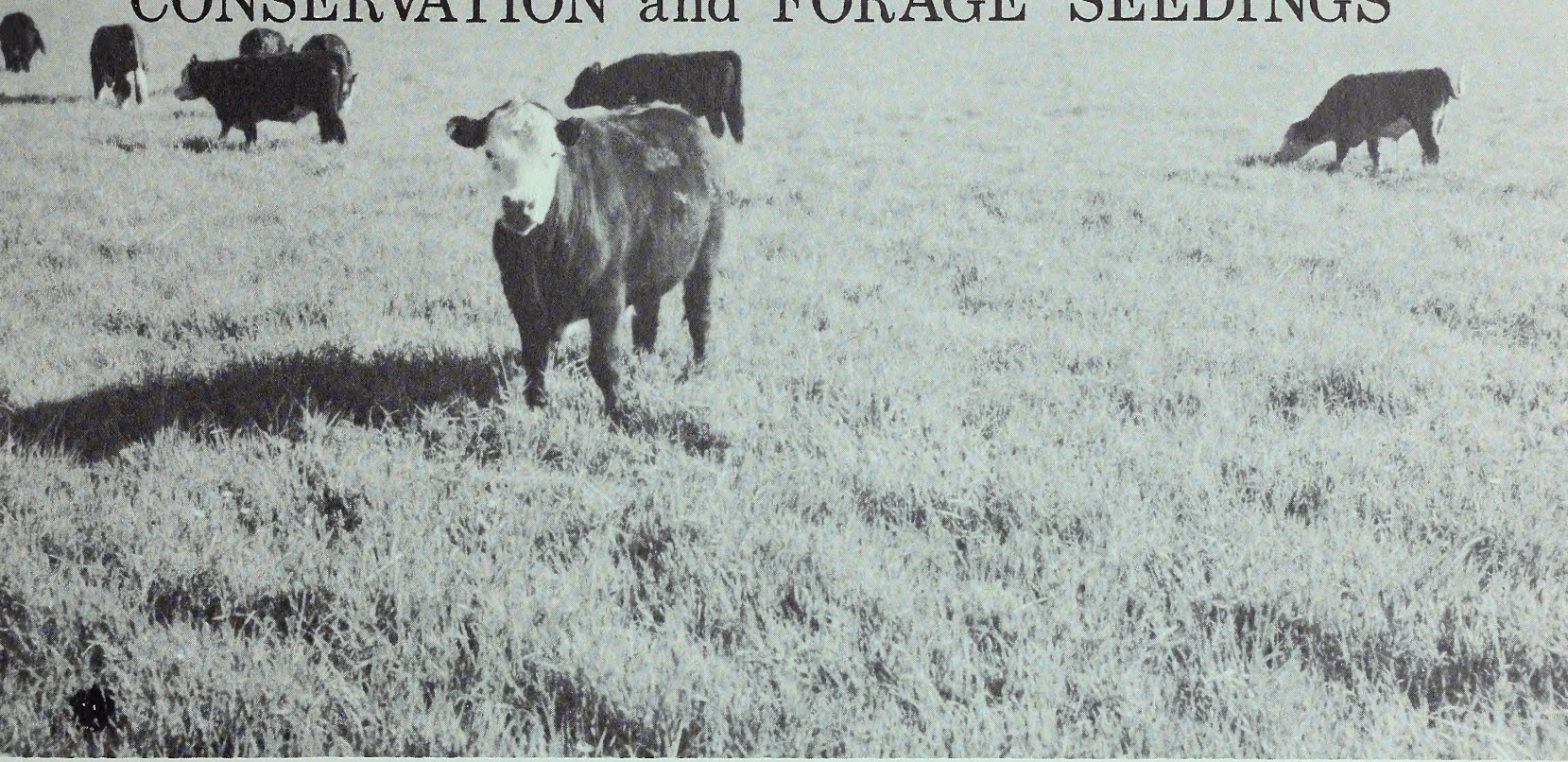


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OREGON INTERAGENCY GUIDE for CONSERVATION and FORAGE SEEDINGS



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FOREWORD

The publication of "Oregon Interagency Guide for Conservation Forage Seedings, 1971" is the culmination of 22 years' work of individuals and agencies, concerned with the work in the State.

This revision is intended to update and standardize seeding recommendations for conservation and forage use. Where possible, recommendations are based on research findings. Personal observations, trial plantings, and nurseries have also been utilized as sources of information for this revision.

Recommendations in this report are intended as general guidelines and should provide the basis of seeding recommendations for all State and Federal agencies in Oregon. Some further revision and modification may be necessary to fit specific local conditions. In such instances, it is suggested that local interagency committees develop local recommendations. The purpose of local modifications is to supplement, not replace this report. This report properly utilized should provide the basis for sound recommendations for conservation and forage seedings for all State and Federal agencies in Oregon.

Participating Agencies:

U. S. Department of Agriculture
Agricultural Stabilization & Conservation Service
Agricultural Research Service
Farmers Home Administration
Forest Service
Soil Conservation Service

U. S. Department of Interior
Bureau of Indian Affairs
Bureau of Land Management

Oregon State University
Cooperative Extension Service
Experiment Station

Oregon State Department of Forestry
Oregon State Game Commission

BLM Library
Denver Federal Center
Bldg. 50, OC-521
P.O. Box 25047
Denver, CO 80225

Editorial Committee:

Bill Anderson, SCS
Bill Billings, SCS
Henry Froehlich, OSU
George Garrison, FS
Dillard Gates, CES
Dave Luman, BLM

Bob Maben, OGC
Bob Martin, BLM
Carl Rice, BLM
Warren Sandau, BLM
Bill Sanford, OGC
Charles Waldron, FS
Harold Youngberg, CES

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SEEDING GUIDELINES

1. Select species and varieties adapted to soil, site, and intended use.
2. Have good seedbed.
3. Control plant competition.
4. Seed at proper time and rate.
5. Plant at proper depth and cover adequately.
6. Protect from damage during establishment. (grazing, trampling, traffic)
7. Inoculate legume seed.
8. Treat seed with approved pesticide when needed.
9. Use wise subsequent management.

GUIDES FOR SUCCESSFUL LEGUME INOCULATION

1. When ordering bacterial culture always state the name of legume to be inoculated.
2. Use culture in the recommended "safe" period.
3. Keep commercial culture in cool dark place until used.
4. Follow directions and mix culture well with seed.
5. Inoculate the seed just before sowing.
6. Sow into moist soil. Planting inoculated seeds in dry soil is usually not recommended. However, if an adhesive like syrup is used to mix the inoculant with the seed, the life of the bacteria can sometimes be maintained for two to three weeks.
7. If inoculated seed must be stored, it is a wise precaution to inoculate again just before sowing.

NORMAL ANNUAL PRECIPITATION 1930 - 1957 STATE OF OREGON

Isohyetal analysis prepared by the U. S. Weather Bureau River Forecast Center, Portland, Oregon using adjusted climatological data (1930-57) and values derived by correlation with physiographic factors.

