Delaware River PIT tag data analysis

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2022-07-14

Note: the results shown here are preliminary and have not been officially reviewed by USGS, NYDEC or PA Fish and Boat

This notebook uses targets to manage running code and updating R objects. Targets sets up dependencies among specified objects and only re-runs code as necessary (when an upstream component gets updated). This can save run times for projects with models that take a while to run, like capture-mark-recapture models.

Data preparation and model running happens using targets and exploration of the data and model runs is below in this Markdown document.

'knit' the document to update all targets and the markdown exploration below.

'tar_make()' runs all the R scripts and functions specified in '_targets.R'. Only updated code or sections that are downstream from updated data are re-run.
'tar_read()' reads 'target' data into the global environment.

This section (tar_make()) reruns the model

```
#  tar_watch(seconds = 10, outdated = FALSE, targets_only = TRUE)


# comment this out when kniting - get Latex error that it can't find the check mark the tar_make() uses
#tar_make()

# tar_prune() # cleans unused data files
#tar_invalidate(everything())
#tar_invalidate(ends_with("ttt"))


#str(d)
```

Load data for analysis

```
dRaw0 <- tar_read(dRaw0) #all data - including untagged
dRaw <- tar_read(dRaw) #all data for CMR models
d <- tar_read(target_d)
eh <- tar_read(target_eh)
```

Visualize the network - does not work with pdf output

```
#tar_visnetwork()
```

Which rivers (Water) riverN corresponds to

```
table(d$Water, d$riverN)
#>
#>                            1    2    3    4    5    6
#>   Balls Creek             41    0    0    0    0    0
#>   Cold Spring Creek        0   95    0    0    0    0
#>   Roods Creek              0    0  159    0    0    0
#>   Sands Creek              0    0    0  139    0    0
#>   Shehawken Creek          0    0    0    0   91    0
#>   West Br Delaware River   0    0    0    0    0 5634
```

Raw data summary tables

```
kable(data.frame(ftable(d$date)))
```

Var1	Freq
2018-05-07	110
2018-05-08	34
2018-05-09	48
2018-06-11	129
2018-06-12	99
2018-06-13	88
2018-07-16	212
2018-07-17	176
2018-07-18	142
2018-08-21	11
2018-09-17	21
2018-09-20	89
2018-10-22	85
2018-10-23	131
2018-10-24	129
2019-04-08	240
2019-04-10	129
2019-05-06	170
2019-05-07	91
2019-06-10	169
2019-06-11	129
2019-07-15	212
2019-07-16	312
2019-07-17	25
2019-08-12	131
2019-08-13	139
2019-08-14	186
2019-08-15	49
2019-09-16	108
2019-09-17	55
2019-09-18	293
2019-10-21	262
2019-10-22	31
2019-10-23	74
2020-07-16	146

Var1	Freq
2020-07-20	249
2020-07-21	29
2020-08-10	89
2020-08-11	41
2020-08-17	145
2020-08-20	110
2020-09-10	187
2020-09-14	252
2020-09-15	47
2020-10-13	368
2020-10-14	55
2020-10-15	132

```
#kable(data.frame(ftable(d$Water, d$riverN)))

#kable(data.frame(ftable(d$Water, d$riverN, d$date)))
kable(data.frame(ftable(d$species)))
```

Var1	Freq
brook trout	13
brown trout	5534
rainbow trout	611

```
### Number of unique tags
length(unique(d$tag))
#> [1] 4610
```

Group observations by month.
Luckily, sampling periods do not span months, so we can use month as a grouping variable for sampling occasion

```
kable(data.frame(ftable(d$dateYM)))
```

Var1	Freq
2018-05	192
2018-06	316
2018-07	530
2018-08	11
2018-09	110
2018-10	345
2019-04	369
2019-05	261
2019-06	298
2019-07	549
2019-08	505
2019-09	456
2019-10	367

Var1	Freq
2020-07	424
2020-08	385
2020-09	486
2020-10	555

Tag information

Grouped by Water (sampling area)

```
tagN <- d %>%
  group_by(tag, Water) %>%
  summarize(n = n()) %>%
  filter(tag != "") %>%
  arrange(desc(n))
#> `summarise()` has grouped output by 'tag'. You can override using the `.groups`
#> argument.

### Number of times individual fish were observed
table(tagN$n)
#>
#>    1    2    3    4    5    6    7    8    9
#> 3641  611  223   90   30   12    4    1    1

### Number of times individual fish were observed by river
(table(tagN$Water, tagN$n))
#>
#>                            1    2    3    4    5    6    7    8    9
#>   Balls Creek             30    4    1    0    0    0    0    0    0
#>   Cold Spring Creek       39    9    4    2    1    1    1    0    0
#>   Roods Creek             78   21    6    4    1    0    0    0    0
#>   Sands Creek             97   16    2    1    0    0    0    0    0
#>   Shehawken Creek         45   10    6    2    0    0    0    0    0
#>   West Br Delaware River 3352  551  204   81   28   11    3    1    1
```

Grouped by main/trib

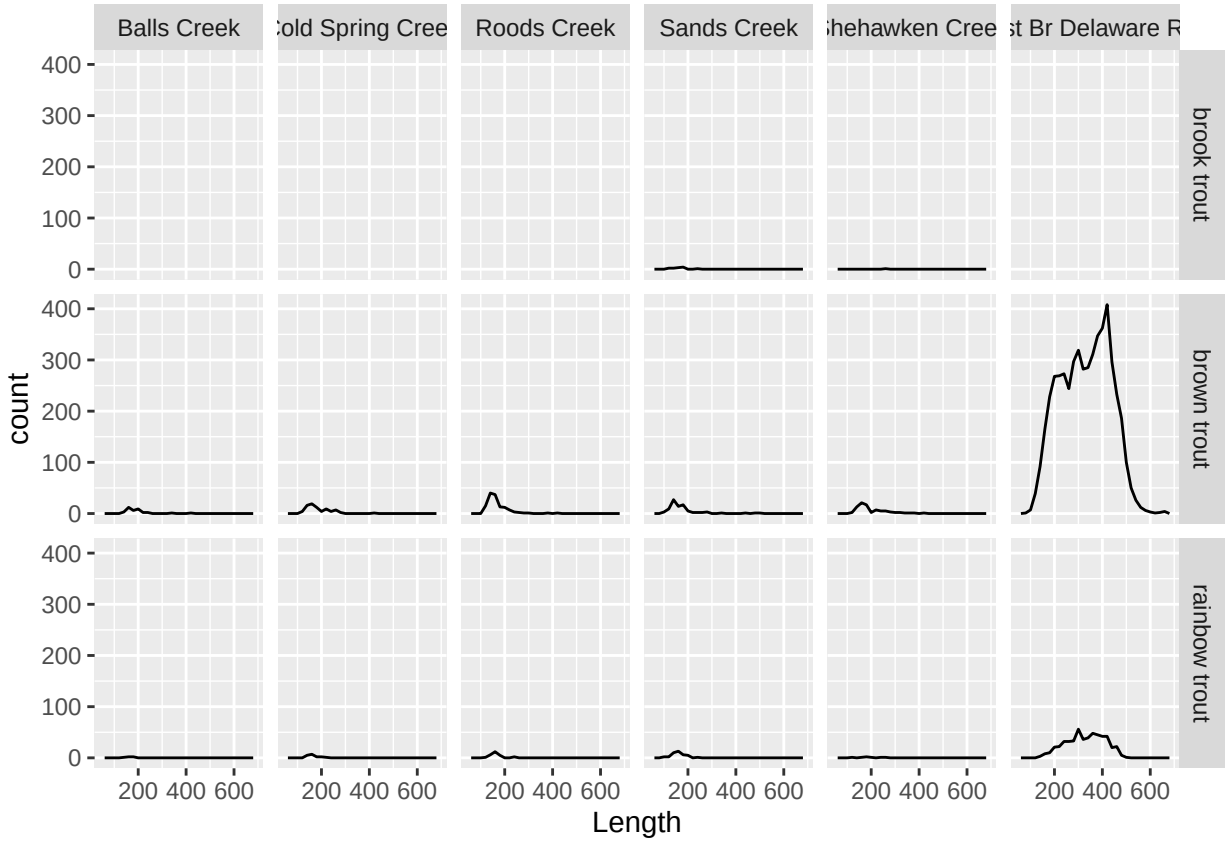
```
tagN_mt <- d %>%
  group_by(tag, mainTrib) %>%
  summarize(n = n()) %>%
  filter(tag != "") %>%
  arrange(desc(n))
#> `summarise()` has grouped output by 'tag'. You can override using the `.groups`
#> argument.

### Number of times individual fish were observed
table(tagN_mt$n)
#>
#>    1    2    3    4    5    6    7    8    9
#> 3641  611  223   90   30   12    4    1    1
```

```
### Number of times individual fish were observed by river
(table(tagN_mt$mainTrib, tagN_mt$n))
#>
#>           1    2    3    4    5    6    7    8    9
#>   main 3352  551  204   81   28   11    3    1    1
#>   trib  289   60   19    9    2    1    1    0    0
```

Basic summary plots of raw tagging data

```
ggplot(d %>% filter(!is.na(species)), aes(Length)) +
  geom_freqpoly() +
  facet_grid(species ~ Water)
#> `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```




```
# dTame <- d %>%
#             select(Latitude, Longitude, tag, dateTime, species, Length, Weight) %>%
#             filter(tag != "", tag != "ad")
#
# write.csv(dTame, './dataOut/dTame.csv', row.names = FALSE)
```

Encounter histories

This is the data structure for the capture-recapture models. Each column is a sampling 'occasion' (here = month) and each row is an individual, where a '1' indicates capture and a '0' indicates not captured.

```
str(eh$eh)
#>  num [1:3673, 1:17] 1 1 1 1 1 1 1 1 1 1 ...
#>  - attr(*, "dimnames")=List of 2
#>   ..$ : NULL
#>   ..$ : chr [1:17] "date_2018-05" "date_2018-06" "date_2018-07" "date_2018-08" ...
kable(head(eh$eh,8))
```

date_2018-05	date_2018-06	date_2018-07	date_2018-08	date_2018-09	date_2018-10	date_2019-04	date_2019-05	date_2019-06	date_2019-07	date_2019-08	date_2019-09	date_2019-10	date_2020-07	date_2020-08	date_2020-09	date_2020-10
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

```
table(paste(eh$first, eh$last, sep="_"))
#>
#>  1_17 10_17 11_17 12_17 13_17 14_17 15_17 16_17  2_17  3_17  4_17  5_17  6_17
#>   173   360   295   264   257   297   246   291   264   373     8    62   231
#>  7_17  8_17  9_17
#>   233   130   189
```

Summary info for years and occasions

```
years <- colnames(eh$eh) %>%
  substr(6,9) %>%
  as.numeric()

occs <- colnames(eh$eh)
```

Models

'phi' = apparent survival (probability of staying in the area = p(survival) + p(not moving out of area)).
'p' = probability of capture given that the fish is alive.

```
### Read the model run into global memory
mod <- tar_read(ttt_modelOut)

#MCMCplot(object = mod$mcmc)

(modSummary <- MCMCsummary(object = mod$mcmc, round = 3))
```

```
#>                    mean    sd   2.5%    50% 97.5% Rhat n.eff
#> betaP[1, 1]       0.031 1.425 -2.801  0.102 2.679 1.00   600
#> betaP[2, 1]      -0.078 1.420 -2.860 -0.101 2.936 1.00   890
#> betaP[3, 1]      -0.031 1.388 -2.808 -0.064 2.620 1.00   600
#> betaP[4, 1]      -0.020 1.396 -2.816  0.023 2.732 1.00   679
#> betaP[5, 1]       0.072 1.371 -2.377 -0.005 2.855 1.01   600
#> betaP[6, 1]       0.066 1.414 -2.635  0.054 2.799 1.00   600
#> betaP[1, 2]       0.047 1.437 -2.691  0.069 2.876 1.00   588
#> betaP[2, 2]      -0.069 1.438 -2.840 -0.090 2.831 1.01   514
#> betaP[3, 2]      -0.064 1.492 -3.206 -0.048 2.801 1.00   600
#> betaP[4, 2]      -0.017 1.364 -2.844 -0.012 2.536 1.00   600
#> betaP[5, 2]      -0.034 1.411 -2.588 -0.094 2.793 1.00   950
#> betaP[6, 2]       0.068 1.458 -2.906  0.069 2.757 1.00   600
#> betaP[1, 3]       0.035 1.442 -2.727  0.080 2.838 1.00   668
#> betaP[2, 3]      -0.084 1.448 -2.868 -0.050 2.679 1.00   661
#> betaP[3, 3]       0.019 1.407 -2.724  0.065 2.759 1.01   775
#> betaP[4, 3]      -0.016 1.427 -2.789 -0.051 2.768 1.00   667
#> betaP[5, 3]       0.050 1.404 -2.893  0.096 2.732 1.00   652
#> betaP[6, 3]       0.138 1.495 -2.789  0.078 2.936 1.00   658
#> betaP[1, 4]      -0.010 1.380 -2.595  0.002 2.747 1.00   600
#> betaP[2, 4]      -0.060 1.470 -3.264 -0.031 2.773 1.03   673
#> betaP[3, 4]      -0.076 1.413 -2.819 -0.140 2.846 1.00   480
#> betaP[4, 4]       0.010 1.402 -2.897  0.087 2.640 1.01   600
#> betaP[5, 4]      -0.030 1.421 -2.934 -0.003 2.792 1.00   664
#> betaP[6, 4]       0.104 1.442 -2.566  0.125 2.916 1.02   600
#> betaP[1, 5]       0.075 1.461 -2.960  0.026 2.890 1.00   515
#> betaP[2, 5]      -0.051 1.437 -2.692 -0.050 2.890 1.00   879
#> betaP[3, 5]      -0.094 1.452 -2.889 -0.093 2.739 1.02   544
#> betaP[4, 5]       0.069 1.440 -2.865  0.081 2.824 1.01   726
#> betaP[5, 5]      -0.013 1.362 -2.670 -0.063 2.590 1.00   459
#> betaP[6, 5]       0.109 1.466 -2.506  0.070 2.995 1.00   681
#> betaP[1, 6]       0.099 1.360 -2.732  0.148 2.680 1.00   549
#> betaP[2, 6]      -0.126 1.353 -2.715 -0.169 2.508 1.00   562
#> betaP[3, 6]      -0.034 1.397 -2.800 -0.034 2.791 1.01   600
#> betaP[4, 6]      -0.110 1.366 -2.586 -0.173 2.703 1.00   600
#> betaP[5, 6]      -0.015 1.394 -2.665 -0.038 2.938 1.00   610
#> betaP[6, 6]       0.128 1.440 -2.580  0.125 3.051 1.01   813
#> betaP[1, 7]       0.067 1.340 -2.428  0.011 2.715 1.00   693
#> betaP[2, 7]      -0.121 1.425 -3.056 -0.132 2.598 1.00   600
#> betaP[3, 7]      -0.023 1.391 -2.961 -0.067 2.709 1.03   600
#> betaP[4, 7]      -0.044 1.462 -2.772  0.029 2.804 1.00   600
#> betaP[5, 7]      -0.002 1.372 -2.611  0.008 2.722 1.00   600
#> betaP[6, 7]       0.101 1.419 -2.753  0.032 2.861 1.01   573
#> betaP[1, 8]       0.020 1.327 -2.521 -0.022 2.463 1.01   550
#> betaP[2, 8]      -0.191 1.407 -2.866 -0.204 2.498 1.01   600
#> betaP[3, 8]      -0.052 1.345 -2.511 -0.046 2.521 1.00   600
#> betaP[4, 8]       0.045 1.437 -2.705  0.085 2.741 1.00   512
#> betaP[5, 8]       0.008 1.450 -2.800 -0.040 2.774 1.00   600
#> betaP[6, 8]       0.084 1.459 -2.809  0.026 2.918 1.01   600
#> betaP[1, 9]       0.033 1.390 -2.953  0.062 2.747 1.00   691
#> betaP[2, 9]      -0.069 1.395 -2.756 -0.083 2.582 1.01   600
#> betaP[3, 9]      -0.042 1.412 -2.756 -0.056 2.802 1.00   600
#> betaP[4, 9]      -0.007 1.467 -2.868  0.007 2.869 1.01   600
```

