

The early history of plantation forestry on State-owned land in Tasmania

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Abstract

The development of forestry plantations on State-owned land in Tasmania was initiated in the early twentieth century. The goal was to secure a source of softwood timber for doors, windows and other building uses, as local hardwoods were considered unsuitable and large quantities of softwood timber were being imported into the State.

The first significant nursery and plantation activities were conducted under the supervision of a State Nursery Board established in 1908. Several thousand seedlings of many species, mainly northern hemisphere softwoods and hardwoods, were raised in the Hobart Botanical Gardens and planted out at Ridgeway near Hobart. In 1910, the Department of Agriculture took over responsibility for the nursery and plantation activities previously conducted by the Lands and Surveys Department, and the forestry nursery was transferred to the Department's farm at Deloraine. A plantation containing 24,000 radiata pine and Douglas fir trees was established at this farm.

The Forestry Department was formed in 1921, and a key part of its planning was to establish large areas of softwood plantations on a wide range of sites. Nurseries and planting trials were established initially in buttongrass country in the west and north-west. Many of these early plantings gave poor results, and planting soon spread to other areas of the State. Following a review in 1930 of eight years of trials of over 60 species, the Forestry Department decided to concentrate future plantings in the better sites in the north-west and north-east, and

commercial-scale softwood plantations, mainly Pinus insignis (now P. radiata), were gradually developed in these areas.

The first hardwood plantations were established in the late 1930s, mainly in the north-west of the State. Most of these were small eucalypt plantings in unstocked patches of native forest, but a larger plantation was established on King Island to supply firewood and fencing material. Some small trial plantings of acacia, mainly black wattle, were established between the mid-1920s and mid-1940s to test the potential of these species as a supplement for native wattle areas to supply the tanning industry. However, most of these trials were burnt in wildfires and no large-scale wattle plantations eventuated.

By 1947, the end of the Forestry Department era, approximately 1,000 hectares of softwood plantation had been established on the more productive sites across the north of the State identified following the early trials. After the Forestry Commission was established in 1947, plantation development expanded on the better sites. The significance of these plantations as the beginning of the State's first softwood plantation industry, and as a resource for tree breeding, improving silvicultural methods and general plantation management, is discussed.

Plantation development before the Forestry Department

The first significant moves towards establishing a plantation forestry industry for Tasmania occurred some 20 years prior to the

formation of the Forestry Department when the Lands and Surveys Department was responsible for forestry. The main objective of this initiative was to provide an ongoing source of softwood timber as described by the Secretary for this Department, Mr Counsel, in 1902:

"...a commencement has been made towards establishing a State Nursery for the production of plants of such softwoods as may be required for local purposes and for distribution throughout the Island by the importation of a case of carefully selected seeds from Denmark. This is undoubtedly a step in the right direction, and one which I hope to see extended, and bear good fruit. It is a feasible, unpretentious and reasonable measure, the importance and prospects of which would seem to fully justify the expenditure. Our hardwood timbers are unsuitable, and there are no Tasmanian soft-woods in quantity to take the place of those required for doors, window-sashes, and light boxes, &c., and therefore such woods must continue to be imported from abroad until they are produced at home. This can only be accomplished by the initiation of a system of State Nurseries, with a view to the free distribution of plants to local bodies, mining companies, and individuals for transplanting." (Lands and Surveys Department 1902).

There is no record of the fate of the seeds imported from Denmark, but eventually, in January 1908, a State Nursery Board was formed to advise the Minister "in matters of constructive forestry." This Board oversaw the importation of more seeds of many species from Europe and interstate, the establishment of a tree nursery in the Hobart Botanical Gardens, and a small experimental plantation on land at Ridgeway near Hobart belonging to the Hobart Corporation (Steane 1947). This latter task was described in 1908 as follows:

"The Board considers it advisable to establish a forest reserve in the vicinity of the capital, where trees of varied sorts will be planted under scientific forest conditions. This will afford means of experiment in the cultivation and management of trees; a centre from which

fresh seed supplies can be procured; also a place where practical forestry may be taught. The Corporation of Hobart has permitted the Board to commence this work on its estate at Ridgeway. On this land 1 acre has been cleared, fenced and planted with Portugal, alonia, white, and British oaks, also English ash. Round this acre the land has been cleared for a breadth of 1 chain, and planted with sycamore, white and Bedford willows, and black, white, Canadian, Lombardy, and other poplars. Beyond this, plots have been sown of seed of British, white, Portugal, and Virginian oaks, walnut, horse-chestnut, hickory, ash, and sycamore. These outer plots are designed to afford nurses when desirable pines shall be available for planting." (Lands and Surveys Department 1908).

