Creating and Applying an Age-Length Key

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Preliminaries

```
> # clears objects in R workspace
> rm(list = ls())
```

```
> # load needed packages
> library(fishWiDNR)   # for setDBClasses()
> library(FSA)         # for lencat(), filterD()
> library(dplyr)       # for select(), mutate(), arrange(),%>%
> library(magrittr)    # for %<>%
> library(lubridate)   # for month()
> library(plotrix)     # for plotH(), histStack()
```

Loading Data and Initial Manipulations

```
> # Load and prepare data ... copied from previous handout
> setwd("C:/aaaWork/Web/fishR/Courses/WiDNR_Statewide_2015/Day1_IntroR_FMData")
> d <- read.csv("SAWYER_fish_raw_data_012915.csv",stringsAsFactors=FALSE,na.strings=c("-","NA","")) %>%
   setDBClasses(type="RDNR") %>%
   select(County,Waterbody.Name,Survey.Year,Sample.Date,Gear,Fish.Data.Seq.No,Species,
          Length.or.Lower.Length.IN,Gender,Age..observed.annuli.,Edge.Counted.Desc,Age.Structure) %>%
   mutate(mon=month(Sample.Date,label=TRUE)) %>%
   mutate(lcat=lencat(Length.or.Lower.Length.IN,w=0.5)) %>%
   arrange(Species,Length.or.Lower.Length.IN)
```

```
> wae <- filterD(d,Waterbody.Name=="NELSON LAKE",Survey.Year==2014,mon=="May",Species=="WALLEYE",
                Gender!="U",Length.or.Lower.Length.IN>11.5,Length.or.Lower.Length.IN<21)
>
> waeF <- filterD(wae,Gender=="F")
> waeM <- filterD(wae,Gender=="M")
```

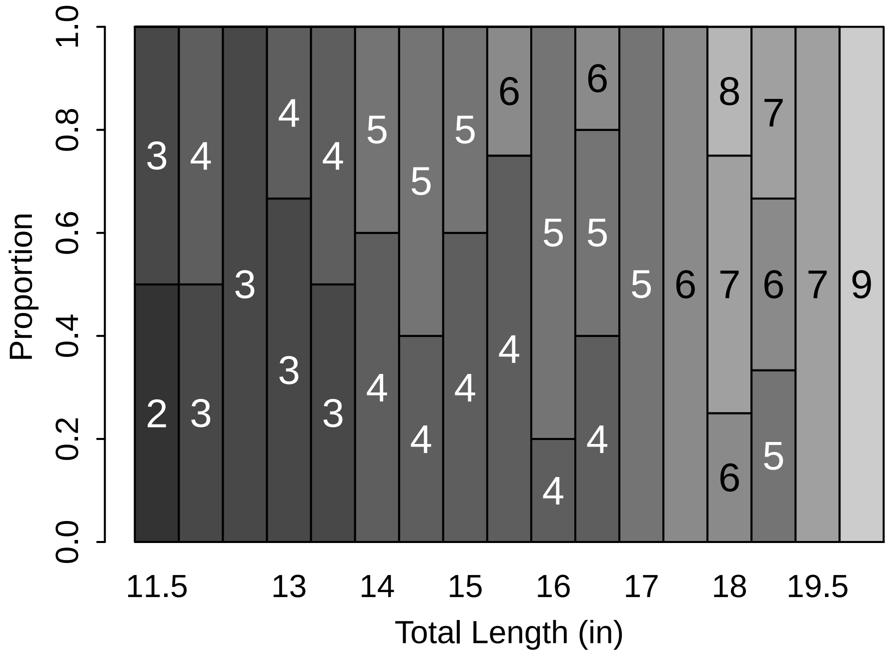
Construct an Age-Length Key – Males

```
> waeM.aged <- filterD(waeM,!is.na(Age..observed.annuli.))
> waeM.aged$Age..observed.annuli.
 [1] 3 2 3 4 3 3 3 3 4 4 3 5 4 4 4 5 5 5 5 4 4 5 4 4 5 4 6 4 4 4 5 5 5 4 5 4 5 4 6 5 5 5 6 6 6 7 6 8
[49] 7 5 6 7 7 9
```

```
> ( rawM <- xtabs(~lcat+Age..observed.annuli.,data=waeM) )
      Age..observed.annuli.
lcat   2 3 4 5 6 7 8 9
  11.5 1 1 0 0 0 0 0 0
  12   0 1 1 0 0 0 0 0
  12.5 0 2 0 0 0 0 0 0
  13   0 2 1 0 0 0 0 0
  13.5 0 1 1 0 0 0 0 0
  14   0 0 3 2 0 0 0 0
  14.5 0 0 2 3 0 0 0 0
  15   0 0 3 2 0 0 0 0
  15.5 0 0 3 0 1 0 0 0
  16   0 0 1 4 0 0 0 0
  16.5 0 0 2 2 1 0 0 0
  17   0 0 0 2 0 0 0 0
  17.5 0 0 0 0 3 0 0 0
  18   0 0 0 0 1 2 1 0
  18.5 0 0 0 1 1 1 0 0
  19.5 0 0 0 0 0 1 0 0
  20.5 0 0 0 0 0 0 0 1
```

```
> alkM1 <- prop.table(rawM,margin=1)
> print(alkM1,digits=2,zero.print="-")                         # for display only
      Age..observed.annuli.
lcat      2    3    4    5    6    7    8    9
  11.5 0.50 0.50    -    -    -    -    -    -
  12      - 0.50 0.50    -    -    -    -    -
  12.5    - 1.00    -    -    -    -    -    -
  13      - 0.67 0.33    -    -    -    -    -
  13.5    - 0.50 0.50    -    -    -    -    -
  14      -    - 0.60 0.40    -    -    -    -
  14.5    -    - 0.40 0.60    -    -    -    -
  15      -    - 0.60 0.40    -    -    -    -
  15.5    -    - 0.75    - 0.25    -    -    -
  16      -    - 0.20 0.80    -    -    -    -
  16.5    -    - 0.40 0.40 0.20    -    -    -
  17      -    -    - 1.00    -    -    -    -
  17.5    -    -    -    - 1.00    -    -    -
  18      -    -    -    - 0.25 0.50 0.25    -
  18.5    -    -    - 0.33 0.33 0.33    -    -
  19.5    -    -    -    -    - 1.00    -    -
  20.5    -    -    -    -    -    -    - 1.00
```

```
> alkPlot(alkM1,pal="gray",xlab="Total Length (in)")
```