```
#> betaP[5, 9]        -0.050 1.406 -2.577 -0.053 2.614 1.00   705
#> betaP[6, 9]         0.124 1.375 -2.721  0.190 2.779 1.01   609
#> betaP[1, 10]        0.076 1.368 -2.667  0.149 2.642 1.00   922
#> betaP[2, 10]       -0.116 1.426 -3.041 -0.118 2.660 1.00   686
#> betaP[3, 10]       -0.181 1.480 -3.093 -0.169 2.635 1.00   600
#> betaP[4, 10]       -0.015 1.391 -2.862  0.004 2.437 1.00   859
#> betaP[5, 10]        0.013 1.382 -2.666 -0.019 2.711 1.00   612
#> betaP[6, 10]        0.152 1.448 -2.547  0.186 2.884 1.01   593
#> betaP[1, 11]        0.032 1.410 -2.584  0.020 2.734 1.00   600
#> betaP[2, 11]       -0.111 1.381 -2.496 -0.118 2.580 1.01   655
#> betaP[3, 11]        0.076 1.448 -2.594  0.119 2.811 1.00   600
#> betaP[4, 11]        0.084 1.403 -2.669  0.071 2.820 1.00   600
#> betaP[5, 11]        0.009 1.404 -2.694 -0.019 2.940 1.00   600
#> betaP[6, 11]        0.077 1.445 -2.630  0.074 2.779 1.01   600
#> betaP[1, 12]        0.026 1.464 -2.830  0.053 2.866 1.00   531
#> betaP[2, 12]       -0.098 1.422 -2.932 -0.115 2.511 1.00   560
#> betaP[3, 12]       -0.001 1.400 -2.752 -0.007 2.672 1.00   600
#> betaP[4, 12]        0.042 1.468 -2.846  0.066 2.935 1.00   551
#> betaP[5, 12]        0.024 1.453 -2.799  0.039 2.862 1.01   647
#> betaP[6, 12]        0.036 1.482 -2.783  0.003 2.729 1.00   652
#> betaP[1, 13]        0.004 1.413 -2.874 -0.036 2.795 1.00   600
#> betaP[2, 13]       -0.118 1.456 -2.842 -0.090 2.801 1.00   600
#> betaP[3, 13]       -0.015 1.386 -2.639 -0.060 2.692 1.00   600
#> betaP[4, 13]       -0.011 1.434 -2.749  0.028 2.670 1.00   600
#> betaP[5, 13]        0.052 1.481 -2.690  0.031 2.998 1.00   600
#> betaP[6, 13]        0.108 1.369 -2.547  0.055 2.922 1.00   600
#> betaP[1, 14]       -0.004 1.353 -2.597  0.002 2.542 1.00   657
#> betaP[2, 14]       -0.146 1.376 -2.729 -0.148 2.304 1.03   696
#> betaP[3, 14]        0.015 1.376 -2.716  0.057 2.734 1.00   659
#> betaP[4, 14]        0.029 1.405 -2.721 -0.031 2.800 1.03   600
#> betaP[5, 14]        0.042 1.401 -2.549  0.053 2.756 1.00   585
#> betaP[6, 14]        0.085 1.412 -2.757  0.050 3.006 1.01   556
#> betaP[1, 15]        0.025 1.381 -2.676 -0.021 2.833 1.00   703
#> betaP[2, 15]       -0.210 1.384 -2.871 -0.236 2.741 1.01   684
#> betaP[3, 15]        0.004 1.447 -2.966  0.017 2.763 1.00   496
#> betaP[4, 15]       -0.028 1.424 -2.877  0.059 2.820 1.00   600
#> betaP[5, 15]        0.012 1.390 -2.803 -0.048 2.769 1.00   789
#> betaP[6, 15]        0.094 1.461 -2.966  0.182 2.784 1.00   600
#> betaP[1, 16]       -0.008 1.448 -2.531 -0.090 2.823 1.00   528
#> betaP[2, 16]       -0.089 1.459 -2.813 -0.034 2.747 1.00   591
#> betaP[3, 16]       -0.097 1.411 -2.735 -0.113 2.441 1.00   537
#> betaP[4, 16]       -0.079 1.462 -3.029 -0.121 2.979 1.01   600
#> betaP[5, 16]        0.006 1.392 -2.791 -0.015 2.699 1.00   600
#> betaP[6, 16]        0.141 1.383 -2.587  0.120 2.748 1.00   600
#> betaPOut[1, 1]      0.509 0.265  0.057  0.526 0.936 1.00   658
#> betaPOut[2, 1]      0.484 0.261  0.054  0.475 0.950 1.00   973
#> betaPOut[3, 1]      0.494 0.258  0.057  0.484 0.932 1.00   600
#> betaPOut[4, 1]      0.499 0.262  0.056  0.506 0.939 1.00   607
#> betaPOut[5, 1]      0.509 0.256  0.085  0.499 0.946 1.01   600
#> betaPOut[6, 1]      0.511 0.259  0.067  0.514 0.943 1.00   600
#> betaPOut[1, 2]      0.509 0.266  0.063  0.517 0.947 1.00   604
#> betaPOut[2, 2]      0.487 0.263  0.055  0.477 0.944 1.00   600
#> betaPOut[3, 2]      0.491 0.269  0.039  0.488 0.943 1.00   600
```

