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Computer Management of Fish Health Problems in Hatcheries

G. E. Hoskins • C. J. West • A. E. Kling

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Computer Management of Fish Health Problems in Hatcheries

G. E. Hoskins

*Department of Fisheries and Oceans
Fisheries Research Branch
Pacific Biological Station
Nanaimo, B.C. V9R 5K6*

C. J. West and A. E. Kling

*Department of Fisheries and Oceans
Salmonid Enhancement Program
1090 West Pender Street
Vancouver, B.C. V6E 2P1*

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Abstract

HOSKINS, G. E., C. J. WEST, AND A. E. KLING. 1983. Computer management of fish health problems in hatcheries. *Can. Spec. Publ. Fish. Aquat. Sci.* 68: 42 p.

A computer program designed to assist fish culturists with the control and treatment of hatchery diseases, especially diseases of Pacific salmon, is described. Following diagnosis of an infectious disease by a fish health specialist, the program will assist in selection of the appropriate treatment procedure, perform all of the necessary calculations, and outline the method of application. A subprogram designed to assist hatchery personnel in recording the occurrence of fish health problems is also described. The program is written in the "Applesoft" version of the BASIC language; 5¹/₄-inch floppy disk copies are available for a limited period.

Résumé

HOSKINS, G. E., C. J. WEST, AND A. E. KLING. 1983. Computer management of fish health problems in hatcheries. *Can. Spec. Publ. Fish. Aquat. Sci.* 68: 42 p.

La présente publication spéciale contient une description d'un programme machine conçu dans le but d'aider les pisciculteurs à contrôler et à traiter les maladies dans les établissements d'élevage, surtout les maladies des saumons du Pacifique. Une fois une maladie infectieuse diagnostiquée par un spécialiste de la santé des poissons, le programme aidera à choisir le traitement approprié, fera tous les calculs nécessaires et décrira la méthode d'application. On décrit un sous-programme qui aidera le personnel des établissements de pisciculture à enregistrer l'occurrence des problèmes sanitaires des poissons. Le programme est présenté dans la version "Applesoft" du BASIC; on peut se procurer des copies, pour une période limitée, sur disquettes de 5¹/₄ po.

Introduction

In fish culture facilities where millions of animals are reared, the control of infectious disease is a major concern. It is made difficult by unavoidable hatchery practices such as crowding, handling, tagging, and transporting; combined, these result in stresses that predispose fish to infection by a long list of infectious agents. The problem is further compounded by the rapidity and ease with which the causative organisms can spread in the aquatic environment. Nevertheless, to be effective, disease control must be an integral and daily part of hatchery life.

In British Columbia, the federal Department of Fisheries and Oceans operates more than 35 facilities engaged in the intensive rearing of salmonids, mainly Pacific salmon (*Oncorhynchus* spp.). Under the high production levels necessary, disease control is essential to the success of these facilities. Many factors influence the options by which disease problems can be managed. For instance, in this province, factors such as species reared, diet, water quality, hatchery design, and pond densities vary considerably between sites. More important, rearing conditions frequently change to meet developing fisheries management strategies and policies. The end result is that standard tables for the application of chemical treatments in the event of disease outbreaks are not entirely practical. Frequently changing conditions require special calculations and application methods for every treatment.

Further, the use of chemicals in fish culture is unavoidable. Recent findings of the Diagnostic Service, Pacific Biological Station, Nanaimo, B.C., indicate that many infectious agents that occur naturally in the province have a wide distribution. For most facilities, avoidance of the causative agent is neither possible nor practical. Instead, the fish culturist must rely upon those management techniques that maximize fish health through minimization of the disease promoting stress. However, when these fail or are not possible, it becomes necessary to use prophylactic treatments, or worse, to combat active disease outbreaks.

Another factor or problem is that the use of the chemicals, drugs, and antibiotics reported in the literature may result in additional losses if not administered correctly at dosages adjusted to local conditions. Many chemical treatments were developed for use in hard water areas of the United States or Europe on either domestic trout, carp, or other species of which many are not native to this province. Experience has shown that salmonids in British Columbia's soft coastal water are very susceptible to the adverse effects of many chemotherapeutic agents, especially when the fish are already weakened by an infectious disease.

Perhaps the major factor encountered at many facilities is the difficulty of administering a chemotherapeutic agent to a raceway or pond containing hundreds of thousands of animals or, in a few cases, millions of animals. The difficulty arises, in part, from a lack of standardization in pond design as well as the need to change rearing techniques frequently. The result

is that the fish culturist is faced with a seemingly endless array of procedures, alternate chemicals, units, concentrations, and environmental conditions. In addition, the culturist must be fully aware of the physiological impact of the chemical used. For instance, the use of Diquat on smolts may destroy their ability to adapt to salt water. Most important, the calculations must be exact or disaster may result.

To overcome many of these problems, this publication presents two closely linked computer programs, specifically designed to assist the salmonid culturist in British Columbia in managing fish health problems, including the selection of appropriate remedial measures. The programs offer a high degree of standardization in a systematic, calculable approach to disease prevention and control. As well, they have proven to be valuable training aids to hatchery personnel and students of fish culture. They are designed primarily for production facilities rearing Pacific salmon in British Columbia and not for foodfish farms, where fish might be harvested within a month of treatment. However, both programs can be modified for application to other species and locations. Because, when combined, they form an ideal fish health management program, they will be considered as a single program for the purpose of this paper. Both are written in the Applesoft version of the BASIC language of computers and are designed to run on the Apple II, 48k microcomputer. In British Columbia, most federal fish culturists and biologists have direct access to this computer.

Program Description

The two programs are entitled "Case Reporter" and "Fish Health." Combined, they have four primary functions: (1) to assist the fish culturist with selection of the appropriate treatment, anesthetic or disinfectant; (2) to perform the necessary calculations; (3) to assist in the documentation and reporting of hatchery fish health problems; and (4) to provide information on the handling, storage, and use of various chemotherapeutic agents. Areas of hatchery disease management in which the system has an effective role are illustrated by the flow chart in Table 1. For ease of use the programs are organized into a single, six-sectioned menu as:

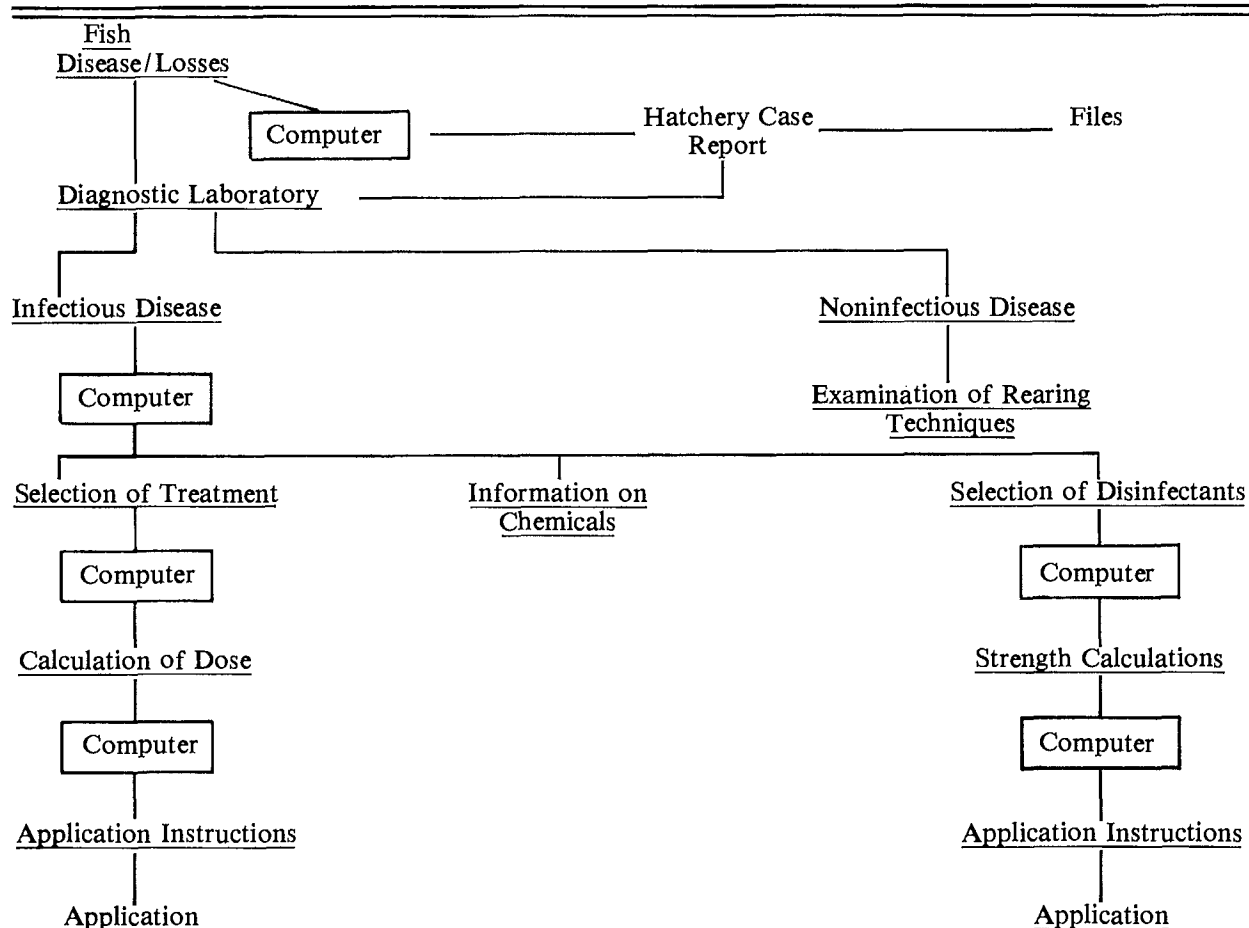
1. Introductory notes
2. Anesthetics
3. Chemical notes
4. Disinfectants
5. Case reporter
6. Disease treatment

Each section is explained in greater detail below. In most cases one or two "dry runs" through each section of the menu is all that is required to become sufficiently familiar with the system to use it effectively.

Introductory Notes

This is essentially a brief introduction to the program outlining its purpose and identifying special function keys on the keyboard. Operation is simple; all incorrect

TABLE 1. Flow chart showing those areas where the program can be effectively used to assist in fish health programs.



entries are ignored and the "Ctrl" (control) key can be used when any of the following appear on the video monitor:

1. OK (Y/N)?
2. SELECT?
3. (PRESS ANY KEY TO CONTINUE)
4. STANDARD DOSE OK?
5. AI's OK?

By simultaneously pressing the "Ctrl" and "R" keys, the operator can return to the menu from anywhere within the programs. If a printer is available, any screen display can be copied by simultaneously pressing "Ctrl" and "P" keys. Any keyboard entry can be changed by entering "N" when OK(Y/N)? is displayed. This repeats the last series of questions. When STANDARD DOSE OK? occurs, the dosage level can be changed to meet specific requirements; otherwise a standard preprogrammed dosage is assumed. When AI's OK? is displayed, the amount of active ingredient (AI) can be altered to agree with that of the product selected for use.

Anesthetics

Although not strictly related to diseases, this section is included as a convenience. It performs all required calculations necessary to prepare anesthetic baths for immobilization of fish. Three commonly employed

anesthetics are included, carbon dioxide, MS222, and 2-phenoxyethanol; others can be added if required. Carbon dioxide is included since hatchery procedural rules prohibit the use of other chemicals on fish that are destined for immediate human consumption. For those cases where lethal sampling is desired, and the fish are not for human consumption, the amount of MS222 necessary to kill fish quickly can be calculated.

Use of this section is simple and details need not be given. Following selection of one of the anesthetics, the user is asked for either the shape and dimensions of the container or its volume. For both volume and dimension, any one of five different units of measurement is permitted. Once the amount of active ingredient in the product being used is confirmed, the program calculates the amount of product required and summarizes preparation of the bath. The program cannot consider all possible variables that may influence the actual degree of immobilization achieved; therefore, it is advisable always to test the bath first with a small lot of fish.

Chemical Notes

This section is basically a listing of the chemical notes used elsewhere in the program. It is primarily intended as a guide to storage, handling, and toxicity but other information may be included. The inclusion or recommended use of a chemical is based upon a reasonably

high degree of:

1. freedom from toxicity to fish in soft water;
2. freedom from toxicity to humans and ecologic damage;
3. efficacy;
4. availability as well as low cost.

All therapeutic drugs, whether hormones, anesthetics, antibiotics, or other substances, should be administered carefully with a definite purpose in mind. The old "shotgun" or "measure-as-you-go" approach is no longer acceptable in today's high production-high technology facilities. Further, the impact of spent drugs on the environment must always be considered. Certain safeguards are built into the program; for instance, the use of formalin at elevated water temperatures is not permitted. Hyamine and Roccal are also included for use on fish but recommendations to limit their use for disinfection of hatchery equipment only are also included.

Disinfectants

As every hatchery person is aware, the effective use of disinfectants is a key element in the control of infectious disease. Use of the program can help to avoid under- or overstrength disinfectant solutions that may be totally ineffective or corrosive to equipment. After entering this section, any one of seven general purpose, commercially available products can be selected. To calculate solution strength, the same program segment used for the anesthetics is employed. Therefore, questions asked by the program and video displays are similar to those for the anesthetics.

It should be noted that one of the safest, yet most effective, disinfection procedures available to the fish culturists is to rinse nets and utensils in clean, uncontaminated water, and to allow them to dry in full sunlight.

If immediate disinfection is required, the program gives two sources of chlorine: HTH (calcium hypochlorite) and household bleach. Special instructions accompany the use of chlorine. Because of its corrosive nature and high toxicity to fish, its handling and disposal demand special care. All chlorine solutions should be neutralized with sodium thiosulfate before disposal.

Use of this section is straightforward and requires no special notes. As with most of the program, a few minutes of use will sufficiently acquaint hatchery personnel with this section.

Case Reporter

Accurate reports on hatchery conditions, fish behavior, and gross disease signs are essential to determine the primary cause of fish health problems. Often, useful clues can be obtained from this information on what investigative procedures are required. In some cases fish behavior and gross disease signs are highly diagnostic; for instance, death accompanied by flared opercula strongly indicates severe gill irritation or acute oxygen depletion, whereas excess gill mucus may indicate low water pH or cyanide poisoning. Data such as mortality patterns, even over short periods, can indicate what type

of agent may be responsible — parasitic, nutritional, bacterial, viral, or environmental.

This section utilizes only the "Case Reporter" subprogram and runs independently of the rest of the program. Its main function is to assist hatchery employees in recording events and conditions surrounding a health problem. In all such cases, the maintenance of complete records is desirable. Following completion of the report, hard copies can be printed to accompany fish samples to the diagnostic laboratory as well as for hatchery files. A blank case report is shown in Appendix I to illustrate the type of information that has the greatest value in attempting to unravel the cause of losses.

An eight-item menu organization is used to manage this subprogram:

1. Input case report
— leads user through a series of questions resulting in a complete case report
2. Review report
— allows the completed report to be examined for errors and omissions, and corrections to be made before hard copying or storage
3. Hard copy report
— produces a hard copy of the completed report when the user's system is appropriately equipped with a printer
4. Store report
— stores the completed report on floppy disk
5. Recall report from disk
— allows any report stored on floppy disk to be recalled by name
6. Return to disease menu
— returns to the main disease management menu
7. Hard copy blank form
— directs the printer to print a blank copy of the report which can be used remotely from the computer
8. Return to utility menu
— returns to the utility menu listing all other fish culture and hatchery management programs available on the disk

Case reports prepared with the assistance of the case reporter are in a format readily available for further machine analysis and manipulation. Data stored on floppy disks are available to the hatchery manager for uses such as monthly reports or for monitoring changing patterns of disease occurrence within the facility. Minor changes in rearing and handling procedures can often have serious consequences for fish health. To analyze the cause and effect relationships, complete records on each case are essential; use of the reporter ensures completeness of relevant information by confronting the user with questions.

Use of the program is straightforward. The user is directed to answer a series of three or four questions; as each series is answered, another appears on the monitor. To minimize typing, a list of answers is given whenever possible, and the user can simply enter a number corresponding to the appropriate answer in the list. For essential data, such as date and location, the program will

not continue until the requested information is entered. Other questions can be ignored by pressing "return." Upon completion, the report should be placed on a floppy disk for permanent storage.

Disease Treatment

Besides carrying out all calculations, this segment of the program is designed to assist the fish culturist with the selection of all disease control and prevention measures. It is most effective when an accurate diagnosis, obtained as soon as possible following the first signs of a problem, is available. Speed is important especially during acute outbreaks of infectious diseases. Furunculosis, for example, responds best to Terramycin if the antibiotic is administered early, before high losses occur, and the fish have stopped feeding. However, no treatment should be undertaken without a definite, well-defined reason or a definite diagnosis. Moreover, prophylactic treatments should be used only when a threatening agent is known to be present.

Use of this section is simple. The 24 most frequently encountered infectious diseases in British Columbia are listed in a menu. Following selection of one, the user is asked to enter fish age, whether disease control or prevention is desired and, in some cases, the water temperature. Depending upon user responses, a list of one to four treatments is displayed with the preferred treatment always listed first. In the use of antibiotics, the program assumes that the diagnostician will have advised the fish culturist on the drug sensitivity of the bacterial agent involved.

The matrix upon which the treatment selection is based is given in Appendix II. This is a useful reference in understanding the program's organization and what it considers in choosing a treatment. The dosage levels within the matrix are given in Appendix III. Personnel who do not have access to an Apple microcomputer will find both appendices useful in planning their treatment schedules.

When the computer and user have selected a treatment, the mode of application is outlined with important precautions and other notes. The user is then asked for sufficient information to allow the treatment levels to be calculated. In all cases, standard treatment levels in strength and time are assumed unless otherwise altered by the user.

The methods of treatment application available to the computer are:

- Dip — 1-10 min exposure to relatively high levels of chemicals
- Static bath — 1-h exposure to moderate levels of chemicals
- Flush — short, single pass of chemicals of varying strength
- Long bath — extended periods of exposure to low concentrations of chemicals
- Oral — administered with food
- Injected — substance applied by injection into the dorsal sinus
- Vaccine — normally a short dip in diluted vaccine as directed by the manufacturer's instructions

Selection of chemicals is primarily based on the diagnosis, fish age, and whether the disease is to be treated or prevented. Chemicals that do not have a high degree of predictability in fish response or do not affect all salmonids in the same manner and to the same degree are not included in the matrix. The final product is a video summary of all entries and a basic procedure for preparation of the necessary stock solutions, setting of dosing pump speed, etc. which can be hard copied for hatchery files and submission to supervisors.

Equipment/Program Source

For hardware, it is necessary to have a reasonably powerful system. Although, as described herein, the program is designed to run on an Apple II Plus microcomputer, a programmer skilled in the BASIC language should be able to adapt it to other systems with no great difficulty. A reasonable system will consist of:

- microcomputer, 48k memory
- two disk drives
- a monitor with a green phosphor, matte finish
- printer
- numeric key pad

For those wishing to examine the program's structure and organization or to adapt it to another machine, the subprograms are presented in hard copy in Appendix IV.

The program is also available on a 5¹/₄-inch floppy disk suitable for running in a 48k Apple microcomputer. Disks can be ordered from the Canadian Government Publishing Centre, Ottawa, Ont., Canada K1A 0S9 (Canada \$40.00, Other countries \$48.00).

