1	-	-	-	-	-	-	-	-	-
ATELECYCLUS ROTUNDATUS	Juvenile	-	-	-	-	-	-	-	1	-	-	-
LIOCARCINUS	Juvenile	-	-	-	1	-	-	-	-	-	-	-
GASTROPODA		-	-	-	-	-	1	-	-	-	-	-
AEOLIDIOIDEA		-	-	-	-	-	-	2	-	-	-	-
ONCHIDORIS BILAMELLATA		-	2	-	-	-	-	3	2	-	-	-
EUSPIRA CATENA		-	-	-	-	-	-	-	-	-	-	-
EUSPIRA NITIDA		-	-	-	-	1	-	-	-	1	-	-
BIVALVIA		-	-	-	-	-	-	-	-	-	-	-
HIATELLA ARCTICA		-	-	-	-	-	-	40	-	-	-	-
PHARIDAE		-	-	-	-	-	-	-	-	-	1	-
ENSIS		-	-	-	-	-	-	-	1	-	-	-
PHAXAS PELLUCIDUS		-	-	-	-	-	-	-	-	-	-	-
ABRA		-	-	-	-	-	-	-	1	-	-	-

	NOTES	S8	S9	S10A	S10B	S10C	S11A	S11B	S11C	S12A	S12B	S12C
ABRA ALBA		-	-	-	-	-	-	-	-	4	-	-
ABRA PRISMATICA		-	-	-	-	-	-	-	-	-	-	1
FABULINA FABULA		3	-	-	-	-	-	-	-	3	-	-
KURTIELLA BIDENTATA		-	-	11	-	25	-	-	-	-	-	-
MYIDAE		-	-	-	-	-	-	3	3	-	-	-
BARNEA CANDIDA		-	2	-	-	-	-	-	-	-	-	-
MYTILUS EDULIS AGG.	Juvenile	-	2	-	-	-	-	360	69	-	-	-
NUCULA		-	-	1	-	1	-	-	-	-	-	-
NUCULA NITIDOSA		-	-	-	-	1	-	-	-	-	-	-
ANOMIIDAE		-	-	-	-	-	-	10	3	-	-	-
AEQUIPECTEN OPERCULARIS	Juvenile	-	-	-	-	-	-	2	1	-	-	-
MACTRA		-	-	-	1	1	-	-	-	-	-	-
SPISULA		-	-	-	-	-	-	-	2	1	1	-
SPISULA ELLIPTICA		-	-	-	-	-	-	-	-	-	-	-
TAPETINAE		-	-	-	-	-	-	12	5	-	-	-
CHAMELEA STRIATULA		-	-	1	-	-	-	-	-	-	-	-
DOSINIA		-	-	-	-	-	-	-	-	-	-	-
THRACIA		-	-	-	-	-	-	-	-	-	-	-
CONOPEUM RETICULUM		-	-	P	-	-	-	P	P	-	-	-
ELECTRA MONOSTACHYS		-	-	P	-	-	-	-	-	-	-	-
ELECTRA PILOSA		-	P	-	-	-	-	P	P	-	-	-
EUCRATEA LORICATA		-	-	-	-	-	-	-	-	-	-	-
ALCYONIDIUM PARASITICUM		-	-	-	-	-	-	P	-	P	-	-
PHORONIS		-	-	2	-	-	-	-	-	-	1	-
ASTEROIDEA	Juvenile	-	-	-	-	-	-	-	1	-	-	-
ASTERIAS RUBENS		-	-	-	-	-	-	1	-	-	-	-
ECHINIDEA	Juvenile	-	-	-	-	-	-	10	4	-	-	-
SPATANGOIDA	Juvenile	-	-	-	-	-	-	-	1	-	-	-
ECHINOCARDIUM CORDATUM		-	-	-	1	1	-	-	-	-	-	-
ACROCNIDA BRACHIATA		-	-	-	-	1	-	-	-	-	-	-
AMPHIURA FILIFORMIS		-	-	6	2	8	-	-	-	-	-	-
OPHIOTHRIX FRAGILIS		-	-	-	-	-	-	-	-	-	-	-
OPHIURA ALBIDA		-	-	1	-	-	-	1	-	-	-	-

	NOTES	S8	S9	S10A	S10B	S10C	S11A	S11B	S11C	S12A	S12B	S12C
POLYCARPA FIBROSA		-	-	1	-	-	-	-	1	-	-	-

7.3.1c Trawl Images – July 2022

Appendix 7.1-1 Trawl A (full contents)

Appendix 7.1-2 Trawl A – Deadman's Fingers removed

Appendix 7.1-3 Trawl B (full contents)

Appendix 7.1-4 Trawl C (full contents)

Appendix 7.1-5 Trawl D1 (full contents)

Appendix 7.1-6 Trawl D2 (full contents)

Appendix 7.1-7 Trawl D2 – Thornback ray (*Raja clavata*)

Appendix 7.1-8 Trawl E (full contents)

Appendix 7.1-9 Trawl F (full contents)

Appendix 7.1-10 Trawl G (full contents)

7.3.1d Intertidal Reef Survey – Howth February 2021

The Rockabill to Dalkey Island SAC includes intertidal reefs as one of its conservation objectives. Supporting documentation for the conservation objectives, specifically Marine Habitats and Species, Version 1 -April 2013, available on the NPWS website, refer to the: *INTERTIDAL REEF COMMUNITY COMPLEX This reef community complex is recorded on the islands within this site and on the south coast of Howth. The exposure regime of the complex ranges from exposed to moderately exposed reef (*Appendix 7.2-2*). Exposed reef is recorded on the east side of Dalkey Island, on the east and southern shores of Ireland's Eye and on all shores of Rockabill and the Muglins. Moderately exposed reef occurs on the western shores of Dalkey and at Howth and Ireland's Eye. The substrate here is that of flat and sloping bedrock; around Rockabill cobbles and boulders occur on bedrock. Vertical cliff faces are found on the north and northeast shores of Ireland's Eye; steep shorelines are a feature of Rockabill, Muglins and the eastern shore of Dalkey Island.*

As part of the 3FM assessment the potential impacts of dredge spoil disposal at the licenced dumpsite in Dublin Bay, surveys were undertaken at the designated intertidal reefs on Howth Head and Ireland's Eye to see if there was any evidence that they were being adversely impacted by the spoil disposal. Two walk-over surveys were undertaken on the southern shore of Howth Head, which contains the nearest reefs to the dumpsite. The first survey was undertaken in February 2021 at a time when there was spoil from the ABR dredging being disposed of and again in August 2022, a little farther east along the shore from the 2021 survey. A third survey was undertaken, also in August 2022, on the south and southern eastern side of Ireland's Eye, again within the designated reef area and immediately adjoining. The 2022 surveys were undertaken at a time when spoil wasn't being disposed of at the dumpsite.

A.1.1.1 Howth – February 2021

The Rockabill to Dalkey Island SAC (site code: 3000) includes intertidal and subtidal reefs as part of its conservation objectives. The nearest location of these habitats to the Dublin Bay licensed dredge spoil disposal site is Howth Head, where the NPWS supporting documentation indicate the presence of intertidal reefs. Detailed dispersion modelling undertaken by RPS, for the ABR EIAR (RPS, 2020), clearly indicated that there would be no deposition from disposal events on the dumpsite and the Annex I reef habitats in the SAC. In order to help corroborate the model's findings, a general walk-over survey was undertaken of the southern shore of Howth Head in the areas indicated by the NPWS 2013 documents that intertidal reefs existed. It was decided to do this survey toward the end of the six-month (October-March) capital dredge programme for 2020/2021, the idea being that if any sedimentation or siltation was likely to be present it should be noticeable after 5 months of continuous dredging. The survey was undertaken on February 27th, 2021 during low water of spring tides in calm conditions.

Just under 2km of shoreline were walked (Appendix 7.2-1) from 53.36795°, -6.09176° to 53.36149°, -6.07437°. The shore was steep and relatively short comprising a rocky intertidal and sub-littoral fringe of boulders and bedrock giving way to an extensive sandy bottom beyond. The shoreline was very jagged with numerous smaller and larger bedrock outcrops which gave way in the lower shore and the shallow sub-littoral to an extensive boulder field (Appendix 7.2-3). The rock was weathered and hard, described by the GSI as a 'quartzite & mudstone melange of the Drumleck Formation'.

