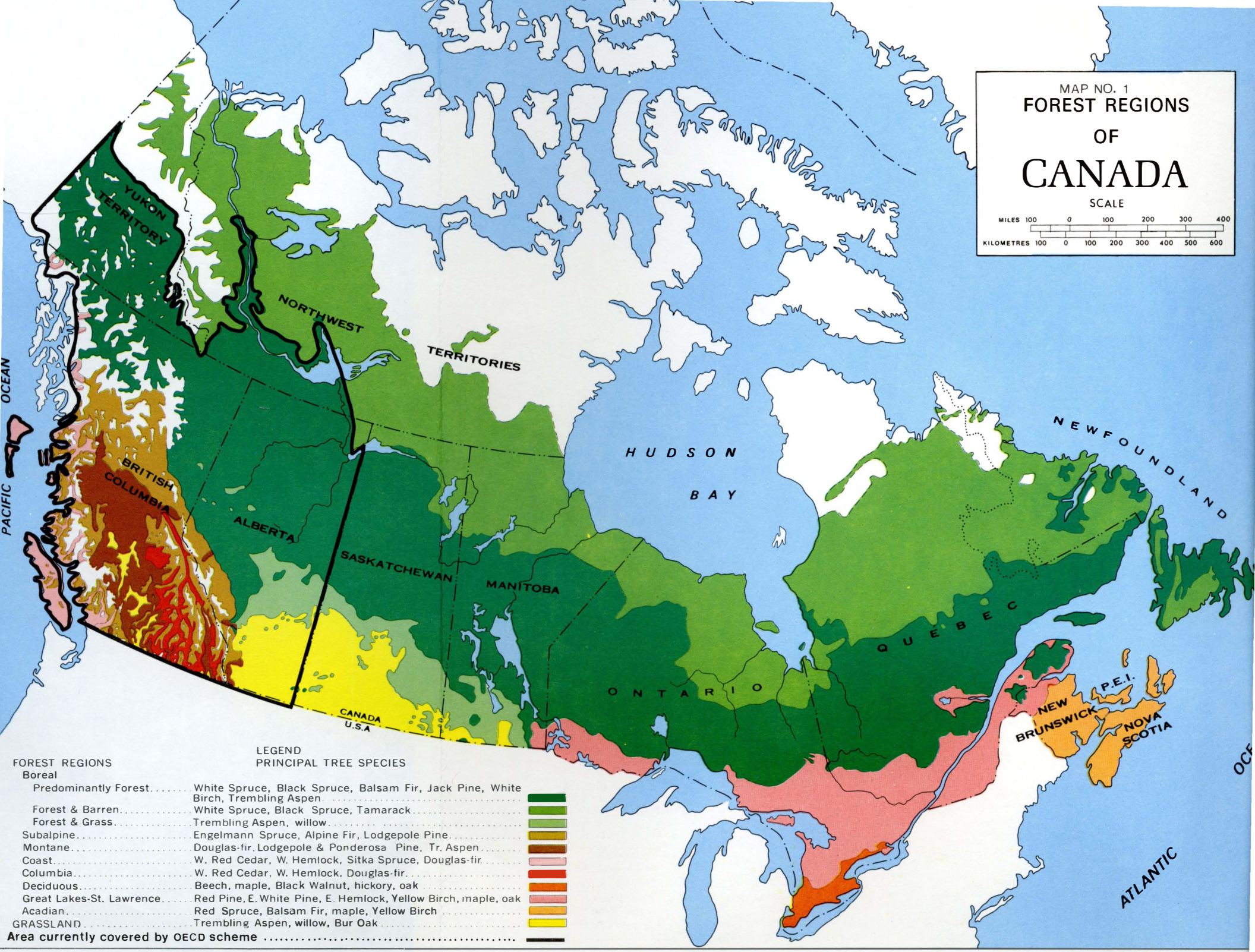
Fisheries and Environment Canada
Forestry Service

Pêches et Environnement Canada
Service des Forêts

Certification of Source-identified Canadian Tree Seed Under the O.E.C.D. Scheme

by R.F. Piesch and R.E.Stevenson


MAP NO. 1
FOREST REGIONS
OF
CANADA
SCALE
MILES 100 0 100 200 300 400
KILOMETRES 100 0 100 200 300 400 500 600
YUKON TERRITORY
NORTHWEST TERRITORIES
BRITISH COLUMBIA
ALBERTA
SASKATCHEWAN
MANITOBA
ONTARIO
QUEBEC
NEWFOUNDLAND
HUDSON BAY
NEW BRUNSWICK
P.E.I.
NOVA SCOTIA
PACIFIC OCEAN
ATLANTIC
CANADA
U.S.A
LEGEND
PRINCIPAL TREE SPECIES
FOREST REGIONS
Boreal
Predominantly Forest — White Spruce, Black Spruce, Balsam Fir, Jack Pine, White Birch, Trembling Aspen
Forest & Barren — White Spruce, Black Spruce, Tamarack
Forest & Grass — Trembling Aspen, willow
Subalpine — Engelmann Spruce, Alpine Fir, Lodgepole Pine
Montane — Douglas-fir, Lodgepole & Ponderosa Pine, Tr. Aspen
Coast — W. Red Cedar, W. Hemlock, Sitka Spruce, Douglas-fir
Columbia — W. Red Cedar, W. Hemlock, Douglas-fir
Deciduous — Beech, maple, Black Walnut, hickory, oak
Great Lakes-St. Lawrence — Red Pine, E. White Pine, E. Hemlock, Yellow Birch, maple, oak
Acadian — Red Spruce, Balsam Fir, maple, Yellow Birch
GRASSLAND — Trembling Aspen, willow, Bur Oak
Area currently covered by OECD scheme

(After Rowe 1

Certification of Source-identified Canadian Tree Seed Under the O.E.C.D. Scheme

by
R.F. Piesch
Pacific Forest Research Centre
Victoria, British Columbia

and

R.E. Stevenson
Northern Forest Research Centre
Edmonton, Alberta

Supersedes Information Reports BC-X-60 and NOR-X-4

Department of Fisheries and the Environment
Canadian Forestry Service
Forestry Technical Report 19
Ottawa, Canada
1976

Issued under the authority of the Minister
Fisheries and Environment
Canada

Catalogue No. Fo64-16/1976
ISBN 0-662-00274-1

Contract No.: KL210-7-5084
National Printers Limited

Front and back cover
Pinus ponderosa seeds x 4

CONTENTS

Cette publication est disponible en français sous le titre:
Certification des semences d'arbres du Canada identifiées à la source conformément au système de l'O.C.D.E.

