

Package ‘FSAdata’

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Description The datasets to support the Fish Stock Assessment ('FSA') package.

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BugReports <https://github.com/droglenc/FSAdata/issues>

License GPL (>= 2)

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AfricanRivers	<i>Characteristics of a sample of West African rivers.</i>
---------------	--

Description

Characteristics of a sample of West African rivers.

Format

A data frame of 39 observations on the following 6 variables:

river name of the river.

richness fish species richness.

surface surface area in km^2 .

disch mean annual discharge in $\frac{m^3}{s}$.

vegdiv terrestrial vegetation diversity (Shannon's diversity index of vegetation in drainage).

forperc percentage of drainage area covered by lowland rain forest.

Topic(s)

- Other

Source

From Table 1 in Hugueny, B. 1989. West African rivers as biogeographic islands: species richness of fish communities. *Oecologia* 79:236-243.

Examples

```
data(AfricanRivers)
str(AfricanRivers)
head(AfricanRivers)
```

AHerringChile

Ages and lengths of Araucanian Herring from Chilean waters.

Description

Ages and lengths of Araucanian Herring (*Strangomera bentincki*) from Chilean waters.

Format

A data frame with the following 2 variables:

age Age in years.

len Total length (to nearest 0.5 cm).

Topic(s)

- Growth
- Seasonal Growth
- von Bertalanffy
- Somers model

Source

From figure 9 of Cubillos, L.A., D.F. Arcosa, D.A. Bucareya, M.T. Canalesa. 2001. Seasonal growth of small pelagic fish off Talcahuano, Chile (37S, 73W): a consequence of their reproductive strategy to seasonal upwelling? Aquatic Living Resources, 14:115-124.

Examples

```
data(AHerringChile)
str(AHerringChile)
head(AHerringChile)
plot(len~age,data=AHerringChile)
```

AlewifeLH

Ages of Lake Huron Alewife assigned from otoliths and scales.

Description

Ages of Alewife (*Alosa pseudoharengus*) assessed from otoliths and scales.

Format

A data frame of 104 observations on the following 2 variables:

otoliths Age assigned from examination of otoliths

scales Age assigned from examination of scales

Topic(s)

- Age Comparison
- Age Precision
- Age Bias
- Ageing Error

Source

From Table 1A of Hoenig, J.M., M.J. Morgan, and C.A. Brown. 1995. Analysing differences between two age determination methods by tests of symmetry. Canadian Journal of Fisheries And Aquatic Systems, 52:364-368. Originally from O’Gorman, R., D.H. Barwick, and C.A. Bowen. 1987. Discrepancies between ages determined from scales and otoliths for alewives from the Great Lakes. pp. 203-210 In. Summerfelt, R.C. and G.E. Hall (Eds.) Age and Growth of Fish. Iowa State University Press, Ames, IA.

Examples

```
data(AlewifeLH)
str(AlewifeLH)
head(AlewifeLH)
plot(scales~otoliths,data=AlewifeLH)
xtabs(~otoliths+scales,data=AlewifeLH)
```

AnchovetaChile

Ages and lengths of Anchoveta from Chilean waters.

Description

Ages (in months) and lengths of Anchoveta (*Engraulis ringens*) from central Chilean waters.

Format

A data frame with 207 observations of the following 3 variables:

age.mon Age in months.

tl.cm Total length (cm).

cohort Year-class.

Topic(s)

- Growth
- Seasonal Growth
- von Bertalanffy
- Somers model

Source

Directly from the authors of Cubillos, L.A., D.F. Arcosa, D.A. Bucareya, M.T. Canalesa. 2001. Seasonal growth of small pelagic fish off Talcahuano, Chile (37S, 73W): a consequence of their reproductive strategy to seasonal upwelling? Aquatic Living Resources, 14:115-124. Data were in Figure 9.

Examples

```
data(AnchovetaChile)
str(AnchovetaChile)
head(AnchovetaChile)
AnchovetaChile$age <- AnchovetaChile$age.mon/12
plot(tl.cm~age, data=AnchovetaChile)
```

 BassFL

Catch-at-age for Suwanee and Largemouth Bass.

Description

Catch-at-age for Suwanee (*Micropterus notius*) and Largemouth Bass (*Micropterus salmoides*) collected from several lakes in Florida, 2001-2002.

Format

A data frame with 39 observations on the following 5 variables.

species Species of bass (Suwanee and Largemouth)

loc Location (SantaFe, Wacissa, Withlacoochee, Ochlockonee)

year Year (2001, 2002)

num Number of fish captured

age Age of fish at capture

Topic(s)

- Total mortality
- Catch curve

Source

From Figure 2 of Bonvechio, T.F., M.S. Allen, and R.L. Cailteux. 2005. Relative Abundance, Growth, and Mortality of Suwannee Bass in Four Florida Rivers. North American Journal of Fisheries Management 25:275-283. [Was (is?) from http://sfrc.ufl.edu/allenlab/publications/2005bonvechio_allen_cailteux.pdf.]

Examples

```
data(BassFL)
str(BassFL)
head(BassFL)
op <- par(mfrow=c(3,2),mar=c(3,3,2,1),mgp=c(1.75,0.5,0),tcl=-0.2,pch=19)
plot(log(num)~age,data=BassFL,subset=(loc=="SantaFe" & year==2001 & species=="Suwanee"),
      ylim=c(0,max(log(num))),main="Suwanee, Santa Fe")
points(log(num)~age,data=BassFL,subset=(loc=="SantaFe" & year==2002 & species=="Suwanee"),col="red")
legend("topright",legend=c("2001","2002"),col=c("black","red"),pch=19)
plot(log(num)~age,data=BassFL,subset=loc=="Wacissa" & year==2002 & species=="Suwanee",
      ylim=c(0,max(log(num))),main="Suwanee, Wacissa")
plot(log(num)~age,data=BassFL,subset=loc=="Withlacoochee" & year==2002 & species=="Suwanee",
      ylim=c(0,max(log(num))),main="Suwanee, Withlacoochee")
plot(log(num)~age,data=BassFL,subset=(loc=="SantaFe" & year==2001 & species=="Largemouth"),
      ylim=c(0,max(log(num))),main="Largemouth, Santa Fe")
points(log(num)~age,data=BassFL,subset=(loc=="SantaFe" & year==2002 & species=="Largemouth"),
       col="red")
legend("topright",legend=c("2001","2002"),col=c("black","red"),pch=19)
plot(log(num)~age,data=BassFL,subset=loc=="Ochlockonee" & year==2001 & species=="Largemouth",
      ylim=c(0,max(log(num))),main="Largemouth, Ochlockonee")
points(log(num)~age,data=BassFL,subset=(loc=="Ochlockonee" & year==2002 & species=="Largemouth"),
       col="red")
legend("topright",legend=c("2001","2002"),col=c("black","red"),pch=19)
par(op)
```

 BGHRfish

Fish information from samples collected from Big Hill Reservoir, KS, 2014.

Description

Fish information from samples collected from Big Hill Reservoir, KS, in May, 2014.

Format

A data frame with 266 observations on the following 6 variables.

UID Unique sample identification number (see [BGHRsample](#))

fishID Unique fish identification number

specCode Numeric code for each species (116="Smallmouth Bass", 118="Largemouth Bass", and 122="Bluegill")

length Total length (mm)

weight Weight (g)

count Number of fish sampled of that species and length

Topic(s)

- Data Manipulation

Note

Used in the [Introductory Fisheries Analyses with R](#) book.

Source

Obtained directly from Ben Neely.

See Also

See [BGHRfish](#) for individual fish collected in these samples.

Examples

```
data(BGHRfish)
str(BGHRfish)
head(BGHRfish)
```

BGHRsample

Information for each electrofishing sample from Big Hill Reservoir, KS, 2014.

Description

Information for each electrofishing sample from Big Hill Reservoir, KS, in May, 2014.

Format

A data frame with 20 observations on the following 4 variables.

UID Unique sample identification number

date Data sample was collected

loc Location code for where the sample was collected

effort Effort (minutes) expended for the sample

Topic(s)

- Data Manipulation

Note

Used in the [Introductory Fisheries Analyses with R](#) book.

Source

Obtained directly from Ben Neely.

See Also

See [BGHRfish](#) for individual fish collected in these samples.

Examples

```
data(BGHRsample)
str(BGHRsample)
head(BGHRsample)
```

BlackDrum2001	<i>Biological data for Black Drum from Virginia waters of the Atlantic Ocean, 2001.</i>
---------------	---

Description

Biological data (lengths, weights, ages (from otoliths), and sex) for Black Drum (*Pogonias cromis*) from Virginia waters of the Atlantic Ocean, 2001.

Format

A data frame with 141 observations on the following 9 variables.

year Year of capture (all 2001)
agid Unique identification number
sname Species name (all “Black Drum”)
month Month of capture
day Day of capture
weight Weight (lbs) – most are missing
tl Total length (mm)
sex Sex (female, male, and unknown)
otoage Age (yrs; from otoliths)

Topic(s)

- Growth
- von Bertalanffy
- Weight-Length

Note

Used in the [Introductory Fisheries Analyses with R](#) book.

Source

Obtained directly from the Virginia Marine Resources Commission via Hank Liao.

Examples

```
data(BlackDrum2001)
str(BlackDrum2001)
head(BlackDrum2001)
plot(tl~otoage, data=BlackDrum2001)
```

BloaterLH

Stock and recruitment data for Lake Huron Bloaters, 1981-1996.

Description

Egg deposition and relative abundance of age-3 Lake Huron Bloaters (*Coregonus hoyi*) by year, 1981-1996.

Format

A data frame of 16 observations on the following 3 variables:

year Year of data (1981-1996)
eggs Millions of eggs deposited
age3 Relative abundance of age-3 fish

Topic(s)

- Stock-Recruit
- Recruitment

Source

From (approximately) Figure 7 of Schaeffer, J.S. 2004. Population dynamics of bloaters *Coregonus hoyi* in Lake Huron, 1980-1998. *Ann Zool Fennici*. 41:271-279.

Examples

```
data(BloaterLH)
str(BloaterLH)
head(BloaterLH)
op <- par(mfrow=c(1,2),pch=19)
plot(eggs~year,data=BloaterLH,type="l")
plot(eggs~age3,data=BloaterLH)
par(op)
```

BlueCatfish

Ages and lengths of Blue Catfish.

Description

Ages and total lengths of Blue Catfish (*Ictalurus furcatus*) collected from the Wilson Reservoir on the Tennessee River, AL.

Format

A data frame with 119 observations on the following 2 variables.

age Age (from otoliths)

tl Total length (mm)

Topic(s)

- Growth
- von Bertalanffy

Source

From (approximately) Figure 2 of Maceina, M.J. 2007. Use of piecewise nonlinear models to estimate variable size-related mortality rates. *North American Journal of Fisheries Management*, 27:971-977.

Examples

```
data(BlueCatfish)
str(BlueCatfish)
head(BlueCatfish)
plot(tl~age,data=BlueCatfish)
```

BlueCrab

Catch and effort data for male Blue Crabs.

Description

Catch and effort data for a population of male Blue Crabs (*Callinectes sapidus*) for a 12-week period.

Format

A data frame with 12 observations on the following 2 variables.

catch A numeric vector of pounds of Blue Crab caught.

effort A numeric vector of lines used per day to catch Blue Crab.

Topic(s)

- Population size
- Abundance
- Depletion
- Leslie method
- DeLury method
- Catchability

Source

From Fischler, K.J. 1965. The use of catch-effort, catch-sampling, and tagging data to estimate a population of blue crabs. Transactions of the American Fisheries Society, 94:287-310.

Examples

```
data(BlueCrab)
str(BlueCrab)
BlueCrab
```

BluefishAge	<i>Ages of Bluefish assigned from otoliths by two readers.</i>
-------------	--

Description

Ages assigned to Bluefish (*Pomatomus saltatrix*) otoliths by two readers.

Format

A data frame with 445 observations on the following 2 variables.

r1 Ages assigned by the first reader

r2 Ages assigned by the second reader

Topic(s)

- Age Comparison
- Age Precision
- Age Bias
- Ageing Error

Source

From Figure 2 in Chapter 3 (Bluefish) of the VMRC Final Report on Finfish Ageing, 2003 by the Center for Quantitative Fisheries Ecology at Old Dominion University.

Examples

```
data(BluefishAge)
str(BluefishAge)
head(BluefishAge)
plot(r1~r2,data=BluefishAge)
```

BluegillIL	<i>Length-at-marking and recapture and time-at-large of Bluegill.</i>
------------	---

Description

Length-at-marking and recapture and time-at-large for Bluegill (*Lepomis macrochirus*) originally captured in Spring 2010 from Inch Lake, Wisconsin.

Format

A data frame with 61 observations on the following 5 variables:

- tag** Unique Floy tag number.
- lenMark** length (mm) at tagging.
- lenRecap** Length (mm) at recapture.
- deltaLen** Change in length (mm).
- deltaTime** Time-at-large (yrs).

Topic(s)

- Growth
- von Bertalanffy
- Fabens method

Source

These unpublished data are from Derek H. Ogle, Northland College. **Do not use for other than educational purposes without permission from the source.**

Examples

```
data(BluegillIL)
str(BluegillIL)
head(BluegillIL)
plot((lenRecap-lenMark)~deltaTime,data=BluegillIL)
```

 BluegillLM

Lengths and weights for Bluegill from Lake Mary, MN.

Description

Lengths (standard, fork, and total) and weights for Bluegill (*Lepomis macrochirus*) collected from Lake Mary, Minnesota.

Format

A data frame with 100 observations on the following 5 variables:

- sernum** Unique serial number
- sl** Standard length (mm)
- fl** Fork length (mm)
- tl** Total length (mm)
- wght** Weight (g)

Topic(s)

- Weight-Length
- Length Conversion
- Length Frequency

See Also

lakemary in **alr3** for a different sample of Bluegill from Lake Mary that has length and age.

Examples

```
data(BluegillLM)
str(BluegillLM)
head(BluegillLM)
op <- par(mfrow=c(3,2),pch=19)
plot(wght~sl,data=BluegillLM)
plot(wght~fl,data=BluegillLM)
plot(wght~tl,data=BluegillLM)
plot(tl~fl,data=BluegillLM)
plot(tl~sl,data=BluegillLM)
plot(fl~sl,data=BluegillLM)
par(op)
```

 BluntnoseIL1

Subsampled lengths of Bluntnose Minnows from Inch Lake, WI.

Description

Total lengths for a subsample from 144 Bluntnose Minnows (*Pimephales notatus*) from Inch Lake, WI in May, 2007.

Format

A data frame of 25 observations on the following 3 variables:

- netID** a netID factor (all 41)
- species** species name (all Bluntnose)
- tl** total length (inches to nearest 0.1)

Topic(s)

- Length Frequency
- Length Expansion
- Size Structure
- PSD

Source

Derek H. Ogle, personal collection

See Also

[InchLake1](#), [InchLake2](#).

Examples

```
data(BluntnoseIL1)
str(BluntnoseIL1)
head(BluntnoseIL1)
```

Bonito

Ages and lengths of Australian Bonito.

Description

Ages and lengths of Australian Bonito (*Sarda australis*).

Format

A data frame with the following 3 variables:

sex Sex (Female, Juvenile, Male).

age Age in decimal years.

fl Total length (to nearest 0.1 cm).

Topic(s)

- Growth
- Seasonal Growth
- von Bertalanffy
- Somers model

Source

From figure 3 of Stewart, J., W. Robbins, K. Rowling, A. Hegarty, and A. Gould. 2013. A multi-faceted approach to modelling growth of the Australian bonito, *Sarda australis* (Family Scombridae), with some observations on its reproductive biology. *Marine and Freshwater Research* 64:671-678.

Examples

```
data(Bonito)
str(Bonito)
head(Bonito)
plot(fl~age,data=Bonito)
```

BrookTroutNC	<i>Stock and recruitment data for Brook Trout from Ball Creek, NC, 1991-2004.</i>
--------------	---

Description

Stock and recruitment data for Brook Trout (*Salvelinus fontinalis*) from Ball Creek, NC, 1991-2004.

Format

A data frame with 10 observations on the following 2 variables.

adult a numeric vector giving autumn adult density (number per square meter)

yoy a numeric vector giving autumn YOY density (number per square meter) in following year

Topic(s)

- Stock-Recruit
- Recruitment

Note

The authors fit a linear model to the stock-recruit relationship.

Source

From (approximately) Figure 5 in Grossman, G.D., R.E. Ratajczak, C.M. Wagner, and J.T. Petty. 2010. Dynamics and regulation of the southern brook trout (*Salvelinus fontinalis*) population in an Appalachian stream. *Freshwater Biology* 55:1494-1508.

Examples

```
data(BrookTroutNC)
str(BrookTroutNC)
head(BrookTroutNC)
plot(adult~yoy,data=BrookTroutNC)
```

BrookTroutNEWP

Catches in removal events for Brook Trout in the Nashwaak Experimental Watersheds Project.

Description

Catches in removal events for Brook Trout (*Salvelinus fontinalis*) in two streams in the the Nashwaak Experimental Watersheds Project on multiple dates.

Format

A data frame of 16 observations on the following 7 variables:

stream Stream (UNM=Upper Narrows Mountain Brook and Hay=Hyaden Brook).

section Section of stream. See source.

date Date of collections.

first Catch on the first removal pass.

second Catch on the second removal pass.

third Catch on the third removal pass.

fourth Catch on the fourth removal pass.

Topic(s)

- Population size
- Abundance
- Removal

Source

From Table 1 in Schnute, J. 1983. A new approach to estimating populations by the removal method. Canadian Journal of Fisheries and Aquatic Sciences, 40:2153-2169.

See Also

See [BrookTroutNEWP1](#) for these data AND the results from Schnute (1983).

Examples

```
data(BrookTroutNEWP)
```

```
## extract data for one stream, section, and date (e.g., 3rd row)  
BrookTroutNEWP[3,]
```

BrookTroutNEWPI	<i>Catches in removal events for Brook Trout in the Nashwaak Experimental Watersheds Project.</i>
-----------------	---

Description

Catches in removal events for Brook Trout (*Salvelinus fontinalis*) in two streams in the the Nashwaak Experimental Watersheds Project on multiple dates. Includes results from Schnute (1983).

Format

A data frame of 16 observations on the following 7 variables:

sample A unique identified for the sample.

stream Stream (UNM=Upper Narrows Mountain Brook and Hay=Hyaden Brook).

section Section of stream. See source.

date Data of collections.

first Catch on the first removal pass.

second Catch on the second removal pass.

third Catch on the third removal pass.

fourth Catch on the fourth removal pass.

Moran.N Schnute (1983) estimate of N using the Moran (1951) method.

Moran.NLCI Schnute (1983) estimate of N 95% LCI using the Moran (1951) method.

Moran.NUCI Schnute (1983) estimate of N 95% UCI using the Moran (1951) method.

Moran.p Schnute (1983) estimate of p using the Moran (1951) method.

Moran.LH Schnute (1983) negative log likelihood using the Moran (1951) method.

Schnute.N Schnute (1983) estimate of N.

Schnute.NLCI Schnute (1983) estimate of N 95% LCI.

Schnute.NUCI Schnute (1983) estimate of N 95% UCI.

Schnute.p1 Schnute (1983) estimate of p1.

Schnute.p Schnute (1983) estimate of p.

Schnute.LH Schnute (1983) negative log-likelihood.

ChiSq Schnute (1983) chi-square from likelihood ratio comparison of Moran and Schnute methods.

Topic(s)

- Population size
- Abundance
- Removal

Source

From Tables 1-3 in Schnute, J. 1983. A new approach to estimating populations by the removal method. Canadian Journal of Fisheries and Aquatic Sciences, 40:2153-2169.

See Also

See [BrookTroutNEWP](#) for only the data (note the results from Schnute (1983)).

Examples

```
data(BrookTroutNEWP1)

## extract data for one stream, section, and date (e.g., 3rd row)
BrookTroutNEWP1[3,]
```

BrookTroutOnt	<i>Summarized single mark-recapture data for Brook Trout across many years.</i>
---------------	---

Description

The number of Brook Trout (*Salvelinus fontinalis*) marked, captured, and recaptured for several years on Meach Lake in central Ontario.

Format

A data frame with 7 observations on the following 5 variables.

year Year of the collection

mark Total number of fish marked on the marking run

catch Total number of fish caught on the recapture run

recap Total number of previously marked fish in the recapture run

correction Number of age-1 fish to be added to final estimated based on mark-recapture to correct for gear selectivity of age-1 fish

Topic(s)

- Population Size
- Abundance
- Mark-Recapture
- Capture-Recapture
- Petersen

Source

From Table 1 of Curry, R.A., C. Brady, and G.E. Morgan. 2003. Effects of Recreational Fishing on the Population Dynamics of Lake-Dwelling Brook Trout. *North American Journal of Fisheries Management* 23:35-47.

Examples

```
data(BrookTrout0nt)
str(BrookTrout0nt)
head(BrookTrout0nt)
```

BrownTroutVC1	<i>Single census mark-recapture data with lengths for Brown Trout from Valley Creek, MN.</i>
---------------	--

Description

Single censuse mark-recapture data for Brown Trout (*Salmo trutta*) from Valley Creek, MN captured in April, 1988. Length of trout was recorded so that abundance estimated can be made by length categories.

Format

A data frame with 1014 observations on the following 3 variables.

len A numeric vector of total length measurements (cm)

sample A factor variable representing the sample in which the fish was captured. The marking run is labelled with `first` and the recapture run is labelled with `second`

recap A factor variable representing whether the fish was a “recap”ture in the second sample (YES) or not (NO)

Topic(s)

- Population Size
- Abundance
- Mark-Recapture
- Capture-Recapture
- Petersen

Source

Obtained directly from Tom Kwak, North Carolina Cooperate Unit at North Carolina State University and part of the data published in Kwak, T.J. and T.F. Waters. 1997. Trout production dynamics and water quality in Minnesota streams. *Transactions of the American Fisheries Society*, 126:35-48.

Examples

```
data(BrownTroutVC1)
str(BrownTroutVC1)
head(BrownTroutVC1)
hist(BrownTroutVC1$len,main="")
```

BSkateGB

Stock and recruitment data for Barndoor Skate from Georges Bank, 1966-2007.

Description

Stock and recruitment data for Barndoor Skate (*Dipturus laevis*) from Georges Bank for three seasons.

Format

A data frame with 31 observations on the following 4 variables.

spawners a numeric vector giving CPUE of spawning fish

recruits a numeric vector containing the CPUE of recruits

year a numeric vector containing the year of the survey (recruits have been properly lagged (3 years) to match with spawners)

season a factor containing the season of capture (fall, spring, winter)

Topic(s)

- Stock-Recruit
- Recruitment

Note

Only years within each season where more than one spawner and more than one recruit were captured were recorded. The authors noted that the Beverton-Holt model could NOT be fit to the winter data.

Source

Estimated (using digitize) from figures 4-6 in Gedamke, T., J.M. Hoenig, W.D. DuPaul, and J.A. Musick. 2009. Stock-recruitment dynamics and the maximum population growth rate of the barn-door skate on Georges Bank. *North American Journal of Fisheries Management* 29:512-526.

Examples

```

data(BSkateGB)
str(BSkateGB)
head(BSkateGB)
op <- par(mfrow=c(3,2),pch=19)
plot(recruits~year,data=BSkateGB,subset=season=="fall",type="b",main="fall")
plot(recruits~spawners,data=BSkateGB,subset=season=="fall",main="fall")
plot(recruits~year,data=BSkateGB,subset=season=="spring",type="b",main="spring")
plot(recruits~spawners,data=BSkateGB,subset=season=="spring",main="spring")
plot(recruits~year,data=BSkateGB,subset=season=="winter",type="b",main="winter")
plot(recruits~spawners,data=BSkateGB,subset=season=="winter",main="winter")
par(op)

```

BullTroutRML1	<i>Lengths and weights for Bull Trout from two Rocky Mountain lakes and two eras.</i>
---------------	---

Description

Lengths and weights of Bull Trout (*Salvelinus confluentis*) from two Rocky Mountain lakes in Alberta, CAN and two eras.