Shoreline Description

The upper part of the shore, i.e. the supralittoral, had a well-developed yellow and grey lichen zone which gave way below to a well-defined bank of the black lichen *Verrucaria maura* in the upper littoral (Appendix 7.2-3), below this the mid-shore was dominated by scattered barnacles and limpets (Appendix 7.2-4), with no fucoid zone. The lower shore saw serrated wrack (*Fucus serratus*) forming a narrow, loose zone which merged into an infralittoral fringe dominated by boulders where kelp abounded (Appendix 7.2-5). In places just above the *Fucus serratus* zone or merging into it, in areas where it wasn't present, a distinct zone of red algae was present dominated by *Mastocarpus stellatus* and *Osmunda pinnatifida*, with varying amounts of *Chondrus crispus*, *Lomentaria articulata*, [1]*Ceramium* sp. and *Corallina* sp., depending on the location (Appendix 7.2-5). Within the lower shore *F. serratus* zone other algae including *Palmaria palmata*, *Cryptopleura ramosa, Membranoptera alata* and *Cladophora rupestris* were very frequently encountered. Less common were species such as *Furcellaria lumbricalis*, *Delesseria sanguinea* and *Dilsea carnosa*. The infralittoral fringe of boulders were dominated by kelp, *particularly Laminaria digitata* but with *L. hyperborea* also frequently present, often with *Palmaria palmata* as an epiphyte (Appendix 7.2-6). At the start of the walkover i.e. toward the north eastern end, very occasional *Saccharina latissima* were also noted, suggesting that this part of the shore is less exposed. The infralittoral fringe boulders were often covered with encrusting calcareous red algae along with frequent extensive covering of sponges, mainly *Halichondria panicea* but also other species e.g. *Amphilectus fucorum* (Appendix 7.2-6).

Within the mid-shore and lower shore, molluscs such as *Littorina saxatilis/rudis*, *Nucella lapillus* and [2]*Steromphala umbilicalis* occurred frequently. In the lower shore*, Littorina obtusata/mariae* and *Steromphala cineraria* were also frequently noted. Lower intertidal rock crevices, overhangs and the sides of sheltered vertical rock also contained algae such as *Plumaria plumosa* and *Lomentaria articulata*, (*Actinia equina*) sponges such as *Hymeniacidon perleve*, *Eurypon major* (?) and *Ophlitaspongia papilla*, hydroids (*Dynamena pumila*) (Appendix 7.2-7) The undersides of boulders in the extreme lower intertidal / shallow subtidal contained a very varied encrusting fauna of sponges, bryozoans, colonial tunicates (*Lissoclinum perforatum*, *Botryllus schlosseri*), barnacles (*Balanus crenatus* and *Verruca stroemia*), molluscs (*Anomia* sp.) and tubeworms (*Spirorbis* sp., *Pomatocerus* sp.) (Appendix 7.2-8)

During the survey there were no signs of silt deposition anywhere on the shore. On the day, in the very lower intertidal there was a cloudiness in the water which may well have related to resuspension of bottom sediments due to onshore breezes coming of the adjoining sandy bottom. Some rock pools, also in the very lower part of the shore also exhibited a slight cloudiness which may have derived from the same source. Dredge spoil disposal was being undertaken during this period, so the possibility that the turbidity was linked to that activity cannot be ruled out. It is important to note however that dispersion modelling undertaken for the 3FM project suggests that if that were the case that the suspended solids concentrations involved would be close to zero, something which seems to be confirmed by the diversity of this shoreline flora and fauna observed during the survey.

[1] Mainly thought to be C. virgatum
[2] This genus was formally known as Gibbula

Habitat Classification

The shore can be described as semi-exposed to exposed, with exposure seeming to increase gradually from the north west to the south east along the survey route. Overlain on this was the very indented nature of the shoreline and varied shoreline substrates which result in a broad range of microhabitats along the shore, as well as localised variations in exposure. Upper and middle sections of the shore are only poorly to moderately diverse which isn't untypical for such shores, whereas the lower intertidal dominated by *Fucus serratus* and red algae grading into an upper sublittoral/infralittoral boulder zone dominated by kelp is very diverse both in terms of flora and fauna. Using the JNCC Habitat Classifications system, a number of habitat types were identified which are described in the following paragraphs.

Upper-Mid Intertidal

LR.HLR.MusB.Sem.Sem: *Semibalanus balanoides*, *Patella vulgata* and *Littorina* spp. on exposed to moderately exposed or vertical sheltered eulittoral rock.

Description

Very exposed to sheltered mid to upper eulittoral bedrock and large boulders characterised by dense barnacles *Semibalanus balanoides* and the limpet *Patella vulgata*. The community has a relatively low diversity of species though occasional cracks and crevices in the rock can provide a refuge for small individuals of the mussel *Mytilus edulis*, the winkle *Littorina* spp. and the whelk *Nucella lapillus*. Seaweeds are usually not found in high numbers though fissures and crevices in the bedrock can hold a sparse algae community, though patches of the red seaweed *Osmundea pinnatifida* can be present throughout the zone. On some shores the olive green lichen *Verrucaria mucosa* can be present in some abundance (Frequent). Records should not be assigned to this species impoverished biotope if there is a significant number or abundance of seaweeds.

Situation

On very exposed to exposed shores *Chthamalus* spp. (see Cht.Cht for geographical variation) often forms a distinct white band above a darker band of *S. balanoides* in the mid eulittoral zone. Alternatively, found above Sem are the black lichen *Verrucaria maura* dominated biotopes (Ver.Ver or Ver.B). In the lower eulittoral and the sublittoral fringe is a community dominated by the wrack *Himanthalia elongata* and various red seaweeds including *Corallina officinalis*, *Mastocarpus stellatus* and *Osmundea pinnatifida* (Him; Coff; Osm) or the mussel and barnacle dominated biotope MytB. Sem.Sem may occur on steep and vertical faces on more sheltered shores, while fucoids dominate the flatter areas (Sem.FvesR; FvesB).

Lower Intertidal:

LR.HLR.FR.Mas: *Mastocarpus stellatus* and *Chondrus crispus* on very exposed to moderately exposed lower eulittoral rock.

Description

Exposed to moderately exposed lower eulittoral vertical to almost horizontal bedrock characterised by a dense turf of *Mastocarpus stellatus* and *Chondrus crispus* (either together or separately). Beneath these foliose seaweeds the rock surface is covered by encrusting coralline algae and the barnacle *Semibalanus balanoides*, the limpet *Patella vulgata* and spirorbid polychaetes. Other seaweeds including the red *Lomentaria articulata* and *Osmundea pinnatifida*, *Palmaria palmata*, *Corallina officinalis* and coralline crusts. The wrack *Fucus serratus* and the green seaweeds *Enteromorpha intestinalis* and *Ulva lactuca* may also be present though

usually at a low abundance. Although both *M. stellatus* and *C. crispus* are widespread in the lower eulittoral and the sublittoral fringe, they occur only infrequently in a distinct band, or in large enough patches, to justify separation from Fser.R. Consequently, where only small patches of these species occur within a larger area of mixed red algal turf, then records should be assigned to more general mixed red algal turf biotope (Coff; Him). *M. stellatus* can be present in high abundance in a number of biotopes (Coff: Him; Fser.R etc.) found on the shore. At least one other species normally co-dominates, and records should be assigned to the appropriate biotope. Caution should be taken regarding the characterising species list due to the low number of records. More information needed to validate this description.

Situation

This biotope can form a band above the main kelp zone, above *Alaria esculenta* (Ala) or the mussel *Mytilus edulis* (MytB) or within a *F. serratus*-red algal mosaic (Fser.R).

LR.MLR.BF.Fser.R: *Fucus serratus* and red seaweeds on moderately exposed lower eulittoral rock.