INTRODUCTION

The Council of the Organization for Economic Co-operation and Development (O.E.C.D.) adopted, on May 30, 1967, a memorandum[1] that established a scheme for the control of forest reproductive material moving in international trade. That document was subsequently amended by Council Decisions [C(70) 136 Final] and [C(74) 29 (Final)] on September 29, 1970[2] and March 5, 1974[3], respectively.

The object is to encourage production and use of forest tree reproductive materials (seeds, parts of plants, plants) that have been collected, processed, raised and distributed in a manner that ensures their trueness to name.

Four categories of reproductive material are recognized and distinguished under the scheme:

(a) *Source-identified reproductive material:* which represents a minimum standard. The two requirements are that (i) the region of provenance where the material is collected and the origin of the basic material (which may be indigenous or non-indigenous) shall be defined and registered by a Designated Authority, and (ii) the material shall be collected, processed and stored, or plants raised, under the control of that Authority.

(b) *Selected reproductive material:* as for (a) above; but, in addition, the material shall be derived from basic material from selected stands and cultivars that conforms to the requirements laid down by the O.E.C.D. (See Appendix I).

(c) *Reproductive material from untested seed orchards:* as for (a) above; but, in addition, the material shall be derived from basic material from untested seed orchards that conforms to requirements laid down by the O.E.C.D. (See Appendix IB).

(d) *Tested reproductive material:* as for (a) above; but, in addition, (i) the genetic superiority of the material shall be proved by tests meeting minimum requirements prescribed by the O.E.C.D. (See Appendix II), and (ii) the results of the tests shall be registered by the Designated Authority.

Participation by any country is voluntary but subject to strict adherance to the rules.

Canada, as a member of O.E.C.D., assisted in formulating the scheme. The governments of several European countries to which it applies, including a number that import forest tree seed in commercial quantities from Canada, insisted that, as of 1970, forest reproductive materials could be imported only in compliance with the scheme. This development had serious immediate implications concerning the export business of several forest tree seed companies in British Columbia. After consulation with seed exporters, the B.C. Provincial Forest Service and the University of British Columbia, the Canadian Forestry Service (C.F.S.) made arrangements for certification of the 1970 seed crop. Subsequently, arrangements were made in 1971 for certification of tree seed from Alberta and in 1972 for certification of tree seed from the Yukon and adjacent parts of the Northwest Territories. The small map in this publication shows that part of Canada from which tree seed may be certified under the O.E.C.D. scheme at the present time. Arrangements for the certification of seed from other provinces will be made in the future as the need arises.

The Government of Canada nominated the C.F.S. as the Designated Authority to implement the scheme. The C.F.S. delegated responsibility for the operation in respect of seed collected in British Columbia and the Yukon Territory to the Director, Pacific Forest Research Centre, Victoria, B.C.; and of seed collected in Alberta and adjacent parts of the Northwest Territories to the Director, Northern Forest Research Centre, Edmonton, Alberta.

It was decided that:

(a) Until there was a demand for certification of other reproductive material, only source-identified seed would be certified.

(b) The arrangements would apply to seed intended for export, and not to that collected for domestic use.

(c) Certification would be required before the seed was exported from Canada.

(d) Participation by seed exporters would be voluntary but subject to strict adherence to rules laid down by O.E.C.D. and the requirements of the C.F.S.

(e) For the time being, the C.F.S. would bear the cost of necessary inspection and certification arrangements; subsequently, other arrangements might be made.

These provisions and arrangements will continue to apply until modified by official notification by the C.F.S.

Procedures for describing regions of provenance and origin, and rules embracing the minimum requirements of O.E.C.D., were prescribed for operation of the scheme in 1970 and were revised in 1971. They are given in the following sections in the modified form that will apply in future and until further amended.

---

[1] Anon. 1967. Decision of the Council Establishing an O.E.C.D. Scheme for the Control of Forest Reproductive Material Moving in International Trade. O.E.C.D. Mimeo, [C(67) 45 (Final)] dated 10 Nov. 1967. 20 p.

[2] Anon. 1971. O.E.C.D. Scheme for the Control of Forest Reproductive Material Moving in International Trade. Organization for Economic Co-operation and Development. Directorate for Agriculture and Food. Paris. 21 p.

[3] Anon. 1974. O.E.C.D. Scheme for the Control of Forest Reproductive Material Moving in International Trade. Organization for Economic Co-operation and Development. Directorate for Agriculture and Food. Paris. 24 p.

REGIONS OF PROVENANCE AND ORIGIN

Regions of Provenance will be described by Forest Region and Section as defined by Rowe[4], supplemented by geographic coordinates and elevation.

Forest Regions and Sections

Rowe's Forest Regions are subdivided into Sections which are geographic areas with distinctive patterns of vegetation and physiography relative to other sections.