By 1909, the Board reported that some 14,514 seedlings of various tree species were available for planting out from the nursery at the Botanical Gardens. The main species were horse chestnut, black walnut, cork oak, white oak, pedunculate oak, European ash, white ash, sycamore, oriental plane, common lime, European larch, Norway spruce, sitka spruce and Corsican pine (see Appendix 1 for species names). It was claimed that if some more space and an extra employee were made available then there would be "no difficulty in maintaining an output of 100,000 young trees per annum". The Board's report for this year also stated that the Ridgeway plantation already contained 5,000 British oaks, 5,000 sycamores and an unstated number of other species. In addition, an area at Interlaken owned by Mr R.W. Elliston had been planted with young pines (Lands and Surveys Department 1909).

Unfortunately, by the next year, progress at the nursery and the Ridgeway plantation was halted as reported (rather dramatically) by the State Nursery Board:

"The State nursery and forest-construction for the last 12 months have made very little advance. Last spring, just when active operations were commencing, the trustees of the Botanical Gardens withdrew their foreman from superintending the work. In consequence of

this, no seed-beds were stocked, and no stock was transplanted. This threw the work back severely, and it will be some years before the evil effect of this action will be overcome." (Lands and Surveys Department 1910).

Departmental reports were silent on the status of the Ridgeway plantation after 1910 and a search of the area in 1930 by the Forestry Department failed to locate any trace of it (Steane 1947).

The Department of Agriculture took over the nursery and plantation part of the Lands and Surveys Department's responsibility for forestry in 1910. In the following year, the Agricultural Department transferred the nursery to its farm at Deloraine, and no more was heard of the State Nursery Board which had been appointed in 1908 to advise on forest policy. During the years 1911 to 1919 several thousand conifer trees were raised at the Deloraine farm and distributed free to schools and public bodies. A plantation of 24,000 trees (22,000 radiata pine and 2,000 Douglas fir) was established at the farm itself (Steane 1947).

In 1915, the Chief Forest Officer in the Lands and Surveys Department, Mr Compton Penny, provided some early, detailed advice on the silvicultural techniques which should be applied to areas allocated for the development of softwood plantations:

"Suitable areas should also be selected and reserved in desirable situations for the plantation of such exotics as may be chosen, with a preference for softwood, as being most desirable; but here the experience of other States would form a guide in the selection of the species of trees to be planted. These lands would require to be fenced, grubbed, ploughed, and drained, and allowed to lie in fallow for a period to sweeten the soil. It should then be harrowed and thoroughly cultivated before being planted. After planting, the young trees would require

continual attention, and must not be allowed to suffer from neglect in the early stages of their growth. During the summer months succeeding the planting it would be necessary to water the young trees until the roots get down into the ground and they become firmly established, otherwise a large percentage of them would die, and others would receive a check in their growth from which they would never properly recover. All this work is absolutely necessary in the first few years of the existence of a plantation; thereafter, all that is required is to thin, prune, and keep the ground free from undergrowth, and to take precautions to safeguard the trees from destruction by fire." (Lands and Surveys Department 1915).

By the following year there were positive signs from the Government for the development of a State forestry policy which included establishment of softwood plantations:

"...it is gratifying to report that the Cabinet has determined on taking the first step forward by selecting and planting out a number of experimental plots in various localities and at various elevations above sea level. These experiments will test their adaptability to the growth of soft exotic woods, with a view to entering upon a prudent and economical policy of afforestation and reforestation." (Lands and Surveys Department 1916).

In December 1919, the Government announced the appointment of Mr. L.G. Irby, formerly of the forest service in NSW (Carron 1985), as Conservator of Forests. On January 1, 1921 the Forestry Department began operating.

Thus, in the early part of the twentieth century there was obvious political will to establish forestry plantations in Tasmania, and some operations to test a range of species had taken place. However, significant progress towards commercial-scale plantations did not occur until the formation of the Forestry Department.

