

Appendix V: MPA characteristics of the studies included in the review

Table 1a. Summary of MPA characteristics of partially protected areas included in the assessment of partial protection over no protection (PPA vs NP)

MPA name	Location	Protection regime	(Year of establishment) Year of effective protection (yrs. to survey)	MPA area (km ²)	Distance range of PPA to NP (km)	Habitat
[1] Arraial de Cabo	S. America	DC	1997 (8)	0.56	0.22	firecoral colony
[2] Scandola PPA	Europe	DC	1975 (19)	9.28	1 - 20	seagrass, rocks
[3] Scandola PPA	Europe	DC	1975 (13)	5.18	10	seagrass
[4] Ahus Island TA	Asia	DR	? (60+)	0.332	1	coral reef
[5] Manele-Hulopoe MLCD	N. America	DC	1976 (27)	1.12	na	hard bottom
[5] Old-Kona Airport MLCD	N. America	DC	1992 (11)	1.06	0.91 - 2.5	hard bottom
[5] Lapakahi MLCD	N. America	DC	1979 (25)	0.54	0.07 - 0.87	hard bottom
[5] Waialea Bay MLCD	N. America	DC	1985 (19)	0.14	0.07 - 2.43	hard bottom
[5] Molokini Shoal MLCD	N. America	DC	1977 (27)	0.36	na	hard bottom
[6] Virgin Island CRNM	N. America	DC	2001 (7)	51	0.11 - 8.36	coral reef
[7] Pupukea MLCD	N. America	DC	1983 (25)	0.71	0.06 - 2	hard bottom
[7] Kealakekua Bay MLCD	N. America	DC	1969 (38)	1.24	0.05 - 1.72	hard bottom
[8] Sugar Loaf Island FCA	New Zealand	DR	1986 (17)	7.49	5	na

[8] Sugar Loaf Island PPA	New Zealand	DR	1987 (17)	7.49	5	na
[9] Mimiwhangata MP	New Zealand	DR	1984 (18)	20	0.75 - 4.58	sand, gravel, rock
[10] Tabarca Island BZ	Europe	DC	1986 (13)	6.7	na	<i>Posidonia oceanica</i>
[11] Virgin Island NP	N. America	DC	1962 (31)	22.87	na	coral reef, hard bottom, algal plain, seagrass beds
[12] Italcomis Reef MUZ	S. America	DR	2000 (5)	40	10 - 40	coral reef
[13] TMPA – PPA1	Europe	DR	(1998) 2003-4 (3)	31.13	1.2 - 7.1	rock
[13] TMPA – PPA2	Europe	DC	(1998) 2003-4 (3)	117.15	1.2 - 7.1	rock
[14] 25nm FMZ	Europe	IdC	1971 (34)	11980	1.7 - 58.3	sand, mud
[15] Northeast of Horn	Europe	IdC	1992 (12)	3113	1 - 20	na
[15] Langanesgrunn	Europe	IdC	1992 (13)	981	1 - 10	na
[15] Off Northeast coast	Europe	IdC	1970s (30)	1283	1 - 10	na
[16] Barbados MR	N. America	DR	1981 (15)	1.5	0.02 - 0.3	coral reef
[17] La Jolla ER	N. America	DC	1974 (24)	1.85	1 - 15	rocky-reef, kelp beds
[18] Virgin Island CRNM	N. America	DC	2001 (2)	51	0.11 - 8.36	coral reef
[19] Achang reef MP	Asia	DR	(1997) 2001 (2)	4.8	na	shallow reef flats
[19] Tumon Bay MP	Asia	DR	(1997) 2001 (2)	4.5	na	sand, rubble, patch reefs, seagrass beds
[20] Easter Group MPA	Australia	IdC	1994 (8)	22.29	na	coral reef, sand, rubble
[20] Wallabi Group MPA	Australia	IdC	1994 (8)	27.4	na	coral reef, sand, rubble
[21] Western Gulf of Maine CA	N. America	IdC	1998 (7)	na	na	cobble, gravel, rock, mud

[22] North Kohala FRA	N. America	-	1999 (4)	na	na	coral reef
[22] Puako-'Anaeho 'Omalu FRA	N. America	-	1999 (4)	na	na	coral reef
[22] Ka'upulehu FRA	N. America	-	1999 (4)	na	na	coral reef
[22] Kaloka-Honokohau FRA	N. America	-	1999 (4)	na	na	coral reef
[22] Kailua-Kona (S. Oneo Bay) FRA	N. America	-	1999 (4)	na	na	coral reef
[22] Kailua-Kona (N. Keauhou) FRA	N. America	-	1999 (4)	na	na	coral reef
[22] Napo' opo' o-Honaunau FRA	N. America	-	1999 (4)	na	na	coral reef
[22] Ho'okena FRA	N. America	-	1999 (4)	na	na	coral reef
[22] Milioli'I FRA	N. America	-	1999 (4)	na	na	coral reef
[23] Achang reef MP	Asia	DR	(1997) 2001 (7)	4.8	3.75	shallow reef flats
[23] Piti MP	Asia	DC	(1997) 2001 (7)	3.6	7.5	shallow reef flats
[24] Cerbere-Banyuls MNR	Europe	DC	1974 (21)	6.5	0.06 – 3.47	rock, pebbles, sand
[25] Houtman-Abrolhos ROAs	Australia	IdC	1994 (15)	66.23	na	coral reef
[26] Mimiwhangata MP	New Zealand	DR	1984 (25)	20	0.4 - 4.27	sand, sand/gravel
[27] Isla La Graciosa BZ	Europe	DC	1995 (9)	609.95	14.71	rocky substrate
[27] Punta La Restiga BZ	Europe	DC	1996 (9)	4.8	14.71	rocky substrate
[28] Gulf of Castellammare FR	Europe	IdC	1990 (8)	200	na	
[29] Admiral Cockburn NPMR	N. America	DR	1992 (na)	4	0.94 - 9.62	coral reef
[30] Mtang'ata CFMZ	Africa	IdC	1996 (8)	na	20 - 200k	rock

