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About the Institute

The Hunt Institute for Botanical Documentation, a research division of Carnegie Mellon University, specializes in the history of botany and all aspects of plant science and serves the international scientific community through research and documentation. To this end, the Institute acquires and maintains authoritative collections of books, plant images, manuscripts, portraits and data files, and provides publications and other modes of information service. The Institute meets the reference needs of botanists, biologists, historians, conservationists, librarians, bibliographers and the public at large, especially those concerned with any aspect of the North American flora.

Hunt Institute was dedicated in 1961 as the Rachel McMasters Miller Hunt Botanical Library, an international center for bibliographical research and service in the interests of botany and horticulture, as well as a center for the study of all aspects of the history of the plant sciences. By 1971 the Library's activities had so diversified that the name was changed to Hunt Institute for Botanical Documentation. Growth in collections and research projects led to the establishment of four programmatic departments: Archives, Art, Bibliography and the Library.

Woodland Management Plan -
So. Fork Purchase Area, Nevada - 1940

FF 30

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service

A WOODLAND MANAGEMENT AND PLANTING PLAN
FOR THE
SOUTH FORK PURCHASE AREA, NEVADA

Yerington, Nevada
January, 1940

A WOODLAND MANAGEMENT AND PLANTING PLAN
FOR THE
SOUTH FORK PURCHASE AREA, NEVADA

- INTRODUCTION -

The Indian Service is confronted with the problem of maintaining an available source of fuelwood and posts for nineteen Indian families now resident upon the area. It is, therefore, the object of this report to suggest ways and means of solving the wood problem in a practicable and economic manner.

The initial investigation sought to answer the following questions:

1. What are the present woodland resources and what is their productivity?
2. What is the annual demand for woods products?
3. How may the present woodlands be managed to insure continuous maximum productivity?
4. What are the needs for woodlot and windbreak plantings?

- WOODLAND RESOURCES -

1 2 3
Aspen , juniper and cottonwood in pure stands constitute the

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1. *Populus tremuloides*
 2. *Juniperus utahensis*
 3. *Populus melanocarpa*

woodlands of the area.

Aspen is used for fuel, posts and poles. Juniper finds best use as fence posts. Cottonwood is used for low-grade fuel and, as a last resort, for posts and poles.

Aspen. There are two small stands of aspen totaling about 20.6 acres in extent, and having a total volume of 670 cords. Neither have been seriously abused in the past and are fairly well stocked and thrifty. Both stands are uneven-aged and have a shortage of small diameter classes due to post cutting.

Juniper. The juniper on the dry hills and fans of Sections 35, 3 and 4 holds an available supply of 4500 fence posts.

Since these stands are easily accessible, they have been cut-over in the past by local ranchers. What remains are second or third grade posts many of which are second growth.

Cottonwood. Native cottonwood grows abundantly on the Indian farms along the meanders of the South Fork of the Humboldt River.

These cottonwood stands are important as windbreaks and livestock shelter and are also desirable in that they reduce stream bank cutting.

By judicious utilization they will provide an appreciable amount of fuelwood to the Indian operators who hold the land and hence may be considered a part of the woodland resource.

National Forest Land as a Source of Fuel. The Humboldt forest, adjacent to the Purchase Area on the East, provides an additional source of fuel in the form of dead aspen, pinion and juniper. The Forest Service estimates an annual yield of about 30 cords of dead wood from accessible areas near the Indian farms. New roads will be needed to make available an additional 80 or 100 cords annually.

DEMANDS FOR FUELWOOD, POSTS AND POLES

Fuelwood. It is estimated that a reasonable annual fuelwood consumption per Indian family will approximate 7 cords, about 140 cords per year for the area. The Agency buildings will use an additional 15 cords.

Fence Posts. Considering all fences now existant on the Purchase Area and those fences proposed to be built to facilitate proper subdivision of the Indian farms, it is estimated that about 50 miles of fence now stands on the area. About 60 miles of fence is yet to be constructed.

The new fence will require an outlay of 20,000 posts while repair and maintenance of the present fences will require 1500 posts per year. The new fence will require very few replacements until 1955 or after.

Poles. Some sixteen Indian farmsteads will require the construction of new pole corrals and shelters. Although the number of pieces needed is difficult to judge, probably some six or eight thousand tree-length poles will be needed during the next five years.

