Chapter 3 Results

# **Occupancy Modeling**

## Longnose Dace:

lnd.results.p

model npar AICc DeltaAICc weight

p(~1)Psi(~GLOBAL) 8 231.7922 0.0000000 0.4462

p(~pctcbbl)Psi(~GLOBAL) 9 232.5388 0.7466409 0.3072

p(~mFlow)Psi(~GLOBAL) 9 233.9733 2.1810909 0.1499

p(~pctcbbl + mFlow)Psi(~GLOBAL) 10 234.8514 3.0592044 0.0967

> #Two models <2 DeltaAICc

> summary(lnd.results.p$p.Dot.Psi.global)#top model

Output summary for Occupancy model

Name : p(~1)Psi(~Area\_km2 + pctcbbl + elev\_m + avgT + med\_len + BRT\_100m)

Npar : 8

-2lnL: 214.6759

AICc : 231.7922

Beta

estimate se lcl ucl

p:(Intercept) 0.7886091 0.2370554 0.3239805 1.2532377

Psi:(Intercept) -13.6198900 3.3958347 -20.2757260 -6.9640537

Psi:Area\_km2 0.0879920 0.0463824 -0.0029175 0.1789015

Psi:pctcbbl 0.0258460 0.0126301 0.0010910 0.0506009

Psi:elev\_m -0.0149622 0.0067626 -0.0282169 -0.0017074

Psi:avgT 0.9076042 0.2174047 0.4814910 1.3337173

Psi:med\_len 0.0015521 0.0022851 -0.0029267 0.0060309

Psi:BRT\_100m -0.0616306 0.0356479 -0.1315005 0.0082392

Real Parameter p

1 2 3

0.6875326 0.6875326 0.6875326

Real Parameter Psi

1

0.1225579

> lnd.results.p$p.Dot.Psi.global$results$real

estimate se lcl ucl fixed note

p g1 a0 t1 0.6875326 0.0509270 0.5802940 0.7778598

Psi g1 a0 t1 0.1225579 0.0402128 0.0628935 0.2252202

> summary(lnd.results.p$p.cobble.Psi.global)#2nd model

Output summary for Occupancy model

Name : p(~pctcbbl)Psi(~Area\_km2 + pctcbbl + elev\_m + avgT + med\_len + BRT\_100m)

Npar : 9

-2lnL: 213.1326

AICc : 232.5388

Beta

estimate se lcl ucl

p:(Intercept) 1.5609726 0.6919842 0.2046837 2.9172616

p:pctcbbl -0.0121131 0.0100035 -0.0317199 0.0074938

Psi:(Intercept) -13.7216150 3.4122839 -20.4096910 -7.0335381

Psi:Area\_km2 0.0908626 0.0481582 -0.0035276 0.1852527

Psi:pctcbbl 0.0271783 0.0128667 0.0019596 0.0523971

Psi:elev\_m -0.0149507 0.0067543 -0.0281892 -0.0017123

Psi:avgT 0.9076765 0.2169247 0.4825041 1.3328490

Psi:med\_len 0.0015748 0.0022862 -0.0029061 0.0060558

Psi:BRT\_100m -0.0623683 0.0361380 -0.1331988 0.0084622

Real Parameter p

1 2 3

0.7022343 0.7022343 0.7022343

Real Parameter Psi

1

0.1225621

> lnd.results.p$p.cobble.Psi.global$results$real

estimate se lcl ucl fixed note

p g1 a0 t1 0.7022343 0.0520194 0.5915457 0.7934031

Psi g1 a0 t1 0.1225621 0.0402596 0.0628468 0.2253720

> summary(lnd.results.p$p.flow.Psi.global)#3rd model

Output summary for Occupancy model

Name : p(~mFlow)Psi(~Area\_km2 + pctcbbl + elev\_m + avgT + med\_len + BRT\_100m)

Npar : 9

-2lnL: 214.567

AICc : 233.9733

Beta

estimate se lcl ucl

p:(Intercept) 1.0363331 0.7885143 -0.5091549 2.5818212

p:mFlow -0.9382210 2.8445474 -6.5135340 4.6370921

Psi:(Intercept) -13.6427330 3.3981767 -20.3031590 -6.9823063

Psi:Area\_km2 0.0876108 0.0462552 -0.0030494 0.1782709

Psi:pctcbbl 0.0257629 0.0126135 0.0010405 0.0504853

Psi:elev\_m -0.0149365 0.0067609 -0.0281878 -0.0016852

Psi:avgT 0.9087482 0.2178056 0.4818492 1.3356472

Psi:med\_len 0.0015825 0.0022950 -0.0029157 0.0060808

Psi:BRT\_100m -0.0615277 0.0356378 -0.1313778 0.0083223

Real Parameter p

1 2 3

0.6919799 0.6919799 0.6919799

Real Parameter Psi

1

0.1224351

> lnd.results.p$p.flow.Psi.global$results$real

estimate se lcl ucl fixed note

p g1 a0 t1 0.6919799 0.0523253 0.5813275 0.7842417

Psi g1 a0 t1 0.1224351 0.0401740 0.0628307 0.2250077

>

######################## -- LND Occupancy models -- ####################################

lnd.results.psi

**model npar AICc DeltaAICc weight**

Psi(~Area\_km2 + pctcbbl + elev\_m + avgT + BRT\_100m) 7 229.9987 0 0.32

Psi(~Area\_km2 + pctcbbl + elev\_m + avgT) 6 230.9942 0.9955829 1.956131e-01

Psi(~FULL) 8 231.7922 1.7935006 1.312600e-01

Psi(~pctcbbl + elev\_m + avgT + BRT\_100m) 6 232.8935 2.8948229 7.568038e-02

#look at summary of top model(s) -- 3 within 2AICc & hold double digit weight

> summary(lnd.results.psi$p.Dot.Psi.combo2) # top model

Output summary for Occupancy model

Name : p(~1)Psi(~Area\_km2 + pctcbbl + elev\_m + avgT + BRT\_100m)