The authors would appreciate receiving any comments or suggestions for improvements, as well as notification of any program errors.

Use of the following trade names in this publication does not necessarily imply endorsement of the product by the authors:

Active Ingredient

Betadine	povidone-iodine
Diquat	herbicidal chemical
Furanace	nifurpirinol
Gallimycin	erythromycin
HTH	calcium hypochlorite
Hyamine	benzalkonium chloride
MS222	tricaine methane sulfonate
Ovadine	povidone-iodine
Roccal	benzalkonium chloride
Terramycin	oxytetracycline
Wescodyne	povidone-iodine

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The authors express their gratitude to Drs G. R. Bell and L. Margolis for reading the manuscript and offering many useful comments. Thanks are also given to E. Lam and W. McLean for contributions to program organization and content.

Appendix I. Hard Copy of the Case Report

CASE REPORTER

=====

DATE : _____
 SAMPLE SITE : _____
 CONTRIBUTOR : _____
 SPECIES : * _____
 AGE : * _____
 LENGTH (MM) : _____
 WEIGHT (GM) : _____
 SEX : * _____

REASON FOR SUBMISSION: * _____
 DATE COLLECTED : _____
 STOCK ORIGIN : * _____

	LOSSES	WATER TEMP	'C
TODAY'S (7)	_____	_____	_____
PAST WEEK (6)	_____	_____	_____
(5)	_____	_____	_____
(4)	_____	_____	_____
(3)	_____	_____	_____
(2)	_____	_____	_____
(1)	_____	_____	_____

SPECIES OPTIONS

COHO
 CHINOOK
 SUMMER CHINOOK
 FALL CHINOOK
 SOCKEYE
 CHUM
 PINK
 SUMMER STEELHEAD
 WINTER STEELHEAD
 DOLLY
 RAINBOW
 CUTTHROAT
 OTHER

AGE OPTIONS

EGGS
 SAC FRY
 FRY (BUTTONED)
 ADVANCED FRY
 YEARLING
 2 YEAR
 3 YEAR
 4 YEAR
 IMMATURE ADULT
 RIPE ADULT
 SPENT ADULT
 JACK
 OTHER

SEX OPTIONS

FEMALES
 MALES
 MIXED
 UNKNOWN

SUBMISSION REASONS

HATCHERY LOSS
 FISH KILL IN WILD
 RESEARCH
 HEALTH CHECK
 CERTIFICATION
 OTHER

STOCK ORIGIN

WILD
 CULTURED
 SEMI-WILD
 UNKNOWN

CASE REPORTER

=====

SAMPLE SIZE : _____
 SAMPLE TYPE : * _____
 NO. AFFECTED CONTAINERS : _____
 CONTAINER I.D. : _____
 CONTAINER TYPE : * _____
 SIZE WIDTH : _____
 LENGTH : _____
 DEPTH : _____
 DIAMETER : _____
 UNKNOWN : _____
 LOAD (FISH/CONTAINER) : _____
 POND INFLOW : _____
 POND VELOCITY : _____

DIET : * _____
 DIET TYPE : * _____
 FEED RATE : _____
 (% OF BODY WEIGHT)
 FEEDING METHOD : * _____
 PELLET SIZE : _____

SAMPLE TYPE	CONTAINER TYPE
LIVE	BURROWS
DEAD	CIRCULAR
MORIBUND	RACEWAY
RANDOM	NET PENS
MIXED	KEEPER POND
OTHER	TROUGHS
	CAP TROUGH
	SPAWNING CHANNEL
	EARTH POND
	HEATH TRAY
	GRAVEL BOX
	NATURAL
	OTHER

DIET	DIET TYPE	FEEDING METHOD
OMP	WET	HAND
BIODIET	DRY	MACHINE
SIVERCUP	MIXED	NATURAL
RANGERS		
ABERNATHY		
APEX		
RESEARCH		
CUSLAN		
NATURAL		
NONE (STARVATION)		
OTHER		

CASE REPORTER

=====

BEHAVIOR : * _____
 GROSS SIGNS : * _____
 RECENT HANDLING : * _____
 PREVIOUS DIAGNOSIS : _____
 DIAGNOSTICIAN : _____
 DIAGNOSIS : _____
 PREVIOUS MEDICATION : _____
 VACCINATION : _____

FOR PREVIOUS DIAGNOSIS, PREVIOUS MEDICATION AND
 VACCINATION FILL IN DATES IF DONE

WATER SOURCE : * _____
 SALINITY : _____
 DISSOLVED OXYGEN : IN : _____
 OUT : _____
 TGP : _____
 HARDNESS : * _____
 PH : _____
 NH3 : _____

BEHAVIOR	GROSS SIGNS	RECENT HANDLING
NORMAL	NORMAL	SORTING
NOT FEEDING	DARK	TAGGING
ON SURFACE	POPEYED	SAMPLING
ON OUTLET	OPEN LESIONS	MOVING
SLUGGISH	BLUE COLOUR (SPOTS)	GRADING
MORIBUND	SCALE LOSS	RESEARCH
DEAD	HEMORRHAGING	
	FIN ROT	
	FIN EROSIONS	
	RED VENT	
	RED MOUTH	
	PARASITES	
	FUNGUS	
	OTHER	

WATER SOURCE	WATER HARDNESS
SURFACE	EXTREMELY SOFT
WELL	VERY SOFT
RIVER	SOFT
CITY	MODERATE
LAKE	HARD
SALT	VERY HARD
BRACKISH	EXTREMELY HARD

COMMENTS

Appendix II. Program Matrix

Diagnosis	Treatment	Application	Adult fingerling	Fry	Sac Fry	Egg	Prevention	Control
<i>Epistylis</i>	Formalin- malachite green	Long bath	x	x			x	x
	Formalin	1-h bath	x	x				x
<i>Hexamita</i>	None	—	x	x	x		x	x
Glochidia (Parasitic larval clam)	None	—	x	x	x		x	x
Fungus	Malachite green	Long bath	x	x	x			x
	Malachite green	Flush				x	x	x
	Malachite green	Dip	x					x
	Formalin- malachite green	Long bath	x	x			x	x
	Formalin	1-h bath	x	x				x
	Formalin	Flush				x	x	
	Potassium permanganate	1-h bath	x	x	x		x	
Motile Aeromonad Septicemia	Terramycin	Oral	x	x	x			x
	Furazolidone	Oral	x	x	x			x
	Ovadine	Dip				x	x	
	Betadine	Dip				x	x	
<i>Gyrodactylus</i>	Formalin- malachite green	Long bath	x	x			x	x
<i>Costia</i> (<i>Ichthyobodo</i>)	Formalin- malachite green	Long bath	x	x			x	x
<i>Cryptobia</i>	None	—	x	x			x	x
<i>Trichodina</i>	Formalin- malachite green	Long bath	x	x			x	x
	Formalin	1-h bath	x	x				x
<i>Salmincola</i>	None	—	x	x	x		x	x
<i>Trichophrya</i>	Formalin- malachite green	Long bath	x	x			x	x
	Formalin	1-h bath	x	x				x
<i>Ichthyophthirius</i> ("Ich")	Formalin	1-h bath	x	x				x
	Formalin- malachite green	Long bath	x	x			x	

Appendix II (continued)

Diagnosis	Treatment	Application	Adult fingerling	Fry	Sac Fry	Egg	Prevention	Control
Vibriosis	Vaccine	Dip		x	x		x	
	Terramycin	Oral		x	x			x
	Furazolidone	Oral	x	x				x
	Sulfamethazine + Furazolidone	Oral	x	x				x
	Sulfamerazine	Oral	x	x	x			x
Enteric Redmouth Disease	Vaccine	Dip		x			x	
	Terramycin + sulfamerazine	Oral	x	x	x			x
	Furazolidone + sulfamerazine	Oral	x	x	x			x
	Terramycin + sulfamethazine	Oral	x	x	x			x
	Terramycin	Oral	x	x	x			x
	Ovadine	Dip				x	x	
	Betadine	Dip				x	x	
Columnaris Disease	Terramycin	Oral	x	x	x			x
	Furanace	Static bath		x	x			x
	Furazolidone	Oral	x	x	x			x
<i>Sporocytophaga</i>	Terramycin	Oral	x	x	x			x
	Furazolidone	Oral	x	x	x			x
	Furazolidone + sulfamethazine	Oral	x	x	x			x
Tuberculosis	None	—	x	x	x		x	x
<i>Pseudomonas</i> Infection	Terramycin	Oral	x	x	x			x
	Ovadine	Dip				x	x	
	Betadine	Dip				x	x	
Bacterial Gill Disease	Potassium permanganate	1-h bath	x	x	x		x	x
	Terramycin	Oral		x	x			x
	Roccal	1-h bath	x	x				x
Coldwater Disease	Terramycin	Oral	x	x	x			x
	Furazolidone	Oral		x	x			x
	Sulfamerazine	Oral		x	x			x
	Sulfamethazine	Oral		x	x			x

Appendix II (concluded)

Diagnosis	Treatment	Application	Adult fingerling	Fry	Sac Fry	Egg	Prevention	Control
Furunculosis	Terramycin	Oral	x	x	x		x	x
	Furazolidone	Oral	x	x	x			x
	Sulfamerazine	Oral	x	x	x			x
	Sulfamethazine	Oral	x	x	x			x
	Sulfamethazine + Terramycin	Oral	x	x	x			x
	Terramycin	Injected	x				x	x
	Ovadine	Dip				x	x	
	Betadine	Dip				x	x	
Bacterial Kidney Disease (BKD)	None	—	x	x	x			x
	Erythromycin	Injected	x				x	
	Gallimycin	Static bath				x	x	
	Erythromycin	Oral	x	x			x	
	Betadine	Dip				x	x	
	Ovadine	Dip				x	x	
Myxobacterial Gill Disease	Potassium permanganate	1-h bath		x	x		x	x
	Terramycin	Oral		x	x			x
	Furanace	Static bath		x	x		x	x
	Roccal	1-h bath	x	x				x
Fusiform Gill Disease	Potassium permanganate	1-h bath		x	x		x	x
	Terramycin	Oral		x	x			x
	Furanace	Static bath		x	x			x
	Terramycin	Static bath	x	x	x		x	x

Appendix III. Route of Administration and Recommended Dosage for Each Treatment Entered in the Program

Treatment	Application	Dose ^{a, b}
Terramycin	Oral	3 g/100 lb of fish for 10 d
	Static bath	2 ppm on 3 consecutive d
	Injection	7.5 mg/lb of fish
Furazolidone	Oral	3 g/100 lb of fish for 14 d
Furanace	Static bath	1-2 ppm on one occasion
Roccal	Bath	1 ppm on one occasion
Erythromycin	Oral	4.5 g/100 lb of fish for 21 d
	Static bath	2 ppm on 3 consecutive d
	Injection	10 mg/lb of fish
Sulfamerazine	Oral	5 g/100 lb of fish for 14 d
Sulfamethazine	Oral	5 g/100 lb of fish for 14 d
Terramycin + sulfamerazine	Oral	2 g/ 100 lb of fish for 14 d 3 g/
Terramycin + sulfamethazine	Oral	2 g/ 100 lb of fish for 14 d 3 g/
Furazolidone + sulfamerazine	Oral	2 g/ 100 lb of fish for 14 d 3 g/
Furazolidone + sulfamethazine	Oral	2 g/ 100 lb of fish for 14 d 3 g/
Formalin	Bath	100 ppm for 1 h on one occasion
	Bath	25 ppm for 8 h on three occasions
	Bath	250 ppm flush on one occasion
Malachite green	Bath	1.0 ppm for 1 h on one occasion
	Bath	0.5 ppm for up to 8 h on one occasion
	Bath	5.0 ppm flush on one occasion
	Dip	20 ppm for 1 min on one occasion
Formalin + malachite green	Bath	25 ppm/ for up to 12 h on 3 0.1 ppm/ consecutive d
Vaccine	Dip	Apply as directed
Potassium permanganate	Bath	1 ppm for 1 h on 2 consecutive d
Ovadine (eggs)	Dip	100 ppm for 10 min on one occasion
Betadine (eggs)	Dip	100 ppm for 10 min on one occasion
Wescodyne (eggs)	Dip	100 ppm for 10 min on one occasion

Appendix III (concluded)

Treatment	Application	Dose ^{a, b}
<i>Disinfection</i>		
Roccal	— 600 ppm	
Hyamine	— 600 ppm	
Wescodyne	— 400 ppm	
Ovadine	— 400 ppm	
Betadine	— 400 ppm	
HTH	— 158 ppm - Equipment, 25 ppm - Ponds	
Bleach	— 158 ppm - Equipment, 25 ppm - Ponds	
<i>Anesthetics</i>		
MS222	— 75 mg/L of water for general use	
	— 400 mg/L of water to kill fish	
2-phenoxyethanol	— 1:5000 for general use	
Carbon dioxide	— 400	

^aAll dosages are given in the amount of active ingredient required to achieve the desired results.

^b Program users are cautioned that metering stock solutions into containers with low exchange rates may not achieve the desired treatment concentrations and exposure times. Under these circumstances, before metering in the stock solution, it may be advisable to bring the container to the desired treatment concentration using the static bath procedures. It may also be advisable to terminate the treatment by rapidly dropping the water level and refilling with chemical free water.

Users are further cautioned that inflow rates and metering pump speeds must be compatible. Otherwise the program will recommend unattainable concentrations of stock solutions.

