

Soil Management Handbook

for Vancouver Island

DRAFT –
(Incomplete – use with caution)

Accompanies the Soil Management Group series
of maps for Southern Vancouver Island

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PREFACE

The Soil Management Handbook for the East Coast of Vancouver Island has been prepared to facilitate the use of soil inventory maps and reports. The Handbook provides information on the types of crops suited to the soils of Vancouver Island and the management inputs required to grow these crops. If more detail or site specific information is required on soil management, contact an office of the B.C. Ministry of Agriculture, Fisheries and Food.

It should be noted that the authors of this document are specialists in soil classification, interpretation and soil management. However, general comments have been made in this publication on production economics, crop suitability and crop production. These are not intended to be expert comments, but are to provide the reader with a general understanding of the suitability of various soils for production of various climatically adapted crops. For definitive information on economics of producing, or marketing a specific crop, or on producing a specific crop, an expert in the appropriate field of agrology should be contacted.

TABLE OF CONTENTS

Acknowledgement
Preface
Table of Contents
List of Soil Series
List of Soil Management Groups and Soil Which Comprise Each Group
List of Figures
List of Tables
Introduction
Use of the Handbook
Management Inputs, Crops and Soil Management Groups
Beddis
Brigantine
Cassidy
Chemainus
Comiaken
Corydon
Cowichan
Crofton
Dougan
Fairbridge
Fanny Bay
Hillbank
Kaptara
Metchosin
Mexicana
Parksville
Qualicum
Royston
Rumsley
Shawnigan

LIST OF SOIL SERIES

LIST OF SOIL MANAGEMENT GROUPS AND SOILS WHICH COMPRISE EACH GROUP

INTRODUCTION

There are a large number of soil series or phases of soil series on the east coast of Vancouver Island. Some of the characteristics which distinguish one soil from another must be considered if agricultural crops are to be grown, whereas other characteristics have little relevance to crop production. In this Handbook, soils having similar agricultural important characteristics are combined into "Soil Management Groups". Each group is comprised of soils with similar limitations to crop production and require similar types and levels of management inputs for successful crop production.

Soil characteristics which were considered agricultural important and used in forming Soil Management Groups included: soil parent material, drainage, texture, surface soil organic matter level, depth to impervious or restricting layers, stoniness, topography and salinity. For each Soil Management Group formed after consideration of the above parameters, the Handbook provides information on soil limitations for agriculture, suited crops and management inputs required to grow various crops.

USE OF THE HANDBOOK

The Handbook is to be used in conjunction with soil survey maps prepared by the Surveys and Resource Mapping Branch of the B.C. Ministry of Environment, Lands and Parks, (Soils of the Duncan - Nanaimo Area). To obtain information about the soils of a particular location, their management requirements and suited crops, the steps outlined below should be followed:

- a) Determine the soil series or soil management groups names from the appropriate maps.
- b) Locate the pages where the soil series or soil management group in question is discussed in the Handbook from the list on pages ____.
- c) Turn to the appropriate pages where information is provided on: general characteristics of the soil, dominant soil limitations for agriculture, suitability of climatically adapted crops and management inputs required to reach an acceptable level of productivity.

Phases of some soil series sometimes require management inputs that are different from those required for crop production on the main soil series. Refer to the "Soil Series" section under each management group to determine whether another management group should be referred to for a discussion of management inputs and suited crops. In addition, the Dougan and Fanny Bay Soil Management Groups consists mainly of gravelly phases of various soil series.

MANAGEMENT INPUTS, CROPS AND SOIL MANAGEMENT GROUPS

The climate (heat units, sunshine, precipitation, freeze-free period) of an area or region is the ultimate limit to the range of crops which are suitable for production and to the yield of each crop. Given a sufficient and appropriate level of management inputs, virtually all climatically suited crops can be produced on all soils within a climatic region with only minor differences in yield. For example, in a class 1 climatic region, most C.L.I. class 1 to 6 lands can be improved through management such that all crops can be grown with similar yield potentials. Droughty land can be irrigated; wet lands drained; acid soils limed; sloping lands can be terraced, levelled or managed using appropriate conservation measures; stones can be removed from stony land; flooded lands protected by dykes; infertile soils fertilized; and so on.

