Technical Support Group
Services and Operating Guidelines

Research Branch
Fall 1988

TECHNICAL SUPPORT GROUP SERVICES AND OPERATING GUIDELINES

Research Branch

Ministry of Forests

Fall 1988

FOREWORD

The Technical Support Group (TSG) provides services to the Ministry Research Program in five areas:

- Research Station Facilities
  - Cowichan Lake Research Station (CLRS)
  - Kalamalka Research Station (KRS)
  - Red Rock Research Station (RRRS)

- Research Laboratory and Analytical Chemistry Section
  - Glyn Road, Saanich

- Systems Support - Headquarters

- Biometrics Services - Headquarters

- Communication and Extension Services - Headquarters

This booklet provides a summary of the services provided by the Technical Support Group, and guidelines to acquire these services. The Operating Guidelines provide a basis for the management of resources for the delivery of TSG services. "Clients" are those individuals actively engaged in forestry research which is supported by the Ministry of Forests Research program. You are encouraged to contact TSG staff directly for information regarding any of the services discussed in this booklet, or for information with respect to their procurement.

To provide services in an efficient manner, guidelines are in place to streamline the planning, coordination and delivery of TSG services to you, our clients. It is our desire to contribute to the work of Ministry scientists, project leaders and others in a cooperative fashion.

This booklet will be amended and/or updated as needed.

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COMMUNICATION AND EXTENSION SERVICES

The Communication and Extension Services Section offers a variety of support services to the Branch's research scientists, technicians and their assistants. The Section consists of a manager, art coordinator, communications assistant and a photographer. The Section also houses, under contract, a full-time graphics artist and a part-time typesetter. In addition, C & ES utilizes alternate service sources and maintains an inventory of qualified consultants, and initiates and monitors contracted service performance and quality.

The Section maintains a supply of all branch publications. Limited quantities of research publications are kept on hand; surplus quantities are stored off site. An archive copy is always available for reference or photocopying. The Section attends to corrections and updates of publications and maps, determines when reprints are justified and liaises with the Queen's Printer in arranging for their preparation.

According to demand, C & ES coordinates the reprinting and distribution of publications. The Section coordinates cost recovery printing arrangements through sale of publications and maps in cooperation with Crown Publications and Maps B.C.

An extensive library of 35 mm photographic slides is kept on hand to assist ministry staff to obtain appropriate photographs to supplement presentations, posters, or other audio-visual productions. C & ES will also provide information relevant to speeches and audio-visual presentations.

The Section maintains a comprehensive mailing list, and, in conjunction with the Postal Services Branch of Provincial Secretary and Government Services, coordinates the rapid mailout of publications, newsletters and other ministry publications to all addressees or to selected subgroups of recipients. Automation is used whenever possible.

C & ES is also concerned with extension and demonstration, and is the branch's liaison with Public Affairs Branch for code 40 expenditures relating to public information.

EDITORIAL SERVICES

The Section offers grammar, style and copy editing, proofreading, and advice on text, table, and figure style and formatting.

PHOTOGRAPHIC AND AUDIO-VISUAL SERVICES

The Section can produce both field and studio photography for copy work (maps, documents, artwork), wall photos and displays. Formats include 35mm, 2 1/4" black-and-white, color prints and slides, polaroids, micro or macro, 16 mm and video [video camera must be supplied by client]. The Section is also equipped to prepare 35 mm title or text slides from video monitors (the process is known as PolaBlues). Consultation and advice for technical photographic services, specialty products and up-to-date camera techniques is available. The section can coordinate film developing, printing and enlarging through private labs for maximum cost-effectiveness. The Section also maintains specialized 35 mm cameras for loan-out to field staff.

GRAPHIC ART SERVICES

Services are available to produce graphs, maps, tables, illustrations and other visual aids designed to communicate or illustrate research results. To ensure accuracy, data and information must be submitted in a form that is well thought out, legible, and concise. Ideas for design and format are welcomed and can be discussed with our staff by appointment.

TYPESETTING SERVICES

Type can be supplied for a variety of specific needs. In consultation with clients, C & ES will choose and prepare type to suit a particular project, or recommend the accepted conventional type for journals and publications.

EQUIPMENT AVAILABLE

2 - IBM PC's provide desktop publishing capabilities.

Software includes:

- Turbo Lightning (dictionary)
- Magna (typesetting)
- PC Slide
- PC Write
- Ventura
- Harvard Graphics
- Watfile
- Word Perfect
- Zenographics

Hardware includes a digitizing board for illustrations and an Apple LaserWriter Plus printer, which enables desk top publishing and in-house production of camera ready art.

Photographic equipment includes:

- Professional camera systems:
  Large (4" x 5"), medium (2 1/4") and 35 mm systems complete with a full range of specialized high resolution lenses and accessories for macro, telephoto, aerial or distortion control applications.

- Professional lighting systems:
  Large copy stand with reflectors and transmitted light sources, polarizing filters, copy hold-down, and industrial quality camera support for producing high quality title and text slides, copy negatives, slides from prints, prints or slides from coloured lithographs. Also used for accurate and controlled macro photography of small specimens (cones, seeds, insects, etc.) Future use as a titling stand for video.

  Strobe lights - portable and studio, from macro ring light to umbrella floods.

  Tungsten lighting system for video lighting.

  Portable reflectors for still or video.

- Miscellaneous Specialized equipment

  Video or 16 mm camera dolly - self tracking, portable, used indoors or outside.

  12' x 12' self-supporting projection screen

- Filing systems - photo files

  Large collection of general forestry-related 35 mm slides

  Small collection of print images

Other "equipment" includes an up-to-date computerized mailing list of all the ministry's clients and publication recipients.

For further information, please contact:

Manager
Communications and Extension Services
Research Branch
Ministry of Forests
31 Bastion Square
Victoria, B.C.
V8W 3E7

Phone 387-3484
Faxcom 387-0046

BIOMETRICS SERVICES

CONSULTATIONS

The Biometrics Section is available to Ministry staff for statistical consultation, and minor requests may be brought directly to the biometricians. Problems of a more complex nature will require an appointment and if "large-scale" biometrics support is required, a formal request must be made through the Manager, Technical Support Group. Ministry staff involved in FRDA projects may request biometrics assistance as described but, if the necessary support materials (microcomputer, software, etc.) are unavailable or in short supply, they may be requested to supply these through FRDA.

Biometrics staff will assist contract personnel if time and resources permit, and the required support has been considered in the contract proposal. A formal request for biometrics assistance for contract staff must be made through the Manager, Technical Support Group.