Format

A data frame with 137 observations on the following 3 variables:

fl Fork length (mm)
mass Wet mass (g)
era Era of collection (1977-79 and 2001)

Topic(s)

- Weight-Length
- Length Frequency

Note

The historical (1977-1980) era samples were from before restrictive sportfishing regulatory regimes were implemented (in the 1990s) that led to changes in abundance and population structure of bull trout.

Source

From (approximately) Figure 2 of Parker, B.R., D.W. Schindler, F.M. Wilhelm, and D.B. Donald. 2007. Bull trout population responses to reductions in angler effort and retention limits. North American Journal of Fisheries Management, 27:848-859. [Was (is?) from <https://www.researchgate.net/publication/2331441>.

Examples

```

data(BullTroutRML1)
str(BullTroutRML1)
head(BullTroutRML1)
op <- par(mfrow=c(1,2),pch=19)
plot(mass~fl,data=BullTroutRML1,subset=era=="1977-79",main="1977-79")
plot(mass~fl,data=BullTroutRML1,subset=era=="2001",main="2001")
par(op)

```

BullTroutRML2	<i>Ages and lengths of Bull Trout from two Rocky Mountain lakes at two times.</i>
---------------	---

Description

Assigned ages (from otoliths) and fork lengths of Bull Trout (*Salvelinus confluentis*) from two Rocky Mountain lakes in Alberta, CAN before and after a regulation change.

Format

A data frame with 96 observations on the following 4 variables:

age Age (from otoliths).

fl Fork length (mm).

lake Lake (Harrison and Osprey).

era Era of collection (1977-80 and 1997-01). See details.

Topic(s)

- Growth
- Von Bertalanffy growth model

Note

The historical (1977-1980) era samples were from before restrictive sportfishing regulatory regimes were implemented (in the 1990s) that led to changes in abundance and population structure of bull trout.

Source

From (approximately) Figure 2 of Parker, B.R., D.W. Schindler, F.M. Wilhelm, and D.B. Donald. 2007. Bull trout population responses to reductions in angler effort and retention limits. North American Journal of Fisheries Management, 27:848-859. [Was (is?) from <https://www.researchgate.net/publication/2331441>]

Examples

```

data(BullTroutRML2)
str(BullTroutRML2)
head(BullTroutRML2)
op <- par(mfrow=c(2,2),pch=19)
plot(fl~age,data=BullTroutRML2,subset=lake=="Harrison" & era=="1977-80",main="Harrison, 1977-80")
plot(fl~age,data=BullTroutRML2,subset=lake=="Harrison" & era=="1997-01",main="Harrison, 1997-2001")
plot(fl~age,data=BullTroutRML2,subset=lake=="Osprey" & era=="1977-80",main="Osprey, 1977-80")
plot(fl~age,data=BullTroutRML2,subset=lake=="Osprey" & era=="1997-01",main="Osprey, 1997-2001")
par(op)

```

BullTroutTC

Catch-at-age for Bull Trout in Trestle Creek, ID.

Description

Catch-at-age (actually carcasses-at-age) for Bull Trout (*Salvelinus confluentis*) in Trestle Creek, ID.

Format

A data frame with 6 observations on the following 2 variables.

age A numeric vector of assigned ages (from otoliths).

carcasses A numeric vector of number of carcasses found in and along Trestle Creek.

Topic(s)

- Mortality
- Catch curve

Source

From (approximately) Figure 4a in Downs, C.C., D. Horan, E. Morgan-Harris, and R. Jakubowski. 2006. Spawning demographics and juvenile dispersal of an adfluvial bull trout population in Trestle Creek, Idaho. *North American Journal of Fisheries Management* 26:190-200.

Examples

```

data(BullTroutTC)
str(BullTroutTC)
head(BullTroutTC)
plot(log(carcasses)~age,data=BullTroutTC)

```

 Cabezon

Ages, lengths, and maturity for female Cabezon from Oregon.

Description

Ages, lengths, and maturity for female Cabezon (*Scorpaenichthys marmoratus*) from Newport and Depoe Bay, Oregon.

Format

A data frame with 525 observations on the following 5 variables.

date Date fish was collected

length Total length (cm)

age Otolith age

maturity Maturity state (Immature or Mature)

stage Stage of maturity (1:Immature, 2:Maturing, 3:Mature, 4:Fertilized, 5:Ripe, 6:Spent, 7:Resting)

Topic(s)

- Maturity
- Growth
- von Bertalanffy

Source

Actual data obtained directly (from Bob Hanna) from Hannah, R.W, M.T.O. Blume, and J.E. Thompson. 2009. Length and age at maturity of female yelloweye rockfish (*Sebastes rubberimus*) and cabezon (*Scorpaenichthys marmoratus*) from Oregon waters based on histological evaluation of maturity. Oregon Department of Fish and Wildlife, Information Reports 2009-04. [Was (is?) from http://www.dfw.state.or.us/mrp/publications/docs/Info200904_YlwEyeRF_Maturity.pdf.]

Examples

```
data(Cabezon)
str(Cabezon)
head(Cabezon)
op <- par(mfrow=c(2,2),pch=19)
plot(length~age,data=Cabezon,ylab="Total Length (cm)",xlab="Age")
hist(Cabezon$length,xlab="Total Length (cm)",main="")
tbl1 <- xtabs(~age+maturity,data=Cabezon)
(ptbl1 <- prop.table(tbl1,margin=1))
plot(ptbl1[,2]~as.numeric(row.names(ptbl1)),type="l",xlab="Age",ylab="Proportion Mature")
tbl2 <- xtabs(~length+maturity,data=Cabezon)
(ptbl2 <- prop.table(tbl2,margin=1))
plot(ptbl2[,2]~as.numeric(row.names(ptbl2)),type="l",xlab="Length",ylab="Proportion Mature")
par(op)
```

Casselman1990

*Instantaneous growth rates for two calcified ageing structures.***Description**

Instantaneous growth rates (percent change per day) for body growth and two calcified ageing structures from age 1-4 female Northern Pike (*Esox lucius*) from Wickett Lake, Ontario.

Format

A data frame with 12 observations on the following 4 variables.

day A numeric vector of days since the beginning of the study.

body A numeric vector of instantaneous growth rates (percent change per day) for body growth.

cleithrum A numeric vector of instantaneous growth rates (percent change per day) for cleithra.

scale A numeric vector of instantaneous growth rates (percent change per day) for scales.

Topic(s)

- Other

Source

From Figure 8 of Casselman, J.M. 1990. Growth and relative size of calcified structures of fish. Transactions of the American Fisheries Society. 119:673-688.

Examples

```
data(Casselman1990)

# recreation of Casselman's (199) Figure 8.
p <- c(19,17,15); clr <- c("black","red","blue"); l <- 1
with(Casselman1990,
     matplot(day,cbind(body,cleithrum,scale),type="b",lwd=2,pch=p,col=clr,lty=1,
             ylab="Instantaneous Growth Rate",xaxt="n",xlab="")
     )
axis(1,at=c(0,31,60,91,121,152,182,213,243,274,304,335,365),tick=TRUE,labels=FALSE)
axis(1,at=c(15,46,76,107,137,168,198,229,260,291,321,352),tick=FALSE,
     labels=c("Jan","Feb","Mar","Apr","May","Jun","Jul","Aug","Sep","Oct","Nov","Dec"))
legend("topleft",legend=c("Body","Cleithrum","Scale"),pch=p,col=clr,lty=1,lwd=2)
```

CCatfishNB

Catch-at-age of Channel Catfish from two sections of the Platte River, NB.

Description

Catch-at-age of Channel Catfish (*Ictalurus punctatus*) from two sections of the Platte River, NB, in 2007 and 2008.

Format

A data frame of 26 observations on the following 3 variables:

age Age (years) assigned from pectoral spines

catch Number of captured fish with baited hoopnets and electrofishing

loc Location of collection (Central and Lower)

Topic(s)

- Mortality
- Catch curve

Note

Used in the [Introductory Fisheries Analyses with R](#) book.

Source

From (approximately) Figure 3-14 in Barada, T.J. 2009. Catfish population dynamics in the Platte River, Nebraska. Master's thesis, University of Nebraska, Lincoln, NE. [Was (is?) from <http://nlc1.nlc.state.ne.us/epubs/U1502009.pdf>.]

Examples

```
data(CCatfishNB)
str(CCatfishNB)
head(CCatfishNB)
op <- par(mfrow=c(1,2),pch=19)
plot(log(catch)~age,data=CCatfishNB,subset=loc=="Central",main="Central")
plot(log(catch)~age,data=CCatfishNB,subset=loc=="Lower",main="Lower")
par(op)
```

ChinookKR	<i>Stock and recruitment data for Klamath River Chinook Salmon, 1979-2000.</i>
-----------	--

Description

Stock and recruitment data for Klamath River Chinook Salmon (*Oncorhynchus tshawytscha*), 1979-2000 brood years.

Format

A data frame with 27 observations on the following 3 variables.

brood.year a numeric vector of brood years

spawners a numeric vector giving number of spawning fish

recruits a numeric vector containing the number of recruits

Topic(s)

- Stock-Recruit
- Recruitment

Source

Was (is?) from http://www.pcouncil.org/bb/2006/0406/age2a_supp_att3.pdf.

Examples

```
data(ChinookKR)
str(ChinookKR)
head(ChinookKR)
op <- par(mfrow=c(1,2),pch=19)
plot(recruits~brood.year,data=ChinookKR,type="l")
plot(recruits~spawners,data=ChinookKR)
par(op)
```

CiscoTL

Lengths, weights, and sex of Cisco from Trout Lake, WI.

Description

Lengths, weights, and sex for Cisco (*Coregonus artedii*) from Trout Lake, WI, 1981-2006. Fish were collected with a variety of gears.

Format

A data frame of 8594 observations on the following 8 variables:

lakeid Lake name (all TR=Trout Lake)
year4 Year of capture
sampledate Date of capture
gearid Capture gear type
sname Species name (all CISCO)
length Total length (nearest mm) at capture
weight Weight (nearest 0.1 or 1 g) at capture
sex Sex (F=Female, I=Immature, M=Male)

Topic(s)

- Weight-Length
- Length Frequency

Source

Was (is?) available for download from <http://www.limnology.wisc.edu/>.

Examples

```
data(CiscoTL)
str(CiscoTL)
head(CiscoTL)
op <- par(mfrow=c(2,2),pch=19)
plot(weight~length,data=CiscoTL,subset=sex=="F",main="Female")
plot(weight~length,data=CiscoTL,subset=sex=="M",main="Male")
plot(weight~length,data=CiscoTL,subset=sex=="I",main="Immature")
par(op)
```

CrappieARMS	<i>Stock and recruitment data for Crappies from four reservoirs in Arkansas and Mississippi, USA.</i>
-------------	---

Description

Stock and recruitment data for Crappies from four reservoirs in Arkansas and Mississippi, USA.

Format

A data frame of 78 observations on the following 3 variables:

reservoir Reservoir (Atkins, Nimrod, Okatibbee, Ross.Barnett)

stock Number of age-1+ fish per hectare

recruits Number of age-0 fish per hectare

Topic(s)

- Stock-Recruit
- Recruitment

Source

From (approximately) Figure 2 of Allen, M.S. and L.E. Miranda. 1998. An age-structured model for erratic crappie fisheries. *Ecological Modeling* 107:289-303.

Examples

```
data(CrappieARMS)
str(CrappieARMS)
head(CrappieARMS)
op <- par(mfrow=c(2,2),mar=c(3,3,2,1),mgp=c(1.75,0.5,0),tcl=-0.2,pch=19)
plot(recruits~stock,data=CrappieARMS,subset=(reservoir=="Atkins"),main="Atkins")
plot(recruits~stock,data=CrappieARMS,subset=(reservoir=="Nimrod"),main="Nimrod")
plot(recruits~stock,data=CrappieARMS,subset=(reservoir=="Okatibbee"),main="Okatibbee")
plot(recruits~stock,data=CrappieARMS,subset=(reservoir=="Ross.Barnett"),main="Ross Barnett")
par(op)
```

CreekChub

Ages (subsample) and lengths (all fish) for Creek Chub.

Description

Ages (subsample) and lengths (all fish) for Creek Chub (*Semotilus atromaculatus*).

Format

A data frame with 218 observations on the following 2 variables.

len Total length (mm)

age Assigned ages (yrs; from scales)

Details

As many as 10 fish per 10 mm length interval were sampled for age assignment with scales.

Topic(s)

- Age-Length Key
- Growth

Note

Used in the [Introductory Fisheries Analyses with R](#) book.

Source

Recreated (random digits were added to construct mm lengths from the cm length bins) from information in Box 15.2 of Quist, M.C., Pegg, M.A., and DeVries, D.R. 2012. Age and growth. In Zale, A.V., Parrish, D.L., and Sutton, T.M., editors. Fisheries Techniques, Third Edition, chapter 15, pages 677-731. American Fisheries Society, Bethesda, MD.

Examples

```
data(CreekChub)
str(CreekChub)
head(CreekChub)
xtabs(~age, data=CreekChub)
plot(len~age, data=CreekChub)
```

Cree1MN

*Results of a large number of creel surveys in Minnesota lakes.***Description**

The species targeted, number of fish harvested, and number of individuals harvesting that number of that species of fish from a large number of surveys on Minnesota Lakes, 1980-1996.

Format

A data frame of 14550 observations on the following 2 variables:

species species of fish that was targeted.

harvest number of fish of that species harvested by one angler.

Topic(s)

- Other

Source

From tables in Cook, M.F., T.J. Goeman, P.J. Radomski, J.A. Younk, and P.C. Jacobson. 2001. Creel limits in Minnesota: A proposal for change. *Fisheries* 26:19-26.

Examples

```
data(Cree1MN)
str(Cree1MN)
head(Cree1MN)
levels(Cree1MN$species)

## ONLY RUN IN INTERACTIVE MODE
## Not run:
require(FSA)
wae <- filterD(Cree1MN,species=="WAE")
( waetbl <- table(wae$harvest) )
( waeptbl <- prop.table(waetbl)*100 )
( waercum <- rcumsum(waeptbl) )
op <- par(mfrow=c(1,2),mar=c(3.5,3.5,0.5,0.5),mgp=c(2,0.5,0))
barplot(waeptbl,xlab="Number of Walleye Harvested",ylab="Percentage of Individuals")
barplot(waercum,xlab="Minimum Number of Walleye Harvested",ylab="Percentage of Individuals")
par(op)
( ttlwae <- sum(wae$harvest) )
wae$svd5 <- wae$harvest-5 # Used to determine the number of fish
xtabs(~svd5,data=wae) # saved if limit was reduced to 5.
( svd5 <- sum(wae$svd5[wae$svd5>0]) ) # Only sum positive numbers (i.e., saved)
round(svd5/ttlwae*100,1) # Show as a percentage

wae$svd1 <- wae$harvest-1 # same but if reduced to 1 bag.
```

```
xtabs(~svd1,data=wae)
( svd1 <- sum(wae$svd1[wae$svd1>0]) )
round(svd1/ttlwae*100,1)

## End(Not run)
```

Croaker1

Ages of Atlantic Croaker assigned from otoliths by two readers.

Description

Otolith age of Atlantic croaker (*Micropogonias undulatus*) from two readers.

Format

A data frame of 317 observations on the following 2 variables:

reader1 Age assigned by the first reader

reader2 Age assigned by the second reader

Topic(s)

- Age Comparison
- Age Precision
- Age Bias
- Ageing Error

Source

From Figure 2 in Chapter 1 (Atlantic Croaker) of the VMRC Final Report on Finfish Ageing, 1999 by the Center for Quantitative Fisheries Ecology at Old Dominion University.

Examples

```
data(Croaker1)
str(Croaker1)
head(Croaker1)
plot(reader2~reader1,data=Croaker1)
xtabs(~reader1+reader2,data=Croaker1)
```

 Croaker2

Ages, lengths, and sexes of Atlantic Croaker by sex.

Description

Assigned ages (by otoliths), total lengths, and sexes of Atlantic Croaker (*Micropogonias undulatus*).

Format

A data frame of 318 observations on the following 3 variables:

age Otolith age-at-capture (years).

tl Total length (nearest mm) at capture.

sex Sex of the fish (M=male and F=female).

Topic(s)

- Growth
- von Bertalanffy

Source

From Figure 4 in Chapter 1 (Atlantic Croaker) of the VMRC Final Report on Finfish Ageing, 1999 by the Center for Quantitative Fisheries Ecology at Old Dominion University.

Examples

```
data(Croaker2)
str(Croaker2)
head(Croaker2)
op <- par(mfrow=c(1,2),pch=19)
plot(tl~age,data=Croaker2,subset=sex=="F",main="Female")
plot(tl~age,data=Croaker2,subset=sex=="M",main="Male")
par(op)
```

 CutthroatALF

Capture histories (9 samples) of Cutthroat Trout from Auke Lake.

Description

Summarized ("RMark" format) capture histories of Cutthroat Trout (*Oncorhynchus clarki*) in Auke Lake, Alaska, from samples taken in 1998-2006.

Format

A data frame with 47 observations on the following 2 variables.

ch Unique capture history (as a character string)

freq Frequency of fish with that capture history

Topic(s)

- Population Size
- Abundance
- Mark-Recapture
- Capture-Recapture
- Jolly-Seber
- Capture History

Source

Entered from Appendix A.3 of Harding, R.D., C.L. Hoover, and R.P. Marshall. 2010. Abundance of Cutthroat Trout in Auke Lake, Southeast Alaska, in 2005 and 2006. Alaska Department of Fish and Game Fisheries Data Series No. 10-82. Accessed from <http://www.sf.adfg.state.ak.us/FedAidPDFs/FDS10-82.pdf>.

See Also

See `CutthroatAL` for the same data in “individual” fish format (i.e., the data in this file were converted using `capHistConvert` from **FSA**). See `mrOpen` from **FSA** for an example analysis.

Examples

```
data(CutthroatALf)
str(CutthroatALf)
head(CutthroatALf)
```

DarterMahon

Catch and effort data for Fantail Darter.

Description

Catch and effort data for Fantail Darter (*Etheostoma flabellare*) from seven removal events conducted by Mahon (1980).

Format

A data frame with 7 observations on the following 2 variables.

catch Catch of Fantail Darter.

effort Constant electrofishing effort.

Details

Catch (number of fish) was recorded. Effort was a constant amount of electrofishing for each sampling event and is, thus, entered as a constant value of 1.

These data are used in many publications because the stream section was rotenoned following the removal surveys to determine a known population size of 1151 individuals.

Topic(s)

- Population size
- Abundance
- Depletion methods
- Leslie method
- DeLury method
- Catchability

Source

From Mahon, R. 1980. Accuracy of catch-effort methods for estimating fish density and biomass in streams. *Environmental Biology of Fishes*. 4:343-363.

Examples

```
data(DarterMahon)
str(DarterMahon)
head(DarterMahon)
```

DarterOnt

Ages and lengths of Channel Darters from two locations.

Description

Assigned ages (from otoliths), total length, and collection location of Channel Darter (*Percina copelandi*).

Format

A data frame of 54 observations on the following 3 variables:

age Otolith age-at-capture (years).

tl Total length (nearest 0.1 mm) at capture.

river Location of capture (Salmon or Trent Rivers).

Topic(s)

- Growth
- von Bertalanffy

Note

The original author used a linear model to describe the relationship between length and age.

Source

From Figure 2 of Reid, S.M. Age estimates and length distributions of Ontario channel darter (*Percina copelandi*) populations. *Journal of Freshwater Ecology* 19:441-444.

Examples

```
data(DarterOnt)
str(DarterOnt)
head(DarterOnt)
op <- par(mfrow=c(1,2),pch=19)
plot(tl~age,data=DarterOnt,subset=river=="Salmon",main="Salmon R.")
plot(tl~age,data=DarterOnt,subset=river=="Trent",main="Trent R.")
par(op)
```

Deckeretal1999

Catches in removal events of Cutthroat Trout and Coho Salmon in Little Stawamus Creek (British Columbia, Canada) in 1997.

Description

Catches of Coho Salmon (*Oncorhynchus kisutch*) and Cutthroat Trout (*Oncorhynchus clarki*) in consecutive removal events at various locations in Little Stawamus Creek (British Columbia, Canada) in 1997.

Format

A data frame of 26 observations on the following 10 variables:

reach Reach number of sampling location.

habitat Habitat type of sampling location – pool, riffle, or run.

strata Stratum number of sampling location.

area Area (m²) of sampling location.

coho1 Coho Salmon removed on the first pass.

coho2 Coho Salmon removed on the second pass.

coho3 Coho Salmon removed on the third pass.

cutt1 Cutthroat Trout removed on the first pass.

cutt2 Cutthroat Trout removed on the second pass.

cutt3 Cutthroat Trout removed on the third pass.

Topic(s)

- Population size
- Abundance
- Removal

Source

From Appendix 2a and 2b in Decker, A.S., J.M. Bratty, S.C. Riley, and J. Korman. 1999. Estimating standing stock of juvenile coho salmon (*Oncorhynchus kisutch*) and cutthroat trout (*Oncorhynchus clarki*) in a small stream: a comparison of sampling designs. Canadian Technical Report of Fisheries and Aquatic Sciences 2282. 24 pp.[Was (is?) from <http://www.dfo-mpo.gc.ca/Library/239481.pdf>.]

Examples

```
data(Deckeretal1999)
str(Deckeretal1999)
head(Deckeretal1999)

## extract data for one sampling location (e.g., 3rd row)
Deckeretal1999[3,]
```

EuroPerchTJ

Ages, lengths, and sexes of European Perch.

Description

Assigned ages, measured fork lengths, and observed sexes for European Perch (*Perca fluviatilis*) from Lake Tjuekemeer (The Netherlands).

Format

A data frame of 69 observations on the following 3 variables:

- fl** Fork lengths (cm).
- age** Assigned ages.
- sex** Sex (female, male).

Topic(s)

- Growth
- fon Bertalanffy

Source

From (approximately) Figure 2 in Mooij, W.M., J.M. Van Rooij, and S. Wijnhoven. 1999. Analysis and comparison of fish growth from small samples of length-at-age data: Detection of sexual dimorphism in Eurasian perch as an example. Transactions of the American Fisheries Society, 128:483-490.

Examples

```
data(EuroPerchTJ)
str(EuroPerchTJ)
head(EuroPerchTJ)
op <- par(mfrow=c(1,2),pch=19)
plot(fl~age,data=EuroPerchTJ,subset=sex=="female",main="Female")
plot(fl~age,data=EuroPerchTJ,subset=sex=="male",main="Male")
par(op)
```

FHCatfish

Catch-at-age of Flathead Catfish from three southeastern rivers.

Description

Numbers of Flathead Catfish (*Pylodictis olivaris*) captured by electrofishing in three rivers – Coosa River, AL; Ocmulgee River, GA; and Satilla River, GA.

Format

A data frame of 39 observations on the following 3 variables:

river Location of collection (Coosa, Ocmulgee, and Satilla)

age Age (years) assigned from otolith

abundance Number of captured fish with boat electrofishing

Topic(s)

- Mortality
- Catch curve

Source

From (approximately) Figure 3 in Sakaris, P.C., E.R. Irwin, J.C. Jolley, and D. Harrison. 2006. Comparison of Native and Introduced Flathead Catfish Populations in Alabama and Georgia: Growth, Mortality, and Management. North American Journal of Fisheries Management 26:867-874.

