Appendix B – Composition of functional groups and parameters

Table B1. The BOWF functional fish groups species composition and parameters used to estimate the basic input parameters: Biomass (B) ($t \cdot km^{-2}$), Production over Biomass ($year^{-1}$) (P/B), Consumption over Biomass ($year^{-1}$) (Q/B). $L\infty$ is the asymptotic length, k is the growth coefficient, a and b are the parameters of the empirical relationship between length and weight ($W\infty=aL\infty^{b}$) where $W\infty$ is the asymptotic weight, M is the natural mortality.

Functional group / Species	B	Ref	L∞	k	Ref	a	b	Ref	A	Ref	W∞	Q/B	Ref	M	Ref
Rays															
Raja asterias	0.022	25	67.4	0.454	24	0.00257	3.25	24	1.32	24	2254.64	4.14	14	0.67	15
Raja clavata	0.047	25	96.3	0.17	4	0.0024	3.24	24	1.32	24	6414.46	3.35	14	0.32	15
Torpedo marmorata	0.0025	25	57.31	0.187	5	0.01862	2.94	24	1.32	24	2749.01	3.98	14	0.39	15
Sharks															
Scyliorhinus canicula	0.026	25	69.3	0.21	19	0.00195	3.13	24	1.26	24	1125.98	4.71	14	0.40	15
Squalus acanthias			102.5	0.21	1	0.00282	3.07	24	2.19	24	4199.25	4.81	14	0.36	15
Deep Sea fish															
Micromesistius poutassou	0.0005	25	40.35	0.22	4	0.00389	3.15	24	1.08	24	445.00	5.51	14	0.48	15
Small demersal fish															
Boops boops	0.0083	25	30.7	0.182	16	0.01047	3	24	3.18		302.94	8.90	14	0.46	15
Diplodus vulgaris	0.0086	25	26.78	0.255	4	0.0123	3.04	24	2.96	13	269.43	8.74	14	0.60	15
Diplodus annularis	0.0089	25	24.54	0.269	4	0.01202	3.07	24	2.96	13	222.24	9.09	14	0.63	15
Mullus barbatus barbatus	0.074	25	23.5	0.58	4	0.00871	3.09	4	2.02		150.18	8.23	14	1.06	15
Pagellus acarne	0.079	25	28	0.37	4	0.0092	3.076	4	2.96	13	260.16	8.80	14	0.75	15
Pagellus erythrinus	0.031	25	40.16	0.2554	4	0.0092	3.076	4	2.91		788.96	6.95	14	0.53	15
Scorpaena notata	0.055	25	21.1	0.314	16	0.008	3.04	16				7.21	16	0.73	15
Medium demersal fish															
Eutrigla gurnadus	0.039	25	48.4	0.22	4,13, 24	0.00676	3.05	24	1.93	24	930.52	5.57	14	0.46	15

Trisopterus capelanus	0.067	25	22.23	0.462	17	0.00724	3.1	24	2.29	24	108.46	9.27	14	0.93	15
Large demersal fish															
Lophius budegassa	0.0042	25	90	0.075	7	0.01259	2.98	24	1.32	24	8388.19	3.17	14	0.19	15
Lophius piscatorius	0.0264	25	162.31	0.088	9	0.01738	2.9	24	1.32	24	44673.61	2.25	14	0.18	15
Conger conger	0.0039	25	228	0.068	4	0.0004	3.34	24	1.32	24	30030.49	2.44	14	0.14	15
European hake															
Merluccius merluccius	0.021	25	88.7	0.146	4, 21	0.00501	3.1	24	0.76	24	5475.21	3.11	14	0.30	15
Flatfishes															
Solea Solea	0.010	25	42.6	0.23	6	0.00759	3.06	24	0.80	24	734.91	4.71	14	0.49	15
Microchirus variegatus	0.0026	25	19.1	0.382	6	0.00851	3.02	24	0.99	24	62.90	8.07	14	0.86	15
Scophthalmus maximus	0.025	25	54.5	0.271	18	0.01122	3.06	24	1.95	24	2308.69	4.65	14	0.51	15
Scophthalmus rhombus	0.061	25	39.95	0.651	18	0.01096	3.01	24	1.99	24	725.06	5.93	14	0.99	15
Sea Bream															
Pagellus bogaraveo	0.0051	25	56.8	0.092	4	0.01148	3.174	4	2.96	13	4248.58	4.98	14	0.25	15
Sparus aurata			75.97	0.13	4	0.029	2.91	11	2.96	13	8611.26	4.31	14	0.29	15
Spondyliosoma cantharus			38.6	0.1	12	0.01259	3.02	24	2.96	13	778.97	7.04	14	0.3	15
European Seabass															
Dicentrarchus labrax	0.17	25	70.45	0.26	4	0.0093	3.02	24	1.78	24	3540.65	4.12	14	0.46	15
European Anchovy															
Engraulis encrasicolus	2.88	26	19.1	0.3491	4	0.0065	3.02	4	2.25	20	48.04	10.85	14	0.81	15
European Pilchard															
Sardina pilchardus	5.03	26	19.65	0.325	4	0.00384	3.25	4	2.38	24	61.34	10.58	14	0.76	15
Small pelagic fish															
Sprattus sprattus	6.55	26	13.8	0.25	8	0.0064	2.921	8	1.81	20	13.67	12.88	14	0.71	15
Trachurus mediterraneus	0.047	25	39.3	0.22	21, 24	0.00891	2.96	24	3.66	20	466.96	8.92	14	0.49	15