Published by the Soil Conservation Service, U. S. Department of Agriculture, in cooperation with the U. S. Weather Bureau, U. S. Department of Commerce, July 1964

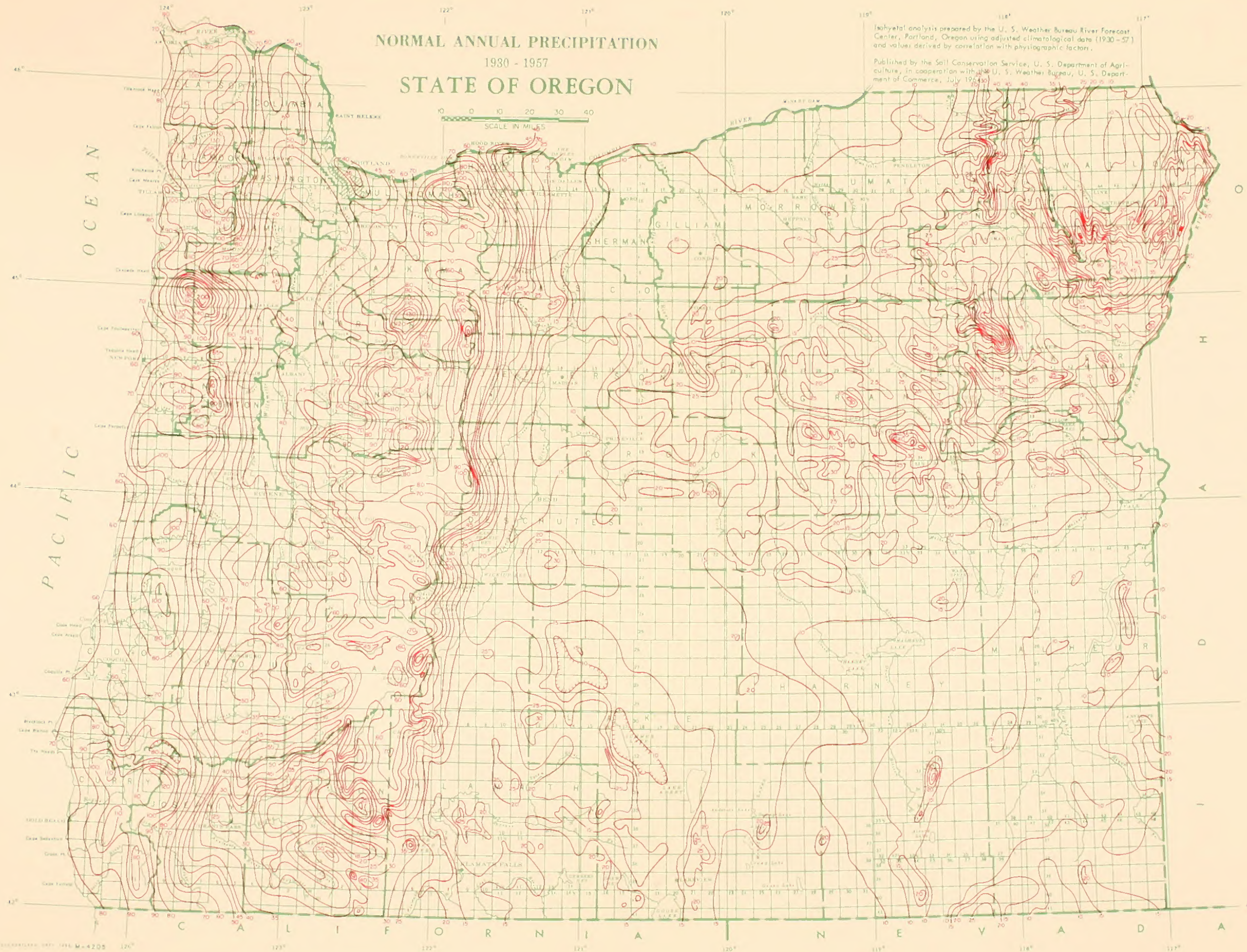


TABLE OF ADAPTABILITY FOR SOME CONSERVATION,
FORAGE AND RANGE PLANTS

Explanation

Current costs of seeding places special emphasis on the need for correctly evaluating the site to be seeded in terms of adapted plants, seeding methods, management, and use.

An ecological approach to site evaluation and selection of adapted plants is basic. This focuses attention on factors such as climate, soil, slope and exposure, and the native plant community of the site, all of which interact upon each other to create a net environment to which the seeded plants respond.

Precipitation zones commonly have been used as an index for selecting species to seed. This can be very misleading and has resulted in many instances where unadapted plants were selected for seeding. For example: under a precipitation of 13 inches, a north facing slope may produce plants as if it were receiving 15 inches precipitation. A south facing slope in the same area may perform as if it were receiving 10 inches precipitation. Other factors such as clayey subsoils, gravelly substrata, restricting layers, and timeliness of the precipitation in relation to the growing season commonly change the net environment from that normally typical of the precipitation that falls on the land.

The concept of net environment may be new to some and difficult at first to comprehend. The majority of plant technicians, ranchers and farmers, however, readily comprehend the usefulness of this concept for improving evaluation of sites to be seeded.

Generalized Concept

With considerable prudence, the following generalized native characteristics of the classes of effective environment cited in this guide can be used for Eastern Oregon.

Under 9": Needlegrasses, ricegrass, Sandberg bluegrass, big sagebrush
Moisture conditions typical for about 6 to 9 inches precipitation

9-11": Bluebunch wheatgrass, Sandberg bluegrass, needlegrasses, big sagebrush
Moisture conditions typical for about 9 to 12 inches precipitation

12-14": Bluebunch wheatgrass, Idaho fescue, Sandberg bluegrass, bitterbrush

Moisture conditions typical for about 12 to 15 inches precipitation

Droughty bottomland soils may have this rating

15-17": Idaho fescue, bluebunch wheatgrass, giant wild rye, snowberry, ponderosa pine

Moisture conditions typical for about 15 to 18 inches precipitation

Semi-moist bottomlands that produce a sparse stand of giant wild rye naturally, have this rating

18-25": Idaho fescue, Columbia needlegrass, elk sedge, pinegrass, slender wheatgrass, tall shrubs, Douglas fir, ponderosa pine

Moisture conditions typical for about 18 to 26 inches precipitation

Moist bottomlands that produce a dense stand of giant wild rye naturally, have this rating

25-40": Tufted hairgrass, timber oatgrass, redtop, twinflower, meadowrue, white fir, Douglas fir

Moisture conditions typical for about 26 to 40 inches precipitation

Semi-wet bottomlands that produce moist-land vegetation such as redtop, have this rating

also

Over 40": High-moisture forested areas not yet characterized in terms of native plants

Moisture conditions typical for about 40 to 70 inches precipitation

Wet bottomlands that produce wet-land vegetation such as tufted hairgrass, have this rating

TABLE OF ADAPTABILITY FOR SOIL CONSERVATION
FORAGE AND FEED PLANTS

How to use the table:

Ascertain the average annual precipitation for the site to be seeded. Next, study the factors of the site that could make the site produce plants as if it were actually receiving more or less precipitation (soil, slope, exposure, run-on, run-off, timeliness of precipitation, elevation, etc.)

