Postprocessing zoning: transition zones

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Contents

```
  library(geozoning)
```

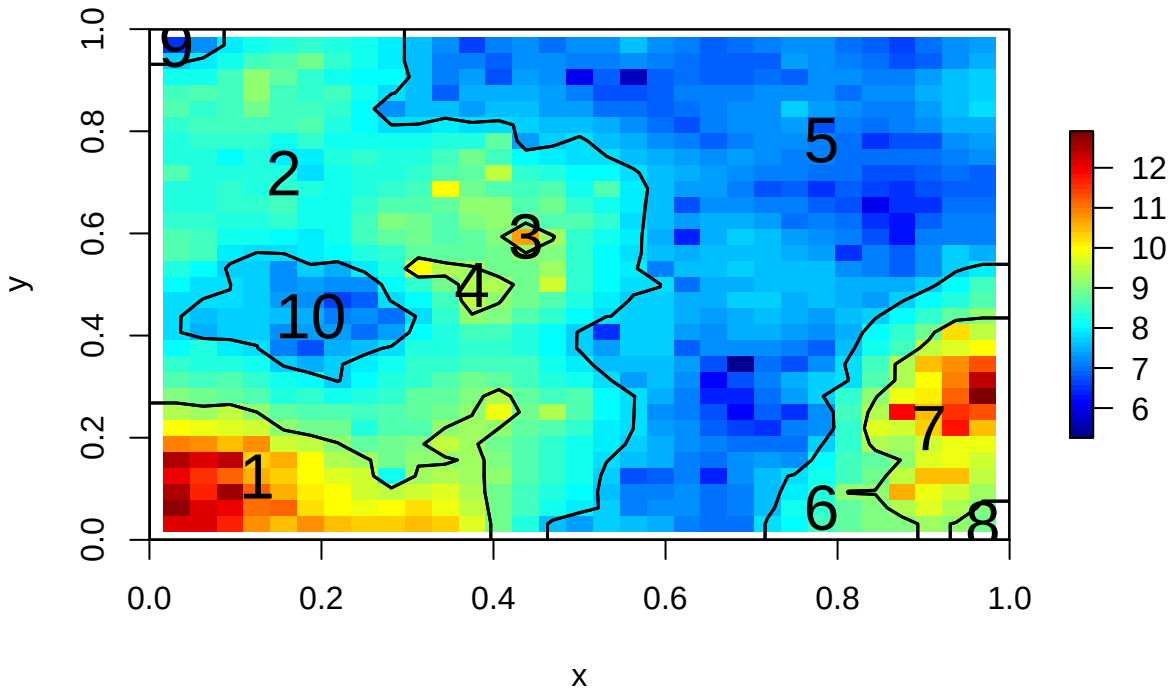
This vignette shows how to find Transition zones: 2 treatments are done depending if zone is near or far from map boundary.

First case: zone is near boundary

```
seed=2
map=genMap(DataObj=NULL,seed=seed,disp=FALSE,krig=2)
```

```
## [1] "DataObj=NULL, generating DataObj-seed= 2"
## [inverse distance weighted interpolation]
```

```
ZK=initialZoning(qProb=c(0.45,0.85),map)
Z=ZK$resZ$zonePolygone # list of zones
lab = ZK$resZ$lab # label of zones
plotM(map = map,Z = Z,lab = lab, byLab = FALSE)
```




```
# zone 6 is a transition zone that has a common boundary with the map
numZ = 6
Estimation = Transition_Zone_Near_Boundary(map = map, Z = Z, numZ = numZ)
# compute the cost
cL = Cost_By_Laplace(map = map, Z = Z, numZ = numZ, Estimation = Estimation)
```

```
cM = Cost_By_Mean(map = map, Z = Z, numZ = numZ)
print(cL$cost_Laplace)
```

```
## [1] 0.04234949
```

```
print(cM$cost_Mean)
```

```
## [1] 0.1402654
```