The forest regions and sections applicable to British Columbia and the Yukon Territory are:

Boreal Forest Region	
Hay River Section	B.18b
Northern Foothills Section	B.19b
Upper Mackenzie Section	B.23a
Upper Liard Section	B.24
Stikine Plateau Section	B.25
Dawson Section	B.26a
Central Yukon Section	B.26b
Eastern Yukon Section	B.26c
Kluane Section	B.26d
Subalpine Forest Region	
East Slope Rockies Section	SA.1
Interior Subalpine Section	SA.2
Coastal Subalpine Section	SA.3
Montane Forest Region	
Ponderosa Pine and Douglas-fir Section	M.1
Central Douglas-fir Section	M.2
Northern Aspen Section	M.3
Montane Transition Section	M.4
Coast Forest Region	
Strait of Georgia Section	C.1
Southern Pacific Coast Section	C.2
Northern Pacific Coast Section	C.3
Queen Charlotte Islands Section	C.4
Columbia Forest Region	
Southern Columbia Section	CL.1
Northern Columbia Section	CL.2

The forest regions and sections applicable to Alberta and to those portions of the Northwest Territories covered by the scheme are:

Boreal Forest Region	
Aspen Grove Section	B.17
Mixedwood Section	B.18a
Hay River Section	B.18b
Lower Foothills Section	B.19a
Upper Foothills Section	B.19c
Athabasca South Section	B.22b
Upper Mackenzie Section	B.23a
Upper Liard Section	B.24
Subalpine Forest Region	
East Slope Rockies Section	SA.1
Montane Forest Region	
Douglas-fir and Lodgepole Pine Section	M.5

The boundaries of the forest sections are shown on the large map inserted in the pocket of the inside back cover.

For the purposes of this report, the boundaries are meant only to indicate general limits for the regions of provenance. In certain detailed instances, therefore, ecological conditions as described by Rowe may not correspond with forest regions and sections as mapped. Seed suppliers, with the help of C.F.S. personnel, will normally describe ecological conditions in collection areas as they actually exist. Consequently, the regions of provenance as stated on certification documents might not always correspond to the forest regions and sections as determined by geographic coordinates on the map. Requests for clarification of particular cases may be made to the C.F.S.

Rowe's bulletin lists climatic data for representative stations within the forest sections; additional information is given in Appendices III, IV and V.

Geographic Coordinates and Elevation

The forest sections are often large, and encompass a variety of environmental conditions. Additional information is needed to stratify them and thus relate seed source to possible geographic or climatic adaptation. Therefore, the location of seed source will be further described in terms of latitude, longitude and elevation.

For collection areas less than 2 miles square (3.2 km x 3.2 km)† latitude and longitude will be recorded to the nearest minute. For larger collection areas, the extremities of the ranges of latitude and longitude will also be recorded to the nearest minute.

Elevation will be recorded to the nearest 500 feet (150 m), unless the range exceeds 500 feet (150 m), in which case, the upper and lower limits of elevation will be given to the nearest 100 feet (30 m).

In no case may the range of a seed source exceed one-quarter of a degree square (30′ latitude x 30′ longitude) or 1000 feet (300 m) in elevation.

[4]Rowe, J. S. 1972. Forest Regions of Canada, Dept. of the Environment. Canadian Forestry Service. Publication No. 1300. 172 p.

†Approximate metric equivalents. A table of metric conversion factors is given in Appendix VI. At such time when metrification in the C.F.S. becomes complete, a fully metricated version of this report will be published. The limits placed on size of collection area and elevation, as stated here, will likely be revised to better fit the metric system.

Origin

The origin of seed will be identified as either:

(a) indigenous—collected from a stand of trees which has been continuously regenerated by natural regeneration, or one raised artificially from seed collected in an indigenous stand of the same region of provenance, or

(b) non-indigenous—collected from a stand which grew from seeds or plants that were introduced from outside the local region of provenance. The original place of origin is to be specified.

RULES

Rules and regulations under which the scheme was implemented in 1970, in compliance with O.E.C.D. requirements, were revised in 1971 to provide greater assurance that the seeds were collected, processed and distributed in a manner that ensures their trueness to name. Rules and regulations currently in effect are:

1.
The C.F.S., as the Designated Authority, will issue Certificates of Provenance and labels in the forms shown in Appendices VII and VIII, respectively, provided that it is satisfied as to the purity of the material, accuracy of the source information given, and the exporter's compliance with these rules. Assurance of the C.F.S. concerning these matters will be based on information provided by exporters, and inspections and audits of their operations and records. Certificates of Provenance and labels will be issued in either the English or French language, whichever is preferable to the consignee or exporter.

2.
The locations of the extraction plants and seed stores of companies processing seed for export and the mailing and telephone addresses of the persons in charge must be registered with the C.F.S.

3.
Collection must be so organized as to ensure trueness of source information. This requires that cones be picked by organized crews directly supervised at all times by a company representative. Cones not picked under continuous supervision of a representative of the company will not be certified.

4.
Cones must be collected in locations and at times designated by the company representative. The number of collection sites will be limited to enable supervision of cone collecting by the company representative at all times throughout the collection period.

5.
The number of collections that can be certified will depend on the time available for field inspection by C.F.S. inspectors. Companies should therefore indicate their intended collection sites in order of priority. The C.F.S. will then state which collection operations it can inspect.

6.
At least three weeks before collection is to begin, the C.F.S. must be given the following information:

(a) Plans for the collection of seed for export including:
   i. names, addresses and telephone numbers of company field representatives;
   ii. location of each collection site, including local or place name;
   iii. alternative locations for areas listed in "ii";
   iv. order of priority of collection sites for inspection under the scheme;
   v. species, and proposed quantity of cones to be collected, by species;
   vi. approximate starting and completion dates for cone collection for each species;
   vii. procedures to be followed by cone collection crews and supervisors to ensure trueness of source information.

(b) Arrangements for storage of cones at field depots and transportation to processing plants.

(c) Location of processing plants to be used and proposed dates of extraction, cleaning, packaging and storage of the seed.

(d) Location of the seed stores to be used.

(e) Measures that will be used to ensure the maintenance of the identity of the seed at all stages.

(f) The system of records to be used.

7.
When definite dates are determined for cone collection, the C.F.S. inspector must be advised.

8.
The C.F.S. must be notified immediately of any changes in the aforementioned plans, procedures or dates.

9.
A register must be maintained by the company to show, for each seed lot, all information required to complete the Certificate, name of company field representative, location of processing plant and seed store used, quantities of cones collected, amounts of seed extracted and stored, dates and quantities of seed shipped, and names and addresses of consignees.

10.
Company records concerning seed collection, processing, storage and shipment must be made available to the C.F.S. and its inspectors upon request.