If nothing about the site logically could increase or decrease the effectiveness of the precipitation that falls on the land, use the column representing the average annual precipitation that falls on the site.

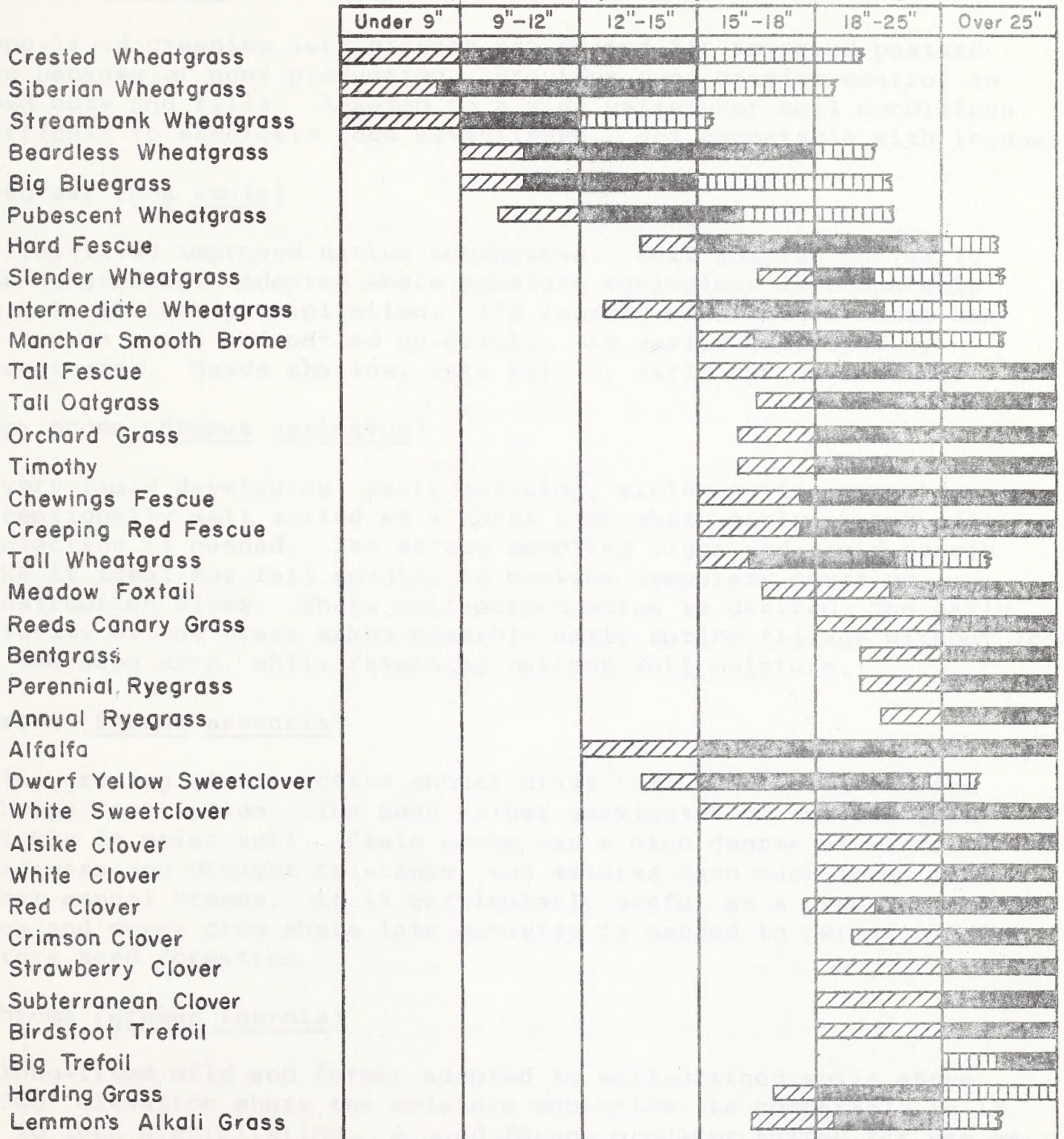
If site factors logically increase the effectiveness of the precipitation that falls on the site so as to make it perform as if it were actually in a higher precipitation zone, use the column representing the higher zone.

If site factors lower the effectiveness one zone, use the column representing the lower zone.

Water-Gainful Performance
Common Performance
Dry-Period-Adapted by Other Species

TABLE OF ADAPTABILITY FOR SOME CONSERVATION, FORAGE, AND RANGE PLANTS IN OREGON

CLASSES OF EFFECTIVE ENVIROMENT (Represented by Average Annual Precipitation)



Below Optimum Performance



Optimum Performance



Out Performed by other Species

CHARACTERISTICS OF GRASS AND LEGUME SPECIES*

Bentgrasses (Agrostis sp.)

Long-lived creeping turf grasses not suited for improved pasture use because of poor production. Provides good erosion control in road cuts and fills. Adapted to a wide variety of soil conditions. Difficult to eradicate once established. Not compatible with legumes.

Big bluegrass (Poa ampla)

A long-lived improved native bunchgrass. Well adapted for early spring grazing. Adapted where moisture equivalent is comparable to 9 to 15 inch precipitation. Its loosely constructed bunch can be broken apart and pulled up easily. Is easily destroyed by overgrazing. Needs shallow, late fall or early spring seeding.

Cucamonga brome (Bromus carinatus)

A very rapid developing, early maturing, winter-active annual grass, exceptionally well suited as a cover crop where early winter soil protection is needed. Its strong seedling vigor and rapid growth make it ideal for fall seeding to provide temporary cover on construction sites. Where self-perpetuation is desired, the early maturity of the grass makes possible early spring tillage without loss of the seed crop, while retaining maximum soil moisture.

Field brome (Bromus arvensis)

A low-growing winter-active annual grass that produces a massive fibrous root system. The seed either germinates or deteriorates quickly in moist soil. Field brome has a high degree of winter hardiness and drought tolerance, and matures seed much later than other annual bromes. It is particularly useful as a green manure crop and cover crop where late maturity is needed to permit plowing before seed formation.

Smooth brome (Bromus inermis)

A long-lived mild sod former adapted to well-drained soils above 2,500' elevation where the moisture equivalent is comparable to 15 to 20 inch precipitation. A good forage producer suited for use as pasture, silage or hay with irrigation or dryland conditions. Does not have suitable longevity under pasture use when mixed with other plants because of its extreme palatability.

* For variety recommendations, see the current revision of "Forage Varieties for Oregon", Circular of Information 617.

Reed canarygrass (Phalaris arundinacea)

A long-lived sod former especially suited for use on extremely wet land or where prolonged inundation occurs. May be high producing under proper grazing management. Uniform utilization is a common problem because of the conditions under which it is used. Suited for pasture or conservation plantings. Can be a serious weed in irrigated areas.

Chewings fescue (Festuca rubra commutata)

A long-lived, turf-type bunchgrass adapted under irrigation and on dryland where the moisture equivalent is comparable to 18 inches or more precipitation. Used primarily as a turf and conservation grass. Does well on soil of low fertility. Is shade tolerant. Requires well drained soil.