However, it is recognized that some soils are better suited to production of a particular crop than are other soils. On the well suited soils, management inputs required to reach an acceptable level of productivity will be less than for soil less well suited to the crop in question. To produce some crops on some soils, the level of management inputs required may not be justified or feasible using current technology and/or under current economic and market conditions.

In the section on "Soil Management Groups", the climatically adapted crop have been placed into one of three groups depending on the level of management required to achieve an acceptable level of production.

These are as follows:

WELL SUITED CROPS: a low to moderate level of management inputs are required to achieve an acceptable level of production.

SUITED CROPS: a moderate to high level of management inputs are required to achieve an acceptable level of production.

UNSUITED CROPS: crops that are not suited to the particular soil management group.

It is recognized that some crops require more intensive management in terms of labour, tillage, soil conservation, crop production, post harvest handling, etc., to achieve acceptable yield than do other crops grown on the same soil. The terms low, moderate and high level of inputs refer to the level of management required to produce a particular crop. That is, a low or moderate level of management inputs for a perennial forage crop on a wet site may be quite different from a low or moderate level for tree fruits. For example, to produce tree fruits, a high management input requirement indicates that it is more costly and difficult to achieve acceptable yields than where a low level of management inputs are required.

Following are some general considerations used to group crops according to their suitability for production within a particular soil management group.

WELL SUITED CROPS

All necessary management inputs can be made by the individual producer.

An exceptional level of management expertise for the crop in question is not required.

Technological inputs are low to moderate.

There are no unusual annual costs which reduce the feasibility for production of the crop under consideration.

SUITED CROPS

A moderate to high level of producer expertise is required. Improperly managed land could be seriously damaged; timeliness of cultivation, fertilization and other field operations are crucial to achieving acceptable crop growth.

Technological inputs are moderate to high. For example, drainage, organic matter incorporation, dyking, subsoiling, conservation practices to reduce erosion and/or other inputs are required before acceptable yields can be sustained.

Land development costs (i.e., stone picking or land levelling) may be moderate to high.

Economic inputs for land development and/or annual production may be moderate to high.

Risk of crop failure or costs to reduce risk may be moderate to high.

UNSUITED CROPS

Crops placed in this category are considered to be not suitable for production on the soil management groups in question. It is, however, not to be concluded that a crop can not be grown on a particular soils. With a sufficient and appropriate level of management inputs, most crops can be grown on most soils. However, long-term commercial production of unsuited crops should be on soils that are well suited or suited to these crops. Some general considerations for considering crops to be unsuited are as follows:

risk of crop failure is high and the costs to reduce the risk to an acceptable level are high.

Level of management inputs required to achieve acceptable yields are probably not justifiable in terms of current economic and market conditions.

An exceptional level of management expertise is required.

MANAGEMENT INPUTS

Cover Cropping:

Cover cropping is needed for wind and water erosion control and to aid soil drainage by maintaining a porous soil surface.

Crop Rotation:

Crop rotation is required to modify cultivation practices, to reduce pest pressure and to enhance the organic matter content of the soil.

Erosion control Practices:

Practices employed to halt mass wasting, to reduce overland flow and/or sloughing, to reduce rainfall impact and wind erosion by cover cropping and to reduce wind velocities, includes: underdrains, blind surface inlets, cover crops and wind breaks.

Irrigation System:

A system is required to supply supplemental water during periods of moisture deficit.

Lime and/or Fertilizer Application:

Soil amendments required to neutralize soil acidity and for nutrient enhancement. Timing of lime or fertilizer application is important to ensure efficient use and to minimize pollution hazard.

Organic Matter Incorporation:

The use of manures, cover crops and other organic inputs to improve soil structure and fertility and to reduce erosion.

Stone Removal:

Stone removal is required for seedbed enhancement and to prevent machinery damage.

BEDDIS SOIL MANAGEMENT GROUP

Soil Series:

Beddis and Deerholme

Variants:

'id' - Imperfectly drained. Refer to Brigantine Soil Management Group.

's' - Shallow soils comprised of 50 to 100 cm over another parent material or strongly contrasting texture.

'g' - Contain 20 to 35% coarse fragments in the surface 25 cm. Most of this is fine gravel which has little effect on the management of these soils.

'a' - Dark colour and high % organic matter in surface horizons.