```
#> betaPOut[4, 2]      0.498 0.255  0.055  0.497 0.927 1.00   600
#> betaPOut[5, 2]      0.490 0.260  0.070  0.477 0.942 1.00   660
#> betaPOut[6, 2]      0.515 0.267  0.052  0.517 0.940 1.00   600
#> betaPOut[1, 3]      0.507 0.266  0.061  0.520 0.945 1.00   667
#> betaPOut[2, 3]      0.486 0.266  0.054  0.487 0.936 1.00   727
#> betaPOut[3, 3]      0.505 0.262  0.062  0.516 0.940 1.01   765
#> betaPOut[4, 3]      0.496 0.263  0.058  0.487 0.941 1.00   702
#> betaPOut[5, 3]      0.511 0.262  0.052  0.524 0.939 1.00   600
#> betaPOut[6, 3]      0.523 0.271  0.058  0.519 0.950 1.00   600
#> betaPOut[1, 4]      0.497 0.257  0.069  0.501 0.940 1.00   600
#> betaPOut[2, 4]      0.492 0.264  0.037  0.492 0.941 1.03   744
#> betaPOut[3, 4]      0.484 0.260  0.056  0.465 0.945 1.00   517
#> betaPOut[4, 4]      0.503 0.261  0.052  0.522 0.933 1.02   600
#> betaPOut[5, 4]      0.494 0.262  0.051  0.499 0.942 1.00   671
#> betaPOut[6, 4]      0.519 0.264  0.071  0.531 0.949 1.02   600
#> betaPOut[1, 5]      0.514 0.269  0.049  0.507 0.947 1.00  1087
#> betaPOut[2, 5]      0.490 0.264  0.063  0.487 0.947 1.00   864
#> betaPOut[3, 5]      0.482 0.260  0.053  0.477 0.939 1.02   476
#> betaPOut[4, 5]      0.512 0.264  0.054  0.520 0.944 1.01   597
#> betaPOut[5, 5]      0.497 0.254  0.065  0.484 0.930 1.00   465
#> betaPOut[6, 5]      0.517 0.267  0.075  0.518 0.952 1.00   600
#> betaPOut[1, 6]      0.521 0.255  0.061  0.537 0.936 1.00   600
#> betaPOut[2, 6]      0.475 0.254  0.062  0.458 0.925 1.00   579
#> betaPOut[3, 6]      0.494 0.260  0.057  0.491 0.942 1.01   550
#> betaPOut[4, 6]      0.476 0.256  0.070  0.457 0.937 1.00   600
#> betaPOut[5, 6]      0.495 0.258  0.065  0.491 0.950 1.00   612
#> betaPOut[6, 6]      0.520 0.265  0.070  0.531 0.955 1.00   745
#> betaPOut[1, 7]      0.512 0.252  0.081  0.503 0.938 1.00   677
#> betaPOut[2, 7]      0.478 0.264  0.045  0.467 0.931 1.00   600
#> betaPOut[3, 7]      0.494 0.258  0.049  0.483 0.938 1.03   600
#> betaPOut[4, 7]      0.494 0.268  0.059  0.507 0.943 1.00   600
#> betaPOut[5, 7]      0.501 0.258  0.068  0.502 0.938 1.00   696
#> betaPOut[6, 7]      0.515 0.264  0.060  0.508 0.946 1.00   660
#> betaPOut[1, 8]      0.503 0.249  0.074  0.495 0.921 1.00   552
#> betaPOut[2, 8]      0.464 0.259  0.054  0.449 0.924 1.00   600
#> betaPOut[3, 8]      0.491 0.255  0.075  0.489 0.926 1.00   600
#> betaPOut[4, 8]      0.509 0.265  0.063  0.521 0.939 1.01   532
#> betaPOut[5, 8]      0.501 0.266  0.057  0.490 0.941 1.00   600
#> betaPOut[6, 8]      0.515 0.268  0.057  0.507 0.949 1.01   518
#> betaPOut[1, 9]      0.507 0.258  0.050  0.516 0.940 1.00   600
#> betaPOut[2, 9]      0.487 0.263  0.060  0.479 0.930 1.02   600
#> betaPOut[3, 9]      0.491 0.264  0.060  0.486 0.943 1.00   600
#> betaPOut[4, 9]      0.498 0.267  0.054  0.502 0.946 1.01   600
#> betaPOut[5, 9]      0.491 0.264  0.071  0.487 0.932 1.00   694
#> betaPOut[6, 9]      0.524 0.258  0.062  0.547 0.942 1.00   580
#> betaPOut[1, 10]     0.515 0.256  0.065  0.537 0.933 1.00   919
#> betaPOut[2, 10]     0.479 0.259  0.046  0.470 0.935 1.00   724
#> betaPOut[3, 10]     0.468 0.268  0.043  0.458 0.933 1.00   600
#> betaPOut[4, 10]     0.501 0.262  0.054  0.501 0.920 1.00   841
#> betaPOut[5, 10]     0.499 0.257  0.065  0.495 0.938 1.00   590
#> betaPOut[6, 10]     0.527 0.267  0.073  0.546 0.947 1.01   590
#> betaPOut[1, 11]     0.504 0.263  0.070  0.505 0.939 1.00   600
#> betaPOut[2, 11]     0.480 0.256  0.076  0.471 0.930 1.01   667
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#> betaPOut[3, 11]     0.513 0.266  0.070  0.530 0.943 1.00   600
#> betaPOut[4, 11]     0.517 0.260  0.065  0.518 0.944 1.00   600
#> betaPOut[5, 11]     0.500 0.261  0.063  0.495 0.950 1.00   600
#> betaPOut[6, 11]     0.515 0.267  0.067  0.519 0.942 1.00   570
#> betaPOut[1, 12]     0.505 0.269  0.056  0.513 0.946 1.00   532
#> betaPOut[2, 12]     0.483 0.263  0.051  0.471 0.925 1.00   505
#> betaPOut[3, 12]     0.499 0.260  0.060  0.498 0.935 1.00   600
#> betaPOut[4, 12]     0.507 0.263  0.055  0.517 0.950 1.00   605
#> betaPOut[5, 12]     0.505 0.266  0.057  0.510 0.946 1.00   622
#> betaPOut[6, 12]     0.506 0.270  0.058  0.501 0.939 1.00   600
#> betaPOut[1, 13]     0.501 0.260  0.053  0.491 0.942 1.00   600
#> betaPOut[2, 13]     0.480 0.264  0.055  0.478 0.943 1.00   600
#> betaPOut[3, 13]     0.495 0.258  0.067  0.485 0.937 1.00   600
#> betaPOut[4, 13]     0.499 0.266  0.060  0.507 0.935 1.00   600
#> betaPOut[5, 13]     0.508 0.270  0.064  0.508 0.953 1.00   600
#> betaPOut[6, 13]     0.518 0.257  0.073  0.514 0.949 1.00   600
#> betaPOut[1, 14]     0.501 0.254  0.069  0.501 0.927 1.00   666
#> betaPOut[2, 14]     0.474 0.257  0.061  0.463 0.909 1.04   691
#> betaPOut[3, 14]     0.504 0.256  0.062  0.514 0.939 1.00   686
#> betaPOut[4, 14]     0.505 0.261  0.062  0.492 0.943 1.03   600
#> betaPOut[5, 14]     0.506 0.262  0.072  0.513 0.940 1.00   586
#> betaPOut[6, 14]     0.516 0.260  0.060  0.513 0.953 1.00   594
#> betaPOut[1, 15]     0.502 0.256  0.064  0.495 0.944 1.00   616
#> betaPOut[2, 15]     0.458 0.252  0.054  0.441 0.939 1.00   600
#> betaPOut[3, 15]     0.501 0.265  0.049  0.504 0.941 1.00   494
#> betaPOut[4, 15]     0.497 0.258  0.053  0.515 0.944 1.00   600
#> betaPOut[5, 15]     0.500 0.257  0.057  0.488 0.941 1.00   711
#> betaPOut[6, 15]     0.520 0.265  0.049  0.545 0.942 1.00   600
#> betaPOut[1, 16]     0.494 0.263  0.074  0.478 0.944 1.00   480
#> betaPOut[2, 16]     0.484 0.271  0.057  0.491 0.940 1.00   589
#> betaPOut[3, 16]     0.482 0.263  0.061  0.472 0.920 1.00   537
#> betaPOut[4, 16]     0.485 0.267  0.046  0.470 0.952 1.01   600
#> betaPOut[5, 16]     0.502 0.258  0.058  0.496 0.937 1.00   600
#> betaPOut[6, 16]     0.527 0.260  0.070  0.530 0.940 1.00   600
#> betaPRiver[1]       0.044 1.003 -2.036  0.068 1.909 1.00   593
#> betaPRiver[2]      -0.104 1.016 -2.090 -0.090 1.756 1.01   695
#> betaPRiver[3]      -0.021 1.002 -1.934 -0.048 2.204 1.00   600
#> betaPRiver[4]      -0.003 1.006 -1.956 -0.019 2.012 1.00   532
#> betaPRiver[5]       0.000 0.994 -1.792  0.011 1.932 1.00   797
#> betaPRiver[6]       0.099 1.032 -1.904  0.108 2.064 1.01   537
#> betaPRiverOut[1]    0.511 0.208  0.115  0.517 0.871 1.00   602
#> betaPRiverOut[2]    0.478 0.209  0.110  0.478 0.853 1.01   692
#> betaPRiverOut[3]    0.494 0.207  0.126  0.488 0.901 1.00   600
#> betaPRiverOut[4]    0.499 0.209  0.124  0.495 0.882 1.00   535
#> betaPRiverOut[5]    0.499 0.207  0.143  0.503 0.873 1.00   763
#> betaPRiverOut[6]    0.521 0.214  0.130  0.527 0.887 1.01   600
#> betaPhi[1, 1]      -0.014 1.425 -2.945 -0.052 2.740 1.02   686
#> betaPhi[2, 1]      -0.046 1.350 -2.752 -0.021 2.544 1.01   539
#> betaPhi[3, 1]       0.010 1.391 -2.791 -0.002 2.727 1.00   600
#> betaPhi[4, 1]      -0.053 1.362 -2.610 -0.106 2.599 1.00   506
#> betaPhi[5, 1]       0.058 1.332 -2.560  0.093 2.536 1.00   658
#> betaPhi[6, 1]      -0.044 1.370 -2.783 -0.054 2.625 1.00   600
#> betaPhi[1, 2]      -0.053 1.415 -2.665 -0.138 2.708 1.02   600
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#> betaPhi[2, 2]      -0.018 1.327 -2.713  0.031 2.458 1.00   600
#> betaPhi[3, 2]      -0.048 1.393 -2.724 -0.057 2.537 1.01   600
#> betaPhi[4, 2]      -0.042 1.387 -2.819 -0.100 2.595 1.00   486
#> betaPhi[5, 2]       0.013 1.371 -2.691 -0.015 2.801 1.00   522
#> betaPhi[6, 2]      -0.056 1.397 -2.804 -0.070 2.747 1.00   547
#> betaPhi[1, 3]      -0.050 1.410 -2.580 -0.064 2.802 1.01   600
#> betaPhi[2, 3]      -0.020 1.389 -2.613 -0.064 2.895 1.01   600
#> betaPhi[3, 3]      -0.019 1.410 -2.588 -0.038 2.688 1.01   873
#> betaPhi[4, 3]       0.030 1.363 -2.599  0.047 2.714 1.00   600
#> betaPhi[5, 3]       0.033 1.397 -2.711 -0.017 2.683 1.00   600
#> betaPhi[6, 3]      -0.041 1.416 -2.915 -0.034 2.817 1.00   619
#> betaPhi[1, 4]      -0.053 1.450 -2.803  0.051 2.727 1.00   600
#> betaPhi[2, 4]      -0.004 1.457 -2.856  0.056 2.703 1.02   569
#> betaPhi[3, 4]      -0.033 1.386 -2.553 -0.020 2.810 1.00   600
#> betaPhi[4, 4]      -0.059 1.341 -2.588 -0.045 2.479 1.01   600
#> betaPhi[5, 4]      -0.018 1.401 -2.853 -0.072 2.753 1.00   552
#> betaPhi[6, 4]      -0.118 1.393 -3.067 -0.117 2.613 1.00   600
#> betaPhi[1, 5]      -0.040 1.449 -2.850 -0.053 2.920 1.00   600
#> betaPhi[2, 5]       0.017 1.441 -2.658  0.059 2.723 1.00   600
#> betaPhi[3, 5]      -0.047 1.418 -2.913  0.008 2.677 1.00   600
#> betaPhi[4, 5]       0.037 1.369 -2.604  0.041 2.854 1.00   600
#> betaPhi[5, 5]       0.048 1.462 -2.802  0.004 2.870 1.00   600
#> betaPhi[6, 5]      -0.079 1.409 -2.868 -0.077 2.473 1.00   600
#> betaPhi[1, 6]      -0.158 1.383 -2.766 -0.223 2.617 1.04   742
#> betaPhi[2, 6]      -0.044 1.416 -2.745  0.019 2.729 1.02   600
#> betaPhi[3, 6]      -0.140 1.366 -2.788 -0.130 2.613 1.00   512
#> betaPhi[4, 6]      -0.024 1.337 -2.539 -0.074 2.603 1.01   600
#> betaPhi[5, 6]       0.047 1.372 -2.576 -0.005 2.645 1.01  1124
#> betaPhi[6, 6]      -0.130 1.357 -2.712 -0.119 2.577 1.00   674
#> betaPhi[1, 7]      -0.067 1.380 -2.650 -0.054 2.632 1.00   600
#> betaPhi[2, 7]       0.000 1.398 -2.579 -0.035 2.736 1.02   600
#> betaPhi[3, 7]      -0.028 1.441 -2.654  0.003 2.883 1.01   527
#> betaPhi[4, 7]      -0.014 1.317 -2.611  0.003 2.461 1.00   600
#> betaPhi[5, 7]      -0.007 1.396 -2.720  0.048 2.549 1.00   600
#> betaPhi[6, 7]      -0.075 1.427 -2.750 -0.063 2.572 1.00   544
#> betaPhi[1, 8]      -0.039 1.320 -2.447 -0.108 2.474 1.01   546
#> betaPhi[2, 8]      -0.016 1.355 -2.723 -0.030 2.695 1.01   600
#> betaPhi[3, 8]      -0.053 1.390 -2.723 -0.069 2.718 1.00   600
#> betaPhi[4, 8]      -0.087 1.353 -2.724 -0.109 2.617 1.01   600
#> betaPhi[5, 8]       0.033 1.354 -2.479  0.017 2.615 1.01   716
#> betaPhi[6, 8]      -0.054 1.409 -2.838 -0.054 2.748 1.00   600
#> betaPhi[1, 9]       0.009 1.375 -2.617  0.039 2.612 1.00   640
#> betaPhi[2, 9]      -0.050 1.350 -2.643 -0.045 2.533 1.03   543
#> betaPhi[3, 9]      -0.002 1.359 -2.573 -0.053 2.881 1.00   544
#> betaPhi[4, 9]       0.041 1.375 -2.622  0.048 2.663 1.00   431
#> betaPhi[5, 9]       0.040 1.398 -2.791  0.079 2.718 1.01   540
#> betaPhi[6, 9]      -0.063 1.347 -2.904 -0.020 2.710 1.00   478
#> betaPhi[1, 10]     -0.055 1.395 -2.909 -0.041 2.723 1.01   600
#> betaPhi[2, 10]     -0.098 1.452 -3.125 -0.048 2.491 1.00   600
#> betaPhi[3, 10]     -0.048 1.438 -2.840 -0.057 2.792 1.00   582
#> betaPhi[4, 10]     -0.114 1.343 -2.483 -0.163 2.561 1.00   600
#> betaPhi[5, 10]      0.003 1.332 -2.672  0.062 2.547 1.00   551
#> betaPhi[6, 10]     -0.065 1.388 -2.501 -0.162 2.601 1.00   606
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#> betaPhi[1, 11]     -0.071 1.437 -2.902 -0.073 2.828 1.01   600
#> betaPhi[2, 11]     -0.109 1.468 -2.837 -0.147 2.856 1.01   490
#> betaPhi[3, 11]      0.007 1.422 -2.908  0.059 3.050 1.01   492
#> betaPhi[4, 11]     -0.134 1.418 -3.066 -0.123 2.589 1.00   600
#> betaPhi[5, 11]     -0.026 1.368 -2.725  0.016 2.593 1.00   548
#> betaPhi[6, 11]     -0.092 1.370 -2.702 -0.167 2.621 1.00   600
#> betaPhi[1, 12]     -0.058 1.467 -2.908 -0.060 2.884 1.03   600
#> betaPhi[2, 12]     -0.084 1.401 -2.686 -0.122 2.568 1.00   633
#> betaPhi[3, 12]     -0.036 1.326 -2.540 -0.025 2.458 1.00   519
#> betaPhi[4, 12]      0.003 1.428 -2.732 -0.008 2.898 1.01   627
#> betaPhi[5, 12]      0.085 1.356 -2.368  0.058 2.885 1.00   503
#> betaPhi[6, 12]     -0.104 1.372 -2.799 -0.044 2.467 1.02   600
#> betaPhi[1, 13]     -0.071 1.373 -2.513 -0.093 2.630 1.01   600
#> betaPhi[2, 13]     -0.089 1.375 -2.663 -0.148 2.844 1.00   600
#> betaPhi[3, 13]      0.017 1.412 -2.710 -0.003 2.616 1.00   529
#> betaPhi[4, 13]     -0.001 1.333 -2.341  0.051 2.731 1.01   600
#> betaPhi[5, 13]      0.085 1.356 -2.727  0.087 2.864 1.00   600
#> betaPhi[6, 13]     -0.104 1.423 -2.780 -0.116 2.580 1.00   600
#> betaPhi[1, 14]     -0.041 1.419 -2.845 -0.028 2.689 1.02   677
#> betaPhi[2, 14]      0.024 1.359 -2.719  0.011 2.546 1.01   600
#> betaPhi[3, 14]     -0.074 1.395 -2.657 -0.061 2.815 1.01   600
#> betaPhi[4, 14]     -0.002 1.360 -2.633  0.079 2.738 1.02   600
#> betaPhi[5, 14]      0.065 1.410 -2.711  0.063 2.678 1.00   570
#> betaPhi[6, 14]     -0.024 1.473 -2.726 -0.038 2.915 1.01   600
#> betaPhi[1, 15]     -0.059 1.441 -2.834 -0.010 2.714 1.00   600
#> betaPhi[2, 15]     -0.010 1.438 -2.845 -0.019 2.672 1.01   600
#> betaPhi[3, 15]     -0.055 1.386 -2.722  0.004 2.589 1.00   479
#> betaPhi[4, 15]     -0.022 1.381 -2.984 -0.002 2.670 1.00   521
#> betaPhi[5, 15]      0.069 1.391 -2.620  0.006 2.792 1.01   592
#> betaPhi[6, 15]     -0.068 1.402 -2.879 -0.092 2.675 1.01   543
#> betaPhi[1, 16]     -0.096 1.352 -2.733 -0.087 2.460 1.00   600
#> betaPhi[2, 16]     -0.053 1.410 -2.743 -0.051 2.638 1.00   607
#> betaPhi[3, 16]      0.000 1.358 -2.654 -0.056 2.530 1.00   485
#> betaPhi[4, 16]     -0.070 1.351 -2.735 -0.028 2.401 1.04   537
#> betaPhi[5, 16]      0.031 1.360 -2.576  0.072 2.531 1.00   600
#> betaPhi[6, 16]     -0.002 1.457 -2.772  0.075 2.745 1.00   600
#> betaPhiOut[1, 1]    0.498 0.262  0.050  0.487 0.939 1.02   680
#> betaPhiOut[2, 1]    0.491 0.252  0.060  0.495 0.927 1.01   545
#> betaPhiOut[3, 1]    0.503 0.258  0.058  0.499 0.939 1.00   600
#> betaPhiOut[4, 1]    0.489 0.258  0.068  0.474 0.931 1.00   545
#> betaPhiOut[5, 1]    0.512 0.253  0.072  0.523 0.927 1.00   527
#> betaPhiOut[6, 1]    0.493 0.257  0.058  0.486 0.932 1.00   600
#> betaPhiOut[1, 2]    0.488 0.264  0.065  0.466 0.937 1.03   600
#> betaPhiOut[2, 2]    0.498 0.251  0.062  0.508 0.921 1.00   600
#> betaPhiOut[3, 2]    0.492 0.260  0.062  0.486 0.927 1.01   600
#> betaPhiOut[4, 2]    0.493 0.262  0.056  0.475 0.931 1.00   487
#> betaPhiOut[5, 2]    0.501 0.254  0.064  0.496 0.943 1.00   515
#> betaPhiOut[6, 2]    0.489 0.259  0.057  0.482 0.940 1.00   594
#> betaPhiOut[1, 3]    0.487 0.259  0.070  0.484 0.943 1.01   600
#> betaPhiOut[2, 3]    0.493 0.257  0.068  0.484 0.948 1.00   600
#> betaPhiOut[3, 3]    0.494 0.262  0.070  0.490 0.936 1.00   600
#> betaPhiOut[4, 3]    0.505 0.259  0.069  0.512 0.938 1.00   600
#> betaPhiOut[5, 3]    0.505 0.260  0.062  0.496 0.936 1.00   600
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#> betaPhiOut[6, 3]    0.492 0.262  0.051  0.492 0.944 1.00   618
#> betaPhiOut[1, 4]    0.493 0.266  0.057  0.513 0.939 1.00   600
#> betaPhiOut[2, 4]    0.502 0.265  0.054  0.514 0.937 1.02   579
#> betaPhiOut[3, 4]    0.493 0.259  0.072  0.495 0.943 1.00   600
#> betaPhiOut[4, 4]    0.491 0.258  0.070  0.489 0.923 1.01   600
#> betaPhiOut[5, 4]    0.496 0.261  0.055  0.482 0.940 1.00   551
#> betaPhiOut[6, 4]    0.478 0.256  0.044  0.471 0.932 1.00   524
#> betaPhiOut[1, 5]    0.491 0.262  0.055  0.487 0.949 1.00   600
#> betaPhiOut[2, 5]    0.504 0.268  0.066  0.515 0.938 1.00   600
#> betaPhiOut[3, 5]    0.492 0.261  0.052  0.502 0.936 1.00   658
#> betaPhiOut[4, 5]    0.505 0.256  0.069  0.510 0.946 1.00   600
#> betaPhiOut[5, 5]    0.509 0.266  0.057  0.501 0.946 1.00   545
#> betaPhiOut[6, 5]    0.486 0.261  0.054  0.481 0.922 1.00   552
#> betaPhiOut[1, 6]    0.469 0.259  0.059  0.445 0.932 1.05   600
#> betaPhiOut[2, 6]    0.493 0.265  0.060  0.505 0.939 1.01   600
#> betaPhiOut[3, 6]    0.475 0.257  0.058  0.468 0.932 1.00   600
#> betaPhiOut[4, 6]    0.495 0.257  0.073  0.482 0.931 1.00   600
#> betaPhiOut[5, 6]    0.507 0.259  0.071  0.499 0.934 1.00  1185
#> betaPhiOut[6, 6]    0.476 0.256  0.062  0.470 0.929 1.00   666
#> betaPhiOut[1, 7]    0.489 0.258  0.066  0.487 0.933 1.00   545
#> betaPhiOut[2, 7]    0.500 0.262  0.070  0.491 0.939 1.02   600
#> betaPhiOut[3, 7]    0.493 0.266  0.066  0.501 0.947 1.00   600
#> betaPhiOut[4, 7]    0.497 0.250  0.068  0.501 0.921 1.00   550
#> betaPhiOut[5, 7]    0.501 0.265  0.062  0.512 0.928 1.00   600
#> betaPhiOut[6, 7]    0.488 0.264  0.060  0.484 0.929 1.00   550
#> betaPhiOut[1, 8]    0.490 0.253  0.080  0.473 0.922 1.01   669
#> betaPhiOut[2, 8]    0.496 0.253  0.062  0.492 0.937 1.00   600
#> betaPhiOut[3, 8]    0.490 0.258  0.062  0.483 0.938 1.00   600
#> betaPhiOut[4, 8]    0.483 0.250  0.062  0.473 0.932 1.00   662
#> betaPhiOut[5, 8]    0.505 0.258  0.077  0.504 0.932 1.00   708
#> betaPhiOut[6, 8]    0.490 0.256  0.055  0.486 0.940 1.00   600
#> betaPhiOut[1, 9]    0.501 0.257  0.068  0.510 0.932 1.00   626
#> betaPhiOut[2, 9]    0.492 0.256  0.066  0.489 0.926 1.02   545
#> betaPhiOut[3, 9]    0.497 0.251  0.071  0.487 0.947 1.00   525
#> betaPhiOut[4, 9]    0.507 0.259  0.068  0.512 0.935 1.00   469
#> betaPhiOut[5, 9]    0.509 0.261  0.058  0.520 0.938 1.00   600
#> betaPhiOut[6, 9]    0.489 0.251  0.052  0.495 0.938 1.00   600
#> betaPhiOut[1, 10]   0.491 0.257  0.052  0.490 0.938 1.01   600
#> betaPhiOut[2, 10]   0.486 0.267  0.042  0.488 0.923 1.00   600
#> betaPhiOut[3, 10]   0.493 0.265  0.055  0.486 0.942 1.00   595
#> betaPhiOut[4, 10]   0.476 0.256  0.077  0.459 0.928 1.00   600
#> betaPhiOut[5, 10]   0.502 0.252  0.065  0.516 0.927 1.00   600
#> betaPhiOut[6, 10]   0.485 0.261  0.076  0.460 0.931 1.00   609
#> betaPhiOut[1, 11]   0.487 0.264  0.052  0.482 0.944 1.00   762
#> betaPhiOut[2, 11]   0.479 0.269  0.055  0.463 0.946 1.00   494
#> betaPhiOut[3, 11]   0.503 0.259  0.052  0.515 0.955 1.01   499
#> betaPhiOut[4, 11]   0.477 0.256  0.045  0.469 0.930 1.00   600
#> betaPhiOut[5, 11]   0.496 0.255  0.062  0.504 0.930 1.00   544
#> betaPhiOut[6, 11]   0.481 0.260  0.063  0.458 0.932 1.00   600
#> betaPhiOut[1, 12]   0.487 0.266  0.052  0.485 0.947 1.03   600
#> betaPhiOut[2, 12]   0.483 0.263  0.064  0.470 0.929 1.00   600
#> betaPhiOut[3, 12]   0.492 0.252  0.073  0.494 0.921 1.00   523
#> betaPhiOut[4, 12]   0.499 0.263  0.061  0.498 0.948 1.01   589
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#> betaPhiOut[5, 12]   0.513 0.257  0.086  0.514 0.947 1.00   517
#> betaPhiOut[6, 12]   0.482 0.259  0.057  0.489 0.922 1.01   600
#> betaPhiOut[1, 13]   0.484 0.259  0.075  0.477 0.933 1.02   600
#> betaPhiOut[2, 13]   0.480 0.257  0.065  0.463 0.945 1.00   600
#> betaPhiOut[3, 13]   0.503 0.264  0.062  0.499 0.932 1.00   595
#> betaPhiOut[4, 13]   0.500 0.252  0.088  0.513 0.939 1.01   600
#> betaPhiOut[5, 13]   0.516 0.255  0.061  0.522 0.946 1.00   533
#> betaPhiOut[6, 13]   0.480 0.267  0.058  0.471 0.930 1.00   552
#> betaPhiOut[1, 14]   0.493 0.263  0.055  0.493 0.936 1.01   600
#> betaPhiOut[2, 14]   0.505 0.256  0.062  0.503 0.927 1.01   600
#> betaPhiOut[3, 14]   0.484 0.258  0.066  0.485 0.943 1.01   600
#> betaPhiOut[4, 14]   0.500 0.255  0.067  0.520 0.939 1.01   600
#> betaPhiOut[5, 14]   0.513 0.260  0.062  0.516 0.936 1.00   569
#> betaPhiOut[6, 14]   0.498 0.266  0.061  0.491 0.949 1.01   600
#> betaPhiOut[1, 15]   0.490 0.266  0.056  0.498 0.938 1.00   546
#> betaPhiOut[2, 15]   0.500 0.263  0.055  0.495 0.935 1.00   600
#> betaPhiOut[3, 15]   0.492 0.262  0.062  0.501 0.930 1.00   467
#> betaPhiOut[4, 15]   0.497 0.258  0.048  0.499 0.935 1.00   553
#> betaPhiOut[5, 15]   0.510 0.260  0.068  0.502 0.942 1.01   601
#> betaPhiOut[6, 15]   0.488 0.260  0.053  0.477 0.936 1.01   540
#> betaPhiOut[1, 16]   0.481 0.255  0.061  0.478 0.921 1.00   619
#> betaPhiOut[2, 16]   0.489 0.261  0.060  0.487 0.933 1.00   622
#> betaPhiOut[3, 16]   0.500 0.254  0.066  0.486 0.926 1.00   482
#> betaPhiOut[4, 16]   0.487 0.253  0.061  0.493 0.917 1.03   545
#> betaPhiOut[5, 16]   0.508 0.260  0.071  0.518 0.926 1.00   600
#> betaPhiOut[6, 16]   0.501 0.266  0.059  0.519 0.940 1.00   549
#> betaPhiRiver[1]    -0.051 0.995 -1.885 -0.098 1.942 1.02   600
#> betaPhiRiver[2]    -0.035 0.992 -1.935 -0.075 1.915 1.00   600
#> betaPhiRiver[3]    -0.025 0.980 -1.927 -0.031 1.905 1.00   467
#> betaPhiRiver[4]    -0.023 0.949 -1.811 -0.034 1.884 1.00   517
#> betaPhiRiver[5]     0.034 0.945 -1.925  0.027 1.804 1.00   600
#> betaPhiRiver[6]    -0.070 0.993 -1.996 -0.055 1.921 1.00   600
#> betaPhiRiverOut[1]  0.488 0.207  0.132  0.476 0.875 1.02   600
#> betaPhiRiverOut[2]  0.492 0.208  0.126  0.481 0.872 1.00   600
#> betaPhiRiverOut[3]  0.494 0.206  0.127  0.492 0.870 1.00   460
#> betaPhiRiverOut[4]  0.494 0.200  0.140  0.492 0.868 1.00   528
#> betaPhiRiverOut[5]  0.508 0.200  0.127  0.507 0.859 1.00   556
#> betaPhiRiverOut[6]  0.486 0.208  0.120  0.486 0.872 1.00   600
#> psi[1, 1, 1]        0.882 0.233  0.144  0.998 1.000 1.01   600
#> psi[2, 1, 1]        0.006 0.045  0.000  0.000 0.026 1.06   479
#> psi[3, 1, 1]        0.013 0.087  0.000  0.000 0.122 1.27   391
#> psi[4, 1, 1]        0.024 0.101  0.000  0.000 0.349 1.00   544
#> psi[5, 1, 1]        0.011 0.071  0.000  0.000 0.090 1.11   544
#> psi[6, 1, 1]        0.008 0.051  0.000  0.000 0.065 1.20   600
#> psi[1, 2, 1]        0.028 0.123  0.000  0.000 0.422 1.15   497
#> psi[2, 2, 1]        0.899 0.218  0.165  0.998 1.000 1.02   600
#> psi[3, 2, 1]        0.016 0.096  0.000  0.000 0.167 1.01   526
#> psi[4, 2, 1]        0.034 0.132  0.000  0.000 0.486 1.01   475
#> psi[5, 2, 1]        0.022 0.102  0.000  0.000 0.249 1.14   493
#> psi[6, 2, 1]        0.016 0.095  0.000  0.000 0.241 1.17   436
#> psi[1, 3, 1]        0.001 0.012  0.000  0.000 0.000 1.28   600
#> psi[2, 3, 1]        0.023 0.107  0.000  0.000 0.364 1.00   684
#> psi[3, 3, 1]        0.920 0.206  0.174  1.000 1.000 1.00   697
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#> psi[4, 3, 1]        0.029 0.120  0.000  0.000 0.401 1.09   600
#> psi[5, 3, 1]        0.030 0.123  0.000  0.000 0.441 1.26   600
#> psi[6, 3, 1]        0.036 0.141  0.000  0.000 0.559 1.00   471
#> psi[1, 4, 1]        0.025 0.114  0.000  0.000 0.397 1.09   535
#> psi[2, 4, 1]        0.013 0.090  0.000  0.000 0.085 1.09   542
#> psi[3, 4, 1]        0.012 0.083  0.000  0.000 0.102 1.08   600
#> psi[4, 4, 1]        0.888 0.226  0.148  0.998 1.000 1.00   600
#> psi[5, 4, 1]        0.015 0.084  0.000  0.000 0.175 1.04   504
#> psi[6, 4, 1]        0.012 0.086  0.000  0.000 0.054 1.04   397
#> psi[1, 5, 1]        0.032 0.125  0.000  0.000 0.517 1.00   600
#> psi[2, 5, 1]        0.031 0.127  0.000  0.000 0.503 1.06   600
#> psi[3, 5, 1]        0.012 0.082  0.000  0.000 0.090 1.07   600
#> psi[4, 5, 1]        0.025 0.107  0.000  0.000 0.453 1.01   600
#> psi[5, 5, 1]        0.894 0.222  0.164  0.998 1.000 1.00   608
#> psi[6, 5, 1]        0.006 0.055  0.000  0.000 0.027 1.21   384
#> psi[1, 6, 1]        0.032 0.128  0.000  0.000 0.474 1.04   448
#> psi[2, 6, 1]        0.027 0.116  0.000  0.000 0.310 1.09   513
#> psi[3, 6, 1]        0.027 0.119  0.000  0.000 0.448 1.00   600
#> psi[4, 6, 1]        0.001 0.022  0.000  0.000 0.000 1.29   600
#> psi[5, 6, 1]        0.029 0.124  0.000  0.000 0.399 1.00   544
#> psi[6, 6, 1]        0.922 0.199  0.197  1.000 1.000 1.02   477
#> psi[1, 1, 2]        0.879 0.234  0.124  0.997 1.000 1.00   600
#> psi[2, 1, 2]        0.014 0.088  0.000  0.000 0.131 1.02   600
#> psi[3, 1, 2]        0.012 0.078  0.000  0.000 0.134 1.04   464
#> psi[4, 1, 2]        0.030 0.124  0.000  0.000 0.455 1.01   600
#> psi[5, 1, 2]        0.010 0.065  0.000  0.000 0.119 1.02   600
#> psi[6, 1, 2]        0.009 0.066  0.000  0.000 0.066 1.11   353
#> psi[1, 2, 2]        0.028 0.120  0.000  0.000 0.414 1.00   600
#> psi[2, 2, 2]        0.872 0.254  0.068  0.999 1.000 1.00   647
#> psi[3, 2, 2]        0.013 0.083  0.000  0.000 0.132 1.12   447
#> psi[4, 2, 2]        0.019 0.097  0.000  0.000 0.237 1.01   465
#> psi[5, 2, 2]        0.025 0.110  0.000  0.000 0.369 1.01   563
#> psi[6, 2, 2]        0.014 0.096  0.000  0.000 0.092 1.10   600
#> psi[1, 3, 2]        0.002 0.024  0.000  0.000 0.000 1.29   600
#> psi[2, 3, 2]        0.032 0.126  0.000  0.000 0.508 1.00   600
#> psi[3, 3, 2]        0.928 0.186  0.224  1.000 1.000 1.00   675
#> psi[4, 3, 2]        0.030 0.126  0.000  0.000 0.388 1.02   529
#> psi[5, 3, 2]        0.032 0.137  0.000  0.000 0.611 1.09   600
#> psi[6, 3, 2]        0.029 0.124  0.000  0.000 0.461 1.00   600
#> psi[1, 4, 2]        0.030 0.125  0.000  0.000 0.431 1.15   600
#> psi[2, 4, 2]        0.011 0.078  0.000  0.000 0.166 1.21   508
#> psi[3, 4, 2]        0.008 0.061  0.000  0.000 0.052 1.23   412
#> psi[4, 4, 2]        0.886 0.238  0.123  0.998 1.000 1.00   653
#> psi[5, 4, 2]        0.012 0.083  0.000  0.000 0.108 1.00   529
#> psi[6, 4, 2]        0.013 0.089  0.000  0.000 0.128 1.00   600
#> psi[1, 5, 2]        0.031 0.128  0.000  0.000 0.468 1.00   575
#> psi[2, 5, 2]        0.035 0.144  0.000  0.000 0.617 1.01   600
#> psi[3, 5, 2]        0.012 0.078  0.000  0.000 0.128 1.17   600
#> psi[4, 5, 2]        0.035 0.139  0.000  0.000 0.571 1.02   600
#> psi[5, 5, 2]        0.891 0.231  0.126  0.999 1.000 1.00   478
#> psi[6, 5, 2]        0.018 0.099  0.000  0.000 0.256 1.10   464
#> psi[1, 6, 2]        0.030 0.122  0.000  0.000 0.500 1.13   600
#> psi[2, 6, 2]        0.036 0.144  0.000  0.000 0.582 1.03   600
