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   M 1962.363 462.5835    15866.614 434 8.236870
## 2   2 2015-12-15 01:00:00   F 1696.429 302.1398    10363.396 467 8.155019
## 3   3 2015-12-15 01:00:00   M 1737.492 222.0226     7615.374 483 8.248875
## 4   4 2015-12-15 01:00:00   F 1791.444 333.0870    11424.884 419 8.204972
## 5   5 2015-12-15 01:00:00   F 1724.362 313.8540    10765.193 512 8.167737
## 6   6 2015-12-15 01:00:00   M 1775.148 279.1464     9574.723 230 8.233974
##   energy_use
## 1   29.65273
## 2   29.35807
## 3   29.69595
## 4   29.53790
## 5   29.40385
## 6   29.64231
```

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: 125 × 4
##      rid `mean(new_fat)` `mean(energy_gain)` `mean(energy_use)`
##    <int>           <dbl>               <dbl>              <dbl>
## 1      1      -0.8614152             0.00000           29.54654
## 2      2      -0.8548091             0.00000           29.31995
## 3      5       1.2867455            73.76113           29.62576
## 4      8      -0.8558332             0.00000           29.35508
## 5      9      10.2255593           380.33452           29.59784
## 6     10      -0.8583254             0.00000           29.44056
## 7     12      -0.8624518             0.00000           29.58210
## 8     14      -0.8577256             0.00000           29.41999
## 9     16      -0.8644474             0.00000           29.65055
## 10    17      -0.8644569             0.00000           29.65087
## # ... with 115 more rows
```