General Characteristics:

- loamy sand to sandy loam material
- moderately well to rapidly drained
- stone free with some gravelly areas
- low nutrient and water-holding capacity
- Deerholme soil and 's' variant of Beddis soil are shallow soils

Dominant Soil Limitations:

Low nutrient and water-holding capacity.

Some restriction of water movement in Deerholme and 's' variant of Beddis due to finer textured subsoil.

Well Suited Crops:

none

Suited Crops:

All climatically adapted crops.

Management Inputs:

Irrigation System:

Lime and/or fertilizer application:

Soil conservation management:

Unsuited Crops:

None

CROPS OR CROP GROUPS

BRIGANTINE SOIL MANAGEMENT GROUP

Soil Series:

Baynes, Bowser and Brigantine

Variants:

'g' - Contain 20 to 35% coarse fragments in the surface 25 cm. Most of this is fine gravel which has little effect on the management of these soils.

'md' - Moderately well to well drained. Refer to Beddis Soil Management Group.

General Characteristics:

- loamy sand to sandy loam material
- imperfectly drained due to perched watertable overlying silt loam marine deposits
- stone free with some gravelly areas
- low nutrient and water-holding capacity

Dominant Soil Limitations:

Low water and nutrient-holding capacity.

Some excess wetness for some crops.

Well Suited Crops:

None

Suited Crops:

All climatically adapted crops except those listed under Unsited Crops.

Management Inputs:

Irrigation System:

Water Management System: Drainage system for water sensitive crops such as raspberries and tree fruits.

Lime and/or fertilizer application:

Soil conservation management: Practices where slopes exceed 5%.

Unsited Crops:

Alfalfa and some water sensitive tree fruits.

Reasons:

Excess water, even after installation of a drainage system, will result in some winter injury of these crops.

CASSIDY SOIL MANAGEMENT GROUP

Soil Series:

Cassidy

Variants:

'co' - Greater than 20% cobbles and stones

'lo' - Loam texture in the upper 50 cm

'g' - 20 to 50% coarse fragments in the surface 25 cm

General Characteristics:

- Very gravelly, coarse fragment content > 50 % of the soil volume.
- Rapidly drained.
- Loamy sand to sand texture.
- Intermittent high watertables and some flooding due to periodic high water levels in adjacent creeks and rivers.
- Very low nutrient and water-holding capacity.

Dominant Soil Limitations:

Low nutrient and water-holding capacities.

Quantity and variability of gravels, cobbles and stones.

Intermittent high watertable.

Well Suited Crops:

None

Suited Crops:

Most forage crops (except water sensitive crops) are suited where coarse fragment content is < 60% of the soil volume and cobbles and stones are < 30% of the soil volume.

Management Inputs:

Stone Removal: Some surface stone removal is required.

Water Management System: Dyking is needed to prevent stream overflow.

Irrigation System:

Lime and/or Fertilizer Application: Careful fertilizer practices.

Unsuited Crops:

All climatically adapted crops except those indicated under Suited Crops. In addition, where coarse fragment content > 60% of the soil volume or cobbles and stones > 30%, the soil is not suitable for arable agriculture.

Reasons:

Stone content and low water-holding capacity of the soil. Intermittent high watertable. Erosion of banks during freshet period.

CHEMAINUS SOIL MANAGEMENT GROUP

Soil Series:

Chemainus and Flewett

Variants:

'g' - Contain 20 to 50% coarse fragments in the surface 25 cm. Refer to the Dougan Soil Management Group.

'id' - Imperfectly drained.

's' - Underlain by another parent material or strongly contrasting texture at a depth of 50 to 100 cm.

General Characteristics:

- Stone free.
- Fine sandy loam to silt loam floodplain deposits.
- Moderately well to well drained.
- High nutrient and water-holding capacity.

Dominant Soil Limitations:

On modal Chemainus and Flewett soils, there are no significant limitations to agriculture.

On 'id' variants, some excess wetness may limit growth of some water sensitive crops.

On 's' variants, there are slight limitations to root and water penetration due to restricting subsoils occurring between 50 to 100 cm from the surface.

Well Suited Crops:

All climatically suited crops on non-variant soils.

Management Inputs:

Irrigation System: To overcome climatic moisture deficit, irrigation is required to maximize production of some crops in some years.

