Energetics

Birds arrive

```
tm<-FMakeTime(2015,12,15)
dt<-format(tm,"%Y-%m-%d")
birds<-FArriveBirds(tm,1000,sites)
```

Calculate BMR of birds

```
library(dplyr)

FBMRHour<-function(fbirds=birds,fclim=clim,fdt=dt)
{
current_clim<-filter(fclim,date==dt)
temperature<-(current_clim$tmin+current_clim$tmax)/20
windspeed<-current_clim$avwind/10
fbirds$BMR<-FBMR(temperature,windspeed,fbirds$weight-fbirds$fat)
fbirds$energy_use<-fbirds$BMR*(60*60/1000)
fbirds
}

birds<-FBMRHour()
head(birds)
```

```
##   bid         arrive_time sex   weight      fat energy_store rid      BMR
## 1   1 2015-12-15 01:00:00   F 1607.806 237.2882     8138.986 339 8.136289
## 2   2 2015-12-15 01:00:00   F 1762.702 377.4762    12947.435 395 8.147891
## 3   3 2015-12-15 01:00:00   M 1769.820 263.9843     9054.660 277 8.241509
## 4   4 2015-12-15 01:00:00   F 1644.075 230.8328     7917.563 439 8.169877
## 5   5 2015-12-15 01:00:00   F 1706.687 315.5853    10824.574 207 8.152515
## 6   6 2015-12-15 01:00:00   M 1894.615 366.9464    12586.263  28 8.258179
##   energy_use
## 1   29.29064
## 2   29.33241
## 3   29.66943
## 4   29.41156
## 5   29.34905
## 6   29.72944
```

Feeding

Set tide

```
sites<-FSuitable(fsites=sites,ftm=tm,ftides=tides,depth=-0.4,height=1)
sites<-FValueSites(sites)
birds<-FMoveBirds(birds,sites,dist,search_distance = 2000)
```

```
birds_sites<-merge(birds,sites)
birds$consumption<-FConsumption(birds_sites$mean_biomass*sites$psuitable/100)*60
```

```
## Warning in birds_sites$mean_biomass * sites$psuitable: longer object length
## is not a multiple of shorter object length
```

```
birds$energy_gain<-FEnergyAssim(birds$consumption)
birds$new_fat<-FEnergy2Fat(birds$energy_gain-birds$energy_use)

birds %>%
  group_by(rid) %>%
summarise(
mean(new_fat),
mean(energy_gain),
mean(energy_use))
```

```
## # A tibble: 130 × 4
##      rid `mean(new_fat)` `mean(energy_gain)` `mean(energy_use)`
##    <int>           <dbl>               <dbl>              <dbl>
## 1      1      -0.8569307                   0           29.39272
## 2      2      -0.8551318                   0           29.33102
## 3      7      -0.8649720                   0           29.66854
## 4      8      -0.8668642                   0           29.73344
## 5     10      -0.8623172                   0           29.57748
## 6     11      -0.8658662                   0           29.69921
## 7     12      -0.8592632                   0           29.47273
## 8     13      -0.8624676                   0           29.58264
## 9     14      -0.8606656                   0           29.52083
## 10    17      -0.8625008                   0           29.58378
## # ... with 120 more rows
```