Description

Moderately exposed lower eulittoral bedrock characterised by mosaics of the wrack *Fucus serratus* and turf-forming red seaweeds including *Osmundea pinnatifida*, *Mastocarpus stellatus* or *Corallina officinalis*. The hydroid *Dynamena pumila* can occur in dense populations on the *F. serratus* fronds whilst the sponge *Halichondria panicea* can cover the bedrock beneath. Underneath the canopy a number of other red seaweeds may be present including *Palmaria palmata*, *Lomentaria articulata*, *Membranoptera alata* and *Chondrus crispus*. Green seaweeds such as *Cladophora rupestris*, *Enteromorpha intestinalis* and *Ulva lactuca* are present though usually in small numbers. In addition, such shores provide a greater number of permanently damp refuges between the stones and underneath the seaweed canopy. Within these micro-habitats species such as the limpet *Patella vulgata*, the barnacle *Semibalanus balanoides* or the whelk *Nucella lapillus* can be found in lower abundance than higher up the shore. If a few boulders are present, then the winkle *Littorina littorea* and the crab *Carcinus maenas* can be found on, or underneath, the boulders.

Situation

Above the *F. serratus* biotope on moderately exposed bedrock shores is the *Fucus vesiculosus* and/or *S. balanoides* and *P. vulgata* dominated biotopes (Sem; Sem.FvesR; FvesB). On more sheltered shores are biotopes dominated by the wracks *F. vesiculosus* and *Ascophyllum nodosum* (Fves; Asc.FS). On moderately exposed shores, the sublittoral fringe below Fser is dominated by the kelp *Laminaria digitata* and on vertical faces the kelp *Alaria esculenta* may be present (Ldig.LdigBo; Ala.Ldig). On more sheltered shores the kelp *Laminaria saccharina* is found among the *L. digitata* (Lsac.Ldig; Lsac.Ft).

LR.MLR.BF.Fser.Bo: *Fucus serratus* and under-boulder fauna on exposed to moderately exposed lower eulittoral boulders.

Description

Exposed to moderately exposed lower eulittoral boulders with the wrack *Fucus serratus* community of a high species richness as the presence of the boulders increases the micro-habitat diversity. The upper surfaces of the boulders are colonised by a very similar fauna to the other *F. serratus* biotopes, including species such as the limpet *Patella vulgata*, the whelk *Nucella lapillus*, the anemone *Actinia equina* and the barnacle *Semibalanus balanoides*. The shaded sides of the boulders are, depending on environmental conditions, often colonised by a variety of foliose red seaweeds, including *Mastocarpus stellatus*, *Lomentaria articulata*, *Osmundea pinnatifida*,

Palmaria palmata and *Chondrus crispus*. Coralline algae such as *Corallina officinalis* and coralline crusts, as well as the green seaweeds *Enteromorpha intestinalis* and *Ulva lactuca*, can be found underneath the *F. serratus* canopy or in patches on the boulders. The species composition underneath the boulders varies considerably depending on the underlying substratum. On muddy shores the fauna living under the boulders may be limited to a few infaunal species, such as the polychaete *Cirratulus cirratus*. Where more space is available beneath the boulders there may be a rich assemblage of animals. Characteristic mobile species include the crabs *Porcellana platycheles* and *Carcinus maenas*. Also present on, and beneath, the boulders are the tube-forming polychaete *Spirobranchus triqueter*, spirorbid polychaetes and a few winkles such as *Littorina obtusata/mariae* and *Littorina littorea* or even the top shell *Gibbula cineraria*. Encrusting colonies of the sponge *Halichondria panicea* are also typical of the undersides of boulders, while the hydroid *Dynamena pumila* colonies can be found on the *F. serratus* fronds. The richest examples of this biotope also contain a variety of brittlestars, ascidians and small hydroids.

Extreme low water springs – Infralittoral

This was the boulder dominated infralittoral fringe merging into the shallow sub-tidal which was one of the most characteristic features of the site. The main habitat type present most closely resembled IR.MIR.KR.Ldig.Bo: *Laminaria digitata* and under-boulder fauna on sublittoral fringe boulders

Description

This *Laminaria digitata* biotope is found predominantly on moderately exposed boulder shores and occasionally also on exposed or sheltered shores. Upper surfaces of the boulders are colonised by dense *L. digitata* though other kelp such as *Laminaria hyperborea* and *Laminaria saccharina* or the wrack *Fucus serratus* can be present at lower abundance. The kelp fronds can be colonised by the bryozoan *Membranipora membranacea*. Beneath the kelp canopy are a variety of red seaweeds such as *Mastocarpus stellatus*, *Chondrus crispus*, *Palmaria palmata*, *Membranoptera alata*, *Corallina officinalis* and coralline crusts. Green seaweeds include *Cladophora rupestris* and *Ulva lactuca*. Where space is available beneath the boulders (i.e. they are not buried in sediment) there may be a rich assemblage of animals. Characteristic species include the crabs *Porcellana platycheles*, *Pisidia longicornis* and juvenile *Cancer pagurus*. Also present beneath the boulders are often high densities of the barnacle *Balanus crenatus*, the tube-building polychaete *Spirobranchus triqueter*, *spirorbid* worms, the polychaete *Harmotho*e sp., gammarid amphipods and a few gastropods such as *Gibbula cineraria*. The encrusting bryozoans *Electra pilosa* and *Umbonula littoralis* and encrusting colonies of the sponges *Halichondria panicea* and *Halisarca dujardini* are also typical of this habitat. The richest examples also contain a variety of echinoderms such as *Asterias rubens*, colonial ascidians such as *Botryllus schlosseri* and small hydroids.

