CHAPTER 16

FISH POPULATION ASSESSMENT: AGE & GROWTH

Age determinations are based on winter changes in growth rates that cause annual marks (annuli) on certain body structures. Growth is the change in length or weight of a fish over time.

Age and growth analysis is required by fishery managers to:

- reveal the general condition of fish populations;
- determine age at first maturity;
- assess stock composition, i.e., age structure determines what age a species will reach a catchable size;
- assess over time environmental problems or improvements which are often reflected by growth rate;
- show normal fluctuations from year to year or region to region (important for comparison studies); and
- reveal fish longevity, mortality and production.

Scales are most commonly used for age determination because they are easy to collect and read. The age and growth of scaleless fishes (i.e. bullhead) can be determined from cross sections of spines or fin rays. Otoliths (ear bones) are sometimes used for age determinations.

Length frequency distributions are also used to show clumping or "distinct peaks" of successive ages about given length ranges, making possible a separation by age groups.

The New Brunswick Department of Natural Resources & Energy developed a computer application (FISHAGE) to analyze fish age and growth information and calculate Fulton's condition factor. Output includes frequency distributions and scatter plots (Appendix E). An age-parasite presence frequency distribution is also provided. Length-weight and age regressions are calculated for combined age classes using Ricker's (1975) regression formula:

$$\log y = a + (b.\log x)$$

The scatter plots exhibit the straight line regression formula and demonstrate the curvilinear structure of the data.

Fulton's condition factor was calculated for:

a) Arabic units: $C = W \cdot 108/L3$

b) Metric units $K = W \cdot 103/L3$

where: W = weight in pounds or grams
L = length in inches or centimeters

The FISHAGE program utilizes data recorded on scale envelopes (Appendix D).

FISHAGE has not been developed to include fish that migrate between fresh and ocean waters, i.e.,

sea run Atlantic salmon. For this species, special notations have been adopted by countries to designate the time in each environment (ICES, 1984).

Fish age and growth data has not yet been incorporated within the Data Warehouse.

References:

Ricker, W.E. 1975. Computation and interpretation of biological statistics of fish populations. Bulletin 191. Department of Environment, Fisheries and Marine Service, Ottawa.

ICES. 1984. Atlantic salmon scale reading. International Council for the Exploration of the Sea Aberdeen, Scotland.