Creeping red fescue (Festuca rubra)

Similar to chewings fescue. Has weak rhizomes.

Hard fescue (Festuca duriuscula)

A low-growing bunchgrass adapted where the moisture equivalent is comparable to 15 to 25 inch precipitation in the Columbia Basin, Blue Mountains, Central Oregon, and Snake River areas. Has a dense and voluminous root system. Gives excellent erosion control.

Tall fescue (Festuca arundinacea)

A long-lived high-producing bunchgrass suited for use under a wide range of soil and climatic conditions. Tolerant of strongly acid to strongly alkaline conditions. Suited for use under irrigation, subirrigated, or moderately wet conditions or on dryland where the moisture equivalent is comparable to over 18 inches precipitation.

Meadow foxtail (Alopecurus pratensis)

A long-lived, weak sod-former well adapted to wet soils, to land subject to flooding in winter or early spring, and to high altitudes. Suited for pasture and hay. Tolerant of prolonged snow cover. Is frost tolerant. Tolerant of strongly sodic conditions. Responsive to high fertility. Difficult to seed -- requires carrier for the seed if seeded through standard drill or requires special seeding equipment. Spreads well into native meadow sod. May become a weed problem in areas of grass seed production.

Creeping meadow foxtail (Alopecurus arundinaceus)

A cool season, sod-forming grass. Possesses strong rhizomes forming a dense sod. Adapted in eastern Oregon mountain meadows.

Hardinggrass (Phalaris tuberosa var. stenoptera)

A drought resistant, winter-active, long-lived perennial adapted for use on moderately deep to deep soils (40" or more), that are fine to medium textured, and imperfectly to moderately well drained. Spring seeding is necessary because seedlings are not winter hardy. Entire stands of Hardinggrass seedlings have been killed when temperatures dropped to 10° F. Adapted to western Oregon.

Tall oatgrass (Arrhenatherum elatius)

A long-lived, rapid-developing bunchgrass. Well adapted to low fertility soils. Best suited for silage and hay on well drained soils under irrigation or on dryland where the moisture equivalent is comparable to 18 inches or more precipitation. Will not persist under heavy grazing. Tolerant of shade. May attract rodents in dryland seedings.

Orchardgrass (Dactylis glomerata)

A long-lived, high-producing bunchgrass adapted to well drained soils under irrigation or on dryland where the moisture equivalent is comparable to 18 inches or more precipitation. Shade tolerant. Suited for pasture, hay or silage. Varieties developed include early, mid, and late season in maturity. Late season varieties are preferred in mixtures with alfalfa, especially in eastern Oregon.

Annual ryegrass (Lolium multiflorum)

A vigorous, winter-active annual adapted to a wide variety of soil conditions under irrigation or on dryland where the moisture equivalent is comparable to 25 inches or more precipitation west of the Cascades. Good for winter cover crop and temporary seedings on disturbed areas. May be seeded with red clover for hay in short rotations. Establishes rapidly, is strongly competitive and can retard establishment of perennial grasses and legumes seeded heavily as a component of a mixture.

Perennial ryegrass (Lolium perenne)

Long-lived vigorous grass adapted to a wide variety of soil conditions under irrigation or on dryland where the moisture equivalent is comparable to 25 inches or more precipitation west of the Cascades.

Well adapted to short rotations with clover. May retard establishment of other perennials if seeded too heavily in a mixture. Good recovery after grazing in the spring. Tends to go dormant in summer. New types are available for turf and conservation uses.

Sudangrass (Sorghum vulgare var. sundanense)

A warm season, summer annual grass, yields well in summer under warm conditions. Requires irrigation where rainfall is less than 30 inches. Piper and Trudan varieties are relatively low in prussic acid. Sudangrass is highly durable under wet conditions west of the Cascades. Piper sudangrass is early maturing and produces substantial amounts of seed and is recommended as a source of feed for upland game birds. Prussic acid content may increase in new growth following a frost or under drought conditions.

Timothy (Phleum pratense)

Perennial adapted to high elevations and where moisture equivalent is comparable to 18 inches or more precipitation. Suited for forage and erosion control and has special value in revegetating forested lands in eastern Oregon, southern Oregon, and the eastern portion of the Willamette Valley. Is a productive hay crop. Its late maturity may be an advantage under certain conditions.

Beardless wheatgrass (Agropyron inerme)

A long-lived drought-tolerant bunchgrass adapted where the moisture equivalent is comparable to 9 to 18 inch precipitation. Provides later green forage than crested wheatgrass. Generally has low seedling vigor which delays establishment about one year.

Crested wheatgrass (Agropyron desertorum)

A long-lived, drought-tolerant bunchgrass. Well adapted for early spring grazing. One of the best adapted grasses for use where moisture equivalent is comparable to 9 to 15 inch precipitation.

Intermediate wheatgrass (Agropyron intermedium)

A late-maturing, long-lived, mild sod former suited for use as hay and pasture, alone or with alfalfa, under irrigated or on dryland where the moisture equivalent is comparable to 15 to 23 inch precipitation. Requires good drainage and moderate to high fertility.

Siberian wheatgrass (Agropyron sibericum)

Has the same general characteristics as Nordan crested wheatgrass. Is considered to be slightly more drought tolerant than crested, especially on coarse textured or sandy soils.

Slender wheatgrass (Agropyron trachycaulum)

A relatively short-lived bunchgrass adapted where the moisture equivalent is comparable to 18 to 22 inch precipitation. Used with sweet or red clover for short rotations, or for green manure, on sandy soils. Tolerant of moderately alkaline conditions.

Streambank wheatgrass (Agropyron riparium)

A long-lived drought tolerant creeping sod former. Has excellent seedling vigor and is particularly well adapted for erosion control where the moisture equivalent is comparable to 9 to 12 inch precipitation. It has little value as a forage producer and is used primarily for stabilization of roadsides and canal banks.

Pubescent wheatgrass (Agropyron trichophorum)

A long-lived sod former adapted to low fertility sites and fine textured soils where moisture equivalent is comparable to 12 to 15 inch precipitation. Will tolerate more alkali and drier conditions than intermediate wheatgrass. Better adapted for pasture than for hay.

Tall wheatgrass (Agropyron elongatum)

A tall-growing, long-lived bunchgrass suited for hay or pasture under irrigation or on dryland where the moisture equivalent is comparable to 16 to 20 inch precipitation. Once established, it is tolerant of strongly to very strongly sodic conditions - one of the most tolerant of all forage grasses used in Oregon. Is late maturing. Adapted especially to clayey sodic soils. Does not withstand close grazing. Good seedling vigor.

Mamouth wildrye (Elymus giganteus)

Improved variety, Volga. A coarse, drought resistant, creeping grass. Unpalatable to livestock. Long lived on inland sand dunes where it will stop sand movement and provide permanent cover. Grown from seed or propagated vegetatively. Seed supply frequently limited.

