Abstract—Three experiments were performed in an estuarine squid-trawl fishery in New South Wales, Australia, to test modifications to trawl nets. Lateral mesh openings were experimentally increased and physical bycatch reduction devices (BRDs) were placed in codends. These modifications aimed to reduce nontargeted catches of fish, while maintaining catches of the targeted broad squid (*Photololigo*) *idgei* and bottle squid (*Loliolus*) *luca*. Compared to conventional codends made with 41-mm diamond mesh, codends made with different posterior circumferences and larger 45-mm mesh had no significant effect on the catches of any species. The best performing configurations involved the installation of BRDs designed to separate organisms according to differences in behavior. In particular, versions of a composite square-mesh panel reduced the total weight of bycatch by up to 71% and there was no significant effect on the catches of squid. The results are discussed in terms of the prob

In New South Wales (NSW) Australia, arrow squid (*Nototodarus gouldi*), mitre squid (*Photololigo* sp.) and southern calamari (*Sepioteuthis australis*) are important in the legally retained bycatch from fish and prawn trawlers working in oceanic waters. In addition, two species of squid are specifically targeted by up to 20 trawlers with modified, single-rigged prawn trawls in Broken Bay (Fig. 1). Broad squid (*P. etheridgei*) (typically 30–290 mm mantle length [ML] when harvested) represent the majority of the total catch (approximately 25−50 t per year since 1997), although the smaller bottle squid (*Loliolus noctiluca*) (30–90 mm ML when harvested) are also retained and sold, primarily as bait for recreational

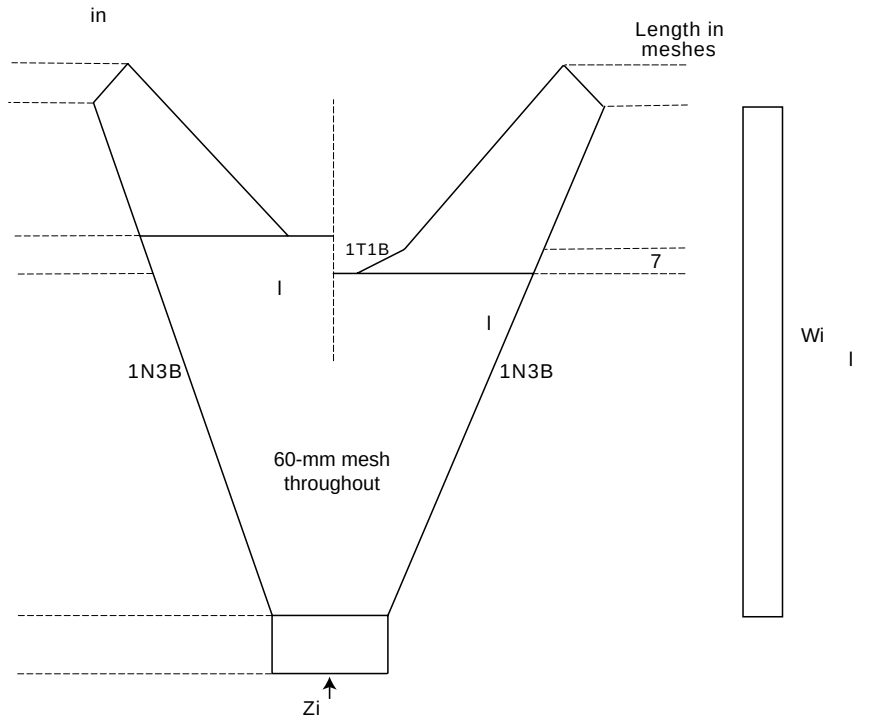

Figure 2

Plan of the 4-seam squid trawl used in the study. N = normals; T = transversals, B = bars.

Table 2

Analyses of catches from experiment 2 during July–August 2002. Data are weights of catches from two locations (Patonga, Flint

Table 3

Analyses of catches from four codends (41/100, square-mesh, 75-panel, 75-CSMP [composite square-mesh panel]) from experiment 3 at Flint and Steel during August–September 2002. Data are weights of catches on five days, during each of which there were $n = 3$ independent hauls with each type of gear.

A Analysis of variance

			Bycatch			Squid			Ratio: bycatch/squid		
		df	Mean square	*F*	*P*	Mean square	*F*	*P*	Mean square	*F*	*P*
Mesh: 41 vs. square mesh	= *M*	1	0.9	1.4	>0.25	0.001	0	>0.95	0.3	0.8	>0.35
+BRD vs. −BRD	= *B*	1	4.5	6.6	<0.01	0.1	0.2	>0.60	2.4	3.1	>0.15
$M \times B$		1	2.5	3.6	>0.05	0.2	0.4	>0.50	1.0	0.4	
Days	= *D*	4	5.7	8.4	<0.001	0.7	0.7	>0.60	2.5	6.0	<0.001
$M \times D$		4	0.8[p]			0.5[p]			0.2[p]	0.4	>0.50
$B \times D$		4	0.8[p]			0.6[p]			0.8	1.8	>0.15
$M \times B \times D$		4	0.6[p]			0.4[p]			0.2[p]		
Residual		40	0.7[p]			0.6[p]			0.5[p]		
[p]Pooled residual		52	0.7			0.6			0.41	(48 df)	

B Multiple comparisons: mean weight (kg, (±standard error, n=30)) of bycatch, squid. and ratio of bycatch/squid; * indicates a difference (Student-Newman-Keuls test; P<0.05).

	Bycatch		Squid		Ratio: bycatch/squid	
	−BRD	+BRD	−BRD	+BRD	−BRD	+BRD

designed from an understanding of the behavior of fish and squid were effective in allowing fish to escape and did

in reducing bycatch and in improving