2 OBJECTIVES

The purpose of fish stock assessment is to provide estimates of the state of the stock. The state of a stock is defined by its abundance at a specific time, together with the mortality and growth that control its development. The use of these estimates varies, from ecological studies, where the fish stock is only one of several components of the ecosystem, to fisheries management advice where the stock abundance forms the basis for reviewing different fishing options. Because of this latter application, fish stock assessment pays particular attention to the influence of fishing on stock development. In this case, total mortality is split into changes caused by fishing and changes caused by ”other” factors. This ”other” component can then be broken down into contributions from predation, disease etc.

The fish stock assessment procedure is built of three parts:

- An estimate of the current stock status,
- A projection of the yield, total and spawning stock biomass and recruitment for specified scenarios of fishing mortalities, and
- The relationship between the stock status / projection and a number of biological reference points.

These parts are used to formulate biological advice on fishery management, and evaluate whether the stock is within safe biological limits, i.e. productivity (growth, recruitment) is not adversely affected by fishing.

The stock status is defined by the:

- Stock size, the number of fish by age group at a particular point in time,
- Stock productivity, growth, maturity, fecundity and recruitment, and
- Stock mortality, made up of fishing and natural mortality rates.

This manual focuses on the estimation of the number of fish and the mortality by age group for a series of years. This procedure also provides an estimate of recruitment. The other information necessary for a full assessment, growth, maturity and fecundity, are estimated by other methods than those included in this manual and are not discussed (see Holden and Raitt 1974). However, this information is often needed as input to methods discussed in this manual (e.g. for estimation of yield-per-recruit reference points).

Stock assessment results are usually given as estimates of the state variables of the stock (numbers-at-age) and projections based on estimates of stock dynamics parameters:

- Abundance of older age groups

- Recruitment
- Mortalities exerted on the population by both fishing and natural causes
- Spawning stock biomass
- Growth parameters
- Relating the stock development to a number of biological reference points based on fishing mortality, spawning stock biomass and recruitment.
- Providing projections of yield, spawning stock biomass and recruitment for specified scenarios of fishing mortality over the short (about 2 years), medium (5-10 years) and long (equilibrium) terms.
- Providing an evaluation of the status of the stock within safe biological limits (i.e. productivity not adversely affected by fishing) and outside safe biological limits (i.e. growth and/or recruitment adversely affected by fishing).