The Forestry Department's vision for plantation forestry

Apart from perhaps some remnants of the first plantings mentioned above, there were no forestry plantations under the control of the new Forestry Department in 1921. Conservator Irby expressed great optimism for the future of plantation forestry in the State, particularly in the large areas of treeless buttongrass plains (referred to by Irby as “waste lands”) in the west and north-west. In the first year of the Department, Professor E.H. Wilson, a dendrologist and Assistant-Director of the Arnold Arboretum, Harvard University, was taken to look at some of these “great waste lands of the State”, particularly Sister’s Hills in the north-west and the buttongrass plains and vast stretches of sand dunes on the west coast between Strahan and Zeehan. Irby commented after the visit:

“The depth and nature of the soil of these areas were investigated, and from all indications and with the rainfall of those parts, the celebrated dendrologist was deeply impressed with the latent possibilities for the growth of exotic conifers, and in fact expressed the view that in much of our waste lands Tasmania possessed the finest tree planting propositions in the world. Such an expression by so renowned an expert goes far to strengthen the opinion given by numerous foresters that Tasmania holds the key to the main supply of softwoods for the whole Commonwealth eventually.”

“Had the people of Tasmania realised the wonderful asset that lies dormant in much of the waste lands of the State, and the vast potentialities of softwood plantations if established thereon, there can be little doubt but that the money to proceed with the planting of same would have been raised somehow many years ago, and what are today still waste lands would, in part at least, have stood now as an offset to the national debt of the State.” (Forestry Department 1921).

These “waste lands” being targeted for plantation development were also seen to

have another advantage in that little or no clearing would be required prior to planting:

“Tasmania is fortunate... in that over the areas which it is proposed to ultimately plant little or no clearing is required, nor any other preparation of the land, with the one exception of fire-breaks, always a vital necessity where plantations are concerned.” (Forestry Department 1921).

A major part of the Department’s vision for plantation was the opportunity to provide employment for young people in the operations required to plant the large areas identified. At the Australian Forestry Conference in Brisbane in March-April 1922, the following resolution reflecting this vision was passed:

“That this conference appreciates the wideness of the Tasmanian conception for bringing into a forestry partnership of practical usefulness the waste lands of Tasmania and the waste childhood of the Empire, and hopes, with the Tasmanian Forest League, that the conception may be reduced at an early date to practical actuality.” (Forestry Department 1922).

Tasmania signed a British migration agreement in 1923. As a Tasmanian project in accord with this agreement, Conservator Irby proposed a Forest Plantation Homes Scheme along the lines of the Fairbridge Farm scheme which had been established in Western Australia a decade earlier. Under the Forest Plantation Homes scheme, 150 British boys – orphans or homeless children, referred to in early Forest Department reports as “waifs” – would be brought each year to Tasmania to plant 60,000 acres (24,000 hectares) of pines in return for training and their keep. Commonwealth endorsement was required for the scheme, and it was referred to the Development and Migration Commission which later conducted an enquiry into Tasmanian forestry (Development and Migration Commission 1929). The Forest Plantation Homes scheme never eventuated, mainly because its main proponent, Conservator Irby, left the Forestry Department in 1928,

and the onset of the subsequent Depression years (Dargavel, 2006).

The areas proposed for planting and species to be trialled were identified in the first year of the new Department. Conservator Irby noted in 1921 that over 30,000 acres (12,000 ha) of old sand dunes merging in parts with buttongrass between Macquarie Harbour and the Henty River were probably “without parallel” as a tree planting proposition in the Commonwealth. He noted that steps were being taken to have this area dedicated as State forest and to establish a forest nursery there so that planting out could commence the next year. Species selection for this venture was clear:

“The main species to be planted for some little time will be Pinus insignis, which has obtained the appellation of ‘Remarkable Pine’ for the rapidity with which it comes to maturity, and its amazing adaptability to almost any conditions throughout Australia. While the timber of this tree is not of a very high class quality, it is nevertheless an excellent wood for case material, &c., and always finds a ready market.”

“With its ideal soil conditions for pines and its immunity from droughts, there is every indication that equal yields [to those obtained from radiata pine in New Zealand and South Australia] could be obtained on the Strahan sand dunes in a much shorter period, probably 20 to 25 years. Trees planted 12 years ago on the beach at Strahan, in virtually pure sand, are today 12 inches in diameter, having grown an inch a year. This rate would represent 5 feet in girth at 20 years.” (Forestry Department 1921).

Several other species were also under consideration for these early plantings, and it was anticipated that experimental plots would soon be established at Sister’s Hills and other waste tracts in order to fully investigate their possibilities for exotic tree growth:

“Such exotic conifers as redwood, maritime pine, remarkable pine, Canary Island pine, Western yellow pine, and many others grow to perfection

here, and very rapidly. As a matter of fact, some of these grow much better here than they do in their native country.” (Forestry Department 1922).