[31] Gulf of Castellammare FR	Europe	IdC	1990 (4)	200	na	
[32] Cerbere-Banyuls MNR	Europe	DC	1974 (20+)	6.5	0.9 – 1.25	sand
[33] Jurien Bay MP	Australia	DC	2005 (2)	140.08	0.46 – 5.56	coral reef
[34] CA-I	N. America	IdC	1994 (5)	3960	0.89 - 3.97	mixed sand & gravel
[34] CA-II	N. America	IdC	1995 (5)	3880	0.8 - 2.5	sand
[35] Western Gulf of Maine CA	N. America	IdC	1998 (6)	3300	0.65 – 11.7	mud, sand, gravel
[36] Western Gulf of Maine Closure West	N. America	IdC	1998 (6)	na	16 nm	gravel, sand, mud
[36] Western Gulf of Maine Closure East	N. America	IdC	2000 (4)	na	16 nm	gravel, sand, mud
[37] Patagonian scallop management unit "Reclutas"	S. America	IdC	1996 (6)	na	just outside	na
[38] South Evvoikos Gulf	Europe	IdC	1966 (30)	na	na	muddy sand
[39] Two-headed Gully	N. America	IdC	1987 (11)	10.2	na	sand, silt, clay
[40] CA-II	N. America	IdC	1994 (5)	3800	22.7	gravel
[41] Port Erin exclusion zone	Europe	IdC	1989 (17)	2	na	gravel, sand, mud
[42] Inshore Potting Agreement	Europe	IdC	1978 (24)	500	4 - 18	mixed coarse substrate
[43] Commercial exclusion zones	New Zealand	DC	2005 (2)	na	na	rock
[44] Cerbere-Banyuls MR	Europe	DC	1974 (25)	6.5	3.89	rock
[45] Arnavon Island MCA	Australia	DC	1995 (na)	80	8.8 - 153	reef habitat
[46] Glacier Bay National Park	N. America	DR	1998 (4)	na	c. 20	cobble, pebble, sand, mud

[47] Bell Island + Lime Kiln	N. America	DC	1997 (1)	na	na	rock, sand
[48] Medes Island partial reserve	Europe	DR	1990 (15)	4.18	c. 2	rock
[49] Isla de la Palma RFA	Europe	DC	2001 (3)	37.19	67	rock
[49] Isla Graciosa RFA	Europe	DC	1995 (6)	707	175	rock
[49] Punta de La restinga BZ	Europe	DC	1996 (5)	7.75	77	rock
[49] Punta de La restinga RFA	Europe	DC	1996 (5)	7.75	77	rock
[50] Santa Catalina Inv NTRA	N. America	DC	1980 (23)	na	na	rock, kelp forest
[51] Mimiwhangata MP	New Zealand	DR	1984 (19)	20	0.17 – 3.5	rock, sand

Table 1b. Summary of survey design & methodology and taxa & metrics measured for each partially protected area included in the assessment of partial protection over no protection (PPA vs NP)

MPA name	Survey design	Survey method	Total area surveyed (m ²)	Taxon; metrics	Analysis			
					Population (n)	Exploitation status (n)		
						D	B	L
[1] Arraial de Cabo	multiple control ACI	t	na	Fish: D	Y (10)			
[2] Scandola PPA	ACI (10)	t	52000	Fish: D	Y (total)			
[3] Scandola PPA	ACI	t	na	Fish: B	Y (total)			
[4] Ahus Island TA	multiple ACI	t	9000	Fish: B	Y (total)			

[5] Manele-Hulopoe MLCD	ACI	t	8500	Fish: B, SR	Y (total)			
[5] Old-Kona Airport MLCD	ACI	t	7925	Fish: B, SR	Y (total)			
[5] Lapakahi MLCD	ACI	t	5125	Fish: B, SR	Y (total)			
[5] Waialea Bay MLCD	ACI	t	6750	Fish: B, SR	Y (total)			
[5] Molokini Shoal MLCD	ACI	t	10000	Fish: B, SR	Y (total)			
[6] Virgin Island CRNM	ACI (5)	t	9000	Fish: D, B, SR	Y (total)			
[7] Pupukeya MLCD	ACI (4)	t	6375	Fish: D, B, SR	Y (total)			
[7] Kealakekua Bay MLCD	ACI (4)	t	4375	Fish: D, B, SR	Y (total)			
[8] Sugar Loaf Island FCA	ACI (3)	t	13250	Fish: D, SR	Y (18)	Y (3)		
[8] Sugar Loaf Island PPA	ACI (3)	t	12875	Fish: D, SR	Y (18)	Y (3)		
[9] Mimiwhangata MP	ACI	t	6000	Fish: D	Y (31)	Y (12)		
[10] Tabarca Island BZ	ACI (6)	t	27000	Fish: D	Y (37)	Y (20)		
[11] Virgin Island NP	ACI	p	na	Fish: D, B	Y (total)	Y (10 fams)		
[12] Italcomis Reef MUZ	ACI (5)	p	26138.05	Fish: B	Y (90)		Y (13)	
[13] TMPA – PPA1	ACI (4)	t	32000	Fish: D, B, SR	Y (23)	Y (5)	Y (4)	
[13] TMPA – PPA2	ACI (4)	t	32000	Fish: D, B, SR	Y (23)	Y (5)	Y (4)	
[14] 25nm FMZ		h	3500280	Fish: D, B	Y (101)	Y (62)	Y (61)	
[15] Northeast of Horn	ACI	h	8284552	Fish: D, L	Y (21)	Y (8)		Y (8)
[15] Langanesgrunn	ACI	h	4418428	Fish: D, L	Y (21)	Y (5)		Y (5)