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#> psi[3, 6, 2]        0.026 0.117  0.000  0.000 0.318 1.00   600
#> psi[4, 6, 2]        0.000 0.001  0.000  0.000 0.000 1.29   600
#> psi[5, 6, 2]        0.029 0.129  0.000  0.000 0.437 1.02   524
#> psi[6, 6, 2]        0.917 0.206  0.137  1.000 1.000 1.04   610
#> psi[1, 1, 3]        0.882 0.236  0.124  0.998 1.000 1.00   539
#> psi[2, 1, 3]        0.013 0.088  0.000  0.000 0.111 1.08   541
#> psi[3, 1, 3]        0.014 0.094  0.000  0.000 0.127 1.07   480
#> psi[4, 1, 3]        0.031 0.126  0.000  0.000 0.375 1.01   576
#> psi[5, 1, 3]        0.018 0.101  0.000  0.000 0.225 1.02   556
#> psi[6, 1, 3]        0.013 0.085  0.000  0.000 0.062 1.26   600
#> psi[1, 2, 3]        0.037 0.146  0.000  0.000 0.676 1.00   600
#> psi[2, 2, 3]        0.885 0.243  0.083  0.999 1.000 1.00   493
#> psi[3, 2, 3]        0.008 0.054  0.000  0.000 0.093 1.09   600
#> psi[4, 2, 3]        0.024 0.098  0.000  0.000 0.326 1.05   600
#> psi[5, 2, 3]        0.033 0.132  0.000  0.000 0.567 1.11   600
#> psi[6, 2, 3]        0.009 0.068  0.000  0.000 0.025 1.00   600
#> psi[1, 3, 3]        0.002 0.034  0.000  0.000 0.000 1.27   600
#> psi[2, 3, 3]        0.033 0.132  0.000  0.000 0.511 1.00   471
#> psi[3, 3, 3]        0.931 0.192  0.126  1.000 1.000 1.00   600
#> psi[4, 3, 3]        0.023 0.110  0.000  0.000 0.373 1.00   600
#> psi[5, 3, 3]        0.031 0.135  0.000  0.000 0.528 1.00   546
#> psi[6, 3, 3]        0.026 0.118  0.000  0.000 0.385 1.01   507
#> psi[1, 4, 3]        0.030 0.132  0.000  0.000 0.409 1.00   479
#> psi[2, 4, 3]        0.010 0.082  0.000  0.000 0.022 1.00   512
#> psi[3, 4, 3]        0.019 0.107  0.000  0.000 0.325 1.03   543
#> psi[4, 4, 3]        0.886 0.230  0.163  0.998 1.000 1.00   600
#> psi[5, 4, 3]        0.009 0.069  0.000  0.000 0.049 1.03   600
#> psi[6, 4, 3]        0.018 0.101  0.000  0.000 0.190 1.11   520
#> psi[1, 5, 3]        0.018 0.082  0.000  0.000 0.248 1.05   522
#> psi[2, 5, 3]        0.031 0.131  0.000  0.000 0.535 1.12   492
#> psi[3, 5, 3]        0.010 0.079  0.000  0.000 0.026 1.24   600
#> psi[4, 5, 3]        0.033 0.128  0.000  0.000 0.447 1.00   600
#> psi[5, 5, 3]        0.872 0.247  0.089  0.997 1.000 1.00   542
#> psi[6, 5, 3]        0.013 0.093  0.000  0.000 0.063 1.09   600
#> psi[1, 6, 3]        0.031 0.127  0.000  0.000 0.513 1.02   600
#> psi[2, 6, 3]        0.027 0.124  0.000  0.000 0.495 1.05   600
#> psi[3, 6, 3]        0.018 0.094  0.000  0.000 0.226 1.09   492
#> psi[4, 6, 3]        0.004 0.053  0.000  0.000 0.000 1.29   600
#> psi[5, 6, 3]        0.036 0.139  0.000  0.000 0.470 1.06   553
#> psi[6, 6, 3]        0.921 0.204  0.192  1.000 1.000 1.00   600
#> psi[1, 1, 4]        0.874 0.243  0.104  0.998 1.000 1.02   600
#> psi[2, 1, 4]        0.012 0.082  0.000  0.000 0.125 1.03   462
#> psi[3, 1, 4]        0.011 0.077  0.000  0.000 0.070 1.20   600
#> psi[4, 1, 4]        0.024 0.103  0.000  0.000 0.330 1.10   551
#> psi[5, 1, 4]        0.007 0.048  0.000  0.000 0.072 1.15   600
#> psi[6, 1, 4]        0.012 0.093  0.000  0.000 0.038 1.01   510
#> psi[1, 2, 4]        0.036 0.138  0.000  0.000 0.566 1.00   420
#> psi[2, 2, 4]        0.883 0.233  0.122  0.999 1.000 1.00   539
#> psi[3, 2, 4]        0.014 0.079  0.000  0.000 0.181 1.27   600
#> psi[4, 2, 4]        0.035 0.146  0.000  0.000 0.623 1.01   479
#> psi[5, 2, 4]        0.034 0.132  0.000  0.000 0.478 1.00   546
#> psi[6, 2, 4]        0.010 0.071  0.000  0.000 0.057 1.29   378
#> psi[1, 3, 4]        0.000 0.005  0.000  0.000 0.000 1.28   600
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#> psi[2, 3, 4]       0.028 0.119  0.000  0.000 0.351 1.00   600
#> psi[3, 3, 4]       0.915 0.205  0.185  1.000 1.000 1.11   600
#> psi[4, 3, 4]       0.028 0.113  0.000  0.000 0.383 1.01   600
#> psi[5, 3, 4]       0.032 0.133  0.000  0.000 0.552 1.08   472
#> psi[6, 3, 4]       0.029 0.123  0.000  0.000 0.400 1.01   600
#> psi[1, 4, 4]       0.029 0.127  0.000  0.000 0.365 1.00   600
#> psi[2, 4, 4]       0.019 0.096  0.000  0.000 0.366 1.00   600
#> psi[3, 4, 4]       0.014 0.089  0.000  0.000 0.143 1.01   600
#> psi[4, 4, 4]       0.883 0.235  0.104  0.997 1.000 1.00   600
#> psi[5, 4, 4]       0.011 0.071  0.000  0.000 0.117 1.10   516
#> psi[6, 4, 4]       0.012 0.079  0.000  0.000 0.078 1.13   600
#> psi[1, 5, 4]       0.034 0.142  0.000  0.000 0.567 1.02   600
#> psi[2, 5, 4]       0.033 0.131  0.000  0.000 0.463 1.02   553
#> psi[3, 5, 4]       0.010 0.075  0.000  0.000 0.036 1.30   483
#> psi[4, 5, 4]       0.027 0.117  0.000  0.000 0.342 1.01   552
#> psi[5, 5, 4]       0.893 0.221  0.186  0.998 1.000 1.00   600
#> psi[6, 5, 4]       0.005 0.040  0.000  0.000 0.010 1.05   600
#> psi[1, 6, 4]       0.027 0.109  0.000  0.000 0.415 1.14   513
#> psi[2, 6, 4]       0.024 0.115  0.000  0.000 0.307 1.02   600
#> psi[3, 6, 4]       0.036 0.142  0.000  0.000 0.545 1.05   552
#> psi[4, 6, 4]       0.003 0.047  0.000  0.000 0.000 1.29   600
#> psi[5, 6, 4]       0.023 0.103  0.000  0.000 0.364 1.00   600
#> psi[6, 6, 4]       0.931 0.185  0.287  1.000 1.000 1.06   600
#> psi[1, 1, 5]       0.883 0.239  0.130  0.999 1.000 1.00   679
#> psi[2, 1, 5]       0.008 0.062  0.000  0.000 0.032 1.11   600
#> psi[3, 1, 5]       0.013 0.085  0.000  0.000 0.085 1.28   503
#> psi[4, 1, 5]       0.024 0.107  0.000  0.000 0.371 1.18   317
#> psi[5, 1, 5]       0.013 0.082  0.000  0.000 0.133 1.09   488
#> psi[6, 1, 5]       0.012 0.082  0.000  0.000 0.104 1.19   488
#> psi[1, 2, 5]       0.032 0.135  0.000  0.000 0.526 1.02   560
#> psi[2, 2, 5]       0.873 0.255  0.090  0.999 1.000 1.01   600
#> psi[3, 2, 5]       0.015 0.096  0.000  0.000 0.169 1.00   386
#> psi[4, 2, 5]       0.033 0.137  0.000  0.000 0.521 1.03   536
#> psi[5, 2, 5]       0.028 0.112  0.000  0.000 0.431 1.07   493
#> psi[6, 2, 5]       0.008 0.054  0.000  0.000 0.052 1.00   464
#> psi[1, 3, 5]       0.000 0.003  0.000  0.000 0.000 1.05   600
#> psi[2, 3, 5]       0.046 0.162  0.000  0.000 0.717 1.00   552
#> psi[3, 3, 5]       0.918 0.212  0.164  1.000 1.000 1.00   427
#> psi[4, 3, 5]       0.023 0.112  0.000  0.000 0.392 1.08   553
#> psi[5, 3, 5]       0.026 0.113  0.000  0.000 0.363 1.02   600
#> psi[6, 3, 5]       0.033 0.137  0.000  0.000 0.463 1.00   421
#> psi[1, 4, 5]       0.034 0.137  0.000  0.000 0.584 1.05   506
#> psi[2, 4, 5]       0.007 0.056  0.000  0.000 0.027 1.03   600
#> psi[3, 4, 5]       0.010 0.069  0.000  0.000 0.114 1.05   600
#> psi[4, 4, 5]       0.892 0.227  0.102  0.998 1.000 1.00   625
#> psi[5, 4, 5]       0.012 0.077  0.000  0.000 0.114 1.01   600
#> psi[6, 4, 5]       0.011 0.075  0.000  0.000 0.053 1.04   600
#> psi[1, 5, 5]       0.027 0.115  0.000  0.000 0.465 1.11   600
#> psi[2, 5, 5]       0.039 0.154  0.000  0.000 0.638 1.05   536
#> psi[3, 5, 5]       0.013 0.088  0.000  0.000 0.046 1.00   520
#> psi[4, 5, 5]       0.027 0.115  0.000  0.000 0.366 1.07   466
#> psi[5, 5, 5]       0.896 0.218  0.169  0.999 1.000 1.00   600
#> psi[6, 5, 5]       0.016 0.101  0.000  0.000 0.141 1.00   512
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#> psi[1, 6, 5]        0.023 0.106  0.000  0.000 0.318 1.01   600
#> psi[2, 6, 5]        0.027 0.118  0.000  0.000 0.425 1.04   468
#> psi[3, 6, 5]        0.032 0.132  0.000  0.000 0.520 1.06   600
#> psi[4, 6, 5]        0.001 0.010  0.000  0.000 0.000 1.00   600
#> psi[5, 6, 5]        0.026 0.117  0.000  0.000 0.402 1.04   500
#> psi[6, 6, 5]        0.921 0.208  0.136  1.000 1.000 1.00   600
#> psi[1, 1, 6]        0.898 0.214  0.195  0.999 1.000 1.00   579
#> psi[2, 1, 6]        0.014 0.087  0.000  0.000 0.171 1.11   600
#> psi[3, 1, 6]        0.004 0.032  0.000  0.000 0.023 1.02   524
#> psi[4, 1, 6]        0.031 0.130  0.000  0.000 0.477 1.01   502
#> psi[5, 1, 6]        0.011 0.072  0.000  0.000 0.087 1.00   600
#> psi[6, 1, 6]        0.013 0.078  0.000  0.000 0.126 1.03   600
#> psi[1, 2, 6]        0.022 0.104  0.000  0.000 0.275 1.06   520
#> psi[2, 2, 6]        0.898 0.218  0.162  0.999 1.000 1.01   600
#> psi[3, 2, 6]        0.014 0.090  0.000  0.000 0.121 1.03   508
#> psi[4, 2, 6]        0.029 0.126  0.000  0.000 0.441 1.02   600
#> psi[5, 2, 6]        0.028 0.120  0.000  0.000 0.454 1.02   528
#> psi[6, 2, 6]        0.012 0.072  0.000  0.000 0.166 1.10   435
#> psi[1, 3, 6]        0.000 0.003  0.000  0.000 0.000 1.29   600
#> psi[2, 3, 6]        0.020 0.102  0.000  0.000 0.259 1.06   600
#> psi[3, 3, 6]        0.937 0.175  0.281  1.000 1.000 1.01   600
#> psi[4, 3, 6]        0.025 0.119  0.000  0.000 0.408 1.01   600
#> psi[5, 3, 6]        0.030 0.131  0.000  0.000 0.473 1.01   449
#> psi[6, 3, 6]        0.028 0.120  0.000  0.000 0.410 1.06   556
#> psi[1, 4, 6]        0.035 0.133  0.000  0.000 0.556 1.04   600
#> psi[2, 4, 6]        0.010 0.074  0.000  0.000 0.050 1.22   343
#> psi[3, 4, 6]        0.010 0.077  0.000  0.000 0.038 1.03   498
#> psi[4, 4, 6]        0.891 0.231  0.092  0.999 1.000 1.00   747
#> psi[5, 4, 6]        0.012 0.083  0.000  0.000 0.087 1.01   600
#> psi[6, 4, 6]        0.009 0.064  0.000  0.000 0.064 1.01   600
#> psi[1, 5, 6]        0.019 0.088  0.000  0.000 0.260 1.00   600
#> psi[2, 5, 6]        0.027 0.112  0.000  0.000 0.388 1.00   600
#> psi[3, 5, 6]        0.009 0.064  0.000  0.000 0.053 1.09   532
#> psi[4, 5, 6]        0.023 0.103  0.000  0.000 0.359 1.01   600
#> psi[5, 5, 6]        0.890 0.227  0.147  0.997 1.000 1.01   600
#> psi[6, 5, 6]        0.012 0.072  0.000  0.000 0.128 1.14   600
#> psi[1, 6, 6]        0.026 0.118  0.000  0.000 0.336 1.28   600
#> psi[2, 6, 6]        0.031 0.123  0.000  0.000 0.481 1.00   600
#> psi[3, 6, 6]        0.026 0.118  0.000  0.000 0.468 1.04   507
#> psi[4, 6, 6]        0.000 0.008  0.000  0.000 0.000 1.29   600
#> psi[5, 6, 6]        0.029 0.117  0.000  0.000 0.454 1.03   600
#> psi[6, 6, 6]        0.927 0.184  0.252  1.000 1.000 1.00   600
#> psi[1, 1, 7]        0.880 0.245  0.099  0.998 1.000 1.00   553
#> psi[2, 1, 7]        0.013 0.078  0.000  0.000 0.134 1.10   600
#> psi[3, 1, 7]        0.017 0.104  0.000  0.000 0.201 1.00   600
#> psi[4, 1, 7]        0.032 0.124  0.000  0.000 0.465 1.00   600
#> psi[5, 1, 7]        0.013 0.089  0.000  0.000 0.103 1.01   435
#> psi[6, 1, 7]        0.013 0.077  0.000  0.000 0.159 1.16   389
#> psi[1, 2, 7]        0.038 0.150  0.000  0.000 0.593 1.00   514
#> psi[2, 2, 7]        0.888 0.231  0.121  0.998 1.000 1.02   553
#> psi[3, 2, 7]        0.012 0.077  0.000  0.000 0.127 1.09   512
#> psi[4, 2, 7]        0.035 0.130  0.000  0.000 0.491 1.10   422
#> psi[5, 2, 7]        0.033 0.129  0.000  0.000 0.499 1.16   504
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#> psi[6, 2, 7]        0.013 0.085  0.000  0.000 0.101 1.08   452
#> psi[1, 3, 7]        0.001 0.012  0.000  0.000 0.000 1.29   600
#> psi[2, 3, 7]        0.023 0.105  0.000  0.000 0.255 1.00   600
#> psi[3, 3, 7]        0.914 0.213  0.136  1.000 1.000 1.00   600
#> psi[4, 3, 7]        0.030 0.125  0.000  0.000 0.459 1.00   600
#> psi[5, 3, 7]        0.028 0.119  0.000  0.000 0.473 1.00   600
#> psi[6, 3, 7]        0.033 0.136  0.000  0.000 0.511 1.00   600
#> psi[1, 4, 7]        0.020 0.098  0.000  0.000 0.317 1.00   600
#> psi[2, 4, 7]        0.015 0.092  0.000  0.000 0.203 1.18   417
#> psi[3, 4, 7]        0.012 0.081  0.000  0.000 0.086 1.00   430
#> psi[4, 4, 7]        0.872 0.235  0.164  0.997 1.000 1.00   545
#> psi[5, 4, 7]        0.011 0.080  0.000  0.000 0.035 1.09   410
#> psi[6, 4, 7]        0.010 0.064  0.000  0.000 0.098 1.27   600
#> psi[1, 5, 7]        0.028 0.113  0.000  0.000 0.403 1.03   546
#> psi[2, 5, 7]        0.029 0.125  0.000  0.000 0.451 1.02   543
#> psi[3, 5, 7]        0.012 0.086  0.000  0.000 0.072 1.00   502
#> psi[4, 5, 7]        0.029 0.114  0.000  0.000 0.401 1.05   491
#> psi[5, 5, 7]        0.891 0.229  0.134  0.999 1.000 1.00   600
#> psi[6, 5, 7]        0.012 0.080  0.000  0.000 0.118 1.00   600
#> psi[1, 6, 7]        0.034 0.147  0.000  0.000 0.651 1.00   600
#> psi[2, 6, 7]        0.033 0.137  0.000  0.000 0.503 1.06   600
#> psi[3, 6, 7]        0.033 0.135  0.000  0.000 0.523 1.00   485
#> psi[4, 6, 7]        0.001 0.020  0.000  0.000 0.000 1.29   600
#> psi[5, 6, 7]        0.024 0.108  0.000  0.000 0.330 1.10   600
#> psi[6, 6, 7]        0.919 0.198  0.183  1.000 1.000 1.00   600
#> psi[1, 1, 8]        0.883 0.236  0.131  0.998 1.000 1.01   603
#> psi[2, 1, 8]        0.019 0.107  0.000  0.000 0.236 1.17   600
#> psi[3, 1, 8]        0.015 0.096  0.000  0.000 0.142 1.04   512
#> psi[4, 1, 8]        0.036 0.140  0.000  0.000 0.594 1.01   600
#> psi[5, 1, 8]        0.014 0.088  0.000  0.000 0.154 1.11   600
#> psi[6, 1, 8]        0.017 0.098  0.000  0.000 0.187 1.03   512
#> psi[1, 2, 8]        0.039 0.148  0.000  0.000 0.632 1.04   472
#> psi[2, 2, 8]        0.887 0.230  0.145  0.999 1.000 1.00   555
#> psi[3, 2, 8]        0.013 0.082  0.000  0.000 0.125 1.10   600
#> psi[4, 2, 8]        0.019 0.092  0.000  0.000 0.321 1.04   600
#> psi[5, 2, 8]        0.045 0.166  0.000  0.000 0.726 1.03   522
#> psi[6, 2, 8]        0.009 0.074  0.000  0.000 0.059 1.29   600
#> psi[1, 3, 8]        0.001 0.017  0.000  0.000 0.000 1.30   600
#> psi[2, 3, 8]        0.027 0.117  0.000  0.000 0.404 1.02   508
#> psi[3, 3, 8]        0.925 0.200  0.187  1.000 1.000 1.00   464
#> psi[4, 3, 8]        0.027 0.117  0.000  0.000 0.464 1.01   510
#> psi[5, 3, 8]        0.020 0.096  0.000  0.000 0.275 1.04   505
#> psi[6, 3, 8]        0.034 0.144  0.000  0.000 0.526 1.14   600
#> psi[1, 4, 8]        0.024 0.105  0.000  0.000 0.291 1.04   537
#> psi[2, 4, 8]        0.015 0.092  0.000  0.000 0.180 1.00   600
#> psi[3, 4, 8]        0.009 0.056  0.000  0.000 0.122 1.06   452
#> psi[4, 4, 8]        0.887 0.231  0.152  0.998 1.000 1.00   841
#> psi[5, 4, 8]        0.010 0.070  0.000  0.000 0.092 1.22   600
#> psi[6, 4, 8]        0.013 0.087  0.000  0.000 0.150 1.01   600
#> psi[1, 5, 8]        0.027 0.117  0.000  0.000 0.347 1.08   465
#> psi[2, 5, 8]        0.027 0.124  0.000  0.000 0.375 1.04   536
#> psi[3, 5, 8]        0.006 0.053  0.000  0.000 0.029 1.07   600
#> psi[4, 5, 8]        0.030 0.135  0.000  0.000 0.469 1.00   547
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#> psi[5, 5, 8]       0.877 0.247  0.129  0.999 1.000 1.01   546
#> psi[6, 5, 8]       0.008 0.066  0.000  0.000 0.019 1.02   600
#> psi[1, 6, 8]       0.026 0.116  0.000  0.000 0.371 1.04   600
#> psi[2, 6, 8]       0.025 0.111  0.000  0.000 0.410 1.13   600
#> psi[3, 6, 8]       0.033 0.138  0.000  0.000 0.467 1.01   534
#> psi[4, 6, 8]       0.001 0.009  0.000  0.000 0.000 1.29   600
#> psi[5, 6, 8]       0.034 0.132  0.000  0.000 0.590 1.00   600
#> psi[6, 6, 8]       0.919 0.211  0.100  1.000 1.000 1.05   713
#> psi[1, 1, 9]       0.858 0.260  0.074  0.998 1.000 1.00   600
#> psi[2, 1, 9]       0.009 0.063  0.000  0.000 0.068 1.00   600
#> psi[3, 1, 9]       0.012 0.082  0.000  0.000 0.112 1.07   522
#> psi[4, 1, 9]       0.036 0.137  0.000  0.000 0.503 1.08   538
#> psi[5, 1, 9]       0.012 0.087  0.000  0.000 0.054 1.00   600
#> psi[6, 1, 9]       0.013 0.089  0.000  0.000 0.110 1.27   550
#> psi[1, 2, 9]       0.036 0.131  0.000  0.000 0.496 1.00   600
#> psi[2, 2, 9]       0.887 0.229  0.133  0.999 1.000 1.00   520
#> psi[3, 2, 9]       0.009 0.061  0.000  0.000 0.042 1.02   600
#> psi[4, 2, 9]       0.038 0.144  0.000  0.000 0.526 1.00   428
#> psi[5, 2, 9]       0.041 0.163  0.000  0.000 0.717 1.05   600
#> psi[6, 2, 9]       0.006 0.053  0.000  0.000 0.015 1.21   600
#> psi[1, 3, 9]       0.002 0.028  0.000  0.000 0.000 1.29   600
#> psi[2, 3, 9]       0.024 0.109  0.000  0.000 0.388 1.04   546
#> psi[3, 3, 9]       0.925 0.184  0.288  1.000 1.000 1.00   500
#> psi[4, 3, 9]       0.025 0.117  0.000  0.000 0.327 1.04   388
#> psi[5, 3, 9]       0.024 0.115  0.000  0.000 0.315 1.08   600
#> psi[6, 3, 9]       0.031 0.130  0.000  0.000 0.471 1.04   600
#> psi[1, 4, 9]       0.028 0.120  0.000  0.000 0.392 1.04   537
#> psi[2, 4, 9]       0.018 0.102  0.000  0.000 0.199 1.01   600
#> psi[3, 4, 9]       0.014 0.080  0.000  0.000 0.248 1.09   375
#> psi[4, 4, 9]       0.879 0.238  0.143  0.997 1.000 1.00   628
#> psi[5, 4, 9]       0.007 0.061  0.000  0.000 0.041 1.01   600
#> psi[6, 4, 9]       0.012 0.073  0.000  0.000 0.120 1.08   600
#> psi[1, 5, 9]       0.034 0.134  0.000  0.000 0.582 1.04   600
#> psi[2, 5, 9]       0.034 0.138  0.000  0.000 0.546 1.05   510
#> psi[3, 5, 9]       0.011 0.075  0.000  0.000 0.117 1.00   539
#> psi[4, 5, 9]       0.021 0.096  0.000  0.000 0.357 1.00   547
#> psi[5, 5, 9]       0.895 0.239  0.118  0.999 1.000 1.02   600
#> psi[6, 5, 9]       0.011 0.077  0.000  0.000 0.058 1.06   600
#> psi[1, 6, 9]       0.042 0.150  0.000  0.000 0.557 1.02   600
#> psi[2, 6, 9]       0.027 0.113  0.000  0.000 0.369 1.03   600
#> psi[3, 6, 9]       0.029 0.119  0.000  0.000 0.476 1.00   495
#> psi[4, 6, 9]       0.000 0.005  0.000  0.000 0.000 1.29   600
#> psi[5, 6, 9]       0.020 0.101  0.000  0.000 0.224 1.06   514
#> psi[6, 6, 9]       0.927 0.193  0.210  1.000 1.000 1.00   552
#> psi[1, 1, 10]      0.868 0.257  0.039  0.998 1.000 1.00   600
#> psi[2, 1, 10]      0.012 0.070  0.000  0.000 0.099 1.13   600
#> psi[3, 1, 10]      0.015 0.090  0.000  0.000 0.188 1.08   600
#> psi[4, 1, 10]      0.035 0.141  0.000  0.000 0.599 1.00   403
#> psi[5, 1, 10]      0.015 0.093  0.000  0.000 0.169 1.03   494
#> psi[6, 1, 10]      0.010 0.070  0.000  0.000 0.061 1.04   600
#> psi[1, 2, 10]      0.032 0.135  0.000  0.000 0.406 1.01   600
#> psi[2, 2, 10]      0.883 0.234  0.143  0.999 1.000 1.02   605
#> psi[3, 2, 10]      0.017 0.101  0.000  0.000 0.198 1.03   600
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#> psi[4, 2, 10]       0.027 0.124  0.000  0.000 0.393 1.04   522
#> psi[5, 2, 10]       0.030 0.120  0.000  0.000 0.372 1.06   600
#> psi[6, 2, 10]       0.020 0.113  0.000  0.000 0.191 1.07   454
#> psi[1, 3, 10]       0.000 0.001  0.000  0.000 0.000 1.29   477
#> psi[2, 3, 10]       0.037 0.147  0.000  0.000 0.660 1.15   600
#> psi[3, 3, 10]       0.923 0.200  0.194  1.000 1.000 1.00   600
#> psi[4, 3, 10]       0.037 0.146  0.000  0.000 0.568 1.11   600
#> psi[5, 3, 10]       0.032 0.133  0.000  0.000 0.515 1.00   600
#> psi[6, 3, 10]       0.033 0.131  0.000  0.000 0.592 1.06   468
#> psi[1, 4, 10]       0.032 0.137  0.000  0.000 0.422 1.16   600
#> psi[2, 4, 10]       0.013 0.084  0.000  0.000 0.120 1.01   600
#> psi[3, 4, 10]       0.014 0.089  0.000  0.000 0.140 1.21   600
#> psi[4, 4, 10]       0.874 0.248  0.114  0.998 1.000 1.01   585
#> psi[5, 4, 10]       0.015 0.091  0.000  0.000 0.155 1.00   547
#> psi[6, 4, 10]       0.011 0.081  0.000  0.000 0.026 1.09   366
#> psi[1, 5, 10]       0.028 0.119  0.000  0.000 0.476 1.00   600
#> psi[2, 5, 10]       0.027 0.114  0.000  0.000 0.389 1.00   571
#> psi[3, 5, 10]       0.006 0.059  0.000  0.000 0.032 1.22   600
#> psi[4, 5, 10]       0.025 0.112  0.000  0.000 0.384 1.03   315
#> psi[5, 5, 10]       0.884 0.235  0.113  0.999 1.000 1.00   600
#> psi[6, 5, 10]       0.006 0.051  0.000  0.000 0.048 1.06   600
#> psi[1, 6, 10]       0.040 0.152  0.000  0.000 0.663 1.01   600
#> psi[2, 6, 10]       0.028 0.119  0.000  0.000 0.368 1.00   401
#> psi[3, 6, 10]       0.025 0.113  0.000  0.000 0.331 1.11   664
#> psi[4, 6, 10]       0.002 0.035  0.000  0.000 0.000 1.29   600
#> psi[5, 6, 10]       0.024 0.109  0.000  0.000 0.416 1.14   522
#> psi[6, 6, 10]       0.920 0.204  0.203  1.000 1.000 1.00   535
#> psi[1, 1, 11]       0.888 0.226  0.157  0.999 1.000 1.06   600
#> psi[2, 1, 11]       0.010 0.067  0.000  0.000 0.089 1.03   404
#> psi[3, 1, 11]       0.012 0.090  0.000  0.000 0.039 1.24   482
#> psi[4, 1, 11]       0.031 0.122  0.000  0.000 0.456 1.00   600
#> psi[5, 1, 11]       0.012 0.082  0.000  0.000 0.122 1.28   514
#> psi[6, 1, 11]       0.012 0.081  0.000  0.000 0.168 1.08   600
#> psi[1, 2, 11]       0.026 0.107  0.000  0.000 0.333 1.01   600
#> psi[2, 2, 11]       0.895 0.218  0.143  0.999 1.000 1.03   600
#> psi[3, 2, 11]       0.012 0.075  0.000  0.000 0.093 1.05   600
#> psi[4, 2, 11]       0.027 0.120  0.000  0.000 0.395 1.05   538
#> psi[5, 2, 11]       0.026 0.114  0.000  0.000 0.390 1.03   600
#> psi[6, 2, 11]       0.016 0.089  0.000  0.000 0.264 1.21   524
#> psi[1, 3, 11]       0.000 0.000  0.000  0.000 0.000 1.29     0
#> psi[2, 3, 11]       0.026 0.109  0.000  0.000 0.443 1.04   498
#> psi[3, 3, 11]       0.909 0.219  0.191  1.000 1.000 1.00   665
#> psi[4, 3, 11]       0.034 0.141  0.000  0.000 0.598 1.09   600
#> psi[5, 3, 11]       0.029 0.127  0.000  0.000 0.467 1.01   543
#> psi[6, 3, 11]       0.032 0.127  0.000  0.000 0.466 1.00   600
#> psi[1, 4, 11]       0.030 0.126  0.000  0.000 0.408 1.03   600
#> psi[2, 4, 11]       0.015 0.094  0.000  0.000 0.191 1.27   480
#> psi[3, 4, 11]       0.010 0.077  0.000  0.000 0.029 1.12   525
#> psi[4, 4, 11]       0.885 0.229  0.159  0.999 1.000 1.06   600
#> psi[5, 4, 11]       0.009 0.071  0.000  0.000 0.038 1.16   600
#> psi[6, 4, 11]       0.011 0.079  0.000  0.000 0.049 1.02   344
#> psi[1, 5, 11]       0.027 0.120  0.000  0.000 0.521 1.04   504
#> psi[2, 5, 11]       0.031 0.127  0.000  0.000 0.441 1.00   600
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#> psi[3, 5, 11]       0.015 0.091  0.000  0.000 0.094 1.02   397
#> psi[4, 5, 11]       0.022 0.097  0.000  0.000 0.325 1.14   600
#> psi[5, 5, 11]       0.894 0.225  0.144  0.999 1.000 1.00   652
#> psi[6, 5, 11]       0.012 0.079  0.000  0.000 0.118 1.05   600
#> psi[1, 6, 11]       0.030 0.120  0.000  0.000 0.415 1.13   600
#> psi[2, 6, 11]       0.023 0.101  0.000  0.000 0.277 1.19   422
#> psi[3, 6, 11]       0.042 0.155  0.000  0.000 0.717 1.01   600
#> psi[4, 6, 11]       0.000 0.002  0.000  0.000 0.000 1.29   600
#> psi[5, 6, 11]       0.030 0.124  0.000  0.000 0.416 1.01   600
#> psi[6, 6, 11]       0.917 0.201  0.148  1.000 1.000 1.03   654
#> psi[1, 1, 12]       0.888 0.234  0.129  0.999 1.000 1.00   600
#> psi[2, 1, 12]       0.016 0.101  0.000  0.000 0.106 1.14   600
#> psi[3, 1, 12]       0.010 0.065  0.000  0.000 0.073 1.04   485
#> psi[4, 1, 12]       0.024 0.106  0.000  0.000 0.378 1.00   600
#> psi[5, 1, 12]       0.008 0.053  0.000  0.000 0.075 1.20   600
#> psi[6, 1, 12]       0.011 0.074  0.000  0.000 0.066 1.00   447
#> psi[1, 2, 12]       0.028 0.121  0.000  0.000 0.438 1.00   475
#> psi[2, 2, 12]       0.880 0.245  0.104  0.999 1.000 1.01   548
#> psi[3, 2, 12]       0.014 0.090  0.000  0.000 0.123 1.01   480
#> psi[4, 2, 12]       0.023 0.099  0.000  0.000 0.323 1.01   417
#> psi[5, 2, 12]       0.038 0.151  0.000  0.000 0.714 1.07   600
#> psi[6, 2, 12]       0.006 0.054  0.000  0.000 0.043 1.29   600
#> psi[1, 3, 12]       0.001 0.012  0.000  0.000 0.000 1.05   600
#> psi[2, 3, 12]       0.036 0.138  0.000  0.000 0.548 1.06   545
#> psi[3, 3, 12]       0.918 0.204  0.154  1.000 1.000 1.03   600
#> psi[4, 3, 12]       0.035 0.133  0.000  0.000 0.529 1.00   600
#> psi[5, 3, 12]       0.023 0.104  0.000  0.000 0.292 1.02   600
#> psi[6, 3, 12]       0.024 0.110  0.000  0.000 0.380 1.08   600
#> psi[1, 4, 12]       0.029 0.125  0.000  0.000 0.390 1.05   499
#> psi[2, 4, 12]       0.011 0.072  0.000  0.000 0.101 1.00   600
#> psi[3, 4, 12]       0.013 0.084  0.000  0.000 0.105 1.25   600
#> psi[4, 4, 12]       0.885 0.230  0.103  0.998 1.000 1.00   539
#> psi[5, 4, 12]       0.011 0.084  0.000  0.000 0.053 1.30   600
#> psi[6, 4, 12]       0.009 0.068  0.000  0.000 0.066 1.01   600
#> psi[1, 5, 12]       0.027 0.111  0.000  0.000 0.419 1.00   600
#> psi[2, 5, 12]       0.029 0.129  0.000  0.000 0.526 1.00   600
#> psi[3, 5, 12]       0.009 0.060  0.000  0.000 0.098 1.00   506
#> psi[4, 5, 12]       0.032 0.132  0.000  0.000 0.374 1.01   414
#> psi[5, 5, 12]       0.890 0.234  0.099  0.999 1.000 1.05   600
#> psi[6, 5, 12]       0.015 0.094  0.000  0.000 0.138 1.25   416
#> psi[1, 6, 12]       0.027 0.127  0.000  0.000 0.471 1.07   540
#> psi[2, 6, 12]       0.028 0.127  0.000  0.000 0.479 1.02   449
#> psi[3, 6, 12]       0.036 0.145  0.000  0.000 0.657 1.09   443
#> psi[4, 6, 12]       0.000 0.007  0.000  0.000 0.000 1.22   600
#> psi[5, 6, 12]       0.030 0.120  0.000  0.000 0.395 1.01   525
#> psi[6, 6, 12]       0.935 0.180  0.261  1.000 1.000 1.05   600
#> psi[1, 1, 13]       0.883 0.235  0.123  0.997 1.000 1.00   665
#> psi[2, 1, 13]       0.014 0.094  0.000  0.000 0.105 1.06   600
#> psi[3, 1, 13]       0.009 0.069  0.000  0.000 0.070 1.27   298
#> psi[4, 1, 13]       0.025 0.114  0.000  0.000 0.355 1.24   530
#> psi[5, 1, 13]       0.009 0.072  0.000  0.000 0.028 1.16   541
#> psi[6, 1, 13]       0.014 0.091  0.000  0.000 0.143 1.00   600
#> psi[1, 2, 13]       0.029 0.128  0.000  0.000 0.449 1.00   600
```
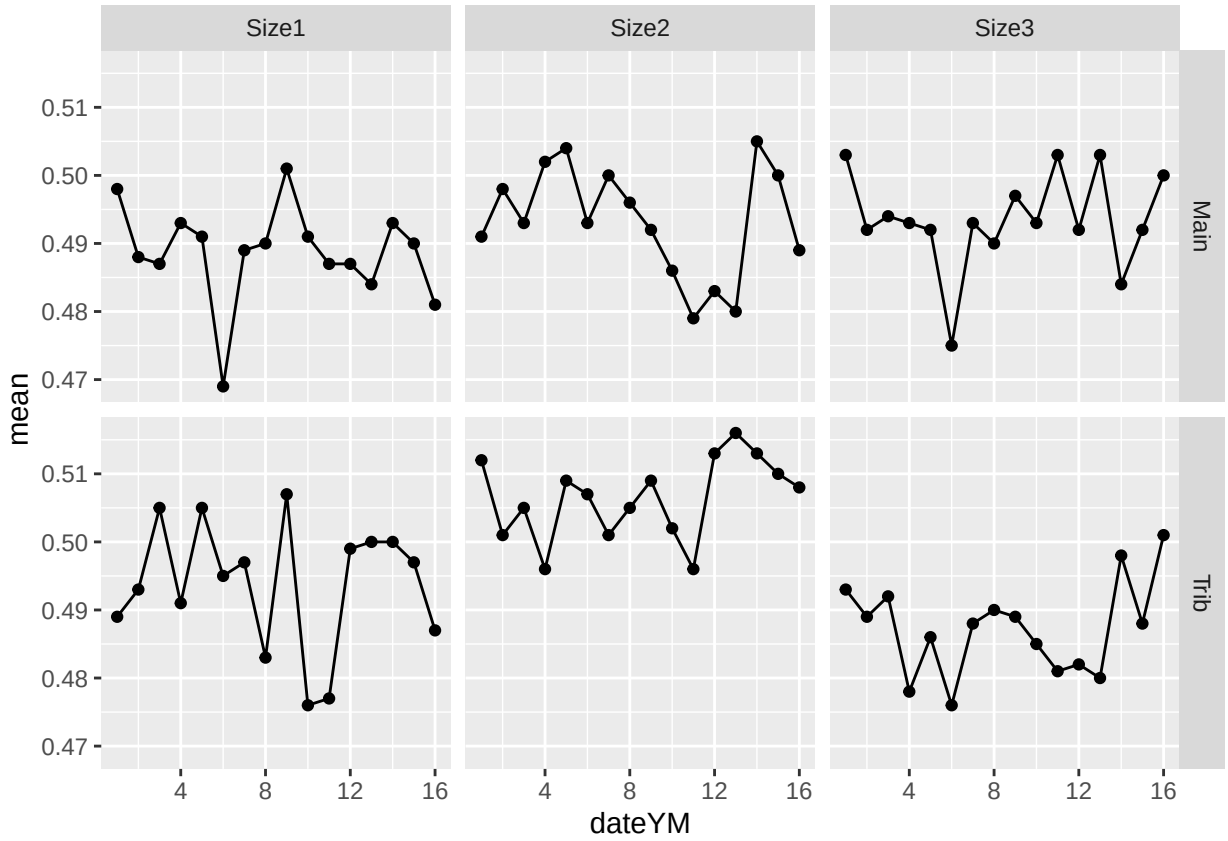