The Annual Report of the Forestry Department after its first full year of operation contains a strong summary statement on the potential for plantations of exotic species, which set the scene for an active planting program in these areas:

“... it is a well known fact that much of our waste lands is definitely known to be capable of growing certain of the most valuable of these exotic pines and other softwoods which Australia continues to import, an unassailable case is presented for making such use of these waste areas.” (Forestry Department 1922).

Thus the Department had a clear vision for the role of plantations in Tasmanian forestry. Although, as discussed later, many of these early sites on the buttongrass ‘wastelands’ were shown to be unsuitable for commercial plantings, the process for developing commercial softwood planting in the State had commenced.

Early nurseries, species trials and plantations

The early plantation research by the Forestry Department was directed at establishing nurseries to raise stock of many species for planting on a range of sites to determine the best species/site combinations. Remnants of some of these plantings survived into the 1970s; examples included small patches of pines at Sister’s Hills in the north-west, Strahan and Queenstown in the west, Beaconsfield in the north and Strathblane in the south (W. Neilsen, pers.comm.).

The first two Forestry Department nurseries for growing plantation stock were set up in 1921-22 near the areas first targeted for plantation development. The larger of these nurseries was a 1.6 ha area at Lake Koonya, two kilometres north of Strahan



Figure 1. The Lake Koonya nursery in the early 1920s, with established beds of various species.

on the west coast, where approximately 3,000 seedlings of remarkable pine (now radiata pine), Douglas fir, aleppo pine and Monterey cypress were raised in this year. The other nursery was established at Sister's Hills in the north-west, where seeds of remarkable pine, ponderosa pine, Canary Island pine, Douglas fir, Californian redwood and other unspecified species were sown (Figures 1 and 2).

In probably the first plantation establishment trial by the Forestry Department using introduced species, some eight acres (3 ha) of the 1,200 acres (480 ha) dedicated as State forest between Strahan and the Henty River were spot-sown with remarkable pine within the existing vegetation to determine how this method was suited to the soil and other conditions. At Sister's Hills, 13 ha was treated in the same way using remarkable pine, Douglas fir, Californian redwood, and Norway spruce (Forestry Department 1922).

Right from the start of the Forestry Department's plantation forestry operations, seed of a wide range of species (mainly exotic conifers) was obtained and used in test plantings in many areas. In 1921-22, the 30,000-40,000 acres (12,000-16,000 ha) of land between Strahan and the Henty River, previously identified by Irby, was considered suitable for conifers such as Corsican pine, sugar pine, and remarkable pine. Sheltered valleys near Mt Dundas were considered suitable for Douglas fir. In north-



Figure 2. Transplanting seedlings at the Sister's Hills nursery in the early 1920s.

east Tasmania, small areas at Mathinna Plains, Pioneer, and in some country between St Helens and Scamander were identified as suitable for plantations. Plantations were even considered for the slopes of Mt Wellington, both to provide a valuable asset, and to preserve the watershed, with suitable areas for nursery sites identified near the Springs.

By the end of 1922-23, there were some 500,000 plants in the Lake Koonya nursery, mainly remarkable pine, and a similar number at the Sister's Hills nursery, mainly remarkable pine, ponderosa pine, maritime pine, Corsican pine and Douglas fir, with smaller numbers of Norway spruce, European larch and Monterey cypress. At Sister's Hills, soil surveys were conducted which included testing for porosity and depth, and these showed that the plantable area comprised about 60% of the 540 acres (216 ha) dedicated as State forest. The original nursery was also extended to four acres, a similar size to the Lake Koonya nursery, and this extended area was ploughed, cross-ploughed and harrowed many times ready for the transplants. The expanded Sister's Hills nursery was considered to be capable of supplying the needs of the plantations in the north-west of the State for many years to come. This nursery also had several trial beds containing Bishop pine, eastern white pine, Bunya pine, and some remarkable pine grown from New Zealand seed.

Species trials were also being conducted at this time in the north-east where Douglas fir, remarkable pine, aleppo pine, Californian redwood, Monterey cypress and Western red cedar were sown in an experimental plot between Herrick and Mt. Cameron. A small nursery had commenced at Pioneer in the north-east "where there is much poor land suitable for plantations" (Figure 3). This theme was repeated on King Island, where potential plantation areas were defined as: "Areas of barren country at present

practically useless in the south and north east of the island suitable for plantations of softwoods." (Forestry Department 1923).

Through the mid 1920s, the plantings at Sister's Hills and on the west coast at Strahan and Queenstown were gradually extended, mainly with remarkable pine, maritime pine and



Figure 3. Monterey cypress (*Cupressus macrocarpa*) seedlings at the Pioneer nursery in the north-east, established in the mid 1920s.