[15] Off Northeast coast	ACI	h	2982439	Fish: D, L	Y (21)	Y (5)		Y (5)
[16] Barbados MR	ACI	t	8000	Fish: D, L	Y (26)	Y (26)		Y (26)
[17] La Jolla ER	ACI (2)	t	9240	Fish: D, B, L	Y (12)	Y (9)	Y (8)	Y (9)
[18] Virgin Island CRNM	ACI (3)	t	11900	Fish: B			Y (16)	
[19] Achang reef MP	ACI (8)	t	16000	Fish: B			Y (5)	
[19] Tumon Bay MP	ACI (8)	t	16000	Fish: B			Y (5)	
[20] Easter Group MPA	BACI (B: 1, A: 2)	t	12000	Fish: D		Y (2)		
[20] Wallabi Group MPA	BACI (B: 1, A: 2)	t	12000	Fish: D		Y (2)		
[21] Western Gulf of Maine CA	ACI (2)	h	11520	Fish: D		Y (1)		
[22] North Kohala FRA	BACI (B: 6, A: 28)	t	800 survey ⁻¹	Fish: D		Y (1)		
[22] Puako-'Anaeho 'Omalu FRA	BACI (B: 6, A: 28)	t	800 survey ⁻¹	Fish: D		Y (1)		
[22] Ka'upulehu FRA	BACI (B: 6, A: 28)	t	800 survey ⁻¹	Fish: D		Y (1)		
[22] Kaloka-Honokohau FRA	BACI (B: 6, A: 28)	t	800 survey ⁻¹	Fish: D		Y (1)		
[22] Kailua-Kona (S. Oneo Bay) FRA	BACI (B: 6, A: 28)	t	800 survey ⁻¹	Fish: D		Y (1)		
[22] Kailua-Kona (N. Keauhou) FRA	BACI (B: 6, A: 28)	t	800 survey ⁻¹	Fish: D		Y (1)		
[22] Napo' opo' o-Honaunau FRA	BACI (B: 6, A: 28)	t	800 survey ⁻¹	Fish: D		Y (1)		
[22] Ho'okena FRA	BACI (B: 6, A: 28)	t	800 survey ⁻¹	Fish: D		Y (1)		
[22] Milioli'I FRA	BACI (B: 6, A: 28)	t	800 survey ⁻¹	Fish: D		Y (1)		
[23] Achang reef MP	ACI	exp. fishing	na	Fish: L				Y (1)

[23] Piti MP	ACI	exp. fishing	na	Fish: L				Y (1)
[24] Cerbere-Banyuls MNR	ACI	t	na	Fish: D, L		Y (2)		Y (2)
[25] Houtman-Abrolhos ROAs	multiple ACI (5)	p (BUV)	na	Fish: D, L		Y (1)		Y (1)
[26] Mimiwhangata MP	ACI	p (BUV)	na	Fish: D, L		Y (1)		Y (1)
[27] Isla La Graciosa BZ	ACI (2)	t	6000	Fish: D, B		Y (4)	Y (4)	
[27] Punta La Restiga BZ	ACI (2)	t	6000	Fish: D, B		Y (3)	Y (2)	
[28] Gulf of Castellammare FR	B/A (2/2)	h	na	Fish: D, L		Y (3)		Y (3)
[29] Admiral Cockburn NPMR	ACI	t	8000	Fish: D, B, L		Y (3)	Y (3)	Y (3)
[30] Mtang'ata CFMZ	ACI (2)	Inv: p (quadrat) Fish: t	11000	Fish: B Inv: B	Y (total)			
[31] Gulf of Castellammare FR	B/A	h	na	Fish: B Inv: B			Y (9) Y (2)	
[32] Cerbere-Banyuls MNR	ACI (2)	h	na	Fish: B Inv: B			Y (3) Y (2)	
[33] Jurien Bay MP	multiple ACI (8)	t	5600	Fish: D, B,SR Inv: D, SR	Y (21)	Y (11) Y (7)	Y (4)	
[34] CA-I	ACI	Fish: h Inv: p (grab)	832104	Fish: D, B, L Inv: B	Y (13) Y (10)	Y (13)	Y (13) Y (10)	Y (11)
[34] CA-II	ACI	Fish: h Inv: p (grab)	1069848	Fish: D, B, L Inv: B, SR	Y (15) Y (10)	Y (15)	Y (14) Y (10)	Y (11)
[35] Western Gulf of Maine CA	ACI	p (box corer)	6.01	Inv: D, B	Y (total)			
[36] Western Gulf of Maine Closure West	ACI (2)	p (video, grab)	na, 1.8	Inv: D, SR	Y (total)			

