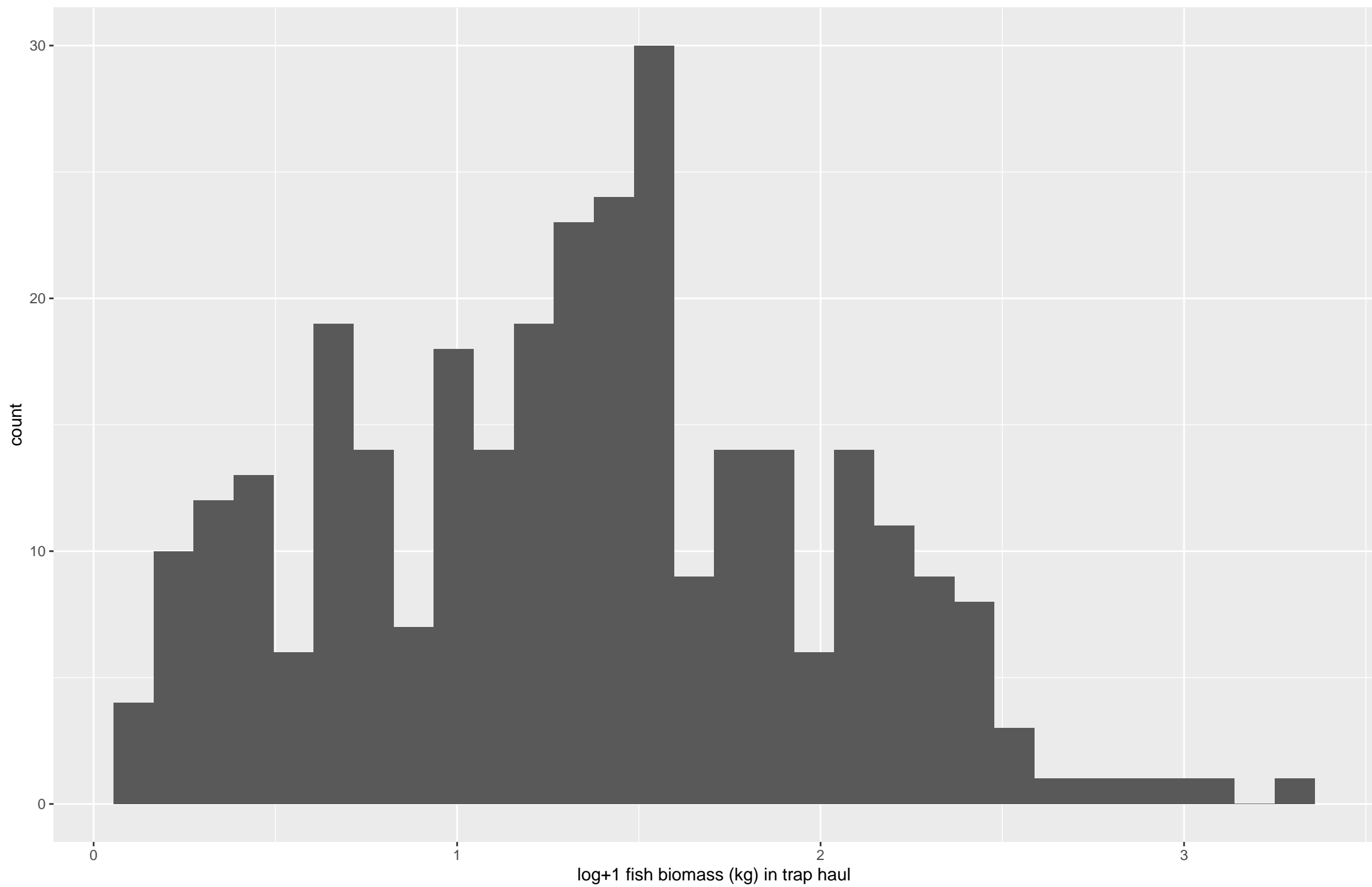
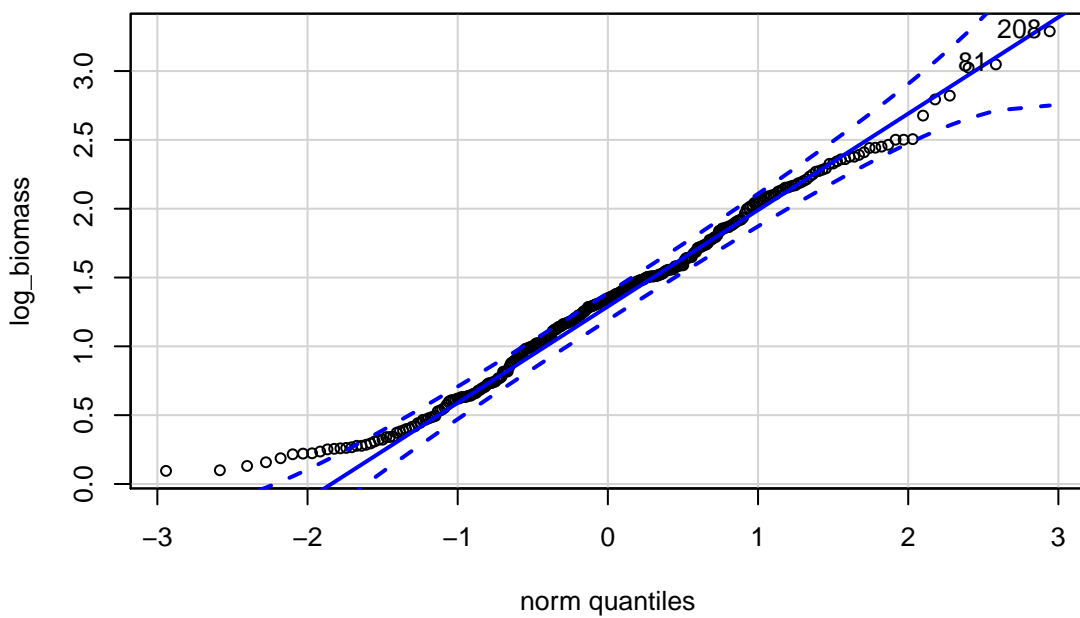