Alfalfa (Medicago sativa)

Perennial legume with numerous varieties, each of which has specific characteristics for a given purpose. Suited for use as hay, pasture or silage under irrigation or on dryland where the moisture equivalent is comparable to 15 inches or more precipitation. In general, those that are winter-hardy show less regrowth after cutting. Alfalfa used in eastern Oregon should be winter-hardy and resistant to bacterial wilt. Stem nematode resistance is necessary in many areas. Flemish types are suited for western Oregon.

Alsike clover (Trifolium hybridum)

Short-lived perennial legume suited for hay or pasture under irrigation or on dryland where the moisture equivalent is comparable to 25 inches or more precipitation. Adapted for use on poorly drained, acid soils, especially in cool areas. Tolerant of moderately alkaline conditions. No improved varieties available.

Crimson clover (Trifolium incarnatum)

A winter-annual legume used primarily for cover crop. Grown in western Oregon on dryland where the moisture equivalent is comparable to 25 inches or more precipitation. Requires well drained soil. Makes rapid spring growth if seeded in early fall.

Red clover (Trifolium pratense)

Short-lived perennial legume suited primarily for hay and silage under irrigation or on dryland where the moisture equivalent is comparable to 20 inches or more precipitation. Requires well drained soil. Produces best under medium acid to neutral soil conditions.

Strawberry clover (Trifolium fragiferum)

A spreading pasture-type perennial clover suited for pasture use under irrigation or semi-wet, strongly to very strongly sodic conditions in eastern Oregon. Less productive than white clover where the latter can be grown. The Salina variety has been found to be tolerant to winter flooding making it a suitable legume adjacent to overflowing waterways.

Subterranean clover (Trifolium subterraneum)

A winter annual legume very well suited for use in non-irrigated pasture in western Oregon where the moisture equivalent is comparable to 25 inches or more precipitation. Will volunteer freely for many years if managed properly. Very well adapted to foothill pastures. Avoid use in rotation with row crops.

Sweet clover (Melilotus sp.)

Tall-growing, stemmy annual or biennial legume. Suited for green manure under irrigation or on dryland where the moisture equivalent is comparable to 15 inches or more precipitation. Can be used as forage with care and experience.

Biennial: Madrid is yellow flowered. It is earlier maturing, less productive under optimum growing conditions, and more suited for use on sandy soils or in drier conditions than is white flowered Spanish.

Annual: Hubam is white flowered summer annual useful for green manure and late-season honey production.

White clover (Trifolium repens)

Long-lived perennial legume suited primarily for pasture, but also suited for hay and silage, under irrigation or on dryland where the moisture equivalent is comparable to 25 inches or more precipitation. Requires medium to high fertility and adequate moisture for optimum production. Is not tolerant of strongly acid nor strongly alkaline conditions. Tolerates poor drainage. May present a bloat hazard when it represents a high percentage of the pasture.

Giant Type. (Ladino) Giant in terms of height, leaf size and other characteristics. Very well suited to interior areas of western Oregon away from the coast, especially for hay and silage. Will winter kill under dry winter conditions. Susceptible to slug damage. Requires high soil phosphate level and good management for maximum production.

Intermediate Type. (New Zealand) Intermediate in terms of height and leaf size. Very well adapted to locations along the coast and interior western Oregon where slugs are a problem. Responds well to good management and fertilization. Common white clover is of intermediate type. Seed should be obtained from a similar climate.

Small Type. Small to intermediate in terms of height and leaf size. Adapted to higher elevations and colder areas where seed used is from similar areas. Most drought-tolerant of the white clovers. Very persistent under pasture conditions. Withstands close grazing. Least productive of the white clovers.

Sainfoin (Onobrychis viciaefolia)

A tall herbaceous legume palatable to livestock. Is frost tolerant and not known to cause bloat. Less productive than alfalfa where tested in Oregon.

Big trefoil (Lotus pedunculatus)

Long-lived rhizomatous legume suited for use as pasture and hay in western Oregon under year-long wet-land conditions. Withstands considerable winter inundation. Not winter hardy.

Birdsfoot trefoil (Lotus corniculatus)

Long-lived, deep-rooted legume suited for use as pasture or hay under irrigation or on dryland where the moisture equivalent is comparable to 25 inches or more precipitation. Because of slow establishment, alternate-row seeding or seeding with herbicide to control competition favors establishment. Requires special inoculant. Does not create bloat problem. Very winter hardy. Useful at high elevation. Drought tolerant under western Oregon conditions. The broadleaf type is tolerant of poor drainage, more vigorous, and better adapted to Oregon conditions.

Common vetch (Vicia sativa)

A winter-annual legume similar to hairy vetch in terms of use. More acceptable for hay than hairy vetch but not as winter hardy.

Hairy vetch (Vicia villosa)

A winter-annual legume suited primarily for cover crops but also suited for silage, winter pasture and hay. Useful for interim cover on disturbed soil. Withstands wetter soil and lower temperatures than other common winter annual legumes. Volunteer readily (profusely) when allowed to disseminate seed.

CHARACTERISTICS OF BROWSE SPECIES

Bitterbrush (Purshia tridentata)

A preferred and highly palatable species for grazing animals. Grows principally on well-drained sites throughout the sagebrush, juniper, ponderosa pine, and mountain brush types with annual precipitation ranges from 10 to 25 inches. Grows well on both acidic and basic soils. A valuable shrub in the restoration of winter game range.

Narrowleaf or Wedgeleaf Buckbrush (Ceanothus cuneatus)

An erect shrub 3' - 8' tall. Twigs rigid and thorn-like. Commonly found in dry, gravelly or rocky soils from central Willamette Valley in western Oregon south into California in elevations up to 3800 feet. This evergreen is a very important black-tailed deer winter browse plant. In the natural state, seeds from this plant germinate well after a fire as this breaks seed dormancy.

Mahogany (Cercocarpus ledifolius or C. montanus)

A highly preferred forage and winter shelter for deer and elk. Grows throughout an elevational zone of 4,000 to 10,000 feet. Occurs on a variety of sites. Seedlings are highly susceptible to drought and frost which makes it difficult to establish.

Four-Wing Saltbush (Atriplex canescens)

A widely adaptable shrub in foothill and desert ranges with superior palatability and productivity for both livestock and game. Has the ability to maintain itself with a strong association of grasses. Adaptable to a wide range of elevations and soil types. Retains its leaves throughout the winter which makes it a preferred shrub on winter ranges.

Snowbrush (Ceanothus velutinus)

An important evergreen shrub found in a variety of sites and exposures, usually at higher elevations than other Ceanothus species. Deer frequently bed in the thickets and may crop the foliage during all seasons. Root crowns usually sprout after fires, and fire appears to stimulate germination of undamaged seed. Shrubs may be erect or prostrate from 2' - 10' tall.