Douglas fir. Much of this planting continued to be experimental, with investigations of suitable species, spacing for weed suppression, and performance on different soils (Figure 4). Tremendous optimism was expressed at this time for softwood plantations in the Queenstown area:

"By following up a vigorous and sustained planting policy, the future of Queenstown and Gormanston, as also of Strahan, will be assured even should mining



Figure 4. Assessing the performance of conifer plantings in the Sister's Hills plantation in 1927.

ultimately fail completely. Within 10-12 years from now it should be quite possible to switch over from mining to paper pulp and artificial silk production, or for such works to start as an additional industry for the District. Failing such establishment, the trees now being planted should, in this District, be fit for milling at from 20-25 years.” (Forestry Department 1925).

Plantation establishment began in the Beaconsfield area in the north-east in the mid-1920s using seedlings raised at the Sister’s Hills nursery; some 300 acres (120 ha) were planted by the end of the decade, mainly with remarkable pine, ponderosa pine and Douglas fir (Figures 5 and 6). At Sheffield in the north-west, a small nursery and arboretum were planned. A shelterwood system was proposed for part of the area, with pines being planted within the existing sparse eucalypt scrub. This method was considered to have great potential for producing good trees at low cost:

“The costs of such a method of planting will be very slight, while the tendency to produce long clean boles will be greatly enhanced. Instances of



Figure 6. Joseph Memory Firth, District Forester North-East, measuring a radiata pine in 1927, three years after planting in Beaconsfield plantation.

mixed planting referred to above point to apparent beneficial results to both conifers and eucalypts, and opens up a very interesting field for future determination.” (Forestry Department 1925).



Figure 5. Early plantings of remarkable pine (radiata pine) at the Beaconsfield plantation in the mid 1920s. About 120 hectares were planted at Beaconsfield in the 1920s using seedlings raised at the Sister’s Hills nursery.

In the following year, 20 acres (8 ha) were planted with maritime pine at Badgers Hills (now part of Stoodley plantation) in the north-west and 24 acres (9.6 ha) of arboretum established with 100 seedlings each of maritime pine, ponderosa pine, Corsican pine, remarkable pine, Norway spruce, Sitka spruce, Douglas fir, and European larch at eight feet (2.4 m) spacing. Small areas of eucalypt scrub were spot sown with Canary Island pine at a similar spacing, and blackwood and black wattle planted at three feet (0.9 m) spacing.

The early plantings on the good sites in the north-east and north-west (e.g. Beaconsfield and Stoodley) showed that very good growth of conifers could be achieved (Cubit 1996). This encouraged the development of the large areas of highly productive pine plantations across the north of the State.

As well as the softwood program, hardwood planting (eucalypts and acacias) was also tried. The first eucalypt seedlings for planting on State forests were tube stock raised in the Forestry Department's nurseries in the late 1930s. These plants were not for the establishment of intensively managed eucalypt plantations but for filling small unstocked areas in some of the northern forests. The first of the eucalypt tube stock was planted across some 162 acres (65 ha) at Mawbanna and Castra in 1939-40, and in the following year a further 123 acres (49 ha) of experimental tube planting was conducted at Pegarah (King Island), Mawbanna, Castra and Warrentinna. Tube stock of stringybark was used in the early 1940s to restock repeatedly burnt areas at Mawbanna, but the Annual Report for 1941-42 noted: "So far results have not been too successful". In the same year, some 20,000 plants of *E. obliqua*, *E. amygdalina*, and false acacia (*Robinia pseudoacacia*) were planted on King Island (Forestry Department 1942). Refilling unstocked areas with eucalypt tube stock (mainly

E. obliqua, *E. globulus* and *E. regnans*) continued through the 1940s.

Wattle plantations were initiated in the mid-1920s at Sister's Hills and Triabunna. Stripping of wattle bark from native forests for use in the tanning industry had been an important part of forestry activities in the State for several decades, and the Bark Mill at Swansea is a reminder of this once flourishing industry. However, the trial plantings of black wattle near Triabunna failed due to exceptionally dry seasons, although the wattle plantings at Sister's Hills were flourishing (Forestry Department 1927). In 1944, six half-acre (0.2 ha) trial plots were sown with black wattle on the Freycinet Peninsula to test the suitability of the area for future establishment of wattle plantations. The fate of these small plantations and trial plots is not known (they were probably burnt by wildfires), but no large-scale wattle plantations eventuated.

