The following supplement accompanies the article

Bait increases the precision in count data from remote underwater video for most subtidal reef fish in the warm-temperate Agulhas bioregion

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Supplement 1. Power analysis (Willis et al. 2003)

This approach is designed for assessing an analysis of count data fitted on a Poisson distribution. Although the Poisson model assumes equality of the mean and the variance, count data are typically over-dispersed, with the variance (σ^2) equalling the sum of the mean and an over-dispersion parameter estimate of ($\sigma^2 = \Phi\mu$). The over-dispersion parameter (Φ) is calculated by dividing the model deviance by the residual degrees of freedom, and is also known as the residual deviance. By incorporating the over-dispersion parameter, the ratio of 2 predicted means (k) can be used to estimate the upper bound (β) on the probability of a Type II error, taken as the probability of having a standard-normal quantile (Z_β)

$$Z_\beta = \frac{\log(k)}{\sqrt{\frac{\phi}{n\mu_1}\frac{k+1}{k}}} - Z_{\alpha/2}$$

Where n is the sample size, α is the Type I error rate of the test, here equalling 0.05 and resulting in a $Z_{\alpha/2}$ of 1.96; μ_1 is the lower of the 2 means. From this equation the required number of samples to achieve a stipulated effect size (k) with a desired power (Z_β) can be estimated by making n the subject of the equation. In this study, a power analysis was used to determine the optimal number of samples required to detect an effect size of 2, a 50% decrease from the maximum of a predicted mean. This could reflect a doubling or halving of a population, and is thought to be a biologically meaningful effect criterion considering the levels of natural variability in fish populations (Edgar & Barrett 1999, Willis et al. 2003).

LITERATURE CITED

Edgar GJ, Barrett NS (1999) Effects of declaration of marine reserves on Tasmanian reef fishes, invertebrates and plants. J Exp Mar Biol Ecol 242:107–144

Willis TJ, Millar RB, Babcock RC (2003) Protection of exploited fish in temperate regions: high density and biomass of snapper *Pargus auratus* (Sparidae) in northern New Zealand marine reserves. J Appl Ecol 40:214–227

Supplement 2. Details for the analysis of the effect of bait on abundance of trophic guilds

Table S2.1. Species classification criteria

Class	Family	Scientific name	Common name	Fisheries importance	Trophic guild
Osteichthyes	Ariidae	*Galeichthys feliceps*	White seacatfish	Tertiary	Generalist carnivore
	Carangidae	*Seriola lalandi*	Giant yellowtail	Primary	Piscivore
		Trachurus trachurus	Maasbanker	Tertiary	Zooplanktivore
	Chaetodontidae	*Chaetodon marleyi*	Doublesash butterflyfish	Aquarium	Microinvertebrate carnivore
	Cheilodactylidae	*Cheilodactylus fasciatus*	Redfingers	Non-target	Microinvertebrate carnivore
		Cheilodactylus pixi	Barred fingerfin	Non-target	Microinvertebrate carnivore
		Chirodactylus brachydactylus	Twotone fingerfin	Tertiary	Microinvertebrate carnivore
	Gobiesocidae	*Chorisochismus dentex*	Rocksucker	Non-target	Microinvertebrate carnivore
	Haemulidae	*Pomadasys olivaceum*	Piggy	Tertiary	Invertebrate carnivore
	Oplegnathidae	*Oplegnathus conwayi*	Cape knifejaw	Secondary	Omnivore
	Parascorpididae	*Parascorpis typus*	Jutjaw	Non-target	Zooplanktivore
	Sciaenidae	*Atractoscion aequidens*	Geelbek	Primary	Piscivore
	Scombridae	*Scomber japonicus*	Chub mackerel	Tertiary	Zooplanktivore
	Serranidae	*Acanthistius sebastoides*	Koester	Non-target	Generalist carnivore
		Epinephelus marginatus	Yellowbelly rockcod	Primary	Generalist carnivore
	Sparidae	*Argyrozona argyrozona*	Carpenter	Primary	Generalist carnivore
		Boopsoidea inornata	Fransmadam	Secondary	Generalist carnivore
		Cheimerius nufar	Santer	Primary	Generalist carnivore
		Chrysoblephus cristiceps	Dageraad	Primary	Generalist carnivore
		Chrysoblephus gibbiceps	Red stumpnose	Primary	Generalist carnivore
		Chrysoblephus laticeps	Roman	Primary	Generalist carnivore
		Diplodus capensis	Blacktail	Secondary	Omnivore
		Diplodus hottentotus	Zebra	Secondary	Omnivore
		Gymnocrotaphus curvidens	Janbruin	Secondary	Omnivore
		Lithognathus mormyrus	Sand steenbras	Tertiary	Invertebrate carnivore
		Pachymetopon aeneum	Blue hottentot	Primary	Invertebrate carnivore
		Pachymetopon blochii	Hottentot	Primary	Generalist carnivore