```
#> psi[2, 2, 13]       0.896 0.225  0.124  0.999 1.000 1.01   558
#> psi[3, 2, 13]       0.011 0.074  0.000  0.000 0.112 1.21   458
#> psi[4, 2, 13]       0.025 0.108  0.000  0.000 0.343 1.01   546
#> psi[5, 2, 13]       0.028 0.113  0.000  0.000 0.410 1.00   564
#> psi[6, 2, 13]       0.011 0.066  0.000  0.000 0.135 1.10   600
#> psi[1, 3, 13]       0.002 0.039  0.000  0.000 0.000 1.29   600
#> psi[2, 3, 13]       0.021 0.105  0.000  0.000 0.301 1.01   600
#> psi[3, 3, 13]       0.935 0.184  0.164  1.000 1.000 1.03   600
#> psi[4, 3, 13]       0.028 0.123  0.000  0.000 0.461 1.01   550
#> psi[5, 3, 13]       0.035 0.132  0.000  0.000 0.511 1.01   527
#> psi[6, 3, 13]       0.026 0.117  0.000  0.000 0.409 1.03   480
#> psi[1, 4, 13]       0.028 0.116  0.000  0.000 0.460 1.02   600
#> psi[2, 4, 13]       0.012 0.081  0.000  0.000 0.117 1.22   600
#> psi[3, 4, 13]       0.011 0.085  0.000  0.000 0.027 1.00   514
#> psi[4, 4, 13]       0.890 0.231  0.130  0.999 1.000 1.03   600
#> psi[5, 4, 13]       0.019 0.108  0.000  0.000 0.239 1.00   512
#> psi[6, 4, 13]       0.013 0.077  0.000  0.000 0.159 1.02   600
#> psi[1, 5, 13]       0.027 0.118  0.000  0.000 0.468 1.01   600
#> psi[2, 5, 13]       0.026 0.117  0.000  0.000 0.377 1.09   492
#> psi[3, 5, 13]       0.013 0.090  0.000  0.000 0.101 1.06   600
#> psi[4, 5, 13]       0.031 0.132  0.000  0.000 0.520 1.02   600
#> psi[5, 5, 13]       0.885 0.225  0.179  0.998 1.000 1.01   600
#> psi[6, 5, 13]       0.007 0.057  0.000  0.000 0.012 1.28   600
#> psi[1, 6, 13]       0.031 0.129  0.000  0.000 0.514 1.05   494
#> psi[2, 6, 13]       0.030 0.128  0.000  0.000 0.465 1.00   544
#> psi[3, 6, 13]       0.021 0.098  0.000  0.000 0.252 1.06   510
#> psi[4, 6, 13]       0.001 0.011  0.000  0.000 0.000 1.29   600
#> psi[5, 6, 13]       0.024 0.102  0.000  0.000 0.384 1.17   583
#> psi[6, 6, 13]       0.929 0.183  0.249  1.000 1.000 1.02   497
#> psi[1, 1, 14]       0.892 0.228  0.153  0.999 1.000 1.00   600
#> psi[2, 1, 14]       0.015 0.092  0.000  0.000 0.200 1.12   600
#> psi[3, 1, 14]       0.012 0.081  0.000  0.000 0.129 1.17   458
#> psi[4, 1, 14]       0.032 0.125  0.000  0.000 0.456 1.02   538
#> psi[5, 1, 14]       0.009 0.069  0.000  0.000 0.040 1.26   600
#> psi[6, 1, 14]       0.013 0.092  0.000  0.000 0.040 1.00   600
#> psi[1, 2, 14]       0.026 0.116  0.000  0.000 0.457 1.07   600
#> psi[2, 2, 14]       0.876 0.240  0.101  0.999 1.000 1.03   600
#> psi[3, 2, 14]       0.011 0.067  0.000  0.000 0.101 1.08   532
#> psi[4, 2, 14]       0.042 0.162  0.000  0.000 0.744 1.02   600
#> psi[5, 2, 14]       0.023 0.113  0.000  0.000 0.281 1.08   581
#> psi[6, 2, 14]       0.011 0.079  0.000  0.000 0.071 1.00   506
#> psi[1, 3, 14]       0.002 0.032  0.000  0.000 0.000 1.29   446
#> psi[2, 3, 14]       0.024 0.109  0.000  0.000 0.313 1.01   546
#> psi[3, 3, 14]       0.919 0.205  0.168  1.000 1.000 1.01   600
#> psi[4, 3, 14]       0.030 0.127  0.000  0.000 0.496 1.15   600
#> psi[5, 3, 14]       0.022 0.100  0.000  0.000 0.398 1.02   444
#> psi[6, 3, 14]       0.035 0.137  0.000  0.000 0.539 1.12   550
#> psi[1, 4, 14]       0.028 0.124  0.000  0.000 0.328 1.00   509
#> psi[2, 4, 14]       0.018 0.096  0.000  0.000 0.303 1.11   600
#> psi[3, 4, 14]       0.006 0.056  0.000  0.000 0.015 1.29   600
#> psi[4, 4, 14]       0.872 0.254  0.066  0.999 1.000 1.00   600
#> psi[5, 4, 14]       0.014 0.086  0.000  0.000 0.177 1.29   377
#> psi[6, 4, 14]       0.010 0.069  0.000  0.000 0.065 1.02   600
```

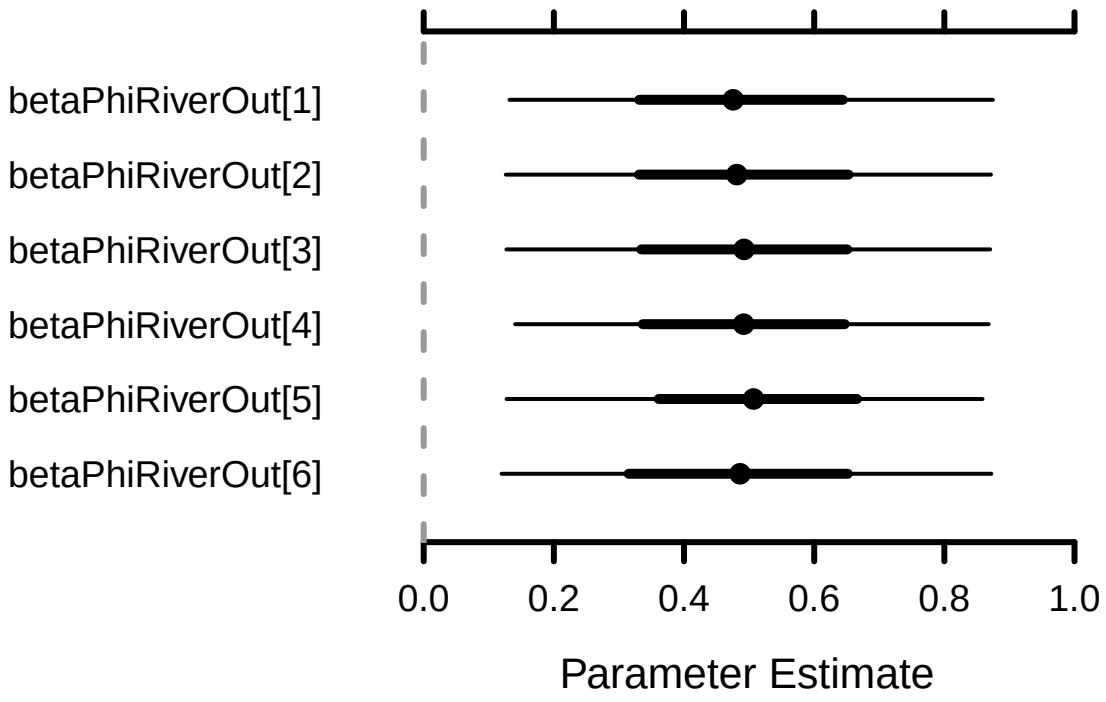
```
#> psi[1, 5, 14]       0.026 0.112  0.000  0.000 0.423 1.00   600
#> psi[2, 5, 14]       0.033 0.128  0.000  0.000 0.564 1.12   579
#> psi[3, 5, 14]       0.015 0.093  0.000  0.000 0.172 1.17   540
#> psi[4, 5, 14]       0.022 0.113  0.000  0.000 0.284 1.00   495
#> psi[5, 5, 14]       0.902 0.215  0.162  0.999 1.000 1.00   600
#> psi[6, 5, 14]       0.007 0.058  0.000  0.000 0.045 1.29   600
#> psi[1, 6, 14]       0.026 0.117  0.000  0.000 0.400 1.03   397
#> psi[2, 6, 14]       0.034 0.135  0.000  0.000 0.461 1.13   600
#> psi[3, 6, 14]       0.038 0.148  0.000  0.000 0.629 1.03   544
#> psi[4, 6, 14]       0.002 0.040  0.000  0.000 0.000 1.27   600
#> psi[5, 6, 14]       0.030 0.121  0.000  0.000 0.440 1.02   489
#> psi[6, 6, 14]       0.924 0.199  0.208  1.000 1.000 1.02   530
#> psi[1, 1, 15]       0.880 0.241  0.090  0.998 1.000 1.00   655
#> psi[2, 1, 15]       0.010 0.071  0.000  0.000 0.047 1.03   527
#> psi[3, 1, 15]       0.016 0.093  0.000  0.000 0.202 1.05   525
#> psi[4, 1, 15]       0.029 0.115  0.000  0.000 0.373 1.01   600
#> psi[5, 1, 15]       0.011 0.077  0.000  0.000 0.064 1.03   322
#> psi[6, 1, 15]       0.010 0.070  0.000  0.000 0.103 1.05   346
#> psi[1, 2, 15]       0.042 0.149  0.000  0.000 0.545 1.02   600
#> psi[2, 2, 15]       0.889 0.234  0.110  0.999 1.000 1.00   969
#> psi[3, 2, 15]       0.017 0.094  0.000  0.000 0.222 1.27   487
#> psi[4, 2, 15]       0.030 0.120  0.000  0.000 0.514 1.06   600
#> psi[5, 2, 15]       0.033 0.139  0.000  0.000 0.500 1.18   600
#> psi[6, 2, 15]       0.026 0.131  0.000  0.000 0.472 1.00   600
#> psi[1, 3, 15]       0.002 0.037  0.000  0.000 0.000 1.29   600
#> psi[2, 3, 15]       0.028 0.112  0.000  0.000 0.387 1.02   600
#> psi[3, 3, 15]       0.911 0.213  0.149  1.000 1.000 1.02   600
#> psi[4, 3, 15]       0.032 0.119  0.000  0.000 0.434 1.03   600
#> psi[5, 3, 15]       0.045 0.149  0.000  0.000 0.597 1.01   600
#> psi[6, 3, 15]       0.025 0.116  0.000  0.000 0.364 1.03   524
#> psi[1, 4, 15]       0.025 0.109  0.000  0.000 0.328 1.08   600
#> psi[2, 4, 15]       0.010 0.074  0.000  0.000 0.058 1.06   600
#> psi[3, 4, 15]       0.009 0.060  0.000  0.000 0.088 1.05   359
#> psi[4, 4, 15]       0.888 0.220  0.171  0.998 1.000 1.08   538
#> psi[5, 4, 15]       0.013 0.081  0.000  0.000 0.131 1.17   503
#> psi[6, 4, 15]       0.013 0.087  0.000  0.000 0.101 1.14   600
#> psi[1, 5, 15]       0.023 0.109  0.000  0.000 0.211 1.00   528
#> psi[2, 5, 15]       0.028 0.125  0.000  0.000 0.531 1.00   509
#> psi[3, 5, 15]       0.013 0.082  0.000  0.000 0.139 1.12   536
#> psi[4, 5, 15]       0.021 0.103  0.000  0.000 0.291 1.22   600
#> psi[5, 5, 15]       0.865 0.253  0.087  0.998 1.000 1.00   411
#> psi[6, 5, 15]       0.009 0.061  0.000  0.000 0.111 1.17   600
#> psi[1, 6, 15]       0.028 0.127  0.000  0.000 0.366 1.02   499
#> psi[2, 6, 15]       0.035 0.140  0.000  0.000 0.603 1.00   600
#> psi[3, 6, 15]       0.034 0.139  0.000  0.000 0.574 1.02   600
#> psi[4, 6, 15]       0.000 0.004  0.000  0.000 0.000 1.27   600
#> psi[5, 6, 15]       0.033 0.139  0.000  0.000 0.611 1.05   600
#> psi[6, 6, 15]       0.917 0.210  0.131  1.000 1.000 1.00   600
#> psi[1, 1, 16]       0.886 0.233  0.132  0.998 1.000 1.00   542
#> psi[2, 1, 16]       0.004 0.036  0.000  0.000 0.020 1.22   600
#> psi[3, 1, 16]       0.013 0.081  0.000  0.000 0.128 1.01   600
#> psi[4, 1, 16]       0.026 0.111  0.000  0.000 0.342 1.13   535
#> psi[5, 1, 16]       0.015 0.095  0.000  0.000 0.152 1.27   600
```