DATA ANALYSIS

Advice on data analysis is available through consultation but is no longer a major function of the Biometrics Section. The occasional analysis will be undertaken for unusually complicated or innovative problems, or for a simple analysis required by a client who has had little experience analyzing data.

REVIEWS

The Biometrics Section will review working plans (WP's), progress reports, final reports and manuscripts for statistical validity. Where appropriate, modifications to the experimental design, sampling scheme, statistical analysis or statistical interpretation will be suggested. Biometrics services are intended to aid researchers, not direct them. Ideally, biometrics assistance is solicited at the inception of an experiment to assure sound experimental design.

BIOMETRICS PROJECTS

The Biometrics Section will undertake projects to answer general statistical questions and to prepare and give training courses. Projects will require the approval of the Manager, Technical Support Group, and a reasonable time frame.

Biometrics projects are initiated by receiving a question during consultation which can not be answered quickly; by recognizing that many clients have a similar statistical problem; or by specific request for research that is essentially statistical. Projects may be short requiring a day's research while major projects may take up to several months to complete. Projects which cannot be undertaken are kept on file, and may be undertaken at some future time.

Training courses, such as the PC/SAS Workshop, are available, and others will be developed as the need arises. The Biometrics Section also will continue to produce its series of instructional pamphlets covering various statistical and sampling techniques.

BIOMETRICS CLIENTS

The Biometrics Section is interested in statistical questions from those asking for assistance. However, resource limitations restrict the Section from accepting all work. Priorities are as follows:

1. Research Branch Staff and affiliated Regional Staff
2. Other Ministry Staff
3. Other provincial government staff
4. Other

These priorities may be modified by the amount and possible impact of the work required for any particular request.

The following is a general time-frame guide for Biometrics Services.

BIOMETRICS PRIORITY LIST

TABLE 1: Time required to obtain a consulting session

Expected Length of Consulting Session	Appointment Required?	Advance Notice?
>10 minutes	no	1 hour
<1 hour	desirable	1/2 day
>1 hour	yes	3 days

TABLE 2: Time required for completion of reviews and projects

Type of Work	Turnaround Time (from receipt of work to completion)
Reviews	
1. Working Plans	3 weeks
2. Manuscripts for publication	3 weeks
3. Progress and Final Reports	4 weeks
Biometrics Projects	
1. General statistical problems and questions - if the project is generated during a consulting session, then a deadline will be established by the Biometrician and Client	1 to 8 weeks
2. Preparation of training courses	4 to 8 weeks

For further information, please contact:

Biometrics Section
Research Branch
Ministry of Forests
31 Bastion Square
Victoria, B.C.
V8W 3E7

Phone 387-5676
Faxcom 387-0046

SYSTEMS SUPPORT SERVICES

The Systems staff provides assistance and technical advice for systems development and computing-related matters to support Research Branch programs. The section coordinates the development of new systems, maintains and modifies existing ones, provides recommendations for the introduction of new software and hardware options, and coordinates and monitors the computing budget and related expenditures.

The section provides consultation, training, and day-to-day support for the various computing environments used within the branch. These services are available upon request with the necessary "lead time" depending on the nature of the request. Specific services are described below and details on obtaining these services are summarized in the Operating Guidelines Section.

COMPUTING FACILITIES

British Columbia System Corporation (BCSC)

IBM 30XX
- Large mainframe shared by all ministries and accessed throughout the province via both network and dialup;
- Branch researchers mainly use shared terminals network connected to give statistical processing under SAS (batch), and editing under Wylbur. The user environment most used is Wylbur. Fortran is also used.

Information Systems Branch (ISB) - Ministry of Forests

WANG VS 100
- Large shared minicomputer accessed throughout the province from regional machines;
- Used by Ministry of Forests for data processing, word processing and electronic mail;
- Used little by Research Branch staff.

WANG VS 45
- Small minicomputer shared with Silviculture Branch at 31 Bastion Square;
- Used mostly for word processing by the WP staff;
- Also used as a local node for connecting to VS 100 and the BCSC network for printing.

IBM 43XX
- large shared minicomputer accessed throughout the province via network and dialup;
- used by Ministry staff through the SNA network for both electronic mail and data processing;
- used a little by Research staff for electronic mail only.

Research Branch

Microcomputers
- Used increasingly by researchers in all phases of their work;
- Hardware is generally IBM compatible PC AT, running under MS-DOS;
- See guidelines for a list of recommended software.

ACQUISITION SERVICES

Computing expenditures (STOB 25 and STUB 68) are monitored and controlled by Research Branch in cooperation with Information Systems Branch (ISB). A formal planning and acquisition process is required by the various organizations responsible. The details are described in the Operating Guidelines section of this guide.

OPERATIONAL SERVICES

Various operational services are provided by the Systems Section. They are listed here for reference. Details on making requests and expected turnaround times are given in the Operating Guidelines section.

1. Librarian archive management
2. Keypunch processing
3. Record Sheet production
4. Data transfers - mainframe/diskette
5. Mainframe access
6. Requests for manuals
7. WYLBUR PIN resetting - Contact ISB

OTHER SUPPORT GROUPS

Research Branch Biometrics Section

In the use of computer based statistical tools, it is frequently unclear whether a problem is one of statistics or computing. Often, there are equally effective but independent solutions in each of these two areas. At one time the support staff was organized in one section, Biometrics and Systems. Now, although the structure is two separate sections, the staff work together closely in the areas of joint concern.

Problems that are clearly statistical in nature should be directed to the Biometrics staff. Those that are clearly systems to the systems staff. Generally, a SAS problem is best directed towards Biometrics, an MS-DOS problem to Systems.

Regional Systems Officers (RSO's)

At Branch headquarters, systems staff provide detailed day to day support for users. While it is a recognized priority for the support people to visit other sites, regional users in particular must look elsewhere for day to day support. Each Region has a RSO who is likely in a position to provide support for MS-DOS and other functions in the mainstream of computing. The skills and experience of the RSO's should be utilized wherever possible.

Information Systems Branch (ISB)

ISB is a Branch in the Management Services Division with general responsibility for systems issues within the Ministry. Research Branch systems section deals with ISB staff in many of the planning and organizational issues that arise. To date, ISB staff are not generally involved in day to day support, but they are a resource that we can call upon. In particular, resetting of lapsed PIN's on the mainframe is handled by ISB.

British Columbia Systems Corporation (BCSC)

The Systems corporation provides mainframe services to the BC government through a shared network. The major support service they provide for Branch computer users is a trouble line at the Customer Service Desk, dealing with problems with mainframe access.