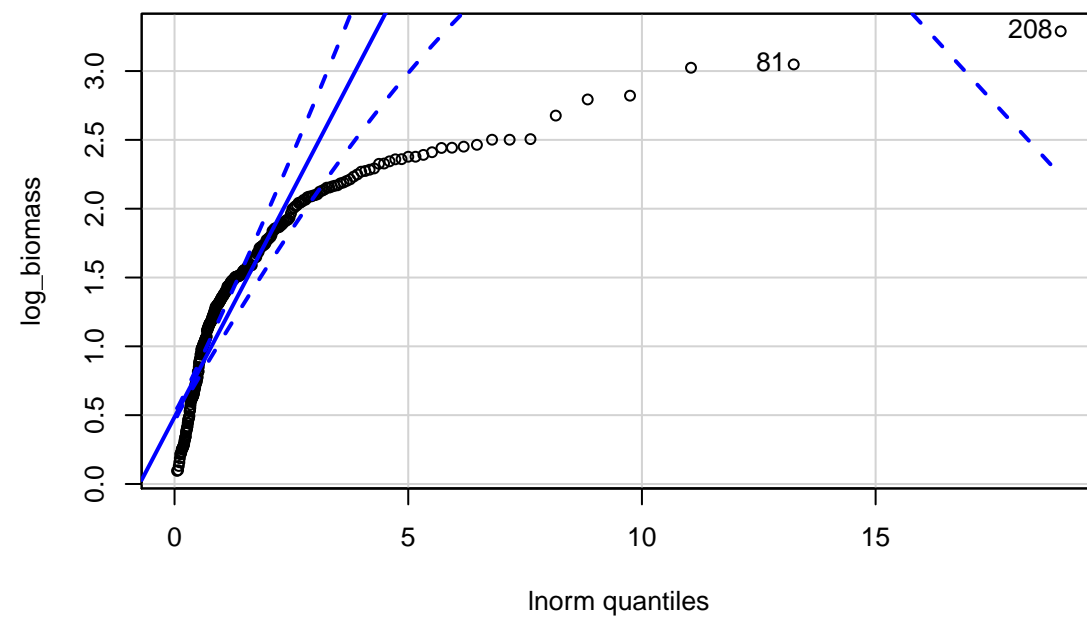
Histogram of log+1 fish biomass (kg)



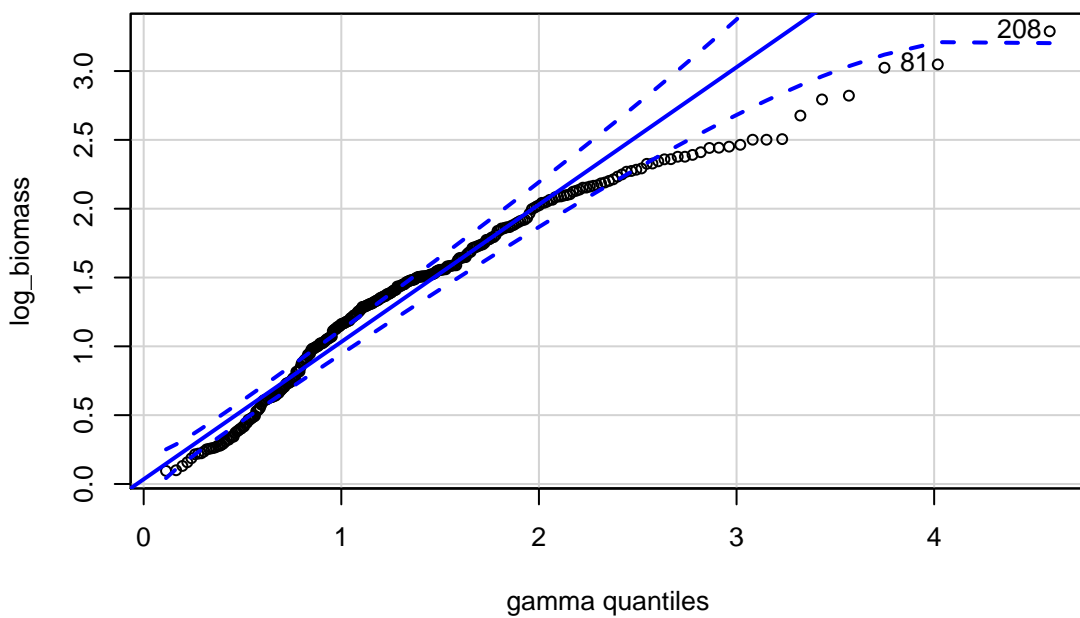
Normal distribution



Log-normal distribution



Gamma distribution



```
Global model call: lmer(formula = log_biomass ~ design + log_days_since_last_haul +
  location_exposure + Exp_or_Cont + (1 | TrapID) + (1 | Date_YMD),
  data = trap_haul_no_zero, REML = FALSE, na.action = "na.fail")
```