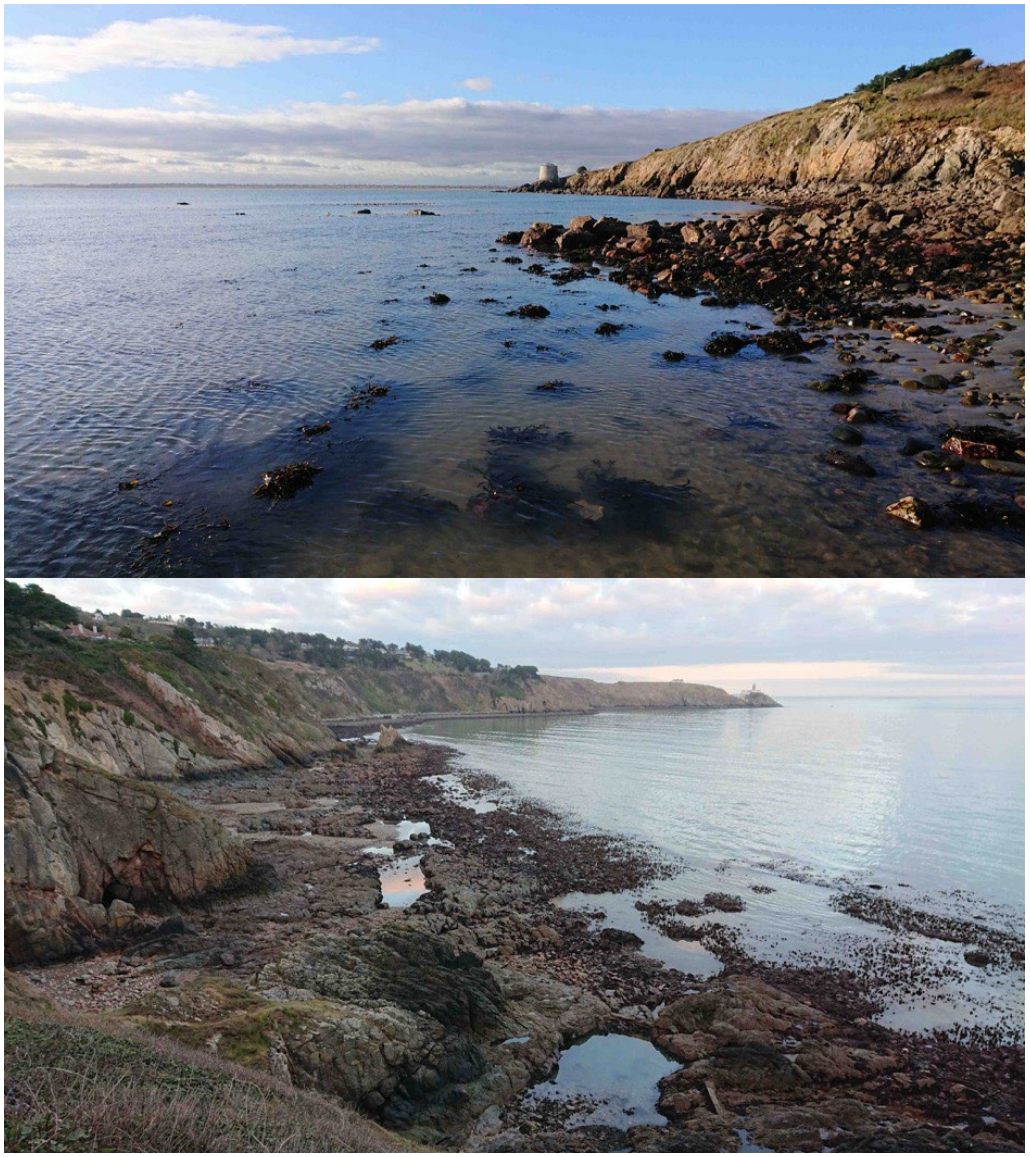
Situation

This biotope is found in a similar situation to Ldig.Ldig, usually beneath the *Fucus serratus* zone (Fser.Bo or Fser.R) and above the *Laminaria hyperborea* zone (Lhyp). Many of the animals found under boulders in the lower shore in Fser.Bo are also found under boulders in the sublittoral fringe (Ldig.Bo), particularly the sponges and crabs. Similarly, many of the seaweeds present on the lower shore are also present in the shallow sublittoral fringe.

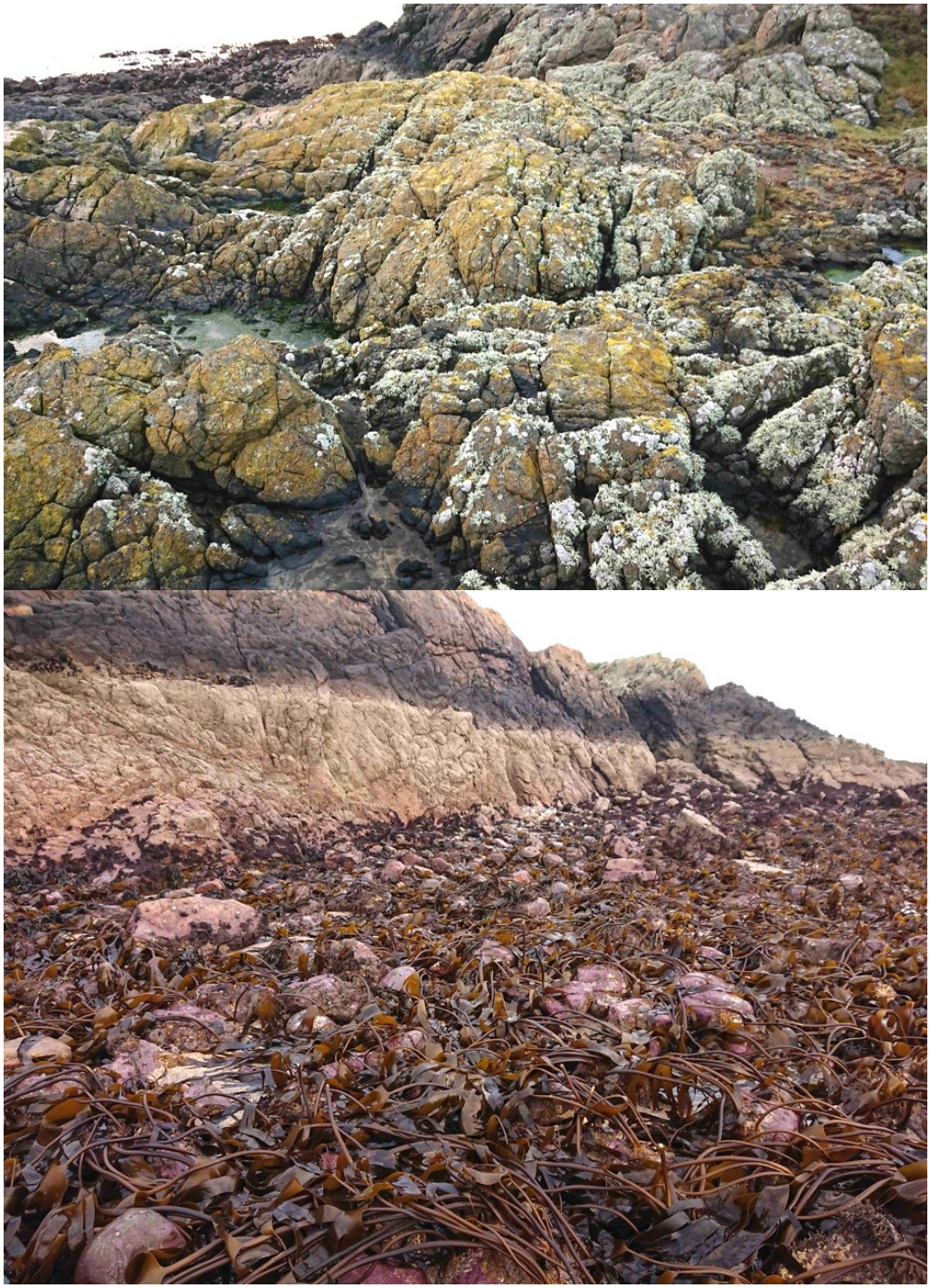
Conclusion – Habitat Types

It is important to note that the habitats listed above are not necessarily exact matches to the JNCC habitats they describe but have been chosen as the closest corresponding. What is notable is that the where two distinct habitats adjoin, they often merge or intermix minutely depending on shore topography, substrate and exposure levels. For example, the red algae dominated *Mastocarpus stellatus and Chondrus crispus on very exposed to moderately exposed lower eulittoral rock* merges into and separates from *Fucus serratus and red seaweeds on moderately exposed lower eulittoral rock* and *Fucus serratus and under-boulder fauna on exposed to moderately exposed lower eulittoral boulders* at various points and the latter merges into *Laminaria digitata and under-boulder fauna on sublittoral fringe boulders* along a broad front.

Appendix 7.1-11: Google Earth aerial showing extent of walkover survey on the southern shore of Howth Head