UTILIZATION OF WOODLAND RESOURCES - PLAN
OF WOODLAND MANAGEMENT

Aspen Stands. The local stands of aspen, although limited in extent, supplies the former owners with a steady supply of posts, poles and fuel without seriously hurting the stand or depleting the growing stock as their demands did not greatly exceed volume growth of the aspen. But there are nineteen farms now where there were two before, and the demands of these nineteen farms could denude the aspen sites in less than ten years if cutting is unrestricted. Hence, if conservation of the soil and moisture of woodland sites and the sustained yield of woodland products are sought after, an annual cut and cutting practices in the aspen stands must be put into effect.

Allowable Annual Cut in Lee Creek Aspen.^{**} The aspen in Lee Creek has an area of 170 acres and a present volume of 586 cords of wood. The allowable cut should not exceed 17 cords per year.

From 1940 to 1955 the cut should be confined to trees which have a diameter at breast height* of 12 inches or more. After 1955, the diameter limit should be established at 10 inches and no living

* 4.5' feet from ground

**Note Tree Volume Table, page 4a

TREE VOLUME TABLE FOR ASPEN CORDWOOD

For Local Use by U. S. Bureau of Indian Affairs
at
Lee, Nevada

<u>Tree</u> <u>D.B.H.</u> <u>(Inches)</u>	<u>Tree</u> <u>Volume</u> <u>(cu.ft.)</u>	<u>Tree</u> <u>Volume</u> <u>(Cords)*</u>	<u>Tree</u> <u>D.B.H.</u> <u>(Inches)</u>	<u>Tree</u> <u>Volume</u> <u>(Cu.ft.)</u>	<u>Tree</u> <u>Volume</u> <u>(Cords)*</u>
4.0	2.25	.0321	11.5	20.75	.2964
4.5	2.50	.0357	12.0	23.00	.3285
5.0	3.00	.0428	12.5	25.50	.3642
5.5	3.50	.0500	13.0	28.00	.4000
6.0	4.25	.0607	13.5	30.50	.4357
6.5	5.00	.0714	14.0	33.50	.4785
7.0	6.00	.0857	14.5	36.75	.5250
7.5	7.25	.1035	15.0	40.00	.5714
8.0	8.50	.1214	15.5	42.75	.6107
8.5	9.75	.1392	16.0	45.50	.6500
9.0	11.00	.1571	16.5	48.25	.6892
9.5	12.75	.1821	17.0	50.50	.7214
10.0	14.75	.2107	17.5	52.75	.7535
10.5	16.50	.2357	18.0	54.75	.7821
11.0	18.50	.2642			

Based on 68 trees; Volume outside bark to a 2 inch top, branches included

*1 cord = 70 cu.ft. of solid wood and bark

tree smaller should be removed. This stand should be protected from grazing, or at least confined to restricted grazing.

Allowable Annual Cut in the Ogilvie Aspen. The Ogilvie aspen has an area of 3.6 acres and a gross volume of about 84 cords of wood. The allowable cut should not exceed 3½ cords per year. The cut should be confined to trees which have a diameter of 8 inches or more at breast height.

Cutting Practices in Aspen.

1. Cut stumps no higher than 12 inches. Encourage the use of saws for felling.
2. Utilize all the tree to a two inch diameter limit.
3. Remove all dead material from the stand.

Utilization of Juniper Stands. The juniper has an area of approximately 220 acres and has a present volume of 4500 posts which are entirely residual and second growth to post cutting which removed the best of the stand.

It is suggested that these posts be utilized at the rate of about 500 posts per year to help maintain existing fence and that the Indian Service look to the establishment of small individual post lots on Indian farms and to a Tribal woodlot to supply the majority of post demands in the future. Posts for new fencing must necessarily be cut elsewhere on Public Domain or National Forest, or must be purchased.

Although the soils of the juniper stands are quite erodible, post cutting, if properly executed by the "concealed cut" method, will not contribute to accelerated erosion. Post cutting will not effect more than 10 per cent of the tree growth over a ten-year period.

Utilization of Cottonwood Stands. The cutting of river bottom cottonwood must be limited and judicious so that their values as wind-breaks and soil binders may be maintained.

A limited cut of decadent or dead trees is possible and desirable. Over-topped sprouts in dense clumps may well be removed. Probably ten or fifteen cords may be cut annually without harming the stands.

