Testing the ASL\_boilerplate function

## age length

## stratified

## known

The proportion of each age category *z* will be estimated for each sampling stratum *t* as follows:

in which equals the number of fish sampled during sampling stratum classified as age category , and equals the number of fish sampled for age determination within sampling stratum .

The sampling variance of will be estimated as the following (Cochran 1977), in which represents the total abundance of fish in sampling stratum *t*:

The total abundance by age category in each sampling stratum will be estimated as follows:

with variance estimated as

The total abundance by age category and its variance will then be estimated by summation as follows:

and

where equals the number of sampling strata.

Finally, the overall proportion by age category and its variance will be estimated as follows:

and

where is the total abundance across all sampling periods.

The mean length by age for each sampling stratum will be estimated as follows:

where is the length of the *i*th fish sampled of age category during sampling stratum .

The sampling variance of will be estimated as

The mean length by age category will then be estimated as follows:

with its variance approximated using a Taylor’s series expansion (Mood et al. 1974):

## References

Cochran, W. G. 1977. *Sampling techniques*. 3rd edition. John Wiley and Sons, New York.

Mood, A. M., F. A. Graybill, and D. C. Boes. 1974. *Introduction to the theory of statistics*. 3rd edition. McGraw-Hill Book Co., New York.

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## age length

## stratified

## estimated

The proportion of each age category *z* will be estimated for each sampling stratum *t* as follows:

in which equals the number of fish sampled during sampling stratum classified as age category , and equals the number of fish sampled for age determination within sampling stratum .

The sampling variance of will be estimated as the following:

The total abundance by age category in each sampling stratum will be estimated as follows:

with variance estimated as (Goodman 1960):

The total abundance by age category and its variance will then be estimated by summation as follows:

and

where equals the number of sampling strata.

Finally, the overall proportion by age category and its variance will be estimated as follows:

with variance estimated by the delta method (Casella & Berger 2002) as:

in which

The mean length by age for each sampling stratum will be estimated as follows:

where is the length of the *i*th fish sampled of age during sampling stratum .

The sampling variance of will be estimated as

The mean length by age category will then be estimated as follows:

with its variance approximated using a Taylor’s series expansion (Mood et al. 1974):

## References

Casella, George and Roger L. Berger. 2002. *Statistical Inference*. Australia ; Pacific Grove, CA, Thomson Learning

Cochran, W. G. 1977. *Sampling techniques*. 3rd edition. John Wiley and Sons, New York.

Goodman, L.A., 1960. On the exact variance of products. *Journal of the American statistical association, 55*(292), pp.708-713.

Mood, A. M., F. A. Graybill, and D. C. Boes. 1974. *Introduction to the theory of statistics*. 3rd edition. McGraw-Hill Book Co., New York.

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## age length

## stratified

## unknown

The proportion of each age category *z* will be estimated for each sampling stratum *t* as follows:

in which equals the number of fish sampled during sampling stratum classified as age category , and equals the number of fish sampled for age determination within sampling stratum .

The sampling variance of will be estimated as the following (Cochran 1977):

The overall proportion by age category and its variance will be estimated as follows, in which represents the sampling weight associated with stratum *t* and *L* equals the number of strata. It is worth noting that weights are treated as constant (i.e. known without error), therefore all variance estimates must be interpreted as minima without further assumptions.

and

The mean length by age for each sampling stratum will be estimated as follows:

where is the length of the *i*th fish sampled of age during sampling stratum .

The sampling variance of will be estimated as:

The mean length by age category will then be estimated as follows:

with its variance approximated using a Taylor’s series expansion (Mood et al. 1974):

## References

Cochran, W. G. 1977. *Sampling techniques*. 3rd edition. John Wiley and Sons, New York.

Mood, A. M., F. A. Graybill, and D. C. Boes. 1974. *Introduction to the theory of statistics*. 3rd edition. McGraw-Hill Book Co., New York.

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## age length

## pooled

## known

Proportions of each age category will be estimated as follows (Cochran 1977):

and

in which denotes the number of fish sampled in age category , denotes the total number of fish sampled, and *N* denotes the total abundance.