For further information, please contact:

Systems Support Section
Research Branch
Ministry of Forests
31 Bastion Square
Victoria, B.C.
V8W 3E7

Phone 387-5413
Faxcom 387-0046

RESEARCH LABORATORY

Facilities - Description

- Greenhouse - 4.6 m x 13.1 m (15' x 43') glass greenhouse, heated, air conditioned, overhead lighting for prolonged photoperiod.
- Header house - 7.6 m x 5.3 m (25' x 17.5') double sink with settling sump 4 m^2 (45 ft^2) bench space.
- Shelter houses - (5) 5.5 m x 12.2 m (18' x 40') 4 with propane heater and 3 with overhead mist watering boom;
- Shelter houses - (3) 23.8 m x 12.5 m (78' x 41') watering boom, 110 VAC outlet available, 1 with propane heater, 1 with watering boom.
- Shelter houses - (3) 5.5 m x 12.2 m (18' x 40'), all with propane heat and 110 VAC outlets.
- Shelter house - 3.4 m x 7.6 m (11' x 25') overhead lighting, 4 x 110 VAC outlets, fans.
- Shelter house - 3.7 m x 7.6 m (12' x 25') 110 VAC outlet.
- Shelter house - 3.7 m x 7.6 m (12' x 25') overhead misting nozzles, electric heat timers and screen shadecloth.

Equipment

- 2 reefers
- 5 growth chambers
- 1 stock-testing chamber
- 1 freezer
- 3 incubators
- 1 seed X-ray system
- 1 cold storage room

For further information, please contact:

Superintendent
Research Laboratory
1320 Glyn Road
Saanich, B.C.
V8Z 3A6 Phone 479-6732

RESEARCH LABORATORY

(Analytical Chemistry Section)

The Analytical Chemistry Section provides analyses of soil, plant and water samples.

Soils

- pH (H_2O) and pH ($CaCl_2$)
- Moisture (Hygroscopic)
- Salinity (Saturated paste)
- Cation Exchange Capacity (1 N Neutral Ammonium Acetate)
- Exchangeable Cations (1 N Neutral Ammonium Acetate)
- Available Cations (Morgan's)
- Available Phosphorus (Bray PI)
- Iron and Aluminum (Sodium Pyrophosphate Extraction)
- Total Nitrogen (Leco)
- Mineralizable Nitrogen (Anaerobic)
- Total Carbon (Leco)
- Total Sulfur (Leco)

Water

- Magnesium (ICAP or AA)
- Calcium (ICAP or AA)
- Potassium (ICAP or AA)
- Phosphorus (ICAP or AA)
- Sodium (ICAP or AA)
- pH
- Salinity

Plants

- Potassium (Dry Ash, ICAP or AA)
- Calcium (Dry Ash, ICAP or AA)
- Magnesium (Dry Ash, ICAP or AA)
- Copper (Dry Ash, ICAP or AA)
- Manganese (Dry Ash, ICAP or AA)
- Zinc (Dry Ash, ICAP or AA)
- Iron (Dry Ash, ICAP or AA)
- Phosphorus (Dry Ash, ICAP or Colourmetric)
- Nitrogen (Leco)
- Sulfur (Leco)
- Boron (Dry Ash, Colourmetric)
- Molybdenum (Dry Ash, ICAP or AA)

Equipment

The Laboratory has the following analytical equipment:

- Atomic absorption spectrophotometers (AA)
- UV/VIS spectrometer
- Auto analyzer
- Programmable ashing furnace
- Muffle furnaces
- Automatic distillation unit
- Ring grinder
- Large and small model Wiley mills
- Power mortar and pestle
- Ro-tap shaker
- Diluting machines
- Other standard analytical chemistry equipment
- Inductively Coupled Argon Plasma Spectrophotometer (ICAP)
- CHN Analyzer (Leco)
- S Analyzer (Leco)

Quality Control of Laboratory Analysis

Procedures in use in the Analytical Chemistry Section have been checked for accuracy against National Bureau of Standards (NBS) and the Canada Soil Survey Committee's Reference Soil Samples. A control sample is analysed along with every batch of samples as a "quality control check".

Specialized Analyses

Upon request, the section will undertake analyses not listed above. Clients should contact the Research Laboratory Superintendent to discuss their special analysis needs prior to submitting such requests, and ensure that adequate lead time is provided for special analytical chemistry or biochemical services.

For further information, please contact:

Supervisor
Research Laboratory
Analytical Chemistry Section
1320 Glyn Road
Saanich, B.C.
V8Z 3A6 Phone 479-6732

COWICHAN LAKE RESEARCH STATION

PROPAGATION

Facilities - Description

- Greenhouses - (2) 36.6 m x 12.2 m (120' x 40') fiberglass greenhouses equipped with HPS lighting for photoperiod extension, automatic misting system, rolling benches.
- Greenhouses - (2) 36.6 m x 12.2 m (120' x 40') fiberglass greenhouses equipped with HPS lighting for photoperiod extension and automatic boom for irrigation and nutrient application.
- Greenhouse - 34.1 m x 12.8 m (112' x 42') fiberglass greenhouse with automatic boom and photoperiod HPS lighting.
- Lath house - fiberglass roof, photoperiod lighting, electrical cable for bottom heat, automatic overhead misting system.
- Container Holding Area - approximately 5800 m^2, irrigated by rain bird sprinklers and set on bark mulch. Used for holding stock for seed orchards, clonebank and research projects.
- Transplant Area - approximately 10,000 m^2 used for holding stock or short-term trial material.
- Open compound - 34.1 m x 12.8 m (112' x 42') with automatic boom and rolling benches.

Seedling Production

Flexible growing regimes (use of shade cloth, black out, automatic boom or hand watering) for:

- progeny test stock
- seedling research trials
- rootstock
- speciality stock types
- pesticide trials

Propagation Centre

- Grafting services for:
  - seed orchards
  - clonebanks
  - research trials
- Cone induction
- Vegetative material for operational cutting programs
- Cuttings for:
  - research trials
  - seed orchards
  - clonebanks
  - operational reforestation programs
- Container and field holding areas.

CLRS PRODUCTION/HOLDING CAPACITY

Area	# of Seedlings		# Grafts / Trees			
	313 Styro	415B Styro	11 L Pot	8 L Pot	4 L Pot	.5 m x.5 m
Green-house	1,400,000	800,000	13,000		60,000	
Poly house	130,000	70,000				
Shade Compound	160,000	86,000				
Open Compound	250,000	160,000				
Container Holding Area			40,000		120,000	
Transplant Area						30,000

Propagation services include rootstock production, grafting and rooted cuttings. Due to existing commitments, not all of the above holding capacity is available for immediate use.

