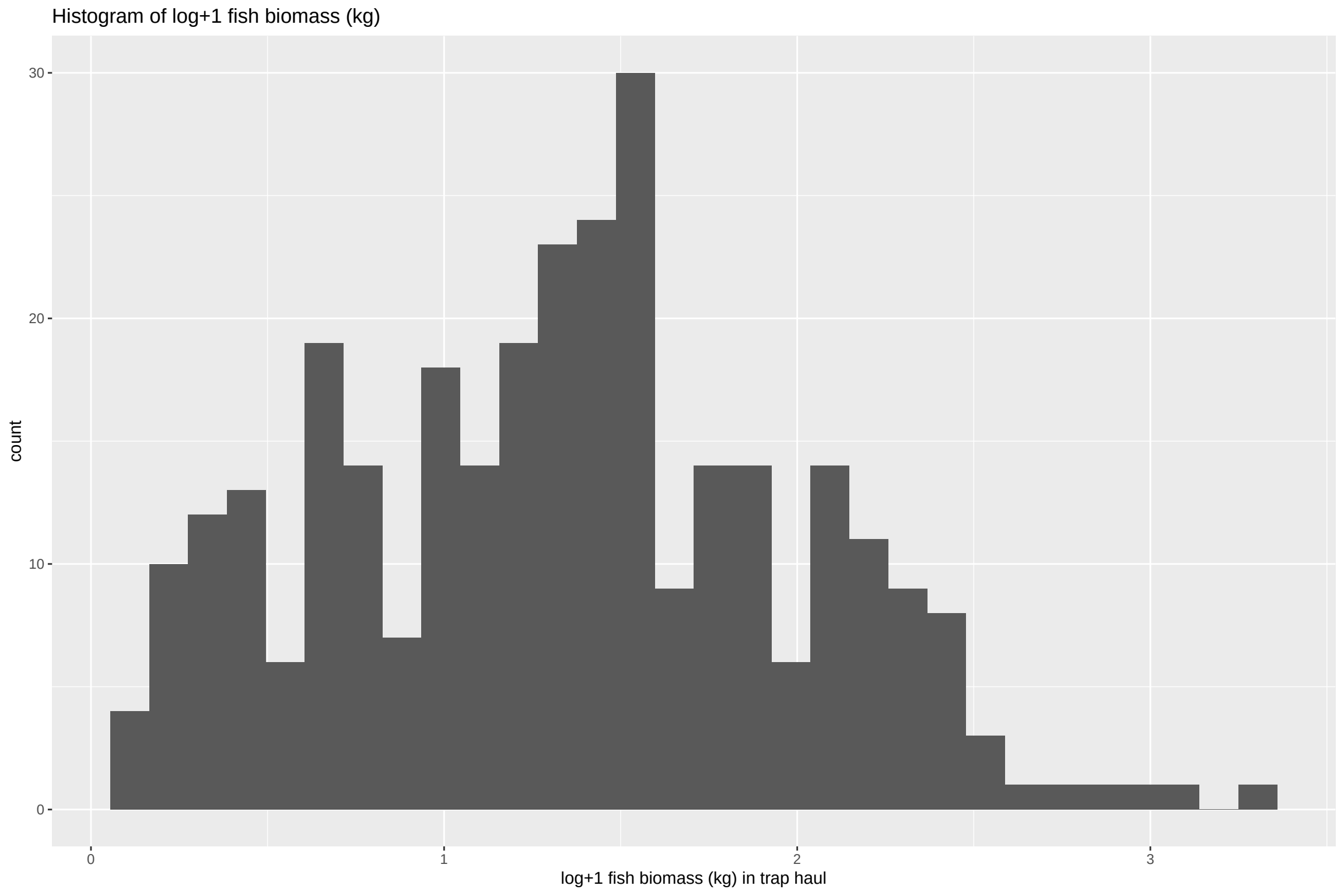
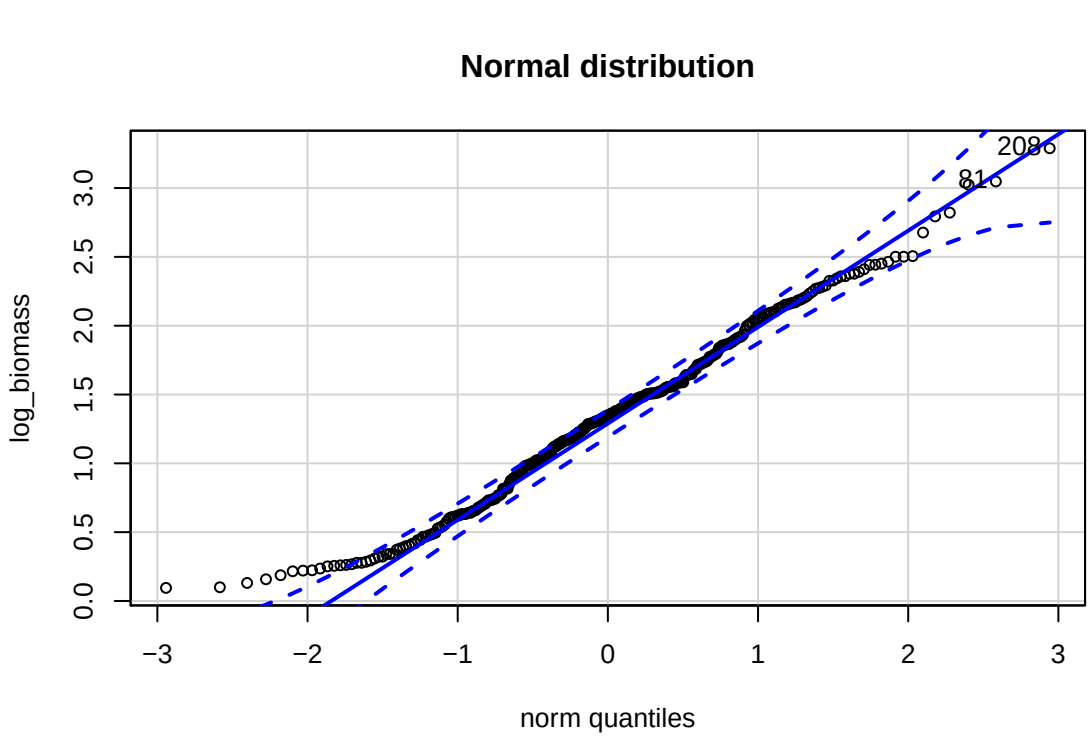
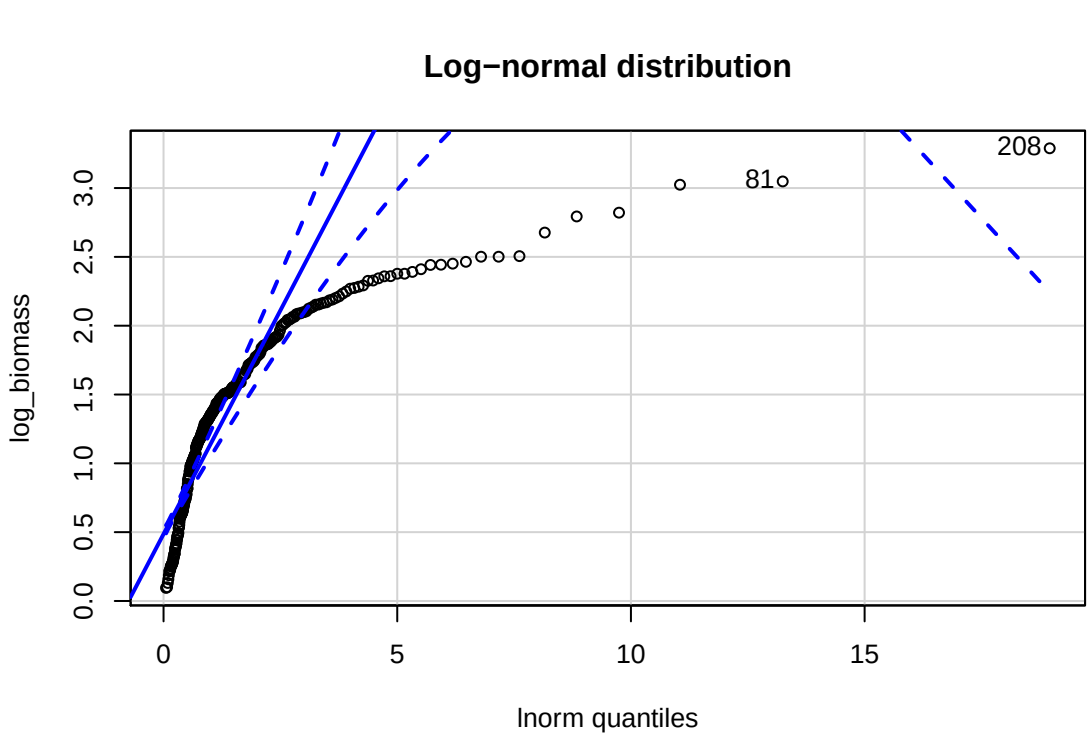
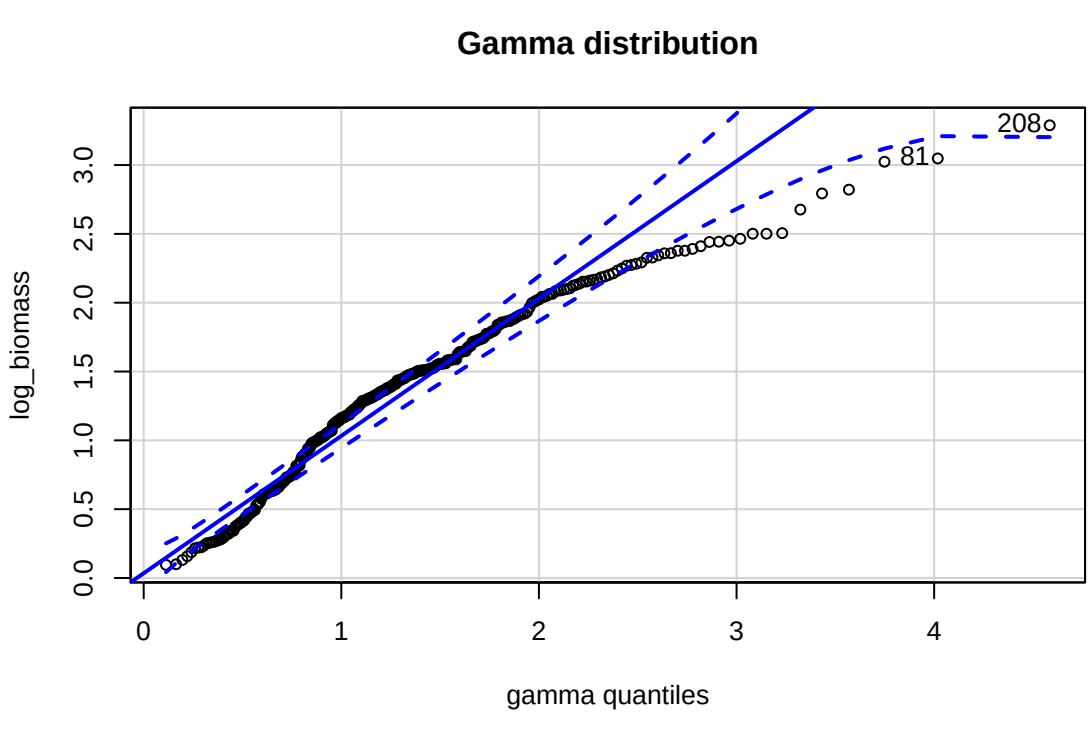

Histogram of log+1 fish biomass (kg)
count
30
20
10
0
0
1
2
3
log+1 fish biomass (kg) in trap haul

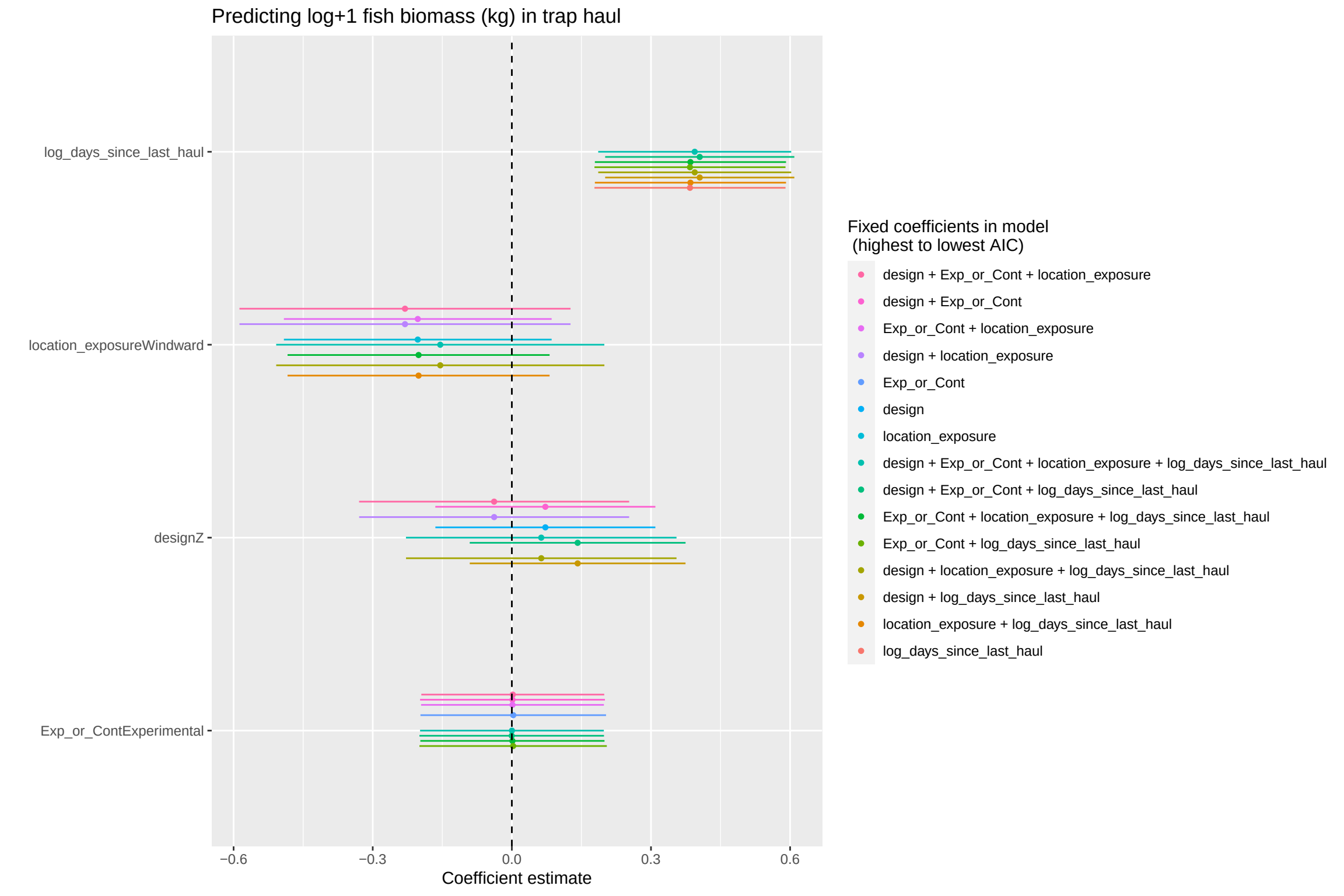

Normal distribution
log_biomass
norm quantiles
208
81
0.0
0.5
1.0
1.5
2.0
2.5
3.0
−3
−2
−1
0
1
2
3


Log−normal distribution
log_biomass
lnorm quantiles
208
81
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
5
10
15


Gamma distribution
log_biomass
gamma quantiles
208
81
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