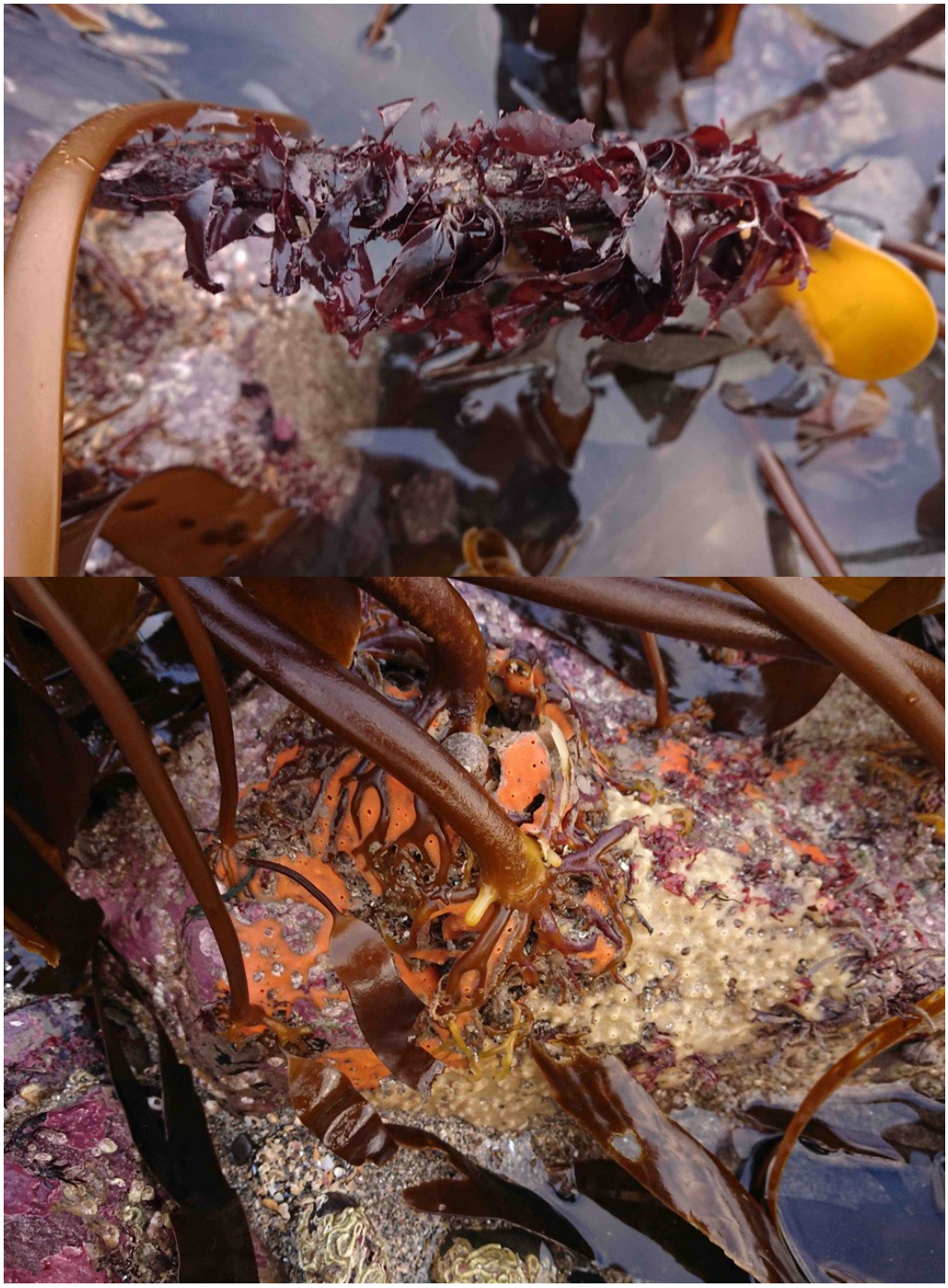
Appendix 7.1-12: Top image looking west toward the Martello Tower (Sutton) at the western end of walkover survey two hours before low spring tide. The bottom image shows the embayment at the eastern end of the survey looking east toward Howth Lighthouse, shortly after low water spring tide.



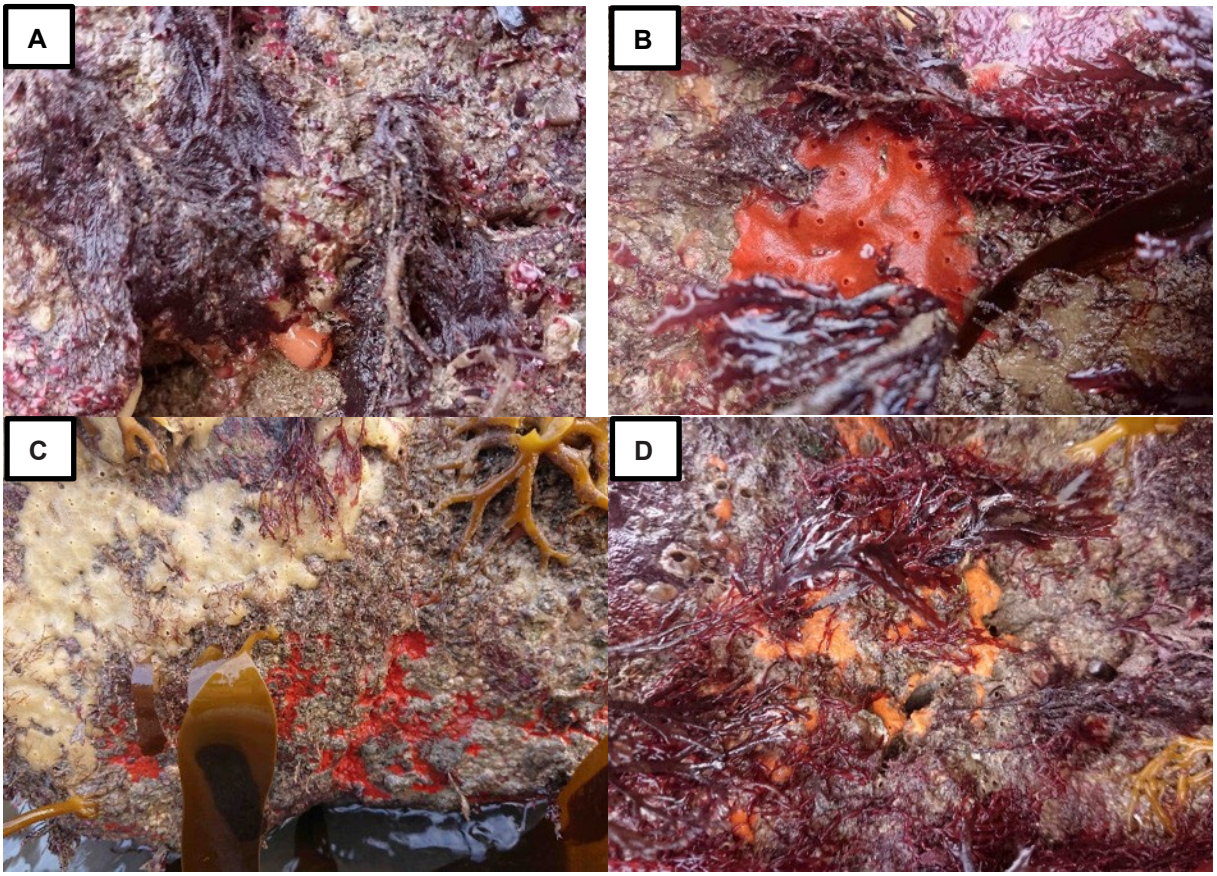
Appendix 7.1-13: The top image shows the top of the shore with the biotope: Yellow and grey lichens on supralittoral rock (LR.FLR.Lic.YG). The bottom image presents the vertical rockface showing upper intertidal dark band of *Verrucaria maura*, occasional clumps of *Lichina pygmaea* and a wide, cream-coloured barnacle and limpet zone, dropping straight into the narrow lower shore and an extensive infralittoral kelp-boulder field.

Appendix 7.1-14: The top image shows the barnacle and limpet zone higher up the shore dropping into narrow zone of calcareous and coralline reds with scattered *F. serratus*. The bottom image shows *Fucus serratus* on boulders in the lower, horizontal part of the shore.

Appendix 7.1-15: The top image shows a narrow band of red algal turf, dominated by *Mastocarpus stellatus*. The bottom image shows *Laminaria digitata* on boulders in the infralittoral fringe.



Appendix 7.1-16: The top image shows a *Laminaria* stipe with *Palmaria palmata* growing epiphytically. The bottom image shows *Laminaria* holdfasts with sponges (*Amphilectus fucorum* and *Halichondria panicea)* growing on the underlying boulder.



Appendix 7.1-17: Flora and fauna on rock faces, boulders or overhangs in the infralittoral. (A) Red alga *Plumaria plumosa*, (B) *Ophlitaspongia papilla (*ketchup red sponge), (C) *Eurypon major* (red colour) and *Halichondria* (cream sponge), (D) *Hymeniacidon perleve* (orange colour).

Appendix 7.1-18: Underside of boulder in extreme low water between *Fucus serratus* and *Laminaria digitata* zones showing a very diverse encrusting fauna including several sponges, bryozoa, colonial tunicates, barnacles, tube worms, saddle oysters and other molluscs.