```
#> psi[6, 1, 16]       0.014 0.083  0.000  0.000 0.166 1.03   600
#> psi[1, 2, 16]       0.030 0.128  0.000  0.000 0.530 1.08   505
#> psi[2, 2, 16]       0.892 0.230  0.116  0.999 1.000 1.00   600
#> psi[3, 2, 16]       0.011 0.085  0.000  0.000 0.042 1.07   600
#> psi[4, 2, 16]       0.023 0.104  0.000  0.000 0.339 1.04   600
#> psi[5, 2, 16]       0.027 0.112  0.000  0.000 0.412 1.00   600
#> psi[6, 2, 16]       0.010 0.074  0.000  0.000 0.062 1.21   600
#> psi[1, 3, 16]       0.000 0.005  0.000  0.000 0.000 1.29   600
#> psi[2, 3, 16]       0.030 0.130  0.000  0.000 0.484 1.03   600
#> psi[3, 3, 16]       0.926 0.194  0.202  1.000 1.000 1.00   600
#> psi[4, 3, 16]       0.026 0.120  0.000  0.000 0.419 1.04   600
#> psi[5, 3, 16]       0.029 0.120  0.000  0.000 0.399 1.04   600
#> psi[6, 3, 16]       0.030 0.126  0.000  0.000 0.514 1.01   522
#> psi[1, 4, 16]       0.028 0.122  0.000  0.000 0.513 1.00   523
#> psi[2, 4, 16]       0.017 0.098  0.000  0.000 0.171 1.18   497
#> psi[3, 4, 16]       0.011 0.070  0.000  0.000 0.112 1.05   600
#> psi[4, 4, 16]       0.892 0.223  0.116  0.999 1.000 1.05   550
#> psi[5, 4, 16]       0.012 0.083  0.000  0.000 0.134 1.19   377
#> psi[6, 4, 16]       0.014 0.087  0.000  0.000 0.125 1.00   600
#> psi[1, 5, 16]       0.030 0.122  0.000  0.000 0.482 1.00   531
#> psi[2, 5, 16]       0.031 0.128  0.000  0.000 0.461 1.00   600
#> psi[3, 5, 16]       0.016 0.093  0.000  0.000 0.154 1.05   447
#> psi[4, 5, 16]       0.031 0.128  0.000  0.000 0.470 1.00   506
#> psi[5, 5, 16]       0.890 0.225  0.170  0.998 1.000 1.00   573
#> psi[6, 5, 16]       0.009 0.066  0.000  0.000 0.061 1.00   600
#> psi[1, 6, 16]       0.027 0.119  0.000  0.000 0.386 1.04   529
#> psi[2, 6, 16]       0.027 0.118  0.000  0.000 0.373 1.02   600
#> psi[3, 6, 16]       0.024 0.109  0.000  0.000 0.266 1.00   498
#> psi[4, 6, 16]       0.002 0.043  0.000  0.000 0.000 1.07   600
#> psi[5, 6, 16]       0.027 0.116  0.000  0.000 0.397 1.00   600
#> psi[6, 6, 16]       0.923 0.194  0.251  1.000 1.000 1.00   457