Model selection table

	(Int)	dsg	Exp_or_Cnt	lct_exp	log_dys_snc_lst_hal	df	logLik	AICc	delta	
9	0.5791					0.3165	5	-273.856	557.9	0.00
13	0.6096			+		0.3173	6	-272.893	558.1	0.16
10	0.4430	+				0.3339	6	-273.164	558.6	0.70
14	0.5415	+			+	0.3249	7	-272.806	560.0	2.07
11	0.5777			+		0.3165	6	-273.856	560.0	2.08
15	0.6089			+	+	0.3173	7	-272.893	560.2	2.25
12	0.4432	+		+		0.3339	7	-273.164	560.7	2.79
16	0.5414	+		+	+	0.3249	8	-272.806	562.1	4.18
1	1.2930						4	-278.982	566.1	8.19
5	1.3240				+		5	-278.041	566.3	8.37
2	1.2430	+					5	-278.804	567.8	9.90
3	1.2910			+			5	-278.982	568.2	10.25
6	1.3550	+			+		6	-278.008	568.3	10.39
7	1.3230			+	+		6	-278.041	568.4	10.45
4	1.2420	+		+			6	-278.804	569.9	11.98
8	1.3540	+		+	+		7	-278.008	570.4	12.48

weight

9	0.244
13	0.226
10	0.172
14	0.087
11	0.086
15	0.079
12	0.060
16	0.030
1	0.004
5	0.004
2	0.002
3	0.001
6	0.001
7	0.001
4	0.001
8	0.000

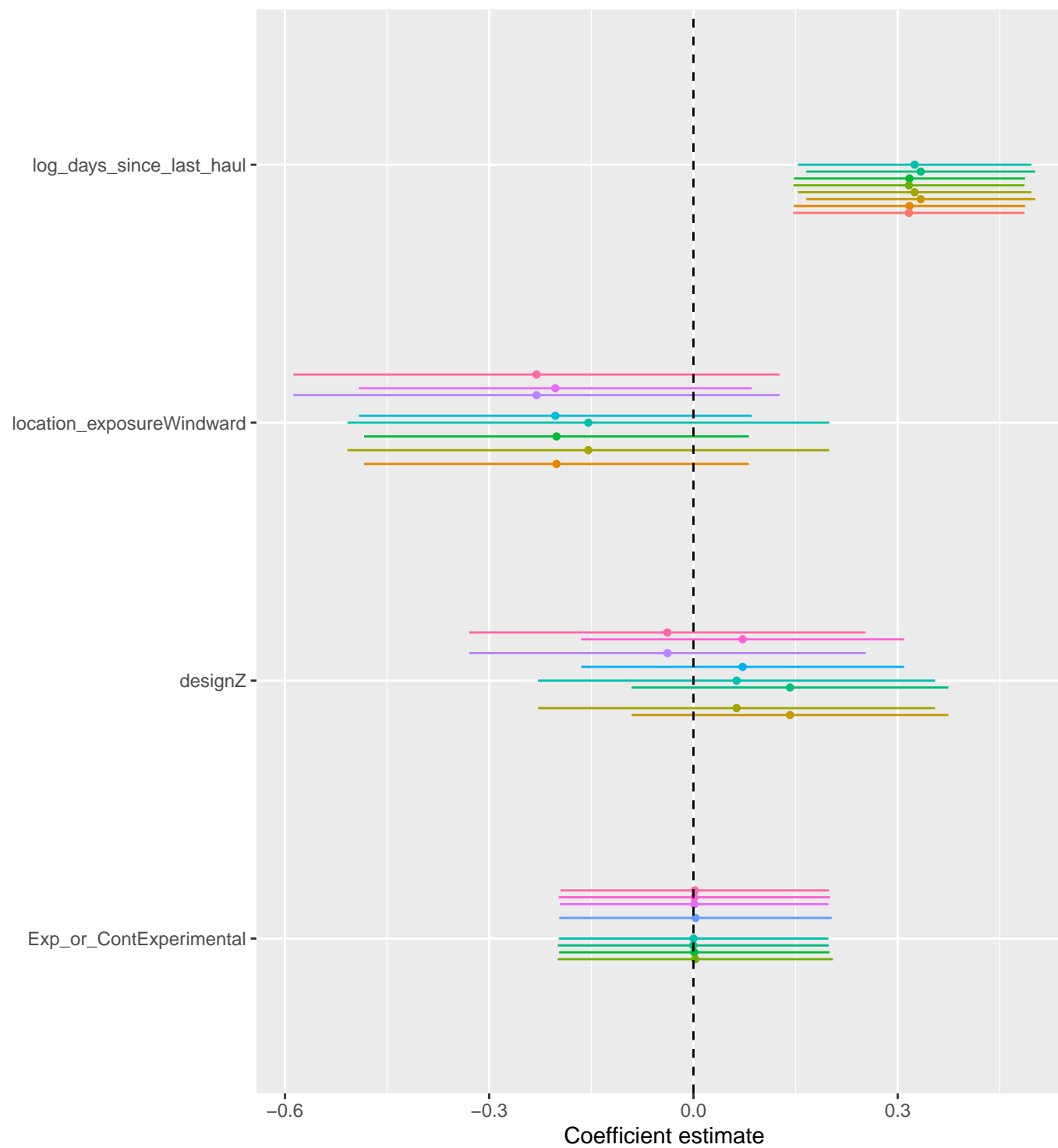
Models ranked by AICc(x)

Random terms (all models):

'1 | TrapID', '1 | Date_YMD'

	model	sigma	logLik	AIC	BIC	deviance	df.residual
	log_days_since_last_haul	0.54	-273.86	557.71	576.35	547.71	302
	location_exposure + log_days_since_last_haul	0.54	-272.89	557.79	580.15	545.79	301
	design + log_days_since_last_haul	0.55	-273.16	558.33	580.69	546.33	301
	design + location_exposure + log_days_since_last_haul	0.54	-272.81	559.61	585.70	545.61	300
	Exp_or_Cont + log_days_since_last_haul	0.54	-273.86	559.71	582.07	547.71	301
	Exp_or_Cont + location_exposure + log_days_since_last_haul	0.54	-272.89	559.79	585.87	545.79	300
	design + Exp_or_Cont + log_days_since_last_haul	0.55	-273.16	560.33	586.42	546.33	300
	design + Exp_or_Cont + location_exposure + log_days_since_last_haul	0.54	-272.81	561.61	591.43	545.61	299
	none	0.54	-278.98	565.96	580.87	557.96	303
	location_exposure	0.54	-278.04	566.08	584.72	556.08	302
	design	0.54	-278.80	567.61	586.24	557.61	302
	Exp_or_Cont	0.54	-278.98	567.96	586.60	557.96	302
	design + location_exposure	0.54	-278.01	568.02	590.38	556.02	301
	Exp_or_Cont + location_exposure	0.54	-278.04	568.08	590.44	556.08	301
	design + Exp_or_Cont	0.54	-278.80	569.61	591.97	557.61	301
	design + Exp_or_Cont + location_exposure	0.54	-278.01	570.02	596.10	556.02	300