Seed Production/Cleaning/Testing

- Pollen collection and drying (extraction)
- Controlled crossbreeding
- Booster pollination
- Cone protection
- Cone collecting and conditioning
- Seed cleaning
- Seed stratification
- Seed storage

Equipment Available

- Pollen extraction equipment
- Dissecting microscope
- Drying oven
- Cone tumbler
- Seed blower
- Walk-in cooler
- SG 30 germinator
- Vandana seeder
- Sony video 8 CCD-V5 recorder

Facilities

- Pollen and seed extraction room
- Service building work area

Gene Archives

- Provides a location for:
  - inbreeding studies
  - progeny tests
  - hedging orchard
  - farm field test
  - clonebanks
  - native arboretum
  - provenance plantations
  - cone induction
  - tree breeding
  - biogeoclimatic zone demonstration area
  - thinning plots.

CLRS CONFERENCE CENTRE

"Providing great food and rustic accommodation for up to 50 people."

Training facilities for:

- Research Branch
- Ministry of Forests
- Government agencies
- Forestry-related programs

Conference room equipment

- overhead projector
- VHS VCR and TV
- slide projector
- flip charts
- chalk board
- screens

Accommodation can be provided for field crews working in the area.

Appendices 1, 2 and 4 provide information to request conference facilities and charges for their use.

For further information, please contact:

Superintendent
Cowichan Lake Research Station
P.O. Box 335
Mesachie Lake, B.C.
V0R 2N0

Phone 749-6811
Faxcom 749-6020

KALAMALKA RESEARCH STATION

PROPAGATION

Facilities - Description

- Greenhouses - (2) 6.1 m x 12.2 m (20' x 40') glass greenhouses equipped with HPS lighting (photoperiod extension and photosynthetic capabilities) and automated misting or travelling boom systems. One misting chamber for limited rooted cutting trials.
- Shelter house - 9.1 m x 15.2 m (30' x 50') with incandescent photoperiod extension lighting and irrigation.
- Wet and dry pollen laboratory and extracting room.
- Header house work area.

Holding/Field Grafting/Trial Beds

- In ground - existing 2500 m^2 holding capacity with auto irrigation used for intensive-care holding, grafting or short term trial material.

KRS PRODUCTION/HOLDING CAPACITY

Area	# of Seedlings		# of Grafts / Trees		
	313 Styro (290 blocks)	415B Styro	.6 m x .6 m 11 L Pot	7 L Pot (spaced out)	4 L Pot
Green-house	57,420	32,480	420	900	1,200
Shelter house	(459 blocks) 90,882	51,408	1,140	(spaced out) 2,265	3,234
Holding bed (above ground)	over-wintering	300 blocks	700	2,000	
Holding bed (in ground)			3,000	(1 m x 1 m spacing) 2,500	

Propagation services include conifer seedlings, rootstock production, grafting and limited rooting of conifers and poplars.

There are 2 ha available for low-maintenance, short-term field trials.

Seed Production/Cleaning/Testing

- Pollen collection and drying (extraction)
- Pollen viability testing
- Controlled crossbreeding
- Booster pollination
- Cone protection
- Cone collection and conditioning
- Seed cleaning
- Seed stratification
- Germination testing
- X-ray seed testing
- Seed Storage

Equipment Available

- Pollen extraction unit
- Mechanical convection ovens
- Germinator
- Cone tumblers
- Dakota seed blower
- Various temperature walk-in coolers
- Microscopes with camera unit
- Electronic analytical balance
- Metal label embosser
- X-ray system and instant processor

TREE PHYSIOLOGY

Stock Quality Testing

- Frost hardiness testing
- Root growth capacity testing
- Root and shoot mass (dry weights)
- Morphological measurements (RCD, SH)
- Sample milling
- pH & conductivity soil testing
- Plant moisture stress evaluation (pressure bomb)
- Controlled environment growing

Equipment Available

- Freezers (3) (-90°C), freezer chamber with controller
- Chart recorder, telethermometers
- Conviron growth chambers (6)
- Mechanical convection ovens (2)
- pH meter
- Conductivity (ec) meter
- Pressure bomb chambers
- Biological oxygen monitor
- Spectrophotometer
- Electronic analytical balance
- Milling machine

Laboratory, growth chamber room and header house work areas.

Fabrication

- Carpentry - basic and custom-designed research equipment, e.g. misting and frost hardiness chambers
- Custom tractor and land preparation implement operation
- Shop facilities - equipment and machinery repair

Conference Room Facility

- Seating capacity 15-18
- Overhead projector
- 16 mm movie projector
- 20" color television
- VHS format VCR

For further information, please contact:

Superintendent
Kalamalka Research Station
3401 Reservoir Road
Vernon, B.C.
V1B 2C7

Phone 549-5577
Faxcom 542-2230

RED ROCK RESEARCH STATION

PROPAGATION

Facilities - Description

- Greenhouse - 15 m x 5.5 m lean-to glass greenhouse, manually operated, no venting or cooling system, 30 m^2 of usable growing space on fixed benches.
- Greenhouse - 18 m x 9 m growing space 105 m^2.
- Greenhouses - (3) 12 m x 6 m growing space 39 m^2, freestanding, equipped with a movable pallet system, travelling boom supplying misting, irrigation, and/or fertilized water (cannot be operated during the four coldest winter months). Heating, venting, lighting for extended growth, misting, irrigation, and fertilization is through a programmable system with manual override; sidewalls (cooling) manually operated, programmable system has the capability for extensive trend logging of the greenhouse environment and run-time of operative equipment.
- Nursery Space - (2.4 ha) bareroot nursery space, irrigation supplied by a solid set system with revolving sprinklers.

Propagation services

- production of a variety of seedling stock types:
  - lodgepole pine and spruce species
  - poplar seedlings from cuttings
  - root stock of lodgepole pine and spruce for grafting
  - grafting and graft maintenance.

Land Base

- 9 ha of rough cleared land (i.e. timber removed), hilly, river bench land with variable soil types;
- 13 ha 85-year-old timber, composed of old river benches bisected by a seasonal creek, two to four small areas that are of relatively uniform soil type, presently no access into this area.

Gene Archives

- grafted clone banks of lodgepole pine representing parent tree selections from the Interior of B.C. and Yukon;
- demonstration plantation of lodgepole pine of open pollinated progeny from inferior and superior phenotypes;
- grafted clone banks of Interior White and Engelmann spruce representing the Willow River and Bowron River drainages, the Smithers-Houston area and the East Kootenay area;
- picetum containing 13 species.