Npar : 7

-2lnL: 215.1371

AICc : 229.9987

Beta

estimate se lcl ucl

p:(Intercept) 0.7868982 0.2374071 3.215802e-01 1.2522161

Psi:(Intercept) -13.8213360 3.4142352 -2.051324e+01 -7.1294346

Psi:Area\_km2 0.0921593 0.0469424 1.522692e-04 0.1841663

Psi:pctcbbl 0.0282986 0.0121016 4.579400e-03 0.0520178

Psi:elev\_m -0.0156122 0.0066945 -2.873340e-02 -0.0024909

Psi:avgT 0.9305449 0.2168967 5.054274e-01 1.3556624

Psi:BRT\_100m -0.0567951 0.0344853 -1.243863e-01 0.0107962

Real Parameter p

1 2 3

0.6871649 0.6871649 0.6871649

Real Parameter Psi

1

0.122515

> lnd.results.psi$p.Dot.Psi.combo2$results$real

estimate se lcl ucl fixed note

p g1 a0 t1 0.6871649 0.0510352 0.5797093 0.7776832

Psi g1 a0 t1 0.1225150 0.0402222 0.0628468 0.2252191

> summary(lnd.results.psi$p.Dot.Psi.habitat) # 2nd model

Output summary for Occupancy model

Name : p(~1)Psi(~Area\_km2 + pctcbbl + elev\_m + avgT)

Npar : 6

-2lnL: 218.353

AICc : 230.9942

Beta

estimate se lcl ucl

p:(Intercept) 0.7826001 0.2383667 3.154013e-01 1.2497989000

Psi:(Intercept) -15.3500720 3.3125945 -2.184276e+01 -8.8573867000

Psi:Area\_km2 0.0722466 0.0405519 -7.235100e-03 0.1517283000

Psi:pctcbbl 0.0220758 0.0112689 -1.121624e-05 0.0441629000

Psi:elev\_m -0.0136794 0.0065784 -2.657300e-02 -0.0007857666

Psi:avgT 1.0040058 0.2146480 5.832957e-01 1.4247158000

Real Parameter p

1 2 3

0.6862402 0.6862402 0.6862402

Real Parameter Psi

1

0.1287733

> lnd.results.psi$p.Dot.Psi.habitat$results$real

estimate se lcl ucl fixed note

p g1 a0 t1 0.6862402 0.0513238 0.5782031 0.7772650

Psi g1 a0 t1 0.1287733 0.0402527 0.0681746 0.2299446

> summary(lnd.results.psi$p.Dot.Psi.global) # 3rd model

Output summary for Occupancy model

Name : p(~1)Psi(~Area\_km2 + pctcbbl + elev\_m + avgT + med\_len + BRT\_100m)

Npar : 8

-2lnL: 214.6759

AICc : 231.7922

Beta

estimate se lcl ucl

p:(Intercept) 0.7886091 0.2370554 0.3239806 1.2532377

Psi:(Intercept) -13.6198910 3.3958356 -20.2757290 -6.9640534

Psi:Area\_km2 0.0879920 0.0463824 -0.0029176 0.1789015

Psi:pctcbbl 0.0258460 0.0126301 0.0010910 0.0506010

Psi:elev\_m -0.0149622 0.0067626 -0.0282169 -0.0017074

Psi:avgT 0.9076042 0.2174048 0.4814909 1.3337176

Psi:med\_len 0.0015521 0.0022851 -0.0029267 0.0060309

Psi:BRT\_100m -0.0616306 0.0356479 -0.1315006 0.0082393

Real Parameter p

1 2 3

0.6875326 0.6875326 0.6875326

Real Parameter Psi

1

0.1225579

> lnd.results.psi$p.Dot.Psi.global$results$real

estimate se lcl ucl fixed note

p g1 a0 t1 0.6875326 0.0509270 0.5802940 0.7778598

Psi g1 a0 t1 0.1225579 0.0402128 0.0628935 0.2252202

summary(lnd.results.psi$p.Dot.Psi.combo2.3) #FMO

Output summary for Occupancy model

Name : p(~1)Psi(~pctcbbl + elev\_m + avgT + BRT\_100m)