Predicting log+1 fish biomass (kg) in trap haul



Fixed coefficients in model (highest to lowest AIC)

- design + Exp_or_Cont + location_exposure
- design + Exp_or_Cont
- Exp_or_Cont + location_exposure
- design + location_exposure
- Exp_or_Cont
- design
- location_exposure
- design + Exp_or_Cont + location_exposure + log_days_since_last_haul
- design + Exp_or_Cont + log_days_since_last_haul
- Exp_or_Cont + location_exposure + log_days_since_last_haul
- Exp_or_Cont + log_days_since_last_haul
- design + location_exposure + log_days_since_last_haul
- design + log_days_since_last_haul
- location_exposure + log_days_since_last_haul
- log_days_since_last_haul

Backward reduced random-effect table:

	Eliminated	npar	logLik	AIC	LRT	Df	Pr(>Chisq)	
<none>		8	-272.81	561.61				
(1 TrapID)	0	7	-281.77	577.54	17.929	1	2.293e-05	***
(1 Date_YMD)	0	7	-278.97	571.95	12.337	1	0.0004442	***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1								

Backward reduced fixed-effect table:

Degrees of freedom method: Satterthwaite

	Eliminated	Sum Sq	Mean Sq	NumDF	DenDF	F value
Exp_or_Cont	1	0.0000	0.0000	1	34.841	0.0000
design	2	0.0537	0.0537	1	79.224	0.1815
location_exposure	3	0.5756	0.5756	1	90.985	1.9476
log_days_since_last_haul	0	3.9617	3.9617	1	23.238	13.3568
Pr(>F)						
Exp_or_Cont		0.998222				
design		0.671277				
location_exposure		0.166241				
log_days_since_last_haul		0.001304	**			

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1						

Model found:

log_biomass ~ log_days_since_last_haul + (1 | TrapID) + (1 | Date_YMD)