Appendix IV. Hard Copies of Subprograms: Fish Health and Case Reporter

Fish Health

```
90 REM ### FISH HEALTH JULY 6,1983 ###
91 REM ### BY G.E. HOSKINS, B.E. MCLEAN AND C.J. WEST ###
92 REM
100 DS$ = CHR$(4):TA$ = CHR$(7)
110 DIM DL$(24),TL$(29),DS$(24,4),SD$(28),AI(14)
120 FOR I = 1 TO 6: READ ML$(I): NEXT
130 DATA INTRODUCTORY NOTES, ANESTHETICS, CHEMICAL NOTES, DISINFECTANTS,
CASE REPORTER, DISEASE TREATMENT
140 HOME : VTAB 11: HTAB 13: PRINT "W O R K I N G": GOSUB 9900
150 HOME : FOR I = 20 TO 1 STEP - 1: FOR J = 1 TO 22 STEP 21: VTAB J: HTAB
I: PRINT "*": VTAB J: HTAB 41 - I: PRINT "*": NEXT : NEXT : FOR I =
2 TO 21: VTAB I: HTAB 1: PRINT "*": VTAB I: HTAB 40: PRINT "*": NEXT

160 VTAB 1: PRINT "***** FISH HEALTH *****": VTAB 3: HTAB
12: PRINT "( VERSION 19/10/82 )": FOR I = 1 TO 6: VTAB 2 * I + 6: HTAB
8: PRINT I;" ";ML$(I): NEXT :V = 5:U = 6:X$ = "ITEM": GOSUB 9100:M
F = F
170 FOR I = 6 TO MF * 2 + 6:X = PEEK ( - 16336):X = PEEK ( - 16336): VTAB
I - 1: HTAB 10: PRINT " ": HTAB 10: PRINT ">": FOR X = 1 TO 20: NEXT
X: NEXT : GOSUB 9000: IF RS$ = "N" THEN 160
190 ON MF GOTO 5200,5500,6000,10000,5600,1000
997 REM
998 REM & TREATMENT CALCULATIONS
999 REM && SELECT DIAGNOSIS
1000 HOME : VTAB 4: FOR I = 1 TO 18: PRINT SPC( 2 - LEN ( STR$( I))); I
;" ";DL$(I): NEXT
1010 FOR I = 4 TO 9: VTAB I: HTAB 24: PRINT I + 15;" ";DL$(I + 15): NEXT

1020 V = 1:U = 24:X$ = "DIAGNOSIS": GOSUB 9100:DF = F: GOSUB 9000: IF RS$
= "N" THEN 1020
1028 REM
1029 REM && SELECT STAGE, P/C
1030 HOME : FOR I = 1 TO 4: VTAB I + 3: PRINT " ";I;" ";SL$(I): NEXT : VTAB
17: PRINT " 1 PREVENTION": PRINT " 2 CONTROL"
1040 V = 1:U = 4:X$ = "STAGE": GOSUB 9100:SF = F
1050 V = 14:U = 2:X$ = "PREVENT/CONTROL": GOSUB 9100:PF = F: GOSUB 9000: IF
RS$ = "N" THEN 1040
1098 REM
1099 REM # PRESENT TREAT/APP'S
1100 L = LEN (DS$(DF,SF)) / 4: IF L > 0 THEN 1120
1110 PRINT TA$: PRINT TA$: HOME : SPEED= 150: PRINT "SORRY, NO TREATMENT
S ON RECORD": VTAB 20: PRINT "PRESS ANY KEY TO RETURN TO MENU": SPEED=
255: GET RS$: RUN
1120 T = - 999999:D = 0: FOR I = 1 TO L:X$ = MID$( DS$(DF,SF),I * 4 - 3
,4):PC = VAL ( MID$( X$,4,1)): IF PC < > PF AND PC < > 3 THEN 118
0
1130 IF LEFT$( X$,2) < > "25" THEN IF LEFT$( X$,2) < > "13" THEN 11
70
1140 IF T = - 999999 THEN PRINT TA$: HOME : PRINT SPC( 18);"NOTE!": VTAB
10: PRINT SPC( 9);"WHAT IS THE TEMP ('C)"
1150 IF T = - 999999 THEN VTAB 10: HTAB 32: INPUT "";T: GOSUB 9000: IF
RS$ = "N" THEN T = - 999999: GOTO 1150
```

```

1160 IF T > = 18 THEN 1180
1170 D = D + 1:DT$(D) = X$
1180 NEXT : IF D = 0 OR (D = 1 AND LEFT$(DT$(D),2) = "10") THEN 1110
1200 HOME : PRINT "SELECTED : DIAGNOSIS : ";DL$(DF): PRINT "===== P
URPOSE : ";PL$(SF): PRINT " STAGE : ";SL$(PF): VTAB 9: FOR
I = 1 TO D:T = VAL ( MID$(DT$(I),1,2)):A = VAL ( MID$(DT$(I),3,1
)): PRINT I;" ";TL$(T);" / ";AL$(A): PRINT : NEXT
1210 V = 6:U = D:X$ = "TREATMENT / APPLICATION": GOSUB 9100:T = F: GOSUB
9000: IF RS$ = "N" THEN 1210
1220 TF = VAL ( MID$(DT$(T),1,2)):AF = VAL ( MID$(DT$(T),3,1)): HOME
: PRINT TL$(TF): VTAB 6: GOSUB 9300: GOSUB 9200
1228 REM
1229 REM ## PRESENT NOTES ##
1230 HOME : PRINT TL$(TF): PRINT :NT = 2: IF TF < = 24 THEN NT = 1: ON
TF - 10 GOSUB 9310,9320,9330,9340,9350,9360,9370,9380,9390,9400,9410
,9410,9430,9440
1231 IF TF = 25 THEN HOME : PRINT TL$(13): PRINT : GOSUB 9330: GOSUB 92
00: HOME : PRINT TL$(17): PRINT : GOSUB 9370
1232 IF TF = 26 THEN HOME : PRINT TL$(23): PRINT : GOSUB 9430: GOSUB 92
00: HOME : PRINT TL$(21): PRINT : GOSUB 9410
1233 IF TF = 27 THEN HOME : PRINT TL$(23): PRINT : GOSUB 9430: GOSUB 92
00: HOME : PRINT TL$(22): PRINT : GOSUB 9410
1234 IF TF = 28 THEN HOME : PRINT TL$(15): PRINT : GOSUB 9350: GOSUB 92
00: HOME : PRINT TL$(21): PRINT : GOSUB 9410
1235 IF TF = 29 THEN HOME : PRINT TL$(15): PRINT : GOSUB 9350: GOSUB 92
00: HOME : PRINT TL$(22): PRINT : GOSUB 9410
1240 VTAB 23: HTAB 12: PRINT "(N=SELECT ANOTHER TREATMENT)": GOSUB 9000:
IF RS$ = "N" THEN 1200
1250 HOME : PRINT "SELECTED APPLICATION ** ";AL$(AF);" **": VTAB 5: GOSUB
9450
1280 VTAB 23: HTAB 12: PRINT "( N = ANOTHER APPLICATION )": GOSUB 9000: IF
RS$ = "N" THEN 1200
1288 REM
1289 REM ## PRESENT STANDARD DOSE ##
1290 HOME : PRINT "SELECTED : ";SL$(SF): PRINT "===== ";TL$(TF): PRINT
SPC( 11);AL$(AF): PRINT SPC( 11);DL$(DF);" ";PL$(PF)
1300 SD = 0: FOR I = 1 TO 28: IF LEFT$(SD$(I),3) = STR$(TF) + STR$(
AF) THEN SD = I:I = 28
1310 NEXT :DO = 2: IF TF < > 24 AND SD = 0 AND AF < > 8 THEN VTAB 11:
PRINT "NO STANDARD DOSAGE ON RECORD.": PRINT : PRINT "YOU WILL HAVE
TO ENTER THE REQUIRED ": PRINT "CONCENTRATIONS.": GOSUB 9200: GOTO
1350
1320 IF TF = 24 OR AF = 8 THEN VTAB 11: PRINT "SEE MANUFACTURER'S INSTR
UCTIONS": VTAB 20: PRINT "PRESS ANY KEY TO RESTART PROGRAM": VTAB 20
: HTAB 38: GET RS$: RUN
1330 VTAB 7: GOSUB 9500: GOSUB 1700: GOSUB 9000: IF RS$ = "N" THEN 1290
1340 ON AF GOTO 1400,2000,1400,2000,2500,2200,2400,1320
1350 LD = VAL ( MID$( "2332121",AF,1)): FOR X = 1 TO LD:N$(X) = "":L$(X)
= MID$( "PPMDAY PPMINDAYPPMHRSDAYPPMMIN PPM GMSDAY MGS
",AF * 9 - 8 + (X - 1) * 3,3): NEXT : IF L$(LD) = "DAY" THEN L
$(LD) = "DAYS"
1357 IF TF > 24 THEN PRINT CHR$( 7): PRINT "PROGRAM CAN'T CONTINUE": PRINT
: PRINT "COMPLAIN TO CAM WEST": END

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```

1360 DO = 1:NT = 1:T(1) = TF: VTAB 8: HTAB 1: CALL - 958: PRINT "ENTER D
      OSAGE (ACTIVE INGREDIENT)": PRINT "=====": PRINT : FOR X = 1 TO
      LD: PRINT SPC( 9 - LEN (L$(X)));L$(X);" = ": NEXT : FOR X = 1 TO L
      D
1370 VTAB 10 + X: HTAB 14: INPUT "";RS$:N$(X) = RS$: IF VAL (RS$) = 0 THEN
      1370
1380 NEXT : GOSUB 9000: IF RS$ = "N" THEN 1360
1390 GOSUB 1740: GOSUB 9000: ON RS GOTO 1360,1340
1398 REM
1399 REM ## CALC : 1 HR BATH & LONG BATH ##
1400 HOME :HR = 1: PRINT "** ";TL$(TF);" ";AL$(AF);" **": VTAB 6: PRINT
      " 1 STOCK SOLUTION CONC.": PRINT : PRINT " 2 PUMP METERING SPEED
      ": PRINT : PRINT " 3 POND INFLOW": PRINT : PRINT " 4 POND CONCEN
      TRATION"
1410 V = 4:U = 4:X$ = "ITEM TO BE CALCULATED": GOSUB 9100:CF = F
1420 IF TF = 25 THEN GOSUB 1560: GOTO 1440
1430 V = 15: IF CF < > 1 THEN VTAB V: INPUT " ENTER STOCK CONC. (PPM)
      ";CS$:CS = VAL (CS$):V = V + 2: IF CS = 0 THEN V = V - 2: GOTO
      1430
1440 IF CF < > 2 THEN VTAB V: INPUT " ENTER PUMP SPEED (ML/MIN) ";
      PS$:PS = VAL (PS$):V = V + 2: IF PS = 0 THEN V = V - 2: GOTO 1440
1450 IF CF < > 3 THEN VTAB V: INPUT " ENTER POND FLOW (LPM) ";
      Q$:Q = VAL (Q$):V = V + 2: IF Q = 0 THEN INPUT " ENTER POND FLOW
      (CFS) ";Q$:Q = VAL (Q$) * 28.317 * 60:V = V + 1: IF Q = 0 THEN
      V = V - 3: VTAB V + 1: CALL - 868: GOTO 1450
1460 IF TF = 25 THEN GOSUB 1580: GOTO 1500
1470 IF CF < > 4 THEN VTAB V: PRINT SPC( 31); VAL (N$(1)): VTAB V: INPUT
      " ENTER POND CONC. (PPM) ";CP$:CP = VAL (CP$): IF CP = 0 THEN
      CP = VAL (N$(1)): VTAB V: HTAB 32: PRINT CP
1500 IF CF = 1 THEN CS = CP * (Q * 1000 + PS) / PS: IF TF = 25 THEN C2S =
      C3P * (Q * 1000 + PS) / PS
1510 IF CF = 2 THEN PS = (Q * 1000 + PS) * CP / CS
1520 IF CF = 3 THEN Q = (CS * PS / CP - PS) / 10
1530 IF CF = 4 THEN CP = CS * PS / (Q * 1000 + PS): IF TF = 25 THEN C3P =
      C2S * PS / (Q * 1000 + PS)
1540 LH = PS * 6 / 100:GM = 48 * CS * .00208333 / AI(3) / 100:G2M = 48 *
      C2S * .00208333 / AI(7) / 100: IF AF = 3 THEN HR = VAL (N$(2)): IF
      TF > 24 THEN HR = VAL (N$(3))
1546 GOSUB 9000: IF RS$ = "N" THEN 1400
1548 REM
1549 REM ## TABLE RESULTS ##
1550 GOTO 4000
1560 V = 15: IF CF < > 1 THEN VTAB V: INPUT " ENTER FORM.STOCK CONC. (
      PPM) ";RS$:CS = VAL (RS$): INPUT " ENTER MAL. STOCK CONC. (PPM) ";
      RS$:C2S = VAL (RS$):V = V + 3: IF CS = 0 OR C2S = 0 THEN V = V - 3:
      GOTO 1560
1570 RETURN
1580 IF CF < > 4 THEN H = 32: VTAB V: PRINT " ENTER POND FORM. CONC. (
      PPM) "; VAL (N$(1)): PRINT " ENTER POND MAL. CONC. (PPM) "; VAL (N
      $(2)): VTAB V: HTAB H: INPUT "";RS$:CP = VAL (RS$): IF CP = 0 THEN
      CP = VAL (N$(1)): VTAB V: HTAB H: PRINT CP
1590 IF CF < > 4 THEN V = V + 1: VTAB V: INPUT " ENTER POND MAL. CONC
      . (PPM) ";RS$:C3P = VAL (RS$): IF C3P = 0 THEN C3P = VAL (N$(2)): VTAB
      V: HTAB H: PRINT C3P
1600 RETURN

```

```

1698 REM
1699 REM ##### CHECK DOSE AND A.I. ##
1700 VTAB 18: PRINT " STANDARD DOSE OK ?":V = 18:H = 21: GOSUB 9010:DO
= 2: IF RS$ = "Y" THEN DO = 1: GOTO 1730
1710 VTAB 17: CALL - 958: POKE 33,7: FOR I = 1 TO LD:V = 9 + I: VTAB V:
POKE 34,V - 1: POKE 35,V + 1: INPUT "":RS$: IF RS$ = "" THEN RS$ =
N$(I): VTAB V: PRINT RS$
1720 N$(I) = RS$: POKE 35,20: NEXT : POKE 33,40: POKE 34,0: POKE 35,24: VTAB
20: PRINT "DOSES OK (Y/N) ?":V = 20:H = 16: GOSUB 9010: IF RS$ = "N"
THEN 1710
1730 IF AF = 7 THEN 1790
1740 FOR I = 1 TO NT:A(I) = AI(T(I) - 10): NEXT
1750 VTAB 15: HTAB 1: CALL - 958: PRINT "A.I. OF CHEMICALS ": PRINT "=
=====": PRINT : FOR I = 1 TO NT: PRINT SPC( 7 - LEN ( STR$
(A(I) * 100));A(I) * 100;" % ";TL$(T(I))
1752 X$ = LEFT$(TL$(T(I)),3): IF X$ = "BRI" OR X$ = "OVA" OR X$ = "WES"
OR X$ = "BET" THEN VTAB PEEK (37): HTAB 22: PRINT "(IODINE)"
1755 NEXT : VTAB 21: PRINT "A.I.'S OK ?":V = 21:H = 12: GOSUB 9010: IF
RS$ = "Y" THEN 1780
1760 POKE 33,7: FOR I = 1 TO NT:V = 17 + I: VTAB V: POKE 34,V - 1: POKE
35,V + 1: INPUT "":RS$: IF RS$ = "" THEN RS$ = STR$(A(I) * 100): VTAB
V: PRINT RS$
1770 A(I) = VAL (RS$) / 100: POKE 35,20: NEXT : POKE 33,40: POKE 34,0: POKE
35,24:V = 21: VTAB V: PRINT "A.I.'S OK (Y/N) ?":H = 17: GOSUB 9010: VTAB
21: CALL - 868: IF RS$ = "N" THEN 1750
1780 RETURN
1790 VTAB 14: HTAB 1: CALL - 958: PRINT "INJECTION SOLUTION": PRINT "=
=====": PRINT : INPUT " MG A.I. / ML = ":RS$
1800 A(1) = VAL (RS$):X = VAL (N$(1)) / VAL (RS$): IF 0 > X OR X > =
.25 THEN PRINT : PRINT "!!!! INJECTION VOLUME TOO GREAT !!!!": GOSUB
9200: GOTO 1790
1810 RETURN
1998 REM
1999 REM ## DIP & STATIC BATH ROUTINE ##
2000 HOME :DC = VAL (N$(1)):AI = A(1): PRINT "ARE VOLUME CALCULATIONS N
EEDED ?": PRINT : PRINT " ( Y = CALCULATIONS ), (Y/N) ":V = PEEK (
37):H = 32: GOSUB 9010: IF RS$ = "Y" THEN 2070
2010 FOR I = 1 TO 5: VTAB 10 + I: PRINT " ";I;" ";UL$(I): NEXT :V = 9:U
= 5:X$ = "UNIT": GOSUB 9100:UF = F
2020 VTAB 18: PRINT "ENTER VOLUME IN ";UL$(UF): VTAB 18: HTAB 26: INPUT
" ";V$:VI = VAL (V$):VL = VI * UC(UF): IF VI = 0 THEN 2020
2030 GOSUB 9000: IF RS$ = "N" THEN 2000
2040 GOTO 2150
2070 HOME : FOR I = 1 TO 4: VTAB I + 2: PRINT " ";I;" ";CL$(I): NEXT : FOR
I = 1 TO 5: VTAB 11 + I: PRINT " ";I;" ";UL$(I + 5): NEXT :V = 1:U =
4:X$ = "CONTAINER": GOSUB 9100:CF = F:V = 10:U = 5:X$ = "UNIT": GOSUB
9100:UF = F + 5
2080 FOR I = 1 TO 7: VTAB I + 9: CALL - 868: NEXT : VTAB 10: PRINT "ENT
ER ";CL$(CF);" DIMENSIONS": PRINT : PRINT " IN ";UL$(UF)
2090 VTAB 15: INPUT "-DEPTH " ;DD$:D = VAL (DD$): IF CF = 2 THEN
INPUT "-DIAMETER " ;R$:R = VAL (R$) / 2:VI = D * 3.14159265 * R
© 2: GOTO 2130

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```

2100 IF CF = 4 THEN INPUT "-TOP WIDTH ";TW$:TW = VAL (TW$): INPUT "
-BOTTOM WIDTH ";BW$:BW = VAL (BW$):W = (TW + BW) / 2: GOTO 2120
2110 INPUT "-WIDTH ";W$:W = VAL (W$)
2120 INPUT "-LENGTH ";L$:L = VAL (L$):VI = D * W * L: IF CF = 3 THEN
VI = (L - W) * W + 3.14159265 * (W / 2) ^ 2
2130 IF VI = 0 THEN 2090
2140 VL = VI * UC(UF) ^ 3 / 1000: VTAB 20: PRINT "VOLUME (CU. ";UL$(UF);"
) = "; INT (VI * 1000 + .5) / 1000: PRINT SPC( 7);" ( LITERS ) =
"; INT (VL * 1000 + .5) / 1000: GOSUB 9000: IF RS$ = "N" THEN 2000
2150 GOTO 4000
2198 REM ## ORAL TREATMENT ##
2199 REM
2200 HOME : PRINT "INPUT TOTAL FISH WEIGHT IN POND"
2210 VTAB 7: PRINT " 1 TOTAL WEIGHT (LB) =": PRINT : PRINT : PRINT " 2
TOTAL WEIGHT (KG) =": PRINT : PRINT : PRINT " 3 NO. OF FISH =":
PRINT " FISH / LB =": PRINT : PRINT " 4 NO. OF FISH =": PRINT
" GM / FISH ="
2220 V = 4:U = 4:X$ = "METHOD": GOSUB 9100:WF = F: ON WF GOTO 2230,2240,2
250,2260
2230 VTAB 7: HTAB 27: INPUT " ";RS$:W = VAL (RS$): GOTO 2270
2240 VTAB 10: HTAB 27: INPUT " ";RS$:W = VAL (RS$) * 2.20463414: GOTO 22
70
2250 VTAB 13: HTAB 20: INPUT " ";RS$:N = VAL (RS$): HTAB 20: INPUT " ";RS
$:W = N / VAL (RS$): GOTO 2270
2260 VTAB 16: HTAB 20: INPUT " ";RS$:N = VAL (RS$): HTAB 20: INPUT " ";RS
$:W = N * VAL (RS$) / 454: GOTO 2270
2270 VTAB 20: PRINT "***** TOTAL WEIGHT OF FISH IN POND *****": PRINT SPC(
11);" = "; INT (W);" LB"
2280 GOSUB 9000: IF RS$ = "N" THEN 2200
2310 GOTO 4000
2398 REM
2399 REM ## INJECTION ##
2400 GOTO 4000
2498 REM
2499 REM ## FLUSH ##
2500 HOME : PRINT "INPUT FLOW": PRINT : PRINT : PRINT : PRINT : PRINT "1
GPM(IMP) =": PRINT : PRINT "2 GPM(US) =": PRINT : PRINT "3 C
FS =": PRINT : PRINT "4 LPM ="
2510 V = 4:U = 4:X$ = "METHOD": GOSUB 9100: VTAB 2 * F + 4: HTAB 16: INPUT
";RS$:UC(3) = UC(3) * 60:UC(4) = 1:LPM = VAL (RS$) * UC(F): IF VAL
(RS$) = 0 THEN 2510
2520 VTAB 15: PRINT "FLOW = ";LPM;" LPM": VTAB 18:D = VAL (N$(1)): PRINT
TL$(TF) + " DOSE = ";D;" PPM/MIN"
2540 VTAB 20: PRINT "DO YOU HAVE A STOCK": PRINT TL$(TF);" SOLUTION (Y/N
) ?":V = 21:H = LEN (TL$(TF)) + 17: GOSUB 9010:CS = .01: IF TF = 13
THEN CS = .10
2550 VTAB 20: HTAB 1: CALL - 868: VTAB 21: CALL - 868: VTAB 20: PRINT
"STOCK ";TL$(TF);" SOLUTION = ": IF RS$ = "N" THEN VTAB 20: HTAB H +
2: PRINT CS * 100;" % A.I.": GOTO 2570
2560 VTAB 20: HTAB H + 8: PRINT "% A.I.": VTAB 20: HTAB H + 3: INPUT " ";
RS$:CS = VAL (RS$) / 100: VTAB 20: HTAB H + 8: PRINT "% A.I.": IF C
S = 0 THEN 2560
2570 GOSUB 9000: IF RS$ = "N" THEN 2500