7.3.1e Intertidal Reef Survey – Howth August 2022

Overview

A small crescent shaped embayment toward the western end of the southern shore of Howth Head was the focus of this second walkover survey of the intertidal reefs on the peninsula (Appendix 7.2-9). The shore is nearly inaccessible from the land requiring cautious access via a very steep path from the public road to the north. The shore is backed by a mix of barren gravel and sand giving way to a largely flat rocky shore interrupted by low ridges running parallel to the shore. This general pattern is interrupted by areas of large boulders and extensive patches of mixed gravel and cobble (Appendix 7.2-10). An outfall pipe also crossed the beach at a point where there is a local concentration of *Ulva intestinalis* over a cobble and gravel substrate. This is thought to emanate from localised freshwater seepage via groundwater at the base of the high ground to the north.

Habitats Encountered

The shore in general is exposed to wave action which is reflected in the communities present. However, part of the upper shore is sheltered by the configuration or rocks down shore from it, resulting in localised areas of dense *Pelvetia canaliculata* and *Fucus spiralis* cover over patchy *Verrucaria maura* and just below this, a localised area of *Ascophyllum nodosum*, which together indicates the presence of sheltered areas in that part of the shore. Small amounts of *Catanella cespitosa* were also noted here in crevices. The main faunal elements included *Littorina saxatilis/rudis* (common) and frequent *Patella vulgata*. A shallow upper shore pool with a soft sediment bottom was dominated by *Ulva intestinalis* along with *Rhodothamniella floridula* binding sand at the margins and occasional *Littorina littorea*. (Site 6)

At about mid shore a localised higher rock ridge is dominated by the JNCC habitat type LR.HLR.MusB.Sem: (*Semibalanus balanoides* on exposed to moderately exposed or vertical sheltered eulittoral rock). The near vertical rock face is dominated by the barnacle *Semibalanus balanoides* with *Patella vulgata*, *Steromphala umbilicalis* and *Littorina littorea* common and *Nucella lapillus* occasional. At higher spots at the top of the same ridge *Chthamalus montagui* dominated, with lesser amounts of *S. balanoides, Littorina saxatilis/rudis* frequent and *Patella vulgata* frequent to common. Patches of *Verrucaria maura* were also present here. (Site 5)

In the lower shore in an area dominated by turf forming reds vertical rocks facing toward and away from the wave direction had slightly different species dominance, with those facing toward the sea with more *Mastocarpus stellatus* and those sheltered from the sea with shaded overhangs dominated by finer reds such as *Plumaria plumosa*. Prominent species included *Mastocarpus stellatus*, *Ulva lactuca*, *Osmundea pinnatifida*, scattered *Fucus serratus* and encrusting calcareous reds at lower levels. *Ceramium virgatum*, *Plocamium lyngbyanum* and small amount of *Lomentaria articulata* and occasional *Dictyota dichotoma* and *Leathesia marina* were also recorded here. Fauna present included *Semibalanus balanoides* and *Patella vulgata* above, frequent *Steromphala umbilicalis, Littorina obtusata* and *Nucella lapillus*, farther down with *Actinia equina* and small amounts of *Halichondria panicea* also present. Within the low water channel between the rock faces *Laminaria digitata* was common. This mix of species combined with the shaded overhanging nature of the rock, directed away from direct wave action has much in common with the JNCC habitat LR.FLR.CvOv.SpR: (Sponges and shade-tolerant red seaweeds on overhanging lower eulittoral bedrock and in cave entrances). Sightly seaward of this point, right at the low water tide line, the substrate is dominated by boulders with red algal turfs prominent and on the boulders and *Fucus serratus* and *Laminaria* common in the intervening low

water gaps. Positionally and structurally this habitat is similar to JNCC habitat type LR.MLR.BF.Fser.Bo: (*Fucus serratus* and under-boulder fauna on exposed to moderately exposed lower eulittoral boulders). (Sites 1 & 3)

Other Shore Features

Mid-shore Rockpool at Site 5

This shallow pool was located in an area dominated by *Fucus vesiculosus* and barnacles on rocks. The base of the pool had small cobble, gravel and sand. Seaweeds within the pool included *Ulva lactuca*, *Cladophora rupestris*, C. sp., a filamentous green (possibly *Rhizoclonium* sp.) *Corallina officinalis*, calcareous encrusting reds, *Chondrus crispus*, *Ceramium virgatum*, *C. pallidum, Gelidium* sp., *Polysiphonia/Vertebrata* sp., Fauna included *Littorina littorea, Steromphala umbilicalis, S. cineraria, Patella vulgata, Actinia equina* and spirorbid worms.

Lower shore Pool at Site 2.

This is an example of a small pool ringed with boulders and bedrock with part of the bottom with sand. It is surrounded by a habitat that corresponds to JNCC classification LR.MLR.BF.Fser: (*Fucus serratus* on moderately exposed lower eulittoral rock with which it shares many species). Species of seaweed included *Fucus serratus, Laminaria digitata, Ulva lactuca* and *U. intestinalis* as dominants with *Mastocarpus stellatus, Chondrus crispus, Cystoclonium purpureum, Cryptopleura ramosa* epiphytic on *Corallina officinalis*, encrusting calcareous reds, *Cladophora rupestris, Gelidium pulchellum, Plocamium lyngbyanum, Ahnfeltia plicata* and *Lomentaria articulata*. Fauna included occasional to frequent *Patella vulgata, Steromphala umbilicalis, Actinia equina* and spirorbid worms.

Lower shore Pool at Site 7.

This pool corresponds to some degree with JNCC habitat LR.FLR.Rkp.FK.Sar: (*Sargassum muticum* in eulittoral rockpools). It was present in the lower shore and was dominated by *Sargassum muticum* with *Fucus serratus, Laminaria digitata, Ulva lactuca* and *Saccharina latissima*. Other species included *Grateloupia turuturu* (a rarely recorded invasive species in Ireland), *Gelidium pulchellum, Ceramium virgatum, Polysiphonia/Vertebrata* sp., *Cladophora rupestris* and *Cladophora* sp., *Chondrus crispus, Corallina officinalis* and encrusting calcareous reds. Fauna included abundant *Steromphala umbilicate, Littorina littorea* (common) and spirorbid worms (common).

Appendix 7.1-19: Google Earth aerial of the southern area of Howth Head showing the positions of various target note locations used in the text.

Appendix 7.1-20: Top image showing the view toward Howth lighthouse from the survey area. Bottom image shows survey area during low tide (August 2nd, 2022)

Appendix 7.1-21: Top image showing sheltered section of upper shore dominated by *Pelvetia* and *Fucus spiralis*, with shallow rockpool dominated by *Ulva intestinalis* (Site 6). Bottom image showing barnacle and limpet dominated mid-shore rock ridge. (Site 5)

Appendix 7.1-22: Top image showing rock face with shaded overhang with diverse red seaweed community. Bottom image with lower shore boulder community of *Fucus serratus* and red seaweed. (Site 1 & 3)

Appendix 7.1-23: Top image showing mid-shore rock pool in a *Fucus vesiculosus* and barnacle zone (Site 5). Bottom image with lower shore pool adjoining a *Fucus serratus* and red seaweed zone. (Site 2)

Appendix 7.1-24: Top image lower shore *Sargassum muticum* pool (Site 7). Bottom image view of lower shore in southwest corner of the study site.

7.3.1f Intertidal Reef Survey – Ireland's Eye August 2022

Ireland's Eye is shaped like an inverted right-angle triangle with the base facing north and the acute angle with a large rock at its tip facing south toward Howth Head. Both the northern and the northern half of the eastern sides consist mainly of short and in many places very steep rocky intertidal shores, while significant sections of the western side of the island comprise sandy beach. At the southern part of the island, a triangular area of roughly 5.5ha is exposed at low water forming a very extensive, mainly low gradient and mainly sheltered or very sheltered fucoid-dominated rocky intertidal reef. Much of the latter area is just outside and to the west of the SAC (the Lambay to Dalkey SAC) boundary which commences on the eastern side of this triangle extending north along the eastern side of the island and along the northern side also. This eastern side is characterised by habitats typical of moderately or more exposed rocky intertidal reef. The southern and southern half of the eastern intertidal was visited at low spring tide on August 3rd, 2022, to conduct a walk over survey (Appendix 7.2-15). The majority of seaweeds and fauna were identified in situ with some of the finer reds retained for later microscopic examination. The conditions at time were very suitable for the survey being calm and bright.