Reviewing the early plantation trials

Conservator Irby left the Forestry Department in 1928 and in that year the Department initiated a review of the plantation program. This review was timely as by then there had been some eight years experience of establishing many different softwood and hardwood species (Appendix 1) on a range of sites across the State, and the performance of these plantations had varied enormously. This review was followed by further analysis over the next 2-3 years of the reasons for success or failure of plantings, and summarised as follows:

"With regard to the much discussed 'success' or 'failure' of the plantations, it cannot be too strongly emphasised that, as far as they have gone, most of them must be regarded as experimental. Only in Beaconsfield and Warrentinna have attempts been made to plant on anything like a commercial scale, and even there such attempts have not gone very far.

Whether the results obtained to-date are to be called 'success' or 'failure' depends on the main objective aimed at. If the Department, from the first, regarded these plantations as commercial undertakings most of them must, from that point of view, be regarded as failures. The overhead charges on small experimental areas would render commercial success almost impossible. If, as the writer believes, the plantations are to be regarded as experimental, then they are not failures."

"Both at Sister's Hills and at Strahan and, to a lesser degree, in some parts of Beaconsfield, conditions have been encountered in which the ordinary planting technique is unsuccessful at any rate with the species tried. The hopelessness of planting in such situations on a large scale with our present limited knowledge of the factors involved is immediately obvious, and the warning has not cost much either in time or in money. The real risk in planting untried types of country lies in a false sense of security induced by apparent success in the early stages. In such cases the loss may be very serious indeed."
(Forestry Department 1932).

From the mid-1930s, in accordance with these informed views, future planting was concentrated in the better-performing areas of the north-west and north-east, particularly Warrentinna, Stoodley, Myrtle Grove and Castra. In the 1940s, ex-farmland with good soils was purchased and planted to pines in these highly productive areas (Cubit 1996) and, on some sites, the third rotation of radiata pine crops is now present.

The Forest Nursery at Perth was established in 1936, mainly for growing young trees for sale or free distribution in the Midlands, north-central and north-eastern areas. Then, in 1938-39, 7,025 acres (2,810 ha) of land was purchased for use in the plantation program; this area was to be planted with seedlings arising from the development of Perth and Mawbanna nurseries. Mawbanna was to supply local requirements in the North-Western Division of the Forestry Department while Perth was to meet the Department's main plantation requirements

and supply trees required by the public. Perth was in a position to supply 250,000 plants for the 1940 season.

The Forestry Department's plantation legacy

The failure of the early 1920s plantings in the buttongrass areas on the west coast and north-west showed that the optimistic expectations for these areas were not fulfilled, and they were not considered for future plantations. The failure of these plantings is not surprising considering much of the targeted buttongrass country is highly acidic (pH 3.5-4.5) and prone to waterlogging and/or severe summer drought (Jarman *et al.* 1988). After Conservator Irby left the Department in 1928 he continued to pursue his vision of 'conquering the buttongrass plains and heathlands', publishing results of long-term trials on his family property at Boat Harbour (Irby 1955, 1959).

After the review of the Department's plantations in 1930, the most suitable sites had been narrowed down to the more fertile areas of the north-west (e.g. Castra, Oldina, Stoodley) and the north-east (e.g. Warrentinna, Myrtle Grove).

By the time the Forestry Department was replaced by the Forestry Commission in April 1947, the main plantation legacy of the Forestry Department was a significant resource of approximately 1,000 hectares of radiata pine. In addition, there were some small plantings of Douglas fir and approximately 80 ha of eucalypts, mainly on King Island. Although small in area, the first commercial forestry plantation estate now existed in Tasmania. Some 60 species of softwoods and hardwoods had been established in planting trials in the 1920s and 1930s, and this experience resulted in radiata pine, Douglas fir and eucalypts being selected as the most promising for commercial plantations. Overall, the Department's vision in 1921 to establish a

conifer estate to supply softwood timber on a commercial scale had been fulfilled.

Development of the plantation resource slowed in the latter days of the Forestry Department in the 1940s during the World War II years, as little money was available and many of the Department's staff had enlisted in the armed forces.

Plantation development in the early years of the Forestry Commission

The first policy statement on forestry plantations by the Forestry Commission was made just a few months after it was formed in 1947. This statement supported the Forestry Department's identification of suitable planting areas and expressed confidence in the future contribution of softwood plantations to the Tasmanian forest industry.

"The Commission is satisfied that areas in the north coastal part of the State will produce high quality exotic softwood plantations with growth rates comparable to those recorded in other mainland States." (Forestry Commission 1947).

