

Supplementary information

Table S1. Edited analysed data

Survey variables			Wild trout variables			Farmed salmon variables			
RepAre <sup>a</sup>	Year	Obs	WTSrf	WTJuvCnt	WTMobCnt	FSAbn0	FSAbn1	FSAbn2	FSAbn3
25	2013	1	9499.91	2	16	0.33	0.23	0.18	0.14
25	2014	2	12448.32	17	4	0.09	0.00	0.00	0.00
25	2015	3	27622.31	108	548	0.00	0.00	8.62	8.63
25	2016	4	20715.74	25	205	0.00	0.00	0.00	0.00
25	2017	5	18389.91	1754	306	6.49	4.65	5.89	4.13
26-N	2013	6	5757.26	340	124	1.14	1.46	2.33	1.93
26-N	2014	7	16472.92	0	0	1.36	1.12	1.59	1.47
26-N	2015	8	49400.28	1480	24	5.74	4.51	6.24	7.03
26-N	2016	9	23732.75	3	0	2.45	2.82	3.84	2.96
26-N	2017	10	25625.89	827	11	3.12	4.60	5.64	4.21
27	2013	11	7346.81	650	206	2.09	2.56	2.27	4.57
27	2014	12	6111.39	441	79	0.73	0.83	0.88	1.27
27	2016	13	5259.07	33	19	0.10	0.04	0.05	0.04
27	2017	14	10542.02	55	56	0.01	0.00	0.00	0.00
28	2013	15	6091.02	10	2	0.01	0.00	0.00	0.00
28	2014	16	473.38	5	5	0.00	0.00	0.00	0.00
28	2015	17	11396.33	490	53	0.75	1.26	1.59	1.45
28	2016	18	1096.87	5	7	0.02	0.02	0.02	0.02
28	2017	19	2901.20	281	52	0.00	0.00	0.00	0.00
29	2013	20	5319.34	19	2	0.75	0.63	0.32	0.29
29	2014	21	2539.68	3	1	0.07	0.03	0.00	0.00
29	2015	22	3881.88	720	39	7.18	6.62	8.98	8.38
29	2016	23	10671.22	229	169	0.00	0.01	0.00	0.00
29	2017	24	18992.72	4152	155	1.17	0.99	0.49	0.45
32	2013	25	6423.96	0	2	0.04	0.01	0.02	0.08
32	2014	26	4792.86	15	10	0.05	0.02	0.03	0.07
33	2013	27	5360.00	2	8	0.04	0.02	0.00	0.56
33	2014	28	1571.10	16	6	0.00	0.33	0.37	0.90
33	2015	29	8204.83	14	153	0.03	0.02	0.01	0.00
33	2016	30	5796.77	30	146	0.05	0.06	0.01	0.04
34-N	2015	31	3214.39	3	9	0.17	0.04	0.00	0.01

34-S	2013	32	15074.98	414	122	0.03	0.00	0.00	0.01
34-S	2014	33	3157.66	92	91	0.04	0.11	0.09	0.04
34-S	2015	34	7601.28	0	9	0.10	0.06	0.05	0.03
34-S	2016	35	31922.42	602	359	1.81	1.84	1.57	1.33
34-S	2017	36	11743.28	80	209	0.33	0.60	1.14	2.36
35	2013	37	2445.01	0	0	0.03	0.04	0.07	0.12
35	2017	38	5500.59	444	41	0.59	0.42	0.21	0.11
36-N	2013	39	16578.31	980	229	0.47	0.36	0.21	0.23
36-N	2014	40	18531.06	2	0	0.01	0.00	0.00	0.00
36-N	2015	41	22151.07	1119	374	0.68	0.31	0.06	0.03
36-N	2016	42	26522.19	389	407	0.03	0.01	0.01	0.00
36-N	2017	43	21016.43	5002	298	1.12	1.15	1.59	1.45
37	2013	44	3031.66	243	206	0.51	0.49	0.20	0.22
37	2014	45	14245.82	37	43	2.16	1.50	1.87	2.50
37	2015	46	9270.35	1134	168	0.12	0.10	0.10	0.12
37	2016	47	2592.45	59	21	5.33	5.87	8.45	9.40
37	2017	48	13073.51	20	165	0.27	0.15	0.09	0.06
41	2013	49	9216.96	11	10	0.08	0.01	0.00	0.00
41	2014	50	7064.93	19	6	0.00	0.01	0.00	0.00
41	2015	51	8909.92	13	10	0.56	0.56	2.09	2.18
41	2016	52	6812.76	29	21	0.09	0.06	0.06	0.04
41	2017	53	3378.58	0	6	1.99	1.12	1.07	1.61
42	2013	54	11250.93	50	33	0.43	0.33	0.25	0.19
42	2014	55	10098.06	3	4	0.02	0.00	0.00	0.00
42	2015	56	23706.75	0	12	3.01	3.93	4.55	8.19
42	2016	57	13611.21	117	52	1.21	0.45	0.12	0.10
42	2017	58	18712.87	392	208	3.10	3.76	3.96	2.95
43	2013	59	9325.05	1	9	0.00	0.00	0.00	0.00
43	2014	60	8306.07	311	245	0.14	0.10	0.08	0.04
43	2015	61	21459.45	16	38	0.00	0.00	0.00	0.00
43	2016	62	1375.90	54	48	6.17	6.64	8.43	9.42
43	2017	63	10791.03	36	108	0.01	0.00	0.00	0.00
58-E	2013	64	20121.83	688	253	0.17	0.09	0.08	0.20
58-E	2014	65	19343.79	376	357	0.72	0.48	0.68	0.47
58-E	2015	66	36951.76	580	1000	0.16	0.44	0.57	0.50
58-E	2016	67	24700.51	68	327	2.70	3.61	4.64	5.03
58-E	2017	68	45859.45	900	816	0.30	0.16	0.05	0.03