Findings

Southern low tide triangular area immediately west of the SAC.

In terms of aerial extent this area is dominated by the JNCC habitat (LR.LLR.F.Asc.FS) *Ascophyllum nodosum* on full salinity mid eulittoral rock, covering most of the intertidal. This is over a combination of low bedrock, boulders and gravel, with pockets where *Fucus vesiculosus* is also common. An example of this was encountered at Site 8 where a rich understory of other seaweeds were noted along with *Vertebrata lanosa* (on the *Ascophyllum*), occasional clumps of *Fucus serratus* and an diverse understorey of the following species: *Chondrus crispus, Cladophora rupestris, Membranoptera alata, Plumaria plumosa*, encrusting calcareous reds and fauna including occasional *Patella vulgata*, small amounts of the sponges *Hymeniacidon perleve* and *Halichondria panicea, Littorina obtusata* (common), *Steromphala umbilicalis* (frequent) *Nucella lapillus* (occasional), spirorbid worms (frequent) and *Carcinus maenas* (Appendix 7.2-16).

On more elevated bedrock at the top of the shore there are distinct zones dominated by *Pelvetia canaliculata* and *Fucus spiralis* also, the latter quite abundant in places.

SAC Reef

The greater part of the southern section of the eastern shore of the island, i.e., within the SAC is dominated by a *Fucus serratus* zone, ranging from more sheltered to a more exposed variants of the habitat. At Site 10 this habitat was of the more sheltered variety with a luxuriant cover of *Fucus serratus* with an understorey of encrusting calcareous reds, *Cladophora rupestris, Mastocarpus stellatus, Membranoptera alata, Lomentaria articulata, Plumaria plumosa, Osmundea pinnatifida* and *Gelidium* sp. Fauna included frequent *Semibalanus balanoides*, occasional *Verruca stroemia, Patella vulgata, Steromphala umbilicalis, Nucella lapillus, Littorina obtusata*, small amounts of the sponges *Hymeniacidon perleve, Halichondria panicea* and *Ophlitaspongia papilla, Carcinus maenas* and porcelain crabs. This variant most closely accords with JNCC habitat LR.LLR.F.Fserr.FS: *Fucus serratus* on full salinity sheltered lower eulittoral rock (Appendix 7.2-18).

The lower shore of the southern and southeastern tip of the island around Sites 16-19 is dominated by a habitat type which closely equates to JNCC classification LR.MLR.BF.Fser: *Fucus serratus* on moderately exposed lower eulittoral rock. The area is characterised by bedrock and large stable boulders with a mosaic of *Fucus serratus* dominated areas and areas where the surface is dominated by turf-forming red seaweeds especially *Mastocarpus stellatus*. Beneath the canopy of *F. serratus* other species were recorded including *Mastocarpus stellatus*, *Plumaria plumosa*, *Membranoptera alata*, *Lomentaria articulata*, *Cladophora rupestris*, *Ulva lactuca*, *Ralfsia verrucosa*, *Osmundea pinnatifida* and encrusting calcareous reds. Finer reds included *Ceramium virgatum*, *C. pallidum*, *Callithamnion tetricum* and *Aglaothamnion hookeri*. Fauna present included *Semibalanus balanoides*, *Patella vulgata*, *Steromphala umbilicalis*, *Steromphala cineraria*, *Littorina obtusata*, *Hymeniacidon perleve*, *Halichondria panicea*, *Dynamena pumila*, *Spirobranchus triqueter* (Appendix 7.2-19). Above this zone a shorter zone was dominated by Barnacles (*Semibalanus balanoides*) with patella and *Fucus vesiculosus*, under the broad JNCC habitat class of LR.MLR.BF.

Sites 12-14

General photos of southern shore where it is a near vertical shore.

Farther east, the shore becomes short and very steep and is dominated by LR.HLR.MusB.Sem.FvesR: *Semibalanus balanoides*, *Fucus vesiculosus* and red seaweeds on exposed to moderately exposed eulittoral rock. The most obvious feature of the community is the dominance of the barnacle *Semibalanus balanoides* along with *Fucus vesiculosus*, some stunted in growth form and without air bladders, which a signs of exposure stress. Further down the shore this merged into a mix of red seaweed turfs (mainly *Mastocarpus stellatus*) and *Fucus serratus* above a *Laminaria digitata* at the waterline. Other seaweeds present included *Ulva intestinalis* and toward the lower part of the *Fucus serratus* / red seaweed zone included lesser amounts of *Lomentaria articulata*, *Callithamnion granulatum*, *Polysiphonia* spp., *Membranoptera alata* and *Palmaria palmata*. In some places between immediately above the *Laminaria* zone there was a narrow but distinct band of *Palmaria palmata*, interspersed in places with small pockets of other species including *Osmundea pinnatifida*, with patches of encrusting calcareous reds on the rock. This habitat broadly accords with LR.HLR.FR.Pal: *Palmaria palmata* on very exposed to moderately exposed lower eulittoral rock. (Appendix 7.2-20) The vertical nature of the rock precluded gastropod molluscs e.g., Littorinids, with barnacles being the dominant faunal element.

Other Shore Features

Lower Shore Pool (Site 9)

This is a moderately shallow lower shore pool dominated by *Corallina officinalis* and with a range of other seaweeds including *Laminaria digitata*, *Fucus serratus*, *Ulva lactuca*, *U. intestinalis*, *Palmaria palmata*, *Mastocarpus stellatus*, *Chondrus crispus*, *Cryptopleura ramosa*, *Phyllophora crispa*, *Cladophora rupestris*, encrusting calcareous reds, *Ceramium virgatum*, *Plumaria plumosa*, *Dictyota dichotoma* and *Plocamium cartilagineum*. Fauna on adjoining rocks included *Semibalanus balanoides*, *Nucella lapillus* and *Littorina obtusata* Appendix 7.1-25:

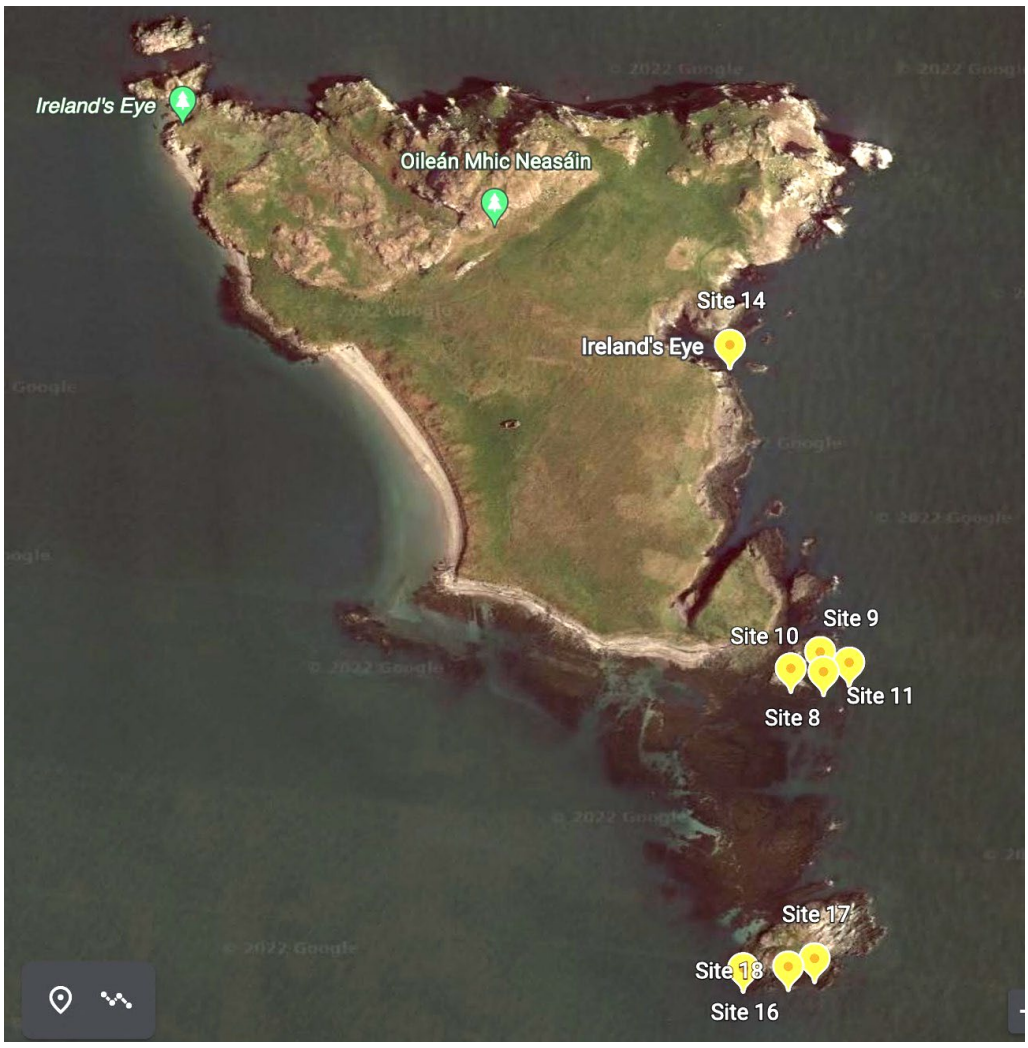
Supralittoral with Prasiola *and* Porphyra *(Site 11)*