Optimal model found using 'step' function which performs backward elimination of fixed-effect terms

```
Linear mixed model fit by maximum likelihood . t-tests use Satterthwaite's
method [lmerModLmerTest]
Formula: log_biomass ~ log_days_since_last_haul + (1 | TrapID) + (1 |
Date_YMD)
Data: trap_haul_no_zero

      AIC      BIC    logLik deviance df.resid
557.7    576.3   -273.9    547.7     302

Scaled residuals:
      Min       1Q   Median       3Q      Max
-2.19806 -0.73098 -0.03229  0.65968  2.82404

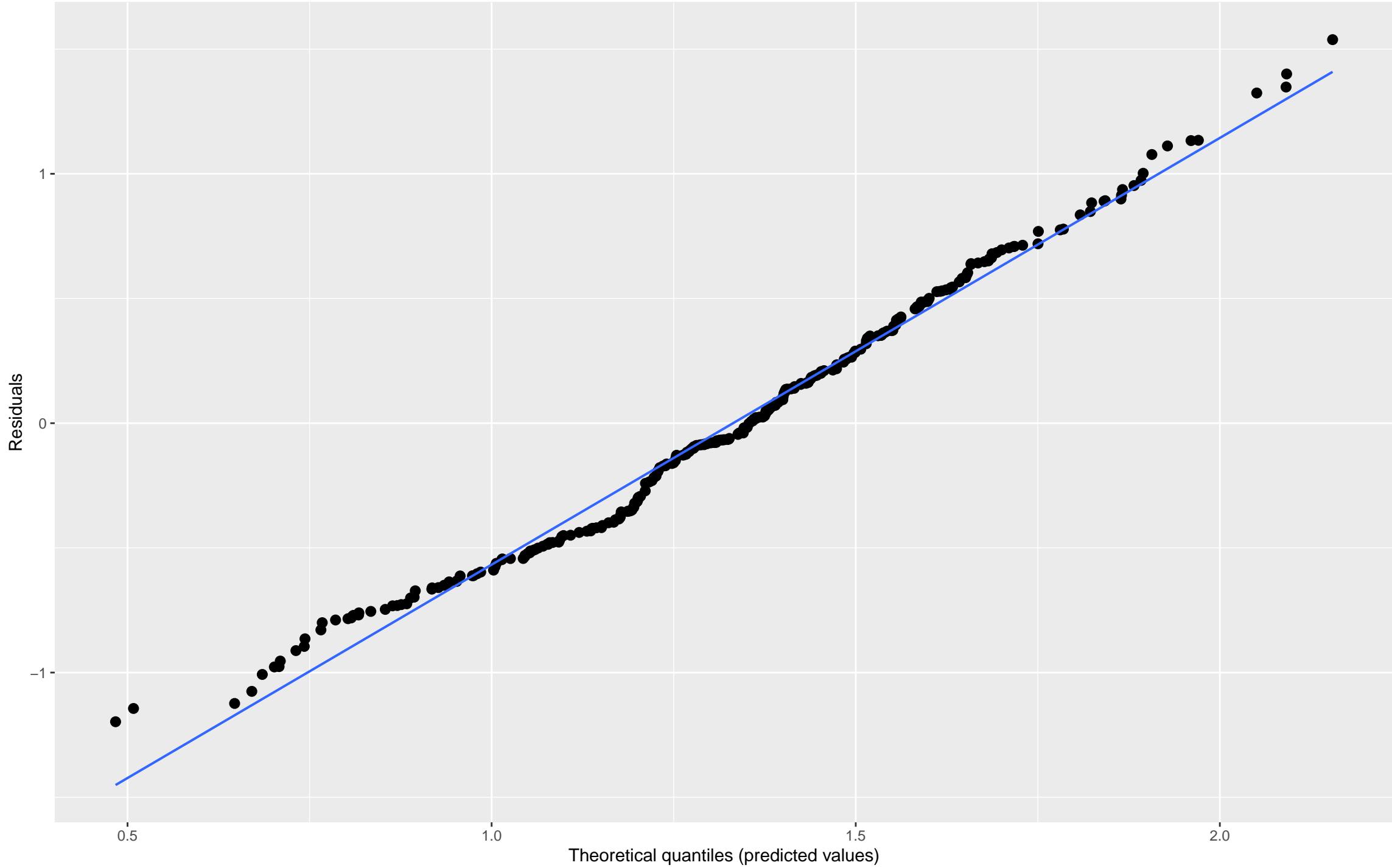
Random effects:
Groups   Name              Variance Std.Dev.
TrapID   (Intercept)  0.04657   0.2158
Date_YMD (Intercept)  0.04001   0.2000
Residual                    0.29660   0.5446
Number of obs: 307, groups:  TrapID, 37; Date_YMD, 23

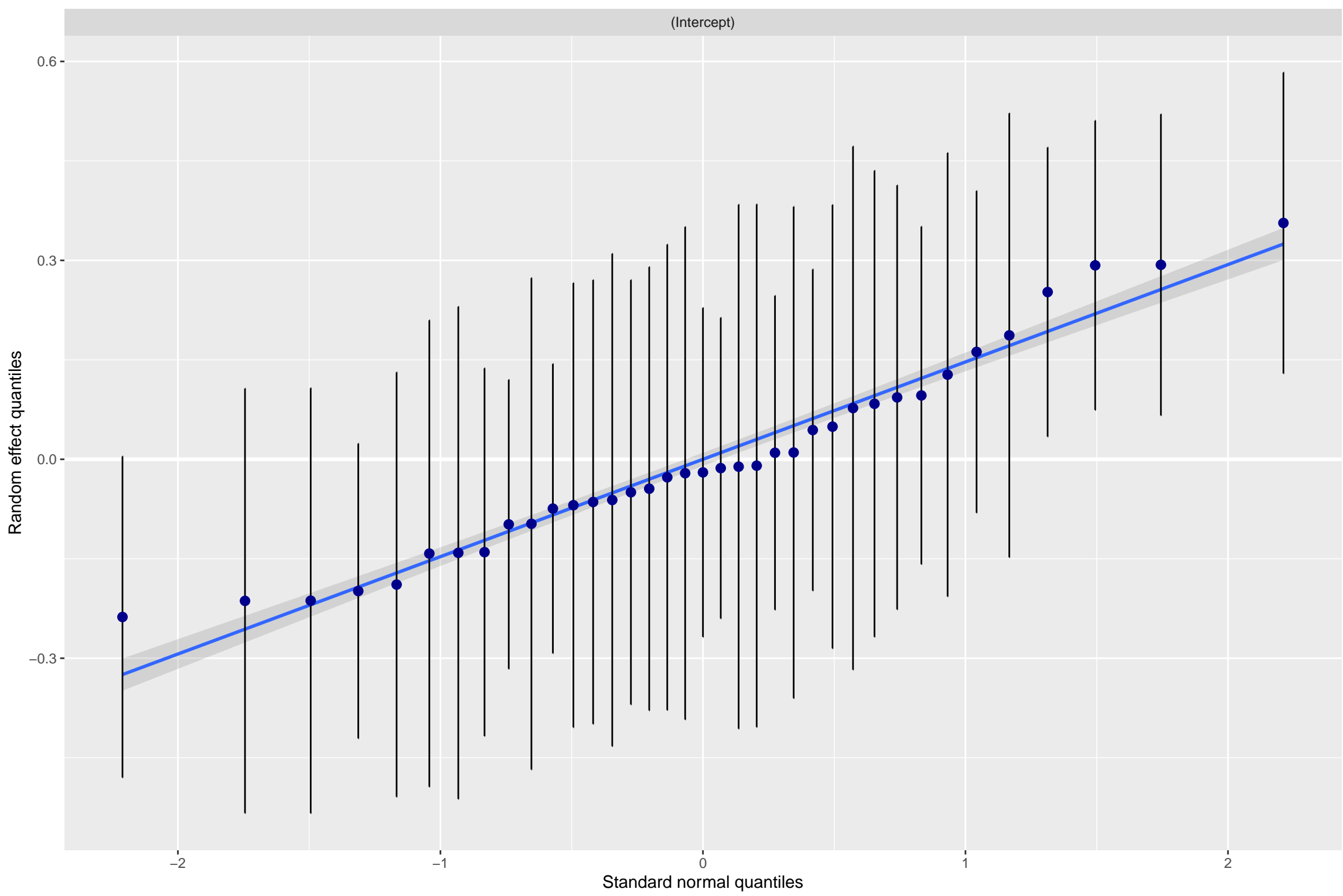
Fixed effects:
              Estimate Std. Error    df t value Pr(>|t|)
(Intercept)      0.5791     0.2067 26.4505   2.802  0.00937 **
log_days_since_last_haul  0.3165     0.0866 23.2383   3.655  0.00130 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:
      (Intr)
lg_dys_sn__ -0.946
```

Non-normality of residuals and outliers

Dots should be plotted along the line





(Intercept)