Facilities

- Service building, laboratory and header house
- Root washing facility (special sink and wash-water disposal system)
- Oven-drying and weighing room for plant samples
- 90 lineal feet of counter space with sinks and one simple fume hood
- 3 areas containing a total of 102 m^2 of open floor space
- growth chambers - (2) CONVIRON E-15

Equipment Available

- Drying ovens:
  - Thelco forced-air Model 28
  - Thelco Model 16A-E-6, small
  - Fisher Isotemp (2) Model 255G
  - Fisher Isotemp Model 230
- Electronic balances:
  - Mettler Model PE360
  - Mettler Model PE11
- Leaf Meter Model LI-3100
- Meter, pH
- Meter, uPpH Specific ion meter, HNV Systems Model 174
- Meter, Salinity, YSI S-C-T Mod. 33
- Infrared gas analyzer
- Chart recorder
- Oxygen monitor
- Freezer, household 0.6 m^3
- Refrigerator, household 0.4 m^3
- Cleaner, seed, clipper - hand crank c/w (2.5 cm) screens
- Counter, tally, hand
- Sprayer, Solo Sanex, backpack
- Sterilizer, soil 1/2 yard
- Brushcutter, Husqvarna, Model 165 RB
- Caliper, dial, Starret
- Caliper, digital
- Hygrothermograph
- Proportioner, Merrit Commander 1:128
- Scale, Ohaus 500 g, mechanical
- Scale, Pacific 50 lbs.

For further information, please contact:

Supervisor
Red Rock Research Station
Ministry of Forests
R.R. #7, RMD 6
Prince George, B.C.
V2N 2J5

Phone 963-9651
Faxcom 963-3436

OPERATING GUIDELINES

To ensure that all TSG resources are used in the best way and that priority projects receive the support they require, it is important that clients recognize the need for cooperative planning and coordination of projects. This includes advising TSG staff of requirements well in advance of a project start or completion date whenever possible.

Generally, the following policy applies:

- Minor equipment is the property of scientists until the project ends.
- Funds for minor equipment maintenance are budgeted in the scientists' budgets.
- Forest Resource Development Agreement (FRDA)-purchased equipment is maintained under the scientists' FRDA budget.
- Finance and Administration maintains inventory lists.
- Facility superintendents advise staff of inventory lists as a source of equipment.
- Superintendent and headquarters section heads are responsible for monitoring and expenditure of their budgets.
- Clients use equipment to meet approved project needs.
- TSG owns and maintains* major equipment to support scientific programs.
- Funds for project equipment are a part of scientists' budgets.
- Funds for equipment maintenance* are provided for in the TSG budget, exceptions being those minor pieces of equipment on scientist property lists.

* Exceptions to this general policy may be necessary if project maintenance consumes a disproportionate amount or exceeds TSG dollar resources or manpower.

COMMUNICATIONS AND EXTENSION SERVICES

The Section can produce many types of publications, posters, overheads and other demonstration aids. To minimize turnaround time, projects should be thought out in advance before discussion with C & ES staff. The production of publications is the most time consuming operation performed by C & ES, and requires advance lead time of at least eight weeks prior to preparation of artwork.

Clients should study the accompanying flow chart, which serves as a checklist in the production of branch publications.

PUBLICATIONS

C & ES coordinates the production and printing of research publications and ensures that they are in a form appropriate to their content and audience. Publication production may require more time than other extension products, and should be discussed with C & ES well in advance of the required date. Turnaround time: 12 weeks (minimum).

POSTERS

Posters are designed for various demonstrations or promotional purposes. They may include photographs, artwork, or special uses of type and colour. Posters can be prepared at the request of the client, or in conjunction with the client to develop his or her ideas. Turnaround time for posters: two weeks.

SLIDES AND OVERHEADS

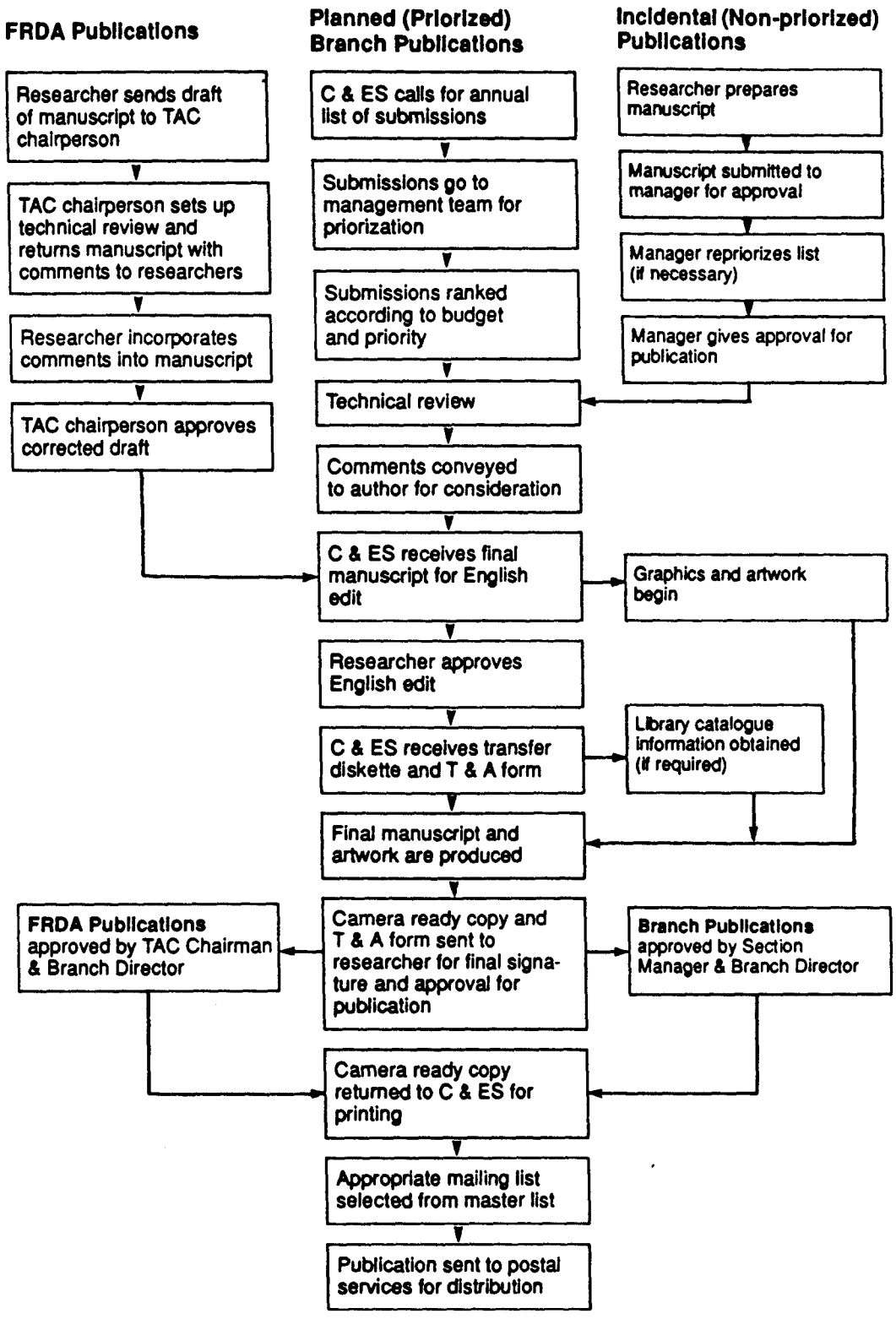
The Section can assemble slide packages for shows, demonstrations and lectures, or produce them individually for other purposes. Photographs, artwork and text can be produced as slides on white, black or blue backgrounds. Turnaround time for slides and overheads: two weeks.