11.
Before Certificates of Provenance and labels can be issued, the exporter must make written application to the C.F.S. in the form shown in Appendix IX. In this application, the exporter must declare that the seed is described, and that it was collected and processed, in compliance with the regions of provenance and rules that apply. Also on this form, the exporter will indicate whether the Certificate and labels are to be issued in the English or French language.

12.
The Certificate reference number will denote country and the province or territory of origin, the Certificate number serially numbered from 0001 for each province or territory, and the year of seed ripening, e.g. CDN-Alta.-0001-72. Provincial and territorial abbreviations will be: Alta., B.C., N.W.T., Y.T.

13.
When there is more than one request for certification of seed from a single source, suffix letters will be used with the Certificate reference number, e.g. CDN-Alta.-0001-72 and CDN-Alta.-0001(a)-72.

14.
A separate Certificate of Provenance will be issued for each package of seed for each seed lot.

15.
A Certificate of Provenance will not be issued once the seed has left Canada. For the purpose of certification, "seed" is defined as material of which at least 95% by weight is actual seed of the designated species.

16.
Seed intended for export must be marketed in packages to which labels issued by the C.F.S. are affixed with a seal by the supplier. Each label will show the reference number of the relevant Certificate of Provenance and a duplicate label will be placed inside the package.

17.
Once a certified seed lot has been packaged, sealed and labelled, the exporter may break the seal to enable seed to be supplied in smaller packages. However, all such actions must be recorded and the exporter must apply to the C.F.S. for amended Certificates of Provenance and labels for the smaller packages. Certificates and labels relating to such opened packages must be returned to the C.F.S. for cancellation as soon as the amended documents are received by the company.

18.
If the C.F.S. becomes aware of any infringement of the rules under which the scheme operates, or if it is of the opinion that the exporter's operation does not ensure trueness to name of the seed to be certified, it may refuse to proceed with inspection or to issue Certificates of Provenance.

19.
The operation and rules of this scheme in no way absolve participants or their agents or employees from compliance with regulations of the Governments of British Columbia, Alberta and the Yukon and Northwest Territories, or from other requirements as they pertain to forests and forest tree seed in these provinces or territories.

20.
All correspondence with the C.F.S. concerning operation of the scheme in B.C. and the Yukon will be directed to:
Director,
Pacific Forest Research Centre,
Canadian Forestry Service,
Department of Fisheries and the Environment,
506 West Burnside Road,
Victoria, British Columbia, Canada, V8Z 1M5

All correspondence with the C.F.S. concerning operation of the scheme in Alberta, and adjacent parts of the Northwest Territories will be directed to:
Director,
Northern Forest Research Centre,
Canadian Forestry Service,
Department of Fisheries and the Environment,
5320-122 Street,
Edmonton, Alberta, Canada, T6H 3S5

APPENDIX I

Minimum O.E.C.D. requirements for the approval of basic material used in the production of selected reproductive material and untested seed orchard material.

A. Selected Stands

1.
Origin: Selected stands may consist of trees that are indigenous or non-indigenous, which have the characters listed below.

2.
Isolation: Selected stands shall be situated at a sufficient distance from poor stands of the same species or from stands of a related species or variety which can form hybrids with the species in question. This requirement is particularly important when the stands surrounding indigenous stands are not indigenous.

3.
Uniformity: The stands must show a normal degree of individual variation in morphological characters.

4.
Volume Production: Volume production of wood normally is an essential criterion for the acceptance of selected stands. Volume production of wood must normally be superior to the accepted mean under similar ecological conditions.

5.
Wood Quality: The quality of wood shall be taken into account and, in some cases, may become an essential criterion.

6.
Form or Growth Habit: The trees in selected stands must show particularly good morphological features, especially straightness and circularity of stem, favorable branching habit, small size of branches and good natural pruning. In addition, the proportion of forked trees and those showing spiral grain should be low.

7.
Health and Resistance: The trees in selected stands must in general be free from attacks by damaging organisms and show resistance to the adverse climatic and site conditions in the place where they are growing.

8.
Effective Size of the Population: Selected stands must consist of one or more groups of trees well distributed and sufficiently numerous to make possible adequate inter-pollination. To avoid the unfavorable effects of inbreeding, selected stands shall consist of a sufficient number of individuals on a given area.

9.
Age and Development: Selected stands shall consist of trees of such an age, height or stage of development that the criteria given above can be clearly judged.

B. Seed Orchards

1.
The objective, design, components, isolation and location must be approved and registered with the Designated Authority. Any subsequent significant changes must also be approved and registered with the Designated Authority.

2.
The component clones or progenies shall be planted according to a plan which has been approved by the Designated Authority and established in such a way that each component can be identified.

3.
Thinnings carried out in progeny seed orchards will be described together with the selection criteria used for such thinnings.

4.
The seed orchards shall be managed and seed harvested in such a way that the objectives of the orchards are attained.

C. Cultivars

1.
Cultivars shall be identifiable by distinctive characters as prescribed in the International Code of Nomenclature for cultivated plants.

2.
The value of cultivars shall be established by experience or demonstrated by sufficiently prolonged experimentation.

3.
Single trees used for the production of clones shall be selected for their outstanding characters and special consideration should be given to the statements made under heads 4, 5, 6, 7 and 9 of Part A.

APPENDIX II

Minimum O.E.C.D. requirements for the approval of basic material intended for production of tested reproductive material.

1. Characters to be Examined

(a) Tests must be designed to assess specified characters and these must be indicated for each test.
(b) Weight is usually given to growth and resistance to pests and diseases of known economic importance. In addition, other characters, considered important in view of the economic objective sought, are considered and evaluated in relation to the ecological conditions of the region in which the test is carried out.
(c) Where the aim of the test is to assess survival under extreme ecological conditions, growth may be less important.

2. General

(a) Comparative tests set up for the approval of basic material are to be prepared, laid out, conducted and their results interpreted in such a way as to give an objective comparison, both between the material under test and with reference to one or preferably several pre-chosen standards.
(b) All care is to be taken to ensure that the reproductive material under test, including the standards, is representative of the basic material being studied.