Erosion Control Practices: On shallow soils ('s' variants) soil conservation management practices should be used to prevent any soil loss due to erosion.

Water Management System: Some Chemainus soils require dyking for flood protection.

Suited Crops:

On 'id' variants only: alfalfa, raspberries and tree fruits.

Management Inputs:

Water Management System: Water control to prevent excess wetness and winter injury.

Unsuited Crops:

None

COMIAKEN SOIL MANAGEMENT GROUP

Soil Series:

Comiaken

Variants:

'id' - Imperfectly drained.

's' - Shallow soils comprised of 50 to 100 cm over gravelly parent material.

General Characteristics:

- Loamy sand to sand material.

- Well to rapidly drained.

Stone free, some gravelly areas with depth to gravels variable.

- Low nutrient and water-holding capacity.

- Ground watertable at or above the surface during high runoff periods.

- Annual flooding in undyked areas.

- Associated with the Chenainus Soil Management Group, but nearer to active stream channels.

Dominant Soil Limitations:

Low nutrient and water-holding capacity.

Intermittent high watertables during high runoff periods.

Well Suited Crops:

None

Suited Crops:

All climatically adapted crops.

Management Inputs:

Irrigation System:

Water Management System: Dyking is required to prevent inundation.

Erosion Control Practices: Channel bank protection to prevent erosion.

Unsuited Crops:

Alfalfa and some other sensitive tree fruits

Reasons:

Intermittent excess water levels, even after installation of dykes, will result in some winter injury to these crops.

CORYDON SOIL MANAGEMENT GROUP

Soil Series:

Corydon

General Characteristics:

- Silt loam to fine sandy loam deltaic deposits.
- Poorly drained.
- Variable depth to gravelly subsoil.
- Moderately to strongly saline.
- Stone free.
- Moderately high nutrient and water-holding capacity.

Dominant Soil Limitations:

Poor drainage.

Salinity due to tidal water entering the root zone through subsurface sand and gravel layers.

Crop Groups and Management Inputs:

Due to poor drainage and sea water intrusion, corydon soils are suited only to some water and salt tolerant forage species. A major regional dyking, drainage, pumping and irrigation system is required to improve the soils sufficiently to allow production of a range of crops. With such improvements, the soils are suitable for production of all climatically adapted crops except water sensitive perennial crops.

COWICHAN SOIL MANAGEMENT GROUP

Soil Series:

Cowichan and Tolmie

Variants:

'g' - Coarse fragments occupy 20 to 30% of the volume of the surface 25 cm.

'p' - Capped by <40 cm of humic or mesic organic material.

's' - Underlain at a depth of 50 to 100 cm by another parent material or a strongly contrasting texture.

General Characteristics:

- Silt loam to silty clay loam marine deposits. Tolmie soil is capped by <30 cm of sandy loam or loamy sand material.

- Poorly drained.

- High water and nutrient-holding capacity.

- Stone free.

Dominant Soil Limitations:

Poor drainage.

Clay content.

Dense subsoil

Well Suited Crops:

None

Suited Crops:

Beans, blueberries, cereals, cole crops, corn leaf vegetables, most forage crops and peas.

Management Inputs:

Water Management System: Drainage system with relatively close drain spacing.

Subsoiling:

Tillage Practices: Careful cultivation practices. There is a narrow soil moisture range at which these soils can be worked into a good seedbed and at the same time minimize compaction.

Stone Removal: Stone removal on 'g' variants.

Unsuited Crops:

Alfalfa, raspberries, most root crops, strawberries, and tree fruits.

Reasons:

Poor drainage, clay content and dense subsoil is difficult to overcome sufficiently to produce these crops.

CROFTON SOIL MANAGEMENT GROUP

Soil Series:

Crofton

Variants:

'p' - Capped by < 40 cm of humic or mesic organic material.

's' - Underlain at a depth of 50 to 100 cm by another parent material of a strong contrasting texture.

'g' - Contains 20 to 35% coarse fragments in the surface 25 cm. Most of this is fine gravel which has little affect on the management of these soils.

General Characteristics:

- Silt loam to fine sandy loam fluvial deposits.
- Poorly drained.
- Stone free.
- Moderately high nutrient and water-holding capacity.
- Some of the soils are subject to flooding and stream bank erosion.