Npar : 6

-2lnL: 220.2523

AICc : 232.8935

Beta

estimate se lcl ucl

p:(Intercept) 0.7719394 0.2403520 0.3008495 1.2430294

Psi:(Intercept) -14.0376740 3.3978946 -20.6975470 -7.3778005

Psi:pctcbbl 0.0274879 0.0116454 0.0046628 0.0503129

Psi:elev\_m -0.0176066 0.0066716 -0.0306829 -0.0045303

Psi:avgT 1.0242245 0.2228026 0.5875313 1.4609177

Psi:BRT\_100m -0.0439076 0.0339933 -0.1105345 0.0227193

Real Parameter p

1 2 3

0.6839403 0.6839403 0.6839403

Real Parameter Psi

1

0.1196802

> lnd.results.psi$p.Dot.Psi.combo2.3$results$real

estimate se lcl ucl fixed note

p g1 a0 t1 0.6839403 0.0519559 0.5746502 0.7760909

Psi g1 a0 t1 0.1196802 0.0400096 0.0606666 0.2225018

## Southern Redbelly Dace:

srd.results.p

**model npar AICc DeltaAICc weight Deviance**

1 p(~avdep)Psi(FULL) 8 245.8310 0.000000 0.5107446 228.7148

2 p(~1)Psi(FULL) 7 247.5977 1.766719 0.2111376 232.7362

4 p(~mFlow + avdep)Psi(FULL) 9 247.9834 2.152351 0.1741112 228.5771

3 p(~mFlow)Psi(FULL) 8 249.0139 3.182830 0.1040066 231.8976

#Compare model results - 2 models <2deltaAICc

> summary(srd.results.p$p.depth.Psi.global) #top model

Output summary for Occupancy model

Name : p(~avdep)Psi(~avgT + avdep + pctfines + med\_len + BRT\_100m)

Npar : 8

-2lnL: 228.7148

AICc : 245.831

Beta

estimate se lcl ucl

p:(Intercept) -1.9974623000 1.1114289 -4.1758631 0.1809384

p:avdep 6.8448247000 3.4267314 0.1284310 13.5612180

Psi:(Intercept) -9.9780304000 3.3043912 -16.4546370 -3.5014236

Psi:avgT 0.5641594000 0.2113168 0.1499785 0.9783404

Psi:avdep 3.1566927000 3.6621637 -4.0211483 10.3345340

Psi:pctfines -0.0075212000 0.0121090 -0.0312548 0.0162123

Psi:med\_len -0.0003599389 0.0027431 -0.0057364 0.0050166

Psi:BRT\_100m -0.2220491000 0.1367206 -0.4900215 0.0459233

Real Parameter p

1 2 3

0.4394175 0.4394175 0.4394175

Real Parameter Psi

1

0.1034697

> srd.results.p$p.depth.Psi.global$results$real

estimate se lcl ucl fixed note

p g1 a0 t1 0.4394175 0.0825687 0.2889457 0.6019165

Psi g1 a0 t1 0.1034697 0.0740228 0.0235850 0.3554361

>

> summary(srd.results.p$p.Dot.Psi.global) #2nd model

Output summary for Occupancy model

Name : p(~1)Psi(~avgT + avdep + pctfines + med\_len + BRT\_100m)

Npar : 7

-2lnL: 232.7362

AICc : 247.5977

Beta

estimate se lcl ucl

p:(Intercept) 0.0932517000 0.2448232 -0.3866018 0.5731051

Psi:(Intercept) -9.9827764000 2.8764163 -15.6205530 -4.3450003

Psi:avgT 0.5011280000 0.1660943 0.1755832 0.8266728

Psi:avdep 6.1175365000 3.0105635 0.2168319 12.0182410

Psi:pctfines -0.0073934000 0.0115269 -0.0299861 0.0151994

Psi:med\_len 0.0001160748 0.0025913 -0.0049628 0.0051949

Psi:BRT\_100m -0.2197298000 0.1348333 -0.4840032 0.0445435

Real Parameter p

1 2 3

0.523296 0.523296 0.523296

Real Parameter Psi

1

0.0898772

> srd.results.p$p.Dot.Psi.global$results$real

estimate se lcl ucl fixed note

p g1 a0 t1 0.5232960 0.0610729 0.4045356 0.6394794

Psi g1 a0 t1 0.0898772 0.0631740 0.0212722 0.3097225

######################## -- SRD Occupancy models -- ####################################

##Examine model list and look at model comparisons

> srd.results.psi

model npar AICc DeltaAICc weight Deviance

15 p(~avdep)Psi(~avgT + BRT\_100m) 5 240.1079 0.000000 4.665279e-01 229.6533

12 p(~avdep)Psi(~avgT + avdep + BRT\_100m) 6 241.7437 1.635786 2.059071e-01 229.1025

13 p(~avdep)Psi(~avgT + pctfines + BRT\_100m) 6 242.0169 1.909026 1.796131e-01 229.3757

11 p(~avdep)Psi(~avgT + avdep + pctfines + BRT\_100m) 7 243.5935 3.485633 8.165486e-02 228.7320

#look at summary of top model(s)

> summary(srd.results.psi$p.depth.Psi.combo2.4) #top model

Output summary for Occupancy model

Name : p(~avdep)Psi(~avgT + BRT\_100m)

