

# Kernel UDs 2016

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## Kernel Utilization Distributions

This script uses the temporally rediscrretized dataset (currently only 20 sec steps) to create utilization distributions. Here I compare the 2016 data with the 2015 data for LFC - I excluded the WRC for coding simplicity, not scientific reasons. Ultimately I plan to also consider variability in flow and fish size, but have not yet incorporated those additional variables.

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### Create kernel UD from tracks

The fish positions are only those from the first two phases - includes 430 individuals.

To improve comparisons between 2015 and 2016 I constrained the 2016 UD to use the same grid as 2015.

The `kernelUD()` function in `adehabitatLT` gives options for how to select a smoothing parameter for the bivariate normal probability space defined at each recorded fish position. In 2015 I used the least squares cross validation to select an appropriate value for  $h$  (smoothing parameter) - the algorithm looks for a value of the smoothing parameter ( $h$ ) where the  $CV(h)$  is minimized. In 2015 the value selected for  $h$  for LFC was 3.03. However, for the 2016 dataset the trend of change in  $CV(h)$  with  $h$  is monotonically increasing, thus the value used for  $h$  is the smallest one considered, or 2.48.

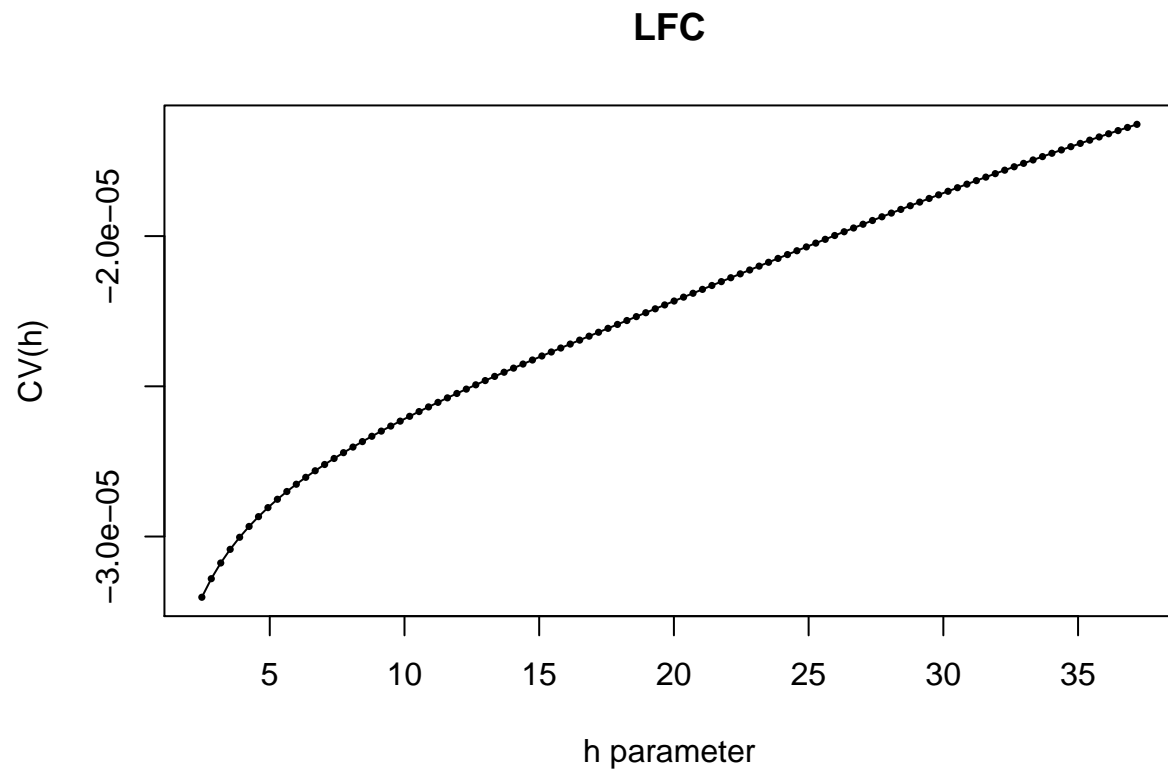
Other options for specifying  $h$  include using the ad hoc method of smoother selection, which is  $h = \text{Sigma} * n^{1/6}$ , or using the same value for  $h$  that was selected for the 2015 dataset.

```
## [1] "h-lscv-2015LFC = 3.027"
```

```
#kud16.lscv = kernelUD(red8.grp[,1], h="LSCV", kern="biunorm", extent=0.1, grid=grid15) # computati
kud16.lscv = readRDS("Maestros/kud16_lscv.RData")
print(paste0("h-lscv = ",round(kud16.lscv$LFC@h$h,3)))
```

```
## [1] "h-lscv = 2.479"
```

```
# windows()
plotLSCV(kud16.lscv)
```

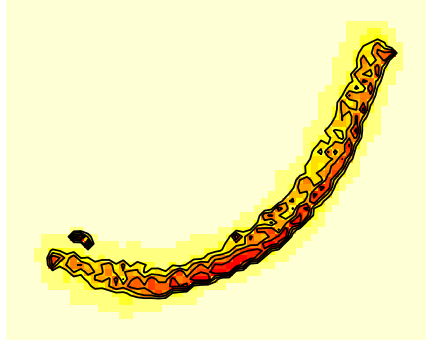


```
kud16.href = kernelUD(red8.grp[,1], h="href", kern="bivnorm", extent=0.1, grid=grid15)
print(paste0("h-href = ",round(kud16.href$LFC@h$h,3)))
```

```
## [1] "h-href = 24.791"
```

```
kud16.h15 = kernelUD(red8.grp[,1], h=3.03, kern="bivnorm", extent=0.1, grid=grid15)
```

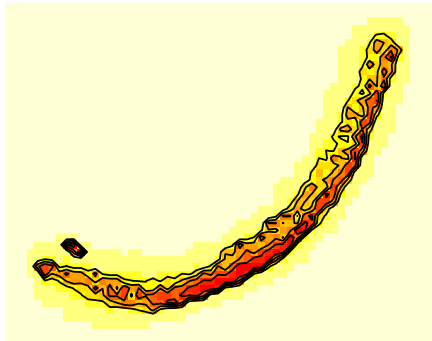
LSCV



HREF



$h=3.03$  (2015)



Compare 2016 UD with 2015 UD (for 2015-LFC)