Dominant Soil Limitations:

Poor drainage.

Well Suited Crops:

None

Suited Crops:

Beans, blueberries, cereals, cole crops, corn, leaf vegetables, most forage crops, peas and toot crops.

Management Inputs:

Water Management System: Drainage system with pumping where required.

Irrigation System:

Erosion control Practices: Some dyking to prevent inundation and stream bank erosion.

Unsuited Crops:

Alfalfa, raspberries, strawberries and tree fruits.

Reasons:

Excess wetness is difficult to alleviate sufficiently to grow these crops.

DOUGAN SOIL MANAGEMENT GROUP

Soil Series:

Chemainus - gravelly phase

Dougan

Fairbridge - gravelly phase

Flewett - gravelly phase

Hillbank - gravelly phase

Mill Bay - gravelly phase

General Characteristics:

- Silt loam marine deposits and minor fluvial deposits.
 - Imperfect to moderately well drained (variable drainage on sloping lands).
 - Coarse fragment content 230 to 35%; mostly gravel and minor cobbles.
 - Moderate to high water and nutrient-holding capacity.
 - Slopes 5 to 15%, subject to erosion.
- No stones at depth.

Dominant Soil Limitations:

Surface coarse fragments.

Erosion prone on slopes greater than 5%.

Some excess water.

Well Suited Crops:

Beans, cereals, cole crops, leaf vegetables, most forage crops and peas.

Management Inputs:

Tillage Practices: Soils are subject to compaction and structural degradation. Tillage operations must be undertaken only when soils are workable.

Erosion Control Practices: Soil erosion practices are required if slopes are over 5%.

Stone Removal: Stone removal on some soils.

Suited Crops:

Blueberries, raspberries, root crops, strawberries and tree fruits.

Management Inputs:

Water Management System: Drainage where excess wetness results in winter injury of water sensitive crops.

Stone Removal: Cobble removal for root crops.

Soil Conservation Management Practices

Unsuited Crops:

Alfalfa on Dougan, Fairbridge and Mill Bay soils.

Reasons:

Excess wetness, even after drainage, will result in winter injury.

FAIRBRIDGE SOIL MANAGEMENT GROUP

Soil Series:

Fairbridge, Kulleet and Mill Bay

Variants:

'g' - Contain 20 to 50% coarse fragments in the surface 25 cm. Refer to dougan Soil Management Group.

'w' - Seasonal perched watertable.

'wc' - Contains weakly cemented soil horizons.

'l' - Shallow soils, 50 to 100 cm, over bedrock.

'g' and 'pd' - Gravelly and poorly drained soil. refer to Cowichan Soil Management Group.

General Characteristics:

- silt loam marine deposits, Kulleet and Mill Bay soils consist of 50 to 100 cm of silt loam material over coarse-textured subsoil.
- Imperfectly drained, intermittent perched watertable.
- Stone free.
- Level to 15% slopes.
- High water and nutrient-holding capacity.

Dominant Soil Limitations:

Excess water for some crops.

Marine parent material which is subject to structural degradation if managed improperly.

Well Suited Crops:

Beans, cereals, cole crops, corn, leaf vegetables, most forage crops, peas and root crops.

Management Inputs:

Tillage Practices: Soils are subject to compaction and structural degradation. Tillage operations must be undertaken only when soils are workable.

Erosion Control Practices: Soil erosion control practices are required if slopes are over 5%.

Suited Crops:

Blueberries, raspberries, strawberries and tree fruits.

Management Inputs:

Water Management System: A water control system, with ditches and underdrains, is required to ensure long term productivity of these crops. Due to imperfect drainage, an on-site soil and drainage assessment should be made before planting perennial crops.

Soil Conservation Management Practices:

Unsuited Crops:

Alfalfa

Reasons:

Winter injury is probable during some years due to excess wetness.

NOTE: On 'w' variants, all crops listed under Suited Crops should be moved to Unsuited Crops. The excess wetness problem in these soils is too great to consider growing these crops.

FANNY BAY SOIL MANAGEMENT GROUP

Soil Series:

Dashwood - gravelly phase
Qualicum - gravelly phase
Quennell - gravelly phase

General Characteristics:

- Loamy sand texture
- Gravelly, coarse fragment content in 20 to 50% of the soil volume. Predominantly coarse and fine gravel.
- Low nutrient and water-holding capacity.