#kable(modSummary %>%
#        add_column(data.frame(year = rep(years[1:15], 2), dateYM = rep(occs[1:15], 2)) )


#  d %>%
#  summarize(unique(data.frame(dateYM, occ)))
```

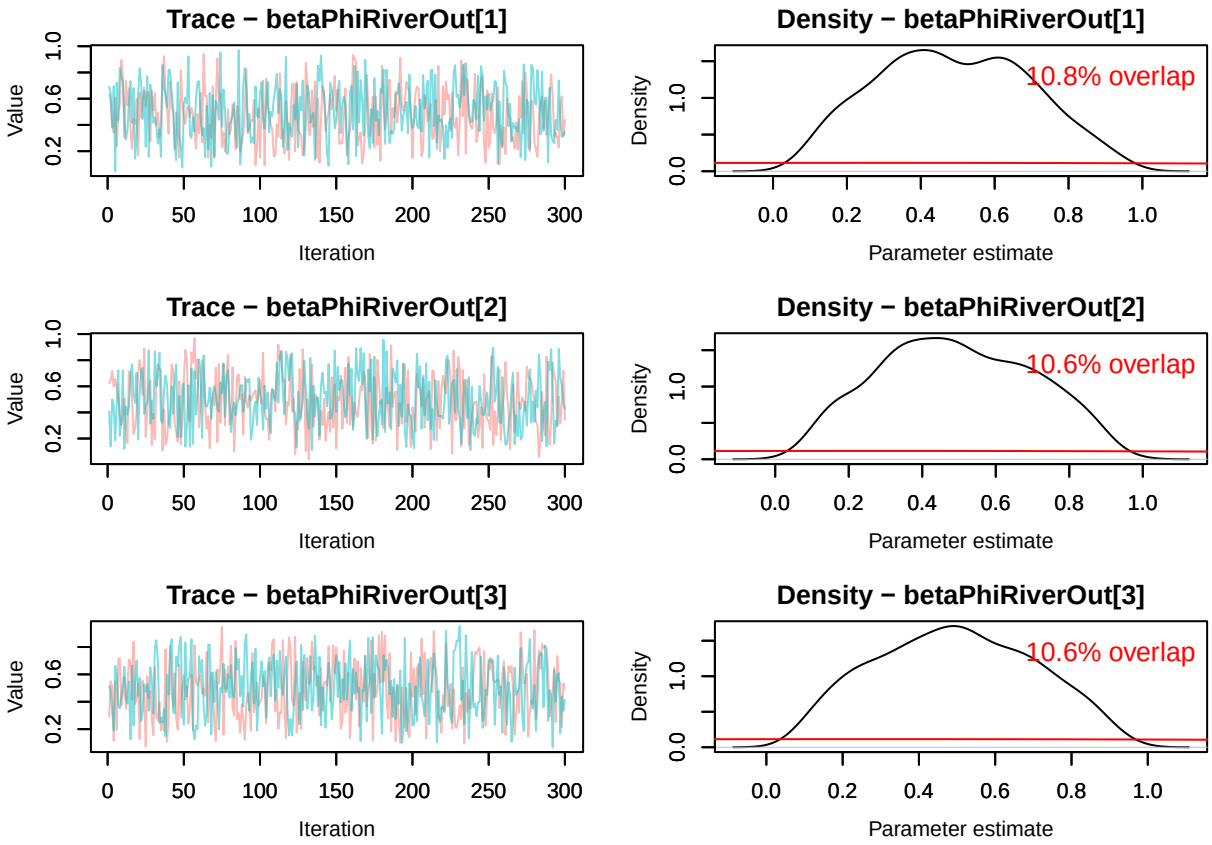
```
nS <- tar_read(nStates)
nT <- tar_read(ttt_myConstants)$T