Apply an Age-Length Key – Males

```
> waeM.unaged <- filter(waeM,is.na(Age..observed.annuli.))
> waeM.unaged <- alkIndivAge(alkM1,Age..observed.annuli.~Length.or.Lower.Length.IN,data=waeM.unaged)
> waeM.fnl <- rbind(waeM.aged,waeM.unaged)
> waeM.fnl$Age..observed.annuli.
  [1] 3 2 3 4 3 3 3 3 4 4 3 5 4 4 4 5 5 5 5 4 4 5 4 4 5 4 6 4 4 4 5 5 5 4 5 4 5 4 6 5 5 5 6 6 6 7 6
 [48] 8 7 5 6 7 7 9 3 4 3 3 3 3 3 3 3 4 4 4 3 3 3 4 4 4 5 4 5 5 5 5 4 4 5 4 5 4 4 4 4 4 5 4 5 5 5 4
 [95] 4 4 5 4 5 5 5 4 5 5 5 4 5 5 5 5 4 5 4 4 4 5 4 4 4 5 4 4 5 4 4 4 4 6 4 4 4 6 4 4 4 4 4 6 4 6 4
[142] 4 4 4 4 6 4 4 4 6 4 4 4 6 5 4 5 4 4 5 5 5 5 5 5 5 5 5 4 5 6 4 4 5 4 5 5 5 5 5 5 5 5 5 5 6 6
[189] 6 6 7 7 7 9 9
```

Construct and Apply an Age-Length Key – Females

Code is in the script. However, it is mostly a copy-and-paste of the code from above with the ’M’s changed to ’F’s

Application Assignment

Create a script that performs the following tasks:

1. Load your FM data into R. Filter your data to a waterbody, species, year, and sampling date such that some sampled fish were aged and some were not. Perhaps, also filter by sex. [Alternatively, use the Sawyer County database and select Walleye in 2014 or 2013 from Lake Chippewa]
2. Construct an **appropriate** age-length key (ALK) from the aged fish. Visualize the ALK in both tabular and graphical form.
3. Apply the ALK to the unaged fish.
4. Combine the fish aged from a structure and those with ages estimated from the ALK to form a combined data.frame.
5. Confirm that all fish in the final data.frame have assigned ages.

6. (*Time Permitting*) Repeat the above for the other sex or another species.

Save your script!