Npar : 5

-2lnL: 229.6533

AICc : 240.1079

Beta

estimate se lcl ucl

p:(Intercept) -2.4958675 0.8490031 -4.1599136 -0.8318213

p:avdep 8.2274084 2.7324311 2.8718433 13.5829730

Psi:(Intercept) -10.4150380 3.4727422 -17.2216130 -3.6084631

Psi:avgT 0.6340307 0.2172479 0.2082249 1.0598365

Psi:BRT\_100m -0.2255701 0.1173358 -0.4555484 0.0044081

Real Parameter p

1 2 3

0.404282 0.404282 0.404282

Real Parameter Psi

1

0.1125344

> srd.results.psi$p.depth.Psi.combo2.4$results$real

estimate se lcl ucl fixed note

p g1 a0 t1 0.4042820 0.0674632 0.2815700 0.5402571

Psi g1 a0 t1 0.1125344 0.0729613 0.0293974 0.3467823

> ##2nd model (delta AIC = 1.47)

> summary(srd.results.psi$p.depth.Psi.combo2.1)

Output summary for Occupancy model

Name : p(~avdep)Psi(~avgT + avdep + BRT\_100m)

Npar : 6

-2lnL: 229.1025

AICc : 241.7437

Beta

estimate se lcl ucl

p:(Intercept) -1.9878719 1.0828781 -4.1103130 0.1345693

p:avdep 6.8065819 3.3555001 0.2298016 13.3833620

Psi:(Intercept) -10.4544410 3.1280595 -16.5854380 -4.3234448

Psi:avgT 0.5775746 0.1982851 0.1889358 0.9662134

Psi:avdep 2.9391303 3.6243783 -4.1646512 10.0429120

Psi:BRT\_100m -0.2090521 0.1117200 -0.4280233 0.0099191

Real Parameter p

1 2 3

0.439366 0.439366 0.439366

Real Parameter Psi

1

0.107256

> srd.results.psi$p.depth.Psi.combo2.1$results$real

estimate se lcl ucl fixed note

p g1 a0 t1 0.439366 0.0806502 0.2920455 0.5982069

Psi g1 a0 t1 0.107256 0.0669689 0.0296009 0.3212003

> ##3rd model (delta AIC = 1.90)

> summary(srd.results.psi$p.depth.Psi.combo2.2)

Output summary for Occupancy model

Name : p(~avdep)Psi(~avgT + pctfines + BRT\_100m)

Npar : 6

-2lnL: 229.3757

AICc : 242.0169

Beta

estimate se lcl ucl

p:(Intercept) -2.5203744 0.8522825 -4.1908481 -0.8499006

p:avdep 8.3075641 2.7418660 2.9335067 13.6816220

Psi:(Intercept) -9.8548569 3.5510917 -16.8149970 -2.8947170

Psi:avgT 0.6160561 0.2156829 0.1933176 1.0387947

Psi:pctfines -0.0066333 0.0126230 -0.0313743 0.0181077

Psi:BRT\_100m -0.2484359 0.1315598 -0.5062931 0.0094213

Real Parameter p

1 2 3

0.4033268 0.4033268 0.4033268

Real Parameter Psi

1

0.10455

> srd.results.psi$p.depth.Psi.combo2.2$results$real

estimate se lcl ucl fixed note

p g1 a0 t1 0.4033268 0.0675415 0.2805547 0.5395341

Psi g1 a0 t1 0.1045500 0.0730745 0.0246616 0.3502858

## Cottus:

cott.results.p

**model npar AICc DeltaAICc weight**

p(~mFlow)Psi(FULL) 9 143.9418 0.000000 0.67217418

p(~pctcbbl + mFlow)Psi(~FULL) 10 146.2557 2.313893 0.21136168

p(~1)Psi(~FULL) 8 148.3419 4.400149 0.07447347

p(~pctcbbl)Psi(~FULL) 9 149.4879 5.546140 0.04199067

> #only one model <2 DeltaAICc

> summary(cott.results.p$p.flow.Psi.global) #top model

Output summary for Occupancy model

Name : p(~mFlow)Psi(~avgT + mFlow + HAiFLS\_for + boulder + med\_len + BRT\_100m)

Npar : 9

-2lnL: 124.5355

AICc : 143.9418

Beta

estimate se lcl ucl

p:(Intercept) 3.1366656 0.8127966 1.5435842 4.7297469

p:mFlow -7.3738046 3.0283396 -13.3093500 -1.4382588

Psi:(Intercept) -1.3815537 2.8489222 -6.9654414 4.2023339

Psi:avgT -0.2150659 0.1589192 -0.5265475 0.0964156

Psi:mFlow -6.6993707 4.1196255 -14.7738370 1.3750955

Psi:HAiFLS\_for 0.0394280 0.0140934 0.0118049 0.0670511

Psi:boulder 1.3135227 0.5945788 0.1481482 2.4788971

Psi:med\_len 0.0097951 0.0040507 0.0018556 0.0177345

Psi:BRT\_100m 0.0463498 0.0204057 0.0063545 0.0863450

Real Parameter p

1 2 3

0.7946285 0.7946285 0.7946285

Real Parameter Psi

1

0.0347355

> cott.results.p$p.flow.Psi.global$results$real

estimate se lcl ucl fixed note

p g1 a0 t1 0.7946285 0.0617344 0.6483078 0.8903674

Psi g1 a0 t1 0.0347355 0.0234316 0.0090636 0.1240199

> #only one model <2 DeltaAICc

> summary(cott.results.p$p.full.Psi.global) #2nd model

Output summary for Occupancy model

Name : p(~pctcbbl + mFlow)Psi(~avgT + mFlow + HAiFLS\_for + boulder + med\_len + BRT\_100m)