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58-W	2015	69	3042.17	149	124	0.00	0.00	0.00	0.00
58-W	2016	70	17873.45	1642	279	1.18	0.38	0.19	0.11
58-W	2017	71	2668.88	0	5	0.00	0.00	0.00	0.00
59	2013	72	12281.68	63	46	0.67	2.21	2.23	2.43
59	2014	73	13103.08	59	4	0.52	0.32	0.20	0.19
59	2015	74	19042.72	439	327	0.20	1.20	3.81	6.64
59	2016	75	17846.69	529	123	0.85	0.58	0.34	0.25
59	2017	76	18310.11	814	155	1.90	3.96	4.17	3.41
60-N	2013	77	9237.47	24	314	1.67	1.14	0.74	0.39
60-N	2014	78	14499.86	376	310	0.26	0.50	0.52	0.65
60-N	2015	79	12545.98	233	254	1.52	1.74	1.79	1.61
60-N	2016	80	26472.77	315	358	0.69	1.27	1.59	1.54
60-N	2017	81	21677.86	352	784	0.02	0.31	0.88	0.91
60-S	2015	82	4548.23	298	123	8.62	4.86	4.46	3.48
60-S	2016	83	20462.18	69	480	0.28	0.21	0.08	0.06
60-S	2017	84	845.99	84	43	2.67	2.38	1.71	1.30
ORA <sup>b</sup>	2013	85	7172.30	30	3	0.00	0.00	0.00	0.00
ORA <sup>b</sup>	2014	86	811.60	28	13	0.00	0.00	0.00	0.00

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<sup>a</sup> Variable names are defined in Table S2.

<sup>b</sup> ORA indicates the wild sea trout sampling location outwith a SSPO reporting area.

### Text S1. Generalized Linear Mixed Model specified within the R Statistical Environment

```
glmer.nb(WTJuvCnt~offset(log(WTSrf))+I(FSAbn1^(1/4))
        +(1|RepArea) + (1|Year), data=wrkdat,,
        control=glmerControl(optimizer="bobyqa", optCtrl=list(maxfun=1e7)))
```

Variable names are defined in Table S1.

This particular model is for wild trout juvenile *L. salmonis* (dependent variable ‘WTJuvCnt’) and farmed salmon adult female *L. salmonis* abundance one month prior to trout sampling (explanatory variable ‘FSAbn1’).

The glmer.nb function is available within the R supplementary package lme4 which can be obtained from the Comprehensive R Archive Network ([cran.r-project.org/](http://cran.r-project.org/)).

**Table S2. Variable name dictionary**

Variable name	Definition	Categorical or numeric
RepAre	SSPO reporting area	categorical
Year	Year of sampling	categorical
Obs	replicate sampling year within ‘RepAre’	categorical
WTSrf	wild trout surface area for relevant ‘Obs’	numeric
WTJuvCnt	wild trout juvenile <i>L. salmonis</i> count for relevant ‘Obs’	numeric
WTMobCnt	wild trout mobile <i>L. salmonis</i> count for relevant ‘Obs’	numeric
FSAbn0	farmed salmon adult female <i>L. salmonis</i> abundance for the calendar month of trout sampling for relevant ‘Obs’	numeric
FSAbn1	farmed salmon adult female <i>L. salmonis</i> abundance for one calendar month prior to trout sampling for relevant ‘Obs’	numeric
FSAbn2	farmed salmon adult female <i>L. salmonis</i> abundance for two calendar months prior to trout sampling for relevant ‘Obs’	numeric
FSAbn3	farmed salmon adult female <i>L. salmonis</i> abundance for three calendar months prior to trout sampling for relevant ‘Obs’	numeric

## Text S2. Model diagnostic plots

Diagnostic model plots are below for juvenile lice (Figure S1) and mobile lice (Figure S2). Figures S1 and S2 highlight 3 key results of tests that were carried out using the DHARMA package version 0.4.6 (Hartig 2022).