Examples

```

data(FHCatfish)
str(FHCatfish)
head(FHCatfish)
op <- par(mfrow=c(2,2),pch=19)
plot(log(abundance)~age,data=FHCatfish,subset=river=="Coosa",main="Coosa")
plot(log(abundance)~age,data=FHCatfish,subset=river=="Ocmulgee",main="Ocmulgee")
plot(log(abundance)~age,data=FHCatfish,subset=river=="Satilla",main="Satilla")
par(op)

```

FHCatfishATL

*Catch-at-age of Flathead Catfish from three Atlantic rivers.***Description**

Catch-at-age of Flathead Catfish (*Pylodictis olivaris*) from three populations of Atlantic rivers – Lumber River, Northeast Cape Fear River (NCF), and Neuse River.

Format

A data frame of 44 observations on the following 3 variables:

river Collection river (Lumber, NCF, and Neuse).

age Age (yrs) assessed by otolith.

number Number of captured fish.

Topic(s)

- Mortality
- Catch curve

Source

From (approximately) Figure 2 in Kwak, T.J., W.E. Pine III, and D.S. Waters. 2006. Age, growth, and mortality of introduced flathead catfish in Atlantic rivers and a review of other populations. North American Journal of Fisheries Management 26:73-87.

Examples

```

data(FHCatfishATL)
str(FHCatfishATL)
head(FHCatfishATL)
op <- par(mfrow=c(2,2),pch=19)
plot(log(number)~age,data=FHCatfishATL,subset=river=="Lumber",main="Lumber")
plot(log(number)~age,data=FHCatfishATL,subset=river=="NCF",main="NCF")
plot(log(number)~age,data=FHCatfishATL,subset=river=="Neuse",main="Neuse")
par(op)

```

 FSAdata

Data to support the FSA package.

Description

This package contains data to support the FSA package.

Usage

FSAdataTopics

Format

An object of class character of length 16.

Details

This package contains additional data files that can be used for common fisheries stock assessment methods described in the **FSA** package and on the [fishR website](#).

The help files for these datasets are embedded with topics that can be searched to find data files that can be analyzed with those topics. For example, use the following commands to find data files for the corresponding topics.

help.search("Length Expansion", package=c("FSAdata", "FSA"))	Expand subsampled lengths.
help.search("Length Conversion", package=c("FSAdata", "FSA"))	Convert between length types.
help.search("Age Comparison", package=c("FSAdata", "FSA"))	Ageing (error, precision, or comparison).
help.search("Age-Length Key", package=c("FSAdata", "FSA"))	Age-Length Key data.
help.search("Weight-Length", package=c("FSAdata", "FSA"))	Weight-length model data.
help.search("Length Frequency", package=c("FSAdata", "FSA"))	Length frequency data.
help.search("Size Structure", package=c("FSAdata", "FSA"))	Size structure data.
help.search("Abundance", package=c("FSAdata", "FSA"))	Data for abundance estimates.
help.search("Capture-Recapture", package=c("FSAdata", "FSA"))	Mark-recapture data.
help.search("Mark-Recapture", package=c("FSAdata", "FSA"))	Mark-recapture data.
help.search("Capture History", package=c("FSAdata", "FSA"))	Capture history mark-recapture (compare to sumr)
help.search("Petersen", package=c("FSAdata", "FSA"))	Petersen mark-recapture (closed population, single)
help.search("Schnabel", package=c("FSAdata", "FSA"))	Schnabel mark-recapture (closed population, multiple)
help.search("Jolly-Seber", package=c("FSAdata", "FSA"))	Jolly-Seber mark-recapture (open population, multiple)
help.search("Depletion", package=c("FSAdata", "FSA"))	Depletion (Leslie, DeLury) methods for estimating abundance
help.search("Removal", package=c("FSAdata", "FSA"))	Removal (K-pass) methods for estimating abundance
help.search("Mortality", package=c("FSAdata", "FSA"))	Data for mortality estimation.
help.search("Catch curve", package=c("FSAdata", "FSA"))	Catch curve.
help.search("Growth", package=c("FSAdata", "FSA"))	Growth model data.
help.search("Recruitment", package=c("FSAdata", "FSA"))	Stock-recruitment and recruitment time-series data
help.search("Maturity", package=c("FSAdata", "FSA"))	Maturity data.

Additional fisheries-related data sets are in the [FSA](#) and [fishmethods](#) packages.

FWDrumLE1

Ages and lengths of Lake Erie Freshwater Drum.

Description

Assigned ages (from scales) and measured total lengths for each of 1577 Freshwater Drum (*Aplodinotus grunniens*) from Lake Erie.

Format

A data frame with 1577 observations on the following 2 variables.

age Assigned ages (from scales).

tl Measured total lengths (mm).

Topic(s)

- Growth
- von Bertalanffy

Source

Simulated from Table 3 of Bur, M.T. 1984. Growth, reproduction, mortality, distribution, and biomass of freshwater drum in Lake Erie. *Journal of Great Lakes Research*. 10:48-58.

See Also

[FWDrumLE2](#).

Examples

```
data(FWDrumLE1)
str(FWDrumLE1)
head(FWDrumLE1)
plot(tl~age,data=FWDrumLE1)
```

FWDrumLE2	<i>Ages (subsample) and lengths (all fish) for Freshwater Drum from Lake Erie.</i>
-----------	--

Description

A total of 253 fish dispersed proportionately over 10-mm total length intervals from the [FWDrumLE1](#) data frame was obtained for age assignment. The remaining fish in the file were only measured for length (i.e., the ages were deleted). This data file can be used to demonstrate the use of age-length keys.

Format

A data frame with 1577 observations on the following 2 variables.

age Assigned ages (from scales).

tl Measured total lengths (mm).

Topic(s)

- Age-Length Key

See Also

[FWDrumLE1](#).

Examples

```
data(FWDrumLE2)
str(FWDrumLE2)
head(FWDrumLE2)
## Extract the aged sample
FWD.aged <- subset(FWDrumLE2,!is.na(age))
str(FWD.aged)
## Extract the length sample
FWD.length <- subset(FWDrumLE2,is.na(age))
str(FWD.length)
```

Ghats

Species accumulation data for fish of the Western Ghats of India.

Description

Species accumulation data for fish of the Western Ghats of India derived from nine random samples of publications.

Format

A data frame with 350 observations on the following 2 variables.

unit a manuscript that was reviewed.

cumspec cumulative number of species described in the reviewed manuscripts.

Topic(s)

- Other

Source

From (approximately) Figure 1 in Dahanukar, N., R. Raut, and A. Bhat. 2004. Distribution, endemism and threat status of freshwater fishes in the Western Ghats of India. *Journal of Biogeography* 31:123-126.

Examples

```
data(Ghats)
str(Ghats)
head(Ghats)
plot(cumspec~unit,data=Ghats)
```

GreensCreekMine

Catches in removal events of Coho Salmon and Dolly Varden Char at various locations near the Greens Creek (AK) Mine site.

Description

Catches in removal events of Coho Salmon (*Oncorhynchus kisutch*) and Dolly Varden Char (*Salvelinus malma*) at various locations near the Greens Creek (AK) Mine site.

Format

A data frame of 66 observations on the following 8 variables:

location Sampling location.

year Sampling year.

species Species (Coho.Salmon or Dolly.Varden).

set1 Catch on the first removal pass.

set2 Catch on the second removal pass.

set3 Catch on the third removal pass.

min.FL Minimum observed fork length.

max.FL Maximum observed fork length.

Details

Reaches were isolated by natural features, such as shallow riffles. The sample reaches were saturated with 6.35 mm (0.25 in) minnow traps baited with whirl packs containing disinfected salmon eggs. The traps were deployed for 1.5 h and then retrieved where each fish was transferred into a plastic bucket, and the trap was re-baited and re-set for another 1.5 h soak. In between trapping events, fish were processed – measured and recorded FL to the nearest 1 mm, weight to the nearest 0.1 g, and species identified. Captured fish were retained during the sample period and returned alive after all three passes were complete.

Topic(s)

- Population size
- Abundance
- Removal

Source

From Appendix C1 of Kanouse, K.M. and B.P. Brewster. 2012. Aquatic Biomonitoring at Greens Creek Mine, 2012. Alaska Department of Fish and Game Technical Report No. 12-11. [Was (is?) from <http://dnr.alaska.gov/mlw/mining/largemine/greencreek/pdf/gc2012bio.pdf>.]

Examples

```
data(GreensCreekMine)
str(GreensCreekMine)
head(GreensCreekMine)
```

```
## extract data for one location, year, and species (e.g., 3rd row)
GreensCreekMine[3,]
```

Hake	<i>Stock and recruitment data for Hake, 1982-1996.</i>
------	--

Description

Stock and recruitment data for Hake (*Merluccius merluccius*), 1982-1996.

Format

A data frame with 15 observations on the following 3 variables.

year a numeric vector of years 1982-1996

recruits a numeric vector of the number of recruits in millions

spawn.biomass a numeric vector of spawning biomass in thousand tonnes

Topic(s)

- Stock-Recruit
- Recruitment

Source

Cadima, E. 2003. Fish Stock Assessment Manual, FAO Fisheries Department. 131 pp.

Examples

```
data(Hake)
str(Hake)
head(Hake)
op <- par(mfrow=c(1,2),pch=19)
plot(recruits~year,data=Hake,type="l")
plot(recruits~spawn.biomass,data=Hake)
par(op)
```

HalibutPAC	<i>Stock and recruitment data for Pacific Halibut, 1929-1991.</i>
------------	---

Description

Pacific Halibut (*Hippoglossus stenolepis*) stock, recruitment, landings, and fishing mortality by year, 1929-1991.

Format

A data frame of 63 observations on the following 5 variables:

year Year of data
ssb Spawning stock biomass (tonnes)
rec Recruits (thousands)
land Landings (in millions of pounds)
fmort Fishing related mortality

Topic(s)

- Stock-Recruit
- Recruitment

Source

From Anonymous. 1989. International Pacific Halibut Commission. Annual Report 1989.; Myhre, Gordon, Peltonen, Stpierre, Skud, and Walden. International Pacific halibut Commission. Technical Report No. 14.; Pers. Comm. with Pat Sullivan. Obtained from Ransom Myers online database which was (is?) at <http://ram.biology.dal.ca/~myers/data.html>.

Examples

```
data(HalibutPAC)
str(HalibutPAC)
head(HalibutPAC)
op <- par(mfrow=c(1,2),pch=19)
plot(rec~year,data=HalibutPAC,type="l")
plot(rec~ssb,data=HalibutPAC)
par(op)
```

Herman

Lengths for Walleye, Yellow Perch, Black Crappie, and Black Bullheads from Lake Herman, SD.

Description

Total lengths of Walleye (*Sander vitreus*), Yellow Perch (*Perca flavescens*), Black Crappie (*Pomoxis nigromaculatus*), and Black Bullheads (*Ameiurus melas*) for four years in Lake Herman, SD.

Format

A data frame of 5931 observations on the following 3 variables:

tl Total lengths (cm).
spec Species codes (wae=walleye, yep=yellow perch, bkc=black crappie, and bbh=black bullhead).
yr Capture years.

Details

Lake Herman was sampled on June 20-22, 2005 with four overnight gillnet sets and 10 overnight trapnet sets. The trapnets were constructed with 19-mm (0.75 in) bar-mesh netting, 0.9 m high x 1.5 m wide (3 ft high x 5 ft wide) frames and 18.3 m (60 ft) long leads. The gillnets were 45.7 m long x 1.8 m deep (150 ft long x 6 ft deep) with one 7.6 m (25 ft) panel each of 13, 19, 25, 32, 38 and 51-mm (0.5, 0.75, 1, 1.25, 1.5, and 2 in) bar-mesh monofilament netting.

Topic(s)

- Length Frequency
- Size Structure
- PSD

Source

From a South Dakota Fish and Game report that was (does not appear to be there (or anywhere) now) at <http://www.sdgifp.info/Wildlife/fishing/SELakes/Herman05.pdf>.

Examples

```
data(Herman)
str(Herman)
head(Herman)
op <- par(mfrow=c(2,2),pch=19)
### Four (of 16 possible) examples
with(subset(Herman,spec=="bbh" & yr==2003),hist(tl,main="Black Bullhead, 2003"))
with(subset(Herman,spec=="bkc" & yr==2001),hist(tl,main="Black Crappie, 2001"))
with(subset(Herman,spec=="yep" & yr==2003),hist(tl,main="Yellow Perch, 2003"))
with(subset(Herman,spec=="wae" & yr==1999),hist(tl,main="Walleye, 1999"))
par(op)
```

HerringBWE

Stock and recruitment data for Blackwater Estuary Herring, 1962-1997.

Description

Stock and recruitment data for Blackwater Estuary Herring (*Clupea harengus*), 1962-1997 spawning years.

Format

A data frame with 36 observations on the following 3 variables.

spawning.year a numeric vector of spawning years

ssb a numeric vector giving biomass of spawning fish

recruits a numeric vector containing the number of recruits

Topic(s)

- Stock-Recruit
- Recruitment

Source

From Fox, C.J. 2001. Recent trends in stock-recruitment of Blackwater herring (*Clupea harengus* L.) in relation to larval production. ICES Journal of Marine Science, 58:750-762.

Examples

```
data(HerringBWE)
str(HerringBWE)
head(HerringBWE)
op <- par(mfrow=c(1,2))
plot(recruits~spawning.year,data=HerringBWE,type="l")
plot(recruits~ssb,data=HerringBWE)
par(op)
```

HerringISS

Stock and recruitment data for Icelandic summer spawning Herring, 1946-1996.

Description

Icelandic summer spawning Herring (*Clupeaformis harengus*) stock, recruitment, landings, and fishing mortality by year, 1946-1996.

Format

A data frame of 51 observations on the following 6 variables:

- year** Year of data
- ssb** Spawning stock biomass (tonnes)
- rec** Recruits – i.e., 1-year olds (thousands)
- land** Landings (in millions of pounds)
- fmort** Fishing related mortality

Topic(s)

- Stock-Recruit
- Recruitment

Source

From the Report of the Atlanto-Scandian Herring and Capelin Working Group. ICES Doc. C.M. 1995. Assess: 9.; Anon. 1986. Report of the herring assessment working group for the area south of 62 degrees N. ICES Doc. C.M. 1986. Assess: 19.; Anon. 1991. Report of the Atlanto-Scandian Herring and Capelin Working Group. ICES Doc. C.M. 1991. Assess: 17.; State of marine stocks and environmental conditions in Icelandic waters 1989 Fishing prospects 1990, August 1990. Hafrannsóknastofnun Fjölrit NR. 19. Marine Research Institute, Iceland. Mon Jun 20, 1988.; Report of the Northern Pelagic and Blue Whiting Fisheries Working Group. ICES Doc. C.M. 1997. Assess:14. Obtained from Ransom Myers online database which was (is?) at <http://ram.biology.dal.ca/~myers/data.html>.

Examples

```
data(HerringISS)
str(HerringISS)
head(HerringISS)
op <- par(mfrow=c(1,2))
plot(rec~year,data=HerringISS,type="l")
plot(rec~ssb,data=HerringISS)
par(op)
```

HumpbackWFCR

Capture histories (2 sample) of Humpback Whitefish.

Description

Capture histories for Humpback Whitefish (*Coregonus pidschian*) greater than 360 mm in the Chatanika River, AK in 2012.

Format

A data frame with 1920 observations on the following 4 variables:

sectMrun Section where the fish was captured on the marking run

Mrun Indicator variable for the marking run (1=captured)

Rrun Indicator variable for the recapture run (1=captured)

sectRrun Section where the fish was captured on the recapture run

Topic(s)

- Population Size
- Abundance
- Mark-Recapture
- Capture-Recapture
- Petersen
- Capture History

Source

From Table 10 in Gryska, A.D. 2014. Stock assessment of humpback whitefish in the Chatanika River, 2012. Alaska Department of Fish and Game, Fishery Data Series No. 14-12, Anchorage. Was (is?) at <https://www.cf.adfg.state.ak.us/FedAidPDFs/FDS14-12.pdf>.

Examples

```
data(HumpbackWFCR)
str(HumpbackWFCR)
head(HumpbackWFCR)
```

InchLake1

Lengths for all fish captured in Inch Lake, WI, in two years

Description

Total lengths of all fish captured in Inch Lake, WI in May, 2007 and May, 2008.

Format

A data frame of 4894 observations on the following 5 variables:

netID A unique identifier for the sampling event

netType gear used (angling, seine, miniWDNR fyke net, miniNC fyke net, regular fyke net)

year year of capture

species species name

length total length (inches to nearest 0.1)

Topic(s)

- Length Frequency
- PSD
- Size Structure

Source

Derek H. Ogle, personal collection

See Also

See [InchLake2](#) for a subsample that include weights.

Examples

```
data(InchLake1)
str(InchLake1)
head(InchLake1)

## Isolate just Bluegills
bg.il <- subset(InchLake1,species=="Bluegill")

## Isolate just largemouth bass from 2007
lmb7.il <- subset(InchLake1,species=="Largemouth Bass" & year==2007)

## Isolate all fish captured in seines
seine.il <- subset(InchLake1,netType=="seine")
```

InchLake2

Lengths and weights for fish captured in Inch Lake

Description

Total lengths and weights for a subsample of fish captured in Inch Lake, WI in May, 2007 and May, 2008.

Format

A data frame of 516 observations on the following 6 variables:

netID A unique identifier for the sampling event

fishID A unique identifier for the individual fish

species Species name

length Total length (inches to nearest 0.1)

weight Wet weight (grams to nearest 0.1)

year Year of capture

Topic(s)

- Weight-Length
- Condition
- Length Frequency

Source

Derek H. Ogle, personal collection

See Also

See [InchLake1](#) for the entire sample, but without weights.

Examples

```
data(InchLake2)
str(InchLake2)
head(InchLake2)

## Isolate just Bluegills
bg.il <- subset(InchLake2,species=="Bluegill")

## Isolate just largemouth bass from 2007
lmb7.il <- subset(InchLake2,species=="Largemouth Bass" & year==2007)
```

JobfishSIO

Catch and effort data for South Indian Ocean Jobfish.

Description

Catch and effort data for Jobfish (*Pristipomoides filamentosus*) from the South Indian Ocean.

Format

A data frame with 13 observations on the following 2 variables.

catch Catches (kg).

effort Effort (man-hours).

Topic(s)

- Population size
- Abundance
- Depletion methods
- Leslie method
- DeLury method
- Catchability

Source

From Table 2 of Grandcourt, E.M. 2003. The effect of intensive line fishing on the virgin biomass of a tropical deepwater snapper, the crimson jobfish (*Pristipomoides filamentosus*). Fisheries Bulletin, 101:305-311. [Was (is?) from <http://fishbull.noaa.gov/1012/08grandc.pdf>.]

Examples

```
data(JobfishSIO)
str(JobfishSIO)
head(JobfishSIO)
```

JonesStockwell	<i>Catches in removal events of Brown and Rainbow Trout at various locations.</i>
----------------	---

Description

Catches of Brown (*Salmo trutta*) and Rainbow Trout (*Oncorhynchus mykiss*) in consecutive removal events at various locations.

Format

A data frame of 40 observations on the following 10 variables:

species Species of trout (brown or rainbow).

site Site in the watershed. See source.

age0 Logical is TRUE if age=0 and FALSE if age is >0.

first Catch on the first removal pass.

second Catch on the second removal pass.

third Catch on the third removal pass.

pop.cs Population estimate by Carle-Strub method.

pop.sch Population estimate by Schnute method.

q.cons Logical is TRUE if catchability was constant.

rejected Logical is TRUE if Schnute method rejected the population estimate because the standard error was too large.

Topic(s)

- Population size
- Abundance
- Removal

Source

From Table 1 in Jones, M.L. and J.D. Stockwell. 1995. A rapid assessment procedure for enumeration of salmonine populations in streams. North American Journal of Fisheries Management, 15:551-562.

Examples

```
data(JonesStockwell)
str(JonesStockwell)
head(JonesStockwell)
```

```
## extract data for one species, age, and site (e.g., 3rd row)
JonesStockwell[3,]
```

Jonubi1

Ages and lengths of male Jonubi.

Description

Assigned ages and measured fork lengths for male Jonubi (*Chalcalburnus mossulensis*) from the Karasu River (Turkey).

Format

A data frame with 410 observations on the following 2 variables:

fl Fork lengths (cm).

age Assigned ages (years).

Topic(s)

- Growth
- von Bertalanffy

Source

Simulated from table 2 of Yildirim, A., H.U. Haluloulu, M. Turkmen, and O. Erdouan. 2003. Age and growth characteristics of *Chalcalburnus mossulensis* (Heckel, 1843) living in Karasu River (Erzurum-Turkey). Turkish Journal of Veterinary and Animal Science. 27: 1091-1096.

See Also

[Jonubi2.](#)

Examples

```
data(Jonubi1)
str(Jonubi1)
head(Jonubi1)
plot(fl~age,data=Jonubi1)
```

Jonubi2

Ages (subsample) and lengths (all fish) of Jonubi.

Description

Ages (subsample) and lengths (all fish) for Jonubi (*Chalcalburnus mossulensis*).

Format

A data frame with 410 observations on the following 2 variables.

fl Fork length (cm) measurements

age Assigned ages (years)

Details

A total of 50 fish dispersed proportionately over 1-cm fork length intervals from the [Jonubi1](#) data frame was obtained for age assignment. The remaining fish in the file were only measured for length (i.e., the ages were deleted). This data file can be used to demonstrate the use of age-length keys.

Topic(s)

- Age-Length Key

See Also

[Jonubi1](#).

Examples

```
data(Jonubi2)
str(Jonubi2)
head(Jonubi2)
plot(fl~age,data=Jonubi2)
```

KingCrabAK

Stock and recruitment data for Red King Crab in Alaska, 1960-2004.

Description

Stock and recruitment data for Red King Crab (*Paralithodes camtschaticus*) from the northern Gulf of Alaska around Kodiak Island by brood year, 1960-2004.

Format

A data frame of 44 observations on the following 3 variables:

year Brood year (1960-2004)

recruits abundance (thousands) of male recruits (≥ 125 mm and < 145 mm)

adults abundance (thousands) legal (≥ 145 mm carapace length) males

Topic(s)

- Stock-Recruit
- Recruitment

Source

From table 1 in Bechtol W.R. and G.H. Kruse. 2009. Analysis of a stock-recruit relationship for Red King Crab off Kodiak Island Alaska. *Marine and Coastal Fisheries: Dynamics Management and Ecosystem Science* 1:29-44.

Examples

```
data(KingCrabAK)
str(KingCrabAK)
head(KingCrabAK)
op <- par(mfrow=c(1,2),pch=19)
plot(recruits~year,data=KingCrabAK,type="l")
plot(recruits~adults,data=KingCrabAK)
par(op)
```

LakeTroutALTER

Biological data for Lake Trout from the Arctic LTER (AK).

Description

Biological data (lengths, weight, age, and sex) of Lake Trout (*Salvelinus namaycush*) sampled from Lake NE12 of the Arctic Long Term Ecological Research location.

Format

A data frame of 86 observations on the following 6 variables:

id A unique identification number.

tl Total Length (nearest mm) at capture.

fl Fork Length (nearest mm) at capture.

sl Standard Length (nearest mm) at capture.

w Weight (nearest g) at capture.

otorad Total otolith radius (mm) at capture.

age Age (completed growing seasons) at capture.

sex Sex of the fish (F=female and M=male).

Details

Lake trout were removed from Lake NE12 in the summers of 1986, 1988, and 1989 using five-panel experimental gill nets (mesh size of 0.75, 1, 1.5, 2, and 2.5 inches). Lengths, weights, and sex were recorded from the fish while otoliths, and if possible, stomachs and gonads were removed for future analysis. A check was performed on several otoliths by an independent colleague and prevents introduction of bias due to familiarity with the samples. The original file was “cleaned” in the following ways:

1. Only Lake Trout were kept in the data file.
2. All unknown sex fish were removed.
3. Fish with missing data (length, weight, age, or sex) were removed.
4. Decimals were removed from the ages.
5. The unique IDs for fish from 1989 were changed to start at 500.
6. The weight of fish number 509 was changed from 100 to 1100.