It appears that shortage of wood elsewhere may endanger the life of the river cottonwood. Since their destruction would be sorely felt, every effort should be made to insure their values by action of the Tribal Council and the maintenance of a reliable supply of fuel elsewhere, particularly on National Forest lands.

Conclusion to Management Plan. From the foregoing, it is calculated that the Indian lands can produce only some 35 cords of fuel wood annually, which is 120 cords short of the required amount. There appears to be no additional land available for the economical production of fuel. Supplementary woodlot plantings, as prescribed

below, are designed principally for the production of durable posts (which are justified by their high value) and will produce only a small volume of fuel.

It, therefore, seems necessary for the Bureau of Indian Affairs to confer with the Forest Service and to make accessible for use the Humboldt National Forest dead timber to the amount required to make up the shortage on Indian lands.

THE NEED FOR ADDITIONAL WOODLAND RESOURCES -

PLANTING PLANS

Since demands for wood far exceeds present supply, it is reasonable to assume that the growing of additional woodlands, particularly rapid-growing hardwoods, would be a profitable venture. An acre or more of woodlot on each 100 acre farm would produce valuable posts (and a quantity of fuel) to supplement present supplies.

Planting Sites. Desirable planting sites are to be found on all Indian farms. In area, each unit should be no less than one acre. Where space is available, a woodlot up to four acres would not be too large. In each case, arrangement must be made to irrigate the planting.

Tree Species. Black locust¹, green ash², Russian olive³, Siberian elm⁴, and honey locust⁵ may be expected to grow well. Black locust should constitute 70 or 80 per cent of the woodlot, green ash and/or honey locust next in proportion, with Russian olive and perhaps such

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1. Robinia pseudoacacia
 2. Fraxinus velutinus
 3. Elaeagnus angustifolia

4. Ulmus pumila
5. Gleditsia triacanthos

other species as white mulberry⁶ planted for their wildlife value. A desirable combination of species for a one-acre woodlot planted 6' x 6' on a 10-year rotation would be as follows:

Black locust	-	100 seedlings
Green ash	-	15 seedlings
Honey locust	-	10 seedlings
Russian olive	-	10 seedlings
White mulberry	-	<u>5</u> seedlings
		140 seedlings annually

Rotation on Woodlots. It is suggested that a ten-year planting program be initiated which will place the farm woodlots on a ten-year rotation.

A ten-year program which will necessitate the planting of a small number of trees each year for ten years rather than the total amount the first year or two is thought desirable for the following reasons:

- (1) The costs and labor are distributed over a 10-year period.
- (2) The chances of getting an Indian operator to plant 140 trees well is much greater than if he were expected to plant 1400 at once.
- (3) It will tend to make tree planting a habit and a recurring job and hence will hold the interest of the operator in his woodlot.

6. *Morus alba*

If a whole woodlot were planted now with the knowledge that many years must elapse before the planting is of value, there is danger of it being neglected if not forgotten.

Planting Methods. Planting methods outlined by the Clark-McNary nursery of Logan, Utah, is well-adapted to farm planting.

Irrigation ditches and fences must be constructed prior to planting.

Weeds and brush should be piled and burned and all effort made in the future to keep down weed growth which competes with trees for soil and moisture.

Ground should be prepared for tree planting in the same manner as for alfalfa and should be moist at time of planting.

Spring planting should be the rule. A triangular spacing of 6' x 6' is suggested.

Silvicultural Considerations. Once a woodlot is established it may be expected to maintain itself if fire and grazing is kept out of the stand. Second-growth woodlots which become too dense must be thinned to a 6' x 6' spacing the second or third year and may be again thinned on the sixth or seventh year to an 8' x 8' spacing and the material used for wire spreaders or fuel wood.

Thinnings should always leave the best trees in the stand.