Dominant Soil Limitations:

Low nutrient and water-holding capacity.
Coarse fragments.

Well Suited Crops:

None

Suited Crops:

All climatically adapted crops except root crops.

Management Inputs:

Irrigation System:

Lime and/or Fertilizer Application: Careful fertilizer practices.

Stone Removal: Coarse gravel and cobble removal (much less of a problem than with the Mexican Soil management Group).

Unsuited Crops:

Root crops

Reasons:

coarse fragments will hinder uniform root development and machine harvesting.

HILLBANK SOIL MANAGEMENT GROUP

Soil Series:

Hillbank and Maple Bay

Variants:

'g' - Contains 20 to 50% coarse fragments in the surface 25 cm. Refer to Dougan Soil Management Group.

'l' - A small amount of Hillbank soil has bedrock occurring at a depth of 50 to 100 cm.

'sl' - Some Maple Bay soil are very shallow, <50 cm, over bedrock. Refer to The Rumsley Soil Management Group.

General Characteristics:

- Silt loam marine deposits.
- Moderately well to well drained.
- High water and nutrient-holding capacity.

Dominant Soil Limitations:

Erosion problem on sloping land.

Marine parent material is subject to structural degradation if managed improperly.

Well Suited Crops:

All climatically adapted crops.

Management Inputs:

Tillage Practices: Soils are subject to compaction and structural degradation. Tillage operations must be undertaken only when soils are workable.

Erosion Control Practices: Soil erosion control practices are required if slopes are over 5%.

Suited Crops:

Same as Well Suited Crops.

Unsuited Crops:

Same as Well Suited Crops.

KAPTARA SOIL MANAGEMENT GROUP

Soil Series:

Kaptara and Koksilah

Variants:

'g' - Contains 20 to 50% coarse fragments in the surface 25 cm.

'p' - Capped by <40 cm of humic or mesic organic material.

General Characteristics:

- Very gravelly, coarse fragment content >50% of soil volume.

Dominant Soil Limitations:

Low nutrient and water-holding capacity.

Quality and variability of coarse fragments.

Stoniness.

Excess wetness.

Well Suited Crops:

None

Suited Crops:

Where coarse fragment content is less than 60% of the soil volume and cobbles and stones are <30% of the soil volume, the soil is suitable for production of some water tolerant forage crops.

Management Inputs:

Stone Removal: Removal of stones from the surface of the soil is required.

Water Management System: Interceptor ditches to remove some of the excess water.

Lime and/or Fertilizer Applications: Careful fertilizer practices.

Unsuited Crops:

All climatically adapted crops except those indicated under Unsuitable Crops. In addition, where coarse fragment content is >60% of cobbles and stones occupy >30% of the soil volume, the soil is not suitable for arable agriculture.

Reasons:

Combination of high coarse fragment content and excess wetness make these soils of very limited value for agriculture. Polygon sizes are small.

METCHOSIN SOIL MANAGEMENT GROUP

Soil Series:

Arrowsmith and Metchosin

Variants:

'so' - These soils have less than 160 cm of organic material over mineral material.

't' - The soil contains more than 25 cm of other types of organic material (i.e., Arrowsmith soils with more than 25 cm of humic organic material).

General Characteristics:

- Partially to well decomposed organic material.
- Poorly to very poorly drained.
- High water and nutrient-holding capacity.
- Subject to subsidence when drained and cultivated.

Dominant Soil Limitations:

Poorly drained soil.

Natural infertility and acidity.

Low bulk density.

Well Suited Crops:

None

Suited Crops:

Beans, blueberries, cereals, cole crops, corn, leaf vegetables, most forage crops, peas and root vegetables.

Management Inputs:

Water Management System: Drainage as some of these soils are located in depressional areas without natural drainage outlets. Pumping and/or excavation may be required to provide an outlet.

Liming and/or Fertilizer Applications: Appropriate fertilization and liming practices are required. These soils are often copper deficient.

Unsuited Crops:

Alfalfa, raspberries, strawberries and tree fruits.

Reasons:

Excess wetness will result in winter injury.