A NOTE ABOUT TURNAROUND TIME FOR JOBS:

Regardless of the task or job, the client should inform C & ES as soon as he or she is aware of a need for the Section's services. C & ES routinely has several jobs underway at any given time. The greater the lead time, the better the finished product. The section prides itself in the caliber of its productions - hasty jobs give rise to mistakes and do not permit full utilization of the capabilities of our staff or technical equipment. The contact person for scheduling and assigning work is the Manager, C & ES. Once submitted, jobs are logged in by the Communications Assistant, who will respond to inquiries regarding the status of projects or advise clients of changes. The Section maintains a project status log which is updated regularly. Interrupting the staff person or service supplier will delay rather than hasten completion of a client's work.

When requesting services of C & ES, clients will be asked to confirm their anticipated delivery date, authorization and source(s) of funding.

Publishing Procedures



BIOMETRICS SERVICES

Biometrics operations can be divided into three categories: consultations, reviews, and projects.

CONSULTATIONS

Consultations with Ministry staff working on ministry projects

Minor consultations - such as requesting assistance with a specific test, experimental design, sampling scheme, SAS program, etc. - require an appointment with the biometrics staff. If large-scale biometric support is required, a formal request must be made through the Manager, Technical Support Group. Biometric support is subject to the constraints of time, facilities and staff expertise.

Consultations with non-Ministry staff or Ministry staff working on FRDA or Section 88 projects

When developing the contract, contractors should specify all statistical and computing support they will require, so that it is written into the contract. Contractor requests for biometric assistance must be made through the Manager, Technical Support Group. Reasonable notice should be allowed when requesting such support, since the availability of support is constrained by time, facilities and staff expertise and may not be available at any given time. In some instances, biometrics staff may request that additional resources be supplied by the contractor to meet the service requested.

Ministry staff working on FRDA projects may request minor consultations, as described previously. Requests for major support with FRDA projects must be made through the Manager, Technical Support Group.

REVIEWS

Biometric review is intended to aid researchers, not hinder them. When a faulty design is encountered, biometricians will try to offer suggestions for altering the experiment to make it workable. As far as possible, this will be done to the satisfaction of the client. Occasionally, major revisions are recommended and, in these instances, the only alternative may be a total revision of an experimental design. Biometrics services result in recommendations and it is the prerogative of the client to accept or reject them.

Working plans

Working plans should contain a clearly stated objective and a concise description of experimental design and proposed analysis techniques. A diagram of the experimental layout and a description of required facilities, manpower and costs are highly desirable.

Progress report

Progress reports should give an accurate account of an ongoing study. Any changes from the approved working plan should be clearly explained. Objectives and a description of the design and proposed analysis techniques should be supplied.

Manuscripts and final reports

Manuscripts and final reports should have clearly stated objectives and a description of methodology detailed enough to allow the reader to replicate the work. If there has been an analysis of variance, information sufficient to construct the entire analysis of variance table must be presented (i.e., degrees of freedom, sums of squares, mean squares and F-ratios). Symbols such as * and ** should not be used to denote levels of significance. Actual p values are preferred.

Generally, biometric assistance should be solicited at the inception of the project.

BIOMETRICS PROJECTS

Requests for major projects - such as the development of a complex sampling scheme - must be made through the Manager, Technical Support Group. A reasonable time frame is required and, if the request is from a consultant, the relevant guideline stated above applies. If the request is a FRDA-related project, it may be necessary for additional resources to be supplied through FRDA.

Training courses and educational pamphlets will be developed and distributed in accordance with user needs and are subject to the approval of the Manager, Technical Support Group. These will be ongoing projects, subject to time and resources.

SYSTEMS SUPPORT SERVICES

COMPUTER ADMINISTRATION

In general, the administration of computing resources within the Branch is the responsibility of the Systems Section of the Technical Services Group. This includes computing hardware and software as well as mainframe access. General responsibility for software and equipment is delegated to users where a single person or group is using equipment. For shared machines, more responsibility falls to the Systems Section, but again in cooperation with users.

MICROCOMPUTER LOANS

The Section has some equipment and software that is available to projects on a temporary basis. This equipment can be reserved in advance, and booked for a predetermined period of time. Allocation will be done on the basis of such factors as level of need, level of utilization and project ranking. Conflicts will be resolved by the Management Team.

Available items are:

Hardware:

1. PC AT
   Three machines are allocated on a yearly basis, one to each of Integrated Resource Management, Forest Renewal and Technical Support Group.

2. PC AT portable
   One Compaq 286 portable is available for short term loan. The loan period is of the order of 1 day, weekly or monthly, depending on demand.

3. Radio Shack Laptop
   There are a number of under-utilized Radio Shack Model 100's that can be made available for short term or long term loan. Note that these are <u>not</u> MS DOS machines, and that they come equipped with word processing, spreadsheet and communications software.

4. Husky Hunter Handheld
   One 352K Husky is available for loan. There are heavy demands on it during the Fall measurement season.

Software:

The Section is investigating the feasibility of providing a library of the major software packages used within the Branch. This will require a determination of what demand there might be, and what sort of procedures might be needed for administration. For the time being, there are a number of packages available on an ad hoc basis. Contract Ralph Kopperson for further information.

ACQUISITION SERVICES

Computing expenditures (STOB 25 and STOB 68) are monitored and controlled by the Research Branch in cooperation with the Information Systems Branch (ISB) through a document called the Information Systems Plan (ISP). To be included in the ISP, your requirements must be identified in the fiscal year prior to acquisition time.

PLANNING

Forest Resource Development Agreement (FRDA)

STOB 68 (New acquisitions)
- Items to be identified in the Working Plan (WP) with general specifications and dollar amounts for the following fiscal year

STOB 25 (Processing costs)
- Dollar amounts to be identified in Working Plan to cover processing costs for the following fiscal year

Regular Budget

STOB 68 (New acquisitions)
- Equipment requirements to be communicated to section manager by December 15th for purchase the following fiscal year

STOB 25 (Processing costs)
- Dollar amounts to be communicated to section manager by December 15th for the following fiscal year;
- Dollar amounts can be expressed as a percentage of the current year's budget.