Topic(s)

- Length Frequency
- Weight-Length
- Length Conversion
- Growth
- von Bertalanffy
- Size Structure

Source

Was (does not appear to be available there now) from <http://ecosystems.mbl.edu/ARC/lakes/fish/89mcne12.html>.
It seems like it should still be available from the Arctic LTER site at <http://ecosystems.mbl.edu/ARC/lakes/fish/index.shtml>.

Examples

```
data(LakeTroutALTER)
str(LakeTroutALTER)
head(LakeTroutALTER)
op <- par(mfrow=c(2,2),pch=19)
## Four (of many possible) examples
hist(LakeTroutALTER$t1,main="")
plot(w~t1,data=LakeTroutALTER)
plot(t1~f1,data=LakeTroutALTER)
plot(t1~age,data=LakeTroutALTER)
par(op)
```

LakeTroutEggs *Length and egg deposition of Lake Superior Lake Trout.*

Description

Length and egg deposition of Lake Superior Lake Trout (*Salvelinus namaycush*).

Format

A data frame of 101 observations on the following 2 variables:

tl Total length (mm) of an individual fish.

eggs Estimated number of eggs.

Topic(s)

- Other

Source

From (approximately) Figure 2 of Schram, S.T. 1993. Fecundity and egg deposition of a wild Lake Superior Lake Trout stock. Wisconsin Department of Natural Resources, Fisheries Management Report no. 149.

Examples

```
data(LakeTroutEggs)
str(LakeTroutEggs)
head(LakeTroutEggs)
plot(eggs~tl, data=LakeTroutEggs)
```

LakeTroutGIS *Stock and recruitment data for Lake Trout from Gull Island Shoal, Lake Superior, 1964-1991.*

Description

Lake trout (*Salvelinus namaycush*) stock and recruitment by year at Gull Island Shoal, Lake Superior, 1964-1991.

Format

A data frame of 28 observations on the following 3 variables:

year Year of data

stock Mean CPE of adult female Lake Trout per 1000 m of gillnet captured in fall spawning surveys

recruits Recruits (number of age-0 fish per ha) captured the following fall in bottom trawls

Topic(s)

- Stock-Recruit
- Recruitment

Source

From Schram, S.T., J.H. Selgeby, C.R. Bronte, and B.L. Swanson. 1995. Population recovery and natural recruitment of Lake Trout at Gull Island Shoal, Lake Superior, 1964-1992. *Journal of Great Lakes Research*. 21(supp.1):225-232. Obtained from Ransom Myers online database which was (is?) at <http://ram.biology.dal.ca/~myers/data.html>.

Examples

```
data(LakeTroutGIS)
str(LakeTroutGIS)
head(LakeTroutGIS)
op <- par(mfrow=c(1,2))
plot(recruits~year,data=LakeTroutGIS,type="l")
plot(recruits~stock,data=LakeTroutGIS)
par(op)
```

 LakeTroutMI

Stock and recruitment data for Lake Trout in Lake Superior, 1971-1991.

Description

Stock and recruitment data for the 1971-1991 year-classes of Lake Trout (*Salvelinus namaycush*) in Michigan waters of Lake Superior.

Format

A data frame of 105 observations on the following 5 variables:

year Year of data

recruits Recruit index – geometric mean number of age-7 fish/km/net-night

wild Wild fish spawning stock index – geometric mean number of wild age-8 and older fish/km/net-night

stocked Stocked fish spawning stock index – geometric mean number of stocked age-8 and older fish/km/net-night

area Lake Superior management unit

Topic(s)

- Stock-Recruit
- Recruitment

Source

From (approximately) figures in Richards, J.M., M.J. Hansen, C.R. Bronte, and S.P. Sitar. 2004. Recruitment dynamics of the 1971-1991 year-classes of Lake Trout in Michigan waters of Lake Superior. *North American Journal of Fisheries Management*. 24:475-489.

Examples

```
data(LakeTroutMI)
LakeTroutMI$stock <- LakeTroutMI$wild+LakeTroutMI$stocked
str(LakeTroutMI)
head(LakeTroutMI)
op <- par(mfrow=c(3,2),pch=19)
plot(recruits~year,data=LakeTroutMI,subset=area=="MI3",type="l",ylim=c(0,max(recruits,na.rm=TRUE)))
lines(recruits~year,data=LakeTroutMI,subset=area=="MI4",col="blue")
lines(recruits~year,data=LakeTroutMI,subset=area=="MI5",col="green")
lines(recruits~year,data=LakeTroutMI,subset=area=="MI6",col="red")
lines(recruits~year,data=LakeTroutMI,subset=area=="MI7",col="yellow")
plot(recruits~stock,data=LakeTroutMI,subset=area=="MI3",main="MI3")
plot(recruits~stock,data=LakeTroutMI,subset=area=="MI4",col="blue",main="MI4")
plot(recruits~stock,data=LakeTroutMI,subset=area=="MI5",col="green",main="MI5")
plot(recruits~stock,data=LakeTroutMI,subset=area=="MI6",col="red",main="MI6")
plot(recruits~stock,data=LakeTroutMI,subset=area=="MI7",col="yellow",main="MI7")
par(op)
```

Lizardfish

Stock and recruitment data for Greater Lizardfish, 1955-1964.

Description

Greater Lizardfish (*Saurida tumbil*) stock and recruitment by year, 1955-1964.

Format

A data frame of 10 observations on the following 6 variables:

year Year of data

stock Spawning stock (in ten thousands)

recruits Recruits (in hundred thousands)

Topic(s)

- Stock-Recruit
- Recruitment

Source

Visually estimated from Figure 7.12 (p. 267) of Hilborn, R. and C.J. Walters. 1992. Quantitative Fisheries Stock Assessment: Choice, Dynamics, and Uncertainty. Chapman and Hall, New York. 570 p.

Examples

```
data(Lizardfish)
str(Lizardfish)
head(Lizardfish)
op <- par(mfrow=c(1,2))
plot(recruits~year,data=Lizardfish,type="l")
plot(recruits~stock,data=Lizardfish)
par(op)
```

LJCisco

Ages and lengths of Longjaw Cisco from two locations in Lake Michigan.

Description

Assigned age (by scales) and total length of Longjaw Cisco (*Leucichthys alpenae*) captured at two locations in Lake Michigan.

Format

A data frame with 378 observations on the following 3 variables.

age Assigned age (by scales).

tl Measured total length (mm).

loc Capture location (NE=northeast and S=south).

Topic(s)

- Growth
- von Bertalanffy

Source

Simulated from age-length data provided in tables 2 and 3 of Jobes, F.W. 1946. The age, growth, and distribution of the longjaw cisco, *Leucichthys alpenae* Koelz, in Lake Michigan. Transactions of the American Fisheries Society. 76:215-247.

Examples

```
data(LJCisco)
str(LJCisco)
head(LJCisco)
op <- par(mfrow=c(1,2))
plot(tl~age,data=LJCisco,subset=loc=="NE",main="northeast")
plot(tl~age,data=LJCisco,subset=loc=="S",main="south")
par(op)
```

LMBassBL

Lengths for Largemouth Bass from Boomer Lake, OK.

Description

Length measurements of Largemouth Bass (*Micropterus salmoides*) from Boomer Lake, Oklahoma, in 1974.

Format

A data frame of 447 observations on the following 1 variable:

tl measured total length (cm)

Topic(s)

- Length Frequency
- Size Structure
- PSD

Source

From McNew, R.W. and R.C. Summerfelt. 1978. Evaluation of a maximum-likelihood estimator for analysis of length-frequency distributions. Transactions of the American Fisheries Society 107:730-736. Data was simulated (uniform distribution of values within length bin) from summarized length frequencies in <http://fishbase.org/>.

Examples

```
data(LMBassBL)
str(LMBassBL)
head(LMBassBL)
hist(LMBassBL$tl,main="")
```

LMBassLCB

Lengths for Largemouth Bass from Lake Carl Blackwell, OK.

Description

Lengths for Largemouth Bass (*Micropterus salmoides*) from Lake Carl Blackwell, Oklahoma, in 1973.

Format

A data frame of 289 observations on the following variable:

tl Measured total length (cm).

Topic(s)

- Length Frequency
- Size Structure
- PSD

Source

From McNew, R.W. and R.C. Summerfelt. 1978. Evaluation of a maximum-likelihood estimator for analysis of length-frequency distributions. Transactions of the American Fisheries Society 107:730-736. Data was simulated (uniform distribution of values within length bin) from summarized length frequencies in <http://fishbase.org/>.

Examples

```
data(LMBassLCB)
str(LMBassLCB)
head(LMBassLCB)
hist(LMBassLCB$tl, main="")
```

LobsterHI

Catch and effort data for Hawaiian Islands Slipper Lobster.

Description

Catches of Slipper Lobster (*Scyllarides squammosus*) in three categories from the vicinity of Laysan Bank, Hawaiian Islands on 34 consecutive days in 1986.

Format

A data frame with 34 observations on the following 6 variables.

day Day of the catch

legal Number of legal lobsters caught.

sublegal Number of sub-legal lobsters caught.

berried Number of egg-bearing lobsters caught.

total Total number of lobsters caught.

effort Total daily effort expended.

Details

Catch (numbers) of lobster in three categories - legal (tail weight greater than 85g), sublegal (tail weight less than 85g), and berried (egg-bearing females). Sublegal and berried lobsters were returned to the water.

The vessel fished between 11 June and 14 July 1986 in the vicinity of Laysan Island and its associated bank. The daily operations of the vessel involved deploying and hauling 1,125 Fathom Plus lobster traps set in strings spaced at 30 m intervals. They were fished in 7 strings of about 160 traps each and baited with Pacific Mackerel, *Scomber japonicus*. Strings were soaked overnight and retrieved the following day; therefore, the standard unit of effort is the trap-haul.

Topic(s)

- Population size
- Abundance
- Depletion methods
- Leslie method
- DeLury method
- Catchability

Source

From Table 1 of Clarke, R.P., and S.S. Yoshimoto. 1990. Application of the Leslie model to commercial catch and effort of the slipper lobster, *Scyllarides squammosus*, fishery in the northwestern hawaiian islands. Marine Fisheries Review, 52(2):1-7.

Examples

```
data(LobsterHI)
str(LobsterHI)
head(LobsterHI)
```

LobsterPEI

Catch and effort data for Prince Edward Island Lobster.

Description

Catch and effort data for Lobster from 33 days in 1944 from the Tignish area of Prince Edward Island.

Format

A data frame with 34 observations on the following 3 variables.

day Day of the catch. Day 1 is 2-May-1944.

catch Catch of Lobster in 1000s of pounds.

effort Total daily effort expended in 1000s of traps.

Details

Catch (1000s of pounds) and effort (1000s of traps) of Lobster from 33 days in 1944 from the Tignish area of Prince Edward Island. The data start on 2-May. These data are from DeLury (1947) who used the data after 22-May (i.e., day 16) to illustrate his depletion method. The data were also used in Example 7.1 of Seber (2002). DeLury (1947) noted that the weight of Lobster did not change appreciably over time so that the poundage caught is a reasonable surrogate for numbers caught.

Topic(s)

- Population size
- Abundance
- Depletion methods
- Leslie method
- DeLury method
- Catchability

Source

From Table 1 of DeLury, D.B. 1947. On the estimation of biological populations. *Biometrics* 3:145-167.

Examples

```
data(LobsterPEI)
str(LobsterPEI)
head(LobsterPEI)
```

Menhaden1

*Catch-at-age for Gulf Menhaden, 1964-2004.***Description**

Estimated catch-at-age for Gulf Menhaden (*Brevoortia patronus*), 1964-2004 from the reduction fishery in the U.S. Gulf of Mexico.

Format

A data frame with 41 observations on the following 7 variables.

year Year of capture.

age0 Estimated catch (millions) of age-0 fish.

age1 Estimated catch (millions) of age-1 fish.

age2 Estimated catch (millions) of age-2 fish.

age3 Estimated catch (millions) of age-3 fish.

age4 Estimated catch (millions) of age-4 fish.

age5 Estimated catch (millions) of age-5 fish.

age6 Estimated catch (millions) of age-6 fish.

Topic(s)

- Mortality
- Catch curve

Source

From Table 2 in Vaughan, D.S., K.W. Shertzer, and J.W. Smith. 2007. Gulf menhaden (*Brevoortia patronus*) in the U.S. Gulf of Mexico: Fishery characteristics and biological reference points for management. *Fisheries Research* 83:263-275.

Examples

```
data(Menhaden1)
str(Menhaden1)
head(Menhaden1)
ages <- 0:6
# Extract one year, delete year column (the -1), and transpose to be a vector
ct <- t(Menhaden1[Menhaden1$year==1974,-1])
plot(ct~ages,pch=16,type="b",xlab="Age",ylab="Est. Catch (Millions)",main="year==1974")
```

Morwong1

Ages of Morwong assigned from otoliths by Reader A at two times.

Description

Ages assigned at two different times by Reader A to the otoliths of Jackass Morwong (*Nemadactylus macropterus*).

Format

A data frame with 217 paired observations on the following 2 variables.

first Ages assigned on the first reading

second Ages assigned on the second reading

Topic(s)

- Age Comparison
- Age Precision
- Age Bias
- Ageing Error

Source

From Table 5 of Restall, J.E., and K. Krusic-Golub. 2004. Development of jackass morwong age-length keys for 2000-2002. Final report to Australian Fisheries Management Authority. 13 pp. Primary Industries Research Victoria, Queenscliff. Was (is?) available at http://web-test.afma.gov.au/wp-content/uploads/2010/07/r03_1724b.pdf.

Examples

```
data(Morwong1)
str(Morwong1)
head(Morwong1)
plot(second~first, data=Morwong1)
xtabs(~first+second, data=Morwong1)
```

Morwong2

Ages of Morwong assigned from otoliths by Reader B at two times.

Description

Ages assigned at two different times by Reader B to the otoliths of Jackass Morwong (*Nemadactylus macropterus*).

Format

A data frame with 136 observations on the following 2 variables.

first Ages assigned on the first reading

second Ages assigned on the second reading

Topic(s)

- Age Comparison
- Age Precision
- Age Bias
- Ageing Error

Source

From Table 6 of Restall, J.E., and K. Krusic-Golub. 2004. Development of jackass morwong age-length keys for 2000-2002. Final report to Australian Fisheries Management Authority. 13 pp. Primary Industries Research Victoria, Queenscliff. Was (is?) available at http://web-test.afma.gov.au/wp-content/uploads/2010/07/r03_1724b.pdf.

Examples

```
data(Morwong2)
str(Morwong2)
head(Morwong2)
plot(second~first, data=Morwong2)
xtabs(~first+second, data=Morwong2)
```

Morwong3

Ages of Morwong assigned from otoliths by two readers.

Description

Ages assigned by two different readers to the otoliths of Jackass Morwong (*Nemadactylus macropterus*).

Format

A data frame with 58 paired observations on the following 2 variables.

readerA Ages assigned by Reader A

readerB Ages assigned by Reader B

Topic(s)

- Age Comparison
- Age Precision
- Age Bias
- Ageing Error

Source

From Table 7 of Restall, J.E., and K. Krusic-Golub. 2004. Development of jackass morwong age-length keys for 2000-2002. Final report to Australian Fisheries Management Authority. 13 pp. Primary Industries Research Victoria, Queenscliff. Was (is?) available at http://web-test.afma.gov.au/wp-content/uploads/2010/07/r03_1724b.pdf.

Examples

```
data(Morwong3)
str(Morwong3)
head(Morwong3)
plot(readerB~readerA,data=Morwong3)
with(Morwong3,table(readerA,readerB))
```

Morwong4

Ages and lengths of Morwong.

Description

Assigned ages (from otoliths) and fork lengths of Jackass Morwong (*Nemadactylus macropterus*) from the Eastern portion of the Southern and Eastern Scalefish and Shark Fishery (SESSF) in 2000.

Format

A data frame with 392 observations on the following 2 variables:

fl Measured fork lengths (cm).

age Assigned ages (from otoliths).

Topic(s)

- Growth
- von Bertalanffy

Source

From appendix 1 of Restall, J.E., and K. Krusic-Golub. 2004. Development of jackass morwong age-length keys for 2000-2002. Final report to Australian Fisheries Management Authority. 13 pp. Primary Industries Research Victoria, Queenscliff. Was (is?) available at http://web-test.afma.gov.au/wp-content/uploads/2010/07/r03_1724b.pdf.

See Also

[Morwong4a](#).

Examples

```
data(Morwong4)
str(Morwong4)
head(Morwong4)
plot(fl~age,data=Morwong4)
```

Morwong4a	<i>Ages (subsample) and lengths (all fish) for Morwong from Morwong4.</i>
-----------	---

Description

A total of 104 fish dispersed proportionately over 1-cm fork length intervals from the [Morwong4](#) data frame was obtained for age assignment. The remaining fish in the file were only measured for length (i.e., the ages were deleted). This data file can be used to demonstrate the use of age-length keys.

Format

A data frame with 392 observations on the following 2 variables.

fl Fork lengths (cm)

age Assigned ages

Topic(s)

- Age-Length Key

See Also

[Morwong4](#).

Examples

```
data(Morwong4a)
str(Morwong4a)
head(Morwong4a)

## extract aged sample
m4a.aged <- subset(Morwong4a,!is.na(age))
str(m4a.aged)

## extract length sample
m4a.length <- subset(Morwong4a,is.na(age))
str(m4a.length)
```

Mosquitofish	<i>Ages and lengths of Eastern Mosquitofish from ten locations from southern France to southern Spain.</i>
--------------	--

Description

Ages and lengths of Eastern Mosquitofish (*Gambusia holbrooki*) from ten locations from southern France to southern Spain.

Format

A data frame with the following 8 variables:

site Site (as a name) of capture.

sitenum Site (as a number) of capture.

day Day of capture.

month Month of capture.

year Year of capture.

sl Standard length (to nearest 0.01 cm).

age Age in integer years.

age2 Age in decimal years.

Topic(s)

- Growth
- Seasonal Growth
- von Bertalanffy
- Somers model

Source

From figure 3 of Carmona-Catot, G., A.F.G.N. Santos, P.A. Tedesco, and E. Garcia-Berthou. 2014. Quantifying seasonality along a latitudinal gradient: From stream temperature to growth of invasive mosquitofish. *Ecosphere* 5:134.

Examples

```
data(Mosquitofish)
str(Mosquitofish)
head(Mosquitofish)
plot(sl~age2,data=Mosquitofish)
```

MulletBS	<i>Ages of Red Mullet assigned from whole and broken-burnt otoliths.</i>
----------	--

Description

Ages assigned to whole and broken-burnt otoliths of Red Mullet (*Mullus barbatus ponticus*) sampled from the Black Sea (Samsun, Turkey).

Format

A data frame with 51 paired observations on the following 2 variables.

whole Ages assigned from whole otoliths

bb Ages assigned from broken/burnt otoliths

Topic(s)

- Age Comparison
- Age Precision
- Age Bias
- Ageing Error

Source

From Figure 3 of Polat, N., D. Bostanci, S. Yilmaz. 2005. Differences between whole otolith and broken-burnt otolith ages of red mullet (*Mullus barbatus ponticus* Essipov, 1927) sampled from the Black Sea (Samsun, Turkey). Turkish Journal of Veterinary and Animal Science 29:429-433.

Examples

```
data(MulletBS)
str(MulletBS)
head(MulletBS)
plot(whole~bb,data=MulletBS)
xtabs(~bb+whole,data=MulletBS)
```

MuskieSLR

Ages of Muskellunge assigned from scales and cleithra.

Description

Ages of St. Lawrence River, ONT, Muskellunge (*Esox masquinongy*) assessed from scales and cleithra.

Format

A data frame of 43 observations on the following 2 variables:

ageC Age assigned from examination of cleithrum

ageS Age assigned from examination of scales

Topic(s)

- Age Comparison
- Age Precision
- Age Bias
- Ageing Error

Source

From Figure 3 in Casselman, J.M. 1983. Age and growth assessment of fish from their calcified structures - techniques and tools. In E.D. Prince and L.M. Pulos, editors, Proceedings of the international workshop on age determination of oceanic pelagic fishes: Tunas, billfishes, and sharks, volume NOAA Technical Report, NMFS 8:1-17.

Examples

```
data(MuskieSLR)
str(MuskieSLR)
head(MuskieSLR)
plot(ageS~ageC, data=MuskieSLR)
xtabs(~ageC+ageS, data=MuskieSLR)
```

MuskieWI06MR

Summarized mark-recapture data for Muskellunge from many Wisconsin Lakes, 2006.

Description

The number of Muskellunge (*Esox masquinongy*) from a variety of lakes in Wisconsin, 2006.

Format

A data frame with 40 observations on the following 7 variables.

county County of the collection

lake Lake of the collection

sex Sex of the Muskellunge (male, female, unknown, total)

mark Total number of fish marked on the marking run

catch Total number of fish caught on the recapture run

recap Total number of previously marked fish in the recapture run

Topic(s)

- Population Size
- Abundance
- Mark-Recapture
- Capture-Recapture
- Petersen

Source

Wisconsin Department of Natural Resources.

Examples

```
data(MuskieWI06MR)
str(MuskieWI06MR)
head(MuskieWI06MR)
```

Pallid *Lengths and weights for Pallid Sturgeon from four locations in the Missouri River.*

Description

Lengths (standard, fork, and total) and weights for Pallid Sturgeon (*Scaphirhynchus albus*) collected at four locations in the Missouri River drainage.

Format

A data frame with 30 observations on the following 7 variables:

date Date of collection

sl Standard length (mm)

fl Fork length (mm)

tl Total length (mm)

w Weight (g)

status Living status of fish at time of collection (Frozen, Live, Dead).

loc Location of fish collection (NB=Nebraska, SD=South Dakota, ND=North Dakota, MT=Montana)

Topic(s)

- Weight-Length
- Length Conversion

Source

From Table 1 in Keenlyne, K.D. and S.J. Maxwell. 1993. Length conversions and length-weight relations for pallid sturgeon. *North American Journal of Fisheries Management*. 13:395-397.

Examples

```
data(Pallid)
str(Pallid)
head(Pallid)
op <- par(mfrow=c(2,2),pch=19)
## four (of many possible) examples
plot(w~tl,data=Pallid,subset=loc=="NB",main="Nebraska")
plot(w~tl,data=Pallid,subset=loc=="SD",main="South Dakota")
plot(w~tl,data=Pallid,subset=loc=="ND",main="North Dakota")
plot(w~tl,data=Pallid,subset=loc=="MT",main="Montana")
par(op)
```

Pathfinder

Catch and effort for three Snapper species in a depletion experiment.

Description

Catch and effort for three Snapper species (*Pristipomoides zonatus*, *Pristipomoides auricilla*, and *Etelis carbunculus*) in a depletion experiment around Pathfinder Reef in the Mariana Archipelago.

Format

A data frame with 13 observations on the following 5 variables.

date Date (1984)

effort Fishing effort (line-hours of a bottom hand-line)

Pzonatus Catch of *Pristipomoides zonatus*

Paucilla Catch of *Pristipomoides auricilla*

Ecarbunculus Catch of *Etelis carbunculus*

Topic(s)

- Depletion methods
- Leslie method
- DeLury method
- Population size
- Abundance
- Catchability

Source

From Table 3 of Polovina, J.J. 1985. A variable catchability version of the Leslie model with application to an intensive fishing experiment on a multispecies stock. Fishery Bulletin 84:423-428. [Was (is?) from <https://swfsc.noaa.gov/publications/CR/1986/8679.PDF>.]