MEXICANA SOIL MANAGEMENT GROUP

Soil Series:

Galiano, Mexicana and Saturna

Variants:

- 'sl' - Very shallow soils (< 50 cm) over bedrock. Refer to Rumsley Soil Management Group.
- 'r' - Contains > 50% rubbly or blocky material. Refer to Rumsley Soil Management Group.
- 'vg' - Contains > 50% coarse fragments. Refer to Rumsley soil Management Group.
- 'id' - Soils are imperfectly drained.

General Characteristics:

- Gravelly, coarse fragment content in 20 to 50% of the soil volume.
 - moderately well to well drained.
 - Sandy loam to loam.
- low water and nutrient-holding capacity.
- 50 to 100 cm to bedrock for Galiano and Saturna soils.

Dominant Soil Limitations:

Low nutrient and water-holding capacity due to high coarse fragment content.
Coarse fragment material.
Irregular topography.

Well Suited Crops:

None

Suited Crops:

All climatically adapted crops except those listed under Unsited Crops.

Management Inputs:

Irrigation System:

Liming and/or Fertilizer Applications: Careful fertilizer practices must be carried out on these soil.

Stone Removal: Stone removal is required where coarse fragments are greater than 2.5 cm in size. This is a significant, on-going limitation.

Unsited Crops:

Root crops.

Reasons:

Coarse fragments will hinder uniform root development and machine harvesting.

NOTE: Where coarse fragment content is high (> 50% of the soils volume) and topography is greater than 20%, soils are not suited to production of annual crops.

PARKSVILLE SOIL MANAGEMENT GROUP

Soil Series:

Denman Island and Parksville

Variants:

'g' - Contain 20 to 50% coarse fragments in the surface 25 cm.

'p' - Capped by < 40 cm of humic or mesic organic material.

General Characteristics:

- Loamy sand to sandy loam material at least 30 cm in depth over silt loam or silty clay loam marine deposits.
- Poorly drained; perched watertable in the fall, winter and early spring.
- Stone free.
- Low water and nutrient-holding capacity.

Dominant Soil Limitations:

Poor drainage.

Low water and nutrient-holding capacity.

Well Suited Crops:

None

Suited Crops:

All climatically adapted crops except those listed under Unsited Crops.

management Inputs:

Water Management System: To remove excess water in the fall, winter and spring.

Irrigation System: To supply supplemental irrigation during the growing season.

Liming and/or Fertilizer Applications: Careful practices.

Unsited Crops:

Alfalfa, raspberries and tree fruits.

Reasons:

Excess soil moisture will result in winter injury.

QUALICUM SOIL MANAGEMENT GROUP

Soil Series:

Dashwood, Hollings, Quennell and Qualicum

Variants:

'co' - Contains greater than 20% cobbles and stones in the surface 25 cm.

'g' - contains 20 to 50% coarse fragments in the surface 25 cm. Refer to Fanny Bay Soil Management Group.

'lo' - Capped by less than 50 cm of loamy textured material. Refer to Mexicana Soil Management Group.

'mc' - Contains moderately to strongly cemented soil horizons.

'id' - Imperfectly drained.

General Characteristics:

- Very gravelly, coarse fragment content > 50% of the soil volume.
- Rapidly drained.
- Very low nutrient and water-holding capacity.

Dominant Soil Limitations:

low nutrient and water-holding capacity.

Quality and variability of coarse fragments.

Cobbles and stones.

Well Suited Crops:

None

Suited Crops:

Where coarse fragment content is < 60% of the soil volume and cobbles and stones are less than 30% of the soil volume, the soil is suitable for production of: blueberries, forage crops, raspberries and tree fruits.

Management Inputs:

Stone Removal: Stone removal from the surface is required.

Irrigation System: Trickle or solid set on fruit crops.

Liming and/or Fertilizer Applications: Careful fertilizer practices are required.

Unsuited Crops:

All climatically adapted crops except those indicated under Suited Crops. In addition, where coarse fragment content > 60% of the soil volume or cobbles and stones are > 39%, the soil is not suitable for arable agriculture.

Reasons:

Stone content and low water-holding capacity.

ROYSTON SOIL MANAGEMENT GROUP

Soil Series:

Royston

Variants:

'mc' - Contains moderately to strongly cemented subsurface horizons which limit water movement and root penetration.