3. Setting up the Tests

(a) Reproductive material under study is to be both raised and planted in the tests, in a replicated random layout.
(b) Each experimental unit is to contain a sufficient number of trees in order that the individual characteristics of each material under examination can be evaluated.
(c) The number of basic materials represented and the number of replicates must be sufficient to give a satisfactory degree of statistical accuracy in measurement of differences, depending on the uniformity of the test site, differences expected and so on.

4. Management of Tests

(a) Reproductive materials and standards must be treated in an identical way throughout the test. This includes treatment in the nursery, whether seeds, rooting cuttings or vegetative production of root stocks, and the establishment and management of the forest tests themselves.
(b) As concerns thinning, the method used should take account of the development of each reproductive material.

5. Procurement of Reproductive Material for Testing

(a) The basic material for testing is to be:
  (i) well defined as regards provenance, constitution, composition and isolation against foreign pollen;
  (ii) of such age and development that reasonable stability of the main features of the offspring can be expected.
(b) Sexual reproductive material for testing is to be:
  (i) harvested in years of good flowering and good fruit setting unless artificial pollination is used;
  (ii) harvested by methods that ensure that the samples obtained are representative.
(c) Vegetative reproductive material for testing is to originate from a single individual by vegetative means.

6. Standards

(a) Standards should if possible have been known over a sufficiently long period in the region in which the test is to be carried out. They represent, in principle, materials that have been shown useful for forestry at the time that the test starts and in ecological conditions for which it is proposed to certify the material. They should come as far as possible from stands or belong to cultivars selected according to the criteria in Appendix I or from basic material officially approved for production of tested material.
(b) For testing interspecific hybrids, both parent species shall, if possible, be included among the standards.
(c) Whenever possible several standards are to be used. When necessary and justified, standards may be replaced by the most suitable of the material under test or the result be presented as a comparative analysis of the relative performance of the components of the test.
(d) The same standards shall be used in all tests over as wide a range as possible.

7. Analysis of Results and Evaluation

(a) The results of the tests are to be presented in the form of numerical data. Each character is to be separately assessed.
(b) Each reproductive material is classified for each character for each environment tested. The means and the variance of the test are to be presented.
(c) The significance level of difference is to be shown. The difference in both absolute and relative terms is to be expressed as far as possible as genetic gain relative to the standard.
(d) The age of reproductive material at which the character is evaluated should be indicated.

(e) A significant superiority, both economically and statistically (95% level), as compared with the standards must be demonstrated for at least one important character. Where superiority is found for only one important character the values of at least two other important characters must at least achieve the average values of the standards for these two characters.

(f) It will be clearly reported if there are any economic characters which are significantly (95% level) inferior to those of the standards. However, it must be stated that their effects are compensated for by favorable characters.

(g) When the aim of the test is to certify reproductive material with reference to a character which is essential for survival under extreme ecological conditions, equality to the average value of the standards for the other characters is no longer required.

(h) The methodology used for the test and the detailed results obtained are to be made freely available.

(i) Records must describe the test sites, including location, climate, soil, past use, preparation, cultivations and any damage due to frost, drought, pests, diseases and so on.

(j) A statement of the suggested region of probable adaptation within the country in which the test was carried out and characteristics which might limit its usefulness must also be given.

8. Early Tests

(a) A preliminary evaluation of young trials may be the basis for conditional approval. Claims of superiority based on early test results must be re-examined at five to ten year intervals.

(b) Nursery, green house and laboratory tests are acceptable as valid early tests if it can be shown that there is a close correlation between the results shown in the early tests and subsequent stages of development of such material.

APPENDIX III

Selected Climatic Data for Forest Regions in British Columbia[1]