After the first full year of operations of the Commission, the Commission set out the following policy for plantations in the *Statement on Forestry in Tasmania* appended to its 1947-48 Annual Report.

"Apart from the King Island project where local considerations may indicate the desirability of some hardwood, plantation projects will be entirely softwoods for the time being. Monterey Pine (Pinus radiata) and Douglas Fir (or Oregon) will be the species mostly used on present information, although experimental plots of other species are proposed, particularly Pinus patula, a tree rarely seen as yet in Tasmania." (Forestry Commission 1948).

The main planting in the first years of the Commission continued at sites such as Warrentinna, Myrtle Grove, Castra and Oldina in line with the policy of concentrating conifer plantations (mainly radiata pine and

Douglas fir) in the more productive sites in the north-west and north-east of the State. In addition to a greatly expanded planting program, some species trials continued to be established, with four acres of poplars planted at Castra and various experimental plots of miscellaneous species planted at Gould's Country and Takone. There were also several arboreta established in the 1940s, some of which (e.g. Hollybank near Launceston) are still largely intact today.

The Commission espoused a policy of managing conifer plantations for the production of high-grade softwood for plywood and joinery manufacture and, in accordance with this policy, a large pruning program was initiated. This policy continues to the present day, although management regimes have changed over the years. Some 390 acres (156 ha) of plantations were pruned at Stoodley, Warrentinna and Myrtle Grove in the Commission's first full year of operations. Figures were also published on the growth being achieved at Warrentinna. In one compartment of radiata pine, the merchantable volume per acre at age 13 years was 38,987 super feet (this equates to 230 m³/ha and an mean annual increment of 17.7 m³/ha/annum). These figures were accompanied by the following positive statement on softwood plantations:

"Provided rapid rates of growth can be maintained by early and periodic thinning, there seems to be little doubt of the ultimate success of the Commission's softwood plantations." (Forestry Commission 1948).

Thinning operations commenced in October 1950 in Warrentinna (Figure 7), and volume data were compiled from Stoodley prior to thinning there. The pruning program continued, using three progressive lifts to 2.4, 4.8, and 6.7 m, with the aim of restricting the knotty core to 10-13 cm in the butt log of the tree. By end of that year, seven nurseries were in operation with Perth being the largest, and a record annual production (before culling) of 2,703,760 seedlings, mostly radiata pine, was achieved. By

30 June 1951, four years after the Forestry Commission was established, the total plantation area had more than doubled to 2,346 ha. (Forestry Commission 1951).

At the time the Forestry Commission was established, there were also some hardwood plantings, mainly small eucalypt plantings on King Island, although the supply of eucalypt timber from native forests being by far the dominant resource. Eucalypt plantations were to remain a very minor part of the State-owned forests until the 1990s, when the area of native forest available for harvesting was substantially reduced as large areas were set aside for conservation, and plantation establishment was increased to supplement the supply of hardwood timber (Farmer and Smith 1997).

Planting of acacias for tanning had ceased at the end of the Forestry Department era, and



Figure 7. Radiata pine stand at Warrentinna, north-eastern Tasmania, 1972. The stand was planted in 1935 and thinned three times, with the third thinning in 1970.

no further work on acacia plantations was conducted until research and development projects in the 1990s under the Intensive Forest Management Program (IFMP). Silvicultural prescriptions for growing blackwood in plantations were developed under this program, and some 700 hectares of plantations were established. However, poor form and other problems were encountered, and intensive management of native eucalypt coupes containing blackwood became the preferred method of blackwood production. Plantation trials of silver wattle were also conducted in the IFMP, but these were later abandoned due to acute form problems.

From the early 1950s, in order to support the large investment in the more intensive management now occurring in the Commission's conifer plantations, a greatly expanded research program was developed aimed at specific problems of establishment and management. By far the bulk of the research effort initially was directed at radiata pine, but there was a gradual expansion of the plantation research program to cover other species, particularly eucalypts, as policy directions and markets changed.

The softwood plantations established during the Forestry Department years were important for future timber supplies, but they were also a great resource for research and development to improve growth rates, wood quality, silvicultural techniques and plantation management. This was a main focus of the Forestry Commission and plantation research was greatly expanded following its establishment. Tree improvement, site selection and preparation, nursery techniques, weed control, fertilising and stand management were key areas for this research (Figure 8). Using the resource already established during the Department years, the Commission was able to begin selections of superior trees for seed collection (Figure 9) and establishment of seed orchards. By 1959, enough seed was able to be collected from selected trees to

grow the whole of the planting stock for the following year. Planning of seed orchards commenced in the early 1950s and the first seed orchard was established at Upper Castra in 1960, providing a valuable resource for continuing tree improvement.