modSummaryPhi <- modSummary %>%
  filter(substr(row.names(modSummary), 1, 10) == "betaPhiOut") %>%
  add_column(data.frame(state = 1:nS, dateYM = rep(1:(nT - 1), each = nS))) %>%
  mutate(mainTrib = ifelse(state < 4, "Main", "Trib"),
         size = paste0("Size", (state - 1) %% 3 + 1))

ggplot(modSummaryPhi, aes(dateYM, mean)) +
  geom_point() +
  geom_line() +
  facet_grid(mainTrib ~ size)
```

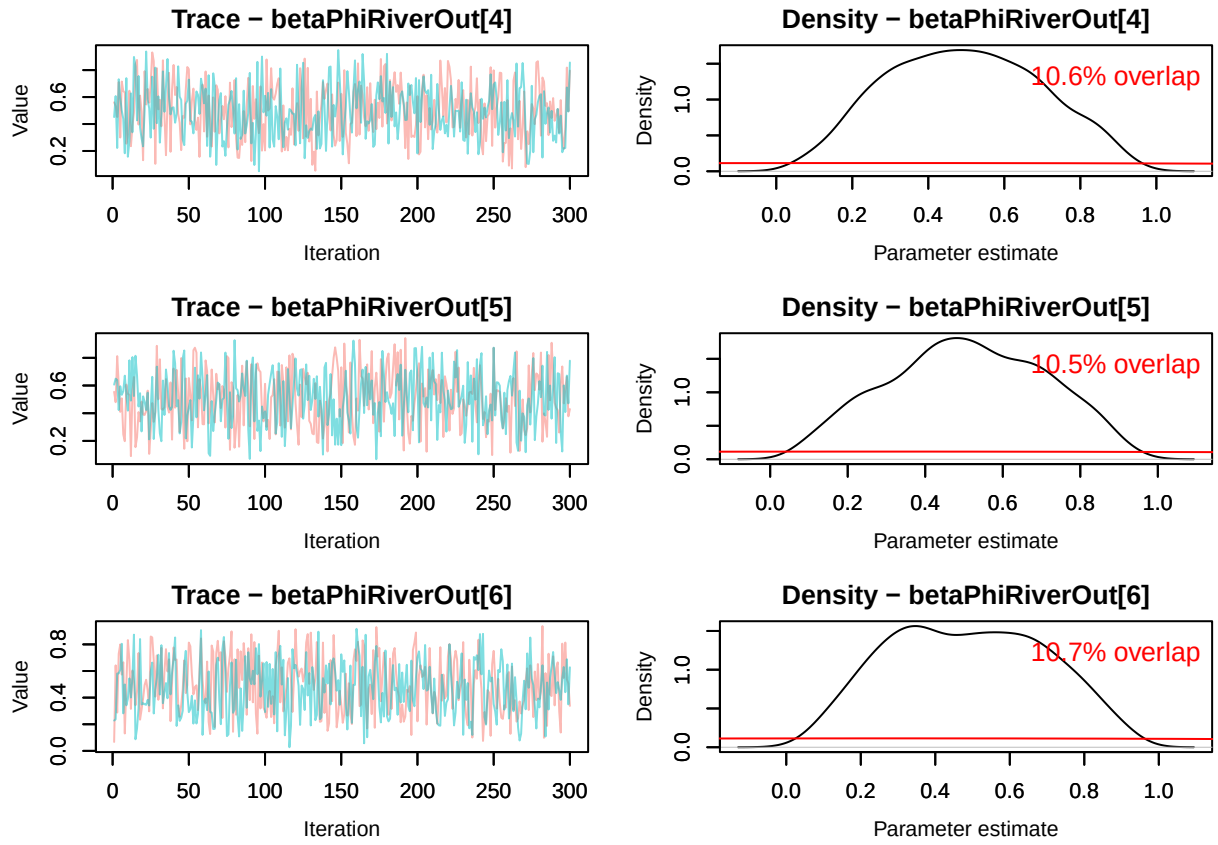



```
# modSummaryYears <- modSummary %>%
#   filter(substr(row.names(modSummary), 1, 3) == "betaPhiout") %>%
#   add_column(data.frame(year = years[1:15], dateYM = occs[1:15], occ = 1:15)) %>%
#   group_by(year) %>%
#   mutate(maxSampPerYear = occ == max(occ))
#
# kable(
#   modSummaryYears %>%
#   group_by(year) %>%
#   filter(!maxSampPerYear) %>%
#   summarize(phiProd = prod(mean),
#             dateRange = range(dateYM)) %>%
#     as.data.frame()
# )
  MCMCplot(object = mod$mcmc, params = "betaPhiRiverOut")
```




```
  priors <- rnorm(tar_read(ttt_runData)$nIter * tar_read(ttt_runData)$nChains, 0, 1/sqrt(.1))
  MCMCtrace(object = mod$mcmc,
            #ISB = FALSE,
            #exact = TRUE,
            params = c("betaPhiRiverOut"),
            pdf = FALSE,
            priors = priors
            )
#> Warning in MCMCtrace(object = mod$mcmc, params = c("betaPhiRiverOut"), pdf =
#> FALSE, : Only one prior specified for > 1 parameter. Using a single prior for
#> all parameters.
#> Warning in MCMCtrace(object = mod$mcmc, params = c("betaPhiRiverOut"), pdf =
#> FALSE, : Number of samples in prior is greater than number of total or specified
#> iterations (for all chains) for specified parameter. Only last 600 iterations
#> will be used.
```


Trace − betaPhiRiverOut[1]
Value
Iteration
Density − betaPhiRiverOut[1]
Density
Parameter estimate
10.8% overlap
Trace − betaPhiRiverOut[2]
Value
Iteration
Density − betaPhiRiverOut[2]
Density
Parameter estimate
10.6% overlap
Trace − betaPhiRiverOut[3]
Value
Iteration
Density − betaPhiRiverOut[3]
Density
Parameter estimate
10.6% overlap




```
#create data frame for summarizing p results

# modSummaryYearsP <- modSummary %>%
#   filter(substr(row.names(modSummary), 1, 2) == "p[") %>%
#   add_column(data.frame(year = years[1:15], dateYM = occs[1:15], occ = 1:15)) %>%
#   group_by(year) %>%
#   mutate(maxSampPerYear = occ == max(occ))
#
# kable(
#   modSummaryYearsP %>%
#   group_by(year) %>%
#   summarize(pMean = mean(mean),
#             dateRange = range(dateYM))
#   )
```

```
# modSummaryYearsP <- modSummary %>%
#   filter(substr(row.names(modSummary), 1, 2) == "p[") %>%
#   add_column(data.frame(year = years[1:15], dateYM = occs[1:15], occ = 1:15)) %>%
#   group_by(year) %>%
#   mutate(maxSampPerYear = occ == max(occ))
```