Computer C Language Program for Calculation of the Estimation of Catch and Effort of Fishing

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ABSTRACT: The quantity of Fishes plays very important roles in marine environment and its function. There is more land is occupied by water so it is difficult to manage. But if it is in the control then the growth of national money population of fishes in marine environment is possibly easy. Until fishing was the need of people for stay live. But then the fishing goes for business and grew in the market. Today's world fish is very traded food for businesses. Fishing is now a trading globally. It held the detail data about the biological characteristics of species or lineage under the fisheries management. This paper has been prepared to simplify the calculations using C language with the project entitled, calculation of the Estimation of the Catch and Effort of Fishing using C language. It includes various formulae and some considerations these are used for developing the calculator for measuring the Catch and Estimation of Effort. It also encapsulates the configuration of the system and information about the used to develop a calculator.

Thompson Compared different measures of fishing efforts in 1916 for the halibut fishery: number and length of trips, number of dories, number of men, and amount of gear.

In the US waters of the Gulf of Mexico shrimp fishery Brunenmeister opted for standardized nominal fishing effort. Firstly make a standard measure of fishing power. These estimates of the relative fishing power is then multiplied by the fishing time measured as number of hours fished. Therefore, a standardized measure of the nominal fishing effort found.

KEYWORDS: marine environment, Fishing, species, C language, fishing effort.

I. INTRODUCTION

The quantity of Fishes plays very important roles in marine environment and its function. Due to fish is the primary protein source in the nature, the peoples are much depends upon the fish. Worldwide the fishing is takes place every day so the population of fishes will goes down if there is no any management and better analysis for increase the population of fishes. There is now days overfishing exist. There is more land is occupied by water so it is difficult to manage. But if it is in the control then the growth of national money population of fishes in marine environment is possibly easy. Until fishing was the need of people for stay live. But then the fishing goes for business and grew in the market. Today's world fish is very traded food for businesses. Fishing is now a trading globally. 'Catch' introduces the total amount of entire fish captured. Food and Agriculture Organization (FAO) gives the reports which was based on data of requested from all countries where the marine environment taken place. For compile a stock assessment catch data are used. It held the detail data about the biological characteristics of species or lineage under the fisheries management.

This paper has been prepared to simplify the calculations using C language with the project entitled, calculation of the Estimation of the Catch and Effort of Fishing using C language, with the focus on the following objectives:

1. To get familiar with the software turbo C++, Version 3.0

2. To determine Estimation of the Catch and Effort of Fishing using C language.

3. To reduce the time required for determining the Estimation of the Catch and Effort of Fishing manually.

II. MATERIALS AND METHODS

This paper deals with the Estimation of the Catch and Estimation of Effort. It includes various formulae and some considerations these are used for developing the calculator for measuring the Catch and Estimation of Effort. It also encapsulates the configuration of the system and information about the used to develop a calculator.

A. Configuration of the System

- ✓ Windows 7 Ultimate
- ✓ Copyright @ 2009 Microsoft Corporation.
- ✓ Processor: Intel (R) Core (TM) i3-3110M CPU @ 2.40 GHz
- ✓ Installed memory (RAM): 4.00 GB (3.39 GB usable)
- ✓ System type: 32 – bit Operating system
- ✓ Pen and Touch: No Pen or Touch Input is available for this display
- ✓ Microsoft® Access 2007
- ➢ **About the platform**
- ✓ Turbo C++
- ✓ Version 3.0
- ✓ Copyright (c)1990, 1992 by Borland International, Inc.

B.Concepts in estimating catch

In most small-scale fishery businesses the amount of data on total landings, species composition, prices, etc., is frequently large, highly distributed and difficult to collect. Due to that the census approach's use is impractical and sampling techniques are nearly always employed. These formulae define a pervasive approach for estimating total catch from basic fishery data which is sample. Such estimation can be works against any reference most broadly a collection of a) a geographical stratum, b) a reference period and c) a specific boat/gear category. The estimation of collateral data such as catch by species, values and average fish size are also presented on the estimated total catch basis.