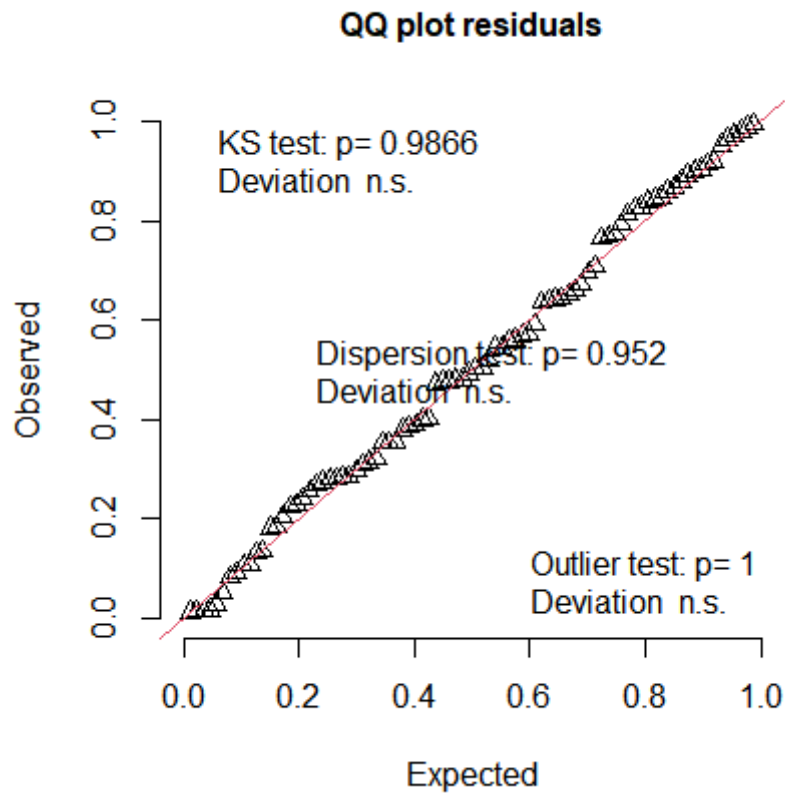


Figure S1 Model diagnostic plot for Juvenile lice model

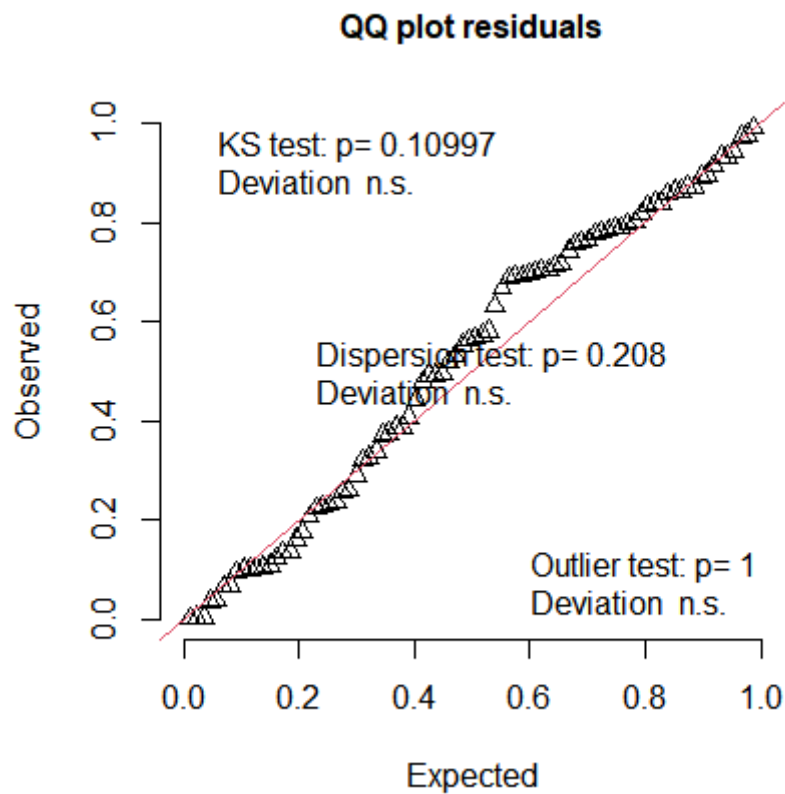


Figure S2 Model diagnostic plot for Mobile lice model

#### LITERATURE CITED

Hartig F (2022) DHARMA: Residual diagnostics for hierarchical (multi-level/mixed) regression models. R package version 0.4.6. <https://CRAN.R-project.org/package=DHARMA>