Forest Region and Section[2]	Station	Location			Temperature—°F[3]					Precipitation—Inches[3]			
		Lat. ° ′	Long. ° ′	Elev. ft[3] a.s.l.	Mean annual	July mean daily maximum	January mean daily minimum	Maximum annual	Minimum annual	Mean total annual	Mean rain annual	July mean rain	No. of days measurable rain
Boreal Region													
B.24	Fort Nelson	58 50	122 35	1230	30.0	73.9	−16.2	98	−61	17.13	10.36	2.56	59
B.25	Dease Lake	58 25	130 00	2678	30.3	67.5	−10.7	93	−60	15.25	8.67	2.13	66
	Telegraph Creek	57 54	131 10	600	36.2	72.2	−3.3	92	−43	12.59	8.09	1.18	67
B.26.b	Atlin	59 34	133 42	2300	32.8	63.3	2.3	87	−54	10.95	6.61	1.17	—
Subalpine Region													
SA.2	Barkerville	53 04	121 31	4180	34.7	67.6	6.4	96	−52	45.25	22.64	3.78	97
	Glacier*	51 14	117 29	4094	36.2	71.8	8.4	98	−32	57.10	20.08	2.87	95
	Hedley*	49 21	120 05	1720	45.8	82.0	16.4	106	−27	11.09	7.86	0.91	71
	Kleena Kleene	51 59	124 56	2950	35.4	72.5	−1.9	93	−58	13.57	7.62	0.90	54
	McCulloch	49 48	119 12	4100	36.4	73.4	6.0	98	−43	28.34	13.13	1.87	67
Montane Region													
M.1	Bralorne	50 47	122 49	3330	40.0	73.8	11.5	100	−33	25.86	15.66	1.17	56
	Golden*	51 18	116 58	2583	40.3	81.4	4.7	104	−51	18.45	10.36	1.24	40
	Greenwood	49 05	118 41	2490	42.5	84.5	11.5	110	−41	17.11	11.08	0.97	55
	Ashcroft R	50 43	121 20	1600	45.7	82.9	13.5	102	−35	9.47	6.27	0.63	55
	Westwold	50 28	119 45	2020	42.7	79.5	10.6	103	−50	13.75	10.13	1.11	85
M.2	Big Creek	51 44	123 02	3720	36.3	71.5	1.8	102	−53	12.63	7.73	1.25	35
M.3	Quesnel*	52 59	122 29	1600	40.7	75.6	6.3	105	−52	19.72	14.00	2.22	80
M.4	Prince George	53 53	122 41	2218	38.0	72.0	3.0	94	−58	24.67	16.71	2.53	97
	Smithers A	54 49	127 11	1718	38.1	69.7	7.3	93	−47	20.27	12.94	1.86	95
	Vanderhoof	54 03	124 08	2210	36.2	72.2	1.5	104	−61	16.89	10.17	1.49	66
	Wistaria	53 49	126 10	2865	36.7	68.1	5.5	97	−47	17.82	9.85	1.68	75
Coast Region													
C.1	Comox	49 43	124 54	93	48.8	73.6	31.8	94	− 6	46.73	42.80	1.02	152
	Duncan	48 47	123 43	28	50.9	78.5	30.2	106	− 5	41.15	38.81	0.98	140
	Nanaimo A	49 03	123 52	104	48.2	75.9	29.7	98	0	41.41	38.33	0.96	145
	Powell River	49 53	124 34	176	51.2	74.7	33.9	93	6	37.25	35.63	1.40	139
	Victoria*	48 25	123 19	228	50.2	68.0	35.8	95	6	27.41	26.26	0.57	138
C.2	Alice Arm	55 41	129 30	1031	40.1	68.3	19.2	93	−13	80.05	50.96	2.77	152
	Britannia Beach*	49 37	123 12	160	50.1	74.3	31.3	103	− 7	78.58	75.91	2.26	164
	Campbell River	50 01	125 18	250	—	—	—	—	—	58.55	54.79	1.30	115
	Cowichan L. For.	48 49	124 08	580	48.1	75.3	30.5	97	0	82.72	75.63	1.29	156
	Port Alberni*	49 14	124 48	195	48.8	76.6	30.1	106	− 7	74.49	71.01	1.44	135
C.3	Bamfield	48 50	125 06	70	—	—	—	—	—	107.10	106.07	2.63	159
	Cape Scott	50 47	128 26	235	46.1	60.8	33.7	85	9	116.00	114.70	1.80	—
	Namu	51 52	127 52	85	—	—	—	—	—	107.37	105.08	4.14	179
	Tofino	49 05	125 46	80	48.5	65.3	35.8	91	17	125.83	124.95	3.69	—
C.4	Masset	54 02	132 08	10	46.3	63.6	31.0	84	− 2	56.27	54.09	2.69	210
	Sandspit	53 15	131 49	25	46.4	62.2	32.1	80	7	49.56	46.53	1.85	194
Columbia Region													
CL.1	Fernie	49 30	115 03	3305	40.0	77.3	9.0	97	−40	41.43	27.11	1.49	95
	Kimberley	49 44	115 47	3016	40.5	80.9	8.2	99	−40	15.03	9.06	0.73	64
	Nelson*	49 30	117 17	1980	46.9	83.3	21.8	103	−17	28.62	20.03	1.23	88
CL.2	Dome Creek	53 45	121 10	2200	39.8	77.6	4.8	108	−56	29.83	19.55	3.16	88
	Horsefly Lake	52 23	121 17	2585	39.6	73.8	6.2	92	−48	27.72	19.81	2.62	74
	McBride	53 18	120 10	2360	40.0	76.1	8.2	100	−50	21.31	12.88	1.78	89
	Revelstoke*	51 00	118 12	1497	44.2	81.0	17.1	105	−30	42.54	26.37	2.00	130

[1] Taken from: Anon 1967. Temperature and precipitation tables for British Columbia. Canada Dept. of Transport, Meteorological Branch. Data generally based on periods of 20 to 30 years.

[2] As per Rowe, J.S. 1972. *Forest Regions of Canada*. Dept. of the Environment. Canadian Forestry Service. Publication No. 1300. 172 p.

* Stations included in Rowe's listings, but entered here with more recent data.

[3] Metric conversion factors given in Appendix VI.

APPENDIX IV

Selected Climatic Data for Forest Regions in Alberta[1]

Forest Region and Section[2]	Station	Location			Temperature—°F[3]					Precipitation—Inches[3]			
		Lat. ° ′	Long. ° ′	Elev. ft[3] a.s.l.	Mean annual	July mean daily maximum	January mean daily minimum	Maximum annual	Minimum annual	Mean total annual	Mean rain annual	July mean rain	No. of days measurable rain
Boreal Region													
B.17	Camrose*	53 01	112 50	2215	35.4	75.4	−6.6	101	−58	15.32	11.52	2.74	49
	Grouard	55 34	116 09	2000	34.1	74.3	−7.1	98	−60	17.56	11.76	2.42	—
	Red Deer	52 16	113 49	2820	36.8	74.3	−2.2	99	−59	21.44	16.52	3.26	68
B.18a	Fort McMurray A.	56 39	111 13	1213	31.0	75.5	−16.4	96	−59	16.85	11.85	2.93	62
	Keg River	57 47	117 52	1402	30.6	74.0	−15.8	99	−67	15.44	10.35	2.46	56
	Lac La Biche A.	54 46	112 01	1835	34.2	72.7	− 6.8	93	−55	17.83	12.01	2.83	61
B.19a	Edson*	53 35	116 25	3033	35.3	73.0	− 1.9	100	−55	20.85	14.98	3.66	69
B.23a	Fort Chipewyan	58 43	111 09	719	27.8	74.9	−20.3	93	−60	12.65	8.34	1.93	—
	Fort Vermilion CDA	58 23	116 03	915	29.1	74.7	−18.9	103	−78	13.92	8.83	2.21	55
Subalpine Region													
SA.1	Jasper	52 53	118 04	3480	37.3	73.6	2.0	98	−52	15.98	11.06	1.96	81
	Lake Louise*	51 25	116 10	5032	31.9	70.9	− 6.5	94	−63	30.37	11.04	1.96	65
Montane Region													
M.5	Beaver Mines	49 28	114 10	4218	38.7	75.7	7.3	98	−50	24.36	12.10	1.41	34
	Kananaskis	51 02	115 03	4560	36.8	71.7	3.7	93	−50	25.09	14.89	2.57	56

[1] Taken from: Anon 1967. Temperature and precipitation tables for Prairie Provinces. Canada Dept. of Transport, Meteorological Branch. Data generally based on periods of 20 to 30 years.