[36] Western Gulf of Maine Closure East	ACI (2)	p (video, grab)	na, 1.8	Inv: D, SR	Y (total)			
[37] Patagonian scallop management unit "Reclutas"	ACI (3)	h	na	Inv: B	Y (total)		Y (9 classe)	
[38] South Evvoikos Gulf	ACI	p (grab), t	6.4, na	Inv: SR				
[39] Two-headed Gully	ACI (2)	t	21630	Inv: SR				
[40] CA-II	ACI	p (photos)	7.78	Inv: D		Y (3)		
[41] Port Erin exclusion zone	ACI (18)	t	15840	Inv: D, B, A		Y (1)		
[42] Inshore Potting Agreement	ACI	h	na	Inv: D, SR		Y (1)		
[43] Commercial exclusion zones	ACI (2)	t	12000	Inv: D		Y (1)		
[44] Cerbere-Banyuls MR	ACI	t	240	Inv: D		Y (1)		
[45] Arnavon Island MCA	multiple control BACI (B: 3, A: 3)	t	144000	Inv: D		Y (3)		
[46] Glacier Bay National Park	BACI	p (pots)	na	Inv: D		Y (1)		
[47] Bell Island + Lime Kiln	ACI	t	6000	Inv: D		Y (1)		
[48] Medes Island partial reserve	ACI (4)	t	na	Inv: L				Y (1)
[49] Isla de la Palma RFA	ACI	t	2720	Inv: D, B		Y (1)	Y (1)	
[49] Isla Graciosa RFA	ACI	t	2900	Inv: D, B		Y (1)	Y (1)	
[49] Punta de La restinga BZ	ACI	t	2320	Inv: D, B		Y (1)	Y (1)	
[49] Punta de La restinga RFA	ACI	t	2520	Inv: D, B		Y (1)	Y (1)	
[50] Santa Catalina Inv NTRA	ACI	p (baited traps)	na	Inv: D, B		Y (1)	Y (1)	
[51] Mimiwhangata MP	B/A (5 / 4)	t	9000	Inv: D, B		Y (1)	Y (1)	

Table 2a. Summary of MPA characteristics of no-take reserves and partially protected areas included in the assessment of full protection over partial protection (NTR vs PPA)

NTR name	PPA name	Location	(Year of establishment) Year of effective protection (yrs. to survey)	NTR area (km²)	PPA area (km²)	Distance range of NTR to PPA (km)	Habitat
[2] Scandola IR	Scandola PPA	Europe	1975 (19)	na	na	adjacent	seagrass, rocks
[3] Scandola IR	Scandola PPA	Europe	1975 (13)	na	na	adjacent	seagrass
[52] Giannutri Island HPA	Giannutri Island LPA	Europe	(1989) 1996 (9)	4.4	na	adjacent	rock
[53] Ustica Island IR	Ustica Island GR	Europe	(1986) 1991 (6)	0.6	80	adjacent	rock
[53] Ustica Island IR	Ustica Island PR	Europe	(1986) 1991 (6)	0.6	79.01	adjacent	rock
[54] Mayor Island NTMR	Mayor Island RFA	New Zealand	1993 (11)	10.31	30.93	adjacent	reef, sand
[12] Italcomis Reef NTZ	Italcomis Reef MUZ	S. America	2001 (4) 2000 (5)	10	40	adjacent	coral reef
[13] Tavolara IR	Tavolara PR	Europe	(1997) 2003-4 (3)	5.29	31.13	adjacent	rock
[13] Tavolara IR	Tavolara GR	Europe	(1997) 2003-4 (3)	5.29	117.15	adjacent	rock
[17] Laguna - Heisler ER	La Jolla ER	N. America	1974 (24)	0.13	1.85	32	rocky-reef, kelp beds
[19] Piti MP	Achang MP	Asia	(1997) 2001 (2)	3.6	4.8	24	shallow reef flats
[19] Piti MP	Tumon Bay MP	Asia	(1997) 2001 (2)	3.6	4.5	12	sand, rubble, patch reefs, seagrass beds
[27] Isla La Graciosa IR	Isla La Graciosa BZ	Europe	1995 (9)	12.5	609.95	adjacent	rock

[27] Punta La Restiga IR	Punta La Restiga BZ	Europe	1996 (8)	1.8	4.8	adjacent	rock
[55] Kingston Reefs MS	Rottneest Island reserve	Australia	1988 (16)	1.26	38	adjacent	reef
[56] Maud SZ	recreational zone	Australia	1991 (9) 1989 (11)	na	na	11	coral lagoon
[56] Osprey SZ	recreational zone	Australia	1991 (9) 1989 (11)	na	na	6	coral lagoon
[56] Mandu SZ	recreational zone	Australia	1991 (9) 1989 (11)	na	na	9	coral lagoon
[57] Kisite MNP	Mpunguti MNR	Africa	(1978) 1989 (3)	28	11	adjacent	coral reef
[58] Giannutri Is zone 1	Giannutri Is zone 2	Europe	(1990) 1996 (4)	4.4	na	adjacent	rock, sand
[58] Capraia Is zone 1	Capraia Is zone 2	Europe	(1989) 1996 (4)	5.4	na	adjacent	seagrass meadow
[59] Long-Island MR	Charlotte Sound	New Zealand	1993 (16)	6.19	na	adjacent	cobble & small boulders
[33] Jurien Bay SZ	Jurien Bay RZ	Australia	2005 (2)	30.49	140.08	adjacent	reef
[60] Ustica Island IR	Ustica Island GR	Europe	(1986) 1991 (5)	0.6	80	adjacent	rock
[60] Ustica Island IR	Ustica Island PR	Europe	(1986) 1991 (5)	0.6	79.01	adjacent	rock
[61] Glover's Reef MRCZ	Glover's Reef MRGUZ	N. America	(1993) 1999 (2)	74	300	adjacent	coral atoll: patch reef
[44] Cerbere-Banyuls MR TPA	Cerbere-Banyuls MR PPA	Europe	1974 (25)	0.65	6.5	adjacent	rock
[49] Isla de la Palma NT	Isla de la Palma RFA	Europe	2001 (3)	na	na	adjacent	rock
[49] Isla Graciosa NT	Isla Graciosa RFA	Europe	1995 (6)	12.5	609.95	adjacent	rock
[49] Punta de La restinga NT	Punta de La restinga BZ	Europe	1995 (5)	1.8	0.9	adjacent	rock
[49] Punta de La restinga NT	Punta de La restinga RFA	Europe	1995 (5)	1.8	4.8	adjacent	rock
[62] Kingston Reefs MSNT	Rottneest MPA	Australia	1986 (18)	1.45	38	adjacent	coral reef