		Pachymetopon grande	Bronze bream	Secondary	Omnivore
		Pagellus bellottii natalensis	Red tjor-tjor	Tertiary	Microinvertebrate carnivore
		Petrus rupestris	Red steenbras	Primary	Generalist carnivore
		Pterogymnus laniarius	Panga	Secondary	Generalist carnivore
		Rhabdosargus globiceps	White stumpnose	Primary	Invertebrate carnivore
		Rhabdosargus holubi	Cape stumpnose	Tertiary	Invertebrate carnivore
		Sarpa salpa	Strepie	Tertiary	Herbivore
		Sparodon durbanensis	White musselcracker	Primary	Invertebrate carnivore
		Spondyliosoma emarginatum	Steentjie	Secondary	Invertebrate carnivore
	Tetraodontidae	*Amblyrhynchotes honckenii*	Evileye blaasop	By-catch	Generalist carnivore
Condrichthyes	Carcharhinidae	*Carcharhinidae* spp.	Requiem shark spp.	Tertiary	Generalist carnivore
		Carcharhinus brachyurus	Copper shark	Tertiary	Piscivore
		Mustelus mustelus	Smooth-hound	By-catch	Generalist carnivore
		Triakis megalopteris	Spotted gullyshark	By-catch	Generalist carnivore
	Dasyatidae	*Dasyatis brevicaudata*	Shorttail stingray	Tertiary	Invertebrate carnivore
		Dasytidae spp.	Stingray spp.	By-catch	Invertebrate carnivore
		Gymnura natalensis	Diamond ray	By-catch	Invertebrate carnivore
	Hexanchidae	*Notorynchus cepedianus*	Spotted sevengill cowshark	Tertiary	Generalist carnivore
	Myliobatidae	*Myliobatis aqulia*	Eagleray	Tertiary	Invertebrate carnivore
		Pteromylaeus bovinus	Duckbill ray	Tertiary	Generalist carnivore
	Rhinobatidae	*Rhinobatos annnulatus*	Lesser guitarfish	By-catch	Invertebrate carnivore
	Scyliorhinidae	*Haploblepharus edwardsii*	Puffadder shyshark	By-catch	Generalist carnivore
		Haploblepharus pictus	Dark shyshark	By-catch	Generalist carnivore
		Poroderma africanum	Striped catshark	By-catch	Generalist carnivore
		Poroderma pantherinum	Leopard catshark	By-catch	Generalist carnivore
		Scyliorhinidae spp.	Catshark spp.	By-catch	Generalist carnivore
	Sphyrnidae	*Sphyrna* spp.	Hammerhead	By-catch	Generalist carnivore
Agnatha	Myxinidae	*Eptatretus hexatrema*	Six-gill hagfish	By-catch	Generalist carnivore

Table S2.2. Summary of the correlation between unbaited (RUV) and baited (BRUV) remote underwater video for the random effects (station and species nested in station) from the generalized linear mixed effects model (GLMM) investigating the effects of bait on the abundance of species grouped according to their trophic guild

Random effects				
Groups	**Method**	**Variance**	**SD**	**Correlation**
Species:Station	RUV	0.643	0.802	
	BRUV	1.081	1.040	0.837
Station	RUV	1.366	1.169	
	BRUV	0.326	0.571	0.719

Table S2.3. Summary of the fixed effects from the GLMM investigating the effects of bait on the abundance of species grouped according to their trophic guild. Significance levels: · < 0.1; * < 0.05; ** < 0.01; *** < 0.001

Best fit model results				
Fixed effects	**log(Odds ratio)**	**SE**	***Z*-value**	
Intercept (RUV: (1) Bony-Omnivore)	-3.60	0.40	-8.91	***
BRUV: (1) Bony-Omnivore	1.26	0.40	3.13	**
RUV: (2) Bony-Microinvertebrate carnivore	0.33	0.24	1.37	
RUV: (3) Bony-Invertebrate carnivore	0.72	0.22	3.26	**
RUV: (4) Bony-Generalist carnivore	0.51	0.21	2.48	*
RUV: (5) Cartilaginous-Invertebrate carnivore	-0.90	0.54	-1.66	·
RUV: (6) Cartilaginous-Generalist carnivore	-1.16	0.33	-3.46	***
RUV: Visible reef	0.04	0.01	5.18	***
BRUV: (2) Bony-Microinvertebrate carnivore	-0.84	0.29	-2.86	**
BRUV: (3) Bony-Invertebrate carnivore	1.08	0.23	4.70	***
BRUV: (4) Bony-Generalist carnivore	0.43	0.22	1.91	.
BRUV: (5) Cartilaginous-Invertebrate carnivore	0.47	0.62	0.76	
BRUV: (6) Cartilaginous-Generalist carnivore	1.43	0.35	4.03	***
BRUV: Visible reef	-0.02	0.01	-3.23	**