1
2
3
4

```
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_Cont lct_exp log_dys_snc_lst_hal df   logLik  AICc
9  0.5791                                     0.3165  5 -273.856 557.9
13 0.6096                       +             0.3173  6 -272.893 558.1
10 0.4430   +                                 0.3339  6 -273.164 558.6
14 0.5414   +                   +             0.3249  7 -272.806 560.0
11 0.5777               +                     0.3165  6 -273.856 560.0
15 0.6089               +       +             0.3173  7 -272.893 560.2
12 0.4432   +           +                     0.3339  7 -273.164 560.7
16 0.5414   +           +       +             0.3249  8 -272.806 562.1
1  1.2930                                             4 -278.982 566.1
5  1.3240                       +                     5 -278.041 566.3
2  1.2430   +                                         5 -278.804 567.8
3  1.2910               +                             5 -278.982 568.2
6  1.3550   +                   +                     6 -278.008 568.3
7  1.3230               +       +                     6 -278.041 568.4
4  1.2420   +           +                             6 -278.804 569.9
8  1.3540   +           +       +                     7 -278.008 570.4
   delta weight
9   0.00  0.244
13  0.16  0.226
10  0.70  0.172
14  2.07  0.087
11  2.08  0.086
15  2.25  0.079
12  2.79  0.060
16  4.18  0.030
1   8.19  0.004
5   8.37  0.004
2   9.90  0.002
3  10.25  0.001
6  10.39  0.001
7  10.45  0.001
4  11.98  0.001
8  12.48  0.000
Models ranked by AICc(x)
Random terms (all models):
'1 | TrapID', '1 | Date_YMD'
```

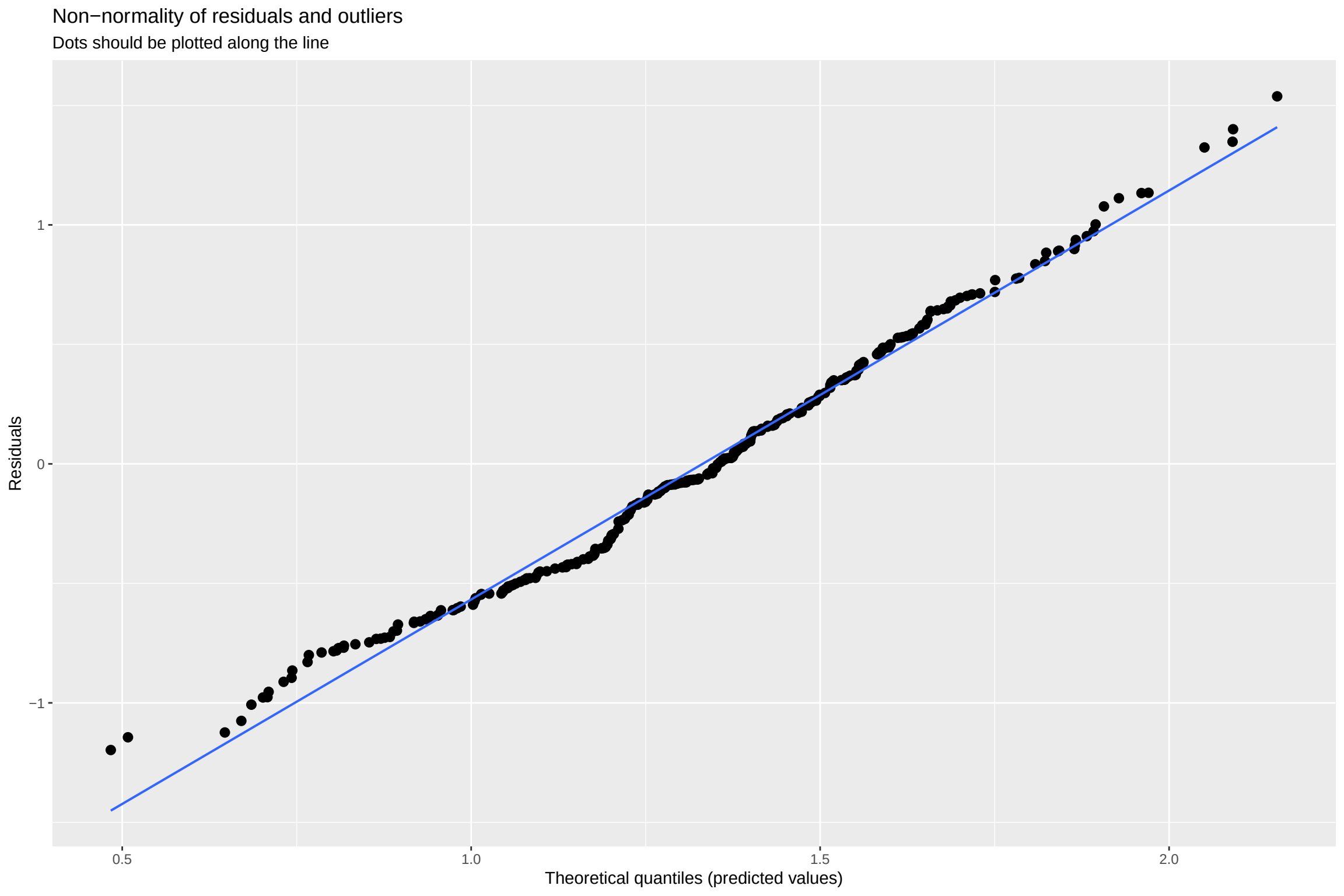
model	sigma	logLik	AIC	BIC	deviance	df.residual
log_days_since_last_haul	0.54	−273.86	557.71	576.35	547.71	302
location_exposure + log_days_since_last_haul	0.54	−272.89	557.79	580.15	545.79	301
design + log_days_since_last_haul	0.55	−273.16	558.33	580.69	546.33	301