Examples

```
data(Pathfinder)
str(Pathfinder)
head(Pathfinder)
```

PikeHL

Capture histories (2 samples) of Northern Pike from Harding Lake.

Description

Capture histories for Northern Pike (*Esox lucius*) captured from Harding Lake, 1990.

Format

A data frame with 481 observations on the following 3 variables.

fish a numeric vector of unique fish identification numbers

first a numeric vector of indicator variables for the first sample (1=captured)

second a numeric vector of indicator variables for the second sample (1=captured)

Topic(s)

- Population Size
- Abundance
- Mark-Recapture
- Capture-Recapture
- Petersen
- Capture History

Note

Only Northern Pike >449 mm were considered here.

Source

Capture histories simulated from summarized data in table 2 and text of Burkholder, A. 1991. Abundance and composition of northern pike, Harding Lake, 1990. Fishery Data Series 91-9, Alaska Department of Fish and Game. Was (is?) from <http://www.sf.adfg.state.ak.us/FedAidpdfs/Fds91-09.pdf>

Examples

```
data(PikeHL)
str(PikeHL)
head(PikeHL)
```

PikeIL

Catch and effort data for Northern Pike from Island Lake, NB.

Description

Catch and effort data for nine removal events of Northern Pike (*Esox lucius*) from Island Lake, NB.

Format

A data frame with 9 observations on the following 3 variables:

date Capture date.

nets Number of fyke nets fished on that date.

catch Number of captured and removed pike.

Topic(s)

- Depletion methods
- Leslie method
- DeLury method
- Population size
- Abundance
- Catchability

Source

From Table 1 of Peterson, J., M. Taylor, and A. Hanson. 1980. Leslie population estimate for a large lake. Transactions of the American Fisheries Society, 109:329-331.

Examples

```
data(PikeIL)
str(PikeIL)
head(PikeIL)
```

PikeNYPartial2

Capture histories (4 samples) of a subset of Northern Pike from Buckthorn Marsh.

Description

Capture histories (4 samples), in capture-by-date format, of a subset of Northern Pike from Buckthorn Marsh.

Format

A data frame with 69 observations on the following 2 variables.

sample Name of the sample taken

id Unique fish identification numbers

Details

Each line consists of the date and unique fish identification number over four samples of northern pike (*Esox lucius*) in Buckthorn Marsh. This file contains the capture histories for only those pike captured from April 1-4.

Topic(s)

- Population Size
- Abundance
- Mark-Recapture
- Capture-Recapture
- Schnabel
- Schumacher-Eschmeyer
- Capture History

Source

Simulated from summary data in Table C-1 of New York Power Authority. 2004. Use of Buckhorn Marsh and Grand Island tributaries by Northern Pike for spawning and as a nursery. Technical report, New York Power Authority, January 2004. Niagara Power Project (FERC No. 2216).

Examples

```
data(PikeNYPartial2)
str(PikeNYPartial2)
head(PikeNYPartial2)
```

PikeWindermere *Stock and recruitment data for Northern Pike from Lake Windermere, 1944-1981.*

Description

Stock and recruitment data for Northern Pike (*Esox lucius*) from Lake Windermere, 1944-1981.

Format

A data frame of 75 observations on the following two variables:

year Year

stock Female biomass (kg)

recruits Number at age-2

basin Basin of Windermere (North or South)

tdd14 Temperature degree-days over 14C

Topic(s)

- Stock-Recruit
- Recruitment

Note

Stock values were originally reported in 1000s of kgs and recruits were originally recorded in tens of numbers. Thus, plots look very discrete.

Source

From table 3 in Kipling, C. 1983. Changes in the population of pike (*Esox lucius*) in Windermere from 1944 to 1981. *Journal of Animal Ecology* 52:989-999.

Examples

```
data(PikeWindermere)
str(PikeWindermere)
head(PikeWindermere)
op <- par(mfrow=c(2,2),pch=19)
plot(recruits~year,data=PikeWindermere,subset=basin=="North",main="North")
plot(recruits~stock,data=PikeWindermere,subset=basin=="North",main="North")
plot(recruits~year,data=PikeWindermere,subset=basin=="South",main="South")
plot(recruits~stock,data=PikeWindermere,subset=basin=="South",main="South")
par(op)
```

PSalmonAK

Stock and recruitment data for Alaskan Pink Salmon, 1960-1990.

Description

Harvest, escapement, and return of northern Southeast Alaska Pink Salmon (*Oncorhynchus gorbuscha*), 1960-1991, and average sea surface temperature between June and November off Sitka, Alaska, 1960-1990.

Format

A data frame of 34 rows on the following 5 variables:

year Year of data

harvest Harvest (thousands of fish)

escapement Escapement (thousands of fish)

return Returns (thousands of fish) as sum of harvest and escapement from two years later (lagging is for proper brood year correspondence)

SST Average sea surface temperature (C) between June and November off Sitka, AK from one year latter (lagging is for matching when the salmon are actually in the ocean)

Topic(s)

- Stock-Recruit
- Recruitment

Source

From Table 3.1 in Quinn, T.J. and R.B. Deriso. 1999. Quantitative Fish Dynamics. Oxford University Press, New York, New York.

Examples

```
data(PSalmonAK)
str(PSalmonAK)
head(PSalmonAK)
op <- par(mfrow=c(1,2))
plot(return~year,data=PSalmonAK)
plot(return~escapement,data=PSalmonAK)
par(op)
```

PygmyWFBC

Biological data for Pygmy Whitefish from Dina Lake #1 (British Columbia), 2000 and 2001.

Description

Biological information for Pygmy Whitefish (*Prosopium coulterii*) from Dina Lake #1 (British Columbia), 2000 and 2001.

Format

A data frame with 690 observations on the following 13 variables.

year Year of capture (2000, 2001)

month Month of capture

week Week within a month of capture

net_no Unique net identification number

fish_no Unique fish identification number

fl Fork length (cm)

tl Total length (cm)

wt Weight (g)

sex Sex code (F=Female, M=Male, Imm=immature)

mat Maturity code (Imm=immature, MG=maturing, MT=mature)

scale_age Scale age (in years)

oto_age Otolith age (in years)

USE Should the individual be used for analyses.

Topic(s)

- Weight-Length
- Age Comparison
- Condition
- Length Frequency

Note

The tl and USE variables were added for teaching purposes only. The tl was created from fl using a known fl-tl relationship and a small random error.

Source

2000 data from Appendix 9 of J. D. McPhail and R. J. Zemplak. October 2001. Pygmy Whitefish studies on Dina Lake #1, 2000. Peace/Williston Fish and Wildlife Compensation Program, Report No. 245. 36pp plus appendices. [Was (is?) from https://www.bchydro.com/pwcp/pdfs/reports/pwfwcp_report_no_245.pdf.]

2001 data from Appendix 14 of Zemplak, R.J. and J.D. McPhail. 2003. Pygmy Whitefish studies on Dina Lake #1, 2001. Peace/Williston Fish and Wildlife Compensation Program Report No. 279. 35pp plus appendices. [Was (is?) from http://a100.gov.bc.ca/appsdata/acat/documents/r39503/pwfwcp_report_no_279_1383]

Examples

```
data(PygmyWFBC)
str(PygmyWFBC)
head(PygmyWFBC)
```

RBSmeltErie

Recruitment time-series for Rainbow Smelt in Lake Erie, 1977-1996.

Description

Rainbow Smelt (*Osmerus mordax*) recruitment time series for Lake Erie, 1977-1996.

Format

A data frame of 20 observations on the following 2 variables:

year Year of data.
recruits Number of recruits (per hour).

Topic(s)

- Recruitment time-series

Note

Zeros were changed to 0.1 in 1984, 1987, 1991, and 1994.

Source

From Ontario Ministry of Natural Resources, Fish and Wildlife Branch, 1997. Lake Erie fisheries report 1996. Lake Erie Committee Meeting, Great Lakes Fishery Commission, Ann Arbor, Michigan. pp 26. Obtained from Ransom Myers online database which was (is?) at <http://ram.biology.dal.ca/~myers/data.html>.

Examples

```
data(RBSmeltErie)
str(RBSmeltErie)
head(RBSmeltErie)
plot(recruits~year,data=RBSmeltErie,type="l")
```

`RBSmeltLM`*Lengths for Rainbow Smelt from Lake Michigan, 1977.*

Description

Rainbow Smelt (*Osmerus mordax*) fork lengths from near Grand Haven, Lake Michigan, 1977.

Format

A data frame of 3293 observations on the following 1 variable:

fl Fork length (mm)

Topic(s)

- Length Frequency
- Size Structure

Source

From Brandt, S.B., J.J. Magnuson, and L.B. Crowder. 1980. Thermal habitat partitioning by fishes in Lake Michigan. *Canadian Journal of Fisheries and Aquatic Sciences*. 37:1557-1564. Data was simulated (uniform distribution of values within length bin) from summarized length frequencies in <http://fishbase.org/>.

Examples

```
data(RBSmeltLM)
str(RBSmeltLM)
head(RBSmeltLM)
hist(RBSmeltLM$fl, main="")
```

`RBTroutKenai`*Length-at-marking and recapture and time-at-large of Rainbow Trout.*

Description

Length-at-marking and recapture and time-at-large for Rainbow Trout (*Oncorhynchus mykiss*) from the Kenai River, Alaska.

Format

A data frame with 102 observations on the following 3 variables:

Lr Length (mm) at recapture.

Lm Length (mm) at marking.

dt Time-at-large (yrs).

Topic(s)

- Growth
- von Bertalanffy
- Fabens method

Source

From Table 4.10 in Quinn, T.J. and R.B. Deriso. 1999. Quantitative Fish Dynamics. Oxford University Press. 560 pages. This table is a 1/3rd subsample of the actual data presented in Baker, T.T., R. Lafferty, and T.J. Quinn II. 1991. A general growth model for mark-recapture data. Fisheries Research 11:257-281.

Examples

```
data(RBTroutKenai)
str(RBTroutKenai)
head(RBTroutKenai)
plot((Lr-Lm)~dt, data=RBTroutKenai)
```

 RBTroutUNSP

Capture histories (2 sample) of Rainbow Trout.

Description

Capture histories for Rainbow Trout (*Oncorhynchus mykiss*) in Upper Niagara Springs pond.

Format

A data frame with 173 observations on the following 2 variables:

first Indicator variable for the first sample (1=captured)

second Indicator variable for the second sample (1=captured)

Topic(s)

- Population Size
- Abundance
- Mark-Recapture
- Capture-Recapture
- Petersen
- Capture History

Source

Simulated from Table 10 in of Warren, C.D., K.A. Frank, and F.E. Partridge. 2004. Federal Aid in Fish Restoration - 2000 job performance report. Idaho Department of Fish and Game.

Examples

```
data(RBTroutUNSP)
str(RBTroutUNSP)
head(RBTroutUNSP)
```

RedDrum

Ages and lengths for Red Drum from the Atlantic Coast.

Description

Assigned ages (from otoliths) and fork lengths of Red Drum (*Sciaenops ocellatus*) from various areas of the Atlantic Coast, 1981-1988.

Format

A data frame with 393 observations on the following 2 variables.

age Age (from otoliths to the nearest years but recorded at half-years)

fl Fork length (mm)

Topic(s)

- Growth
- von Bertalanffy

Source

From (approximately) Figure 27 in Vaughan, D.S. and T.E. Helser. 1990. Status of the red drum stock of the Atlantic Coast: Stock assessment report for 1989. NOAA Technical Memorandum, NMFS-SEFC-263.

Examples

```
data(RedDrum)
str(RedDrum)
head(RedDrum)
plot(fl~age,data=RedDrum)
```

Riffleshell

Summarized multiple mark-recapture data for Tan Riffleshell.

Description

Summarized multiple mark-recapture data for Tan Riffleshell.

Format

A data frame with 6 observations on the following 4 variables.

t Sample number

caught Total number of fish caught in the sample

recaps Number of previously marked fish in the sample

retmarks Number of marked fish returned to the population

Details

The number of mussels caught in multiple samples of Tan Riffleshell (*Epioblasma florentina walkeri*) from Indian Creek, Virginia. The caught fish were examined for previous marks, marked (if previously unmarked), and then returned to the population.

Topic(s)

- Population Size
- Abundance
- Mark-Recapture
- Capture-Recapture
- Schnabel
- Schumacher-Eschmeyer

Source

From Table 1-2 of Rogers, S.O. 1999. Population biology of the Tan Riffleshell (*Epioblasma florentina walkeri*) and the effects of substratum and light on juvenile mussel propagation. Virginia Tech M.S. Thesis.

Examples

```
data(Riffleshell)
str(Riffleshell)
head(Riffleshell)
```

RockBassCL

Catch-at-age of Cayuga Lake Rock Bass.

Description

Catch-at-age for Cayuga Lake Rock Bass (*Ambloplites rupestris*) from a single season.

Format

A data frame of 6 observations on the following 2 variables:

age Assigned age.

catch Number in catch.

Topic(s)

- Mortality
- Catch curve

Source

D.S. Robson and D.G. Chapman. 1961. Catch curves and mortality rates. Transactions of the American Fisheries Society. 90:181-189.

Examples

```
data(RockBassCL)
str(RockBassCL)
RockBassCL
plot(log(catch)~age, data=RockBassCL)
```

RockBassL01

Ages and lengths of Lake Ontario Rock Bass.

Description

Assigned ages (from scales) and measured total lengths for each of 1288 Rock Bass (*Ambloplites rupestris*) from Lake Ontario.

Format

A data frame with 1288 observations on the following 2 variables:

age Assigned ages (from scales).

tl Measured total lengths (mm).

Topic(s)

- Growth
- von Bertalanffy

Source

Simulated from Table 1 of Wolfert, D.R. 1980. Age and growth of Rock Bass in Eastern Lake Ontario. New York Fish and Game Journal, 27:88:90.

See Also

[RockBassL02](#).

Examples

```
data(RockBassL01)
str(RockBassL01)
head(RockBassL01)
plot(tl~age,data=RockBassL01)
```

RockBassL02

Ages (subsample) and lengths (all fish) for Rock Bass from Lake Ontario.

Description

Ages (subsample) and lengths (all fish) for Rock Bass from Lake Ontario.

Format

A data frame with 1288 observations on the following 2 variables:

- age** Assigned ages (from scales)
- tl** Measured total lengths (mm)

Details

As many as 10 fish per 10-mm total length intervals from the [RockBassL01](#) data.frame was obtained for age assignment. The remaining fish in the file were only measure for length (i.e., the ages were deleted). This data file can be used to demonstrate the use of age-length keys.

Topic(s)

- Age-Length Key

See Also

[RockBassL01](#).

Examples

```
data(RockBassL02)
str(RockBassL02)
head(RockBassL02)

## extract aged sample
rb.aged <- subset(RockBassL02,!is.na(age))

## extract length sample
rb.length <- subset(RockBassL02,is.na(age))
```

RuffeSLRH92

Biological data for Ruffe captured from the St. Louis River in 1992.

Description

Biological data for Ruffe (*Gymnocephalus cernuus*) captured in the St. Louis River, Lake Superior in 1992.

Format

A data frame of 738 observations on the following 11 variables:

fish.id A unique fish identification number (across all years, most of which are not shown in this file)

month Month (numeric) of capture

day Day of capture

year Year of capture

indiv A unique fish identification number within the year

location Grid location of capture

length Total length (mm)

weight Weight (g)

sex Sex factor (female, male, or unknown)

maturity Maturity stage factor (developing, immature, mature, nearly.ripe, nearly.spent, recovering, ripe, running, spent, unknown, or yoy)

age Age (yrs) from scales

Topic(s)

- Length Frequency
- Weight-Length
- Growth
- von Bertalanffy
- Maturity

Source

personal collection by the United States Geological Survey, Lake Superior Biological Station, Ashland, WI.

Examples

```
data(RuffeSLRH92)
str(RuffeSLRH92)
head(RuffeSLRH92)
op <- par(mfrow=c(2,2),pch=19)
hist(RuffeSLRH92$length,main="")
hist(RuffeSLRH92$age,main="")
plot(weight~length,data=RuffeSLRH92)
plot(length~age,data=RuffeSLRH92)
par(op)
xtabs(~age,data=RuffeSLRH92)
xtabs(~sex,data=RuffeSLRH92)
tmp <- c("yoy","immature","developing","mature","nearly.ripe","ripe",
        "running","nearly.spent","spent","recovering","unknown")
RuffeSLRH92$maturity <- ordered(RuffeSLRH92$maturity,levels=tmp)
xtabs(~maturity,data=RuffeSLRH92)
xtabs(~maturity+month+sex,data=RuffeSLRH92)
```

RuffeTL89

Lengths of Ruffe captured from the St. Louis River in July, 1989.

Description

Total length for Ruffe (*Gymnocephalus cernuus*) captured in July, 1989 (cycle 6) in the St. Louis River, Lake Superior.

Format

A data frame of 236 observations on the following 1 variable:

tl Total length (mm).

Topic(s)

- Length Frequency
- Size Structure

Source

personal collection by the United States Geological Survey, Lake Superior Biological Station, Ashland, WI.

Examples

```
data(RuffeTL89)
str(RuffeTL89)
head(RuffeTL89)
hist(RuffeTL89$tl,main="")
```

RWhitefishAI

Ages and lengths of Round Whitefish.

Description

Ages and total lengths of Round Whitefish (*Prosopium cylindraceum*) collected from the Apostles Islands, Lake Superior.

Format

A data frame with 995 observations on the following 2 variables.

tl Total length (in).

age Age (from scales).

Topic(s)

- Growth
- von Bertalanffy

Source

From Table 3 (a random tenths digit was added to the TL) in Bailey, M.M. 1963. Age, growth, and maturity of Round Whitefish of the Apostle Islands and Isle Royale Regions, Lake Superior. Fishery Bulletin, 63:63-75. [Was (is?) from <http://fishbull.noaa.gov/63-1/bailey.pdf>.]

Examples

```
data(RWhitefishAI)
str(RWhitefishAI)
head(RWhitefishAI)
plot(tl~age,data=RWhitefishAI)
```

RWhitefishIR *Ages and lengths of Round Whitefish.*

Description

Ages and total lengths of Round Whitefish (*Prosopium cylindraceum*) collected from Isle Royale, Lake Superior.

Format

A data frame with 103 observations on the following 2 variables.

- tl** Total length (in).
- age** Age (from scales).

Topic(s)

- Growth
- von Bertalanffy

Source

From Table 4 (a random tenths digit was added to the TL) in Bailey, M.M. 1963. Age, growth, and maturity of round whitefish of the Apostle Islands and Isle Royale Regions, Lake Superior. Fishery Bulletin, 63:63-75. [Was (is?) from <http://fishbull.noaa.gov/63-1/bailey.pdf>.]

Examples

```
data(RWhitefishIR)
str(RWhitefishIR)
head(RWhitefishIR)
plot(tl~age,data=RWhitefishIR)
```

SalmonADP *Catches in removal events of salmon parr.*

Description

Catches in removal events of salmon parr from the Afon Dulas at Pentre, 19Jun79.

Format

A data frame with 5 observations on the following 2 variables:

- catch** Removal event.
- caught** Number of fish captured and removed.

Topic(s)

- Population size
- Abundance
- Removal

Source

From Table 2 in Cowx, I.G. 1983. Review of the methods for estimating fish population size from survey removal data. Fisheries Management, 14:67-82.

See Also

[TroutADP](#)

Examples

```
data(SalmonADP)
str(SalmonADP)
SalmonADP
```

SalmonidsMCCA

Catches in removal events of Cutthroat Trout and Steelhead of various sizes in two reaches of McGarvey Creek (CA).

Description

Catches in removal events of Cutthroat Trout (*Oncorhynchus clarki*) and Steelhead (*Oncorhynchus mykiss*) of various sizes in two reaches of McGarvey Creek (CA).

Format

A data frame of 5 observations on the following 5 variables:

reach Sampling location.

group Size or species caught (fry=both age-0 Cutthroat Trout and Steelhead, Steelhead=age-1+ Steelhead, or Cutthroat=age-1+ Cutthroat Trout).

pass1 Catch on the first removal pass.

pass2 Catch on the second removal pass.

pass3 Catch on the third removal pass.

Details

Sampling was conducted using a Smith Root model 15-D POW electrofisher. Block nets were placed at upstream and downstream reach boundaries. Efforts were made to keep the effort consistent between passes. Fixed electrofisher settings were used to maintain capture probabilities during sampling. Index reaches were rested for at least 90 minutes between passes to allow recovery time for fish not captured. Fish were measured (fork length in mm) and weighed to the nearest 0.1 gm. Scales were collected from below the dorsal fin on both left and right sides of selected fish. After data were recorded for each pass, fish were placed in a floating live car until all sampling was completed. Fish were then released throughout the reach.

Topic(s)

- Population size
- Abundance
- Removal

Source

From Table 2 of Voight, H. 1999. Assessment of juvenile salmonid populations in two index reaches of McGarvey Creek, a tributary to the lower Klamath River. First Year of Investigations - 1998. [Was (is?) from http://www.krisweb.com/biblio/klamath_yurokfp_voight_1999_7.pdf.]

Examples

```
data(SalmonidsMCCA)
str(SalmonidsMCCA)
head(SalmonidsMCCA)

## extract data for one reach and group (e.g., 3rd row)
SalmonidsMCCA[3,]
```

SardineChile

Ages and lengths of two year-classes of Sardine from Chilean waters.

Description

Ages (in months) and total lengths of two year-classes of Sardine (*Strangomera bentincki*) from central Chilean waters.

Format

A data frame with 196 observations of the following 3 variables:

age.mon Age in months.

tl.cm Total length (cm).

cohort Year-class.

Topic(s)

- Growth
- Seasonal Growth
- von Bertalanffy
- Somers model

Source

Directly from the authors of Cubillos, L.A., D.F. Arcosa, D.A. Bucareya, M.T. Canalesa. 2001. Seasonal growth of small pelagic fish off Talcahuano, Chile (37S, 73W): a consequence of their reproductive strategy to seasonal upwelling? Aquatic Living Resources, 14:115-124. Data were in Figure 9.

Examples

```
data(SardineChile)
str(SardineChile)
head(SardineChile)
SardineChile$age <- SardineChile$age.mon/12
plot(tl.cm~age,data=SardineChile)
```

SardineLK

Ages and lengths of larval Lake Tanganyika Sardine.

Description

Ages (days) and total lengths of larval Lake Tanganyika Sardine (*Limnothrissa miodon*) from Lake Kariba.

Format

A data frame with 75 observations on the following 2 variables.

days Age in days (determine from otoliths).

tl Total length (mm within 0.1).

Topic(s)

- Growth
- von Bertalanffy

Source

From (approximately) Figure 3 of Mtsambiwa, M.Z. 1992. Fitting a von Bertalanffy growth model to length at age data for larval *Limnothrissa miodon* from Lake Kariba. Paper presented at the Symposium on biology, stock assessment, and exploitation of small pelagic fish species in the African Great Lakes region. [Was (is?) from <http://www.fao.org/docrep/005/v2648e/V2648E06.htm>.]

Examples

```
data(SardineLK)
str(SardineLK)
head(SardineLK)
plot(tl~days,data=SardineLK)
```

SardinesPacific

Stock and recruitment data for Pacific Sardines, 1935-1990.

Description

Pacific Sardine (*Sardinops sagax*) stock and recruitment by year, 1935-1990.

Format

A data frame of 34 observations on the following 3 variables:

year Year of data

ssb Spawning stock biomass – millions of fish

recruits Recruitment index – millions of fish

Topic(s)

- Stock-Recruit
- Recruitment

Source

From Jacobson, L.D. and A.D. MacCall. 1995. Stock-recruitment models for Pacific Sardine (*Sardinops sagax*). Canadian Journal of Fisheries and Aquatic Sciences. 52:566-577.