```

```

2578 REM
2579 REM ## OUTPUT ##
2580 GOTO 4000
3998 REM
3999 REM ## OUTPUT TABLE ##
4000 HOME :HC = 0:U$ = " GM ":U2$ = U$: IF TF = 11 OR TF = 13 OR TF = 18
OR TF = 20 OR TF = 25 OR MF = 2 AND LF = 1 THEN U$ = " ML "
4010 IF HC = 1 THEN PRINT " ": PRINT TITLE$: PRINT
4020 PRINT DL$(DF);" ";PL$(PF): PRINT SL$(SF): PRINT " ":RS$ = " " + TL
$(TF) + " " + AL$(AF) + " ": FOR X = 1 TO INT ((39 - LEN (RS$)) /
2):RS$ = "*" + RS$ + "*": NEXT : PRINT RS$: PRINT : ON AF GOSUB 4100
,4200,4100,4200,4400,4300,4350,4600
4030 PR# 0: VTAB 23: FOR X = 1 TO 1000: NEXT : POKE - 16368,0: PRINT "H
ARDCOPY (Y/N) (N = RETURN TO MENU)":V = 23:H = 16: GOSUB 9010: IF
RS$ = "N" THEN RUN
4040 IF HC = 0 THEN HC = 1: PRINT : PRINT "ENTER TITLE ( DO NOT USE ANY
COMMAS )": INPUT TITLE$
4050 PR# 1: PRINT " ": GOTO 4010
4098 REM
4099 REM ## TABLE : 1 HR BATH, LONG BATH ##
4100 PRINT " POND FLOW (LPM) = "; INT (Q): PRINT : PRINT "
PUMP SPEED (ML/MIN) = "; INT (PS): PRINT : IF TF = 25 THEN 41
30
4110 PRINT " STOCK CONC. (PPM A.I.) = "; INT (CS * 10 + .5) / 10: PRINT
: PRINT " POND CONC. (PPM A.I.) = "; INT (CP * 10 + .5) / 10: GOSUB
4170
4120 PRINT "***** STOCK RECIPE *****": PRINT " "; INT (
GM * LH * HR / A(1) * 10 + .5) / 10;U$;TL$(TF);" (";A(1) * 100;" % A
.I.)": PRINT : PRINT " MADE UP TO "; INT (LH * HR * 10 + .5) / 10;"
LITRES WITH WATER": RETURN
4130 PRINT " STOCK (PPM A.I.) FORMALIN = "; INT (CS * 100 + .5) / 100:
PRINT SPC( 19);"MALACHITE = "; INT (C2S * 100 + .5) / 100: PRINT :
PRINT " POND (PPM A.I.) FORMALIN = "; INT (CP * 100 + .5) / 100:
PRINT SPC( 19);"MALACHITE = "; INT (C3P * 100 + .5) / 100: GOSUB 4
170
4140 PRINT "***** STOCK RECIPE *****"
4150 PRINT " "; INT (GM * LH * HR / A(1));" ML FORMALIN (";A(1) * 100;
" % A.I.)": PRINT " "; INT (G2M * LH * HR / A(2) * 100 + .5) / 100;
" GM MALACHITE ("A(2) * 100;" % A.I.)": PRINT " MADE UP TO "; INT
(LH * HR);" LITRES WITH WATER": RETURN
4170 PRINT : IF AF = 3 THEN PRINT " "; INT (LH * HR * 100 + .5) / 100;
" LITERS OF STOCK SOL. OVER ";HR;" HR": PRINT
4180 RETURN
4198 REM
4199 REM ## DIP, STATIC BATH TABLE ##
4200 GL = INT (DC / AI * 10000 + .5) / 10000000:GT = INT (DC * VL / AI +
.5) / 1000: PRINT : PRINT " TREATMENT CONC. = ";DC;" PPM A.I.": PRINT
: IF GT > = 1000 THEN GT = INT (GT)
4210 IF MF = 6 THEN PRINT " APPLY FOR ";N$(2);" MIN.": PRINT
4220 VI = INT (VI * 1000 + .5) / 1000:VL = INT (VL * 1000 + .5) / 1000:
IF MF = 2 AND LF = 1 THEN TL$(TF) = TL$(TF) + " STOCK"
4230 U2L$ = "": IF UF > 5 THEN U2L$ = "CU": IF VL > = 1000 THEN VL = INT
(VL)

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4240 IF VL > = 1000 THEN VL = INT (VL)
4250 PRINT : PRINT "***** BATH PREPARATION *****": PRINT : PRINT
    SPC( 6 - LEN ( LEFT$ ( STR$ (GT), 6)));GT;U$;" ";TL$(TF);" (";AI *
100;" % A.I.)": PRINT : PRINT " IN "; INT (VI * 1000 + .5) / 1000;"
";U2L$;" ";UL$(UF);" ("; INT (VL * 10 + .5) / 10;" LITERS)"
4260 IF MF = 2 THEN PRINT : PRINT : PRINT "THIS IS GUIDELINE AND VARIE
S WITH TEMP ": PRINT "TRY A TEST GROUP IF NOT FAMILIAR !!!!!"
4270 RETURN
4297 REM
4298 REM ## ORAL TABLE ##
4299 REM
4300 FOR I = 1 TO NT: PRINT " "; VAL (N$(I));" "L$(I);" ";TL$(T(I));" A
.I./100 LB/DAY": PRINT : NEXT : PRINT " "; VAL (N$(1 + NT));" ";L$(
1 + NT): PRINT : PRINT " "; INT (W);" LB OF FISH": PRINT
4310 PRINT "***** RECIPE *****": PRINT : FOR I = 1 TO
NT: PRINT " "; INT ( VAL (N$(I)) * W / A(I) + .5) / 100;" ";L$(I);"
";TL$(T(I));" / DAY": PRINT SPC( 13);"(";A(I) * 100;" % A.I.)": PRINT
: NEXT : RETURN
4347 REM
4348 REM ## INJECTION ##
4349 REM
4350 PRINT :X = INT ( VAL (N$(1)) * 100 / A(1) + .5) / 100: PRINT SPC(
6 - LEN ( STR$ (X));X;" ML ";TL$(TF);" SOLUTION": PRINT : PRINT SPC(
10);"/ LB OF FISH": PRINT : PRINT : PRINT "***** RECIPE
*****": PRINT
4360 PRINT " SOLUTION = ";A(1);" MG A.I./ ML": RETURN
4397 REM
4398 REM ## FLUSH TABLE ##
4399 REM
4400 PRINT " ";D;" PPM TREATMENT ": PRINT : PRINT " "; INT (.25 * LPM
/ CS + .5) / 10;" ML ";TL$(TF);" STOCK SOL.": PRINT " (";CS *
100;" % A.I. STOCK SOL.)": PRINT : PRINT " INTO ";LPM;" LPM FLOW":
PRINT
4410 PRINT "***** ";CS * 100;" % STOCK RECIPE *****": PRINT :UL$
= " ML": IF TF < > 13 THEN UL$ = " GM "
4420 PRINT " "; INT (CS * 10000 / A(1) + .5) / 10;UL$;TL$(TF);" (";A(1)
* 100;" % A.I.) / LITER": PRINT : IF TF = 13 THEN PRINT " NOTE.: 1
00 % FORMALIN": PRINT SPC( 11);"= 37 % FORMALDEHYDE": PRINT
4430 IF TF = 17 THEN PRINT : PRINT "FLUSH NOT RECOMMENDED AFTER EYED ST
AGE ": PRINT "2 PPM METERED FOR 1 HR IS PREFERRED": PRINT : PRINT "
*****"
4440 RETURN
4998 REM
4999 REM ### EQUIPMENT DISINFECTION ###
5000 HOME :LS = 0: PRINT "**** ";ML$(MF);" ****": VTAB 5: FOR I = 1 TO 7
: PRINT " ";I;" ";TL$(I + 10): PRINT : NEXT :U = 7:V = 3:X$ = "DI
SINFECTANT": GOSUB 9100:TF = F + 10:A(1) = AI(TF - 10): VTAB F * 2 +
3: HTAB 5: PRINT ">": IF F = 7 THEN LS = 1
5010 IF TF > 15 THEN VTAB 21: PRINT " 1 EQUIP. DISINFECTION": PRINT
" 2 POND DISINFECTION":V = 19:U = 2:X$ = "CHLORINE USE": GOSUB
9100:CLF = F: GOSUB 9000: IF RS$ = "N" THEN 5000
5020 IF TF > 15 THEN GOSUB 8830: GOSUB 9200: HOME : ON CLF GOSUB 8860,8
870: GOSUB 9000: IF RS$ = "N" THEN 5000

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5030 IF TF = 11 THEN VTAB 21: PRINT " 1 ROCCAL 10 % A.I.": PRINT "
      2 ROCCAL 20 % A.I.":V = 19:U = 2:X$ = "ROCCAL CONCENTRATION": GOSUB
      9100:AI(TF - 10) = AI(TF - 10) * F: GOSUB 9000: IF RS$ = "N" THEN 50
      00
5040 IF TF = 12 THEN VTAB 21: PRINT " 1 HYAMINE 1622 SOLID (100 % A
      .I.)": PRINT " 2 HYAMINE 1622 LIQUID (50 % A.I.)":V = 19:U = 2:X
      $ = "HYAMINE TYPE": GOSUB 9100:AI(TF - 10) = AI(TF - 10) / F:LS = 2 -
      F: GOSUB 9000: IF RS$ = "N" THEN 5000
5050 IF TF > 12 AND TF < 16 THEN GOSUB 9000: IF RS$ = "N" THEN 5000
5060 HOME : PRINT TL$(TF): PRINT : PRINT ML$(MF): VTAB 7:AF = 2:NT = 1:S
      D = TF - 10: IF TF > 15 THEN SD$(TF - 10) = "0" + STR$(TF - 10) +
      "5" + MID$(SD$(5 + CLF),4,3)
5070 GOSUB 9500: GOSUB 1700:AL$(AF) = "DISINFECTANT BATH":DF = 1:DL$(DF
      ) = "":PF = 1:PL$(PF) = "":SF = 1:SL$(SF) = ""
5080 TL$(13) = TL$(TF):TL$(14) = TL$(TF):TF = 13 + LS: HOME : GOSUB 2000:
      RUN
5198 REM
5199 REM ## DOCUMENTATION ##
5200 HOME : VTAB 3: PRINT " THIS PROGRAM HAS BEEN PREPARED FOR": PRINT
      : PRINT "USE IN THE FEDERAL FACILITIES OF THE": PRINT : PRINT "SALMO
      NID ENHANCEMENT PROGRAM IN": PRINT : PRINT "BRITISH COLUMBIA."
5210 VTAB 15: PRINT " CARE SHOULD BE TAKEN WHEN USING": PRINT : PRINT "
      THIS PROGRAM AT ANY OTHER LOCATION.": GOSUB 9200
5220 HOME : VTAB 3: PRINT " FOR INFORMATION, CONTACT:": VTAB 6: PRINT "
      - GARY HOSKINS": PRINT " DIAGNOSTIC SERVICE": PRINT " DEP
      T. OF FISHERIES & OCEANS": PRINT " PACIFIC BIOLOGICAL STATION":
      PRINT " NANAIMO,BC"
5230 VTAB 13: PRINT " - CAM WEST OR BILL MCLEAN": PRINT " SALMON
      ID ENHANCEMENT PROGRAM": PRINT " DEPT. OF FISHERIES & OCEANS": PRINT
      " 1090 WEST PENDER ST": PRINT " VANCOUVER,BC"
5240 GOSUB 9200
5250 HOME : PRINT "NOTE !!!": PRINT : PRINT "THE CHEMICALS REFERRED TO A
      RE COMMONLY USED IN FEDERAL B.C. FACILITIES.": PRINT
5260 PRINT " THE SELECTION OF DISEASES IN THIS PROGRAM ARE FOUND IN
      B.C. WATERS. THE TREATMENTS GIVEN ARE RECOMMENDED BY THE DISEASE
      DIAGNOSTICS LAB, DFO."
5270 PRINT : PRINT " TREATMENT/APPLICATIONS ARE LISTED IN ORDER OF PRE
      FERENCE. THEREFORE, THOSE AT THE TOP OF THE LIST ARE THE MOST
      HIGHLY RECOMMENDED.": PRINT
5280 PRINT " OPERATION OF THE DISEASE PROGRAM IS SIMPLE. ILLEGAL ENT
      RIES ARE NOT RECOGNIZED. ANY ENTRY CAN BE CHANGED BY PRESSING
      <N> WHEN ASKED 'OK (Y/N)'. THIS REPEATS THE MOST RECENT SCREEN
      OF QUESTIONS."
5290 GOSUB 9000: IF RS$ = "N" THEN 5250
5300 HOME : PRINT " OPTIONS HAVE BEEN GIVEN FOR ALL FORESEEN INST
      ANCES IN WHICH THE USER MAY REFER TO DIFFERENT PONDS AND/OR USE ONE O
      F MANY POSSIBLE UNITS OF MEASURE."
5310 PRINT : PRINT " WHEN ENTERING THE POND FLOW FOR LONG BATH OR
      1 HOUR BATH CALCULATIONS, PRESSING THE RETURN KEY WILL ALTERNATE
      THE UNITS BETWEEN LPM AND CFS.": PRINT
5320 PRINT " BY PRESSING 'CTRL R' YOU MAY RETURN DIRECTLY TO THE MAIN
      MENU FROM ANY PART OF THE PROGRAM. 'CTRL P' WILL COPY VIDEO DI
      SPLAYS ONTO THE PRINTER. CTRL COMMANDS MAY BE USED WHEN THESE REQU
      ESTSAPPEAR :": PRINT

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5330 PRINT " 1) OK (Y/N) ?": PRINT " 2) SELECT # ?": PRINT "
3) (PRESS ANY KEY TO CONTINUE) ? ": GOSUB 9200
5350 HOME : PRINT "NOTE : A.I. IS USED AS THE SHORT FORM OF ACTIVE
INGREDIENT.": VTAB 13: HTAB 4: PRINT "( ANY SUGGESTIONS TO IMPROVE
THE DISEASE PROGRAM ARE WELCOME. )"
5360 VTAB 23: HTAB 1: PRINT "PRESS ANY KEY TO RETURN TO THE MENU": VTAB
23: HTAB 39: GET RS$: RUN
5498 REM
5499 REM ## ANESTHETIC ##
5500 LF = 0:TL$(11) = "MS222":TL$(12) = TL$(11):TL$(13) = "2-PHENOXYETHAN
OL":TL$(14) = "CO2":N$(1) = " 75":N$(2) = "400":N$(3) = "200":A(1) =
1
5510 HOME : PRINT "ANESTHETIC": PRINT "*****": VTAB 8: PRINT " 1 M
S222 - 75 MG / L FOR GENERAL USE": PRINT : PRINT " 2 MS222 - 400 M
G / L TO KILL FISH": PRINT : PRINT " 3 2-PHENOXYETHANOL - 0.2 ML /
LITRE": PRINT SPC( 23);"FOR GENERAL USE"
5520 PRINT : PRINT " 4 CO2 - 200 TO 400 MG/L":AL$(2) = "ANESTHETIC B
ATH":AF = 2:DF = 1:DL$(1)h"":PF = 1:PL$(1) = "":SF = 1:SL$(1) = "":U
= 4:V = 5:X$ = "ANESTHETIC": GOSUB 9100:N$(1) = N$(F):TF = F + 10: IF
F = 3 THEN LF = 1
5530 IF TF < 14 THEN V = 18: VTAB V: PRINT "ARE YOU USING A STOCK SOLUTI
ON ?":H = 32: GOSUB 9010: IF RS$ = "N" THEN 5550
5540 LF = 1: VTAB 20: HTAB 1: INPUT "STOCK CONCENTRATION (A.I. %) = ";RS$
:A(1) = VAL (RS$) / 100: IF A(1) = 0 THEN 5540
5550 HOME : PRINT TL$(TF); " :": PRINT : ON TF - 10 GOSUB 8900,8900,8910,
8920: VTAB 23: HTAB 13: PRINT "( N = ANOTHER ANESTHETIC )": GOSUB 90
00: IF RS$ = "N" THEN 5510
5560 IF TF = 12 THEN AL$(2) = "DIP FOR KILLING"
5570 IF TF = 14 THEN RUN
5580 HOME : GOSUB 2000: RUN
5598 REM
5599 REM ### DISEASE CASE REPORTS ##
5600 HOME : VTAB 11: HTAB 13: PRINT "W O R K I N G": PRINT D$;"RUN";ML$(
MF)
5998 REM
5999 REM ## CHEMICAL NOTES ##
6000 HOME : VTAB 3: FOR I = 1 TO 14: PRINT SPC( 3 - LEN ( STR$ (I)));I
;" ";TL$(I + 10): NEXT : PRINT : FOR I = 1 TO 6: PRINT SPC( 3 - LEN
( STR$ (I + 14)));I + 14;" ";DIL$(I): NEXT : FOR I = 1 TO 3: VTAB 1
7 + I: HTAB 23: PRINT SPC( 3 - LEN ( STR$ (I + 20)));I + 20;" ";A
NL$(I): NEXT
6002 VTAB 23: HTAB 14: PRINT ", BLEACH, HYPOCHLORITES": VTAB 1
6010 V = 1:U = 23:X$ = "": GOSUB 9100: HOME : IF F < 15 THEN PRINT TL$(F
+ 10);" :": GOTO 6040
6020 IF F < 21 THEN PRINT DIL$(F - 14);" :": GOTO 6040
6030 PRINT ANL$(F - 20);" :":
6040 VTAB 3: ON F GOSUB 9310,9320,9330,9340,9350,9360,9370,9380,9390,940
0,9410,9410,9430,9440,9310,8810,9380,9400,8820,8830,8900,8910,8920
6050 VTAB 22: HTAB 14: PRINT "(Y = RETURN TO MENU)": PRINT SPC( 13);"(N
= SELECT ANOTHER NOTE)": GOSUB 9000: IF RS$ = "N" THEN 6000
6060 RUN

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8798 REM
 8799 REM ## DISINFECTANT NOTES ##
 8810 PRINT "1 50% ACTIVE INGREDIENT IN LIQUID FORM. ": PRINT : PRINT "2
 100% ACTIVE INGREDIENT IN POWDER. ": PRINT : PRINT "3 USE AS GEN
 ERAL HATCHERY DISINFECTANT. ": PRINT
 8811 PRINT "4 NOT RECOMMENDED FOR USE DIRECTLY ON ": PRINT " FISH.": PRINT
 : PRINT : RETURN
 8820 PRINT "1 ACTIVE INGREDIENT 1.6% (16,000 MG/L) ": PRINT " AVAILABL
 E IODINE.": PRINT : PRINT : PRINT "2 IF USED TO DISINFECT EGGS, CHEC
 K PH ": PRINT " AND ADJUST TO 7.0 WITH": PRINT
 8821 PRINT " SODIUM BICARBONATE (BAKING SODA). ": PRINT : PRINT "3
 SINCE WESCODYNE CONTAINS A WETTING ": PRINT " AGENT, IT IS A GOO
 D GENERAL PURPOSE ": PRINT " DISINFECTANT BUT RINSE WELL AFTER US
 E.": RETURN
 8829 REM ## CHLORINE NOTES ##
 8830 HOME : PRINT "CHLORINE": PRINT "DOMESTIC BLEACH": PRINT "SODIUM HYP
 OCHLORITE": PRINT "CALCIUM HYPOCHLORITE": PRINT : PRINT "1.USE FOR P
 OND OR EQUIPMENT DISINFECTION ONLY. DO NOT USE IN NATURAL OR SEMI-
 NATURAL CHANNELS, IT KILLS VEGETATION."
 8831 PRINT "2.USE WITH EXTREME CAUTION, IT IS HIGHLY TOXIC AT VERY LOW
 CONCENTRATIONS. ": PRINT : PRINT "3.ALWAYS CONSIDER EFFECTS OF T
 HE SPENT CHEMICAL ON THE ENVIRONMENT. NEUTRALIZE WITH
 SODIUM THIOSULFATE"
 8832 PRINT " (NA2SO2O3) BEFORE RELEASE INTO ANY WATER SYSTEM (111.
 3 MG/L SOLUTION). ": GOSUB 9200: VTAB 21: PRINT "4.HIGH-TEMPERATUR
 ES AND LOW PH OVER A LONG TIME GIVE THE MOST EFFECTIVE BAC
 TERICIDAL ACTION.": PRINT
 8833 PRINT "5.IF NECESSARY, ADD ACID (H2SO4) SLOWLY TO THE WATER TO LO
 WER PH AND INCREASE THE AMOUNT OF FREE CHLORINE, OR USE HYPOCH
 LOROUS ACID IN SOLUTION. DO NOT INHALE THE CHLORINE GAS PRODUCED B
 Y THESE MIXTURES."
 8834 PRINT : PRINT "5.ACTIVE INGREDIENT WILL VARY DEPENDING ON THE TYP
 E OF CHLORINE USED. CONSULT THE LABEL.": PRINT : PRINT : PRINT : PRINT
 : RETURN
 8849 REM ## CHLORINE PROCEDURES ##
 8860 PRINT "CHLORINE : BUCKET WASHING / DISINFECTION": PRINT "***** P
 ROCEDURE IS IMPORTANT *****": PRINT "1 PREPARE CONTAINER OF CHLOR
 INE SOLUTION": PRINT "2 PREPARE NEUTRALIZING TUB 178 MG/L "
 8861 PRINT " NA2S2O3 (SODIUM THIOSULFATE)": PRINT : PRINT "3 WASH BUCK
 ETS IN CHLORINE SOL.": PRINT : PRINT "4 RINSE IN NEUTRALIZING SOL.":
 PRINT : PRINT "5 RINSE IN WATER (HOSE OFF) & SET TO DRY"
 8862 PRINT "6 NEUTRALIZE CHLORINE SOLUTION BEFORE ": PRINT " RELEASIN
 G (703 MG NA2S2O3 PER LITER)": RETURN
 8870 PRINT "CHLORINE : POND DISINFECTION": PRINT : PRINT "***** PROCE
 DURE IS IMPORTANT *****": PRINT "1 PREPARE CONTAINER OF CHLORINE
 SOLUTION": PRINT "2 SEQUENCE IS IMPORTANT, WAIT 15 MIN. "
 8871 PRINT "3 MIX IN H2SO4. DO THIS SLOWLY OR CHLORINE GAS FORMS
 .": PRINT : PRINT "5 ALLOW 10 HOURS FOR DISINFECTION.": PRINT : PRINT
 "6 NEUTRALIZE WITH SODIUM THIOSULFATE ": PRINT " (NA2S2O3) 111
 .3 MG / LITER SOL. ": RETURN

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8898 REM
8899 REM ## ANESTHETIC NOTES ##
8900 PRINT "1 ACTIVE INGREDIENT 100% IN POWDER FORM. ": PRINT : PRINT "
2 TEST EACH BATCH FOR FISH TOXICITY ": PRINT " BEFORE ALLOWING
GENERAL HATCHERY USE, ": PRINT " THERE HAVE BEEN SOME TOXIC LOTS.
": PRINT
8901 PRINT "3 IN VERY SOFT WATER SOLUTIONS OF MS-222": PRINT " MAY REQU
IRE BUFFERING. ADJUST TO ": PRINT " PH 7.0 USING SODIUM BICARB
ONATE": PRINT : PRINT " (BAKING SODA).": PRINT : GOSUB 9200
8902 VTAB 22: PRINT "4 *** ACTUAL AMOUNT NEEDED FOR DESIRED ": PRINT "
RESULTS DEPENDS ON WATER TEMP, ": PRINT " SPECIES, AGE
& HEALTH. ": PRINT : PRINT : RETURN
8910 PRINT : PRINT "1 ACTIVE INGREDIENT 100% IN LIQUID FORM.": PRINT : PRINT
"2 STANDARD DOSAGE MAY BECOME LETHAL AT ": PRINT " HIGHER TEMP. OR
LARGER FISH SIZES.": PRINT
8911 PRINT : PRINT "3 STORE IN DARK BOTTLES AWAY FROM LIGHT ": PRINT "
IN A COOL LOCATION.": PRINT : PRINT : PRINT "4 MIX WELL BEFORE USE T
O AVOID HOT SPOTS": PRINT " OF 2-PHENOXY IN BATH."
8912 GOSUB 9200: VTAB 22: PRINT "5 DOES NOT DISSOLVE WELL IN COLD WATER.
": PRINT : PRINT "6 *** ACTUAL AMOUNT NEEDED FOR DESIRED ": PRINT
" RESULTS DEPEND ON WATER TEMP, ": PRINT " SPECIES, AGE
& HEALTH.": PRINT : PRINT : RETURN
8920 PRINT "1 MAINTAIN PH BETWEEN 6.0 - 6.5 WITH 0.122 GM SODIUM BI
CARBONATE / LITER. ": PRINT "2 OPT. CO2 CONCENTRATION = 200-400 MG/
L.": PRINT "3 USE ANHYDROUS CO2 GAS ONLY.": PRINT
8921 PRINT "4 INTRODUCE CO2 SLOWLY TO MAINTAIN O2 LEVEL ABOVE 6 PPM.
": PRINT : PRINT "5 USE A VERY LARGE AIRSTONE AND TURN ON GAS BEFO
RE IMMERSING STONE. ": PRINT
8922 PRINT "6 ADD ADDITIONAL CO2 AS REQUIRED TO MAINTAIN DESIRED
DEGREE OF IMMOBILIZATION.": GOSUB 9200: VTAB 20: PRINT
"7 RECOMMENDED WHEN FISH ARE FOR HUMAN CONSUMPTION.": PRINT
8923 PRINT "8 FOR FURTHER INSTRUCTIONS, SEE YOUR NEIGHBOURHOOD BIOL
OGIST": PRINT : PRINT : PRINT : RETURN
8999 REM ## OK (Y/N)
9000 VTAB 23: HTAB 1: PRINT "OK (Y/N)":V = 23:H = 10: GOSUB 9010: RETURN

9010 VTAB V: HTAB H: GET RS$: IF ASC (RS$) = 18 THEN RUN
9015 IF ASC (RS$) = 16 THEN GOSUB 9050: GOTO 9000
9020 IF RS$ < > "Y" AND RS$ < > "N" THEN 9010
9025 RS = 1: IF RS$ = "Y" THEN RS = 2
9030 VTAB 23: HTAB 1: CALL - 868: POKE - 16368,0: RETURN
9049 REM ## SCREEN DUMP ##
9050 QS = "": FOR I = 1 TO 42:QS = QS + "-": NEXT : VTAB 23: HTAB 39: POKE
33,1: POKE 32,38: POKE 34,23: PR# 1: PRINT " ": PRINT QS: FOR VV = 1
TO 23:RS$ = "!"
9060 FOR HH = 1 TO 40:RS$ = RS$ + CHR$ ( SCRN( HH - 1,2 * (VV - 1)) + 1
6 * SCRN( HH - 1,2 * (VV - 1) + 1)): NEXT
9070 PRINT RS$ + "!" : NEXT : PRINT QS: PR# 0: POKE 34,0: POKE 32,0: POKE
33,40: RETURN
9099 REM ## SELECT
9100 VTAB V: HTAB 4: PRINT "SELECT ";X$;" #":H = 13 + LEN (X$): VTAB V:
HTAB H: POKE 33,38: INPUT "";F$: IF F$ < > "" THEN IF ASC (F$) =
18 THEN RUN
9110 IF F$ < > "" THEN IF ASC (F$) = 16 THEN GOSUB 9050: GOTO 9100

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9120 F = VAL (F$): IF F > U OR F < 1 THEN 9100
9130 POKE 33,40: RETURN
9198 REM
9199 REM ## CONTINUE ##
9200 VTAB 23: HTAB 1: PRINT "(PRESS ANY KEY TO CONTINUE)": VTAB 23: HTAB
40: GET RS$: IF ASC (RS$) = 18 THEN RUN
9210 VTAB 23: HTAB 1: CALL - 868: IF ASC (RS$) = 16 THEN GOSUB 9050: GOTO
9200
9220 RETURN
9298 REM
9299 REM ## CHEMICAL NOTES ##
9300 PRINT "GENERAL ": PRINT : PRINT "1 ALWAYS HAVE CALCULATIONS CHECKE
D BY": PRINT " A SECOND PERSON.": PRINT : PRINT "2 IF NOT SURE OF F
ISH REACTION TO A": PRINT " TREATMENT, TEST A CONTROL GROUP FIRST."

9301 PRINT "3 ALWAYS CONSIDER THE ENVIRONMENTAL ": PRINT " IMPACT OF TH
E SPENT CHEMICAL.": PRINT : PRINT "4 ALL CHEMICALS USED TO TREAT FIS
H": PRINT " SHOULD BE HANDLED WITH CARE.": PRINT : PRINT "5 USE REC
OMMENDED CHEMICAL DOSAGES.": RETURN
9310 PRINT "1 KNOWN AS BETADINE OR BRIDINE.": PRINT : PRINT "2 10,000 MG
/L AVAILABLE IODINE (1% A.I.)": PRINT "3 USE FOR EGG OR EQUIPMENT DI
SINFECTION.": PRINT : PRINT "4 IF USED TO DISINFECT EGGS, CHECK PH."

9311 PRINT : PRINT " ADJUST TO 7.0 WITH SODIUM BICARBONATE ": PRINT "
(BAKING SODA) BEFORE USE.": PRINT : PRINT : PRINT "5 OVADINE AND WES'
CODYNE ARE ALTERNATIVE ": PRINT " DISINFECTANTS.": RETURN
9320 PRINT "1 GALLIMYCIN IS A TRADE NAME.": PRINT : PRINT : PRINT "2 U
SE THE PHOSPHATE FORM OF ERYTHRO. ": PRINT : PRINT "3 REFRIGERATI
ON IS PREFERRED BUT IS": PRINT : PRINT " NOT NECESSARY. KEEP COOL
AND DRY. ": PRINT
9321 PRINT "4 ABSORPTION RATE OF ERYTHROMYCIN ": PRINT " PHOSPHA
TE IS SIGNIFICANTLY INCREASED ": PRINT " BY SURFACTANTS ADDED TO T
HE": PRINT : PRINT " DRUG BATH.": RETURN
9330 PRINT "1 DO NOT USE AT TEMPERATURES ABOVE 18'. ": PRINT "2 IN VERY
SOFT WATER DO NOT USE AT": PRINT : PRINT " CONCENTRATIONS > 25 PPM.
": PRINT : PRINT "3 HANDLE WITH CARE, FORMALDEHYDE IS": PRINT : PRINT
" TOXIC TO HUMANS."
9331 PRINT : PRINT "4 DO NOT ALLOW TO FREEZE. STORE AT": PRINT : PRINT
" ROOM TEMPERATURE.": PRINT : PRINT "5 USE FORMALIN THAT HAS BEEN S
TABILIZED": PRINT : PRINT " WITH METHANOL.": GOSUB 9200: VTAB 21: PRINT
"6 IN EARTHEN PONDS FORMALIN MAY KILL": PRINT :
9332 PRINT " VEGETATION.": PRINT : PRINT "7 FORMALIN = 37 GM OF FORMALD
EHYDE GAS": PRINT " (100%) DISSOLVED IN 100 ML H2O": PRINT "
(37% FORMALDEHYDE)": PRINT : PRINT : PRINT : PRINT
9333 RETURN
9340 PRINT "1 THE HIGH PRICE OF FURANACE REQUIRES": PRINT : PRINT " TRE
ATMENTS TO BE CARRIED OUT IN AS": PRINT : PRINT " SMALL A VOLUME OF
WATER AS POSSIBLE. ": PRINT : PRINT "2 AUXILIARY AERATION MAY BE N
CESSARY."
9341 PRINT : PRINT "3 ALSO KNOWN AS FURPYRIDINOL.": RETURN
9350 PRINT "1 MIX WITH FOOD JUST BEFORE USING": PRINT : PRINT " ENZYMES
IN MOIST DIETS RAPIDLY": PRINT : PRINT " INACTIVATE THE DRUG. ": PRINT
: PRINT : PRINT "2 HANDLE WITH CARE, DO NOT INHALE DUST"
9351 PRINT : PRINT " AVOID CONTACT WITH SKIN": PRINT : PRINT " ALSO KN
OWN AS NF180, FUROXONE OR ": PRINT " NITROFURAN.": RETURN

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9360 PRINT "1 IS ERYTHROMYCIN WITH A SUGAR CARRIER. ": PRINT : PRINT "2
 A COMMERCIAL PRODUCT CONTAINING: ": PRINT " 13 GM WATER SOLUBL
 E ERYTHROMYCIN ": PRINT " PHOSPHATE / 100 GRAMS, OR": PRINT
 9361 PRINT " 11.56 GRAMS ERYTHROMYCIN / 100 GRAMS. ": PRINT : PRINT "3
 USE 2 PPM FOR 60 MIN WATER HARDENING ": PRINT " OF EGGS TO PREVENT
 BKD.": RETURN
 9370 PRINT "1 DO NOT USE IN CONTACT WITH ZINC.": PRINT : PRINT "2 USE ZI
 NC - FREE FORM OF THE DYE.": PRINT : PRINT "3 AVOID SKIN CONTACT AND
 DO NOT INHALE. ": PRINT "4 USE WITH EXTREME CAUTION. TOXIC TO": PRINT

 9371 PRINT " SOME SPECIES AND SIZES OF FISH. ": PRINT "5 REPORTED
 TO BE CARCINOGENIC. ": PRINT : PRINT : RETURN
 9380 PRINT "1 ACTIVE INGREDIENT 1 % (10000 MG/L) ": PRINT " AVAILABL
 E IODINE.": PRINT : PRINT : PRINT "2 OVADINE CONTAINS SOME BUFFER, H
 OWEVER ": PRINT " CHECK PH BEFORE USING. IF NECESSARY,"
 9381 PRINT " ADJUST PH TO 7.0 USING SODIUM ": PRINT " BICARBON
 ATE (BAKING SODA).": RETURN
 9390 PRINT "1 IN VERY SOFT WATER USE WITH CAUTION.": PRINT : PRINT : PRINT
 "2 10 PPM IS HIGHLY TOXIC TO SALMONIDS. ": PRINT
 9391 PRINT "3 AVAILABLE AT LOCAL DRUG STORES. ": PRINT : PRINT "4
 EXPLOSIVE IF BROUGHT INTO CONTACT WITH": PRINT " READILY OXIDIZABLE
 SUBSTANCES ": PRINT " (EG. GLYCEROL).": RETURN
 9400 PRINT "1 EXTREMELY TOXIC AT HIGH TEMPERATURES": PRINT : PRINT " AN
 D LOW WATER HARDNESS. TEST A ": PRINT " CONTROL GROUP FIRST.
 ": PRINT : PRINT : PRINT "2 ALSO KNOWN AS BENZALKONIUM CHLORIDE. ":
 PRINT
 9401 PRINT "3 RECOMMENDED FOR DISINFECTION OF EQUIP.": PRINT " NON-CORR
 OSIVE BUT HAS HIGH TOXICITY ": PRINT " TO FISH.": PRINT : PRINT :
 PRINT "4 CHECK % ACTIVE INGREDIENT LEVEL.": RETURN
 9410 PRINT "1 DO NOT FEED LESS THAN THE RECOMMENDED": PRINT : PRINT " A
 MOUNT.": PRINT : PRINT : PRINT "2 STABLE FOR 5 - 10 YEARS IF STORED
 IN A": PRINT " COOL DRY PLACE.": PRINT : PRINT
 9411 PRINT "3 SULFAMERAZINE AND SULFAMETHAZINE ": PRINT " CAN BE S
 UBSTITUTED FOR EACH OTHER ": PRINT " IN MOST CASES.": RETURN
 9430 PRINT "1 DRUG RESISTANCE BY BACTERIAL PATHOGEN": PRINT : PRINT " M
 AY DEVELOP IF USED IMPROPERLY.": PRINT : PRINT " DO NOT FEED LESS T
 HAN THE RECOMMENDED": PRINT : PRINT " AMOUNT.": RETURN
 9440 PRINT "1 SEE MANUFACTURER'S INSTRUCTIONS FOR": PRINT : PRINT " .APP
 LICATION.": RETURN
 9449 REM ## APPLICATION NOTES
 9450 HOME : VTAB 4: PRINT " DEFINITION OF SELECTED APPLICATION ": PRINT
 "*****": VTAB 9: PRINT AL\$(AF); "
 ": PRINT : ON AF GOSUB 9460,9465,9470,9475,9480,9485,9486: RETURN
 9460 PRINT "ONE HOUR EXPOSURE TO MODERATE ": PRINT "CONCENTRAT
 IONS OF CHEMICALS WITH": PRINT : PRINT "INFLOWING WATER.": RETURN
 9465 PRINT "ONE HOUR EXPOSURE TO A CHEMICAL WITH THE": PRINT "WATER TURN
 ED OFF.": RETURN
 9470 PRINT "EXPOSURE TO LOW CONCENTRATIONS OF ": PRINT "CHEMICALS
 FOR PROLONGED PERIODS OF TIME ": PRINT "(4 - 12 HOURS)": RETURN
 9475 PRINT "A QUICK EXPOSURE TO HIGH CONCENTRATIONS ": PRINT "OF CHEMICA
 LS FOR 1 TO 10 MIN.": RETURN
 9480 PRINT "A SINGLE FLUSH THROUGH THE SYSTEM": RETURN