Table 2b. Summary of survey design & methodology and taxa & metrics measured for each no-take reserve and partially protected area included in the assessment of full protection over partial protection (NTR vs PPA)

NTR name	PPA name	Survey design	Survey method	Taxon; metrics	Analysis			
					Population (n)	Exploitation status (n)		
						D	B	L
[2] Scandola IR	Scandola PPA	ACI	t	Fish: D	Y (total)			
[3] Scandola IR	Scandola PPA	ACI (10)	p (stationary UVC)	Fish: B	Y (total)			
[52] Giannutri Island HPA	Giannutri Island LPA	ACI (4)	p (area search)	Fish: D	Y (56)	Y (47)		
[53] Ustica Island IR	Ustica Island GR	ACI (10)	t	Fish: D, SR	Y (total)	Y (15)		
[53] Ustica Island IR	Ustica Island PR	ACI (10)	t	Fish: D, SR	Y (total)	Y (15)		
[54] Mayor Island NTMR	Mayor Island RFA	ACI	p (BUV)	Fish: D, SR	Y (total)	Y (6)		
[12] Italcomis Reef NTZ	Italcomis Reef MUZ	ACI (5)	p (stationary UVC)	Fish: B	Y (total)		Y (4)	
[13] Tavolara IR	Tavolara PR	ACI (4)	t	Fish: D, B, SR	Y (total)	Y (5)	Y (5)	
[13] Tavolara IR	Tavolara GR	ACI (4)	t	Fish: D, B, SR	Y (total)	Y (5)	Y (5)	
[17] Laguna - Heisler ER	La Jolla ER	ACI (2)	t	Fish: D, B, L	Y (total)	Y (12)	Y (12)	Y (12)
[19] Piti MP	Achang MP	ACI (8)	t	Fish: B			Y (5)	
[19] Piti MP	Tumon Bay MP	ACI (8)	t	Fish: B			Y (5)	
[27] Isla La Graciosa IR	Isla La Graciosa BZ	ACI (2)	t	Fish: D, B		Y (4)	Y (4)	

[27] Punta La Restiga IR	Punta La Restiga BZ	ACI (2)	t	Fish: D, B		Y (4)	Y (4)	
[55] Kingston Reefs MS	Rottneest Island reserve	ACI (2)	p (baited BUV)	Fish: D, B, L		Y (4)	Y (3)	Y (3)
[56] Maud SZ	recreational zone	ACI (2)	p (BUV)	Fish: D, B, L		Y (5)	Y (1)	Y (1)
[56] Osprey SZ	recreational zone	ACI (2)	p (BUV)	Fish: D, B, L		Y (1)	Y (1)	Y (1)
[56] Mandu SZ	recreational zone	ACI (2)	p (BUV)	Fish: D, B, L		Y (5)	Y (1)	Y (1)
[57] Kisite MNP	Mpunguti MNR	ACI	t	Fish: D Inv: D	Y (total)	Y (41) Y (3)		
[58] Giannutri Is zone 1	Giannutri Is zone 2	ACI (3)	Fish (stationary count) Inv (quadrat)	Fish: D, SR Inv: SR	Y (total)			
[58] Capraia Is zone 1	Capraia Is zone 2	ACI (3)	Fish (stationary count) Inv (quadrat)	Fish: D, SR Inv: D, SR	Y (total)	Y (2)		
[59] Long-Island MR	Charlotte Sound	BACI (x/x) & ACI (x)	Fish: t Inv: p (quadrat)	Fish: D, L Inv: D, L		Y (7) Y (3)		Y (3) Y (3)
[33] Jurien Bay SZ	Jurien Bay RZ	multiple ACI (8)	t	Fish: D, B, SR Inv: D, L, SR	Y (21)	Y (12) Y (5)	Y (5)	Y (1)
[60] Ustica Island IR	Ustica Island GR	ACI	t	Inv: D, SR	Y (total)			
[60] Ustica Island IR	Ustica Island PR	ACI	t	Inv: D, SR	Y (total)			
[61] Glover's Reef MRCZ	Glover's Reef MRGUZ	BACI (9/9)	p (area search)	Inv: B, D		Y (2)	Y (2)	
[44] Cerbere-Banyuls MR TPA	Cerbere-Banyuls MR PPA	ACI	t	Inv: D, L		Y (1)		Y (1)
[49] Isla de la Palma NT	Isla de la Palma RFA	ACI	t	Inv: D, B, L		Y (1)	Y (1)	Y (1)
[49] Isla Graciosa NT	Isla Graciosa RFA	ACI	t	Inv: D, B, L		Y (1)	Y (1)	Y (1)

[49] Punta de La restinga NT	Punta de La restinga BZ	ACI	t	Inv: D, B, L		Y (1)	Y (1)	Y (1)
[49] Punta de La restinga NT	Punta de La restinga RFA	ACI	t	Inv: D, B, L		Y (1)	Y (1)	Y (1)
[62] Kingston Reefs MSNT	Rottneest MPA	ACI (2)	t	Inv: D, B, L		Y(1)	Y(1)	Y(1)

Table 2c. Studies not included in the meta-analysis due to different years of establishment of the no-take reserve and the partially protected area.