Examples

```
data(SardinesPacific)
str(SardinesPacific)
head(SardinesPacific)
op <- par(mfrow=c(1,2),pch=19)
plot(recruits~year,data=SardinesPacific,type="l")
plot(recruits~ssb,data=SardinesPacific)
par(op)
```

SculpinALTER

Biological data for Slimy Sculpin from the Arctic LTER (AK).

Description

Biological data (length, weight, and age) for Slimy Sculpin (*Cottus cognatus*) sampled from Lake S-6 of the Arctic Long Term Ecological Research location.

Format

A data frame of 117 observations on the following 3 variables:

w Weight (nearest 0.1 g) at capture

tl Total length (nearest mm) at capture

age Age (completed growing seasons from otoliths) at capture

Details

Slimy Sculpin were captured from Lake S-6 during the summers of 1988 and 1989. Sculpins were captured using canning jars with acetate funnels inserted in them (similar in design to some minnow traps). The sculpin traps were set by raft and placed on the bottom of the lake in a specific habitat (inshore, rocky, rock-mud interface, and mud bottom). (Roughly) every three days the traps were retrieved and the sculpins, if any, were removed. The ages of the fish were determined by counting the rings in their otoliths.

Topic(s)

- Length Frequency
- Weight-Length
- Growth
- von Bertalanffy
- Size Structure

Source

Was (does not appear to be available there now) from <http://ecosystems.mbl.edu/ARC/lakes/fish/89hes6ag.html>. It seems like it should still be available from the Arctic LTER site at <http://ecosystems.mbl.edu/ARC/lakes/fish/index.shtml>.

Examples

```
data(SculpinALTER)
str(SculpinALTER)
head(SculpinALTER)
op <- par(mfrow=c(2,2),pch=19)
hist(SculpinALTER$tl,main="")
hist(SculpinALTER$age,main="")
plot(w~tl,data=SculpinALTER)
```

```
plot(tl~age,data=SculpinALTER)
par(op)
```

ShadCR	<i>Ages of American Shad assigned from scales by three readers at two times.</i>
--------	--

Description

Ages of American Shad (*Alosa sapidissima*) assigned from scales by three readers at two times.

Format

A data frame with 53 observations on the following 8 variables.

fishID A unique fish identification number

trueAge The true age of the fish

agerA1 Ages assigned by reader A at time 1

agerA2 Ages assigned by reader A at time 2

agerB1 Ages assigned by reader B at time 1

agerB2 Ages assigned by reader B at time 2

agerC1 Ages assigned by reader C at time 1

agerC2 Ages assigned by reader C at time 2

Details

The true ages for fish in their sample were known because the Shad had been marked prior to being stocked. Additionally, 13 biologists twice (independently) estimated the age from scales for each fish. The known age of the fish (`trueAge`) and the age estimates from three of the 13 biologists are available in this data.frame. The estimated age variables are labeled with `ager`, a letter for the three biologists (A, B, or C) and a number for which time the scale was interpreted (1 or 2). Some biologists chose not to assign an age to some scales and, thus, those data are missing (shown as NA values).

Topic(s)

- Age Comparison
- Age Precision
- Age Bias
- Ageing Error

Note

Used in the [Introductory Fisheries Analyses with R](#) book.

Source

From McBride, R.S., Hendricks, M.L., and Olney, J.E. 2005. Testing the validity of Cating's (1953) method for age determination of American Shad using scales. *Fisheries*, 30:10-18. Obtained directly from Rich McBride.

Examples

```
data(ShadCR)
str(ShadCR)
head(ShadCR)
op <- par(mfrow=c(2,2), pch=19)
plot(agerA1~agerA2, data=ShadCR)
plot(agerB1~agerB2, data=ShadCR)
plot(agerC1~agerC2, data=ShadCR)
plot(agerA1~agerB1, data=ShadCR)
par(op)
```

 ShrimpGuam

Catch and effort data for Deepwater Caridean Shrimp.

Description

Catch and effort data for Deepwater Caridean Shrimp (*Heterocarpus laevigatus*) from 15 days in 1984 from near Alamagan Islan in the Marian Archipelago (near Guam).

Format

A data frame with 15 observations on the following 4 variables.

day Day of the catch. Day 9 is 9-Jan-1984.

standard Catch (kg) of of Shrimp in the standard traps.

pyramid Catch (kg) of of Shrimp in the pyramid traps.

effort Total effort (trap-nights) for the standard traps.

Details

Catch (kg) and effort (trap-nights) of Deepwater Caridean Shrimp (*Heterocarpus laevigatus*) from 15 days in 1984 from near Alamagan Islan in the Marian Archipelago (near Guam). The data start on 9-Jan-1984. Catches were recorded separately for standard traps and in pyramid traps.

The original authors estiamted populations size using the Leslie method with the cumulative catch from the combined catch in the standard and pyramid traps, but with a CPE computed from just the catch in standard traps.

Topic(s)

- Population size
- Abundance
- Depletion methods
- Leslie method
- DeLury method
- Catchability

Source

From Table 1 of Ralson, S. 1986. An intensive fishing experiment for the Caridean Shrimp, *Heterocarpus laevigatus*, at Alamagn Island in the Mariana Archipelago. Fishery Bulletin 84:927-934. [Was (is?) from <http://fishbull.noaa.gov/844/ralston.pdf>.]

Examples

```
data(ShrimpGuam)
str(ShrimpGuam)
head(ShrimpGuam)

## Computations by the original authors
# CPE for just the standard traps
ShrimpGuam$CPE <- ShrimpGuam$standard/ShrimpGuam$effort
# Total catch in both traps
ShrimpGuam$total <- ShrimpGuam$standard+ShrimpGuam$pyramid
# Cumulative catch in both traps (with the Ricker modification)
ShrimpGuam$cumCatch <- cumsum(ShrimpGuam$total)-ShrimpGuam$total/2
```

SimonsonLyons

Catches in removal events of trout at various locations.

Description

Catches of various species in consecutive removal events at various locations.

Format

A data frame of 58 observations on the following 7 variables:

- species** Species of fish.
- stream** Stream name.
- first** Catch on the first removal pass.
- second** Catch on the second removal pass.
- third** Catch on the third removal pass.
- fourth** Catch on the fourth removal pass.
- pop.cs** Population estimate by Carle-Strub method.

Topic(s)

- Population size
- Abundance
- Removal

Source

From Appendix in Simonson, T.D. and J. Lyons. 1995. Comparison of catch per effort and removal procedures for sampling stream fish assemblages. North American Journal of Fisheries Management, 15:419-427.

Examples

```
data(SimonsonLyons)
str(SimonsonLyons)
head(SimonsonLyons)

## extract data for one species and stream (e.g., 3rd row)
SimonsonLyons[3,]
```

SiscowetMI2004	<i>Ages (subsample) and lengths (all fish) for male and female Siscowet Lake Trout captured at four locations in Michigan waters of Lake Superior.</i>
----------------	--

Description

Ages (subsample) and lengths (all fish) for male and female Siscowet Lake Trout captured at four locations in Michigan waters of Lake Superior.

Format

A data frame with 780 observations on the following 8 variables.

locID Locations (Blind Sucker, Deer Park, Grand Marais, Little Lake Harbor)

pnldep Depth of gillnet panel in which the fish was captured

mesh Gillnet stretch mesh measure

fishID Unique fish identification code

sex Sex (F and M)

age Assigned ages (yrs; from otoliths)

len Total length (mm)

wgt Weight (g)

Topic(s)

- Age-Length Key
- Growth

Note

Used in the [Introductory Fisheries Analyses with R](#) book.

Source

Obtained directly from the U.S. Fish and Wildlife Service via Michael Seider.

Examples

```
data(SiscowetMI2004)
str(SiscowetMI2004)
head(SiscowetMI2004)
xtabs(~age+locID,data=SiscowetMI2004)
op <- par(mfrow=c(2,2),pch=19)
plot(len~age,data=SiscowetMI2004,subset=locID=="Blind Sucker",main="Blind Sucker")
plot(len~age,data=SiscowetMI2004,subset=locID=="Grand Marais",main="Grand Marais")
plot(len~age,data=SiscowetMI2004,subset=locID=="Little Lake Harbor",main="Little Lake Harbor")
par(op)
```

SLampreyGL

Stock and recruitment data for Sea Lamprey in the Great Lakes, 1997-2007.

Description

Stock and recruitment data for Sea Lamprey (*Petromyzon marinus*) in the Great Lakes, 1997-2007 from 37 streams.

Format

A data frame of 76 observations on the following two variables:

stock Female spawners per 100 square meters.

recruits Yearlings per 100 square meters.

Topic(s)

- Stock-Recruit
- Recruitment

Source

From (approximately) Figures 2a and 2b in Dawson, H.A. and M.L. Jones. 2009. Factors affecting recruiting dynamics of Great Lakes sea lamprey (*Petromyzon marinus*) populations. *Journal of Great Lakes Research* 35:353-360.

Examples

```
data(SLampreyGL)
str(SLampreyGL)
head(SLampreyGL)
plot(recruits~stock,data=SLampreyGL)
```

Snapper

Lengths for Snapper from Australia.

Description

Lengths of Australian Snapper (*Chrysophrys auratus*) taken by trawl.

Format

A data frame of 256 observations on the following 1 variable:

len Length in inches

Topic(s)

- Length Frequency
- Size Structure

Source

Simulated from length frequency summaries found in `data(cassie)` of the **mixdist** package. Data originally from Cassie, R.M. 1954. Some uses of probability paper in the analysis of size frequency distributions. *Australian Journal of Marine and Freshwater Research*. 5:513-522.

Examples

```
data(Snapper)
str(Snapper)
head(Snapper)
hist(Snapper$len,main="")
```

SnapperHG1	<i>Age (subsample) and length (all fish) of Snapper from two survey locations.</i>
------------	--

Description

A large sample (not random or proportional) of Snapper (*Pagrus auratus*) were aged from otoliths, with the remainder of the fish just measured for length. Note that age-20 is actually age 19+.

Format

A data frame of 18421 observations on the following 3 variables:

len Measured lengths (cm)

age Ages assigned from examination of otoliths

survey Survey location (KAH8810 or KAH0012)

Topic(s)

- Age-Length Key

Note

The unaged fish were simulated from Table 5 assuming that the total number of fish was large enough that at least one fish was observed in each cell where a proportion was listed.

Source

Recreated from Tables 2, 3, and 5 in Davies, N.M. and C. Walsh. 2002. Snapper age and length samples from Kaharoa research trawl surveys KAH8810 and KAH0012 of the Hauraki Gulf. Final Research Report for Ministry of Fisheries Research Project SNA2000/01. National Institute of Water and Atmospheric Research. [Was (is?) from <http://fs.fish.govt.nz/Page.aspx?pk=113&dk=22516>.]

Examples

```
data(SnapperHG1)
str(SnapperHG1)
head(SnapperHG1)

## Extract one of the sample surveys
sn1 <- subset(SnapperHG1,survey=="KAH8810")

## Extract the aged sample
sn1.aged <- subset(sn1,!is.na(age))
str(sn1.aged)

## Extract the length sample
sn1.length <- subset(sn1,is.na(age))
str(sn1.length)
```

SnapperHG2

Ages (subsample) and lengths (all fish) for Snapper.

Description

A large sample (approximately fixed sample size per length interval) of Snapper (*Pagrus auratus*) were aged, with the remainder of the fish just measured for length. Note that age-16 is actually age 16+ and length 60 is for 60-64 cm and 65 is for 65+ cm.

Format

A data frame of 6724 observations on the following 2 variables:

len Measured lengths (cm)

age Ages assigned

Topic(s)

- Age-Length Key

Source

Recreated from summarized results in Table 8.3 of Quinn, T. J. and R. B. Deriso. 1999. Quantitative Fish Dynamics. Oxford University Press, New York, NY. 542 p.

See Also

See the same data in summarized format as `alkdata` in **fishmethods**.

Examples

```
data(SnapperHG2)
str(SnapperHG2)
head(SnapperHG2)

## Extract the aged sample
sn2.aged <- subset(SnapperHG2,!is.na(age))
str(sn2.aged)

## Extract the length sample
sn2.length <- subset(SnapperHG2,is.na(age))
str(sn2.length)
```

SockeyeKL	<i>Stock and recruitment data for Sockeye Salmon from Karluk Lake, AK, 1921-1948.</i>
-----------	---

Description

Sockeye Salmon (*Oncorhynchus nerka*) stock and recruitment in Karluk Lake, AK, by year, 1921-1948.

Format

A data frame of 28 observations on the following 3 variables:

year Year of data.

stock Upstream escapement.

recruits Recruits.

Topic(s)

- Stock-Recruit
- Recruitment

Source

From Gulland, J.A. 1983. Fish stock assessment: A manual of basic methods. John Wiley and Sons, New York, NY. 223 p.

Examples

```
data(SockeyeKL)
str(SockeyeKL)
head(SockeyeKL)
op <- par(mfrow=c(1,2),pch=19)
plot(recruits~year,data=SockeyeKL,type="b")
plot(recruits~stock,data=SockeyeKL)
par(op)
```

SockeyeSR	<i>Stock and recruitment data for Skeena River Sockeye Salmon, 1940-1967.</i>
-----------	---

Description

Stock and recruitment data for Skeena River Sockeye Salmon (*Oncorhynchus nerka*), 1940-1967.

Format

A data frame with 28 observations on the following 3 variables.

year a numeric vector of years

spawners a numeric vector giving number of spawning fish (in thousands)

recruits a numeric vector containing the recruitment (thousands)

Topic(s)

- Stock-Recruit
- Recruitment

Note

The dataset is usually analysed without case 12 because a rockslide occurred that year.

Source

Carroll, R. J. and Ruppert, D. 1988. Transformation and Weighting in Regression. Chapman and Hall, New York. 140 pp.

Examples

```
data(SockeyeSR)
str(SockeyeSR)
head(SockeyeSR)
SockeyeSR1 <- SockeyeSR[-12,]
op <- par(mfrow=c(1,2),pch=19)
plot(recruits~year,data=SockeyeSR1,type="b")
plot(recruits~spawners,data=SockeyeSR1)
par(op)
```

SpottedSucker1

Ages and lengths of Spotted Sucker.

Description

Ages and total lengths of Spotted Sucker (*Minytrema melanops*) collected from the Apalachicola River, Florida.

Format

A data frame with 96 observations on the following 2 variables.

tl Total length (mm).

age Age (from scales).

Topic(s)

- Growth
- von Bertalanffy

Source

From Box 5.4 in Iseley, J.J. and T.B. Grabowski. 2007. Age and Growth in Guy, C.S. and M.L. Brown, editors. Analysis and Interpretation of Freshwater Fisheries Data. American Fisheries Society. Likely originally from Grabowski, T.B., S.P. Young, J.J. Isely, and P.C. Ely. Age, growth, and reproductive biology of three catostomids from the Apalachicola River, Florida. Journal of Fish and Wildlife Management 3:223-237. [Was (is?) from <http://www.fwspubs.org/doi/pdf/10.3996/012012-JFWM-008>.]

Examples

```
data(SpottedSucker1)
str(SpottedSucker1)
head(SpottedSucker1)
plot(tl~age, data=SpottedSucker1)
```

SpotVA2

Ages (subsample) and lengths (all fish) for Spot.

Description

As many as 10 fish per 1-inch total length intervals from the [SpotVA1](#) data frame were obtained for age assignment. The remaining fish in the file were only measured for length (i.e., the ages were deleted). This data file can be used to demonstrate the use of age-length keys.

Format

A data frame of 403 observations on the following 2 variables:

tl Measured total lengths (in inches)

age Ages assigned from examination of otoliths

Topic(s)

- Age-Length Key

Source

From Table 1 in Chapter 8 (Spot) of the VMRC Final Report on Finfish Ageing, 2002 by the Center for Quantitative Fisheries Ecology at Old Dominion University.

See Also

SpotVA1 in **FSA**.

Examples

```
data(SpotVA2)
str(SpotVA2)
head(SpotVA2)

## Extract the aged sample
spot.aged <- subset(SpotVA2, !is.na(age))
str(spot.aged)

## Extract the length sample
spot.length <- subset(SpotVA2, is.na(age))
str(spot.length)
```

StripedBass1

Ages of Striped Bass assigned from scales and otoliths.

Description

Ages of Striped Bass (*Morone saxatilis*) assessed from heat-pressed scales and cracked-and-burnt otoliths.

Format

A data frame of 343 observations on the following 2 variables:

ageO Age assigned from examination of otoliths

ageS Age assigned from examination of scales

Topic(s)

- Age Comparison
- Age Precision
- Age Bias
- Ageing Error

Source

From Figure 6 in Chapter 10 (Striped Bass) of the VMRC Final Report on Finfish Ageing, 2000 by the Center for Quantitative Fisheries Ecology at Old Dominion University.

Examples

```
data(StripedBass1)
str(StripedBass1)
head(StripedBass1)
plot(ageS~age0,data=StripedBass1)
xtabs(~age0+ageS,data=StripedBass1)
```

StripedBass2

Ages and lengths of Atlantic Ocean Striped Bass.

Description

Assigned ages (from otoliths) and measured total lengths for each of 1201 Striped Bass (*Morone saxatilis*) from the Atlantic Ocean.

Format

A data frame of 1201 observations on the following 2 variables:

age Assigned ages (from scales).

tl Measured total lengths (in inches).

Topic(s)

- Growth
- von Bertalanffy

Source

From Table 1 in Chapter 10 (Striped Bass) of the VMRC Final Report on Finfish Ageing, 2003 by the Center for Quantitative Fisheries Ecology at Old Dominion University.

See Also

[StripedBass3](#).

Examples

```
data(StripedBass2)
str(StripedBass2)
head(StripedBass2)
plot(tl~age,data=StripedBass2)
```

StripedBass3

Ages (subsample) and lengths (all fish) for Striped Bass.

Description

As many as 10 fish per 1-inch total length intervals from the StripedBass2 data frame were obtained for age assignment. The remaining fish in the file were only measured for length (i.e., the ages were deleted). This data file can be used to demonstrate the use of age-length keys.

Format

A data frame of 1201 observations on the following 2 variables:

tl Measured total lengths (in inches).

age Ages assigned from examination of otoliths.

Topic(s)

- Age-Length Key

See Also

[StripedBass2](#).

Examples

```
data(StripedBass3)
str(StripedBass3)
head(StripedBass3)

## Extract the aged sample
sb.aged <- subset(StripedBass3,!is.na(age))
str(sb.aged)

## Extract the length sample
sb.length <- subset(StripedBass3,is.na(age))
str(sb.length)
```

StripedBass4

Ages of Striped Bass assigned from scales by two readers.

Description

Ages assigned by two different readers to the scales of Striped Bass (*Morone saxatilis*).

Format

A data frame of 1202 observations on the following 2 variables:

reader1 Ages assigned by the first reader

reader2 Ages assigned by the second reader

Topic(s)

- Age Comparison
- Age Precision
- Age Bias
- Ageing Error

Source

From Figure 3 in Chapter 10 (Striped Bass) of the VMRC Final Report on Finfish Ageing, 2003 by the Center for Quantitative Fisheries Ecology at Old Dominion University.

See Also

[StripedBass5](#) and [StripedBass6](#).

Examples

```
data(StripedBass4)
str(StripedBass4)
head(StripedBass4)
plot(reader2~reader1,data=StripedBass4)
xtabs(~reader1+reader2,data=StripedBass4)
```

StripedBass5

Ages of Striped Bass assigned from otoliths by two readers.

Description

Ages assigned by two different readers to the otoliths of Striped Bass (*Morone saxatilis*).

Format

A data frame of 458 observations on the following 2 variables:

reader1 Ages assigned by the first reader

reader2 Ages assigned by the second reader

Topic(s)

- Age Comparison
- Age Precision
- Age Bias
- Ageing Error

Source

From Figure 5 in Chapter 10 (Striped Bass) of the VMRC Final Report on Finfish Ageing, 2003 by the Center for Quantitative Fisheries Ecology at Old Dominion University.

See Also

[StripedBass4](#) and [StripedBass6](#).

Examples

```
data(StripedBass5)
str(StripedBass5)
head(StripedBass5)
plot(reader2~reader1,data=StripedBass5)
xtabs(~reader1+reader2,data=StripedBass5)
```

StripedBass6

Ages of Striped Bass assigned from scales and otoliths.

Description

Ages assigned to the scales and otoliths of Striped Bass (*Morone saxatilis*).

Format

A data frame of 451 observations on the following 2 variables:

scale Ages assigned to scales

otolith Ages assigned to otoliths

Topic(s)

- Age Comparison
- Age Precision
- Age Bias
- Ageing Error

Source

From Figure 6 in Chapter 10 (Striped Bass) of the VMRC Final Report on Finfish Ageing, 2003 by the Center for Quantitative Fisheries Ecology at Old Dominion University.

See Also

[StripedBass4](#) and [StripedBass5](#).

Examples

```
data(StripedBass6)
str(StripedBass6)
head(StripedBass6)
plot(scale~otolith,data=StripedBass6)
xtabs(~otolith+scale,data=StripedBass6)
```

SturgeonBL

Summarized multiple mark-recapture data for Lake Sturgeon.

Description

The number of Lake Sturgeon (*Acipenser fulvescens*) caught in multiple samples from Black Lake, MI in 1997. The caught fish were examined for previous marks, marked (if previously unmarked), and then returned to the population.

Format

A data frame with 6 observations on the following 4 variables:

t Sample number

caught Total number of fish caught in the sample

recaptures Number of previously marked fish in the sample

retmarks Number of marked fish (previously and newly marked) returned to the population

Topic(s)

- Population Size
- Abundance
- Mark-Recapture
- Capture-Recapture
- Schnabel
- Schumacher-Eschmeyer

Source

From Table 1 in Baker, E.A. and D.J. Borgeson. 1999. Lake sturgeon abundance and harvest in Black Lake, Michigan, 1975-1999. North American Journal of Fisheries Management. 19:1080-1088.

Examples

```
data(SturgeonBL)
str(SturgeonBL)
head(SturgeonBL)
```

SturgeonGB	<i>Capture years and ages for Lake Sturgeon from Goulais Bay, Lake Superior, Ont.</i>
------------	---

Description

Pratt et al. (2014) recorded the capture years and ages for Lake Sturgeon captured in multiple gillnet sets in Goulais Bay, Lake Superior (Ontario) in July 2010-2012.

Format

A data frame with 436 observations on the following 2 variables.

year Year of capture

age Age (yrs; from pectoral fin ray)

Topic(s)

- Year-class Strength

Note

Used in the [Introductory Fisheries Analyses with R](#) book.

Source

From Pratt, T.C., Gardner, W.M., Pearce, J., Greenwood, S., and Chong, S.C. 2014. Identification of a robust Lake Sturgeon (*Acipenser fulvescens* Rafinesque, 1917) population in Goulais Bay, Lake Superior. *Journal of Applied Ichthyology*, 30:1328-1334. Obtained directly from Tom Pratt.

Examples

```
data(SturgeonGB)
str(SturgeonGB)
head(SturgeonGB)
plot(age~year, data=SturgeonGB)
```

SunfishIN

Summarized multiple mark-recapture data for Redear Sunfish.

Description

The number of Redear Sunfish (*Lepomis microlophus*) caught in multiple samples from Gordy Lake, IN. The caught fish were examined for previous marks, marked (if previously unmarked), and then returned to the population.

Format

A data frame with 6 observations on the following 4 variables:

t Sample number

caught Total number of fish caught in the sample

recaps Number of previously marked fish in the sample

retmarks Number of marked fish returned to the population

Topic(s)

- Population Size
- Abundance
- Mark-Recapture
- Capture-Recapture
- Schnabel
- Schumacher-Eschmeyer

Source

Originally from Gerking, S.D. 1953. Vital statistics of the fish population of Gordy Lake, Indiana. Transactions of the American Fisheries Society. 82:48-67. But also found in Table 2.4 of Krebs, C.J. 1999. Ecological Methodology. Addison-Welsey Educational Publishing, second edition and Table 4.4 of Ricker, W.E. 1975. Computation and interpretation of biological statistics of fish populations. Technical Report Bulletin 191, Bulletin of the Fisheries Research Board of Canada.