Npar : 10

-2lnL: 124.5234

AICc : 146.2557

Beta

estimate se lcl ucl

p:(Intercept) 3.3034641 1.7297958 -0.0869358 6.6938640

p:pctcbbl -0.0027685 0.0251335 -0.0520302 0.0464933

p:mFlow -7.2375145 3.2599711 -13.6270580 -0.8479711

Psi:(Intercept) -1.3765395 2.8487815 -6.9601513 4.2070724

Psi:avgT -0.2152798 0.1589436 -0.5268092 0.0962495

Psi:mFlow -6.7114926 4.1186745 -14.7840950 1.3611095

Psi:HAiFLS\_for 0.0394129 0.0140934 0.0117899 0.0670359

Psi:boulder 1.3148438 0.5948782 0.1488825 2.4808052

Psi:med\_len 0.0097952 0.0040492 0.0018589 0.0177316

Psi:BRT\_100m 0.0463347 0.0203746 0.0064004 0.0862690

Real Parameter p

1 2 3

0.8009342 0.8009342 0.8009342

Real Parameter Psi

1

0.0346977

> cott.results.p$p.full.Psi.global$results$real

estimate se lcl ucl fixed note

p g1 a0 t1 0.8009342 0.0830667 0.5916990 0.9178354

Psi g1 a0 t1 0.0346977 0.0234077 0.0090532 0.1239018

#######################################################################################################################

##Examine model list and look at model comparisons

> cott.results.psi

**model npar AICc DeltaAICc weight Deviance**

Psi(~avgT + mFlow + HAiFLS\_for + boulder + med\_len + BRT\_100m) 9 143.9418 0.000000 3.868578e-01 124.5355

Psi(~HAiFLS\_for + boulder + BRT\_100m) 6 145.9371 1.995331 1.426496e-01 133.2959

Psi(~mFlow + HAiFLS\_for + boulder + BRT\_100m) 7 146.7573 2.815588 9.465729e-02 131.8958

#look at summary of top model(s)

> summary(cott.results.psi$p.flow.Psi.global) #top model

Output summary for Occupancy model

Name : p(~mFlow)Psi(~avgT + mFlow + HAiFLS\_for + boulder + med\_len + BRT\_100m)

Npar : 9

-2lnL: 124.5355

AICc : 143.9418

Beta

estimate se lcl ucl

p:(Intercept) 3.1366655 0.8127965 1.5435843 4.7297468

p:mFlow -7.3738045 3.0283393 -13.3093500 -1.4382593

Psi:(Intercept) -1.3815548 2.8489146 -6.9654275 4.2023179

Psi:avgT -0.2150659 0.1589188 -0.5265468 0.0964150

Psi:mFlow -6.6993687 4.1196235 -14.7738310 1.3750934

Psi:HAiFLS\_for 0.0394280 0.0140934 0.0118049 0.0670511

Psi:boulder 1.3135227 0.5945786 0.1481485 2.4788968

Psi:med\_len 0.0097951 0.0040507 0.0018556 0.0177345

Psi:BRT\_100m 0.0463498 0.0204057 0.0063545 0.0863450

Real Parameter p

1 2 3

0.7946285 0.7946285 0.7946285

Real Parameter Psi

1

0.0347355

> cott.results.psi$p.flow.Psi.global$results$real

estimate se lcl ucl fixed note

p g1 a0 t1 0.7946285 0.0617344 0.6483078 0.8903674

Psi g1 a0 t1 0.0347355 0.0234316 0.0090636 0.1240199

> summary(cott.results.psi$p.flow.Psi.combo2.9) #2nd model

Output summary for Occupancy model

Name : p(~mFlow)Psi(~HAiFLS\_for + boulder + BRT\_100m)