NTR name	(Year of NTR establishment) Year of effective protection	PPA name	Year of PPA protection	Age diff (NTR – PPA) (yrs)
[9] Poor Knights Island MR	1998	Mimiwhangata MP	1984	+14
[63] Oculina Experimental CA	1994	Oculina Habitat APC	1984 expanded in 2000	+10 / -6
[43] [64] Te Awaatu Channel MR	1993	Commercial Exclusion Zone	2005	-12
[30] Kisite MNP & GRZ	1978	Mtang'ata CFMZ	1996	-18
[48] Medes Island IR	1983	Medes Island PR	1990	-7
[26] Poor Knights MR	1998	Mimiwhangata MP	1984	+14
[51] Tawharanui MP	(1981) 1983	Mimiwhangata MP	1984	+3 / +1
[17] Catalina MLR	1988	La Jolla ER	1974	+14
[17] Natural Area	1971	La Jolla ER	1974	-3

References of included studies

- [1] Teixeira Chaves, L.D.C., Monteiro-Neto, C. 2009. Comparative analysis of rocky reef fish community structure in coastal islands of south-eastern Brazil. *Journal of the Marine Biological Association of the United Kingdom*, 89(3): 609-619.
- [2] Francour, P. 2000. Evolution spatio-temporelle a long terme des peuplements de poissons des herbiers a *Posidonia oceanica* de la reserve naturelle de Scandola (Corse, Mediterranee nord-occidentale). *Cybium*, 24(3): 85-95.
- [3] Francour, P. 1991. The effect of protection level on a coastal fish community at Scandola, Corsica. *Rev. Ecol. (Terre Vie)*, 46: 65 – 81.
- [4] Cinner, J.E., Marnane, M.J., McClanahan, T.R. 2005. Conservation and community benefits from traditional coral reef management at Ahus Island, Papua New Guinea. *Conservation Biology*, 19(6): 1714-1723.
- [5] Friedlander, A.M., Brown, E., Monaco, M.E, Clark, A. 2006. Fish Habitat Utilization Patterns and Evaluation of the Efficacy of Marine Protected Areas in Hawaii: Integration of NOAA Digital Benthic Habitat Mapping and Coral Reef Ecological Studies. NOAA Technical Memorandum NOS NCCOS 23, Silver Spring, MD. 217 pp.
- [6] Monaco M.E., Friedlander A.M., Caldow C., Hile S.D., Menza C., Boulon, R.H. 2009. Long-term monitoring of habitats and reef fish found inside and outside of the US Virgin Islands Coral Reef National Monument: a comparative assessment. *Caribbean Journal of Science*, 45: 338-347.
- [7] Friedlander, A.M., Wedding, L.M., Brown, E., Monaco, M.E. 2010. Monitoring Hawaii's Marine Protected Areas: Examining Spatial and Temporal Trends Using a Seascape Approach. NOAA Technical Memorandum NOS NCCOS 117. Prepared by the NCCOS Center for Coastal Monitoring and Assessment's Biogeography Branch. Silver Spring, MD. 130 pp.
- [8] Miller, R., Williams, B., Duffy, C. 2005. Reef fish of the Sugar Loaf Islands (Ngä Motu) Marine Protected Area, New Zealand. DOC Research & Development Series 226, pp. 1-26.
- [9] Denny, C.M., Babcock, R.C. 2004. Do partial marine reserves protect reef fish assemblages? *Biological Conservation*, 116(1): 119-129.
- [10] Valle, C., Bayle-Sempere, J.T. 2009. Effects of a marine protected area on fish assemblage associated with *Posidonia oceanica* seagrass beds: temporal and depth variations. *Journal of Applied Ichthyology*, 25(5): 537-544.
- [11] Garrison, V.H., Rogers, C.S., Beets, J. 1998. Of reef fishes, overfishing and in situ observations of fish traps in St. John, US Virgin Islands. *Rev Biol Trop*, 46(5): 41-59.
- [12] Francini, R.B., de Moura, R.L. 2008. Dynamics of fish assemblages on coral reefs subjected to different management regimes in the Abrolhos Bank, eastern Brazil. *Aquatic Conservation-Marine and Freshwater Ecosystems*, 18(7): 1166-1179.
- [13] Di Franco, A., Bussotti, S., Navone, A., Panzalis, P., Guidetti, P. 2009. Evaluating effects of total and partial restrictions to fishing on Mediterranean rocky-reef fish assemblages. *Marine Ecology Progress Series*, 387: 275-285.
- [14] Dimech, M., Camilleri, M., Hiddink, J.G., Kaiser, M.J., Ragonese, S., Schembri, P.J. 2008. Differences in demersal community structure and biomass size spectra within and outside the Maltese Fishery Management Zone (FMZ). *Scientia Marina*, 72(4): 669-682.
- [15] Jaworski, A., Solmundsson, J., Ragnarsson, S.A. 2010. Fish assemblages inside and outside marine protected areas off northern Iceland: protection effects or environmental confounds? *Fisheries Research*, 102: 50-59.