RECOMMENDED SEEDINGS AND MIXTURES

WESTERN OREGON

COASTAL AREA

I. LIVESTOCK FORAGE PRODUCTION

A. Bottom land, tideland, diked land, and bench land

1. Well drained bottom land and bench land including irrigated land

a. Long Term Pasture^{1/}

	(1)	(2) ^{2/}	(3)	(4) ^{3/}	(5) ^{3/}
Orchardgrass	12			5	6
Tall fescue		15		5	8
Meadow foxtail			10		
Perennial ryegrass				5	
New Zealand white clover	<u>3</u>	<u>3</u>	<u>3</u>	<u>3</u>	<u>3</u>
Total lbs./Acre	15	18	13	18	17

^{1/} Three to six pounds of H-1 ryegrass may be added to long term pasture mixtures for increased production in the first two or three years.

^{2/} Requires intensive management.

^{3/} Single species grass mixtures are easier to manage.

b. Short Rotation Pasture

	(1)	(2)
H-1 ryegrass	15	15
New Zealand white clover	3	3
Red clover	<u> </u>	<u>5</u>
Total lbs./Acre	18	23

Coastal Area (continued)

2. Poorly drained land - high water table

	(1)	(2)	(3) ^{1/}	(4)	(5) ^{2/}
Meadow foxtail	10	10			
Tall fescue			15	12	
H-1 ryegrass				4	
Big trefoil	3	3	3		
New Zealand white clover		3		3	
Reed canarygrass					15
Total lbs./Acre	13	16	18	19	15

1/ Two pounds of New Zealand white clover may be added to mixture if the field is spotted with better drained areas.

2/ Use on very wet land flooded for extended periods

B. Hill soil - non-irrigated

1. Well drained, logged-off and burned - to be converted to long-term pasture.

	(1)	(2)	(3)	(4)	(5)
Orchardgrass	8			12	
Tall fescue		15	15		
Perennial ryegrass ^{1/}	6				15
Subterranean clover ^{1/}	5		6		6
New Zealand white clover ^{2/}	2	3		3	
Total lbs./Acre	21	18	21	15	21

Comment: One pound of big trefoil may be added to above mixtures.

1/ Seeding rates should be increased on partial seedbed.

2/ White clover used on moist sites or north slopes. Requires higher fertility than subterranean clover.

2. Poorly drained

	(1)	(2)	(3)
Meadow foxtail	10	6	
Tall fescue			15
Timothy		4	
Big trefoil	2	2	2
New Zealand white clover	2	2	2
Total lbs./Acre	14	14	19

II. OTHER CONSERVATION AND WILDLIFE USE

A. Interim protective soil cover on logged-off land (temporary during reforestation)

	(1)	(2)	(3)	(4)
Timothy	4			
Big trefoil	2		2	
Birdsfoot trefoil		6		
Subterranean clover			5	5
White clover			2	
Hardinggrass		7		
Annual ryegrass				8
Total lbs./Acre	6	13	9	13

B. Newly constructed log roads and skid trails for stabilization and beautification

	(1)	(2)	(3)	(4)
Blue wild rye ^{1/}				20
Birdsfoot trefoil		5		4
Creeping red fescue	10	5		
Chewings fescue	8			
White clover	3			
Perennial ryegrass ^{2/}	3		5	
Tall fescue		5	9	
Orchardgrass			3	
Highland bentgrass			3	
Total lbs./Acre	24	15	20	24

^{1/} Limited seed supply.

^{2/} Annual ryegrass may be used for quick cover. It may be competitive with other perennials.

C. Wildlife developments, species that have wildlife values

1. Big game - seeded on burned, plowed, or other disturbed soils

	(1)	(2)	(3)	(4)
Orchardgrass	5	5		
*Hardinggrass			5	
Perennial ryegrass				7
Big trefoil		2		2
Birdsfoot trefoil		1		1
*Subterranean clover	5		5	5
Common white clover	3	3	3	3
Total lbs./Acre	13	11	13	18

Other species

- *Burnet
- *Wheat, barley, gray oats
- *Elderberry
- *Blackberry
- Snowbrush (Ceanothus velutinus)
- Deerbrush (C. intergerimus)

Comment: These species can be seeded separately or mixed and added to other seedings such as: roadside, stabilization, and beautification.

Commercial fertilizers improve forage production and animal use on seeded and native species.

2. Upland game and waterfowl

* Species under C. 1., big game, are important upland game bird food species.

Pounds seed per acre

Proso millet	20
Buckwheat, common or tartary	30
Smartweed	10
Corn, sweet or field	5
Foxtail millet	20
Barley or wheat	75-100

Comment: All species under C. 1. provide game cover.

SOUTHERN OREGON

I. LIVESTOCK FORAGE PRODUCTION

A. Well drained, irrigated land

1. Pasture

	(1)	(2)	(3)
Orchardgrass	10		
Tall fescue		12	
Hardinggrass			8
Ladino or New Zealand white clover	<u>2</u>	<u>2</u>	<u>2</u>
Total lbs./Acre	12	14	10

2. Hay and Silage

	(1)	(2)	(3)	(4)
Orchardgrass		3	3	
Tall fescue				4
Timothy			6	
Alfalfa	<u>10-15</u>	<u>10-15</u>		<u>15</u>
Total lbs./Acre	10-15	13-15	6	19

B. Well drained land, not irrigated

1. Deep soil (over 36")

a. Pasture

	(1)	(2)	(3)	(4)	(5)	(6)
Orchardgrass		8				8
Tall fescue	12		12			
Perennial ryegrass				8-10		
Hardinggrass					6	
New Zealand white clover ^{1/}			2			2
Subterranean clover ^{1/}	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>
Total lbs./Acre	19	15	14	15-17	13	10

^{1/} Seeding rates should be increased on partial seedbed.

b. Hay and Silage

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Alfalfa	10-15	10-15	10-15				
Birdsfoot trefoil				6			
Subterranean clover					7	7	7
Perennial ryegrass					10-15		
Orchardgrass	3					8-10	
Tall fescue		4					8-10
Total lbs./Acre	13-18	14-19	10-15	6	17-22	15-17	15-17

2. Shallow soil (less than 36")

	(1)	(2)	(3)	(4)	(5) ^{2/}
Tall fescue	8				
Orchardgrass		6			
Hardinggrass				6	
Annual ryegrass					6
Perennial ryegrass ^{1/}	3	3	6		
Subterranean clover ^{1/}	7	7	7	7	7
Total lbs./Acre	18	16	13	13	13

^{1/} Seeding rates should be increased on partial seedbed.

^{2/} Recommended only on very shallow soils (less than 12").

C. Poorly drained wet land, not irrigated

	(1)	(2)	(3)	(4)	(5)
Meadow foxtail	8	8			
Tall fescue			12	12	
Birdsfoot trefoil	6		6		6
New Zealand white clover		2		2	
Total lbs./Acre	14	10	18	14	6

D. High range - non-forested

1. Moist site

	(1)	(2)	(3)
Tall fescue			8
Timothy	2		
Meadow foxtail	2		
Orchardgrass	3		
Tall wheatgrass		10	
Birdsfoot trefoil	3	6	5
<u>Total lbs./Acre</u>	<u>10</u>	<u>16</u>	<u>13</u>

2. Dry Site

	(1)
Pubescent wheatgrass	3
Hard fescue	2
Intermediate wheatgrass	3
Birdsfoot trefoil	2
<u>Total lbs./Acre</u>	<u>10</u>

II. OTHER CONSERVATION AND WILDLIFE USE

A. Logged-off land - interim cover

	(1)	(2)	(3)
Timothy	4		
Birdsfoot trefoil	4		
Burnet	4		
Annual ryegrass		8 1/2	
Subterranean clover			5
Field brome			8
<u>Total lbs./Acre</u>	<u>12</u>	<u>13</u>	<u>13</u>

1/ Seeding rates should be increased on partial seedbed.

