



Fish stock assessment and analysis: Methods and applications

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DESCRIPTION

Fish stock assessment and analysis is an important field of study that helps in the management and conservation of fish populations. In this review article, we will provide an overview of the key concepts and methods used in fish stock assessment and analysis. Fish stock assessment is the process of estimating the abundance, growth, mortality, and recruitment of fish populations. It is an essential tool for fishery managers and policymakers to determine the health of fish populations and make informed decisions about fishing regulations. Fish stock assessment also helps to ensure the long-term sustainability of fish populations and the fishing industry.

There are various methods used in fish stock assessment and analysis, including direct and indirect methods. Direct methods involve the measurement and counting of fish populations, while indirect methods use data such as catch rates, size distribution, and tagging studies to estimate population parameters. One of the most commonly used methods in fish stock assessment is the Catch Per Unit Effort (CPUE) method. CPUE is calculated by dividing the total catch by the effort expended in catching the fish. This method is widely used because it is easy to collect data on the total catch and effort expended.

Another method used in fish stock assessment is the stock-recruitment relationship. This method involves the estimation of the relationship between the size of the spawning stock and the number of recruits produced in the following year. This method is useful in predicting future stock sizes and determining sustainable fishing levels. Fish

stock assessment also involves the analysis of data using statistical models such as age-structured models and biomass dynamic models. Age-structured models use data on the age composition of the fish population to estimate growth, mortality, and recruitment rates. Biomass dynamic models use data on the total biomass of the fish population to estimate population parameters.

In recent years, there has been an increasing focus on the use of data from electronic monitoring systems and other sources such as acoustic surveys and DNA analysis in fish stock assessment and analysis. These methods provide more accurate and reliable data, which can improve the accuracy of fish stock assessments and inform better management decisions. DNA analysis has revolutionized the way fish stock assessment is carried out. By analyzing the DNA of fish populations, scientists can accurately identify different fish species, estimate their population size, and assess their genetic diversity.

One of the most common methods of DNA analysis used in fish stock assessment is the Polymerase Chain Reaction (PCR). This technique amplifies specific regions of DNA, making it easier to study and compare genetic variation between individuals and populations. Another technique that is often used in fish stock assessment is DNA barcoding, which involves sequencing a short section of DNA from a standardized region of the genome. By comparing these DNA sequences to a reference database, researchers can identify the species of a fish and determine its origin.

DNA analysis can also provide insights into the reproductive biology of fish populations. For example, by analyzing the genetic structure of a population, scientists can determine whether fish are breeding within a single population or whether they are migrating to breed with other populations.

CONCLUSION

In conclusion, fish stock assessment and analysis is a critical field of study that plays a vital role in the management and conservation of fish populations. The use of direct and indirect methods, statistical models, and new Kenyan technologies can help to improve the accuracy and reliability of fish stock assessments and inform better management decisions. It is essential to continue investing in research and

development in this field to ensure the long-term sustainability of fish populations and the fishing industry.