Trachurus trachurus	0.16	25	37.5	0.22	4	0.00832	2.95	24	3.66	20	366.03	9.38	14	0.49	15
Medium pelagic fish															
Scomber colias	0.0082	25	40	0.37	23	0.00646	3.05	24	4.01	20	497.18	9.42	14	0.68	15
Scomber scombrus	0.015	25	41.95	0.485	4	0.0067	3.125	4	4.01	20	789.06	8.58	14	0.80	15
Large pelagic fish															
Coryphaena hippurus	0.009	27	200	0.64	13	0.0138	2.87	24	3.72	24	55441.53	3.41	14	0.62	15
Lichia amina	0.009	27	106.5	0.31	3	0.01349	2.95	24	4.2	13	12903.08	5.03	14	0.46	15
Xiphias gladius	0.002	10	224.5	0.169	22	0.0038	3.15	24	5.81	20	96853.45	4.54	14	0.25	15
Thunnus thynnus	0.04	2	318.9	0.07	4	0.01259	3.01	24	5.54	20	432539.56	3.17	14	0.13	15

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Table A2. The BOWF functional non fish groups (FGs) species composition, methods and references used to estimate the basic input parameters: Biomass (B) ($t \cdot km^{-2}$), Production over Biomass ($year^{-1}$) (P/B), Consumption over Biomass ($year^{-1}$) (Q/B). gC is equivalent of grams of carbon, gWW is the wet weight in g and gAFDW is the ash free dry weight.

Input parameters	Methods	References
1 - Phytoplankton		
B	Chlorophylle-a represents 98% of the total weight of phytoplankton Depth is constant is the model area, equal to 70m	(Lefevre et al., 1997; Severin et al., 2014; Vörös and Padisák, 1991)
P/B	Data in gC to gWW by multiplying by 16,7	(Gaudy et al., 2003; Lefevre et al., 1997 ; Optiz,1996)
2- Algae		
B	Chlorophylle-a represents 98% of the total weight of phytoplankton	(Plante-Cuny and Boboy, 1987; Vörös and Padisák, 1991)
P/B	Data in gC to gWW by multiplying by 16,7	(Bănaru et al., 2013; Optiz, 1996)
3- Zooplankton		
B	Data in gC to gWW (wet weight) by multiplying by 5,71 Data in gAFDW to gWW by multiplying by 6,49 (1/0,154)	(Espinasse et al., 2014 ; Labrune et al., 2007 ; Optiz ,1996 ; Plounevez and Champalbert, 2000 ; Ricciardi and Bourget, 1998)
P/B	Data in gC to gWW by multiplying by 5,71	(Gaudy et al., 2003; Optiz, 1996)
Q/B		(Bănaru et al., 2013)
4- Bivalves & gastropods: *Spisula subtruncata, Acanthocardia aculeata,* *Callista chione, Boliunus barandaris, Cassidaria echinophora, Cerastoderma edule…*		
B	Data in gAFDW to gWW by multiplying by 8 (1/0,125)	(Labrune et al., 2007 ; Ricciardi and Bourget, 1998)
P/B		(Bănaru et al., 2013)
Q/B		(Bănaru et al., 2013)
5- Crustaceans : *Parapenaeus longirostris* *,Plesionika edwardsii, Plesionika acanthonotus, Plesionika gigliolii, Plesionika martia; Carcinus maenas,* *Carcinus aestuarii,* *Liocarcinus corrugatus,* *Liocarcinus depurator, Nephrops norvegicus, Palinurus elephas, …*		
B		French Mediterranean bottom trawl surveys - IFREMER database MEDITS (2019)
P/B		(Piroddi et al., 2017)
Q/B		(Piroddi et al., 2017)
6- Benthos : *Paraprionospio spp., Aspidosiphon spp., Lumbrineris spp., Notomastus spp., Holothuria tubulosa, Leptosynapta inhaerens,* *Thyone fusus, Salmacina sp./Filograna sp*		