Total abundance for age category will be estimated as

and

The mean length associated with age category will be estimated as the following, in which represents the length of the *i*th fish in age category *z* and represents the number of fish in age category *z* with an associated length measurement:

and

## References

Cochran, W. G. 1977. *Sampling techniques*. 3rd edition. John Wiley and Sons, New York.

R Core Team (2023). *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing, Vienna, Austria. <https://www.R-project.org/>.

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## age length

## pooled

## estimated

Proportions of each age category will be estimated as follows (Cochran 1977):

and

in which denotes the number of fish sampled in age category , denotes the total number of fish sampled, and denotes the estimated abundance.

Total abundance for age category will be estimated as follows (Goodman 1960):

and

The mean length associated with age category will be estimated as the following, in which represents the length of fish *i* within age category category *z*, and denotes the number of fish within age category *z* with an associated length measurement:

and

## References

Cochran, W. G. 1977. *Sampling techniques*. 3rd edition. John Wiley and Sons, New York.

Goodman, L.A., 1960. On the exact variance of products. *Journal of the American statistical association, 55*(292), pp.708-713.

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## age length

## pooled

## unknown

Proportions of each age category will be estimated as follows (Cochran 1977):

and

in which denotes the number of fish sampled in age category , and denotes the total number of fish sampled.

The mean length associated with age category will be estimated as the following, in which denotes the length measurement associated with the *i*th fish in age category *z*:

and

## References

Cochran, W. G. 1977. *Sampling techniques*. 3rd edition. John Wiley and Sons, New York.

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## age

## stratified

## known

The proportion of each age category *z* will be estimated for each sampling stratum *t* as follows:

in which equals the number of fish sampled during sampling stratum classified as age category , and equals the number of fish sampled for age determination within sampling stratum .

The sampling variance of will be estimated as the following (Cochran 1977), in which represents the total abundance of fish in sampling stratum *t*:

The total abundance by age category in each sampling stratum will be estimated as follows:

with variance estimated as

The total abundance by age category and its variance will then be estimated by summation as follows:

and

where equals the number of sampling strata.

Finally, the overall proportion by age category and its variance will be estimated as follows:

and

where is the total abundance across all sampling periods.

## References

Cochran, W. G. 1977. *Sampling techniques*. 3rd edition. John Wiley and Sons, New York.

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## age

## stratified

## estimated

The proportion of each age category *z* will be estimated for each sampling stratum *t* as follows:

in which equals the number of fish sampled during sampling stratum classified as age category , and equals the number of fish sampled for age determination within sampling stratum .

The sampling variance of will be estimated as the following:

The total abundance by age category in each sampling stratum will be estimated as follows:

with variance estimated as (Goodman 1960):

The total abundance by age category and its variance will then be estimated by summation as follows:

and

where equals the number of sampling strata.

Finally, the overall proportion by age category and its variance will be estimated as follows:

with variance estimated by the delta method (Casella & Berger 2002) as:

in which

## References

Casella, George and Roger L. Berger. 2002. *Statistical Inference*. Australia ; Pacific Grove, CA, Thomson Learning

Cochran, W. G. 1977. *Sampling techniques*. 3rd edition. John Wiley and Sons, New York.

Goodman, L.A., 1960. On the exact variance of products. *Journal of the American statistical association, 55*(292), pp.708-713.

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## age

## stratified

## unknown

The proportion of each age category *z* will be estimated for each sampling stratum *t* as follows:

in which equals the number of fish sampled during sampling stratum classified as age category , and equals the number of fish sampled for age determination within sampling stratum .

The sampling variance of will be estimated as the following (Cochran 1977):

The overall proportion by age category and its variance will be estimated as follows, in which represents the sampling weight associated with stratum *t* and *L* equals the number of strata. It is worth noting that weights are treated as constant (i.e. known without error), therefore all variance estimates must be interpreted as minima without further assumptions.

and

## References

Cochran, W. G. 1977. *Sampling techniques*. 3rd edition. John Wiley and Sons, New York.

R Core Team (2023). *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing, Vienna, Austria. <https://www.R-project.org/>.