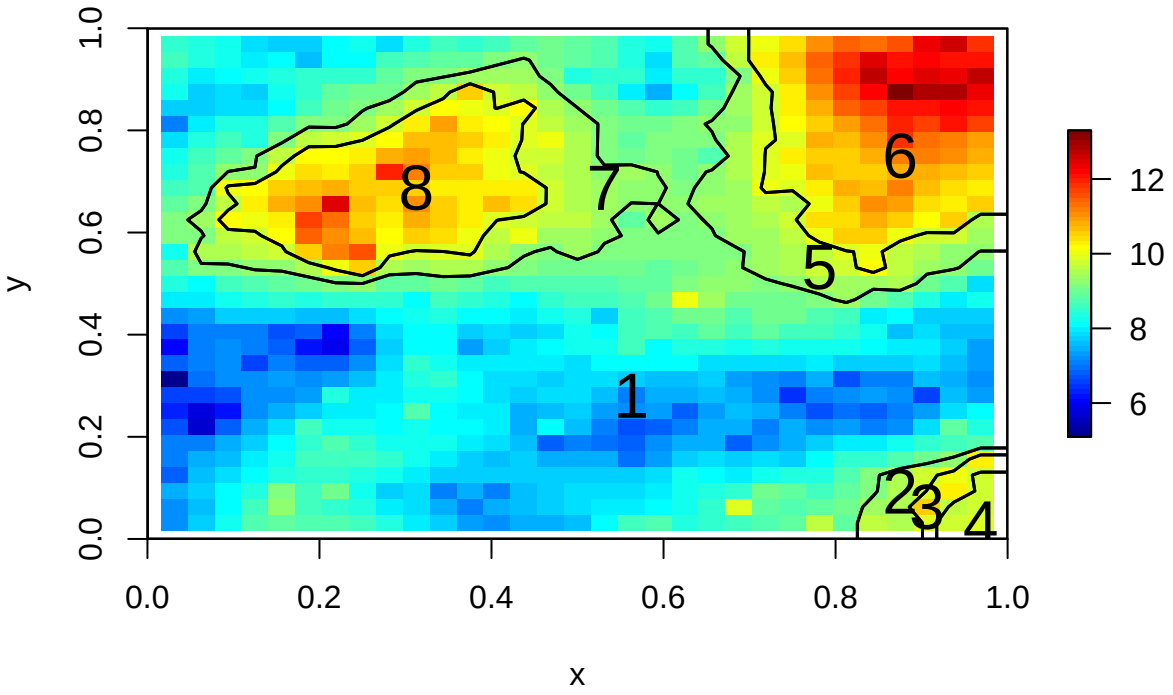
```
#zone 6 can be qualified as a zone with gradient, because cost_Laplace is much smaller than cost_Mean.
```

Second case: zone is far from boundary

```
seed=9
map=genMap(DataObj=NULL,seed=seed,disp=FALSE,krig=2)
```

```
## [1] "DataObj=NULL, generating DataObj-seed= 9"
## [inverse distance weighted interpolation]
```

```
ZK=initialZoning(qProb=c(0.65,0.8),map)
Z=ZK$resZ$zonePolygone # list of zones
lab = ZK$resZ$lab # label of zones
plotM(map = map,Z = Z,lab = lab, byLab = FALSE)
```




```
# zone 7 is a transition zone that is far from map boundary
numZ = 7
Estimation = Transition_Zone_Far_Boundary(map = map, Z = Z, numZ = numZ)
# compute the cost
cL = Cost_By_Laplace(map = map, Z = Z, numZ = numZ, Estimation = Estimation)
cM = Cost_By_Mean(map = map, Z = Z, numZ = numZ)
print(cL$cost_Laplace)
```

```
## [1] 0.02543495
```

```
print(cM$cost_Mean)
```

```
## [1] 0.04565793
```

