Detection and quantification of differences in catch rates among research vessel gears and commercial vessels

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Supplementary material for "Detection and quantification of differences in catch rates among research vessel gears and commercial vessels" by Delargy *et al.*

Includes: Tables A.1 and A.2 and Figures A.1 and A.2.

Table A.1: A list of the order of statistical model comparisons made between pairs of vessels, or type of research vessel dredges.

Commercial vessel	Compared to
FV1	FV2
FV1	FV3
FV1	RVK
FV1	RVQ
FV2	FV3
FV2	RVK
FV2	RVQ
FV3	RVK
FV3	RVQ

Table A.2. Statistics for each of the vessel comparisons studied. These are the number of hauls conducted, the number of hauls excluded from the statistical analyses because no scallops were caught by either vessel, the mean distance between the two vessels across all hauls and the distance from the hauls when the two vessels were furthest apart.

Vessel one	Compared to (Vessel two)	Number of hauls	Number of hauls excluded	Mean distance between vessels (m)	Maximum distance between vessels (m)
FV1	FV2	20	0	469.8	1103.3
FV1	FV3	21	1	521.1	1358.6
FV1	RVK	21	0	545.2	936.9
FV1	RVQ	21	1	545.2	936.9
FV2	FV3	34	0	376.6	1381.9
FV2	RVK	34	1	475.8	969.3
FV2	RVQ	34	0	475.8	969.3
FV3	RVK	35	0	486.1	976.1
FV3	RVQ	35	1	486.1	976.1

Table A.3: Parameter estimates from size structured binomial models for each comparison between two vessels (either basis spline or polynomial model). Type of model was selected by AIC for each comparison. Each model was fitted with scallop width (mm) (x) scaled so that $scaled = \frac{x-\bar{x}}{sd(x)}$, where $\bar{x}$ is the mean scallop width.

	Basis spline			
Comparison	β_0	β_1	β_2	β_3
FV1 vs FV2	0.016	-1.027	0.622	-2.18
FV1 vs FV3	2.224	-3.897	-1.058	-3.724
FV1 vs RVK	-4.033	1.591	6.584	1.15
FV1 vs RVQ	-7.541	7.892	7.68	6.545
FV2 vs FV3	2.427	-3.902	-1.674	-1.834
FV2 vs RVK	-3.98	2.531	5.596	3.731
FV3 vs RVQ	-12.536	17.41	10.5	13.18
	Polynomial			
Comparison	β_0	β_1	β_2	β_3
FV2 vs RVQ	-0.201	0.831	-0.443	0.121
FV3 vs RVK	-0.198	0.496	-0.491	0.111