Southern Oregon (continued)

B. Cover crops on croplands and orchards

1. Winter cover and green manure crops^{1/}

	(1)	(2)	(3)	(4)
Winter cereal grains (rye or oats)	100	60	60	60
Hairy vetch		20		
Common vetch			40	
Austrian peas				60
Total lbs./Acre	100	80	100	120

^{1/} 20 to 40 pounds actual nitrogen per acre at seeding will speed development of protective cover.

2. Permanent orchard cover crop

a. Non-irrigated

Pounds per acre

Subterranean clover 10

b. Irrigated

Chewings or creeping red fescue 10
Orchardgrass (Pomar) 8
White clover 4

C. Newly constructed log roads and skid trails for stabilization and beautification

	(1)	(2)
Creeping red fescue	11	10
Chewings fescue	8	
Birdsfoot trefoil	3	5
Perennial ryegrass	3	
Kentucky bluegrass	5	5
Total lbs./Acre	30	20

Southern Oregon (continued)

D. Wildlife habitat developments

1. Big game - seeded on burned, plowed, or other disturbed sites.

	(1)	(2)	(3)
Orchardgrass	7	7	5
Timothy			2
Birdsfoot trefoil ^{1/}	3		3
Subterranean clover		6	
Common white clover	<u>2</u>	<u> </u>	<u>3</u>
Total lbs./Acre	12	13	13

^{1/} Use subterranean clover below 4,000', common white above 4,000'.

Other Species

	<u>Pounds per acre</u>
Hardinggrass	7
Perennial ryegrass	10
Pubescent wheatgrass	8
Intermediate wheatgrass	8
Burnet	5
Alfalfa	1-4
Wheat, barley, and oats (fall seeded)	75-100
Snowbrush (<u>Ceanothus velutinus</u>)	
Deerbrush (<u>Ceanothus intergerrimus</u>)	
Wedgeleaf (<u>Ceanothus cuneatus</u>)	
Elderberry	

Comments: Application of commercial fertilizer will improve establishment, forage production and utilization of native as well as seeded species.

These species can be seeded separately or mixed and added to other seedings such as roadsides, stabilization, and beautification.

Southern Oregon (continued)

2. Upland game and waterfowl

	<u>Pounds per acre</u>
Wheat and barley	75-100
*Proso millet	20
*Smartweed	10
*Buckwheat	30
*Corn, sweet and field	5
*Sudangrass	6
Lana vetch	30
*Alfalfa	4-15
Foxtail millet	20

* Require irrigation.

Comment: Waterfowl use is enhanced by flooding with 2 to 15 inches of water.

WILLAMETTE VALLEY

I. LIVESTOCK FORAGE PRODUCTION

A. Well drained valley floor and river bottom - not irrigated

1. Permanent pasture

	(1)	(2)	(3)	(4)
Orchardgrass	10	10	10	
Tall fescue				12
Perennial ryegrass		3	3	
Subterranean clover			6	6
New Zealand white clover	<u>2</u>	<u>2</u>	<u> </u>	<u> </u>
Total lbs./Acre	12	15	19	18

2. Hay and Silage

	(1)	(2)	(3)	(4)	(5) ^{1/}	(6)
Orchardgrass		2	2			
Timothy				6		
Alfalfa	12	10				
Red clover					8	
Birdsfoot trefoil	<u> </u>	<u> </u>	<u>6</u>	<u>6</u>	<u> </u>	<u>8</u>
Total lbs./Acre	12	12	8	12	8	8

^{1/} Red clover recommended only for short rotation hay or silage.

B. Well drained valley floor and river bottom - irrigated

1. Permanent pasture

	(1)	(2)	(3)	(4)
Orchardgrass	12			
Tall fescue		15		
Meadow foxtail			10	10
Ladino or New Zealand white clover	2	2	2	2
Birdsfoot trefoil ^{1/}	<u> </u>	<u> </u>	<u> </u>	<u>4</u>
Total lbs./Acre	14	17	12	16

^{1/} Birdsfoot trefoil will not persist under continuous close grazing.

Willamette Valley (continued)

2. Hay and Silage

	(1)	(2)	(3)	(4)	(5)
Orchardgrass		2	2		
Timothy					6
Alfalfa	12	10			
Birdsfoot trefoil			6	8	
Total lbs./Acre	12	12	8	8	6

C. Poorly drained land - not irrigated -- permanent pasture, hay or silage

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Tall fescue	12						6
Meadow foxtail		10		8			
Perennial ryegrass			12				
Timothy							4
New Zealand white clover	2	2	2	2			2
Birdsfoot trefoil					8		
Big trefoil ^{1/}				2			2
Reed canarygrass ^{2/}						15	
Total lbs./Acre	14	12	14	12	8	15	14

1/ Big trefoil does well only on very wet or sub-irrigated land.

2/ Reed canarygrass is suggested for land too wet for other seedings.

D. Hill soil, well-drained plowable - not irrigated

1. Pasture

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Orchardgrass	10	10				10	10
Tall fescue			12	12			
Perennial ryegrass					10	3	3
Subterranean clover ^{1/}	6		6		6	6	
New Zealand white clover		2		2			2
Total lbs./Acre	16	12	18	14	16	19	15

1/ In vegetable or small fruit rotations, the use of sub clover is not recommended. Seeding rates should be increased on partial seedbed.

Willamette Valley (continued)

2. Hay and Silage

	(1)	(2)	(3)	(4) ^{1/}
Orchardgrass	2		2	
H-1 ryegrass				6
Alfalfa	10	12		
Red clover				8
Birdsfoot trefoil			6	
Total lbs./Acre	12	12	8	14

^{1/} Recommended only for short-term hay or silage planting.

E. Hill soil, cut-over or burned -- non plowable

1. Permanent pasture

	(1)	(2)	(3)	(4)	(5)	(6) ^{1/}
Orchardgrass	10	10				3
Tall fescue			12	12		
Perennial ryegrass ^{2/}		3		3	10	
Subterranean clover ^{2/}	7	7	7	7	7	
Meadow foxtail						2
Timothy						2
Birdsfoot trefoil						3
Total lbs./Acre	17	20	19	22	17	10

^{1/} High elevation range use.

^{2/} Seeding rate should be increased on partial seedbed.