- [16] Chapman, M.R., Kramer, D.L. 1999. Gradients in coral reef fish density and size across the Barbados Marine Reserve boundary: effects of reserve protection and habitat characteristics. *Marine Ecology Progress Series*, 181: 81-96.
- [17] Tetreault, I., Ambrose, R.F. 2007. Temperate marine reserves enhance targeted but not untargeted fishes in multiple no-take MPAs. *Ecological Applications*, 17(8): 2251-2267.
- [18] Monaco, M.E., Friedlander, A.M., caldow, C., Christensen, J.D., Rogers, C., Beets, J., Miller, J., Boulon, R. 2007. Characterising reef fish populations and habitats within and outside the US Virgin Islands Coral Reef National Monument: a lesson in marine protected area design. *Fisheries Management and Ecology*, 14(1): 33-40.
- [19] Tupper, M.H. 2007. Spillover of commercially valuable reef fishes from marine protected areas in Guam, Micronesia. *Fishery Bulletin*, 105(4): 527-537.
- [20] Nardi, K., Jones, G.P., Moran, M.J., Cheng, Y.W. 2004. Contrasting effects of marine protected areas on the abundance of two exploited reef fishes at the sub-tropical Houtman Abrolhos Islands, Western Australia. *Environmental Conservation*, 31(2): 160-168.
- [21] Smith, M.D., J. H. Grabowski, Yund, P.O. 2008. The role of closed areas in rebuilding monkfish populations in the Gulf of Maine. *ICES Journal of Marine Science*, 65(7): 1326-1333.
- [22] Walsh, W.J., Tissot, B.N., Hallacher, L.E., 2004. A report on the findings and recommendations of effectiveness of the West Hawaii Regional Fishery Management Area. In: Report to the Twenty-Third Hawai'i Legislature Regular Session of 2005., p. 38.
- [23] Taylor, B.M., McIlwain, J.L. 2010. Beyond abundance and biomass: effects of marine protected areas on the demography of a highly exploited reef fish. *Marine Ecology Progress Series*, 411: 243-258.
- [24] Jouvenel, J.Y., Pollard, D.A. 2001. Some effects of marine reserve protection on the population structure of two spearfishing target-fish species, *Dicentrarchus labrax* (Moronidae) and *Sparus aurata* (Sparidae), in shallow inshore waters, along a rocky coast in the northwestern Mediterranean Sea. *Aquatic Conservation-Marine and Freshwater Ecosystems*, 11(1): 1-9.
- [25] McLean, D.L., Harvey, E.S., Fairclough, D.V., Newman, S.J. 2010. Large decline in the abundance of a targeted tropical lethrinid in areas open and closed to fishing. *Marine Ecology Progress Series*, 418: 189-199.
- [26] Roux De Buisson, P. 2010. Poor Knights Islands marine reserve and Mimiwhangata marine park fish monitoring 2009. Department of Conservation, Whangarei, New Zealand, pp. 1-42.
- [27] Tuya, F., Garcia-Diez, C., Espino, F., Haroun, R.J. 2006. Assessment of the effectiveness of two marine reserves in the Canary Islands (eastern Atlantic). *Ciencias Marinas*, 32(3): 505-522.
- [28] Badalamenti, F., D'Anna, G. et al. 2002. Size-related trophodynamic changes in three target fish species recovering from intensive trawling. *Marine Biology*, 141(3): 561-570.
- [29] Tupper, M., Rudd, M.A. 2002. Species-specific impacts of a small marine reserve on reef fish production and fishing productivity in the Turks and Caicos Islands. *Environmental Conservation*, 29(4): 484-492.
- [30] McClanahan, T.R., Verheij, E., Maina, J. 2006. Comparing the management effectiveness of a marine park and a multiple-use collaborative fisheries management area in East Africa. *Aquatic Conservation-Marine and Freshwater Ecosystems*, 16(2): 147-165.

- [31] Pipitone, C., Badalamenti, F. et al. 2000. Fish biomass increase after a four-year trawl ban in the Gulf of Castellammare (NW Sicily, Mediterranean Sea). *Fisheries Research*, 48(1): 23-30.
- [32] Forcada, A., Valle, C. et al. 2009. Effects of habitat on spillover from marine protected areas to artisanal fisheries. *Marine Ecology Progress Series*, 379: 197-211.
- [33] Edgar, G., Barrett, N., Crane, K., Bancroft, K. 2009. Ecosystem monitoring of subtidal reefs in different management zones of the Jurien Bay Marine Park 1999 2007. TAFI Internal Report, pp. 1- 57.
- [34] Link, J., Almeida, F., Valentine, P., Auster, P., Reid, R., Vitaliano, J. 2005. The effects of area closures on Georges Bank. *Benthic Habitats and the Effects of Fishing*, 41: 345-368.
- [35] Grizzle, R.E., Ward, L.G., et al. 2009. Effects of a large fishing closure on benthic communities in the western Gulf of Maine: recovery from the effects of gillnets and otter trawls. *Fishery Bulletin*, 107(3): 308-317.
- [36] Knight, E.P. 2005. The effects of trawling on benthic habitats: an analysis of recovery in the Western Gulf of Maine closure. M.S. thesis, 94 p. Univ. Maine, Orono, ME.
- [37] Schejter, L., Bremec, C.S., Hernandez, D. 2008. Comparison between disturbed and undisturbed areas of the Patagonian scallop (*Zygochlamys patagonica*) fishing ground "Reclutas" in the Argentine Sea. *Journal of Sea Research*, 60: 193 – 200.
- [38] Simboura, N., Zenetos, A., Pancucci-Papadopoulou, M., Thessalou-Legaki, M., Papaspyrou, S. 1998. A baseline study on benthic species distribution in two neighbouring gulfs, with and without access to bottom trawling. *Marine Ecology-Pubblicazioni Della Stazione Zoologica Di Napoli I*, 19(4): 293-309.
- [39] Stone, R.P., Masuda, M.M., Malachi, P.W. 2005. Effects of bottom trawling on soft-sediment epibenthic communities in the Gulf of Alaska. *Benthic Habitats and the Effects of Fishing*, 41: 461-475.
- [40] Asch, R.G., Collie, J.S. 2008. Changes in a benthic megafaunal community due to disturbance from bottom fishing and the establishment of a fishery closure. *Fishery Bulletin*, 106(4): 438-456.
- [41] Beukers-Stewart, B.D., Vause, B.J., Mosley, M.W.J., Rossetti, H.L., Brand, A.R. 2005. Benefits of closed area protection for a population of scallops. *Marine Ecology Progress Series*, 298: 189-204.
- [42] Blyth, R.E., Kaiser, M.J., Edward-Jones, G., Hart, P.J.B. 2004. Implications of a zoned fishery management system for marine benthic communities. *Journal of Applied Ecology*, 41: 951- 961
- [43] Jack, L., Wing, S.R. 2010. Maintenance of old-growth size structure and fecundity of the red rock lobster *Jasus edwardsii* among marine protected areas in Fiordland, New Zealand. *Marine Ecology Progress Series*, 404: 161-172.
- [44] Lecchini, D., Lenfant, P., Planes, S. 2002. Variation in abundance and population dynamics of the sea-urchin *Paracentrotus lividus* on the Catalan coast (North-Western Mediterranean Sea) in relation to habitat and marine reserve. *Vie et Milieu*, 52(2-3): 111-118.
- [45] Lincoln-Smith, M.P.L., Bell, J.D., Pitt, K.A., Thomas, P., Ramohia, P. 2000. The Arnavon Islands Marine Conservation Area: Lessons in monitoring and management. *Proceedings 9th International Coral Reef Symposium, Bali, Indonesia 23-27 October 2000*.