```

9485 PRINT "DRUGS MIXED WITH FOOD. THIS TREATMENT ": PRINT "ASSUMES TH
AT EACH FISH RECEIVES IT'S ": PRINT "CALCULATED ALLOTMENT, THEREF
ORE THE ": PRINT "POND WEIGHT ESTIMATE MUST BE AS ACCURATE": PRINT
"AS POSSIBLE.": RETURN
9486 PRINT "ANTIBIOTIC INJECTED INTO THE DORSAL ": PRINT "SINUS LOCA
TED CENTER OF THE BACK, ": PRINT "IMMEDIATELY ANTERIOR TO THE
DORSAL FIN. ": PRINT "INSERT NEEDLE VERTICALLY. FOR A 2-LB. "
9487 PRINT "FISH THE SINUS IS APPROXIMATELY 1 CM ": PRINT "BELOW THE
SKIN.": RETURN
9498 REM
9499 REM ** PRINT STANDARD DOSE **
9500 LD = LEN (SD$(SD)) / 3 - 1: FOR I = 1 TO LD:L$(I) = "":N$(I) = MID$(
SD$(SD),I * 3 + 1,3): NEXT : PRINT "STANDARD DOSE : (ACTIVE INGREDI
ENT)": PRINT "===== ": PRINT :X$ = "CONSECUTIVE DAYS":T(1) =
TF: IF TF > 24 THEN 9550
9510 L$(1) = MID$( "PPMPPMPPMPPMPPMGMMSG",AF * 3 - 2,3): IF MF = 6 AND
AF = 7 THEN L$(1) = "MGS A.I./ LB FISH"
9520 L$(2) = MID$( "DAYMINHRSMIN DAY ",AF * 3 - 2,3): IF MF = 6 AND
AF = 6 THEN L$(2) = X$
9530 IF LD = 3 THEN L$(3) = X$
9540 GOTO 9570
9550 L$(1) = "GMS":L$(2) = "GMS":L$(3) = X$: IF AF = 3 THEN L$(1) = "PPM"
:L$(2) = "PPM":L$(3) = "HR":L$(4) = X$
9560 X$ = "13172321232215211522": FOR I = 1 TO 2:T(I) = VAL ( MID$( X$,T
F * 4 - 101 + 2 * I,2)): NEXT
9570 FOR I = 1 TO LD: PRINT " ";N$(I);" ";L$(I): NEXT
9580 RETURN
9899 REM ## LABELS
9900 FOR DF = 1 TO 24: READ DL$(DF): NEXT
9901 FOR TF = 10 TO 29: READ TL$(TF): NEXT
9902 FOR AF = 0 TO 8: READ AL$(AF): NEXT
9903 FOR SF = 1 TO 4: READ SL$(SF): NEXT
9904 FOR DF = 1 TO 24: FOR SF = 1 TO 4: READ DS$(DF,SF): NEXT : NEXT
9905 FOR SD = 1 TO 28: READ SD$(SD): NEXT
9906 FOR UF = 1 TO 10: READ UL$(UF): NEXT
9907 FOR UF = 1 TO 10: READ UC(UF): NEXT
9908 FOR I = 1 TO 6: READ DIL$(I): NEXT : FOR I = 1 TO 3: READ ANL$(I): NEXT