'co' - Contains >20% cobbles and stones in the surface 25 cm. Refer to Shawnigan Soil Management Group.

'vg' - Contains >50% coarse fragments in the surface 25 cm. Refer to Shawnigan Soil Management Group.

General Characteristics:

- Gravelly, coarse fragment content is 20 to 50% of the soil volume.
- Imperfectly to moderately well drained.
- Matric texture, silt loam to silty clay loam.

Dominant Soil Limitations:

coarse fragment content.

Some excess wetness during late fall, winter and early spring.

Clay content of the soil matrix is sufficient to require careful management to avoid compaction and structural degradation.

Well Suited Crops:

None

Suited Crops:

Blueberries, cereals, corn and most forage crops. Where simple slopes are less than 10%, the soil is also suited to beans, cole crops, leaf vegetables and peas.

Management Inputs:

Stone Removal: Stones are an on-going limitation requiring extensive removal on a regular basis.

Irrigation System:

Conservation management practices where slopes are >5%.

Water Management System: Some excess water control may be required in some locations.

Unsuited Crops:

Alfalfa, raspberries, root crops, strawberries and tree fruits. Where slopes are greater than 10%, beans, cole crops, leaf vegetables and peas.

Reasons:

Stones make root crop production difficult. Excess wetness will injure water sensitive plants. slopes greater than 10% are very erosion prone when annually cultivated for vegetable production.

RUMSLEY SOIL MANAGEMENT GROUP

Soil Series:

Bellhouse, Rumsley and Salalakim

Variants:

- 'co' - Contains >20% cobbles and stones in the surface 25 cm.
- 'r' - Contains >50% rubbly or blocky material.
- 'sl' - Are very shallow soils (50 cm) over bedrock.
- 'g' - Contains 20 to 50% coarse fragments in the surface 25 cm.
- 'sl' and 'r' - Contains >50% rubbly or blocky material and are very shallow (<50 cm) over bedrock.

General Characteristics:

- Very gravelly, coarse fragment content >50% of the soil volume.
- Well to rapidly drained.
- 50 to 100 cm to bedrock; Bellhouse soil <50 cm to bedrock.
- Loamy sand to loam.
- Low water and nutrient-holding capacity.

Dominant Soil Limitations:

Coarse fragments.

Low nutrient and water-holding capacity.

Shallow soils.

Quantity and variability of coarse fragments.

'r' and 'sl' variants are sufficiently shallow and/or rubbly to have a very low or no capability for agriculture.

Well Suited Crops:

None

Suited Crops:

Where coarse fragment content <60% of the soil volume and cobbles and are <30% of the soil volume and the depth to bedrock is >25 cm, the soil is suitable for the production of: blueberries, forage crops, raspberries and tree fruits.

Management Inputs:

Stone Removal: Stone removal fro the surface.

Irrigation System: A system that allows for frequent applications of small quantities of water.

Liming and/or Fertilizer Applications: Careful fertilizer practices.

Erosion Control Practices: Care to prevent soil erosion due to shallow soil overlying bedrock.

Unsuited Crops:

All climatically adapted crops except those indicated under Suited Crops. In addition, where coarse fragment content >60% of the soil volume or cobbles and stones >30%, or where soil is <25 cm over bedrock, the soil is not suitable for arable agriculture.

SHAWNIGAN SOIL MANAGEMENT GROUP

Soil Series:

Quinsam and Shawnigan

Variants:

'co' - Contains greater than 20% cobbles and stones in the surface 25 cm.

'g' - Have coarse fragment content of 20 to 50%. Refer to Mexicana Soil Management Group.

'lo' - Capped by less than 50 cm of loamy textured material. Refer to Mexicana soil Management Group.

'id' - Imperfectly drained.

'wc' - Have weekly cemented horizons.

General Characteristics:

- Very gravelly, coarse fragment content > 50% of the soil volume.
- Moderately well to well drained.
- Strongly cemented horizons resulting in a perched watertable during periods of heavy precipitation.

Dominant Soil Limitations:

Low nutrient and water-holding capacity.

Quantity and variability of coarse fragment content.

Cobbles and stones.

Cemented layers within 100 cm of the soil surface.

Well Suited Crops:

None