ACQUISITIONS

STOB 68 (New acquisitions)
- Current-year purchases will have been identified the previous fall as part of the planning process;
- The purchase is initiated by contacting the Systems section to refine the specifications of the equipment;
- The deadline for requesting Systems to initiate purchase is October 31st;
- FRDA acquisitions must be accompanied by justification giving the cost/benefit result of the acquisition.

STOB 25 (Processing costs)
- Current-year needs will have been identified the previous fall as part of the planning process;
- The managers will receive monthly billings for distribution to users;
- It is the responsibility of the user to ensure that the computing budget will be sufficient for the entire fiscal year.

OPERATIONAL SERVICES

Librarian Transfer
- Written or verbal request to Systems Admin. Clerk (1-week turnaround)

Keypunch
- Documents and Multiple Card Layout (MCL) to Systems Administration Clerk (average turnaround 3 weeks; more during peak periods in late Summer and Fall)

Record Sheets
- Module ID and sample output to Systems Analyst (1-month turnaround).

Data up/down loads - mainframe/diskette
- Written or verbal request to the Systems Administration Clerk (same day to 2 weeks depending on volume).

New BCSC PINS or USERID Access Changes
- Written or verbal requests to the Systems Administration Clerk (2-week turnaround for new PIN; 1-week for USERID access change).

Requests for manuals (Wylbur, Laser)
- Written or verbal request to Systems Administration Clerk (1-week turnaround).

BCSC PIN Resetting (Forgotten passwords, RACF user access revoked)
- Written or verbal request to Jerry Groneberg, ISB (Information Systems Branch).

SOFTWARE STANDARDIZATION

The MS DOS software industry is volatile, with constant introduction of new products. In this environment, standardization of tools is difficult, but still necessary. Listed below is recommended software for the major functions of interest to researchers.

The goal is to identify a set of preferred tools for the major functions. The list will change over time. The major input for change will come from the users. It is important that staff who discover software that is particularly effective, and might be generally useful to others, let us know.

Statistics
- SAS PC - main product;
- SYSTAT - alternative when required;
  - third product needed to handle deficiencies in the first two.

Word Processing
- WORDPERFECT - full featured WP for technical and academic writing.
- PC WRITE - easy to use.
- MULTIMATE - included for historical reasons but not recommended.

Database

- WATFILE - simple, intuitive but powerful file processor.
- dBASE III Plus - mainstream full function database with application development;

Spreadsheet

- Lotus 123 - mainstream, full function for general analysis;
- WATFILE - simple, intuitive but powerful file processor;
- MULTIPLAN - included for historical reasons but not recommended.

Data editing

- Wylbur PC - full power editing with strong columnar operations;
- WATFILE - simple, intuitive but powerful file processor.

For further information, please contact:

Systems Support Section
Research Branch
Ministry of Forests
31 Bastion Square
Victoria, B.C.
V8W 3E7

Phone 387-5413
Faxcom 387-0046

RESEARCH STATIONS AND RESEARCH LABORATORY

Requests for Research Station and/or Laboratory facilities and services should be discussed with the Station or Laboratory Superintendent where the services are to be obtained and utilized. Users are encouraged to discuss their project requirements with the Superintendent so that an assessment can be made of the availability of resources required to undertake the project or study prior to their submission to the Manager, Technical Support Group and the Program Manager(s) at Headquarters.

The following list is not exhaustive but provides a framework for planning, according to specific project requirements.

- Greenhouse/lath house space
- Growth chambers
- Freezers/coolers
- Storage space - indoor/field
- Lighting requirements (supplemental dollar costs)
- Heating requirements (supplemental dollar costs)
- Project dates and duration - short term/long term
- Stock required - species, numbers, age, etc.
- Dates (start-up and termination of project)
- Numbers (i.e. samples, trees)
- Work location (field, holding beds, building, i.e., header house, lab, coolers, etc.)
- Equipment and materials
- Cooperators (various agencies involved, i.e. CLRS)
- Special requirements - greenhouse lights, growth chamber lights, heat, cooling, etc., including supplemental dollar costs
- Estimate of manpower required to complete project
- Funding arrangements.

Requests directed to a particular facility must be received by the Manager, Technical Support Group by the end of November preceding the year of intended use indicating EP and or FRDA project number.

Requests for the following season and/or fiscal year activities, which are not specific to a particular station/laboratory, must be received by the Manager, Technical Support Group, by December 15 to allow for priority rating.

The Manager, Technical Support Group, along with the Managers of Forest Renewal and Integrated Resource Management, will determine project priorities according to the overall Research Program Priority Rating System, before January 20. Projects which cannot be supported through regular space, funding, equipment or manpower availability will be:

- accepted, if space is available and manpower is supplied;
- "conditionally accepted", subject to financial/manpower support from the client; or
- abandoned.

If additional costs are incurred by the research stations or laboratories for projects incremental to the regular research program (e.g. FRDA), it may be necessary to charge those projects accordingly.

To keep the process simple, no rigid requisition format is in effect.

RESEARCH LABORATORY

(Analytical Chemistry Section)

Analytical Chemistry Laboratory services will be provided to approved projects. Non-Research Branch requests incremental to regular branch workload will either be charged for the additional costs (material and/or staff) at the averaged laboratory cost per sample, or contracted and invoiced to the originator.

Requests must provide the following information.

1. EP and/or FRDA project number
2. Number of samples requiring analysis
3. Analysis required
4. Date by which results required
5. Date samples will be ready for submission to the Analytical Chemistry Section
6. Condition of sample upon submission to laboratory (e.g. washed, dried, milled, sieved, etc.)

Program Managers will priorize the requests and notify the Laboratory Superintendent of the priority order. The analyses will be carried out in the order indicated by the priority lists, subject to batching of similar samples. Program Managers will notify clients directly when their requests are approved.

Appendix 3 provides detailed information regarding sample preparation, identification and batching.