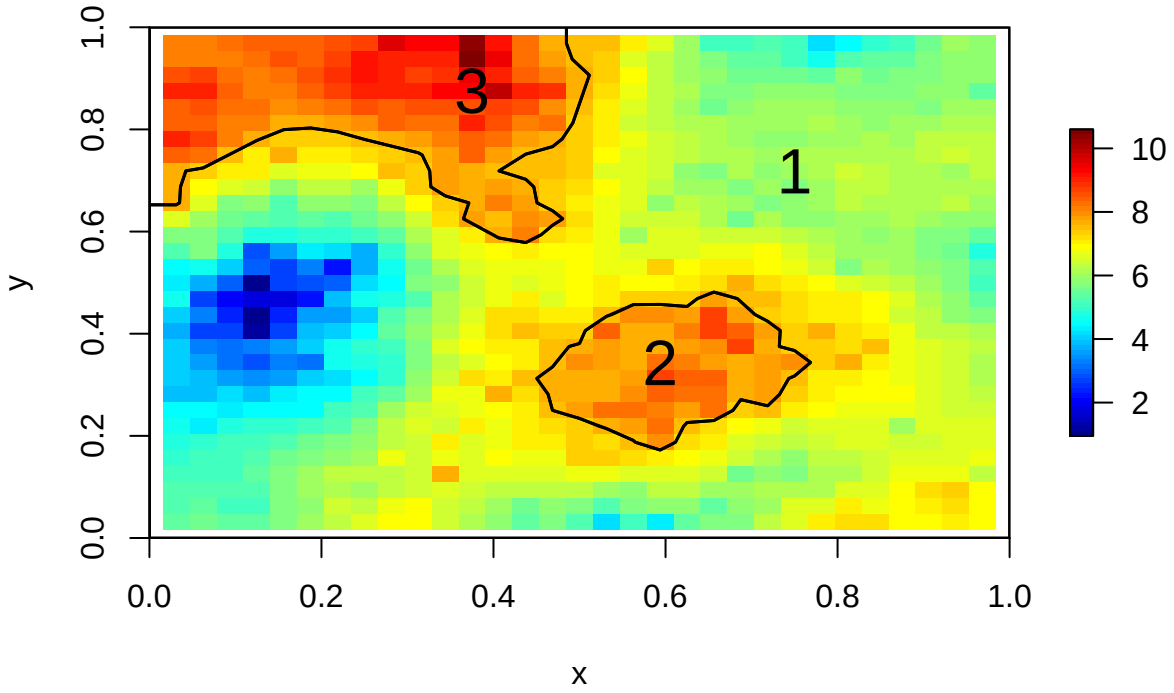
```
# zone 7 is a zone with gradient.
```

Example of extreme zone detection

```
seed=6
map=genMap(DataObj=NULL,seed=seed,disp=FALSE,krig=2)
```

```
## [1] "DataObj=NULL, generating DataObj-seed= 6"
## [inverse distance weighted interpolation]
```

```
ZK=initialZoning(qProb=c(0.8),map)
Z=ZK$resZ$zonePolygone # list of zones
lab = ZK$resZ$lab # label of zones
plotM(map = map,Z = Z,lab = lab, byLab = FALSE)
```




```
# zone 2 is a zone with maximum label
numZ = 2
Estimation = Extreme_Zone(map = map, Z = Z, numZ = numZ, label.is.min = FALSE)
# compute the cost
cL = Cost_By_Laplace(map = map, Z = Z, numZ = numZ, Estimation = Estimation)
cM = Cost_By_Mean(map = map, Z = Z, numZ = numZ)
print(cL$cost_Laplace)
```

```
## [1] 0.2497524
```

```
print(cM$cost_Mean)
```

```
## [1] 0.1085486
```

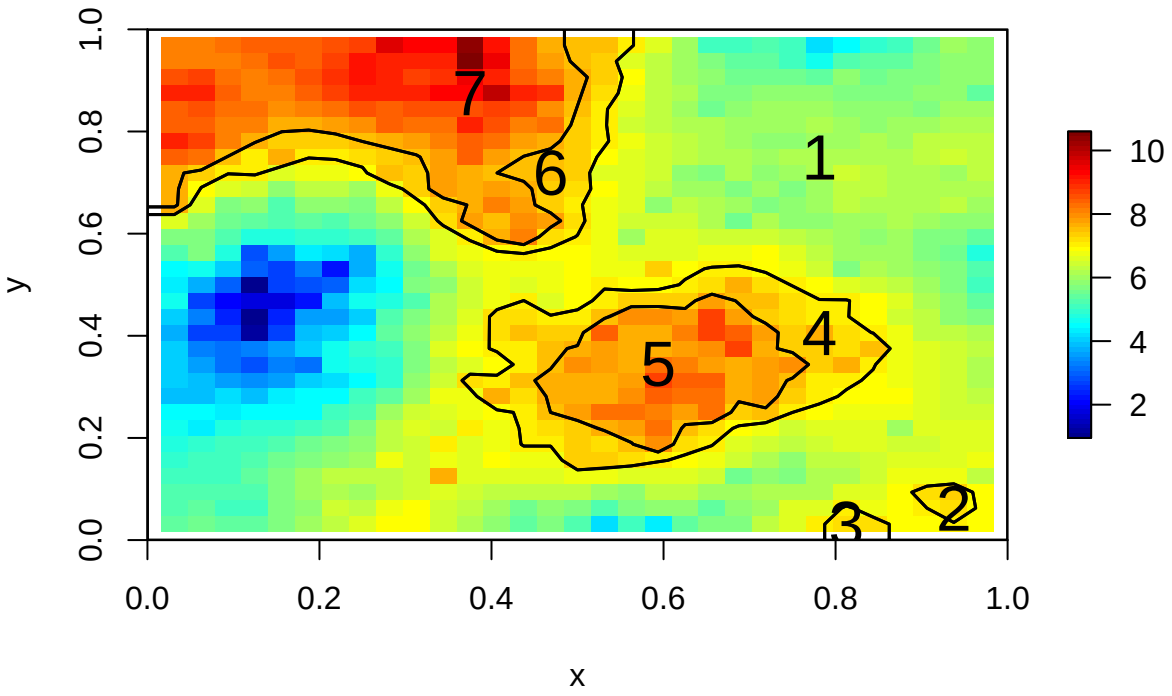
```
# zone 2 is not a zone with gradient.
```