Npar : 6

-2lnL: 133.2959

AICc : 145.9371

Beta

estimate se lcl ucl

p:(Intercept) 3.4072980 0.8398238 1.7612433 5.0533526

p:mFlow -9.4440790 3.1648994 -15.6472820 -3.2408760

Psi:(Intercept) -4.4791396 0.8285582 -6.1031138 -2.8551655

Psi:HAiFLS\_for 0.0298815 0.0104472 0.0094050 0.0503580

Psi:boulder 1.3675857 0.5655493 0.2591090 2.4760625

Psi:BRT\_100m 0.0841660 0.0231557 0.0387808 0.1295512

Real Parameter p

1 2 3

0.7545297 0.7545297 0.7545297

Real Parameter Psi

1

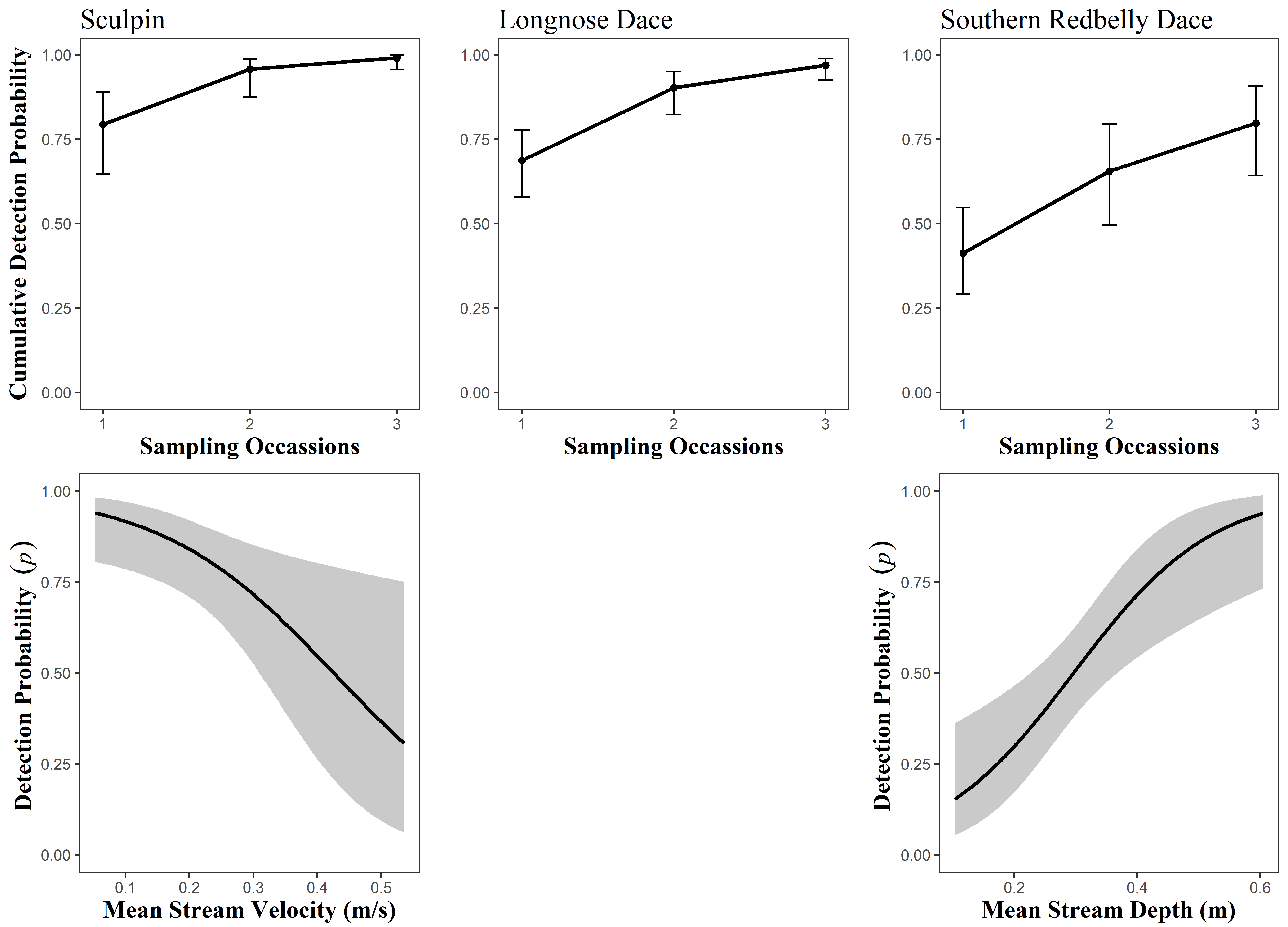
0.0756404

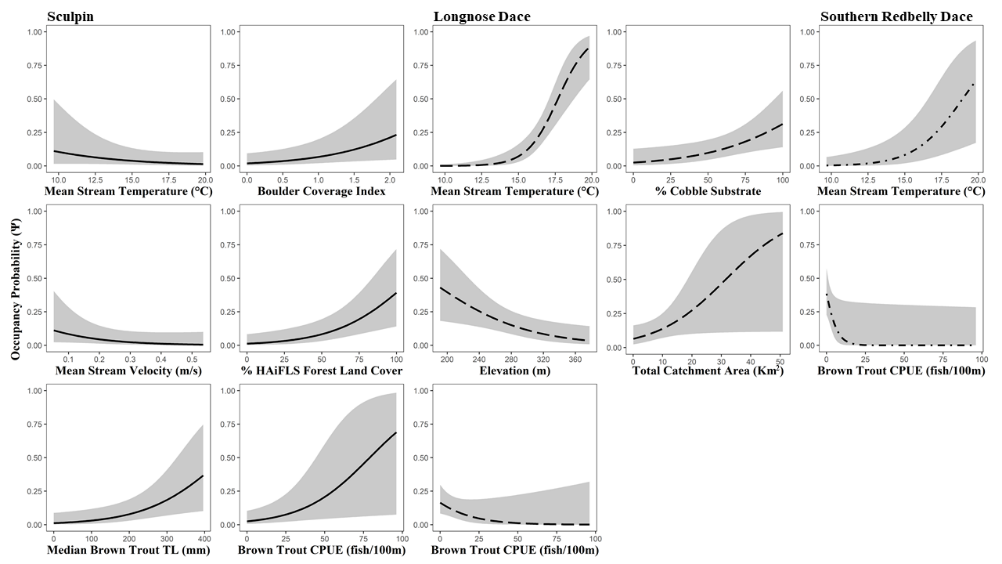
> cott.results.psi$p.flow.Psi.combo2.9$results$real

estimate se lcl ucl fixed note

p g1 a0 t1 0.7545297 0.0681298 0.5991555 0.8634081

Psi g1 a0 t1 0.0756404 0.0303438 0.0337735 0.1607714





# **CPUE comparisons and relationships:**

## Comparisons of CPUE b/w sites with and without Brown Trout:

#############################################################################

>

> # Mann Whitney U / Wilcox Sign Rank Test

>

> #-----

> #LND

> #-----

> #full dataset

> #two sided

> wilcox.test(a, b, mu=0, alt="two.sided", conf.int=T, conf.level=0.95, paired=F,