Economic Value of Farm Woodlots. If a farmer establishes an acre of woodlot by planting 140 trees per year for 10 years on

a 6' x 6' triangular spacing, he may, after 10 years, cut the increment on the 140 trees he planted 10 years back. The monetary value of this cut - minus the cost of planting material, labor and maintenance, and minus the interest charges on his investment, - is the net value of the cut and represents the annual income on an acre of woodlot planted 6' x 6' on a 10-year rotation.*

The annual return may be summarized as follows:

ANNUAL COSTS

Planting stock (140 trees) and planting labor.....	\$ 5.40
Interest at 6% compounded annually for 10 years..	<u>\$ 4.27</u>
Planting costs at end of rotation.....	\$ 9.67
Maintenance cost on 140 trees at 50¢ per year compounded annually at 6% for 10 years.....	<u>6.59</u>
Total planting and carrying costs after 10 years.	\$16.26

ANNUAL RETURNS

	Survival average Growth average	Survival good Growth good
Expected trees to be cut	90	115
Number of posts per tree	2	3
Number of posts cut	180	345
Value at 20¢ per post	\$36.00	\$69.00
Discounting costs	<u>-\$16.26</u>	<u>-\$16.26</u>
	\$19.74	\$52.74
Cost of cutting @ 5¢ per post -	<u>9.00</u>	<u>17.25</u>
Net return per acre per year (i.e. increment on 1/10 acre after 10 years)	\$10.74	\$35.49

* These estimates disregard land rent charges

The annual net return, therefore, on an acre of woodlot cut for posts carrying a growing stock of 1400 trees on a 10-year rotation will be between \$10.00 and \$35.00 per year depending upon the success of the operation.

After 20 years when cutting will begin in second growth trees, the annual return will be greater as no investment will have been made in planting stock and labor.

Tribal Woodlots. A Tribal woodlot is suggested which will produce for later use a quantity of hardwood posts and fuel for use on tribal lands or at the disposition of the Indian Agency.

The proposed site* has an area of 4.86 acres which is already under irrigation and is fenced. It is thought desirable to plant the entire site at once to the following species on a 6' x 6' triangular spacing:

5000	Black locust
1000	Honey locust
500	Green ash
<u>300</u>	Russian olive
6800	Seedlings

The ground of the planting site should be partially re-broken in double furrows 6 feet apart in which the seedlings may be planted

* See map.

in the spring. This woodlot should produce about 800 posts per year after 10 years.

Windbreaks. Carolina and Lombardy poplar (grown from cuttings) should be used for windbreaks along canals and fence lines, with about a 25 per cent mixture of Russian olive, white mulberry and Siberian pea tree for wildlife foods. Siberian elm is a hardy, fast growing species which may be used in place of poplar when lower growing tree is the need.

The Indian operators should be instructed, if necessary, how windbreaks may be grown from cottonwood and poplar cuttings. Siberian elm seedlings, if available, may also be employed especially around farmsteads and gardens.

Wildlife Problems and Recommendations. The South Fork Purchase Tract does not have any special wildlife problems. The area is so small that any game on the area is also indigenous to the surrounding land, which consequently brings this wildlife under the jurisdiction of the State of Nevada. Game in the south occurs in the form of trout in the South Fork River, sage hens in the sage flats and several deer are reported to live in the aspens along the bottom lands. Fishing along the South Fork in the purchase tract is reported good. Fishermen from Elko paid 50¢ per day for fishing privileges along the South Fork in the purchase tract last season. The improvement of these waters might

add a small amount to the income of the Indians from this source. Coyotes were seen on several occasions during the summer on the reservation. Their number are too small to cause any concern.

There is an excellent possibility of improving wildlife by planting such species as Russian olive, Siberian pea tree, white mulberry and native river hawthorn along waterways on the protected benches and thereby provide an environment for valley quail and other game which, at present, are confined to the river bottom thickets. Everything indicates a desirable combination of factors which make for the propagation of quail, and it seems that an increase in numbers may be obtained by extending favorable environmental conditions to the bench lands. In this manner, also, waste places may be converted from weed patches into stable tree cover, which will pay dividends in terms of wild game. Post lots may be expected, also, to increase the woody "edge" from which game may venture.

Field mice on the South Fork are numerous and in some years, they might even become a problem. Pocket gophers mounds were observed in several fields but they are not numerous. Squirrels cause some damage to irrigation canals by their burrowing but they can be easily controlled by trapping or poisoning.

F-PLANS
Indian

Yerington, Nevada
January 18, 1940

Mr. T. B. Blair
Chief, Regional Forestry Division
Soil Conservation Service
Berkeley, California

Dear Ted:

Enclosed is a final copy of my work at South Fork.
If it meets with your approval, kindly forward it to the
Physical Surveys Division.

Very truly yours,

Jack L. Reveal
Project Forester
For:
Ray S. Carberry
Acting Area Conservationist

JLR:jap