Transition zones zith 2 neighbours each

```
seed=6
map=genMap(DataObj=NULL,seed=seed,disp=FALSE,krig=2)
```

```
## [1] "DataObj=NULL, generating DataObj-seed= 6"
## [inverse distance weighted interpolation]
```

```
ZK=initialZoning(qProb=c(0.67,0.8),map)
Z=ZK$resZ$zonePolygone # list of zones
lab = ZK$resZ$lab # label of zones
plotM(map = map,Z = Z,lab = lab, byLab = FALSE)
```




```
# zone 4 and 6 are transition zones and have exactly 2 neighbours with different labels.
list_Zone_2_Neighbours(Z = Z, lab = lab)
```

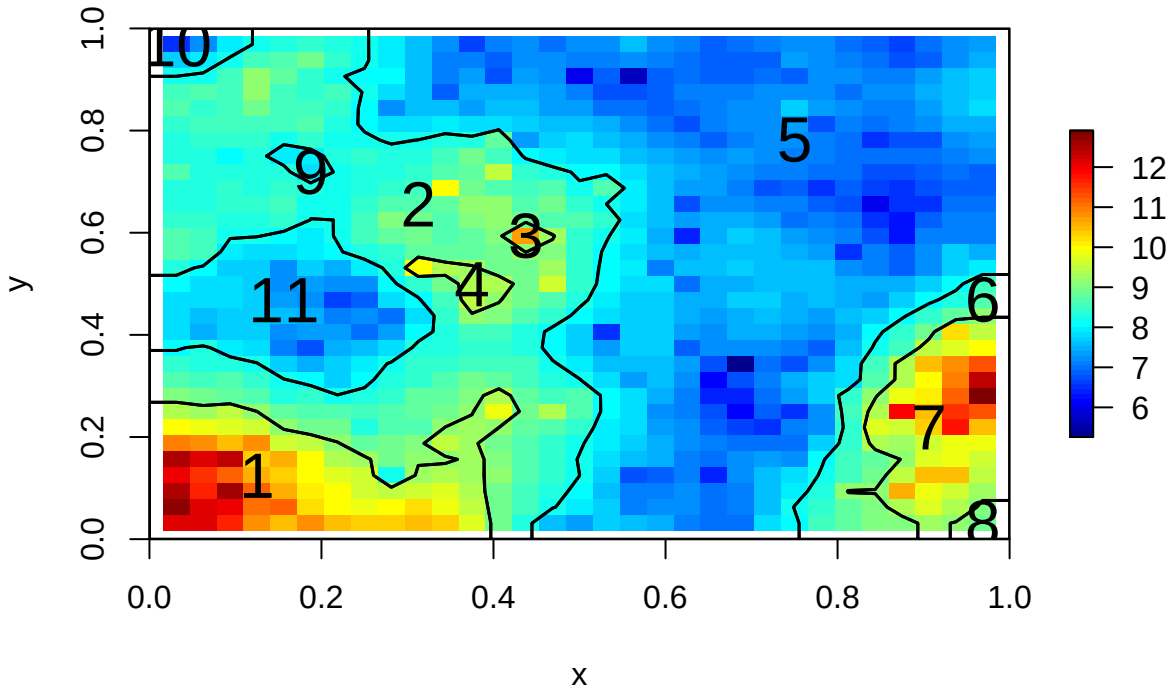
```
## [1] 4 6
```

View transition zone

```
seed=2
map=genMap(DataObj=NULL,seed=seed,disp=FALSE,krig=2)
```

```
## [1] "DataObj=NULL, generating DataObj-seed= 2"
## [inverse distance weighted interpolation]
```