9909 FOR I = 1 TO 14: READ AI(I): NEXT :PL$(1) = "PREVENTION":PL$(2) = "
CONTROL":PL$(3) = "PREVENT/CONTROL":CL$(1) = "RECTANGULAR":CL$(2) =
"CIRCULAR":CL$(3) = "OVAL":CL$(4) = "SLOPE-SIDED RACEWAY": RETURN
9910 DATA BACT GILL DISEASE,BKD,COLDWATER DISEASE,COLUMNARIS DISEASE, CO
STIA, CRYPTOBIA, ENTERIC REDMOUTH, EPISTYLIS, FUNGUS, FURUNCULOSIS,
FUSIFORM GILL DISEASE, GLOCHIDIA (CLAM)
9911 DATA GYRODACTYLUS,HEXAMITA, ICH, MOTILE AEROMONAS SEPTICEMIA, MYXOBA
CTERIAL GILL DISEASE, PSEUDOMONAS INFECTION, SALMONCOLA, SPOROCYTOPH
AGA, TRICHODINA, TRICHOPHYRA, TUBERCULOSIS,VIBRIOSIS
9920 DATA NONE, BETADINE, ERYTHROMYCIN, FORMALIN, FURANACE, FURAZOLIDONE
, GALLAMYCIN, MALACHITE, OVADINE, POTASSIUM PERMANGANATE, ROCCAL, SU
LFAMERAZINE, SULFAMETHAZINE, TERRAMYCIN, VACCINE
9921 DATA FORMALIN-MALACHITE, TERRAMYCIN-SULFAMERAZINE, TERRAMYCIN-SULFA
METHAZINE, FURAZOLIDONE-SULFAMERAZINE, FURAZOLIDONE-SULFAMETHAZINE
9930 DATA ,1 HR BATH, STATIC BATH, LONG BATH, DIP, FLUSH, ORAL, INJECTED
, VACCINE
9940 DATA ADULT/FINGERLING, FRY, SAC FRY,EGG

```


Case Reporter

```
90 REM *** CASE REPORTER JULY 6,1983 ***
91 REM *** ANNE KLING ***
100 HOME
110 FS$(1) = "DDMMYY":SM$(2) = "DDMMYY":D$ = CHR$(4):FF$ = CHR$(12):B
    = 6
120 DIM D0(13),D0$(13),D1(13),D1$(13),D6(13),D6$(13),D7(11),D7$(11),DA(1
    0),DA$(10),DB(14),DB$(14),LO$(7,2),CM$(100),ZL(61),CD$(8)
130 GOSUB 9000: REM * READ DATA *
137 REM
138 REM *** LAYOUT MENU ***
139 REM
140 GOSUB 10000: VTAB 4: PRINT "CHOOSE MENU OPTION # "
145 MX = 7
150 FOR I = 1 TO MX: VTAB (V(I)): HTAB 5: PRINT N(I); SPC(.2);MN$(I): NEXT

160 V = 4:H = 21: GOSUB 21000: GOSUB 24000: GOSUB 23000: IF RS$ = "" THEN
    160
165 RS = VAL (RS$)
170 VTAB (V(RS)): INVERSE : HTAB 8: PRINT MN$(RS): NORMAL
180 GOSUB 26000: IF RS$ = "N" THEN VTAB (V(RS)): HTAB 8: PRINT MN$(RS):
    GOTO 160
190 ON RS GOTO 1000,2000,3000,4000,5000,6000,7000
200 GOTO 140
999 REM
1000 REM *** INPUT ROUTINE ***
1001 REM
1010 GOSUB 11000: PRINT : GOSUB 11500
1020 GOSUB 12000: PRINT : GOSUB 12500
1030 GOSUB 13000: PRINT : GOSUB 13500
1040 GOSUB 14000: PRINT : GOSUB 14500
1050 GOSUB 15000: PRINT : GOSUB 15500
1060 GOSUB 16000: PRINT : GOSUB 16500
1070 PRINT : GOSUB 17000
1080 GOTO 140
1999 REM
2000 REM *** REVIEW ROUTINE ***
2001 REM
2010 GOSUB 11000: GOSUB 26000: IF RS$ = "N" THEN VTAB 10: GOSUB 11500
2020 GOSUB 12000: GOSUB 26000: IF RS$ = "N" THEN GOSUB 12500
2030 GOSUB 13000: GOSUB 26000: IF RS$ = "N" THEN GOSUB 13500
2040 GOSUB 14000: GOSUB 26000: IF RS$ = "N" THEN GOSUB 14500
2050 GOSUB 15000: GOSUB 26000: IF RS$ = "N" THEN GOSUB 15500
2060 GOSUB 16000: GOSUB 26000: IF RS$ = "N" THEN GOSUB 16500
2070 GOSUB 10000: HTAB 15: PRINT "COMMENTS": PRINT : PRINT
2080 FOR I = 1 TO N: PRINT CM$(I): NEXT : GOSUB 26000: IF RS$ = "N" THEN
    GOSUB 17000
2090 GOTO 140
2999 REM
3000 REM *** HARD COPY OF REPORT ***
3001 REM
3010 PR# 1: GOSUB 11000: PRINT : PRINT : PRINT : GOSUB 12010: PRINT : PRINT
    : PRINT : GOSUB 13010: PRINT : PRINT : PRINT : PRINT : GOSUB 14010: PRINT :
    PRINT : PRINT : GOSUB 15010: PRINT : PRINT : PRINT : PRINT : GOSUB 16010
```

```

3020 PRINT : PRINT : PRINT : PRINT "COMMENTS": PRINT : PRINT : FOR I = 1
    TO N: PRINT CM$(I): PRINT : NEXT
3030 PR# 0: GOTO 140
3999 REM
4000 REM *** WRITE DATA ROUTINE ***
4001 REM
4010 GOSUB 10000:DS$ = "DS " + FS$(1) + " " + DO$( VAL (FS$(4))) + " " +
    FS$(2)
4020 VTAB 4: PRINT "A FILE CONTAINING ALL THE DATA WILL NOW BE SAVED UND
    ER THE NAME ": PRINT : PRINT : PRINT "*"; LEFT$( DS$,30);"*"
4030 VTAB 11: PRINT "WILL THIS NAME BE SUFFICIENT FOR IDENTIFICAT
    ION ? <Y/N>": VTAB 12: HTAB 24: GET RS$: PRINT : IF RS$ < > "Y" AND
    RS$ < > "N" THEN 4030
4040 IF RS$ = "Y" THEN DS$ = LEFT$( DS$,30): GOTO 4060
4050 PRINT : VTAB 15: PRINT "RENAME THE FILE INCLUDING SPECIES": PRINT "
    NEW NAME MUST BE LESS THEN 30 CHARACTERS": PRINT "NOTE : NAME MUST A
    LSO BE UNIQUE !"
4055 VTAB 20: HTAB 32: PRINT "*": VTAB 20: PRINT "*DS ";FS$(1): VTAB 20:
    HTAB 11: INPUT " ";RS$
4056 DS$ = "DS " + FS$(1) + RS$
4057 IF LEN (DS$) > 30 THEN 4020
4060 PRINT D$;"OPEN ";DS$
4070 PRINT D$;"DELETE ";DS$
4080 PRINT D$;"OPEN ";DS$
4090 PRINT D$;"WRITE ";DS$
4100 PRINT 10000 + N
4110 FOR I = 1 TO 8: PRINT FS$(I): NEXT
4120 FOR I = 1 TO 3: PRINT SM$(I): NEXT
4130 FOR J = 0 TO 1: FOR I = 1 TO 7: PRINT LO$(I,J): NEXT I: NEXT J
4140 FOR I = 1 TO 8: PRINT CD$(I): NEXT
4150 FOR I = 1 TO 5: PRINT DM$(I): NEXT
4160 FOR I = 1 TO 5: PRINT FD$(I): NEXT
4170 FOR I = 1 TO 3: PRINT TM$(I): NEXT
4175 FOR I = 1 TO 6: PRINT DV$(I): NEXT
4180 FOR I = 1 TO 8: PRINT W$(I): NEXT
4185 PRINT STR$( PF)
4190 FOR I = 1 TO N: PRINT CM$(I): NEXT
4200 PRINT D$;"CLOSE ";DS$
4210 IF PF = 0 THEN 4310
4220 TT$ = RIGHT$( DS$, LEN (DS$) - 2)
4230 PRINT D$;"OPEN XR";TT$
4240 PRINT D$;"DELETE XR";TT$
4250 PRINT D$;"OPEN XR";TT$
4260 PRINT D$;"WRITE XR";TT$
4270 FOR I = 1 TO 8: PRINT XD$(I): NEXT
4280 PRINT D$;"CLOSE XR";TT$
4310 GOTO 140
4999 REM
5000 REM *** RETRIEVE DATA ***
5001 REM
5010 PRINT D$;"CATALOG"
5020 PRINT "ALL DISEASE DATA FILES BEGIN WITH 'DS' ": INPUT "CHOOSE ONE
    ";DS$

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5030 PRINT D$;"OPEN ";DS$
5040 PRINT D$;"READ ";DS$
5050 INPUT N:N = N - 10000
5060 FOR I = 1 TO 8: INPUT FS$(I): NEXT
5070 FOR I = 1 TO 3: INPUT SM$(I): NEXT
5080 FOR J = 0 TO 1: FOR I = 1 TO 7: INPUT LO$(I,J): NEXT I: NEXT J
5090 FOR I = 1 TO 8: INPUT CD$(I): NEXT
5100 FOR I = 1 TO 5: INPUT DM$(I): NEXT
5110 FOR I = 1 TO 5: INPUT FD$(I): NEXT
5120 FOR I = 1 TO 3: INPUT TM$(I): NEXT
5125 FOR I = 1 TO 6: INPUT DV$(I): NEXT
5130 FOR I = 1 TO 8: INPUT W$(I): NEXT
5135 INPUT RS$:PF = VAL (RS$)
5140 FOR I = 1 TO N: INPUT CM$(I): NEXT
5150 PRINT D$;"CLOSE ";DS$
5160 IF PF = 0 THEN 5300
5170 TT$ = RIGHT$( DS$, LEN (DS$) - 2)
5180 PRINT D$;"OPEN XR";TT$
5190 PRINT D$;"READ XR";TT$
5200 FOR I = 1 TO 8: INPUT XD$(I): NEXT
5210 PRINT D$;"CLOSE XR";TT$
5300 GOTO 140
5999 REM
6000 REM *** HARD COPY OF BLANK FORM ***
6001 REM
6010 HOME : VTAB 9: HTAB 18: FLASH : PRINT "WARNING": NORMAL
6020 VTAB 11: HTAB 7: PRINT "THIS OUTPUT ERASES ALL DATA"
6030 VTAB 12: HTAB 5: PRINT "IF YOU WISH TO CONTINUE TYPE <C>": VTAB 12:
HTAB 38: GET RS$
6040 IF RS$ < > "C" THEN GOTO 140
6045 UN$ = CHR$( 223): FOR I = 1 TO 11:Z$ = Z$ + UN$: NEXT
6050 ZZ$ = "*" + Z$
6052 FOR I = 1 TO 9:FS$(I) = Z$:SM$(I) = Z$:DM$(I) = Z$:FD$(I) = Z$:TM$(
I) = Z$:DV$(I) = Z$:W$(I) = Z$: NEXT
6053 FOR I = 1 TO 8:CD$(I) = Z$: NEXT
6054 K = 1: FOR I = 1 TO 8: FOR J = 1 TO ZL(K):FS$(I) = FS$(I) + UN$: NEXT
:K = K + 1: NEXT
6056 FOR I = 1 TO 3: FOR J = 1 TO ZL(K):SM$(I) = SM$(I) + UN$: NEXT :K =
K + 1: NEXT
6058 FOR I = 1 TO 10:LO$ = LO$ + UN$: NEXT
6059 FOR I = 1 TO 7:LO$(I,0) = LO$:LO$(I,1) = LO$: NEXT
6060 FOR I = 1 TO 8: FOR J = 1 TO ZL(K):CD$(I) = CD$(I) + UN$: NEXT :K =
K + 1: NEXT
6062 FOR I = 1 TO 5: FOR J = 1 TO ZL(K):DM$(I) = DM$(I) + UN$: NEXT :K =
K + 1: NEXT
6064 FOR I = 1 TO 5: FOR J = 1 TO ZL(K):FD$(I) = FD$(I) + UN$: NEXT :K =
K + 1: NEXT
6065 FOR I = 1 TO 6: FOR J = 1 TO ZL(K):DV$(I) = DV$(I) + UN$: NEXT :K =
K + 1: NEXT
6066 FOR I = 1 TO 8: FOR J = 1 TO ZL(K):W$(I) = W$(I) + UN$: NEXT :K = K
+ 1: NEXT
6068 FOR I = 1 TO 8:CD$ = CD$ + UN$: NEXT :CD$(3) = CD$:CD$(6) = CD$

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6070 DO$(0) = ZZ$:D1$(0) = ZZ$:D2$(0) = ZZ$:D3$(0) = ZZ$
6072 D4$(0) = ZZ$:D5$(0) = ZZ$:D6$(0) = ZZ$:D7$(0) = ZZ$
6074 D8$(0) = ZZ$:D8$(0) = ZZ$:D9$(0) = ZZ$:DA$(0) = ZZ$
6076 DB$(0) = ZZ$:DC$(0) = ZZ$:DD$(0) = ZZ$:DE$(0) = ZZ$:DF$(0) = ZZ$
6078 FOR I = 1 TO ZL(K):DO$(0) = DO$(0) + UN$: NEXT :K = K + 1: FOR I =
1 TO ZL(K):D1$(0) = D1$(0) + UN$: NEXT :K = K + 1
6080 FOR I = 1 TO ZL(K):D2$(0) = D2$(0) + UN$: NEXT :K = K + 1: FOR I =
1 TO ZL(K):D3$(0) = D3$(0) + UN$: NEXT :K = K + 1
6081 FOR I = 1 TO ZL(K):D4$(0) = D4$(0) + UN$: NEXT :K = K + 1: FOR I =
1 TO ZL(K):D5$(0) = D5$(0) + UN$: NEXT :K = K + 1
6082 FOR I = 1 TO ZL(K):D6$(0) = D6$(0) + UN$: NEXT :K = K + 1: FOR I =
1 TO ZL(K):D7$(0) = D7$(0) + UN$: NEXT :K = K + 1
6084 FOR I = 1 TO ZL(K):D8$(0) = D8$(0) + UN$: NEXT :K = K + 1: FOR I =
1 TO ZL(K):D9$(0) = D9$(0) + UN$: NEXT :K = K + 1
6086 FOR I = 1 TO ZL(K):DA$(0) = DA$(0) + UN$: NEXT :K = K + 1: FOR I =
1 TO ZL(K):DB$(0) = DB$(0) + UN$: NEXT :K = K + 1
6088 FOR I = 1 TO ZL(K):DC$(0) = DC$(0) + UN$: NEXT :K = K + 1: FOR I =
1 TO ZL(K):DD$(0) = DD$(0) + UN$: NEXT :K = K + 1
6090 FOR I = 1 TO ZL(K):DE$(0) = DE$(0) + UN$: NEXT :K = K + 1: FOR I =
1 TO ZL(K):DF$(0) = DF$(0) + UN$: NEXT
6130 PR# 1: PRINT CHR$(9);"10L"
6140 PRINT CHR$(9);"10L"
6170 GOSUB 11000: PRINT : PRINT : GOSUB 12010
6180 PRINT : PRINT : PRINT "SPECIES OPTIONS"; SPC(10);"AGE OPTIONS"; SPC(
10);"SEX OPTIONS": PRINT
6190 FOR I = 1 TO 4: PRINT DO$(I); SPC(25 - LEN(DO$(I)));D1$(I); SPC(
21 - LEN(D1$(I)));D2$(I): NEXT
6200 FOR I = 5 TO 13: PRINT DO$(I); SPC(25 - LEN(DO$(I)));D1$(I): NEXT
6220 PRINT : PRINT : PRINT "SUBMISSION REASONS"; SPC(7);"STOCK ORIGIN":
PRINT
6230 FOR I = 1 TO 6: PRINT D3$(I); SPC(25 - LEN(D3$(I)));D4$(I): NEXT
6240 PRINT D$;FF$
6250 GOSUB 13000: PRINT : PRINT : GOSUB 14010
6260 PRINT : PRINT : PRINT "SAMPLE TYPE"; SPC(14);"CONTAINER TYPE": PRINT
6270 FOR I = 1 TO 6: PRINT D5$(I); SPC(25 - LEN(D5$(I)));D6$(I): NEXT
6280 FOR I = 7 TO 13: PRINT TAB(26);D6$(I): NEXT
6290 PRINT : PRINT : PRINT "DIET"; SPC(21);"DIET TYPE"; SPC(12);"FEEDI
NG METHOD": PRINT
6300 FOR I = 1 TO 3: PRINT D7$(I); SPC(25 - LEN(D7$(I)));D8$(I); SPC(
21 - LEN(D8$(I)));D9$(I): NEXT
6310 FOR I = 4 TO 11: PRINT D7$(I): NEXT
6320 PRINT D$;FF$
6330 GOSUB 15000: PRINT : PRINT "FOR PREVIOUS DIAGNOSIS, PREVIOUS MEDICA
TION AND": PRINT "VACCINATION FILL IN DATES IF DONE": PRINT : PRINT
: GOSUB 16010
6340 PRINT : PRINT : PRINT "BEHAVIOR"; SPC(11);"GROSS SIGNS"; SPC(10);
"RECENT HANDLING": PRINT
6350 FOR I = 1 TO 7: PRINT DA$(I); SPC(19 - LEN(DA$(I)));DB$(I); SPC(
21 - LEN(DB$(I)));DC$(I): NEXT
6360 FOR I = 8 TO 14: PRINT SPC(19);DB$(I): NEXT
6370 PRINT : PRINT : PRINT "WATER SOURCE WATER HARDNESS": PRINT
6380 FOR I = 1 TO 7: PRINT DE$(I); SPC(19 - LEN(DE$(I)));DF$(I): NEXT

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6390 PRINT D$;FF$
6400 PRINT : PRINT "COMMENTS"
6410 FOR I = 1 TO 10: PRINT : PRINT : PRINT : FOR J = 1 TO 6: PRINT Z$;:
NEXT : NEXT
6420 PR# 0
6430 PRINT : RUN
6999 REM
7000 REM *** GO TO DISEASE MENU ***
7001 REM
7010 PRINT D$;"RUN FISH HEALTH"
8997 REM
8998 REM *** READ DATA AT END ***
8999 REM
9000 FOR I = 1 TO 13: READ DO(I),DO$(I): NEXT
9010 FOR I = 1 TO 13: READ D1(I),D1$(I): NEXT
9020 FOR I = 1 TO 4: READ D2(I),D2$(I): NEXT
9030 FOR I = 1 TO 6: READ D3(I),D3$(I): NEXT
9040 FOR I = 1 TO 4: READ D4(I),D4$(I): NEXT
9050 FOR I = 1 TO 6: READ D5(I),D5$(I): NEXT
9060 FOR I = 1 TO 13: READ D6(I),D6$(I): NEXT
9070 FOR I = 1 TO 11: READ D7(I),D7$(I): NEXT
9080 FOR I = 1 TO 3: READ D8(I),D8$(I): NEXT
9090 FOR I = 1 TO 3: READ D9(I),D9$(I): NEXT
9100 FOR I = 1 TO 10: READ DA(I),DA$(I): NEXT
9110 FOR I = 1 TO 14: READ DB(I),DB$(I): NEXT
9120 FOR I = 1 TO 6: READ DC(I),DC$(I): NEXT
9130 FOR I = 1 TO 2: READ DD(I),DD$(I): NEXT
9140 FOR I = 1 TO 7: READ DE(I),DE$(I): NEXT
9150 FOR I = 1 TO 7: READ DF(I),DF$(I): NEXT
9160 FOR I = 1 TO 7: READ V(I),N(I),MN$(I): NEXT
9165 FOR I = 1 TO 59: READ ZL(I): NEXT
9170 RETURN
9997 REM
9998 REM *** TITLE ***
9999 REM
10000 HOME : VTAB 1: HTAB 14: PRINT "CASE REPORTER"
10010 VTAB 2: HTAB 14: PRINT "===== "
10020 RETURN
10997 REM
10998 REM *** PRINT PAGE ONE ***
10999 REM
11000 GOSUB 10000
11010 VTAB 4: HTAB 1: PRINT "DATE : ";FS$(1)
11020 VTAB 6: PRINT "SAMPLE SITE : ";FS$(2)
11030 VTAB 8: PRINT "CONTRIBUTOR : ";FS$(3)
11040 VTAB 10: PRINT "SPECIES : ";DO$( VAL (FS$(4)))
11045 IF PF = 1 AND FS$(4) = "13" THEN VTAB 10: HTAB 11: CALL - 868: VTAB
10: HTAB 11: PRINT XD$(1)