APPENDIX 1

REQUEST FOR CLRS CONFERENCE CENTRE

Facilities Requested by: _____

Purpose of Request: _____

Dates Required: _____

Conference Room Required: (Yes) _____ (No) _____

Dates: _____

Number Expected in Group: _____

Time of Arrival: _____

Time of Departure: _____

			Dates and Numbers of Meals
# of Meals Required:	Breakfast	7:00 a.m.	_____
	Hot Lunch	12:00 a.m.	_____
	Packed Lunch		_____
	Dinner	5:00 p.m.	_____
	Morning Coffee		_____
	Afternoon Coffee		_____
	No Meals		_____

Other Services Requested:

_____

_____

_____

Name of Organizer:

_____

Address: _____

_____

Phone: _____

Signature: _____ Date: _____

PLEASE RETURN TO: Ministry of Forests
Research Branch
Cowichan Lake Research Station
P.O. Box 335
Mesachie Lake, B.C.
V0R 2N0

$50.00 deposit Enclosed Yes ___

Phone 749-6811
Faxcom 749-6020

NOTE: An overhead projector, slide projector, screens, flip charts, TV & VHS VCR are available upon request.

APPENDIX 2

The CLRS Conference Centre will continue to operate on a "first come basis" and bookings once confirmed will not be cancelled. The first week of every month is set aside for Research Branch use only, but can be utilized by other groups if Research Branch bookings have not been confirmed 2 weeks prior to the first week of every month.

To cover incurred expenses as a consequence of bookings which are cancelled, a nonrefundable deposit of $50.00 will be required with each group booking. The deposit will be credited to the group account. Catering costs can be negotiated.

The list of approved users includes:

Research Branch	n/c
Forest Service	$25/day
Other Government Ministries/Agencies	$36/day
Forestry-Related Groups	$36/day
* Other Government-related or Public Service Organizations	$36/day

* Approval to be determined by the Manager or Superintendent.

APPENDIX 3

Sampling Techniques

The laboratory is concerned with providing analyses of samples that are as representative and statistically valid as possible. This is entirely up to the collector. If there is doubt on this point, consult a biometrician or other appropriate specialist so that time and effort are not misdirected.

Sample Size

A soil sample of 500 ml volume is usually adequate for all analyses carried out. For particle size analysis of peat samples, at least two litres is required.

The amount of plant material required depends upon the type of determinations to be carried out. Listed below are the approximate weights required for the different analysis groups:

1. Macro Analysis (N, P, K, Ca, Mg) - 5 g Dry Wt
2. Macro & Micro Analysis (N, P, K, Ca, Mg, Cu, Fe, Mn, Zn) - 10 g Dry Wt
3. Boron - 3 g Dry Wt additional to any other
4. Sulfur - 2 g Dry Wt additional to any other
5. Molybdenum - 10 g Dry Wt additional to any other

"Dry Wt" means weight of sample after drying 24 hours at 80°C.

Sample Preparation

As much sample preparation as possible should be carried out by the client (depending upon the equipment available) before samples are submitted to the laboratory.

Sample preparation, the first step in analysis procedure, is labour-intensive and, as the laboratory becomes more automated, will become the rate-determining step for the number of samples that can be processed.

Procedures for Sample Preparation

Soils

Samples should be air-dried, crushed with a rolling pin and sieved through a 2-mm sieve. Retain the fraction passing the 2 mm sieve and send to the laboratory for analysis.

Plant

Plant material for macronutrient, boron and sulfur analysis should be washed, dried at 80°C for 24 hours in a forced-draft oven and ground in a Wiley mill to pass a 40-mesh screen.

(NOTE: All material put into the Wiley mill to be ground must end up in the final ground sample. That is, do not discard material in the grinding chamber that has not passed the sieve.)

For plant material requiring micronutrient analysis, please contact the Superintendent for special instructions.

Sample Containers

Soil samples should be submitted in cardboard boxes available from the laboratory upon request.

If soil boxes are not available, please note that wet soil samples should not be placed in air-tight plastic containers. They can, however, be placed in hardware-weight kraft paper bags.

Plant samples should be submitted in plastic vials, plastic bags or kraft paper bags, depending upon whether ventilation is desirable or whether pre-dried samples require maintaining in a dry condition. For dried and ground samples, plastic vials are best. Water samples should be placed in a chemically clean, leak-proof plastic container.

Sample Identification

Each sample must be clearly identified with EP and/or FRDA project number and user-supplied numbers 1 to n within batches. Batch numbers will be assigned by the laboratory as received. This becomes the number against which all laboratory operations and reporting will be documented.

When submitting large batches of samples to the laboratory, please ensure that the samples are packed in numerical order. Following this procedure will considerably reduce the time spent by laboratory personnel verifying that all samples are present in the shipment, and it will also alert the packer to any duplicated or missing samples.

Each batch of samples must be accompanied by a covering memo outlining the analysis requested. If there is not enough sample for all the required tests, please submit a list indicating the order of analysis priority.

APPENDIX 4

Welcome to the Cowichan Lake Research Station!

Please make yourself at home.

The following guidelines and information are intended to make your stay at Cowichan Lake Research Station as enjoyable as possible.

- Select any available bed unless specifically assigned by your group leader.
- Guests are requested to bring their own towels.
- Meals are served in the Dining Room (F7). Unless otherwise arranged, meal times are:

Breakfast	-	7:00 a.m.
Lunch	-	NOON
Dinner	-	5:00 p.m.

Coffee is almost always available in the Dining Room.

- If any problems are encountered with the building (e.g. furnace, water, etc.), contact the maintenance supervisor in the residence across the road from the Main Office. **PLEASE REPORT ANY DAMAGES TO THE OFFICE.**
- Messages received by the office for those staying in camp will be placed by the coffee pot at 10:00 a.m., noon, 2:00 p.m. and 4:00 p.m.
- The pay phone in the bunkhouse is available for personal calls. During office hours the phone in the Cookhouse may be used for GOVERNMENT BUSINESS ONLY. When making a government call, use Provnet lines 3 or 4. Push 8 and dial the number.
- **IN CASE OF FIRE, FIRST ENSURE THAT ALL GUESTS ARE OUT OF THE BUILDING, THEN CALL THE MESACHIE LAKE FIRE DEPARTMENT AT 749-3838.**

  AMBULANCE CAN BE REACHED AT 749-3131

  POLICE CAN BE REACHED AT 749-6668
- Fire hose and fire hydrant locations are indicated throughout the facility.
- A number of jogging trails are located on the east side of the research reserve. Jog with a friend and work up an appetite!
- Smoking is permitted in the lounge area and in the dining room. When outside, please extinguish cigarettes in the black buckets provided for this purpose.
- The Village of Cowichan Lake is located approximately 5 km southeast of the Research Station. A pharmacy and various shops are available.
- Arrangements can be made in advance to use the VHS format VCR equipment. Video movies may be rented in Cowichan Lake.
- If there are any questions about the Forestry Research operation, please inquire at the main office, where our staff will be happy to answer your questions.

Thank you for taking care while staying at Cowichan Lake Research Station camp. If you have any suggestions for improvement, please let us know.