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## age

## pooled

## known

Proportions of each age category will be estimated as follows (Cochran 1977):

and

in which denotes the number of fish sampled in age category , denotes the total number of fish sampled, and *N* denotes the total abundance.

Total abundance for age category will be estimated as

and

## References

Cochran, W. G. 1977. *Sampling techniques*. 3rd edition. John Wiley and Sons, New York.

R Core Team (2023). *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing, Vienna, Austria. <https://www.R-project.org/>.

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## age

## pooled

## estimated

Proportions of each age category will be estimated as follows (Cochran 1977):

and

in which denotes the number of fish sampled in age category , denotes the total number of fish sampled, and denotes the estimated abundance.

Total abundance for age category will be estimated as follows (Goodman 1960):

and

## References

Cochran, W. G. 1977. *Sampling techniques*. 3rd edition. John Wiley and Sons, New York.

Goodman, L.A., 1960. On the exact variance of products. *Journal of the American statistical association, 55*(292), pp.708-713.

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## age

## pooled

## unknown

Proportions of each age category will be estimated as follows (Cochran 1977):

and

in which denotes the number of fish sampled in age category , and denotes the total number of fish sampled.

## References

Cochran, W. G. 1977. *Sampling techniques*. 3rd edition. John Wiley and Sons, New York.

R Core Team (2023). *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing, Vienna, Austria. <https://www.R-project.org/>.

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## length

## stratified

## known

The mean length for each sampling stratum will be estimated as follows, where is the length of the *i*th fish sampled within sampling stratum , and is the number of fish in stratum *t* sampled for length:

The sampling variance of will be estimated as

Stratified estimates of mean length will be calculated as follows, in which represents the abundance associated with sampling stratum , represents the total abundance, and *L* represents the number of sampling strata:

and

## References

R Core Team (2023). *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing, Vienna, Austria. <https://www.R-project.org/>.

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## length

## stratified

## estimated

The mean length for each sampling stratum will be estimated as follows, where is the length of the *i*th fish sampled within sampling stratum , and is the number of fish in stratum *t* sampled for length:

The sampling variance of will be estimated as

Stratified estimates of mean length will be calculated as follows, in which and represent the estimated abundance and mean length associated with stratum *t*, respectively:

and

in which

and

by means of the delta method (Casella & Berger 2002) and Goodman (1960), respectively.

## References

Casella, George and Roger L. Berger. 2002. *Statistical Inference*. Australia ; Pacific Grove, CA, Thomson Learning

Goodman, L.A., 1960. On the exact variance of products. *Journal of the American statistical association, 55*(292), pp.708-713.

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## length

## stratified

## unknown

The mean length for each sampling stratum will be estimated as follows, where is the length of the *i*th fish sampled within sampling stratum , and is the number of fish in stratum *t* sampled for length:

The sampling variance of will be estimated as:

Stratified estimates of mean length will be calculated as follows, in which and represent the sampling weight and average length associated with sampling stratum , respectively. It is worth noting that weights are treated as constant (i.e. known without error), therefore all variance estimates must be interpreted as minima without further assumptions.

and

## References

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## length

## pooled

## known

The mean length of all fish will be estimated as the following, in which represents the length of the *i*th fish , represents the number of fish with an associated length measurement, and *N* represents the total abundance:

and

## References

R Core Team (2023). *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing, Vienna, Austria. <https://www.R-project.org/>.

Tyers M (2024). *dsftools: Common Tools for Fisheries Analyses*. R package version 0.1.0, <https://github.com/ADFG-DSF/dsftools>.

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## length

## pooled

## estimated

The mean length of all fish will be estimated as the following, in which represents the length of the *i*th fish , represents the number of fish with an associated length measurement, and represents the estimated total abundance:

and

## References

Goodman, L.A., 1960. On the exact variance of products. *Journal of the American statistical association, 55*(292), pp.708-713.

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## length

## pooled

## unknown

The mean length will be estimated as the following, in which denotes the length measurement associated with the *i*th fish and denotes the number of fish with an associated length measurement:

and

## References

R Core Team (2023). *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing, Vienna, Austria. <https://www.R-project.org/>.

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