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11050 VTAB 12: PRINT "AGE : ";D1$( VAL (FS$(5)))
11055 IF PF = 1 AND FS$(5) = "13" THEN VTAB 12: HTAB 7: CALL - 868: VTAB
12: HTAB 7: PRINT XD$(2)
11060 VTAB 14: PRINT "LENGTH (MM) : ";FS$(6)
11070 VTAB 16: PRINT "WEIGHT (GM) : ";FS$(7)
11080 VTAB 18: PRINT "SEX : ";D2$( VAL (FS$(8)))
11090 RETURN
11497 REM
11498 REM *** INPUT PAGE ONE ***
11499 REM
11500 V = 4:H = 7:B = 6:RS$ = FS$(1): GOSUB 21000: GOSUB 22000: GOSUB 250
00:FS$(1) = RS$: GOSUB 28000
11510 V = 6:H = 14:RS$ = FS$(2): GOSUB 21000:FS$(2) = RS$: GOSUB 28000
11520 V = 8:H = 14:RS$ = FS$(3): GOSUB 21000:FS$(3) = RS$: GOSUB 28000
11530 MN = 1:MX = 13:V = 10: FOR I = 1 TO MX: VTAB V + I: HTAB 21: PRINT
DO(I); SPC( 3 - LEN ( STR$( DO(I))));DO$(I): NEXT
11540 V = 10:H = 10:RS$ = FS$(4): GOSUB 21000: GOSUB 23000:FS$(4) = RS$:R
S$ = DO$( VAL (FS$(4))): GOSUB 28000
11542 RR$ = FS$(4):XC = 1: GOSUB 31000: GOSUB 28000
11550 V = 11:H = 21:BL = MX: GOSUB 27000
11560 V = 10:MX = 13: FOR I = 1 TO MX: VTAB V + I: HTAB 23: PRINT " ";D1(
I); SPC( 3 - LEN ( STR$( D1(I))));D1$(I): NEXT
11570 V = 12:H = 6:RS$ = FS$(5): GOSUB 21000: GOSUB 23000:FS$(5) = RS$:RS
$ = D1$( VAL (FS$(5))): GOSUB 28000
11572 RR$ = FS$(5):XC = 2: GOSUB 31000: GOSUB 28000
11580 V = 11:H = 24:BL = MX: GOSUB 27000
11585 V = 12:H = 6: GOSUB 28000
11590 V = 14:H = 14:RS$ = FS$(6): GOSUB 21000:FS$(6) = RS$: GOSUB 28000
11600 V = 16:H = 14:RS$ = FS$(7): GOSUB 21000:FS$(7) = RS$: GOSUB 28000
11610 V = 19:MN = 1:MX = 4: FOR I = 1 TO MX: VTAB V: HTAB 24: PRINT D2(I)
;" ";D2$(I):V = V + 1: NEXT
11620 V = 18:H = 6:RS$ = FS$(8): GOSUB 21000: GOSUB 23000:FS$(8) = RS$:RS
$ = D2$( VAL (FS$(8))): GOSUB 28000
11630 V = 19:H = 24:BL = MX: GOSUB 27000
11640 GOSUB 26000: IF RS$ = "N" THEN 1010
11650 RETURN
11997 REM
11998 REM *** PRINT PAGE TWO ***
11999 REM
12000 GOSUB 10000
12010 VTAB 4: PRINT "REASON FOR SUBMISSION: ";D3$( VAL (SM$(1)))
12015 IF PF = 1 AND SM$(1) = "6" THEN VTAB 4: HTAB 24: CALL - 868: VTAB
4: HTAB 24: PRINT XD$(3)
12020 VTAB 6: PRINT "DATE COLLECTED : ";SM$(2)
12030 VTAB 8: PRINT "STOCK ORIGIN : ";D4$( VAL (SM$(3)))
12040 VTAB 10: PRINT TAB( 16);"LOSSES WATER TEMP 'C"
12050 VTAB 11: PRINT "TODAY'S (7) ";LO$(1,0); SPC( 11 - LEN (LO$(1,0
)));LO$(1,1)
12060 VTAB 12: PRINT "PAST WEEK (6) ";LO$(2,0); SPC( 11 - LEN (LO$(2,0
)));LO$(2,1)
12070 V = 13:J = 5: FOR I = 3 TO 7: VTAB V: PRINT " (";J;" " ";L
O$(I,0); SPC( 11 - LEN (LO$(I,0))));LO$(I,1):V = V + 1:J = J - 1: NEXT

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12080 RETURN
12497 REM
12498 REM *** INPUT PAGE TWO ***
12499 REM
12500 V = 19: FOR I = 1 TO 3: VTAB V: HTAB 1: PRINT D3(I);" ";D3$(I):V =
      V + 1: NEXT
12510 V = 19: FOR I = 4 TO 6: VTAB V: HTAB 25: PRINT D3(I);" ";D3$(I):V =
      V + 1: NEXT
12520 V = 4:H = 23:MX = 6:RS$ = SM$(1): GOSUB 21000: GOSUB 23000:SM$(1) =
      RS$:RS$ = D3$( VAL (SM$(1))): GOSUB 28000
12522 RR$ = SM$(1):XC = 3: GOSUB 31000: GOSUB 28000
12530 V = 19:BL = 3:H = 1: GOSUB 27000
12540 V = 6:H = 17:RS$ = SM$(2): GOSUB 21000: GOSUB 22000: GOSUB 25000:SM
      $(2) = RS$: GOSUB 28000
12550 V = 19: FOR I = 1 TO 4: VTAB V: HTAB 15: PRINT D4(I);" ";D4$(I):V =
      V + 1: NEXT
12560 V = 8:H = 15:MX = 4:RS$ = SM$(3): GOSUB 21000: GOSUB 23000:SM$(3) =
      RS$:RS$ = D4$( VAL (SM$(3))): GOSUB 28000
12570 V = 19:BL = 4:H = 1: GOSUB 27000
12580 V = 11: FOR I = 1 TO 7:H = 15:RS$ = LO$(I,0): GOSUB 29000:LO$(I,0) =
      RS$:H = 26:RS$ = LO$(I,1): GOSUB 29000:LO$(I,1) = RS$:V = V + 1: NEXT

12590 GOSUB 26000: IF RS$ = "N" THEN 1020
12600 RETURN
12997 REM
12998 REM *** PRINT PAGE THREE ***
12999 REM
13000 GOSUB 10000
13010 VTAB 4: PRINT "SAMPLE SIZE : ";CD$(1)
13020 VTAB 5: PRINT "SAMPLE TYPE : ";D5$( VAL (CD$(2)))
13025 IF PF = 1 AND CD$(2) = "6" THEN VTAB 5: HTAB 15: CALL - 868: VTAB
      5: HTAB 15: PRINT XD$(4)
13030 VTAB 7: PRINT "NO. AFFECTED CONTAINERS : ";CD$(3)
13040 VTAB 9: PRINT "CONTAINER I.D. : ";CD$(4)
13050 VTAB 10: PRINT "CONTAINER TYPE : ";D6$( VAL (CD$(5)))
13055 IF PF = 1 AND CD$(5) = "13" THEN VTAB 10: HTAB 18: CALL - 868: VTAB
      10: HTAB 18: PRINT XD$(5)
13060 VTAB 11: PRINT TAB( 2)"SIZE WIDTH : ";DM$(1)
13080 VTAB 12: PRINT TAB( 9)"LENGTH : ";DM$(2)
13090 VTAB 13: PRINT TAB( 10)"DEPTH : ";DM$(3)
13100 VTAB 14: PRINT TAB( 7)"DIAMETER : ";DM$(4)
13110 VTAB 15: PRINT TAB( 8);"UNKNOWN : ";DM$(5)
13120 VTAB 17: PRINT " LOAD (FISH/CONTAINER) : ";CD$(6)
13130 VTAB 18: PRINT " POND INFLOW : ";CD$(7)
13135 VTAB 19: PRINT " POND VELOCITY : ";CD$(8)
13140 RETURN
13497 REM
13498 REM *** INPUT PAGE THREE ***
13499 REM
13500 V = 4:H = 14:RS$ = CD$(1): GOSUB 21000: GOSUB 24000:CD$(1) = RS$: GOSUB
      28000
13510 VTAB 19: CALL - 868:V = 19: FOR I = 1 TO 3: VTAB V: HTAB 5: PRINT
      D5(I);" ";D5$(I): VTAB V: HTAB 25: PRINT D5(I + 3);" ";D5$(I + 3):V =
      V + 1: NEXT

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13520 V = 5:H = 14:MX = 6:RS$ = CD$(2): GOSUB 21000: GOSUB 23000:CD$(2) =
      RS$:RS$ = D5$( VAL (CD$(2))): GOSUB 28000
13522 RR$ = CD$(2):XC = 4: GOSUB 31000: GOSUB 28000
13530 V = 19:BL = 3:H = 5: GOSUB 27000
13532 VTAB 19: HTAB 2: PRINT "POND VELOCITY : ";CD$(8)
13540 V = 7:H = 26:RS$ = CD$(3): GOSUB 21000: GOSUB 24000:CD$(3) = RS$: GOSUB
      28000
13550 V = 9:H = 17:RS$ = CD$(4): GOSUB 21000:CD$(4) = RS$: GOSUB 28000
13555 V = 17:BL = 6:H = 1: GOSUB 27000
13560 V = 16:MX = 13: FOR I = 1 TO 6: VTAB V + I: HTAB 1: PRINT D6(I); SPC(
      3 - LEN ( STR$( D6(I))));D6$(I);: HTAB 16: PRINT D6(I + 6); SPC( 3 -
      LEN ( STR$( D6(I + 6))));D6$(I + 6): NEXT
13570 VTAB 22: HTAB 30: PRINT D6(13);" ";D6$(13);
13580 V = 10:H = 17:RS$ = CD$(5): GOSUB 21000: GOSUB 23000:CD$(5) = RS$:R
      S$ = D6$( VAL (CD$(5))): GOSUB 28000
13582 RR$ = CD$(5):XC = 5: GOSUB 31000: GOSUB 28000
13590 V = 17:BL = 6:H = 1: GOSUB 27000
13591 VTAB 17: HTAB 2: PRINT "LOAD (FISH/CONTAINER) : ";CD$(6)
13592 VTAB 18: HTAB 2: PRINT "POND INFLOW : ";CD$(7)
13594 VTAB 19: HTAB 2: PRINT "POND VELOCITY : ";CD$(8)
13600 V = 11:H = 17: FOR I = 1 TO 5:RS$ = DM$(I): GOSUB 21000
13610 DM$(I) = RS$: GOSUB 28000:V = V + 1: NEXT
13630 V = 17:H = 25:RS$ = CD$(6): GOSUB 21000:CD$(6) = RS$: GOSUB 28000
13640 V = 18:H = 15:RS$ = CD$(7): GOSUB 21000:CD$(7) = RS$: GOSUB 28000
13655 V = 19:H = 17:RS$ = CD$(8): GOSUB 21000:CD$(8) = RS$: GOSUB 28000
13670 GOSUB 26000: IF RS$ = "N" THEN 1030
13680 RETURN
13997 REM
13998 REM *** PRINT PAGE FOUR ***
13999 REM
14000 GOSUB 10000
14010 VTAB 4: PRINT "DIET : ";D7$( VAL (FD$(1)))
14015 IF PF = 1 AND FD$(1) = "11" THEN VTAB 4: HTAB 8: CALL - 868: VTAB
      4: HTAB 8: PRINT XD$(6)
14020 VTAB 5: PRINT "DIET TYPE : ";D8$( VAL (FD$(2)))
14030 VTAB 7: PRINT "FEED RATE : ";FD$(3)
14040 VTAB 8: PRINT " (% OF BODY WEIGHT) "
14050 VTAB 10: PRINT "FEEDING METHOD : ";D9$( VAL (FD$(4)))
14060 VTAB 12: PRINT "PELLET SIZE : ";FD$(5)
14070 RETURN
14497 REM
14498 REM *** INPUT PAGE FOUR ***
14499 REM
14500 MX = 11:V = 15: FOR I = 1 TO 5: VTAB V: HTAB 5: PRINT D7(I); SPC( 3
      - LEN ( STR$( D7(I))));D7$(I): VTAB V: HTAB 20: PRINT D7(I + 5); SPC(
      3 - LEN ( STR$( D7(I + 5))));D7$(I + 5):V = V + 1: NEXT
14510 VTAB V: HTAB 20: PRINT D7(11);" ";D7$(11)
14520 V = 4:H = 7:RS$ = FD$(1): GOSUB 21000: GOSUB 23000:FD$(1) = RS$:RS$
      = D7$( VAL (FD$(1))): GOSUB 28000
14522 RR$ = FD$(1):XC = 6: GOSUB 31000: GOSUB 28000
14530 V = 15:BL = 6:H = 5: GOSUB 27000
14540 V = 12:MX = 3: FOR I = 1 TO MX: VTAB V: HTAB 25: PRINT D8(I);" ";D8
      $(I):V = V + 1: NEXT

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14550 V = 5:H = 12:RS$ = FD$(2): GOSUB 21000: GOSUB 23000:FD$(2) = RS$:RS
      $ = D8$( VAL (FD$(2))): GOSUB 28000
14560 V = 12:BL = MX:H = 25: GOSUB 27000
14570 V = 7:H = 12:RS$ = FD$(3): GOSUB 21000:FD$(3) = RS$: GOSUB 28000
14580 V = 12: FOR I = 1 TO MX: VTAB V: HTAB 25: PRINT D9(I);" ";D9$(I):V =
      V + 1: NEXT
14590 V = 10:H = 17:RS$ = FD$(4): GOSUB 21000: GOSUB 23000:FD$(4) = RS$:R
      S$ = D9$( VAL (FD$(4))): GOSUB 28000
14600 V = 12:H = 25:BL = MX: GOSUB 27000
14610 V = 12:H = 14:RS$ = FD$(5): GOSUB 21000:FD$(5) = RS$: GOSUB 28000
14620 GOSUB 26000: IF RS$ = "N" THEN 1040
14630 RETURN
14997 REM
14998 REM *** PRINT PAGE FIVE ***
14999 REM
15000 GOSUB 10000
15010 VTAB 4: HTAB 1: PRINT "BEHAVIOR : ";DA$( VAL (TM$(1)))
15015 IF PF = 1 AND TM$(1) = "10" THEN VTAB 4: HTAB 12: CALL - 868: VTAB
      4: HTAB 12: PRINT XD$(7)
15020 VTAB 6: PRINT "GROSS SIGNS : ";DB$( VAL (TM$(2)))
15025 IF PF = 1 AND TM$(2) = "14" THEN VTAB 6: HTAB 15: CALL - 868: VTAB
      6: HTAB 15: PRINT XD$(8)
15030 VTAB 8: PRINT "RECENT HANDLING : ";DC$( VAL (TM$(3)))
15040 VTAB 10: PRINT "PREVIOUS DIAGNOSIS : ";DV$(1)
15045 IF LEN (DV$(1)) = 6 OR LEFT$( DV$(2),1) = CHR$( 223) THEN GOTO
      15055
15050 VTAB 11: HTAB 10: PRINT "(IF ANY)": GOTO 15060
15055 VTAB 11: PRINT "      DIAGNOSTICIAN : ";DV$(2)
15056 VTAB 12: PRINT "      DIAGNOSIS : ";DV$(6)
15060 VTAB 14: PRINT "PREVIOUS MEDICATION : ";DV$(3)
15065 IF LEN (DV$(3)) = 6 OR LEFT$( DV$(4),1) = CHR$( 223) THEN 15075

15070 VTAB 15: HTAB 10: PRINT "(IF ANY)"
15075 IF LEN (DV$(3)) = 6 OR LEFT$( DV$(4),1) = "." THEN VTAB 15: PRINT
      "
      TYPE : ";DV$(4)
15080 VTAB 17: PRINT "VACCINATION : ";DV$(5)
15090 RETURN
15497 REM
15498 REM *** INPUT PAGE FIVE ***
15499 REM
15500 V = 18: FOR I = 1 TO 5: VTAB V: HTAB 5: PRINT DA(I); SPC( 3 - LEN
      ( STR$( DA(I)))):DA$(I);: HTAB 25: PRINT DA(I + 5); SPC( 3 - LEN ( STR$(
      DA(I + 5))):DA$(I + 5):V = V + 1: NEXT
15510 V = 4:H = 11:MX = 10:RS$ = TM$(1): GOSUB 21000: GOSUB 23000:TM$(1) =
      RS$:RS$ = DA$( VAL (TM$(1))): GOSUB 28000
15512 RR$ = TM$(1):XC = 7: GOSUB 31000: GOSUB 28000
15520 V = 17:BL = 6:H = 1: GOSUB 27000
15530 V = 16:BL = 1:H = 1: GOSUB 27000:V = 16: FOR I = 1 TO 7: VTAB V: HTAB
      1: PRINT DB(I); SPC( 3 - LEN ( STR$( DB(I)))):DB$(I);: HTAB 24: PRINT
      DB(I + 7); SPC( 3 - LEN ( STR$( DB(I + 7))):DB$(I + 7):V = V + 1: NEXT

15540 V = 6:H = 14:MX = 14:RS$ = TM$(2): GOSUB 21000: GOSUB 23000:TM$(2) =
      RS$:RS$ = DB$( VAL (TM$(2))): GOSUB 28000
15542 RR$ = TM$(2):XC = 8: GOSUB 31000: GOSUB 28000
15550 V = 16:BL = 7:H = 1: GOSUB 27000: VTAB 17: PRINT "VACCINATION : ";D
      V$(5)