design + location_exposure + log_days_since_last_haul	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

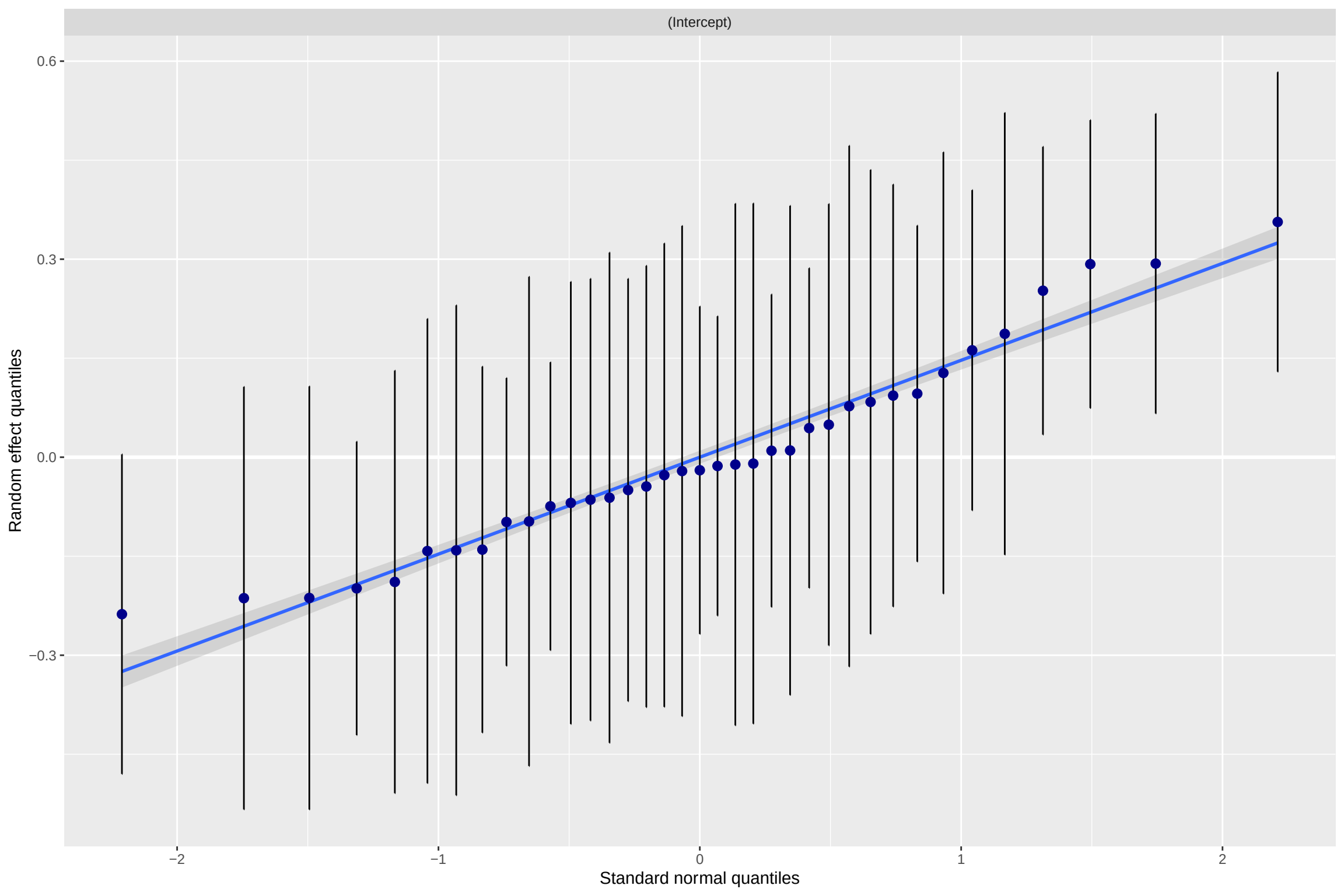

Predicting log+1 fish biomass (kg) in trap haul
log_days_since_last_haul
location_exposureWindward
designZ
Exp_or_ContExperimental
−0.6
−0.3
0.0
0.3
0.6
Coefficient estimate
Fixed coefficients in model
(highest to lowest AIC)
design + Exp_or_Cont + location_exposure
design + Exp_or_Cont
Exp_or_Cont + 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

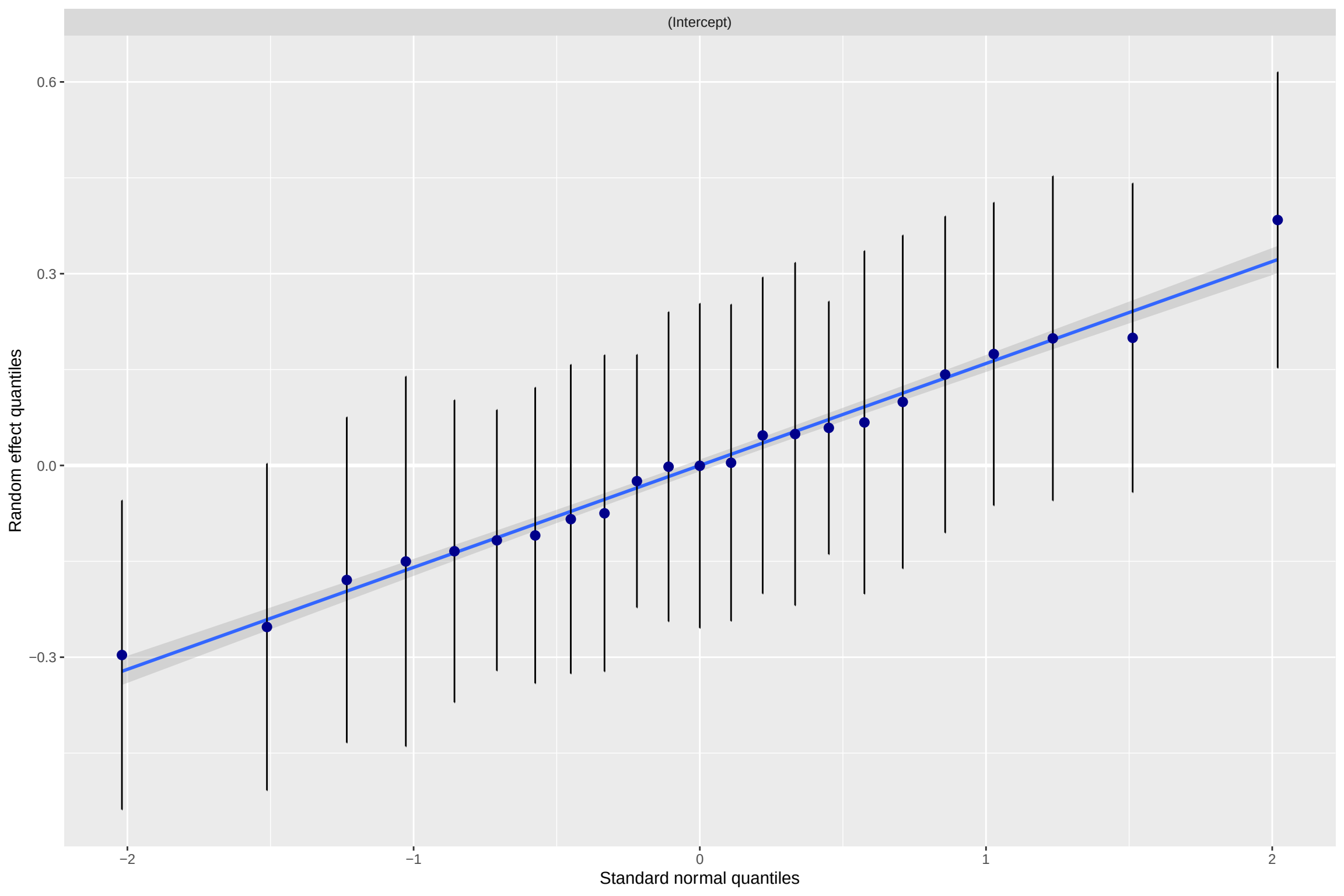
```
Backward reduced random-effect table:

               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 0.0538  0.0538     1 79.167  0.1817
location_exposure                 3 0.5756  0.5756     1 90.986  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                   0.671040
location_exposure        0.166240
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)
```

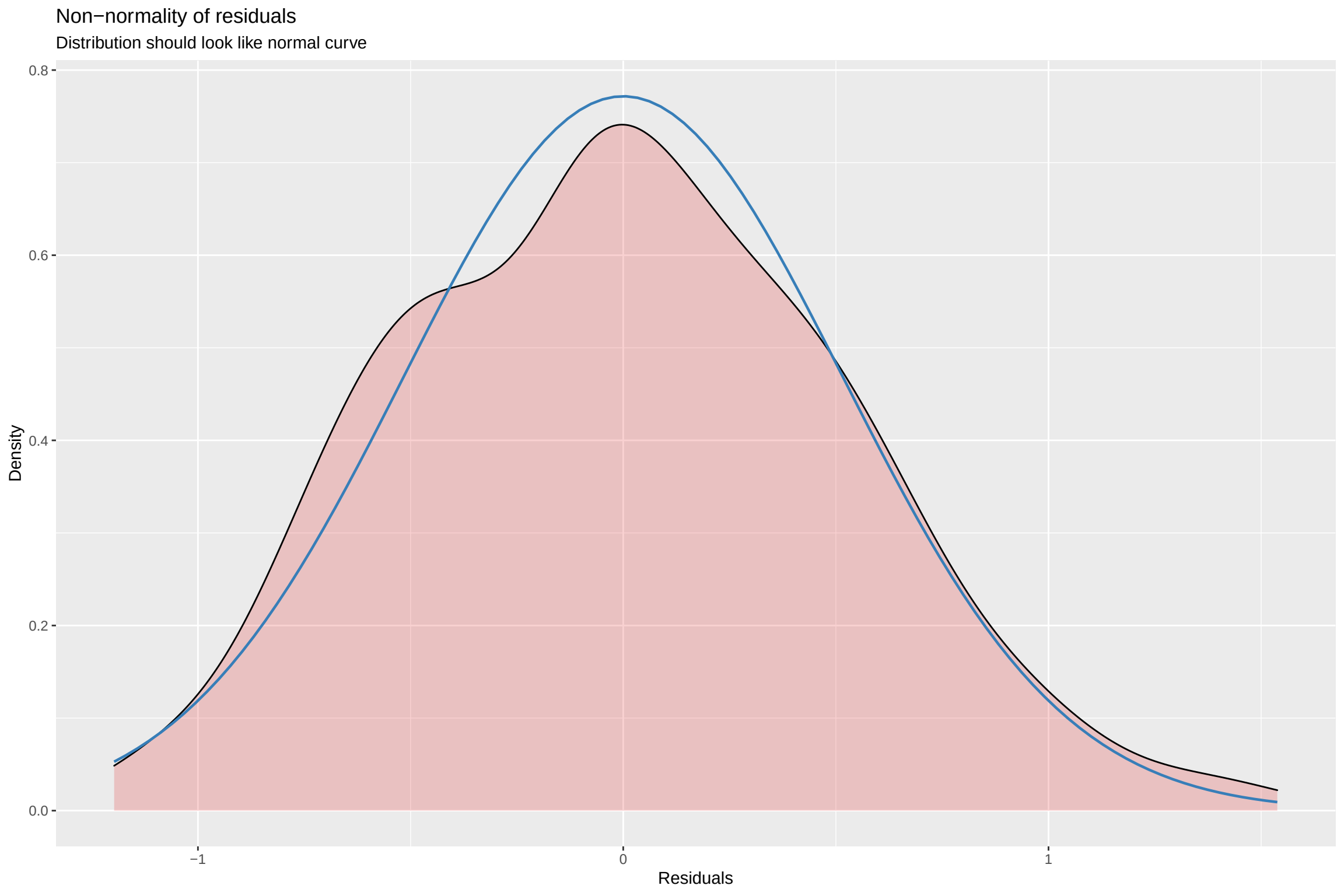
Optimal model found using 'step' function which performs backward elimination of fixed−effect terms

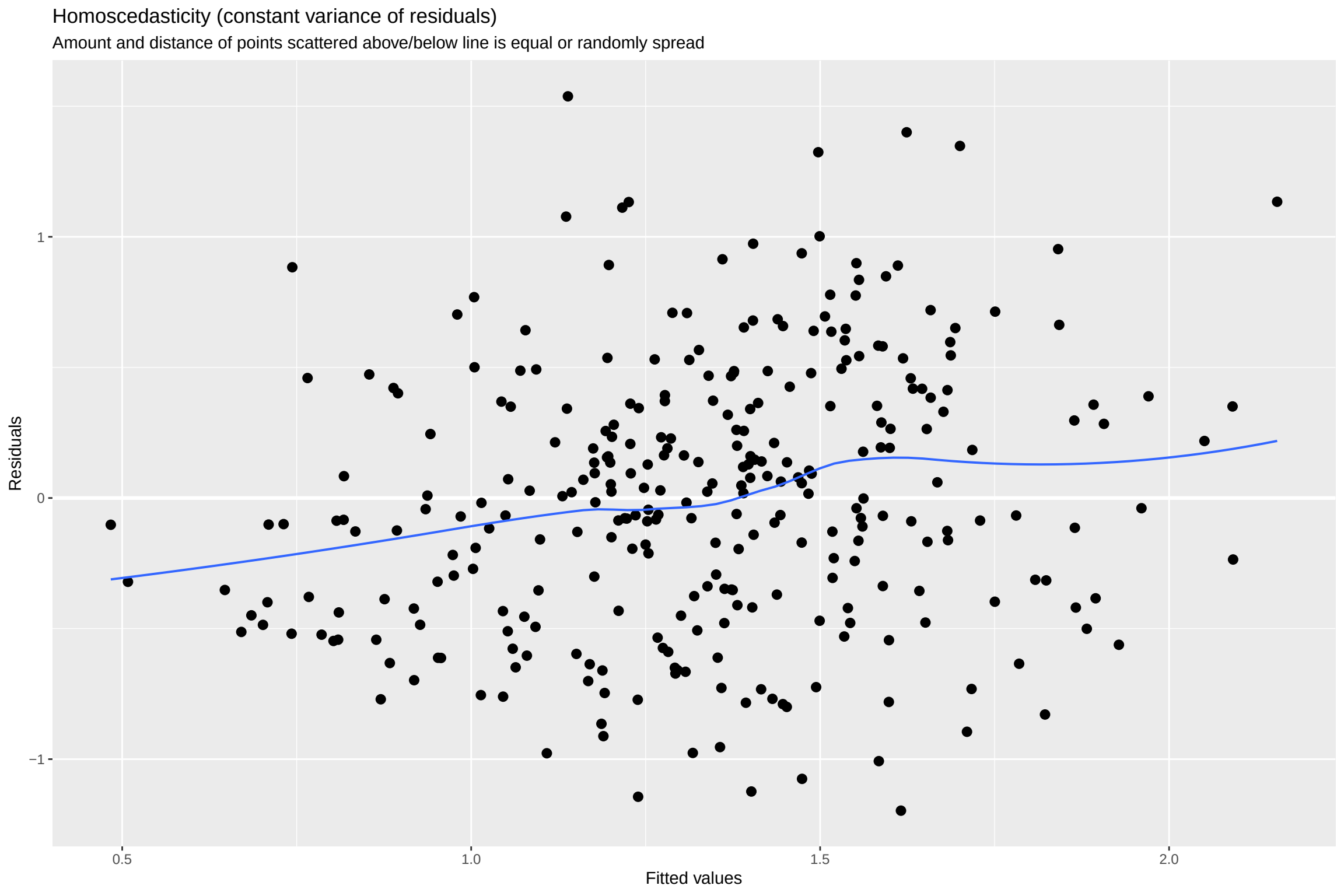
```
Linear mixed model fit by maximum likelihood . t−tests use
  Satterthwaite's method [lmerModLmerTest]
Formula: log_biomass ~ log_days_since_last_haul + (1 | TrapID) + (1 |