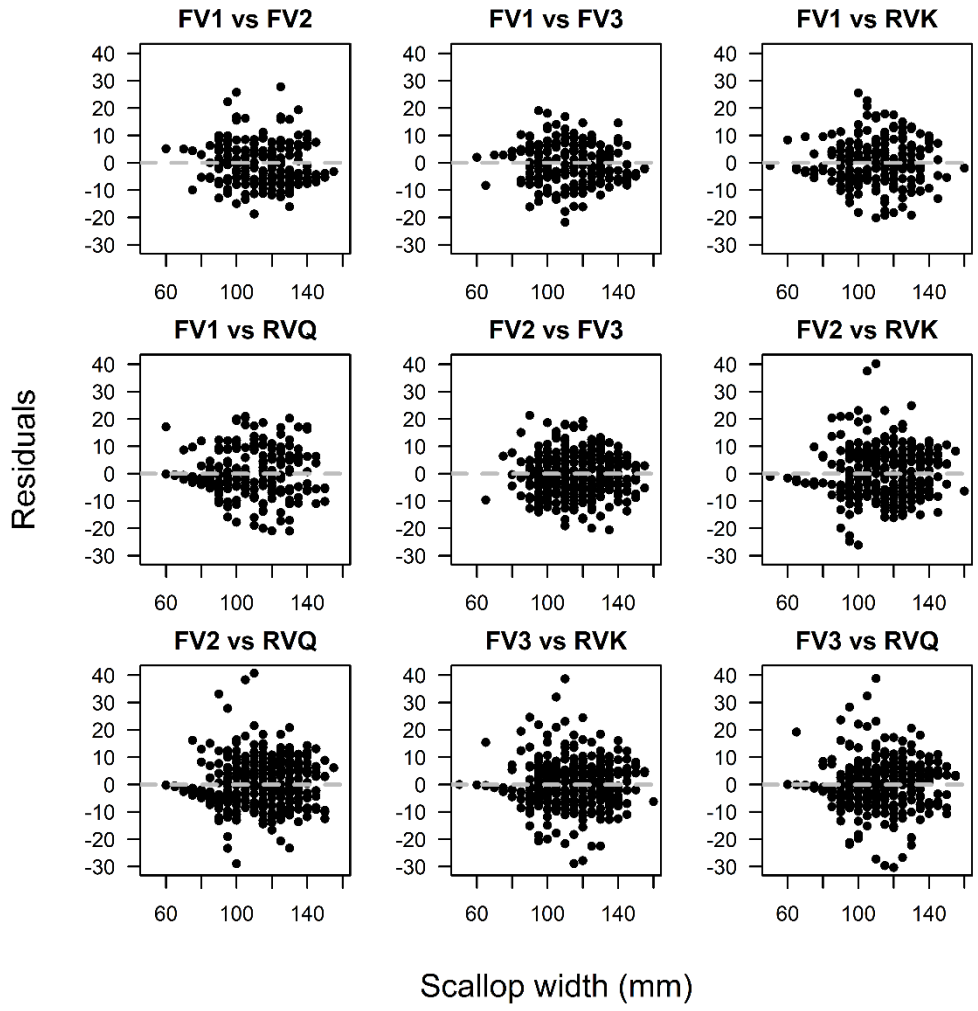

Figure A.1: Deviance residuals for each size group of king scallops at each haul from a catch comparison study involving three commercial vessels and a research vessel in April 2021. The dashed line in each panel is at zero, which indicates no difference between observed and model estimated responses.