Table S2.4. Summary of the correlation of fixed effects from the GLMM investigating the effects of bait on the abundance of species grouped according to their trophic guild. B = bony fish, C = cartilaginous fish, micIC = microinvertebrate carnivores, IC = invertebrate carnivores, GC = generalist carnivores, BRUV = omnivores sampled with the BRUV. The intercept can be taken as the value for the omnivores from the RUV

Correlation of fixed effects													
	Intercept	**BRUV**	**(2) B-MicIC**	**(3) B-IC**	**(4) B-GC**	**(5) C-IC**	**(6) C-GC**	**Visible reef**	**BRUV:(2) B-MicIC**	**BRUV:(3) B-IC**	**BRUV:(4) B-GC**	**BRUV:(5) C-IC**	**BRUV:(6) C-GC**
BRUV	-0.75												
(2) B-MicIC	-0.31	0.15											
(3) B-IC	-0.36	0.18	0.57										
(4) B-GC	-0.39	0.19	0.61	0.68									
(5) C-IC	-0.17	0.11	0.23	0.26	0.27								
(6) C-GC	-0.28	0.15	0.38	0.43	0.47	0.17							
Visible reef	-0.69	0.63	-0.01	0.00	0.00	0.04	0.04						
BRUV:(2) B-MicIC	0.12	-0.33	-0.38	-0.24	-0.25	-0.10	-0.15	0.01					
BRUV:(3) B-IC	0.19	-0.42	-0.28	-0.45	-0.34	-0.13	-0.21	-0.02	0.55				
BRUV:(4) B-GC	0.19	-0.44	-0.29	-0.32	-0.45	-0.13	-0.22	-0.01	0.56	0.74			
BRUV:(5) C-IC	0.10	-0.21	-0.10	-0.11	-0.12	-0.71	-0.08	-0.05	0.21	0.26	0.27		
BRUV:(6) C-GC	0.16	-0.32	-0.18	-0.21	-0.23	-0.08	-0.71	-0.05	0.36	0.48	0.50	0.18	
BRUV: Visible reef	0.58	-0.76	0.01	0.01	0.01	-0.04	-0.03	-0.83	0.01	0.00	0.01	0.07	0.05

Supplement 3. Details of the analysis of the effect of bait and environmental variables on the observed count data of dominant species

Table S3.1. Results from the generalised linear mixed effects models conducted on the dominant species investigating the effect of bait and environmental variables on the observed count data. RDF: residual degrees of freedom; AIC: Akaike information criterion; OR: odds ratio

	Roman					**Steentjie**					**Fingerfins**				
	RDF	Deviance	AIC	ΔAIC	Weight	RDF	Deviance	AIC	ΔAIC	Weight	RDF	Deviance	AIC	ΔAIC	Weight
Saturated model	41	82.14	100.10		0.02	37	153.90	175.90		0.02	59	78.67	100.70		0.01
Best fit model	45	84.40	94.40	-5.74	0.34	43	161.20	171.20	-4.69	0.18	65	83.86	93.86	-6.84	0.25
Residual deviance	1.88					3.75					1.29				

	log(OR) ± SE	MaxN ± SD	*Z*-value	log(OR) ± SE	MaxN ± SD	*Z*-value	log(OR) ± SE	MaxN ± SD	*Z*-value
Intercept ± RUV	-0.92 ± 0.19	2.74 ± 1.84	-4.87 ***	-0.95 ± 0.36	5.60 ± 7.89	-2.61 **	-1.45 ± 0.20	1.83 ± 0.78	-7.33 ***
BRUV	0.70 ± 0.15	5.48 ± 3.52	4.60 ***	2.37 ± 0.31	30.53 ± 20.68	7.69 ***	-1.22 ± 0.26	0.54 ± 0.24	-4.61 ***

	Red steenbras					**Smooth-hound**					**Catsharks**				
	RDF	Deviance	AIC	ΔAIC	Weight	RDF	Deviance	AIC	ΔAIC	Weight	RDF	Deviance	AIC	ΔAIC	Weight
Saturated model	23	24.46	46.46		0	27	36.81	51.00		0.03	47	60.45	74.45		0.08
Best fit model	29	28.51	38.51	-7.95	0.22	33	47.09	46.55	-4.45	0.29	49	60.73	70.73	-3.72	0.51
Residual deviance	0.98					1.43					1.24				

	Log(OR) ± SE	MaxN ± SD	*Z*-value	log(OR) ± SE	MaxN ± SD	*Z*-value	log(OR) ± SE	MaxN ± SD	*Z*-value
Intercept ± RUV	-2.26 ± 0.30	0.73 ± 0.47	-7.50 ***	-3.13 ± 0.42	0.32 ± 0.21	-7.52 ***	-3.23 ± 0.47	0.27 ± 0.15	-6.87 ***
BRUV	0.55 ± 0.35	1.39 ± 0.90	1.58	1.77 ± 0.45	1.84 ± 1.20	3.94 ***	1.69 ± 0.42	1.44 ± 0.63	4.04 ***