Just above a narrow zone of scattered Pelvetia and Fucus spiralis there is a narrow zone of dense *Porphyra* (probably *Porphyra umbilicalis*) topped above with an area of dense *Prasiola stipitata* on a small rocky platform where roosting seagulls have enriched the area with droppings. This splash zone community repeats itself at

several locations farther east north along the eastern shore where seabirds (mainly gulls) roost (Appendix 7.2-21). This habitat corresponds to JNCC habitat LR.FLR.Lic.Pra: *Prasiola stipitata* on nitrate-enriched supralittoral or littoral fringe rock.

Conclusion

The intertidal reef areas along the eastern and southern side of Irelands Eye and in the low lying extensive rocky and mixed sediment shore toward the southern tip of the island contain all the intertidal reef habitats that would be expected to occur in an area with similar substrates, geomorphology and exposure ranges including, all the main characteristic species both seaweed and invertebrate fauna. Moreover, the habitats also contain a diverse range of additional species, in particular fine red seaweeds. Nothing in the community composition of the site would point to any adverse impact from dispersed fines from the Burfort Bank Dublin Bay disposal site.



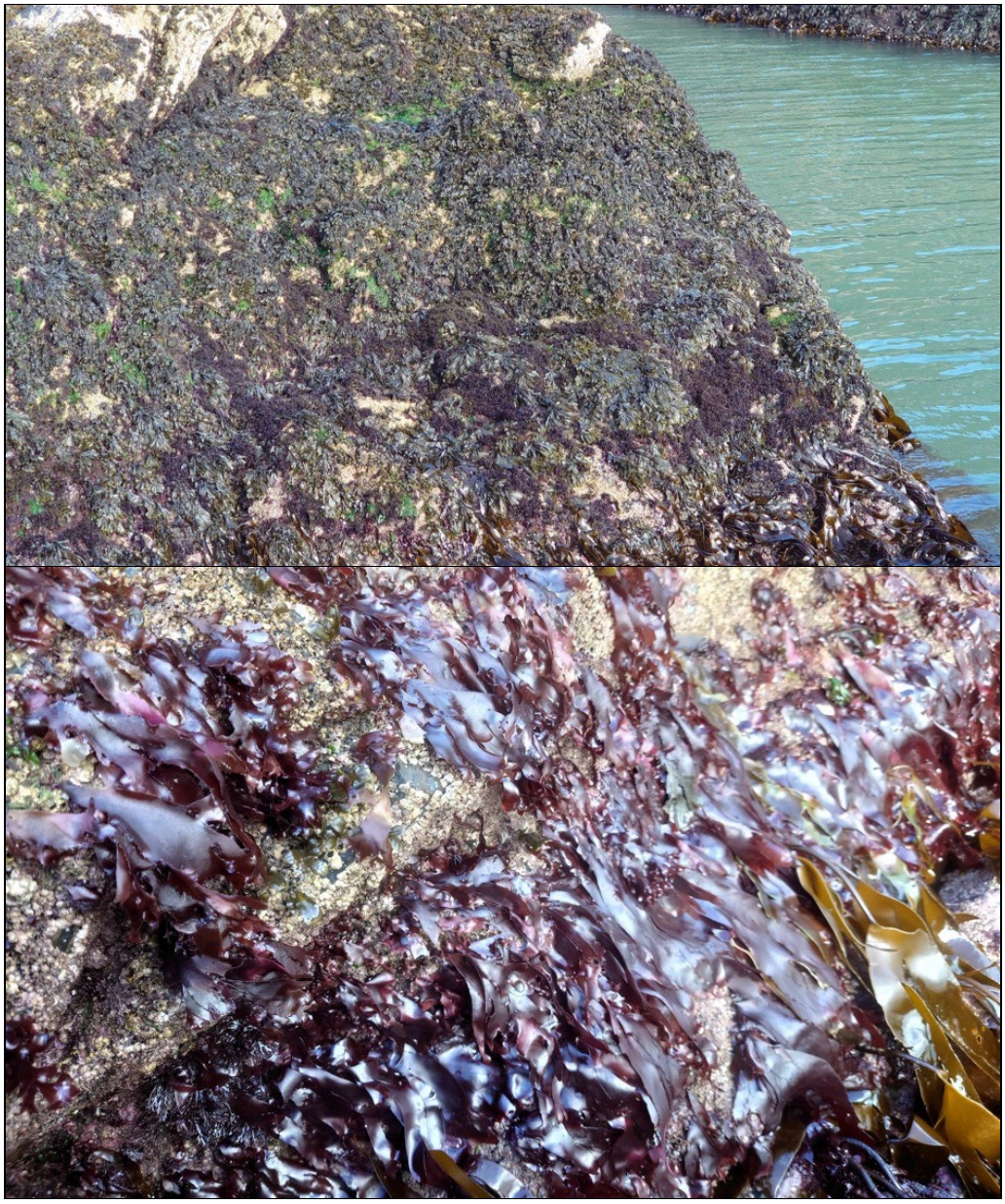
Appendix 7.1-26: Google Earth aerial of Ireland's Eye showing some positions of various target note locations used in the text.

Appendix 7.1-27: Top image shows dense cover of *Ascophyllum nodosum* in sheltered section of southern shore with *Fucus spiralis* and *Pelvetia canaliculata* zones on higher rocks behind. Bottom image shows diverse understorey below the *Ascophyllum nodosum* cover.

Appendix 7.1-28: Top image shows dense cover of *Fucus serratus* in sheltered southern section of eastern shore. Bottom image shows understorey at the same location with diverse range of seaweeds and encrusting fauna.

Appendix 7.1-29: Southern tip of island showing mainly *Fucus serratus* on large boulders (above) – Site 17, and on bedrock with more turf-forming reds (below), Site 16. The higher ground in the bottom image shows an area dominated by barnacles and *Fucus vesiculosus*.

Appendix 7.1-30: The understorey of the *Fucus serratus* zone at Site 18 on the southern tip of the island, showing the presence of *Halichondria panicea* and *Dynamena pumila* (Upper image) and a range of red and green seaweeds including encrusting calcareous reds (Lower image).



Appendix 7.1-31: Upper image shows short and very steep nature of the shores along northern part of the western shore. With *Fucus vesiculosus* and barnacles on upper levels merging in a *Fucus serratus* and red seaweed turfs toward the lower section of the shore dropping into a *Laminaria* upper sub-tidal zone. The lower image shows a narrow strip above the *Laminaria* zone where *Palmaria palmata* forms a distinct zone in places.

Appendix 7.1-32: Upper image shows supralittoral platform dominated by the green alga *Prasiola stipitata* in an area where large numbers of seagulls roost, immediately below which, *Pelvetia* and *Fucus spiralis* zones are present. The bottom image shows a shallow lower intertidal pool at Site 9.