[2] As per Rowe, J.S. 1972. *Forest Regions of Canada.* Dept. of the Environment. Canadian Forestry Service. Publication No. 1300. 172 p.

* Stations included in Rowe's listings, but entered here with more recent data.

[3] Metric conversion factors given in Appendix VI.

APPENDIX V

Selected Climatic Data for Forest Regions in the Yukon and Northwest Territories[1]

Forest Region and Section[2]	Station	Location			Temperature—°F[3]					Precipitation—Inches[3]			
		Lat. ° ′	Long. ° ′	Elev. ft[3] a.s.l.	Mean annual	July mean daily maximum	January mean daily minimum	Maximum annual	Minimum annual	Mean total annual	Mean rain annual	July mean rain	No. of days measurable rain
Yukon Territory													
Boreal Region													
B.24	Watson Lake A.	60 07	128 49	2248	27.4	70.5	−20.9	93	−74	16.98	8.73	2.04	66
B.26b	Whitehorse A.	60 43	135 04	2289	30.8	68.3	− 8.1	91	−62	10.05	5.49	1.36	49
B.26c	Mayo Landing	63 36	135 53	1625	25.4	71.4	−23.0	95	−80	11.16	6.98	1.66	55
Northwest Territories													
Boreal Region													
B.18b	Hay River A.*	60 50	116 00	729	25.2	69.0	−21.2	96	−62	12.59	7.26	1.61	43
B.23a	Fort Simpson*	61 52	121 21	432	25.0	73.5	−23.6	97	−69	12.92	8.13	2.14	52
	Norman Wells A.	65 17	126 48	209	20.8	71.2	−26.1	89	−66	12.95	7.58	1.94	50

[1] Taken from: Anon 1967. Temperature and precipitation tables for the North – Y.T. and N.W.T. Canada Dept. of Transport, Meteorological Branch. Data generally based on periods of 20 to 30 years.

[2] As per Rowe, J.S. 1972. *Forest Regions of Canada*. Dept. of the Environment. Canadian Forestry Service. Publication No. 1300. 172 p.

* Stations included in Rowe's listings, but entered here with more recent data.

[3] Metric conversion factors given in Appendix VI.

APPENDIX VI

Metric Conversion Table

To convert column 1 into column 2, multiply by	Column 1	Column 2	To convert column 2 into column 1, multiply by
0.304 8 (exactly)	foot, ft	metre, m	3.280 84
2.54 (exactly)	inch, in.	centimetre, cm	0.393 701
1.609 34	mile, mi	kilometre, km	0.621 371
0.453 592	pound, lb.	kilogram, kg	2.204 62
5/9 (°F−32)	Fahrenheit, °F	Celsius, °C	9/5 (°C)+32

APPENDIX VII

CERTIFICATE OF PROVENANCE

Issued by the Canadian Forestry Service, Designated Authority for Canada, in accordance with the O.E.C.D. Scheme for Forest Reproductive Material.

Reference Number.....

It is certified that the forest reproductive material described below has been produced in accordance with the O.E.C.D. Scheme for Forest Reproductive Material.

1. Category of reproductive material:..... Source-Identified .....

2. Nature of produce:..... Seed .....

3. Genus, species, sub-species, variety, cultivar.

   (a) Latin name (1).....

   (b) Common name.....

4. Provenance or Region of Provenance: Forest Region and Section (2).....

   Latitude from.....to.....

   Longitude from.....to.....

   Elevation from.....to.....

5. Origin: Indigenous.....Unknown.....Introduced from.....

6. Year of ripening of seed:.....

7. Weight of seed:.....

8. Remarks:.....

.....

Name and Address of Certifying Authority:

.....

.....

.....

.....

.....

Signature:.....

Date:.....

(Stamp of Designated Authority)

(1) Nomenclature as in Hosie, R.C. 1970. *Native Trees of Canada.* 7th Edition. Canadian Forestry Service, Dept. of Fisheries & Forestry.

(2) Forest Regions and Sections from: Rowe, J.S. 1972. *Forest Regions of Canada.* Dept. of the Environment. Canadian Forestry Service Publication No. 1300. 172 p.

(Français au verso)

ANNEXE VII

CERTIFICAT DE PROVENANCE

Délivré par le Service canadien des forêts, autorité compétente pour le Canada conformément aux dispositions du système de l'O.C.D.E. pour le contrôle du matériel forestier de reproduction.

Numéro de référence .....

Il est certifié que le matériel forestier de reproduction décrit ci-après a été produit conformément au système de l'O.C.D.E. pour le contrôle du matériel forestier de reproduction.

1. Catégorie de matériel de reproduction ..... Identifié à la source .....

2. Nature du produit ..... Semences .....

3. Genre, espèce, sous-espèce, variété, cultivar

   (a) Nom latin (1) .....

   (b) Nom commun .....

4. Provenance ou région de provenance: région et section forestières (2) .....

   Latitude: de ..... à .....

   Longitude: de ..... à .....

   Altitude: de ..... à .....

5. Origine: indigène ..... inconnue ..... introduite de .....

6. Année de maturation de la semence .....

7. Poids de la semence .....

8. Remarques .....

.....

Nom et adresse de l'autorité certificatrice .....

.....

.....

.....

.....

.....

Signature .....

(Estampille de l'autorité compétente)

Date .....

(1) Nomenclature selon Hosie, R.C. 1970. *Arbres indigènes du Canada.* Canada. Min. de l'Environnement. Service canadien des forêts.

(2) Régions et sections forestières selon Rowe, J.S. 1972. *Les Régions forestières du Canada.* Min. de l'Environnement. Service canadien des forêts. Publication n° 1300F. 172 p.