Serpula vermicularis, Scrupocellaria sp *Pentapora fascialis* *Dentiporella sardenica* *Alcyonium palmatum, Phallusia mammillata,* *Halocynthia papillosa , Alcyonium coralloides* *Leptogorgia sarmentosa,* *Antedon mediterránea,* *Ophiothrix fragilis, Paracentrotus lividus…*		
B	Data in gAFDW to gWW by multiplying by 9 (1/0,11)	(Labrune et al., 2007; Ricciardi and Bourget, 1998)
P/B		(Bănaru et al., 2013; Coll et al., 2006; Piroddi et al., 2017)
Q/B		(Bănaru et al., 2013; Coll et al., 2006; Piroddi et al., 2017)
7- Jellyfish : *Aequorea forskalea, Aurelia aurita, Chrysaora hysoscella, Hydrozoa, Pelagia noctiluca, Pleurobrachia pileus, Rhizostoma pulmo*		
B		French Mediterranean bottom trawl surveys - IFREMER database MEDITS (2019)
P/B		(Coll et al., 2006; Corrales et al., 2015)
Q/B		(Coll et al., 2006; Corrales et al., 2015; Optiz, 1996)
8- Cuttlefish & squids : *Sepia ssp. Loligo spp., …*		
B		French Mediterranean bottom trawl surveys - IFREMER database MEDITS (2019)
P/B		(Bănaru et al., 2013; Vilas et al., 2021)
Q/B		(Bănaru et al., 2013; Vilas et al., 2021)
9- Octopuses : *Octopuses vulgaris, octopuses salutii,* *Eledone cirrhosa, Eledone moschata, …*		
B		Mediterranean bottom trawl surveys- IFREMER database MEDITS (2019)
P/B		(Bănaru et al., 2013; Vilas et al., 2021)
Q/B		(Bănaru et al., 2013; Vilas et al., 2021)
25- Seabirds : *Puffinus spp, puffinus yelkouan, Larus minutus, Larus michahellis, …*		
B		Observatoire PELAGIS, UMS 3462 ULR/CNRS, AAMP, CEBC, 'SAMM1'
P/B	$\frac{P}{B} = 0{,}6457 \times W_{mean}^{-0{,}37}$ W_{mean} is the mean weight of an individual in kcal. To convert kcal to g, kcal is multiplied by 0,6.	(Banse and Mosher, 1980; Mills and Fournier, 1979)
Q/B	$Log(R_c) = -0{,}293 + 0{,}85 \times \log_{10}(W_{mean})$ R_c is the daily consumption. This value is multiplied by 365 to obtain an annual consumption and by the number of individuals.	(Nilsson and Nilsson, 1976)

26- Dolphins : *Tursiops truncates, Stenella coeruleoalba, …*		
B	$W_{mean} = 0{,}3 \times W_{max}$	(Froese, R. and D. Pauly; Laran et al., 2017; Optiz, 1996)
P/B	$\frac{P}{B} = 0{,}6457 \times W_{mean}^{-0{,}37}$	(Banse and Mosher, 1980)
Q/B	$R = 0{,}1 \times W_{mean}^{0{,}8}$ R is the daily ration by individual $Q = N \times R$ N is the number of individuals, R the annual ration by individual.	(Innes et al., 1987)
27- Detritus		
B	$\log_{10} D = -2{,}41 + 0{,}954 \log_{10} PP + 0{,}863 \log_{10} E$ D is the biomass of detritus (gC/m²), PP is the primary production and E is the euphotic depth. Data in gC to gWW by multiplying by 25	(Duforêt-Gaurier et al., 2010; Pauly et al., 1993; Optiz, 1996)
P/B		(Tanaka and Rassoulzadegan, 2002)

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