- **Generic formula for estimating catch**

Total estimated **Catch** from sample CPUE multiplied by estimated effort.

$$\text{Catch} = \text{CPAU} \times \text{Effort} \qquad \qquad \dots (1)$$

Where,

Catch – It refers to all species which are taken jointly and it is normally enumerated within the logical reference of a) a limited geographical area or stratum, b) a given context time period (i.e. A calendar month) and c) a insistent boat/gear category.

 CPUE –   It is an overall average attained from sampling and expressing that how much fish (i.e all species) is caught by a unit efforts. Sampling context or Sampling reference is the same as that for the estimated catch.

Effort (estimated from sample) = introduced uniformly in total number of boat- days within the same logical reference or context which is used for total catch and overall CPUE.

- ### Catch by species

After the process of estimating total catch, species composition is calculated by means of the following formula:

$$\text{Species} = \text{SP} \times \text{Catch} \qquad \dots (2)$$

Where,

Species catch = Species catch is the estimated catch for each species within the estimating context.

SP = It is a fraction of the total catch correspond to a species which is formulated by the proportion of a species that are found in the samples.

Catch = It is the total estimated catch.

- ### Species value

Once the catch by species has been estimated then its value is measured by mean of the below formula:

$$\text{Value} = \text{P} \times \text{Species} \qquad \dots (3)$$

Where,

P is the sample price first-sale of a landed species.

Species is what estimated species catch.

- ### Concepts in estimating effort

In the numerical example discussed above, it can applied the generic approach for find estimate total catch, it was defined that total fishing efforts were known. There are three approaches to the fishing effort estimation of:

1) Census in space and sampling in time;

2) Sampling in space and census in time;

3) Sampling in both space and time.

Their competence is depends on the local environment within the specific region as well as on the human capacity which to conduct the required information or data collection operations.

- ### Census in Space, Sampling in Time

In the figure below all the fishing sites and boats that are shaded to indication that they have been computed. Recording was not performed on all days is indicated by blank boxes in the figure. At the end of the onth total fishing effort is estimated as:

$$E = AverE \times A$$

Where,

AverE = It is the average of fishing effort in the boat-days over the sample days.

A is a uplifting factor indicating total number of days which of fishing activities during the month, i.e. It is calculated in each month.

- ### Census in Time, Sampling in Space

Census in time and sampling in space is shown in the figure above. There are three fishing sites are shaded as partake in the samples. Sampling at these three sites will takes place in every day, as shown in the shaded boxes in that calendar. At the end of the month total fishing effort is calculated by:

$$E = AverF \times F \qquad \dots (5)$$

Where,

AverF is the fishing effort average that deployed in during the month by a single fishing unit and it is append only to the sampling locations where information is collected.

F is a raising factor that indicating the fishing unit's total number which is likely sustaining at all sites of fishing.

- ### Sampling in Space and in Time

In this approach the fishing sites are sampled over ten days. The formula for Total Fishing Effort is described by the formula:

$$Effort = BAC \times F \times A \qquad \dots (6)$$

Where,

BAC is the Boat Activity Coefficient. It express the probability which any boat (fishing unit) will be active (fishing) on any day during that specific month.

F is a raising factor. It express the total number of fishing units which are likely sustain at all there fishing.

A is a raising time factor that express a total number of days by holding fishing activities during a month.