Conclusion

Today, there are over 100,000 hectares of softwood and hardwood plantations on State forest land in Tasmania, supplying timber to local and interstate industries. The early research and operational work conducted by the Forestry Department and the Forestry Commission established the potential and began the development of this important resource.

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Photographs were obtained from the Forestry Tasmania library, and Emil Johnston kindly supplied the information on Figure 8.



Figure 8. A 1950s fertiliser trial in thinned and unthinned radiata pine planted at Warrentinna in the 1930s. (From left: Max Gilbert, Murray Cunningham, Emil Johnston and John Ruiter).



Figure 9. Selecting plus trees of radiata pine in Stoodley plantation in 1953. These trees were planted by the Forestry Department in 1939 and were the source of seed used in progeny trials in the Forestry Commission's tree improvement program.

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Appendix 1. Common and scientific names of species used in trials and plantations by the Forestry Department (common names as listed in Annual Reports of the Forestry Department).

Common name	Scientific name	Common name	Scientific name
Aleppo pine	<i>Pinus halepensis</i>	Menzies' spruce	<i>Picea sitchensis</i>
American ash	<i>Fraxinus americana</i>	Mexican weeping pine	<i>Pinus patula</i>
Bedford willow	<i>Salix viridis</i>	Monterey cypress	<i>Cupressus macrocarpa</i>
Bhutan pine	<i>Pinus wallichiana</i>	Mountain pine	<i>Pinus montana</i> var. <i>uncinata</i>
Bishop pine	<i>Pinus muricata</i>	Norway spruce	<i>Picea abies</i>
Black poplar	<i>Populus nigra</i> var. <i>betulifolia</i>	Oriental plane	<i>Platanus orientalis</i>
Black walnut	<i>Juglans nigra</i>	Pedunculate oak	<i>Quercus robur</i>
Black wattle	<i>Acacia decurrens</i> , <i>A. mearnsii</i>	Ponderosa or Yellow pine	<i>Pinus ponderosa</i>
Blackwood	<i>Acacia melanoxylon</i>	Portugal oak	<i>Quercus suber</i>
British oak	<i>Quercus robur</i>	Radiata, Monterey or Remarkable pine	<i>Pinus radiata</i> or (previously) <i>P. insignis</i>
Canary Island pine	<i>Pinus canariensis</i>	Scots pine	<i>Pinus sylvestris</i>
Carolina poplar	<i>Populus x canadensis</i>	Sitka spruce	<i>Pinus sitchensis</i>
Common lime	<i>Tilia x europea</i>	Sugar pine	<i>Pinus lambertiana</i>
Cork oak	<i>Quercus suber</i>	Sycamore	<i>Acer pseudoplatanus</i>
Corsican pine	<i>Pinus nigra</i> subsp. <i>laricio</i>	Valonia oak	<i>Quercus aegilops</i>
Cricket bat willow	<i>Salix alba</i> 'coerulea'	Virginian oak	<i>Quercus virginiana</i>
Douglas fir	<i>Pseudotsuga menziesii</i>	Western red cedar	<i>Thuja plicata</i>
Eastern white pine	<i>Pinus strobus</i>	Western yellow pine	<i>Pinus ponderosa</i>
English oak	<i>Quercus robur</i>	White ash	<i>Fraxinus alba</i>
Eucalypt	<i>Eucalyptus</i> spp.	White Californian cedar	<i>Calocedrus decurrens</i>
European ash	<i>Fraxinus excelsior</i>	White oak	<i>Quercus alba</i>
European hackberry	<i>Celtis australis</i>	White poplar	<i>Populus alba</i>
European larch	<i>Larix decidua</i>	White willow	<i>Salix alba</i>
European silver fir	<i>Abies alba</i>		
False acacia	<i>Robinia pseudoacacia</i>		
Giant thuja	<i>Thuja plicata</i>		
Hardy catalpa	<i>Catalpa speciosa</i>		
Hickory	<i>Carya</i> spp.		
Horse chestnut	<i>Aesculus hippocastanum</i>		
Larch	<i>Larix</i> spp.		
Lodgepole pine	<i>Pinus contorta</i>		
Lombardy poplar	<i>Populus nigra</i> 'italica'		
Maritime pine	<i>Pinus pinaster</i>		