- [46] Taggart, S.J., Shirley, T.C., O'Clair, C.E., Mondragon, J. 2004. Dramatic increase in the relative abundance of large male Dungeness crabs *Cancer magister* following closure of commercial fishing in Glacier bay, Alaska. *Aquatic Protected Areas as Fisheries Management Tools*, 42: 243-253.
- [47] Tuya, F.C., Sobol, M.L., Kido, J. 2000. An assessment of the effectiveness of Marine Protected Areas in the San Juan Islands, Washington, USA. *ICES Journal of Marine Science*, 57(4): 1218-1226.
- [48] Rius, M., Zabala, M. 2008. Are marine protected areas useful for the recovery of the Mediterranean mussel populations? *Aquatic Conservation: Marine and Freshwater Ecosystems*, 18(5): 527-540.
- [49] Hernandez, J.C., Clemente, S., Sangil, C., Brito, A. 2008. Actual status of the sea urchin *Diadema aff. antillarum* populations and macroalgal cover in marine protected areas compared to a highly fished area (Canary Islands - eastern Atlantic Ocean). *Aquatic Conservation: Marine and Freshwater Ecosystems*, 18(7): 1091-1108.
- [50] Iacchei, M., Robinson, P., Miller, K.A. 2005. Direct impacts of commercial and recreational fishing on spiny lobster, *Panulirus interruptus*, populations at Santa Catalina Island, California, United States. *NZJ Mar Freshw Res*, 39: 1201-1214.
- [51] Shears, N.T., Grace, R.V., Usmar, N.R., Kerr, V., Babcock, R.C. 2006. Long-term trends in lobster populations in a partially protected vs. no-take Marine Park. *Biological Conservation*, 132(2): 222-231.
- [52] Cecchi, E., Piazzini, L., Balata, D. 2007. Interaction between depth and protection in determining the structure of Mediterranean coastal fish assemblages. *Aquatic Living Resources*, 20(2): 123-129.
- [53] La Mesa, G., Vacchi, M. 1999. An analysis of the coastal fish assemblage of the Ustica Island Marine Reserve. *PSZN I: Marine Ecology*, 20: 147-165.
- [54] Shears, N.T., Usmar, N.R. 2006. Response of reef fish to partial and no-take protection at Mayor Island (Tuhua). *Dept of Conservation Research and Development Report No. 243*
- [55] Kleczkowski, M., Babcock, R.C., Clapin, G. 2008. Density and size of reef fishes in and around a temperate marine reserve. *Marine and Freshwater Research*, 59(2): 165-176.
- [56] Westera, M., Lavery, P., Hyndes, G. 2003. Differences in recreationally targeted fishes between protected and fished areas of a coral reef marine park. *Journal of Experimental Marine Biology and Ecology*, 294(2): 145-168.
- [57] Watson, M., Ormond, R.F.G. 1994. Effect of an Artisanal Fishery on the Fish and Urchin Populations of a Kenyan Coral-Reef. *Marine Ecology Progress Series*, 109(2-3): 115-129.
- [58] Micheli, F., Benedetti-Cecchi, L. et al. 2005. Human impacts, Marine protected areas, and the structure of Mediterranean reef assemblages. *Ecological Monographs*, 75(1): 81-103.
- [59] Davidson, R.J., Abel, W., Richards, L.A. 2009. Biological monitoring update for Long Island-Kokomohua Marine Reserve, Queen Charlotte Sound: 1992-2009. Prepared by Davidson Environmental Limited for Department of Conservation, Nelson. *Survey and Monitoring Report No. 573*.
- [60] Milazzo, M., Chemello, R., Badalamenti, F., Riggio, S. 2000. Molluscan assemblages associated with photophilic algae in the marine reserve of Ustica Island (Lower Tyrrhenian Sea, Italy). *Ital J Zool (Modena)*, 67:287-295.

- [61] Acosta, C.A., Robertson, D.N. 2003. Comparative spatial ecology of fished spiny lobsters *Panulirus argus* and an unfished congener *P. guttatus* in an isolated marine reserve at Glover's Reef atoll, Belize. *Coral Reefs*, 22(1): 1-9.
- [62] Babcock, R.C., Phillips, J.C. et al. 2007. Increased density, biomass and egg production in an unfished population of Western Rock Lobster (*Panulirus cygnus*) at Rottneest Island, Western Australia. *Marine and Freshwater Research*, 58(3): 286-292.

Not included in the quantitative analysis

- [63] Harter, S.L., Ribera, M.M. et al. 2009. Assessment of fish populations and habitat on Oculina Bank, a deep-sea coral marine protected area off eastern Florida. *Fishery Bulletin*, 107(2): 195-206.
- [64] Jack, L., Wing, S.R., McLeod, R.J. 2009. Prey base shifts in red rock lobster *Jasus edwardsii* in response to habitat conversion in Fiordland marine reserves: implications for effective spatial management. *Marine Ecology Progress Series*: 381: 213-222.