C. Source code for calculation Estimation of the Catch and Estimation of Effort using C language

```
#include <stdio.h>
#include<math.h>
#include<conio.h>
void main()
{
```

```c
   float  CPUE,E,Catch,Species,SP,P,Value,AverE,A,AverF,F,BAC;      /* This parameter for estimating Catch and
       Effort */

   int kk, choice = 0 ;
   clrscr();
   // while statement start

       while (choice!=7)
       {
    clrscr();
   // setcolor(10);   //
       printf("\n\t\t\t**** DEPARTMENT OF Fishery***\n");
       printf("\t\t\t---------------------------------------\n");
       printf("\t Development of calculator for concept of estimating Catch and Effort \n\n");
       printf("\t\t  1.Generic Formula for Estimating Catch \n");
       printf("\t\t  2.Secondary Estimate Catch by Species \n");
       printf("\t\t  3.Secondary Estimate Species Value \n");
       printf("\t\t  4.Effort for Census in Space, Sampling, in Time \n");
       printf("\t\t  5.Effort for Census in time, Sampling, in Space\n");
       printf("\t\t  6.Effort for Census in Sampling Space and Time \n");
     printf("\t\t  7.EXIT \n");

       printf("\n\t ENTER YOUR CHOICE TO CALCULATE <1 -7>");

       scanf("%d",&choice);

switch (choice)
{

   case 1:            /* Generic Formula for Estimating Catch */

    {
    clrscr();
       printf("\n\n\t ****** 1.Generic Formula for Estimating Catch *****\n\ ");
       printf("\n\t Enter the value of Catch Per Unit Effort (kg/boat day) \t:");
       scanf("%f",&CPUE);
       printf("\t Enter value of total number of boat-days used for total catch and overall CPUE (days)\t:");
       scanf("%f",&E);

       Catch = (CPUE*E);
       printf("\n\t Catch (kg) =%5.2f",Catch);
    getch();
    break;
    }

   case 2 :           /******* Secondary Estimates Catch by Species *******/

    {
     clrscr();
       printf("\n\n\t\t*** 2.Secondary Estimate Catch by Species ***\n");
     printf("\n\t\t\t Enter the value of Species Fraction \tt=");
       scanf("%f",&SP);
       printf("\t\t\t Enter the value of Catch(kg) \t\td=");
       scanf("%f",&Catch);
```

```
   Species = (SP*Catch);
      printf("\n\t Catch by Species (kg) =%5.2f",Species);
   getch();
   break;
   }


case 5:                /*** Effort for Census in time, Sampling in Space ***/

   {
   clrscr();
      printf("\n\n\t *** 5.Effort for Census in time, Sampling in Space  ***\n\ ");
      printf("\n\t Enter the value of average fishing effort by single fishing unit during the month (boat-days) \t=");
      scanf("%f",&AverF);
      printf("\t Enter the value of raising factor expressing total number of fishing units that are potentially operating
      at all fishing sites \t=");
      scanf("%f",&F);

      E = (AverF*F);
      printf("\n\t Effort(boat-days) =%5.2f",E);
   getch();
   break;
   }

        // end of case 14
   }   // end of all cases
 }      // main switch statement end
         // end of 1 start and end brace bracket
```

III.RESULTS AND DISCUSSION

This paper deals with the results obtained by calculation of the characteristics of the watershed using C++. The program is created in the C language, Version 3.0 Turbo C++.

- **Steps to be followed**

1) Enter any option from 1 to 7.
2) Give the values for input
3) By pressing enter key, output is going to displayed.
4) Press the enter key again to switch over to the first page.
5) Follow the same procedure to design the various parameters.

Fig: Output of main page

Fig: Output to generic formula for estimating catch

IV.SUMMARY AND CONCLUSIONS

A. Summary

The Generic formula for estimating catch, secondary estimate of catch by species, secondary estimate of species value, effort for census in space, sampling, in time, effort for census in time, sampling, in space, effort for census sampling in space and in time were correctly discussed. Thus, we neglect the time consuming method and uses the software that is created above in Turbo C++, Version 3.0. So, the software is very beneficial for measuring morphological characteristics of the watershed.

Conclusions

1) The correct calculations were done using C language.
2) It is user friendly.
3) It is time efficient uses very less time as compare to manual process.
4) This is very useful for Estimating the Catch and Estimation of Effort.

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