Random effect quantiles

0.6
0.3
0.0
-0.3

-2

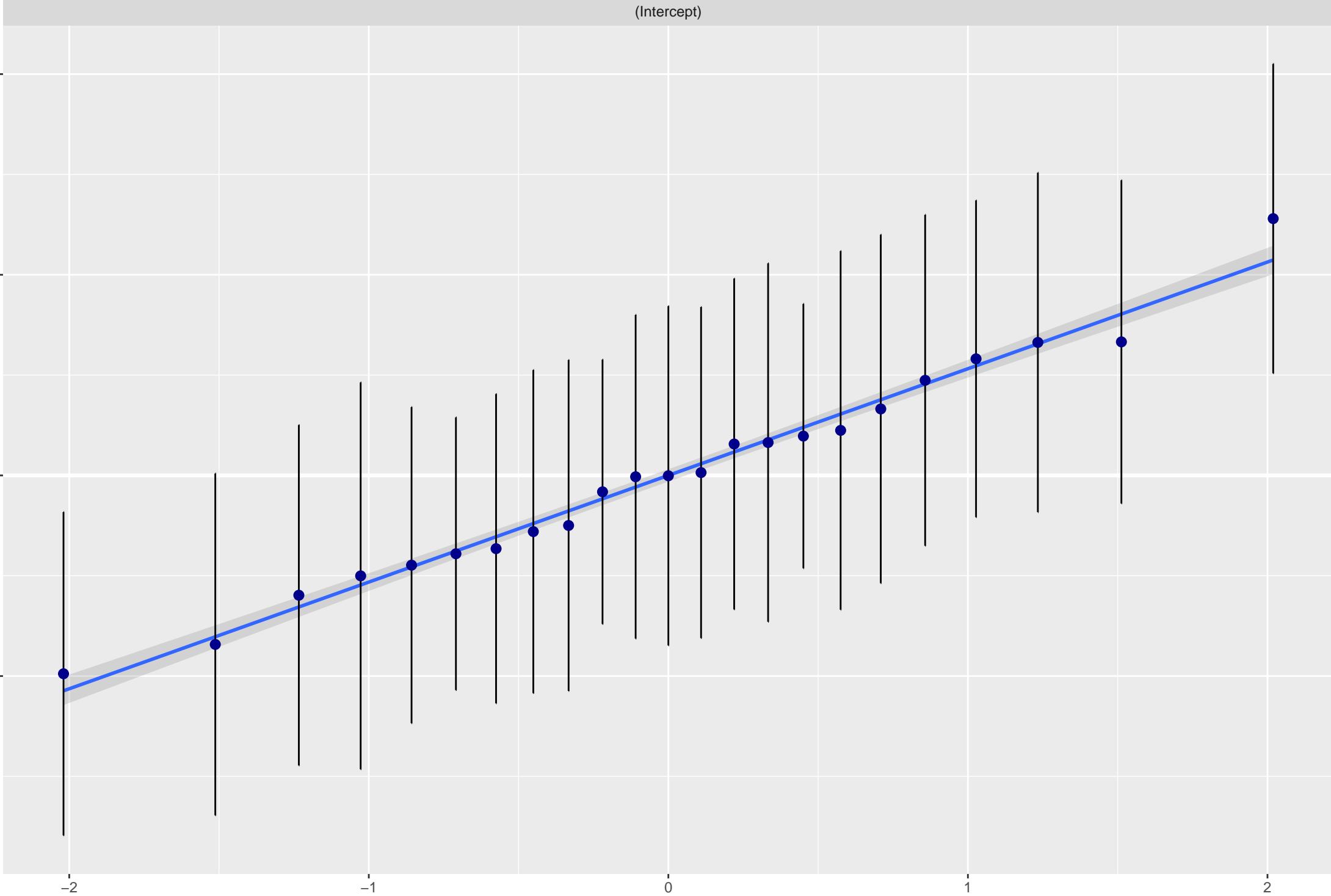
-1

0

1

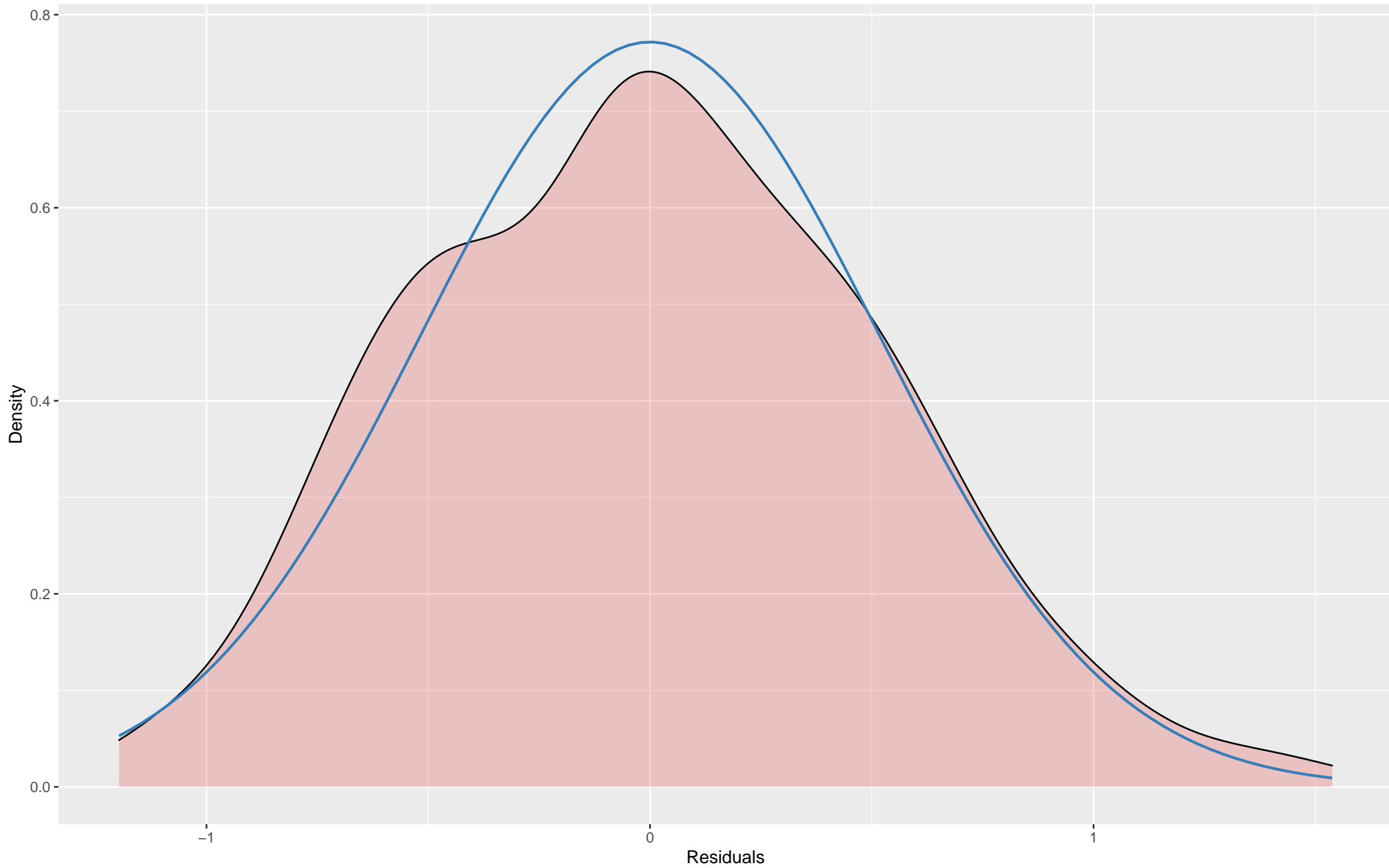
2

Standard normal quantiles