    Date_YMD)
   Data: trap_haul_no_zero

     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
Residuals
1
0
−1
0.5
1.0
1.5
2.0
Theoretical quantiles (predicted values)


(Intercept)
0.6
0.3
0.0
−0.3
Random effect quantiles
−2
−1
0
1
2
Standard normal quantiles


(Intercept)
0.6
0.3
0.0
−0.3
Random effect quantiles
−2
−1
0
1
2
Standard normal quantiles


Non−normality of residuals
Distribution should look like normal curve
0.8
0.6
0.4
0.2
0.0
Density
−1
0
1
Residuals


Homoscedasticity (constant variance of residuals)
Amount and distance of points scattered above/below line is equal or randomly spread
Residuals
1
0
−1
0.5
1.0
1.5
2.0
Fitted values

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) 0.04385  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 26.99061   2.939  0.00668 **
location_exposureWindward -0.20115    0.14414 90.98576  -1.396  0.16624
log_days_since_last_haul   0.31733    0.08665 23.59684   3.662  0.00126 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

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

Correlation of Fixed Effects:
            (Intr) designZ lg____ lctn_W
designZ     -0.595
lg_dys_sn__ -0.834  0.197
lctn_xpsrWn -0.422  0.605  0.110
Exp_r_CntEx -0.187 -0.025 -0.007 -0.006
```