+ exact=F)

Wilcoxon rank sum test with continuity correction

data: a and b

W = 2280, p-value = 0.6175

alternative hypothesis: true location shift is not equal to 0

95 percent confidence interval:

-7.508378e-05 3.262860e-05

sample estimates:

difference in location

-3.661339e-05

#-----

> #SRD

> #-----

> #greater without

> wilcox.test(a3, b3, mu=0, alt="g", conf.int=T, conf.level=0.95, paired=F,

+ exact=F)

Wilcoxon rank sum test with continuity correction

data: a3 and b3

W = 2750.5, p-value = 0.01371

alternative hypothesis: true location shift is greater than 0

95 percent confidence interval:

2.209698e-05 Inf

sample estimates:

difference in location

9.19241e-06

#-----

> #Cottus

> #-----

> #less than without BRT

> wilcox.test(aa, bb, mu=0, alt="l", conf.int=T, conf.level=0.95, paired=F,

+ exact=F)

Wilcoxon rank sum test with continuity correction

data: aa and bb

W = 1866, p-value = 0.000235

alternative hypothesis: true location shift is less than 0

95 percent confidence interval:

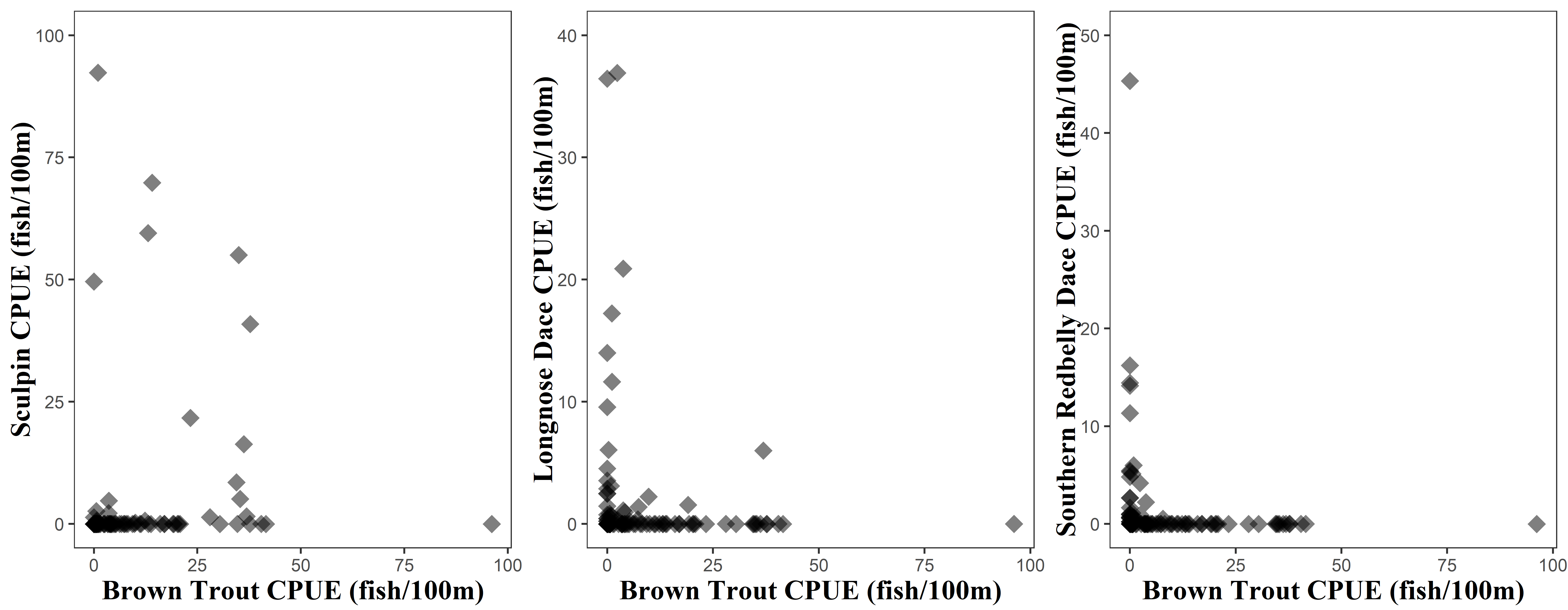
-Inf -4.618917e-05

sample estimates:

difference in location

-5.439162e-05

# CPUE Relationships:



# **Size Comparisons:**

## Longnose Dace:

## compare across BRT status and size bins (percentage based %)

> #size class 1

> wilcox.test(lnd.comp2$bin1\_pct ~ lnd.comp2$BRT, mu=0, alt="two.sided", conf.int=T, conf.level=0.95, paired=F,

+ exact=F)