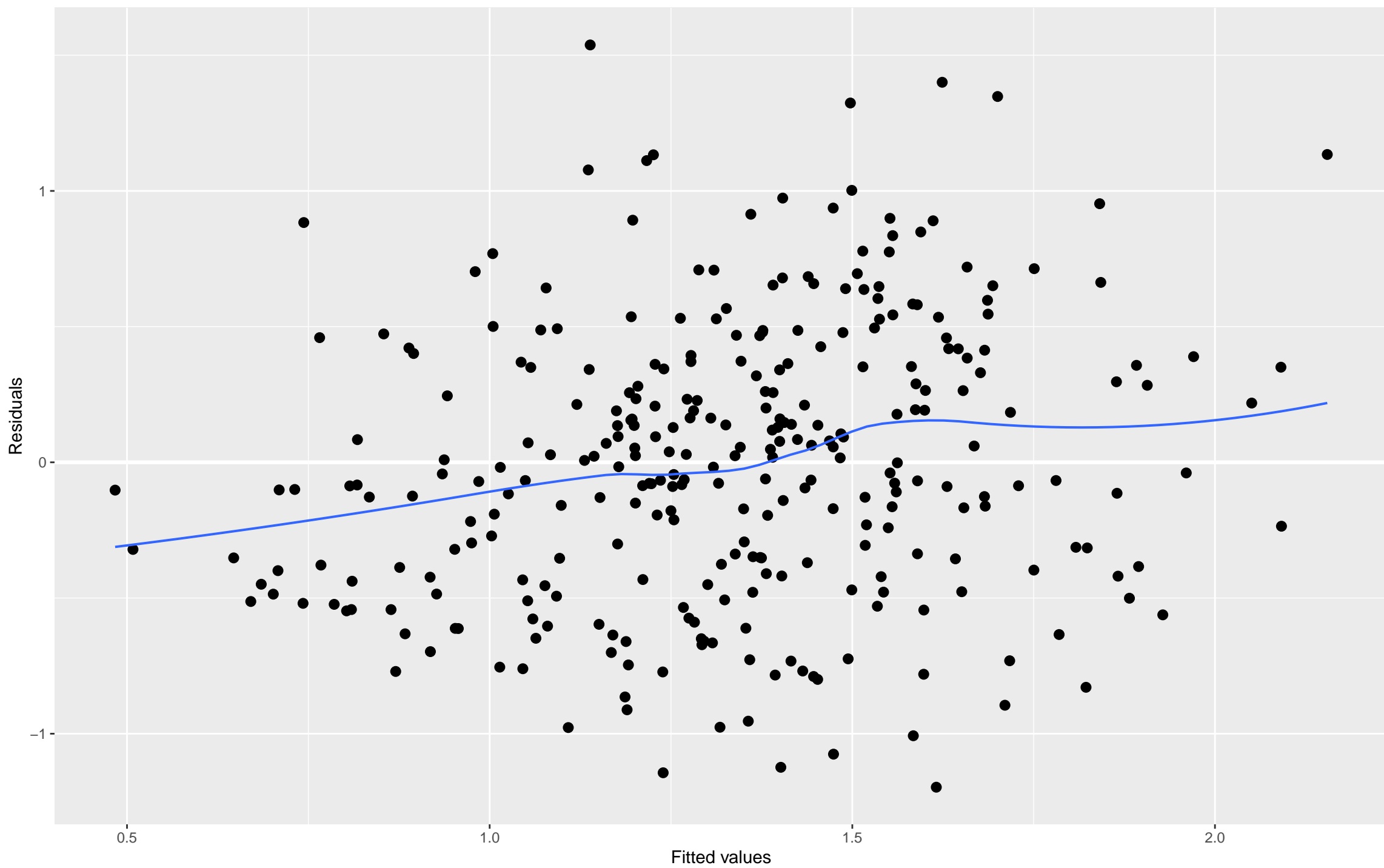
Non-normality of residuals

Distribution should look like normal curve



Homoscedasticity (constant variance of residuals)