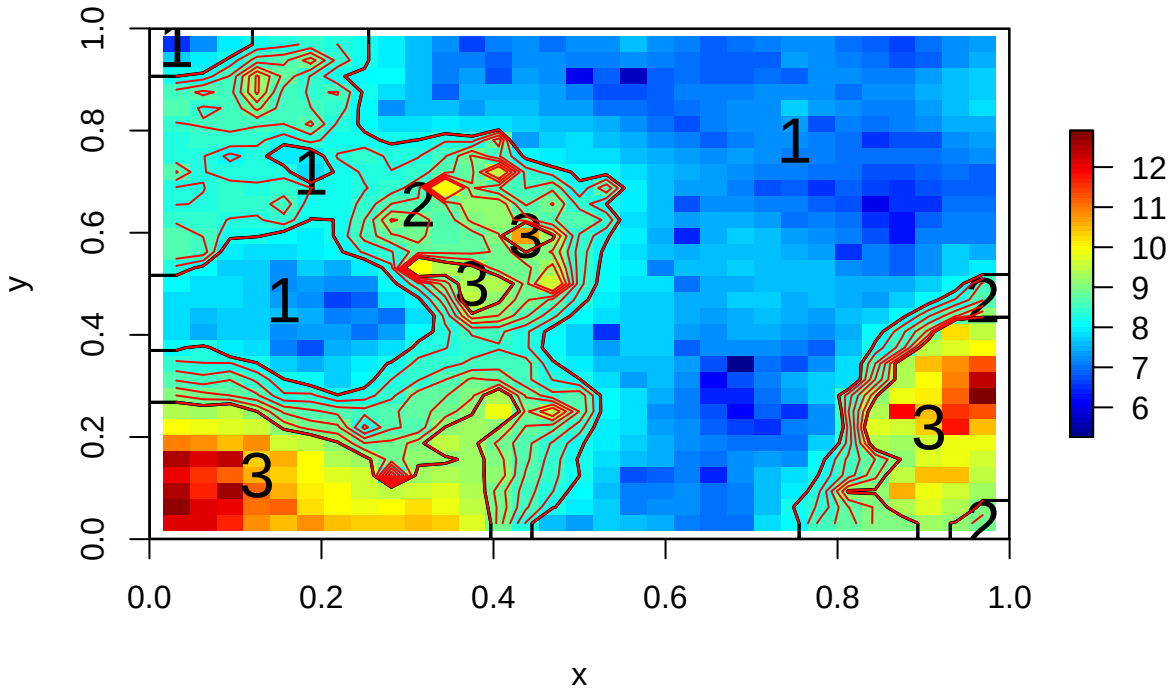
```
ZK=initialZoning(qProb=c(0.55,0.85),map)
Z=ZK$resZ$zonePolygone # list of zones
lab = ZK$resZ$lab # label of zones
plotM(map = map,Z = Z,lab = lab, byLab = FALSE)
```