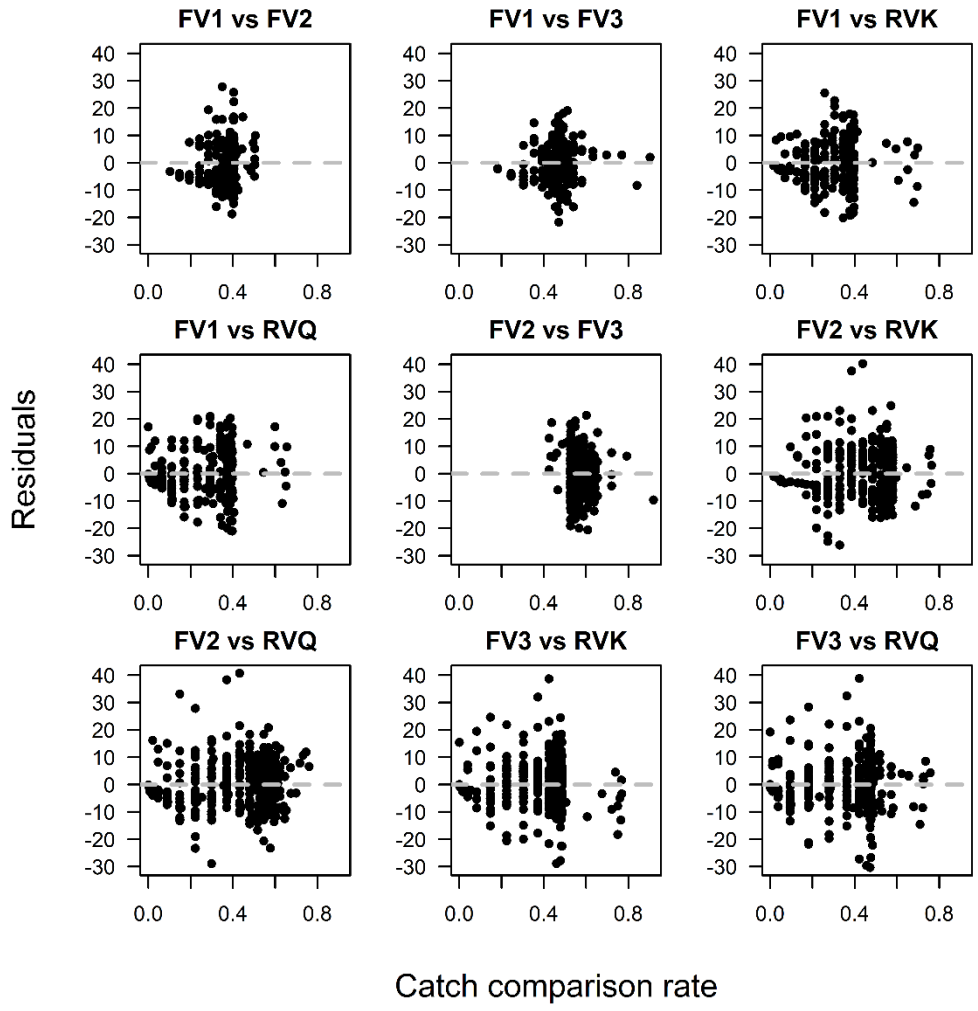

Figure A.2: Deviance residuals plotted against model fitted catch comparison rates for size structured king scallop data. Each panel represents a comparison between two vessels. The catch comparison study involved three commercial vessels and a research vessel in April 2021. The dashed line in each panel is at zero, which indicates no difference between observed and model estimated responses.

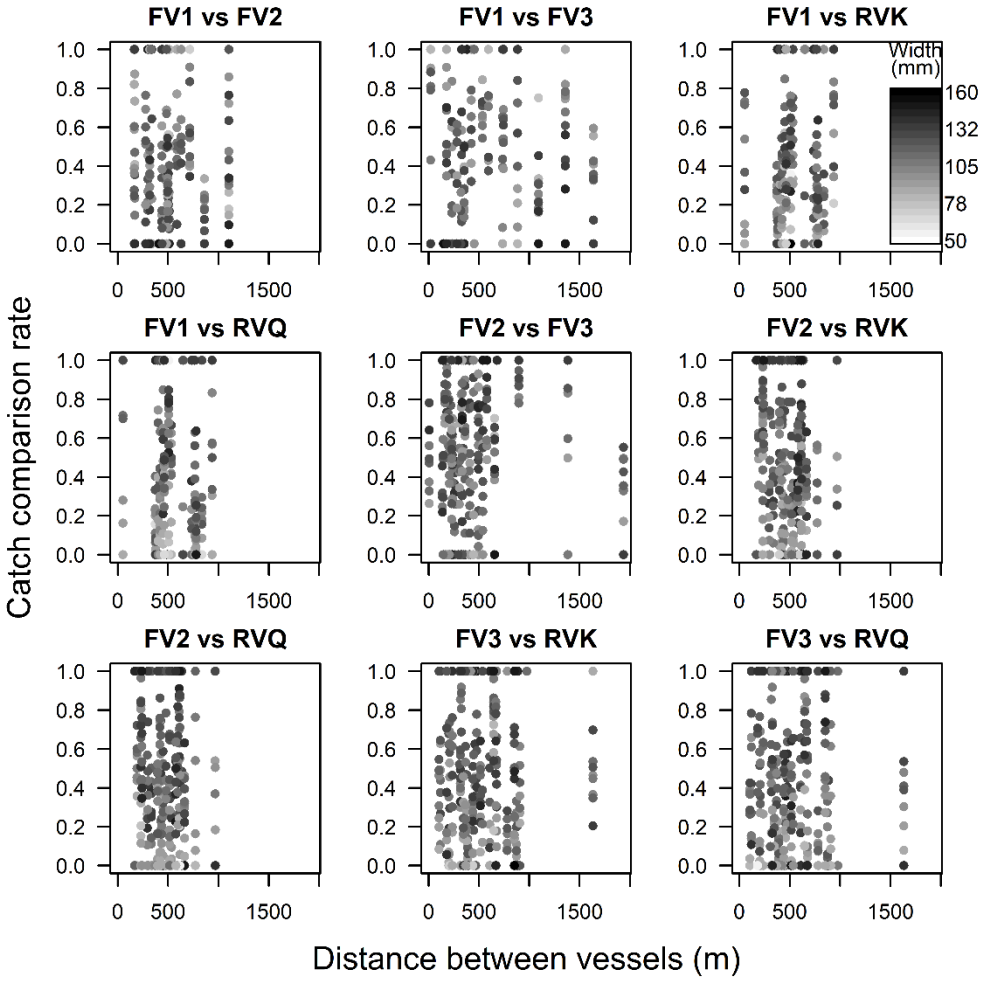

Figure A.3: The relationship between distance between vessels (m) and size structured catch comparison rates, from a catch comparison study involving three commercial vessels (FV1, FV2, FV3) and a research vessel using two dredge types (RVK and RVQ) in April 2021. Each panel represents a unique comparison. Points are the observed catch comparison rates for 5 mm size classes of scallops and are shaded by scallop size as indicated in the top right panel.