(English on reverse side)

APPENDIX VIII

O.E.C.D. LABEL

(OBVERSE)

GENUS, SPECIES, SUBSPECIES, VARIETY, CULTIVAR

LATIN NAME .....

COMMON NAME .....

CATEGORY ..... Source-Identified Wt. .....

PROVENANCE OR REGION OF PROVENANCE .....

LATITUDE FROM ..... TO .....

LONGITUDE FROM ..... TO .....

ELEVATION ..... TO .....

CERTIFICATE NUMBER .....

O.E.C.D. SCHEME
FOR FOREST
REPRODUCTIVE MATERIAL

(REVERSE)

DESIGNATED AUTHORITY:

CANADIAN FORESTRY SERVICE
DEPARTMENT OF FISHERIES AND THE ENVIRONMENT
OTTAWA, ONTARIO K1A 0H3
CANADA

CERTIFYING AUTHORITY:

WARNING: Certification not valid unless label is fastened to container by unbroken seal and there is a duplicate label inside the container

SYSTÈME O.C.D.E.
POUR LES MATÉRIELS FORESTIERS
DE REPRODUCTION

Color: Both sides shall be yellow with the free end overprinted black for a distance of 3 cm.

(Français au verso)

ANNEXE VIII

ÉTIQUETTE DE L'O.C.D.E.

(RECTO)

GENRE, ESPÈCE, SOUS-ESPÈCE, VARIÉTÉ, CULTIVAR

NOM LATIN.....

NOM COMMUN.....

CATÉGORIE..... Identifée à la source .....POIDS.....

PROVENANCE OU RÉGION DE PROVENANCE.....

LATITUDE : de .....à.....

LONGITUDE : de .....à.....

ALTITUDE : de .....à.....

NUMÉRO DE CERTIFICAT.....

SYSTÈME O.C.D.E.
POUR LES MATÉRIELS FORESTIERS
DE REPRODUCTION

(VERSO)

AUTORITÉ COMPÉTENTE:

SERVICE CANADIEN DES FORÊTS
MINISTÉRE DES PÊCHES ET DE L'ENVIRONNEMENT
OTTAWA, ONTARIO K1A 0H3
CANADA

AUTORITÉ CERTIFICATRICE:

AVIS: La certification n'est valide que si l'étiquette est fixée au contenant par un sceau intact et si le contenant renferme un duplicata de cette étiquette.

O.E.C.D. SCHEME
FOR FOREST
REPRODUCTIVE MATERIAL

Couleur: Recto et verso jaunes, extrémité libre noire sur une largeur de 3 cm.

(English on reverse side)

APPENDIX IX

O.E.C.D. SCHEME FOR FOREST REPRODUCTIVE MATERIAL MOVING IN INTERNATIONAL TRADE

Request for Certification of Source-Identified Forest Tree Seed

To: (Name and Address of Certifying Authority)

1. Genus, species, sub-species, variety, cultivar

   Latin name.....

   Common name.....

2. Region of Provenance, Forest Region and Section.....

   Latitude from.....to.....

   Longitude from.....to.....

   Elevation from.....to.....

3. Local or Place Name.....

4. Origin: Indigenous.....Unknown.....Introduced from.....

5. Year of ripening of seed.....

6. Number and weights of packages.....

7. Company field representative.....

   Location of: Seed processing plant.....

   Storage plant.....

8. Exporter's stock number.....

9. Preferred language for Certificate of Provenance and labels.

   English.....French.....

10. Remarks.....

    .....

11. I.....certify that this seed is described and has been collected and processed in compliance with the rules and the regions of provenance that apply to the O.E.C.D. Scheme.

    Name of Exporting Firm.....

    Signature.....

    Date.....

(Français au verso)

ANNEXE IX

SYSTÈME DE L'O.C.D.E. POUR LE CONTRÔLE DU MATÉRIEL FORESTIER DE REPRODUCTION DESTINÉ AU COMMERCE INTERNATIONAL

Demande de certification de semences d'arbres forestiers identifiées à la source

A: (nom et adresse de l'autorité certificatrice)

1. Genre, espèce, sous-espèce, variété, cultivar

   Nom latin .....

   Nom commun .....

2. Région de provenance, région et section forestières .....

   Latitude: de .....à.....

   Longitude: de .....à.....

   Altitude: de .....à.....

3. Désignation du secteur .....

4. Origine: indigène .....inconnue.....introduite de.....

5. Année de maturation des semences .....

6. Nombre d'emballages et poids .....

7. Représentant de la société sur le terrain .....

   Situation de l'installation de traitement des semences .....

   de l'entrepôt .....

8. Numéro de stock de l'exportateur .....

9. Langue préférée pour la rédaction du certificat de provenance et des étiquettes:

   anglais.....français.....

10. Remarques .....

    .....

11. Je,.....,certifie que les semences qui font l'objet de la présente demande ont été décrites et qu'elles ont été récoltées et traitées conformément aux directives sur les régions de provenance et aux autres règles en vigueur pour le système de l'O.C.D.E.

    Nom de la société exportatrice .....

    Signature .....

    Date .....

(English on reverse side)

A specially prepared large-scale map for field use, covering British Columbia, Alberta and those parts of the Yukon and Northwest Territories to which the O.E.C.D. Scheme is applied, will be issued soon as a separate publication. Copies will be available on request from:

Pacific Forest Research Centre
Fisheries and Environment Canada
506 West Burnside Road
Victoria, B.C., V8Z 1M5

or

Publication Distribution Centre
Fisheries and Environment Canada
131 Greber Blvd
Pointe-Gatineau, Quebec, J8T 3R1


FOREST REGIONS
OF
CANADA
1972
ALASKA
(U.S.A.)
YUKON TERRITORY
NORTHWEST TERRITORIES
DISTRICT OF MACKENZIE
DISTRICT OF KEEWATIN
DISTRICT OF FRANKLIN
ALBERTA
SASKATCHEWAN
MANITOBA
ONTARIO
QUEBEC
UNITED STATES OF AMERICA