Examples

```
data(SunfishIN)
str(SunfishIN)
SunfishIN
```

 SunfishLP

Catch-at-age for Bluegill and Redear Sunfish in Florida.

Description

The percent frequency of of Bluegill (*Lepomis macrochirus*) and Redear Sunfish (*Lepomis microlophus*) caught in Lake Panasoffkee, FL.

Format

A data frame with 12 observations on the following 3 variables:

species Species of sunfish (bluegill or redear)

age Age (yrs from otoliths)

perc.freq Percent frequency of fish collected in 1998

Topic(s)

- Mortality
- Catch curve

Source

From (approximately) Figure 2 in Crawford, S. and M.S. Allen. 2006. Fishing and natural mortality of Bluegills and Redear Sunfish at Lake Panasoffkee, Florida: Implications for size limits. North American Journal of Fisheries Management 26:42-51. Note that I added a percentage for age-1 fish (the difference in percentages from Fig. 2).

Examples

```
data(SunfishLP)
str(SunfishLP)
head(SunfishLP)
plot(log(perc.freq)~age,data=SunfishLP)
```

 TPrawnsEG

Stock and recruitment data for Exmouth Gulf Tiger Prawn, 1970-83.

Description

Stock and recruitment data for Exmouth Gulf Tiger Prawn (*Panaeus esculentus*), 1970-1983.

Format

A data frame with 14 observations on the following 5 variables.

year a numeric vector of years

stock a numeric vector giving the index of spawning stock fish

recruits a numeric vector containing the index of recruits

cycloneJan a numeric vector containing the relative rainfall in January as an index of cyclonic activity

cycloneFeb a numeric vector containing the relative rainfall in February as an index of cyclonic activity

Topic(s)

- Stock-Recruit
- Recruitment

Source

From table 9.1 in Haddon, M. 2000. Modeling and Quantitative Methods in Fisheries, CRC Press. Originally from Penn, J. W., and Caputi, N. 1986. Spawning stock-recruitment relationships and environmental influences on the Tiger Prawn (*Penaeus esculentus*) fishery in Exmouth Gulf, Western Australia. Australian Journal of Marine and Freshwater Research 37:491-505.

Examples

```
data(TPrawnsEG)
str(TPrawnsEG)
head(TPrawnsEG)
op <- par(mfrow=c(1,2),pch=19)
plot(recruits~year,data=TPrawnsEG,type="l")
plot(recruits~stock,data=TPrawnsEG)
par(op)
```

 TroutADP

Catches in removal events of trout.

Description

Catches of trout on five successive removal events from the Afon Dulas at Pentre, 19Jun79.

Format

A data frame with 5 observations on the following 2 variables:

catch Removal event.

caught Number of fish captured and removed.

Topic(s)

- Population size
- Abundance
- Removal

Source

From Table 1 in Cowx, I.G. 1983. Review of the methods for estimating fish population size from survey removal data. Fisheries Management, 14:67-82.

See Also

[SalmonADP](#)

Examples

```
data(TroutADP)
str(TroutADP)
TroutADP
```

TroutBR

Ages and lengths of migratory Brown and Rainbow Trout.

Description

Total lengths (inches) and ages (from scales) of Brown Trout (*Salmo trutta*) and Rainbow Trout (*Oncorhynchus mykiss*) migrating upstream on the Bois Brule River, WI in 1978 and 1979.

Format

A data frame with 851 observations on the following 3 variables:

- tl** Measured total length (inches).
- age** Assigned age (from scales).
- species** Species (Brown and Rainbow).

Topic(s)

- Growth
- von Bertalanffy

Source

From tables 18 and 19 of Scholl, D.K., P.J. Peeters, and S.T. Schram. 1984. Migratory brown trout and rainbow trout populations of the Brule River, Wisconsin. Wisconsin Department of Natural Resources, Fish Management Report No. 123.

Examples

```

data(TroutBR)
str(TroutBR)
head(TroutBR)
op <- par(mfrow=c(1,2),pch=19)
plot(tl~age,data=TroutBR,subset=species=="Brown",main="Brown Trout")
plot(tl~age,data=TroutBR,subset=species=="Rainbow",main="Rainbow Trout")
par(op)

```

TroutperchLM1

*Ages, lengths, and sexes of Troutperch.***Description**

The assigned ages (by scales), total lengths (mm), and sexes of Troutperch (*Percopsis omiscomaycus*) captured in southeastern Lake Michigan.

Format

A data frame with 431 observations on the following 3 variables:

- age** Assigned ages (by scales).
- tl** Measured total length (mm).
- sex** Sex (f=female and m=male).

Topic(s)

- Growth
- von Bertalanffy

Source

Simulated from the age-length data provided in Table 1 of House, R., and L. Wells. 1973. Age, growth, spawning season, and fecundity of the trout-perch (*Percopsis omiscomaycus*) in southeastern Lake Michigan. *Journal of the Fisheries Research Board of Canada*. 30:1221-1225.

Examples

```

data(TroutperchLM1)
str(TroutperchLM1)
head(TroutperchLM1)
op <- par(mfrow=c(1,2),pch=19)
plot(tl~age,data=TroutperchLM1,subset=sex=="f",main="female")
plot(tl~age,data=TroutperchLM1,subset=sex=="m",main="male")
par(op)

```

TroutperchLM2

Lengths for Troutperch from Lake Michigan, 1977.

Description

Troutperch (*Percopsis omiscomaycus*) fork lengths from near Grand Haven, Lake Michigan, 1977.

Format

A data frame of 3385 observations on the following 1 variable:

fl fork length (mm)

Topic(s)

- Length Frequency
- Size Structure

Source

From Brandt, S.B., J.J. Magnuson, and L.B. Crowder. 1980. Thermal habitat partitioning by fishes in Lake Michigan. *Canadian Journal of Fisheries and Aquatic Sciences*. 37:1557-1564. Data was simulated (uniform distribution of values within length bin) from summarized length frequencies in <http://fishbase.org/>.

Examples

```
data(TroutperchLM2)
str(TroutperchLM2)
head(TroutperchLM2)
hist(TroutperchLM2$fl,main="")
```

TroutperchLM3

Subsampled lengths of Troutperch from Lake Michigan, 1977.

Description

Troutperch (*Percopsis omiscomaycus*) fork lengths from a subsample of fish captured near Grand Haven, Lake Michigan, 1977.

Format

A data frame of 300 observations on the following 1 variable:

fl Fork length (mm)

Details

A random subsample of the lengths in the [TroutperchLM2](#) data frame.

Topic(s)

- Length Frequency
- Length Expansion
- Size Structure

See Also

[TroutperchLM2](#).

Examples

```
data(TroutperchLM3)
str(TroutperchLM3)
head(TroutperchLM3)
```

VendaceLP

Stock and recruitment data for Vendace from Lake Puulavesi, 1982-1996.

Description

Vendace (*Coregonus albula*) recruitment by year in Lake Puulavesi, 1982-1996.

Format

A data frame of 15 observations on the following 3 variables:

year Year of data

stock Spawning stock index – autumn biomass (kg/ha) of age-1+ fish

recruits Recruit index – density (indivs/ha) of age-0+ fish in first autumn

Topic(s)

- Stock-Recruit
- Recruitment

Source

From (approximately) Figure 1 and 2 of Marjomaki, T.J. 2004. Analysis of the spawning stock-recruitment relationship of vendace (*Coregonus albula* (L.)) with evaluation of alternative models, additional variables, biases and errors. Ecology of Freshwater Fish 13:46-60.

Examples

```
data(VendaceLP)
str(VendaceLP)
head(VendaceLP)
op <- par(mfrow=c(1,2),pch=19)
plot(recruits~year,data=VendaceLP,type="l")
plot(recruits~stock,data=VendaceLP)
par(op)
```

VendaceLP2

Stock and recruitment data for Vendace from Lake Pyhajarvi.

Description

Vendace (*Coregonus albula*) recruitment in Lake Pyhajarvi.

Format

A data frame of 9 observations on the following 2 variables:

fecundity Total fecundity (10^9 eggs) of spawning stock

recruits Number of recruits (10^6 fish) in Autumn after hatching

Topic(s)

- Stock-Recruit
- Recruitment

Note

Original authors fit an exponential curve to the fecundity-recruits relationship.

Source

From (approximately) Figure 6 in Helminen, H. and J. Sarvala. 1994. Population regulation of vendace (*Coregonus albula*) in Lake Pyhajarvi, southwest Finland. *Journal of Fish Biology* 45:387-400.

Examples

```
data(VendaceLP2)
str(VendaceLP2)
head(VendaceLP2)
plot(recruits~fecundity,data=VendaceLP2)
```

WalleyeConsumption *Consumption of prey by Walleye.*

Description

Consumption of prey by Walleye (*Sander vitreus*) at different prey densities.

Format

A data frame of 23 observations on the following 2 variables:

PreyDensity Density of prey (mg per g per day).

FoodConsump Food consumption by predator (mg per cubic meter)

Topic(s)

- Nonlinear modeling

Source

From Figure 3 in Madenjian, C.P., and S.R. Carpenter. 1991. Individual-based model for growth of young-of-the-year walleye: A piece of the recruitment puzzle. *Ecological Applications*. 1:268-279. Data were originally from Swenson, W. A. 1977. Food consumptions of walleye (*Stizostedion vitreum vitreum*) and sauger (*S. canadense*) in relation to food availability and physical conditions in Lake of the Woods, Minnesota, Shagawa Lake, and western Lake Superior. *Journal of the Fisheries Research Board of Canada* 34:1643-1654. [Madenjian et al. (1991) was (is?) from <http://www.esajournals.org/doi/abs/10.2307/1941756>. Swenson (1977) was (is?) from <http://www.nrcresearchpress.com/doi/10.1139/jfrbc-1977-0229>.]

Examples

```
data(WalleyeConsumption)
str(WalleyeConsumption)
head(WalleyeConsumption)
plot(FoodConsump~PreyDensity,data=WalleyeConsumption,pch=16)
```

WalleyeEL *Stock and recruitment data for Walleye from Escanaba Lake, WI, 1958-1992.*

Description

Abundance of age-0 and age-5 and older Walleye (*Sander vitreus*), abundance of adult Yellow Perch (*Perca flavescens*), and coefficient of variation of May temperatures for Escanaba Lake, WI, 1958-1992.

Format

A data frame of 39 observations on the following 5 variables:

yrclass Year-class of the data

age0 Abundance of age-0 Walleye (recruits)

age5 Abundance of age-5 and older Walleye (stock)

maycv Coefficient of variation of May temperatures in birth year

yep Abundance of adult (larger than 152.4 mm) Yellow Perch

Topic(s)

- Stock-Recruit
- Recruitment

Source

Hansen, M. J., M. A. Bozek, J. R. Newby, S. P. Newman, and M. D. Staggs. 1998. Factors affecting recruitment of walleyes in Escanaba Lake, Wisconsin, 1958-1995. *North American Journal of Fisheries Management* 18:764-774.

Examples

```
data(WalleyeEL)
str(WalleyeEL)
head(WalleyeEL)
op <- par(mfrow=c(1,2),pch=19)
plot(age0~yrclass,data=WalleyeEL,type="l")
plot(age0~age5,data=WalleyeEL)
par(op)
```

WalleyeErie

Recruitment time-series for Walleye in Lake Erie, 1959-1972.

Description

Walleye (*Sander vitreus*) recruitment time-series for Lake Erie, 1959-1972.

Format

A data frame of 14 observations on the following 6 variables:

year Year of data.

recruits Number of recruits (per 1000 ft of net).

Topic(s)

- Recruitment time-series

Source

From Wolfert, D. R. 1981. The commercial fishery for walleyes in New York waters of Lake Erie, 1959-1978. *North American Journal of Fisheries Management* 1: 112-126. Obtained from Ransom Myers online database which was (is?) at <http://ram.biology.dal.ca/~myers/data.html>.

Examples

```
data(WalleyeErie)
str(WalleyeErie)
head(WalleyeErie)
plot(recruits~year, data=WalleyeErie, type="l")
```

WalleyeErie2

Biological data for Walleye from Lake Erie, 2003-2014.

Description

Walleye (*Sander vitreus*) biological data (length, weight, sex, maturity, and age) from several locations in Lake Erie, October-November of 2003-2014.

Format

A data frame of 33734 observations on the following 10 variables:

setID Unique gear (multifilament gill net keged 6 ft below surface) set identification number.

loc Regional location (1=Toledo to Huron, 2=Huron to Fairport Harbor, 3=Fairport Harbor to Conneaut).

grid 2.5-minute sampling grid location.

year Year of data.

tl Total length (mm).

w Weight (g). There are several missing values.

sex Sex (female, male).

mat Maturity (immature, mature).

age Age (yrs) from otoliths.

Topic(s)

- Growth
- von Bertalanffy
- Weight-Length
- Catch curve
- Mortality
- Maturity
- Size Structure
- Length Frequency
- Condition

Source

These unpublished data are from the Ohio Department of Natural Resources, Division of Wildlife (via Christopher Vandergoot). **Do not use for other than educational purposes without permission from the source.**

Examples

```
data(WalleyeErie2)
str(WalleyeErie2)
head(WalleyeErie2)
xtabs(~year+loc+sex,data=WalleyeErie2)
```

 WalleyeKS

Catch-at-age for Walleye from eight Kansas reservoirs.

Description

Catch-at-age for Walleye (*Sander vitreus*) from eight Kansas reservoirs during 1991-1999.

Format

A data frame with 66 observations on the following 3 variables.

reservoir Reservoir (Cedar.Bluff, Cheney, Glen.Elder, Kirwin, Lovewell, Marion, Webster, Wilson)

age Age of fish at capture

catch Number of fish captured

Topic(s)

- Mortality
- Catch curve

Note

The authors used all age-2 and older Walleye to construct the catch curves.

Source

From Figure 2 of Quist, M.C., J.L. Stephen, C.S. Guy, and R.D. Schultz. 2004. Age structure and mortality of Walleyes in Kansas reservoirs: Use of mortality caps to establish realistic management objectives. *North American Journal of Fisheries Management* 24:990-1002.

Examples

```
data(WalleyeKS)
str(WalleyeKS)
head(WalleyeKS)
op <- par(mfrow=c(2,2),mar=c(3,3,2,1),mgp=c(1.75,0.5,0),tcl=-0.2,pch=19)
plot(log(catch)~age,data=WalleyeKS,subset=(reservoir=="Cedar.Bluff"),main="Cedar Bluff")
plot(log(catch)~age,data=WalleyeKS,subset=(reservoir=="Cheney"),main="Cheney")
plot(log(catch)~age,data=WalleyeKS,subset=(reservoir=="Glen.Elder"),main="Glen Elder")
plot(log(catch)~age,data=WalleyeKS,subset=(reservoir=="Kirwin"),main="Kirwin")
plot(log(catch)~age,data=WalleyeKS,subset=(reservoir=="Lovewell"),main="Lovewell")
plot(log(catch)~age,data=WalleyeKS,subset=(reservoir=="Marion"),main="Marion")
plot(log(catch)~age,data=WalleyeKS,subset=(reservoir=="Webster"),main="Webster")
plot(log(catch)~age,data=WalleyeKS,subset=(reservoir=="Wilson"),main="Wilson")
par(op)
```

WalleyeML

Back-calculated lengths-at-age for Walleye from Lake Mille Lacs, 2000-2011.

Description

Back-calculated lengths-at-age for Walleye (*Sander vitreus*) from Lake Mille Lacs. Walleye were captured by Minnesota Department of Natural Resources personnel in fishery-independent gillnets (five multifilament nylon mesh panels with each panel measuring 15.2 m wide and 1.8 m high; bar-measure mesh sizes of the panels were 19.1, 25.4, 31.7, 38.1, and 50.8 mm) set in the fall (mid September to early October) from 2000 to 2011.

Format

A data frame of 14583 observations on the following 9 variables:

ID A unique fish identification number.

Year Year of data.

Sex Sex (female, male).

Est.Age Estimated (from otoliths) age (yrs) at capture.

TL Total length (mm).

Scale.Rad Total scale radius (mm) at capture.

Dist.Ann Scale radius (mm) to annulus given in BC.Age.

BC.Age Annulus or previous age.

BC.Len Back-calculated length at BC.Age. Lengths were back-calculated using the *Scale-Proportional Hypothesis* method.

Topic(s)

- Growth
- von Bertalanffy
- Back-calculation

Source

These unpublished data are from the Minnesota Department of Natural Resources, Section of Fisheries (via Melissa Trembl). **Do not use for other than educational purposes without permission from the source.**

Examples

```
data(WalleyeML)
str(WalleyeML)
head(WalleyeML)
xtabs(~Year+Est.Age+Sex,data=WalleyeML)
```

WalleyeMN06a

Catch-at-age for Walleye.

Description

Catch-at-age for Walleye (*Sander vitreus*) collected from four lakes in Northern Minnesota, USA.

Format

A data frame with 52 observations on the following 3 variables.

lake A factor vector of collection lake (Crooked, Fourmile, Island, Tom)

age A numeric vector of assigned ages (from dorsal spines)

number A numeric vector of number of fish

Topic(s)

- Mortality
- Catch curve

Source

From various tables in Borkholder, B.D., A.J. Edwards, and C. Olson. 2007. Spring adult and fall juvenile walleye population surveys within the 1854 ceded territory of Minnesota, 2006. Fond du Lac Division of Resource Management, Technical Report 41. [Was (is?) from <http://www.1854treatyauthority.org/cms/files/REP9>]

Examples

```
data(WalleyeMN06a)
str(WalleyeMN06a)
head(WalleyeMN06a)
op <- par(mfrow=c(2,2),pch=19)
plot(log(number)~age,data=WalleyeMN06a,subset=lake=="Crooked")
plot(log(number)~age,data=WalleyeMN06a,subset=lake=="Fourmile")
plot(log(number)~age,data=WalleyeMN06a,subset=lake=="Island")
plot(log(number)~age,data=WalleyeMN06a,subset=lake=="Tom")
par(op)
```

WalleyeMN06b

Summarized multiple mark-recapture data for Walleye from four lakes in Northern Minnesota.

Description

Summary results of capture histories (number captured, number of recaptured fish, and number of unmarked fish that were marked) for Walleye (*Sander vitreus*) collected from four lakes in Northern Minnesota, USA.

Format

A data frame with 20 observations on the following 5 variables.

lake Studied lake (Crooked, Fourmile, Island, Tom)

date Capture date

catch Total fish captured in each sample

recap Marked fish captured in each sample

retMark Marked fish returned to the population

Topic(s)

- Population Size
- Abundance
- Mark-Recapture
- Capture-Recapture
- Schnabel
- Schumacher-Eschmeyer

Source

From appendix 2 in Borkholder, B.D., A.J. Edwards, and C. Olson. 2007. Spring adult and fall juvenile walleye population surveys within the 1854 ceded territory of Minnesota, 2006. Fond du Lac Division of Resource Management, Technical Report 41. [Was (is?) from <http://www.1854treatyauthority.org/cms/files/REP9>

Examples

```
data(WalleyeMN06b)
str(WalleyeMN06b)
head(WalleyeMN06b)
```

WalleyePL

Summarized multiple mark-recapture data for YOY walleye.

Description

The numbers of young-of-year walleye (*Sander vitreus*) that were captured, found to have previous marks (i.e., recaptured), and were newly marked on several sampling occasions in 1959, 1960, 1961, and 1962 in Pike Lake, Wisconsin.

Format

A data frame with 33 observations on the following 5 variables:

year Sampling year

t Sampling occasion within each year

caught Number of walleye captured

recaptures Number of marked walleyes captured

newmarks Number of unmarked walleyes that were captured, marked, and returned to the population

Topic(s)

- Population Size
- Abundance
- Mark-Recapture
- Capture-Recapture
- Schnabel
- Schumacher-Eschmeyer

Source

From table 3 of Mraz, D. 1968. Recruitment, growth, exploitation, and management of walleyes in a southeastern Wisconsin lake. Wisconsin Department of Natural Resources Technical Bulletin 40. 38 pages.

Examples

```
data(WalleyePL)
str(WalleyePL)
WalleyePL
subset(WalleyePL, year==1960)
```

WalleyePS

Ages of Walleye assigned from otoliths, scales, and spines.

Description

Age of Pymatuning Sanctuary (PA) Walleye (*Sander vitreus*) assessed from three calcified structures – sectioned otoliths, sectioned dorsal spines, and scale impressions.

Format

A data frame with 61 observations on the following 4 variables:

otolith Age (years) assigned from broken, ground, and polished otolith sections

spine Age (years) assigned from dorsal spine sections

scale Age (years) assigned from scale impressions

sex Sex of fish (female and male)

Topic(s)

- Age Comparison
- Age Precision
- Age Bias
- Ageing Error

Note

Relationships between otoliths and spines and otoliths and scales are exact according to Figure 2. Relationship between spines and scales is approximate as Figure 2 did not show this exact relationship.

Source

From Figure 2 in Kocovsky, P.M., and R.M. Carline. 2000. A comparison of methods for estimating ages of unexploited walleyes. North American Journal of Fisheries Management 20:1044-1048.

Examples

```

data(WalleyePS)
str(WalleyePS)
head(WalleyePS)
op <- par(mfrow=c(3,2),pch=19)
plot(scale~otolith,data=WalleyePS,subset=sex=="female",main="Female")
plot(scale~otolith,data=WalleyePS,subset=sex=="male",main="Male")
plot(scale~spine,data=WalleyePS,subset=sex=="female",main="Female")
plot(scale~spine,data=WalleyePS,subset=sex=="male",main="Male")
plot(spine~otolith,data=WalleyePS,subset=sex=="female",main="Female")
plot(spine~otolith,data=WalleyePS,subset=sex=="male",main="Male")
par(op)

```

WalleyeRL

Growth increment data for Red Lakes Walleye.

Description

Growth increment data for Red Lakes Walleye (*Sander vitreus*) in one-fish-per-line format.

Format

A data frame with 1543 observations on the following 13 variables.

fish A fish identification number. Unique within a year but not across years.

yearcap Year the fish was captured.

ce A factor denoting capture gear (C=commercial and E=experimental nets).

agecap Age of fish at capture.

lencap Length of fish at capture.

inc1 Scale measurement to first annulus.

inc2 Scale measurement between first and second annulus.

inc3 Scale measurement between second and third annulus.

inc4 Scale measurement between third and fourth annulus.

inc5 Scale measurement between fourth and fifth annulus.

inc6 Scale measurement between fifth and sixth annulus.

inc7 Scale measurement between sixth and seventh annulus.

radcap Scale radius at time of capture

Topic(s)

- Growth increment analysis
- Weisberg linear growth model

Note

Data is in one-fish-per-line format.

Source

Cyterski, M.J. and G.R. Spangler. 1996. A tool for age determination. North American Journal of Fisheries Management, 16:403-412.

Examples

```
data(WalleyeRL)
str(WalleyeRL)
head(WalleyeRL)
```

WalleyeWad	<i>Catches-at-age for male and female Walleye from Lake Winnebago, WI, 2010.</i>
------------	--

Description

Catches-at-age for male and female Walleye from Lake Winnebago, WI, 2010.

Format

A data frame with 18 observations on the following 3 variables.

age Age (yrs; from pectoral fin ray)

numF Number of captured females

numM Number of captured males

Details

Koenigs et al. (2015) captured adult Walleye from Lake Winnebago during spawning assessments in 2010. The sex was recorded and ages were estimated from sectioned otoliths for each fish. Koenigs et al. (2015) fit separate catch curves to female and male Walleye.