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15560 V = 19: FOR I = 1 TO 3: VTAB V: HTAB 8: PRINT DC(I); SPC( 3 - LEN
      ( STR$ (DC(I)))));DC$(I);: HTAB 22: PRINT DC(I + 3); SPC( 3 - LEN ( STR$
      (DC(I + 3)))));DC$(I + 3):V = V + 1: NEXT
15570 V = 8:H = 18:MX = 6:RS$ = TM$(3): GOSUB 21000: GOSUB 23000:TM$(3) =
      RS$:RS$ = DC$( VAL (TM$(3))): GOSUB 28000
15580 V = 19:BL = 3:H = 1: GOSUB 27000
15590 V = 19: FOR I = 1 TO 2: VTAB V: HTAB 20: PRINT DD(I); SPC( 3 - LEN
      ( STR$ (DD(I)))));DD$(I):V = V + 1: NEXT
15592 V = 10:H = 21:MX = 2: IF LEN (DV$(1)) = 6 THEN MX = 999999
15594 RS$ = DV$(1): GOSUB 21000: GOSUB 23000:DV$(1) = RS$: IF RS$ = "1" THEN
      RS$ = "DDMMYY": GOSUB 28000: VTAB 11: PRINT "      DIAGNOSTICIAN : ";
      DV$(2): VTAB 12: PRINT "      DIAGNOSIS : ";DV$(6)
15596 IF RS$ = "2" THEN RS$ = "NO": GOSUB 28000:DV$(1) = RS$
15598 V = 19:BL = 2:H = 20: GOSUB 27000
15600 V = 10:H = 21: IF RS$ = "DDMMYY" THEN GOSUB 21000:B = 6: GOSUB 220
      00
15602 IF LEN (RS$) = 6 THEN GOSUB 25000:DV$(1) = RS$: GOSUB 28000:V =
      11:H = 21:RS$ = DV$(2): GOSUB 21000:DV$(2) = RS$: GOSUB 28000
15604 IF LEN (DV$(1)) = 6 THEN V = 12:H = 21:RS$ = DV$(6): GOSUB 21000:
      DV$(6) = RS$: GOSUB 28000
15620 V = 19: FOR I = 1 TO 2: VTAB V: HTAB 20: PRINT DD(I); SPC( 3 - LEN
      ( STR$ (DD(I)))));DD$(I):V = V + 1: NEXT
15622 V = 14:H = 22:MX = 2: IF LEN (DV$(3)) = 6 THEN MX = 999999
15624 RS$ = DV$(3): GOSUB 21000: GOSUB 23000:DV$(3) = RS$: IF RS$ = "1" THEN
      RS$ = "DDMMYY": GOSUB 28000: VTAB 15: PRINT "      TYPE : "
      ;DV$(4)
15626 IF RS$ = "2" THEN RS$ = "NO": GOSUB 28000:DV$(3) = RS$
15628 V = 19:BL = 2:H = 20: GOSUB 27000
15630 V = 14:H = 22: IF RS$ = "DDMMYY" THEN GOSUB 21000:B = 6: GOSUB 220
      00
15632 IF LEN (RS$) = 6 THEN GOSUB 25000:DV$(3) = RS$: GOSUB 28000:V =
      15:H = 22:RS$ = DV$(4): GOSUB 21000:DV$(4) = RS$: GOSUB 28000
15666 V = 19: FOR I = 1 TO 2: VTAB V: HTAB 20: PRINT DD(I); SPC( 3 - LEN
      ( STR$ (DD(I)))));DD$(I):V = V + 1: NEXT
15668 V = 17:H = 14:MX = 2: IF LEN (DV$(5)) = 6 THEN MX = 999999
15670 RS$ = DV$(5): GOSUB 21000: GOSUB 23000:DV$(5) = RS$: IF RS$ = "1" THEN
      RS$ = "DDMMYY": GOSUB 28000
15672 IF RS$ = "2" THEN RS$ = "NO": GOSUB 28000:DV$(5) = RS$
15674 V = 19:BL = 2:H = 20: GOSUB 27000
15676 V = 17:H = 14: IF RS$ = "DDMMYY" THEN GOSUB 21000:B = 6: GOSUB 220
      00
15678 IF LEN (RS$) = 6 THEN GOSUB 25000:DV$(5) = RS$: GOSUB 28000
15680 V = 19:BL = 2:H = 20: GOSUB 27000
15690 GOSUB 26000: IF RS$ = "N" THEN 1050
15700 RETURN
15997 REM
15998 REM *** PRINT PAGE SIX ***
15999 REM
16000 GOSUB 10000
16010 VTAB 4: PRINT "WATER SOURCE : ";DE$( VAL (W$(1)))
16020 VTAB 6: PRINT "SALINITY : ";W$(2)
16030 VTAB 8: PRINT "DISSOLVED OXYGEN : IN : ";W$(3)
16040 VTAB 9: PRINT "      OUT : ";W$(4)
16050 VTAB 11: PRINT "TGP : ";W$(5)
16060 VTAB 13: PRINT "HARDNESS : ";DF$( VAL (W$(6)))
16070 VTAB 15: PRINT "PH : ";W$(7)

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16080 VTAB 17: PRINT "NH3 : ";W$(8)
16090 RETURN
16497 REM
16498 REM *** INPUT PAGE SIX ***
16499 REM
16500 V = 19: FOR I = 1 TO 4: VTAB V: PRINT DE(I);" ";DE$(I);: IF I = 4 THEN
16520
16510 HTAB 20: PRINT DE(I + 4);" ";DE$(I + 4):V = V + 1: NEXT
16520 MX = 7:V = 4:H = 15:RS$ = W$(1): GOSUB 21000: GOSUB 23000:W$(1) = R
S$:RS$ = DE$( VAL (W$(1))): GOSUB 28000
16530 V = 19:H = 1:BL = 4: GOSUB 27000
16540 V = 6:H = 11:RS$ = W$(2): GOSUB 21000:W$(2) = RS$: GOSUB 28000
16550 V = 8:H = 25:RS$ = W$(3): GOSUB 21000:W$(3) = RS$: GOSUB 28000
16560 V = 9:H = 25:RS$ = W$(4): GOSUB 21000:W$(4) = RS$: GOSUB 28000
16570 V = 11:H = 6:RS$ = W$(5): GOSUB 21000:W$(5) = RS$: GOSUB 28000
16580 V = 19: FOR I = 1 TO 4: VTAB V: PRINT DF(I);" ";DF$(I);: IF I = 4 THEN
16600
16590 HTAB 20: PRINT DF(I + 4);" ";DF$(I + 4):V = V + 1: NEXT
16600 MX = 7:V = 13:H = 11:RS$ = W$(6): GOSUB 21000: GOSUB 23000:W$(6) =
RS$:RS$ = DF$( VAL (W$(6))): GOSUB 28000
16610 V = 19:H = 1:BL = 4: GOSUB 27000
16620 V = 15:H = 5:RS$ = W$(7): GOSUB 21000:W$(7) = RS$: GOSUB 28000
16630 V = 17:H = 6:RS$ = W$(8): GOSUB 21000:W$(8) = RS$: GOSUB 28000
16640 GOSUB 26000: IF RS$ = "N" THEN 1060
16650 RETURN
16999 REM
17000 REM *** INPUT COMMENTS ***
17001 REM
17010 GOSUB 10000
17020 PRINT : PRINT "ENTER ANY SPECIFIC COMMENTS YOU WISH TO": PRINT "MA
KE REGARDING THIS REPORT"
17030 PRINT "PLEASE LIMIT SENTENCES TO LESS THAN 240": PRINT "CHARACTERS
(APPROX. 6 LINES)"
17040 PRINT "WHEN FINISHED, TYPE <RETURN>": PRINT
17050 N = 0:V = 10:H = 1: FOR I = 1 TO 100:RS$ = CM$(I): PRINT " ";RS$: GOSUB
21000: IF RS$ = "" THEN 17080
17060 CM$(I) = RS$:N = N + 1:V = V + 1 + ( LEN (RS$) / 40): IF V > 23 THEN
V = 23
17070 NEXT
17080 GOSUB 26000: IF RS$ = "N" THEN 17000
17090 IF RS$ = "2" THEN RS$ = "NO": GOSUB 28000
17100 RETURN
20999 REM
21000 REM *** INPUT SUBROUTINE ***
21001 REM
21010 VTAB V: HTAB H: INPUT " ";A$: IF A$ = "" THEN RETURN
21020 IF A$ = CHR$(16) THEN PR# 1: PRINT CHR$(9);"S": PR# 0: GOTO 2
1000
21022 IF A$ = CHR$(18) THEN GOTO 140
21025 IF A$ = "/" THEN A$ = ""
21030 RS$ = A$
21040 RETURN
21999 REM

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22000 REM *** LENGTH CHECK ***
22001 REM
22010 IF LEN (RS$) < > B THEN VTAB V: HTAB H: PRINT " DDMMYY ": GOSUB
      21010: GOSUB 22010
22020 RETURN
22999 REM
23000 REM *** LIMITS CHECK ***
23001 REM
23010 IF A$ = "" THEN RETURN
23015 IF VAL (RS$) > = MN THEN IF VAL (RS$) < = MX THEN 23030
23020 PRINT TA$: GOSUB 21010: GOSUB 23010
23030 RETURN
23999 REM
24000 REM *** CHECK FOR CHAR. IN NUMBER STRING ***
24001 REM
24005 IF LEN (RS$) = 0 THEN 24050
24010 FOR J = 1 TO LEN (RS$): IF VAL ( MID$ (RS$,J,1)) = 0 AND MID$ (
      RS$,J,1) < > "0" THEN 24040
24020 NEXT
24030 GOTO 24050
24040 PRINT TA$: GOSUB 21010: GOSUB 24010:
24050 RETURN
24999 REM
25000 REM *** DATE CHECK ***
25001 REM
25010 IF VAL ( LEFT$ (RS$,2)) < = 31 AND VAL ( LEFT$ (RS$,2)) > = 0 THEN
      GOTO 25030
25020 GOTO 25060
25030 IF VAL ( MID$ (RS$,3,2)) < = 12 AND VAL ( MID$ (RS$,3,2)) > =
      0 THEN 25050
25040 GOTO 25060
25050 IF VAL ( RIGHT$ (RS$,2)) > = 70 THEN 25070
25060 VTAB V: HTAB H: PRINT " DDMMYY ": GOSUB 21000: GOSUB 25000
25070 RETURN
25999 REM
26000 REM *** OK SUBROUTINE ***
26001 REM
26010 VTAB 23: HTAB 28: PRINT "OK <Y/N>";:V = 23:H = 38: GOSUB 26020: RETURN

26020 VTAB V: HTAB H: GET RS$: IF RS$ < > "Y" THEN IF RS$ < > "N" THEN
      VTAB V: GOTO 26020
26030 VTAB V: HTAB 1: CALL - 868: VTAB 22: PRINT : RETURN
26999 REM
27000 REM *** BLANK OUT ROUTINE ***
27001 REM
27010 FOR I = 1 TO BL: VTAB V: HTAB H: CALL - 868:V = V + 1: NEXT : RETURN

27999 REM
28000 REM *** PRINT DATA ROUTINE ***
28001 REM
28010 VTAB V: HTAB H + 1: PRINT RS$: RETURN
28997 REM
28998 REM *** WINDOWED INPUT SUBROUTINE***

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28999 REM
29000 POKE 33,10: POKE 32,H: POKE 34,V - 1: POKE 35,V
29010 VTAB V: HTAB 1: INPUT " ";A$: IF A$ = "" THEN GOTO 29030
29012 IF A$ = CHR$(16) THEN PR# 1: PRINT CHR$(9);"S": PR# 0: GOTO 2
9010
29013 IF A$ = CHR$(18) THEN GOTO 140
29014 IF A$ = "/" THEN A$ = ""
29016 RS$ = A$
29030 POKE 32,0: POKE 33,40: POKE 34,0: POKE 35,23
29040 VTAB V: HTAB H + 1: PRINT RS$
29050 RETURN
29997 REM
29998 REM *** DATA STATEMENTS ***
29999 REM
30000 REM *** D0$(I) = SPECIES ***
30010 DATA 1,COHO,2,CHINOOK,3,SUMMER CHINOOK,4,FALL CHINOOK,5,SOCKEYE,6
,CHUM,7,PINK,8,SUMMER STEELHEAD,9,WINTER STEELHEAD,10,DOLLY,11,RAINB
OW,12,CUTTHROAT,13,OTHER
30020 REM *** D1$(I) = AGE ***
30030 DATA 1,EGGS,2,SAC FRY,3,FRY (BUTTONED),4,ADVANCED FRY,5,YEARLING,
6,2 YEAR,7,3 YEAR,8,4 YEAR,9,IMMATURE ADULT,10,RIPE ADULT,11,SPENT A
DULT,12,JACK,13,OTHER
30040 REM *** D2$(I) = SEX ***
30050 DATA 1,FEMALES,2,MALES,3,MIXED,4,UNKNOWN
30060 REM *** D3$(I) = SUBMISSION REASON ***
30070 DATA 1,HATCHERY LOSS,2,FISH KILL IN WILD,3,RESEARCH,4,HEALTH CHEC
K,5,CERTIFICATION,6,OTHER
30080 REM *** D4$(I) = STOCK ORIGIN ***
30090 DATA 1,WILD,2,CULTURED,3,SEMI-WILD,4,UNKNOWN
30100 REM *** D5$(I) = SAMPLE TYPE ***
30110 DATA 1,LIVE,2,DEAD,3,MORIBUND,4,RANDOM,5,MIXED,6,OTHER
30120 REM *** D6$(I) = CONTAINER TYPES ***
30130 DATA 1,BURROWS,2,CIRCULAR,3,RACEWAY,4,NET PENS,5,KEEPER POND,6,TR
OUGHS,7,CAP TROUGH,8,SPAWNING CHANNEL,9,EARTH POND,10,HEATH TRAY,11,
GRAVEL BOX,12,NATURAL,13,OTHER
30140 REM *** D7$(I) = FOOD ***
30150 DATA 1,OMP,2,BIODIET,3,SIVERCUP,4,RANGERS,5,ABERNATHY,6,APEX,7,RE
SEARCH,8,CUSLAN,9,NATURAL,10,NONE (STARVATION),11,OTHER
30160 REM *** D8$(I) = FOOD TYPE ***
30170 DATA 1,WET,2,DRY,3,MIXED
30180 REM *** D9$(I) = FEEDING METHOD ***
30190 DATA 1,HAND ,2,MACHINE,3,NATURAL
30200 REM *** DA$(I) = BEHAVIOR ***
30210 DATA 1,NORMAL,2,NOT FEEDING,3,ON SURFACE,4,ON OUTLET,5,SLUGGISH,6
,MORIBUND,7,DEAD,8,FLASHING,9,CORKSCREWING,10,OTHER
30220 REM *** DB$(I) = GROSS SYMPTOMS ***
30230 DATA 1,NORMAL,2,DARK,3,POPEYED,4,OPEN LESIONS,5,BLUE COLOUR (
SPOTS),6,SCALE LOSS,7,HEMORRHAGING,8,FIN ROT,9,FIN EROSIONS,10,RED V
ENT,11,RED MOUTH,12,PARASITES,13,FUNGUS,14,OTHER
30240 REM *** DC$(I) = HANDLING ***
30250 DATA 1,SORTING,2,TAGGING,3,SAMPLING,4,MOVING,5,GRADING,6,RESEARC
H
30260 REM *** DD$(I) = VACCINATIONS ***

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30270 DATA 1,YES (& DATE DONE),2,NO
30280 REM *** DE$(I) = WATER SOURCE ***
30290 DATA 1,SURFACE,2,WELL,3,RIVER,4,CITY,5,LAKE,6,SALT,7,BRACKISH
30300 REM *** DF$(I) = WATER HARDNESS ***
30310 DATA 1,EXTREMELY SOFT,2,VERY SOFT,3,SOFT,4,MODERATE,5,HARD,6,VERY
HARD,7,EXTREMELY HARD
30320 REM *** MAIN MENU DATA ***
30330 DATA 7,1,INPUT FOR REPORT,8,2,REVIEW OF REPORT,9,3,HARD COPY OF R
EPORT,11,4,STORE DATA ON DISK,12,5,RECALL DATA FROM DISK,14,6,HARDCO
PY OF BLANK FORM
30340 DATA 16,7,RETURN TO FISH HEALTH
30350 REM *** FORM LABELS ***
30360 DATA 12,5,5,1,1,5,5,1,1,9,1,9,1,1,6,12
30365 DATA 12,7,5,6,6,6,6,6,6,1,11,11,9,6,6,5,15,13,6,5,6,2,2,11,1,12,1
1
30370 DATA 8,12,12,2,10,8,5,15,10,5,15,12,8,5,1,5
30999 REM
31000 REM *** INPUT "OTHER" DATA SUBROUTINE ***
31001 REM
31002 J = 0
31020 CF(1) = 13:CF(2) = 13:CF(3) = 6:CF(4) = 6:CF(5) = 13:CF(6) = 11:CF(
7) = 10:CF(8) = 14
31030 IF A$ = "" AND VAL (RR$) = CF(XC) THEN VTAB V: HTAB H: CALL - 8
68:RS$ = XD$(XC): RETURN
31040 IF VAL (RR$) < > CF(XC) THEN RETURN
31045 PF = 1
31050 VTAB V: HTAB H + 1: CALL - 868
31060 VTAB 23: CALL - 868: VTAB 23: HTAB 5: PRINT "USE SEMICOLONS,"; INVERSE : VTAB 23:
31061 IF XC = 2 THEN VTAB 12: HTAB 24: PRINT "2 SAC FRY"
31070 VTAB V: HTAB H + 1: INPUT "":XD$(XC)
31075 VTAB 23: HTAB 5: CALL - 868
31080 FOR I = 1 TO LEN (XD$(XC))
31090 RT$ = MID$(XD$(XC),I,1)
31095 RU$ = ""
31100 IF I < LEN (XD$(XC)) THEN RU$ = MID$(XD$(XC),I + 1,1)
31110 IF VAL (RT$) < > 0 OR RT$ = "0" THEN J = J + 1:SS$(J) = RT$: IF
VAL (RU$) < > 0 OR RU$ = "0" THEN SS$(J) = SS$(J) + RU$:I = I + 1
31120 NEXT
31140 IF J = 0 THEN XFLAG = 1:RS$ = XD$(XC): RETURN
31150 RS$ = ""
31160 ON XC GOTO 31200,31210,31220,31230,31240,31250,31260,31270
31200 FOR I = 1 TO J:SS(I) = VAL (SS$(I)):RS$ = RS$ + D0$(SS(I)) + "; "
: NEXT : GOTO 31300
31210 FOR I = 1 TO J:SS(I) = VAL (SS$(I)):RS$ = RS$ + D1$(SS(I)) + "; "
: NEXT : GOTO 31300
31220 FOR I = 1 TO J:SS(I) = VAL (SS$(I)):RS$ = RS$ + D3$(SS(I)) + "; "
: NEXT : GOTO 31300
31230 FOR I = 1 TO J:SS(I) = VAL (SS$(I)):RS$ = RS$ + D5$(SS(I)) + "; "
: NEXT : GOTO 31300
31240 FOR I = 1 TO J:SS(I) = VAL (SS$(I)):RS$ = RS$ + D6$(SS(I)) + "; "
: NEXT : GOTO 31300
31250 FOR I = 1 TO J:SS(I) = VAL (SS$(I)):RS$ = RS$ + D7$(SS(I)) + "; "
: NEXT : GOTO 31300
31260 FOR I = 1 TO J:SS(I) = VAL (SS$(I)):RS$ = RS$ + DA$(SS(I)) + "; "
: NEXT : GOTO 31300

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31270 FOR I = 1 TO J:SS(I) = VAL (SS$(I)):RS$ = RS$ + DB$(SS(I)) + "; "  
      : NEXT : GOTO 31300  
31300 I = LEN (RS$):RS$ = LEFT$(RS$,I - 2):XD$(XC) = RS$:XFLAG = 1: RETURN  
  
32030 IF A$ = "" AND VAL (RR$) = CF(XC) THEN VTAB V: HTAB H: CALL - 8  
      68:RS$ = XD$(XC): RETURN
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