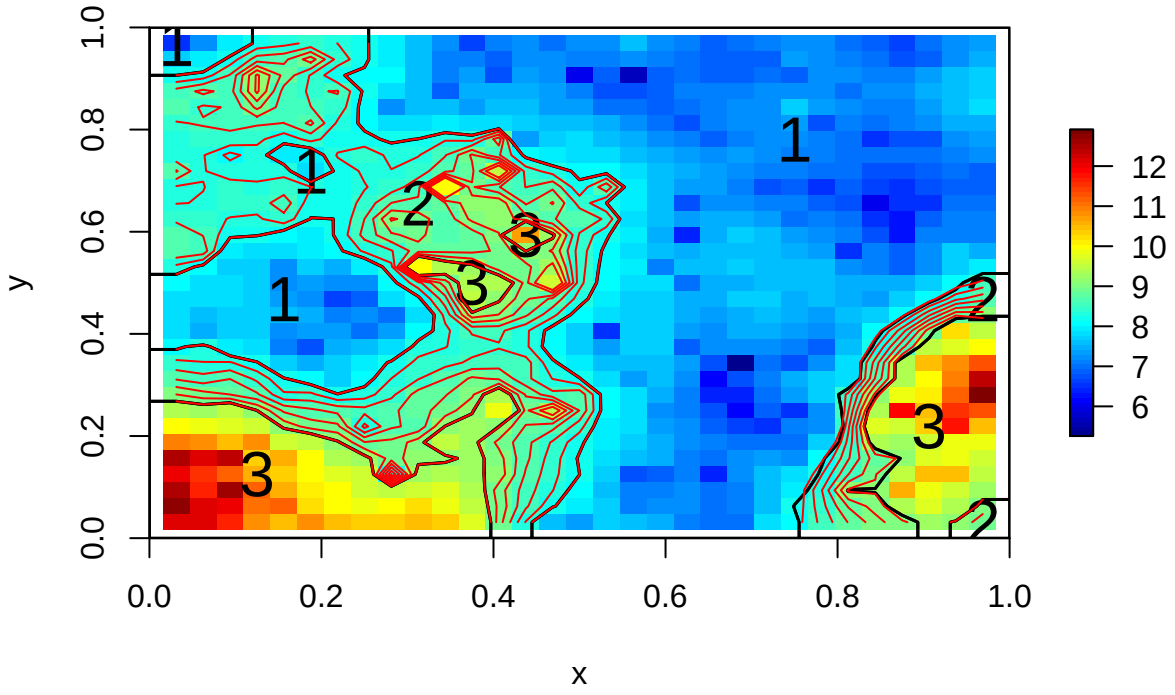

```
# zone 6 is a transition zone that has a common boundary with the map
numZ = 6
Estimation = Transition_Zone_Near_Boundary(map = map, Z = Z, numZ = numZ)

result = new_krigGrid_for_visualisation(map = map, Z = Z, numZ = numZ, solution = Estimation)
new_krigGrid = result$new_krigGrid
new_data = result$new_data
quant1 = quantile(map$krigData@data$var1.pred,probs = 0.55)
quant2 = quantile(map$krigData@data$var1.pred,probs = 0.85)

# plot initial isocontours
plotM(map = map,Z = Z,lab = lab, byLab = TRUE)
listContours = contourBetween(map = map, krigGrid = map$krigGrid, q1 = quant1, q2 = quant2)
for (i in 1:length(listContours)){
  plot(listContours[[i]]$contour,add=TRUE,col = "red")
}
```




```
# plot modified isocontours
plotM(map = map,Z = Z,lab = lab, byLab = TRUE)
listContours = contourBetween(map = map, krigGrid = new_krigGrid, q1 = quant1, q2 = quant2)
for (i in 1:length(listContours)){
  plot(listContours[[i]]$contour,add=TRUE,col = "red")
}
```



Session informations

```
## R version 3.4.0 (2017-04-21)
## Platform: x86_64-pc-linux-gnu (64-bit)
```

```
## Running under: Debian GNU/Linux 8 (jessie)
##
## Matrix products: default
## BLAS: /usr/lib/libblas/libblas.so.3.0
## LAPACK: /usr/lib/lapack/liblapack.so.3.0
##
## locale:
##  [1] LC_CTYPE=fr_FR.utf8       LC_NUMERIC=C
##  [3] LC_TIME=fr_FR.utf8        LC_COLLATE=C
##  [5] LC_MONETARY=fr_FR.utf8    LC_MESSAGES=fr_FR.utf8
##  [7] LC_PAPER=fr_FR.utf8       LC_NAME=C
##  [9] LC_ADDRESS=C              LC_TELEPHONE=C
## [11] LC_MEASUREMENT=fr_FR.utf8 LC_IDENTIFICATION=C
##
## attached base packages:
## [1] stats     graphics  grDevices utils     datasets  methods   base
##
## other attached packages:
## [1] sp_1.2-4        ggplot2_2.2.1   rgeos_0.3-23    geozoning_1.0.0
##
## loaded via a namespace (and not attached):
##  [1] Rcpp_0.12.11             compiler_3.4.0
##  [3] plyr_1.8.4               tools_3.4.0
##  [5] xts_0.9-7                digest_0.6.12
##  [7] gstat_1.1-5              evaluate_0.10.1
##  [9] tibble_1.3.1             gtable_0.2.0
## [11] lattice_0.20-35          rlang_0.1.1
## [13] yaml_2.1.14              spam_1.4-0
## [15] stringr_1.2.0            knitr_1.17
## [17] raster_2.5-8             RandomFieldsUtils_0.3.25
## [19] fields_8.15              maps_3.1.1
## [21] rprojroot_1.2            grid_3.4.0
## [23] spacetime_1.2-0          foreign_0.8-68
## [25] rmarkdown_1.6            deldir_0.1-14
## [27] magrittr_1.5             backports_1.1.0
## [29] scales_0.4.1             htmltools_0.3.6
## [31] intervals_0.15.1         RandomFields_3.1.50
## [33] maptools_0.9-2           colorspace_1.3-2
## [35] labeling_0.3             stringi_1.1.5
## [37] lazyeval_0.2.0           munsell_0.4.3
## [39] FNN_1.1                  zoo_1.8-0
```