Topic(s)

- Mortality
- Catch Curve

Note

Used in the [Introductory Fisheries Analyses with R](#) book.

Source

From Koenigs, R.P., Bruch, R.M., Stelzer, R.S., and Kamke, K.K. 2015. Validation of otolith ages for Walleye (*Sander vitreus*) in the Winnebago System. Fisheries Research, 167:13-21. Obtained directly from Ryan Koenigs.

Examples

```
data(WalleyeWad)
str(WalleyeWad)
head(WalleyeWad)
plot(numF~age,data=WalleyeWad)
points(numM~age,data=WalleyeWad,pch=19)
```

WalleyeWyrllng	<i>Annual catches of yearling Walleye in bottom trawls from Lake Winnebago, WI, 1986-2010.</i>
----------------	--

Description

Annual catches of yearling Walleye (*Sander vitreus*) in bottom trawls from Lake Winnebago, WI, 1986-2010.

Format

A data frame with 35 observations on the following 4 variables.

tows Number of trawl tows (i.e., effort)

year Year of capture

yearlings Number of yearling Walleye captured

yrclass Year-class of the captured yearlings (capture year minus 1)

Details

The catch of yearling Walleye and number of trawl tows by year are in this data.frame. The CPE is catch divided by number of tows. Koenigs et al. (2015) rescaled the CPE values to have a mean of 0 and a standard deviation of 1.

Topic(s)

- Year-class Strength
- Recruitment

Note

Used in the [Introductory Fisheries Analyses with R](#) book.

Source

From Koenigs, R.P., Bruch, R.M., Stelzer, R.S., and Kamke, K.K. 2015. Validation of otolith ages for Walleye (*Sander vitreus*) in the Winnebago System. Fisheries Research, 167:13-21. Obtained directly from Ryan Koenigs.

Examples

```
data(WalleyeWyrIng)
str(WalleyeWyrIng)
head(WalleyeWyrIng)
plot(yearlings~yrclass,data=WalleyeWyrIng)
```

WhitefishGSL

Catch-at-age of Great Slave Lake Whitefish (commercial) by area.

Description

Age composition of commercial Whitefish (*Coregonus clupeaformis*) catches for five areas of Great Slave Lake.

Format

A data frame with 16 observations on the following 6 variables:

- age** Assigned ages.
- area.IE** Catches for area IE.
- area.II** Catches for area II.
- area.IV** Catches for area IV.
- area.V** Catches for area V.
- area.IW** Catches for area IW.

Topic(s)

- Mortality
- Catch curve

Note

All data are from summer samples except for Area.IW which is a winter sample

Source

From Table 19 of Mosenko, R.W., and G. Low. 1980. Data from the commercial fishery for lake whitefish *Coregonus clupeaformis* (Mitchill), on Great Slave Lake, Northwest Territories, 1979. Canadian Data Report of Fisheries And Aquatic Sciences, No. 194.

Examples

```

data(WhitefishGSL)
str(WhitefishGSL)
head(WhitefishGSL)
op <- par(mfrow=c(3,2),pch=19)
plot(log(area.IE)~age,data=WhitefishGSL)
plot(log(area.II)~age,data=WhitefishGSL)
plot(log(area.IV)~age,data=WhitefishGSL)
plot(log(area.V)~age,data=WhitefishGSL)
plot(log(area.IW)~age,data=WhitefishGSL)
par(op)

# can be reshaped to 'long' format with
## Not run:
library(reshape)
WhitefishGSL1 <- melt(WhitefishGSL,id.vars="age")
names(WhitefishGSL1) <- c("age","area","number")

## End(Not run)

```

WhitefishLS

Landings and value of Lake Superior Lake Whitefish.

Description

Landings and value of Lake Whitefish *Coregonus clupeaformis* in Lake Superior by state from 1971-2001.

Format

A data frame with 12 observations on the following 4 variables:

year Year of catch.
state State of catch (MI, MN, or WI).
catch Catch in lbs.
value Value of catch in dollars.

Topic(s)

- Other

Source

Results from a query in 2006 to the NMFS Great Lakes Commercial Fishery Landings database which was (is?) at http://www.st.nmfs.noaa.gov/pls/webpls/webst1.MF_GL_SPECIES_HELP.SPECIES.

Examples

```
data(WhitefishLS)
str(WhitefishLS)
head(WhitefishLS)
```

WhitefishMB	<i>Ages of Lake Whitefish from four lakes assigned from scales and fin-rays.</i>
-------------	--

Description

Ages of Lake Whitefish (*Coregonus clupeaformis*) from four lakes as determined by scales and fin-rays.

Format

A data frame with 859 observations on the following 3 variables:

fin Ages assigned from fin-ray sections

scale Ages assigned from scales

lake Lake from which the fish was captured (L122, L226, Huron, or Dezadeash)

Topic(s)

- Age Comparison
- Age Precision
- Age Bias
- Ageing Error

Source

From (approximately) Figure 1 of Mills, K.H., and R.J. Beamish. 1980. Comparison of fin-ray and scale age determinations for lake whitefish (*Coregonus clupeaformis*) and their implications for estimates of growth and annual survival. Canadian Journal of Fisheries and Aquatic Sciences, 37:534-544.

Examples

```
data(WhitefishMB)
str(WhitefishMB)
head(WhitefishMB)
op <- par(mfrow=c(2,2),pch=19)
plot(scale~fin,data=WhitefishMB,subset=lake=="L122",main="Lake L122")
plot(scale~fin,data=WhitefishMB,subset=lake=="L226",main="Lake L226")
plot(scale~fin,data=WhitefishMB,subset=lake=="Huron",main="Huron")
plot(scale~fin,data=WhitefishMB,subset=lake=="Dezadeash",main="Dezadeash")
par(op)
```

WhitefishTB	<i>Stock and recruitment data for Lake Whitefish in Thunder Bay, Lake Superior, 1975-1988.</i>
-------------	--

Description

Lake Whitefish (*Coregonus clupeaformis*) stock, recruitment, landings, and fishing mortality by year, 1975-1988.

Format

A data frame of 14 observations on the following 5 variables:

year Year of data

ssb Spawning stock biomass (in tonnes)

rec Recruits (in thousands)

land Landings (in tonnes)

fmort Fishing related mortality (natural mortality was assumed to be 0.3)

Topic(s)

- Stock-Recruit
- Recruitment

Source

From Petzold, M. 1995. An historical analysis of the Lake Whitefish fisheries of Thunder Bay (Zone 1) and Whitefish Bay (Zone 34), Lake Superior. Ontario Min. of Nat. Res. unpubl. manuscript. Obtained from Ransom Myers online database which was (is?) at <http://ram.biology.dal.ca/~myers/data.html>.

Examples

```
data(WhitefishTB)
str(WhitefishTB)
head(WhitefishTB)
op <- par(mfrow=c(1,2),pch=19)
plot(rec~year,data=WhitefishTB,type="b")
plot(rec~ssb,data=WhitefishTB)
par(op)
```

WhiteGrunt1	<i>Catch-at-age for White Grunt.</i>
-------------	--------------------------------------

Description

Catch-at-age for White Grunt (*Haemulon plumierii*) collected from the central coast of Brazil.

Format

A data frame with 25 observations on the following 2 variables.

age A numeric vector of assigned ages (from otoliths).

catch A numeric vector of number of fish.

Topic(s)

- Mortality
- Catch curve

Source

From Figure 7 of Araujo, J.N. and A.S. Martins. 2007. Age, growth and mortality of white grunt (*Haemulon plumierii*) from the central coast of Brazil. *Scientia Marina* 71:793-800.

Examples

```
data(WhiteGrunt1)
str(WhiteGrunt1)
head(WhiteGrunt1)
plot(log(catch)~age,data=WhiteGrunt1)
```

WhiteGrunt2	<i>Ages, lengths, and sexes of White Grunt.</i>
-------------	---

Description

Ages, lengths, and sexes of White Grunt (*Haemulon plumierii*) collected from the central coast of Brazil

Format

A data frame with 465 observations on the following 3 variables.

age Age (from otoliths to the nearest 0.1 years)

tl Total length (mm)

sex Sex (male and female)

Topic(s)

- Growth
- von Bertalanffy

Source

From (approximately) Figure 6 of Araujo, J.N. and A.S. Martins. 2007. Age, growth and mortality of white grunt (*Haemulon plumieri*) from the central coast of Brazil. *Scientia Marina* 71:793-800.

Examples

```
data(WhiteGrunt2)
str(WhiteGrunt2)
head(WhiteGrunt2)
op <- par(mfrow=c(1,2),pch=19)
plot(tl~age,data=WhiteGrunt2,subset=sex=="female",main="Female")
plot(tl~age,data=WhiteGrunt2,subset=sex=="male",main="Male")
par(op)
```

WShrimpGA

Stock and recruitment data for White Shrimp off the coast of Georgia (USA), 1979-2000.

Description

White Shrimp (*Litopenaeus setiferus*) stock and recruitment data from off the coast of Georgia (USA), 1979-2000.

Format

A data frame with 22 observations on the following 3 variables:

year Year of data

stock Spawning stock index – CPUE in June assessment surveys

recruits Recruit index – commercial landings in pounds from Aug-Jan

yrconf A code of confidence for whether or not the stock value is known to come from the year shown (see the note)

Topic(s)

- Stock-Recruit
- Recruitment

Note

No graph was shown for stock values vs. year so some stock values had to be haphazardly paired with recruit values – especially for stock values between 2.5 and 3.0.

Source

From (approximately) Figures 2 and 3 of Belcher, C.N., and C.A. Jennings. 2004. Evaluation of stock-recruitment curves for white shrimp in Georgia. *North American Journal of Fisheries Management*. 24:654-661.

Examples

```
data(WShrimpGA)
str(WShrimpGA)
head(WShrimpGA)
op <- par(mfrow=c(1,2),pch=19)
plot(recruits~year,data=WShrimpGA,type="b")
plot(recruits~stock,data=WShrimpGA)
par(op)
```

 YERockfish

Ages, lengths, and maturity for Yelloweye Rockfish.

Description

Ages, lengths, and maturity for female Yelloweye Rockfish (*Sebastes rubberimus*) from Oregon.

Format

A data frame with 159 observations on the following 5 variables.

date Date fish was collected

length Total length (cm)

age Otolith age

maturity Maturity state (Immature or Mature)

stage Stage of maturity (1:Immature, 2:Maturing, 3:Mature, 4:Fertilized, 5:Ripe, 6:Spent, 7:Resting)

Topic(s)

- Growth
- Maturity
- von Bertalanffy

Source

Obtained directly (from Bob Hannah). Data were used in Hannah, R.W, M.T.O. Blume, and J.E. Thompson. 2009. Length and age at maturity of female yelloweye rockfish (*Sebastes rubberimus*) and cabezon (*Scorpaenichthys marmoratus*) from Oregon waters based on histological evaluation of maturity. Oregon Department of Fish and Wildlife, Information Reports 2009-04. [Was (is?) from http://www.dfw.state.or.us/mrp/publications/docs/Info200904_YlwEyeRF_Maturity.pdf]

Examples

```

data(YERockfish)
str(YERockfish)
head(YERockfish)
op <- par(mfrow=c(2,2),pch=19)
plot(length~age,data=YERockfish,ylab="Total Length (cm)",xlab="Age")
hist(YERockfish$length,xlab="Total Length (cm)",main="")
tbl1 <- with(YERockfish,table(age,maturity))
(ptbl1 <- prop.table(tbl1,margin=1))
plot(ptbl1[,2]~as.numeric(row.names(ptbl1)),type="l",xlab="Age",ylab="Proportion Mature")
tbl2 <- with(YERockfish,table(length,maturity))
(ptbl2 <- prop.table(tbl2,margin=1))
plot(ptbl2[,2]~as.numeric(row.names(ptbl2)),type="l",xlab="Age",ylab="Proportion Mature")
par(op)

```

YPerchCBI

*Catch-at-age for Yellow Perch from Chequamegon Bay, Lake Superior.***Description**

Catch-at-age for Yellow Perch (*Perca flavescens*) from Chequamegon Bay, Lake Superior, 1973-1988.

Format

A data frame with 39 observations on the following 5 variables.

age Age in that capture year (1973-1988).

year73 Number of fish at each age in capture year 1973.

year74 Number of fish at each age in capture year 1974.

year75 Number of fish at each age in capture year 1975.

year76 Number of fish at each age in capture year 1976.

year77 Number of fish at each age in capture year 1977.

year78 Number of fish at each age in capture year 1978.

year79 Number of fish at each age in capture year 1979.

year80 Number of fish at each age in capture year 1980.

year81 Number of fish at each age in capture year 1981.

year82 Number of fish at each age in capture year 1982.

year83 Number of fish at each age in capture year 1983.

year84 Number of fish at each age in capture year 1984.

year85 Number of fish at each age in capture year 1985.

year86 Number of fish at each age in capture year 1986.

year87 Number of fish at each age in capture year 1987.

year88 Number of fish at each age in capture year 1988.

Topic(s)

- Mortality
- Catch curve

Source

From Table 1 in Bronte, C.R., J.H. Selgeby, D.V.Swedberg. 1993. Dynamics of a yellow perch population in Western Lake Superior. *North American Journal of Fisheries Management* 13:511-523.

Examples

```

data(YPerchCB1)
str(YPerchCB1)
head(YPerchCB1)
max.n <- max(YPerchCB1[,-1]) # maximum catch
op <- par(mfrow=c(4,4),mar=c(3.5,3.5,1,1),mgp=c(2,0.75,0))
plot(log(year73)~age,data=YPerchCB1,ylim=c(0,log(max.n)),main="1973")
plot(log(year74)~age,data=YPerchCB1,ylim=c(0,log(max.n)),main="1974")
plot(log(year75)~age,data=YPerchCB1,ylim=c(0,log(max.n)),main="1975")
plot(log(year76)~age,data=YPerchCB1,ylim=c(0,log(max.n)),main="1976")
plot(log(year77)~age,data=YPerchCB1,ylim=c(0,log(max.n)),main="1977")
plot(log(year78)~age,data=YPerchCB1,ylim=c(0,log(max.n)),main="1978")
plot(log(year79)~age,data=YPerchCB1,ylim=c(0,log(max.n)),main="1979")
plot(log(year80)~age,data=YPerchCB1,ylim=c(0,log(max.n)),main="1980")
plot(log(year81)~age,data=YPerchCB1,ylim=c(0,log(max.n)),main="1981")
plot(log(year82)~age,data=YPerchCB1,ylim=c(0,log(max.n)),main="1982")
plot(log(year83)~age,data=YPerchCB1,ylim=c(0,log(max.n)),main="1983")
plot(log(year84)~age,data=YPerchCB1,ylim=c(0,log(max.n)),main="1984")
plot(log(year85)~age,data=YPerchCB1,ylim=c(0,log(max.n)),main="1985")
plot(log(year86)~age,data=YPerchCB1,ylim=c(0,log(max.n)),main="1986")
plot(log(year87)~age,data=YPerchCB1,ylim=c(0,log(max.n)),main="1987")
plot(log(year88)~age,data=YPerchCB1,ylim=c(0,log(max.n)),main="1988")
par(op)
op <- par(mfrow=c(1,2),mar=c(3.5,3.5,1,1),mgp=c(2,0.75,0))

## plot for 1973 and 1982 year-classes (be very careful)
# get 1973 year-class as diagonal for ages 0-9 and years 1973-1982
yc73 <- diag(as.matrix(YPerchCB1[,2:11]))
plot(log(yc73)~YPerchCB1$age,main="1973 Year-Class")
yc82 <- diag(as.matrix(YPerchCB1[1:7,11:17]))
plot(log(yc82)~YPerchCB1$age[1:7],main="1982 Year-Class")

```

Description

Yellow Perch (*Perca flavescens*) stock-recruitment by year-class in Chequamegon Bay, 1975-1986.

Format

A data frame with 12 observations on the following 2 variables:

yrclass Year-class (see below)

stock Estimated numbers of mature females caught the year prior to the origin of the 1975-1986 year classes

recruits Catches of age-2 fish (when the year-class is formed)

Topic(s)

- Stock-Recruit
- Recruitment

Source

From (approximately) Figure 7 in Bronte et al. 1993. Dynamics of a yellow perch population in Western Lake Superior. North American Journal of Fisheries Management. 13:511-523.

Examples

```
data(YPerchCB2)
str(YPerchCB2)
head(YPerchCB2)
op <- par(mfrow=c(1,2),pch=19)
plot(recruits~yrclass,data=YPerchCB2,type="b")
plot(recruits~stock,data=YPerchCB2)
par(op)
```

YPerchGB

Recruitment time-series for Yellow Perch in Green Bay, 1978-1992.

Description

Yellow Perch (*Perca flavescens*) recruitment time-series for Green Bay, 1978-1992.

Format

A data frame with 15 observations on the following 2 variables:

year Year of data.

recruits Number of recruits (thousands per hour).

Topic(s)

- Recruitment time-series

Source

From Walters, C., and A. Punt. 1994. Placing odds on sustainable catch virtual population analysis and survey data. *Canadian Journal of Fisheries and Aquatic Sciences*, 51:946-958. Obtained from Ransom Myers online database which was (is?) at <http://ram.biology.dal.ca/~myers/data.html>.

Examples

```
data(YPerchGB)
str(YPerchGB)
head(YPerchGB)
plot(recruits~year, data=YPerchGB)
```

YPerchGL

Lengths and weights of Yellow Perch from Grafton Lake (ME) by year.

Description

Yellow Perch (*Perca flavescens*) fork lengths and weights seperated by year.

Format

A data frame with 100 observations on the following 3 variables:

fl Fork Length (nearest mm) at capture

w Weight (nearest 0.1 g) at capture

year Year of capture (1994 or 2000)

Topic(s)

- Weight-Length
- Length Frequency

Source

From (approximately) Figure 3 in Brylinsky, M. 2001. An evaluation of changes in the yellow perch (*Perca flavescens*) population of Grafton Lake, Kejimikujik National Park, after dam removal. Technical Report Publication No. 59, Acadia Centre for Estuarine Research.

Examples

```

data(YPerchGL)
str(YPerchGL)
head(YPerchGL)
op <- par(mfrow=c(1,2),pch=19)
plot(w~f1,data=YPerchGL,subset=year==1994,main="1994")
plot(w~f1,data=YPerchGL,subset=year==2000,main="2000")
par(op)

```

YPerchRL

Recruitment time-series for Yellow Perch in Red Lakes, MN, 1942-1960.

Description

Yellow Perch (*Perca flavescens*) recruitment time-series for Red Lakes, MN, 1942-1960.

Format

a data.frame with:

year Year of data.

recruits CPUE of recruits (relative to a mean).

Topic(s)

- Recruitment time-series

Source

From Smith, L.L. Jr. 1977. Walleye (*Stizostedion vitreum*) and yellow perch (*Perca flavescens*) populations and fisheries of the Red Lakes, Minnesota, 1930-75. J. Fish. Res. Board Can. 34: 1774-1783. Obtained from Ransom Myers online database which was (is?) at <http://ram.biology.dal.ca/~myers/data.html>.

Examples

```

data(YPerchRL)
str(YPerchRL)
head(YPerchRL)
plot(recruits~year,data=YPerchRL)

```

YPerchSB	<i>Stock and recruitment data for Yellow Perch from South Bay, Lake Huron, 1950-1983.</i>
----------	---

Description

Yellow Perch (*Perca flavescens*) stock and recruitment by year in South Bay, Lake Huron, 1950-1983.

Format

A data frame with 15 observations on the following 3 variables:

year Year of data

stock Spawning stock (number per set)

recruits Recruits (number per set)

Topic(s)

- Stock-Recruit
- Recruitment

Source

From Henderson, B.A. 1985. Factors affecting growth and recruitment of yellow perch, *Perca flavescens* Mitchill, in South Bay, Lake Huron. Journal of Fisheries Biology 26:449-458. Obtained from Ransom Myers online database which was (is?) at <http://ram.biology.dal.ca/~myers/data.html>.

Examples

```
data(YPerchSB)
str(YPerchSB)
head(YPerchSB)
op <- par(mfrow=c(1,2),pch=19)
plot(recruits~year,data=YPerchSB,type="b")
plot(recruits~stock,data=YPerchSB)
par(op)
```

YPerchSB1	<i>Lengths for Yellow Perch from two locations in Saginaw Bay, Lake Michigan.</i>
-----------	---

Description

Length measurements for Yellow Perch (*Perca flavescens*) from two locations – inner and outer bay – in Saginaw Bay, Lake Michigan.

Format

A data frame with 2074 observations on the following 2 variables:

- tl** Measured total length (cm).
- loc** Location of capture (inner or outer).

Topic(s)

- Length Frequency
- Size Structure
- PSD

Source

Simulated (uniform distribution of values within length bin) from summarized length frequencies in Figure 2 (top) in Diana, J.S. and R. Salz. 1990. Energy storage, growth, and maturation of yellow perch from different locations in Saginaw Bay, Michigan. Transactions of the American Fisheries Society 119:976-984.

Examples

```
data(YPerchSB1)
str(YPerchSB1)
head(YPerchSB1)
op <- par(mfrow=c(1,2),pch=19)
with(subset(YPerchSB1,loc=="inner"),hist(tl,main="Inner"))
with(subset(YPerchSB1,loc=="outer"),hist(tl,main="Outer"))
par(op)
```

YPerchTL

Lengths and weights for Yellow Perch from Trout Lake, WI.

Description

Lengths and weights for Yellow Perch (*Perca flavescens*) from Trout Lake, WI, 1981-2006. Fish were collected with a variety of gears.

Format

A data frame with 7238 observations on the following 7 variables:

lakeid Lake name (all TR=Trout Lake)

year4 Year of capture

sampledate Date of capture

gearid Capture gear type – beach seine (BSEINE), crayfish trap (CRAYTR), electrofishing (ELFISH), fyke net (FYKNET), trammel net (TRAMML), vertical gillnets of different mesh sizes (VBN0XX), and different types of fyke nets (FYKNED and FYKNEL)

spname Species name (all YELLOWPERCH)

length Total Length (nearest mm) at capture

weight Weight (nearest 0.1 or 1 g) at capture

Topic(s)

- Weight-Length
- Length Frequency
- Size Structure
- PSD

Source

From a query to the North Temperate Lakes Long Term Ecological Research, Fish Lengths and Weights Database which was (is?) at <https://lter.limnology.wisc.edu/dataset/north-temperate-lakes-lter-fish-lengths-and-weights-1981-current>.

Examples

```
data(YPerchTL)
str(YPerchTL)
head(YPerchTL)
plot(weight~length, data=YPerchTL)
```

YTFloUNDER

Ages of Yellowtail Flounder assigned from scales and otoliths.

Description

Ages of commercially caught Georges Bank Yellowtail Flounder (*Limanda ferruginea*) as determined by scales, whole otoliths, or otolith cross-sections.

Format

A data frame with 27 paired observations on the following 3 variables.

scale Ages assigned from scales

whole Ages assigned from whole otoliths

cross Ages assigned from cross-sections of otoliths

Topic(s)

- Age Comparison
- Age Precision
- Age Bias
- Ageing Error

Source

From tables in Annex 3 of Walsh, S.J. and J. Burnett. 2002. The Canada-United States yellowtail flounder age reading workshop: 28-30 November 2000, St. John's, Newfoundland. North Atlantic Fisheries Organization. Scientific Council Studies 35:1-59.

Examples

```
data(YTFloUNDER)
str(YTFloUNDER)
head(YTFloUNDER)
op <- par(mfrow=c(2,2),pch=19)
plot(scale~whole,data=YTFloUNDER)
plot(scale~cross,data=YTFloUNDER)
plot(whole~cross,data=YTFloUNDER)
par(op)
```

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