Amount and distance of points scattered above/below line is equal or randomly spread



Model summaries for all models with delta AIC < 2

```
$log_days_since_last_haul
Linear mixed model fit by maximum likelihood . t-tests use Satterthwaite's
method [lmerModLmerTest]
Formula: log_biomass ~ log_days_since_last_haul + (1 | TrapID) + (1 |
  Date_YMD)
Data: trap_haul_no_zero

      AIC      BIC    logLik deviance df.resid
557.7    576.3    -273.9    547.7        302

Scaled residuals:
   Min       1Q   Median       3Q      Max
-2.19806 -0.73098 -0.03229  0.65968  2.82404

Random effects:
 Groups   Name                Variance Std.Dev.
TrapID    (Intercept)  0.04657    0.2158
Date_YMD  (Intercept)  0.04001    0.2000
Residual                    0.29660    0.5446
Number of obs: 307, groups: TrapID, 37; Date_YMD, 23

Fixed effects:
              Estimate Std. Error    df t value Pr(>|t|)
(Intercept)      0.5791     0.2067 26.4505   2.802  0.00937 **
log_days_since_last_haul  0.3165     0.0866 23.2383   3.655  0.00130 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:
      (Intr)
lg_dys_sn__ -0.946

$'location_exposure + log_days_since_last_haul'
Linear mixed model fit by maximum likelihood . t-tests use Satterthwaite's
method [lmerModLmerTest]
Formula: log_biomass ~ location_exposure + log_days_since_last_haul +
  (1 | TrapID) + (1 | Date_YMD)
Data: trap_haul_no_zero

      AIC      BIC    logLik deviance df.resid
557.8    580.1    -272.9    545.8        301

Scaled residuals:
   Min       1Q   Median       3Q      Max
-2.20897 -0.73974 -0.01921  0.64412  2.81684

Random effects:
 Groups   Name                Variance Std.Dev.
TrapID    (Intercept)  0.04386    0.2094
Date_YMD  (Intercept)  0.04024    0.2006
Residual                    0.29555    0.5436
Number of obs: 307, groups: TrapID, 37; Date_YMD, 23

Fixed effects:
              Estimate Std. Error    df t value Pr(>|t|)
(Intercept)      0.60960     0.20745 26.99079   2.939  0.00668 **
location_exposureWindward -0.20115     0.14414 90.98490  -1.396  0.16624
log_days_since_last_haul  0.31733     0.08665 23.59697   3.662  0.00126 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:
      (Intr) lctn_W
lctn_xparWn -0.097
lg_dys_sn__ -0.941 -0.012

$'design + log_days_since_last_haul'
Linear mixed model fit by maximum likelihood . t-tests use Satterthwaite's
method [lmerModLmerTest]
Formula: log_biomass ~ design + log_days_since_last_haul + (1 | TrapID) +
  (1 | Date_YMD)
Data: trap_haul_no_zero

      AIC      BIC    logLik deviance df.resid
558.3    580.7    -273.2    546.3        301

Scaled residuals:
   Min       1Q   Median       3Q      Max
-2.22809 -0.74814 -0.01972  0.64751  2.81760

Random effects:
 Groups   Name                Variance Std.Dev.
TrapID    (Intercept)  0.04394    0.2096
Date_YMD  (Intercept)  0.03694    0.1922
Residual                    0.29737    0.5453
Number of obs: 307, groups: TrapID, 37; Date_YMD, 23

Fixed effects:
              Estimate Std. Error    df t value Pr(>|t|)
(Intercept)      0.44301     0.23187 41.03757   1.911  0.06306 .
designZ            0.14185     0.11868 70.68139   1.195  0.23602 .
log_days_since_last_haul  0.33386     0.08575 24.49901   3.893  0.00067 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:
      (Intr) designZ
designZ      -0.492
lg_dys_sn__ -0.894  0.167
```

Full model summary

```
Linear mixed model fit by maximum likelihood . t-tests use Satterthwaite's
method [lmerModLmerTest]
Formula: log_biomass ~ design + log_days_since_last_haul + location_exposure +
  Exp_or_Cont + (1 | TrapID) + (1 | Date_YMD)
Data: trap_haul_no_zero

      AIC      BIC    logLik deviance df.resid
561.6    591.4    -272.8    545.6      299

Scaled residuals:
    Min       1Q   Median       3Q      Max
-2.21977 -0.74005 -0.02548  0.64625  2.81568

Random effects:
Groups      Name                Variance Std.Dev.
TrapID      (Intercept) 0.04338  0.2083
Date_YMD    (Intercept) 0.03889  0.1972
Residual                    0.29606  0.5441
Number of obs: 307, groups:  TrapID, 37; Date_YMD, 23

Fixed effects:
              Estimate Std. Error    df t value Pr(>|t|)
(Intercept)    5.414e-01  2.642e-01  5.977e+01  2.049  0.04482 *
designZ         6.337e-02  1.488e-01  7.909e+01  0.426  0.67141
log_days_since_last_haul  3.249e-01  8.749e-02  2.468e+01  3.714  0.00105 **
location_exposureWindward -1.544e-01  1.805e-01  1.001e+02 -0.855  0.39448
Exp_or_ContExperimental  2.268e-04  1.011e-01  3.484e+01  0.002  0.99822
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:
      (Inter) designZ lg_____ lctn_W
designZ      -0.595
lg_dys_sn_   -0.834  0.197
lctn_xparWn  -0.422  0.605  0.110
Exp_r_CntEx -0.187 -0.025 -0.007 -0.006
```