Wilcoxon rank sum test with continuity correction

data: lnd.comp2$bin1\_pct by lnd.comp2$BRT

W = 148, p-value = 0.5162

alternative hypothesis: true location shift is not equal to 0

95 percent confidence interval:

-0.0000428524 3.1745892004

sample estimates:

difference in location

5.616438e-05

> # p-value = 0.5162

>

> #size class 2

> wilcox.test(lnd.comp2$bin2\_pct ~ lnd.comp2$BRT, mu=0, alt="two.sided", conf.int=T, conf.level=0.95, paired=F,

+ exact=F)

Wilcoxon rank sum test with continuity correction

data: lnd.comp2$bin2\_pct by lnd.comp2$BRT

W = 114.5, p-value = 0.486

alternative hypothesis: true location shift is not equal to 0

95 percent confidence interval:

-28.048764 3.174584

sample estimates:

difference in location

-6.47006e-05

> # p-value = 0.486

>

> #size class 3

> wilcox.test(lnd.comp2$bin3\_pct ~ lnd.comp2$BRT, mu=0, alt="two.sided", conf.int=T, conf.level=0.95, paired=F,

+ exact=F)

Wilcoxon rank sum test with continuity correction

data: lnd.comp2$bin3\_pct by lnd.comp2$BRT

W = 144, p-value = 0.6761

alternative hypothesis: true location shift is not equal to 0

95 percent confidence interval:

-3.22578 7.31705

sample estimates:

difference in location

3.427485e-05

> # p-value = 0.6761

## Southern Redbelly Dace:

## compare across BRT status and size bins (percentage based %)

> #size class 1

> wilcox.test(srd.comp2$bin1\_pct ~ srd.comp2$BRT, mu=0, alt="two.sided", conf.int=T, conf.level=0.95, paired=F,

+ exact=F)

Wilcoxon rank sum test with continuity correction

data: srd.comp2$bin1\_pct by srd.comp2$BRT

W = 133.5, p-value = 0.5969

alternative hypothesis: true location shift is not equal to 0

95 percent confidence interval:

-9.99996 21.53848

sample estimates:

difference in location

2.674882e-05

> #size class 2

> wilcox.test(srd.comp2$bin2\_pct ~ srd.comp2$BRT, mu=0, alt="two.sided", conf.int=T, conf.level=0.95, paired=F,

+ exact=F)

Wilcoxon rank sum test with continuity correction

data: srd.comp2$bin2\_pct by srd.comp2$BRT

W = 112.5, p-value = 0.7778

alternative hypothesis: true location shift is not equal to 0

95 percent confidence interval:

-21.53852 11.11111

sample estimates:

difference in location

-7.049267e-06

> #size class 3

> wilcox.test(srd.comp2$bin3\_pct ~ srd.comp2$BRT, mu=0, alt="two.sided", conf.int=T, conf.level=0.95, paired=F,

+ exact=F)

Wilcoxon rank sum test with continuity correction

data: srd.comp2$bin3\_pct by srd.comp2$BRT

W = 121, p-value = 0.9693

alternative hypothesis: true location shift is not equal to 0

95 percent confidence interval:

-9.601063e-06 1.434308e-05

sample estimates:

difference in location

9.749906e-06

## Sculpins:

## compare across BRT status and size bins (percentage based %)

> #size class 1

> wilcox.test(cott.comp2$bin1\_pct ~ cott.comp2$BRT, mu=0, alt="two.sided", conf.int=T, conf.level=0.95, paired=F,

+ exact=F)

Wilcoxon rank sum test with continuity correction

data: cott.comp2$bin1\_pct by cott.comp2$BRT

W = 14, p-value = 0.6439

alternative hypothesis: true location shift is not equal to 0

95 percent confidence interval:

-50.00001 11.20000

sample estimates:

difference in location

-0.9188509

> #size class 2

> wilcox.test(cott.comp2$bin2\_pct ~ cott.comp2$BRT, mu=0, alt="two.sided", conf.int=T, conf.level=0.95, paired=F,

+ exact=F)

Wilcoxon rank sum test with continuity correction

data: cott.comp2$bin2\_pct by cott.comp2$BRT

W = 25, p-value = 0.412

alternative hypothesis: true location shift is not equal to 0

95 percent confidence interval:

-33.33326 42.74281

sample estimates:

difference in location

13.70691

> #size class 3

> wilcox.test(cott.comp2$bin3\_pct ~ cott.comp2$BRT, mu=0, alt="two.sided", conf.int=T, conf.level=0.95, paired=F,

+ exact=F)

Wilcoxon rank sum test with continuity correction

data: cott.comp2$bin3\_pct by cott.comp2$BRT

W = 21, p-value = 0.7496

alternative hypothesis: true location shift is not equal to 0

95 percent confidence interval:

-36.80004 33.33333

sample estimates:

difference in location

3.199965

> #size class 4

> wilcox.test(cott.comp2$bin4\_pct ~ cott.comp2$BRT, mu=0, alt="two.sided", conf.int=T, conf.level=0.95, paired=F,

+ exact=F)

Wilcoxon rank sum test with continuity correction

data: cott.comp2$bin4\_pct by cott.comp2$BRT

W = 15, p-value = 0.6124

alternative hypothesis: true location shift is not equal to 0

95 percent confidence interval:

-1.010018 0.000000

sample estimates:

difference in location

0