II. OTHER CONSERVATION AND WILDLIFE USE

A. Interim cover on logged-off hill land (temporary during reforestation)

	(1)	(2)	(3)	(4)	(5)
Timothy	4	4	4		
Burnet	4	4			
Birdsfoot trefoil	4		2	6	2
White clover		2			2
Subterranean clover					5
Total lbs./Acre	12	10	6	6	9

B. Cover crops on croplands and orchards

1. Winter cover and green manure crops

a. Overflow land subject to winter erosion

Annual ryegrass^{1/} 40 lbs./Acre

^{1/} 20 to 40 lbs. actual nitrogen per acre at seeding will speed development of protective cover.

b. Other land

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Winter cereal grains (rye, oats, barley, or wheat)	100	60	60	60					
Hairy vetch		15			25				
Common vetch			40			75			
Austrian peas ^{1/}				60			100		
Crimson clover ^{1/}								15	
Annual ryegrass									30
Total lbs./Acre	100	75	100	120	25	75	100	15	30

^{1/} Limit to fertile soils and when fall rains permit early seeding or on irrigated land.

2. Permanent orchard cover crop

a. Non-irrigated

Subterranean clover^{1/} 10 lbs./Acre

^{1/} Subterranean clover must be closely cropped in order to maintain the stands.

b. Irrigated

	<u>Pounds per acre</u>
White clover	4
Chewings or creeping red fescue	10
Tall fescue ^{1/2/}	10
Orchardgrass ^{1/}	8

^{1/} May be mixed with perennial legumes at 4 lbs./Acre if desired.

^{2/} May be too competitive under some conditions.

C. Newly constructed log roads and skid trails for stabilization and beautification

	(1)	(2)	(3)	(4)	(5)
Blue wild rye	20		5		
Birdsfoot trefoil	4				
Creeping red fescue		10	5		
Chewings fescue		8			3
White clover		3			
Annual ryegrass		3		5	5
Tall fescue			5	9	
Orchardgrass				3	8
Highland bentgrass				3	
Total lbs./Acre	24	24	15	20	16

D. Wildlife habitat developments

1. Big game

	(1)	(2)	(3)	(4)
Orchardgrass ^{1/}	7		7	
Hardinggrass ^{1/}		5		
Timothy ^{2/}		2		
Perennial ryegrass				7
Common white clover		3		3
Birdsfoot trefoil	2			
Subterranean clover	5	3		5
Total lbs./Acre	14	13	7	15

^{1/} Below 2,500'

^{2/} Timothy does well under moderate use.

Other Species

- Burnet
- Wheat
- Barley
- Elderberry
- Blackberry
- Snowbrush (Ceanothus velutinus)
- Deerbrush (Ceanothus intergerrimus)

Willamette Valley (continued)

Comments: These species can be seeded separately or mixed and added to other seedings such as: roadside, stabilization, and beautification.

Commercial fertilizers improve establishment, forage production and animal use on seeded and native species.

2. Upland game and waterfowl

- Barley
- Proso millet
- Smartweed
- Buckwheat
- Corn, sweet and field
- Sudangrass
- Potatoes (late planted and flooded for waterfowl)
- Meadow foxtail - clipped short for fall, winter goose and duck browse
- Barley - fall seeded for waterfowl browse

Comment: Wildlife use is enhanced by flooding with 2 to 15 inches of water.

RECOMMENDED SEED MIXTURES FOR EASTERN OREGON

I. LIVESTOCK FORAGE PRODUCTION

A. Irrigated pastures and hay mixtures

1. Adequate water, neutral conditions, no drainage problems

a. Pasture

	(1)	(2)	(3) ^{2/}	(4)	(5)	(6) ^{3/}
Tall fescue		15	9			
Meadow foxtail				8	4	
Orchardgrass	10		6		6	
Manchar smooth brome						10
Ladino or New Zealand white clover ^{4/}	1	1	1	1	1	
Alfalfa ^{1/}						2
Total lbs./Acre	11	16	16	9	11	12

1/ Alfalfa at 1-3 lbs./acre may be substituted for clover in above mixtures.

2/ Compatible species only under high-level management.

3/ For use only at elevations above 2,500' - 4,000'

4/ Use common white clover at 2,500' - 4,000'

b. Hay and Silage

	(1)	(2)	(3)	(4)	(5)	(6) ^{1/}	(7)
Alfalfa	8	8	8	8	8	8	8-10
Orchardgrass	4						
Manchar smooth brome		6					
Meadow foxtail			5				
Tualatin tall oatgrass				6			
Tall fescue					8		
Hard fescue or big bluegrass						4	
Total lbs./Acre	12	14	13	14	16	12	8-10

1/ Used for cheatgrass control where second crop is wanted for grass-free commercial hay.

Eastern Oregon (continued)

2. Adequate water, alkaline or sodic conditions - pasture and hay

	Moderately Alkaline		Strongly Sodic		Very Strongly Sodic	
	(1)	(2)	(3)	(4)	(5)	
Tall fescue	12	12				
Meadow foxtail			8			
Tall wheatgrass				8		8
Strawberry clover ^{1/}	2	4	4			4
Birdsfoot trefoil	2					
Lemmons alkali grass						1 ^{2/}
Total lbs./Acre	16	16	12	8	13	

^{1/} 2 lbs. of alfalfa can be substituted for clover in mixtures (1), (2), and (3).

^{2/} Broadcast lemmons alkali grass on extremely sodic spots only.

3. Inadequate irrigation water

	Pasture		Hay	
	(1)	(2)	(3)	(4)
Alfalfa	2	2	4	4
Intermediate wheatgrass	6		6	
Pubescent wheatgrass		5		
Total lbs./Acre	8	7	10	4

4. Wet conditions - pasture and hay

	Occasionally Flooded		Inundated for Short Periods			Inundated for Long Periods	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Meadow foxtail	8		8				8
Reed canarygrass		8		8		8	
Tall fescue					12		
Birdsfoot trefoil			4	4	4		
Alsike clover	2	2					
Total lbs./Acre	10	10	12	12	16	8	8

Comment: 2 lbs. timothy can be added to mixtures (1) and (2).

B. Non-irrigated pasture and hay mixtures

1. Effective environment comparable to less than 9 inches precipitation

a. Pasture

	(1)	(2)
Siberian wheatgrass	5	
Nordan crested wheatgrass	<u> </u>	<u>5</u>
Total lbs./Acre	5	5

Forage production may not be economical. Use 12-18 inch drill spacing, deep furrow preferred.

2. Effective environment comparable to 9-12 inch precipitation

a. Pasture

	(1)	(2)	(3)	(4)
Sherman big bluegrass				6 $\frac{1}{4}$
Nordan crested wheatgrass	6			<u>4$\frac{1}{4}$</u>
Siberian wheatgrass		6		
Whitmar beardless wheatgrass	<u> </u>	<u> </u>	<u>8</u>	<u> </u>
Total lbs./Acre	6	6	8	10

1/ Reduces pull-up of bluegrass.

b. Hay

Moisture insufficient for perennial grass hay.
Consider cereals.

3. Effective environment comparable to 12-15 inch precipitation

a. Pasture

	Spring & Spring-Fall Use ^{2/}				Early Summer Use	
	(1)	(2)	(3)	(4)	(5)	(6)
Sherman big bluegrass				6		
Nordan crested wheatgrass	6			4 ^{3/}		
Siberian wheatgrass		6				
Whitmar beardless wheatgrass			8		8	
Topar pubescent wheatgrass						8
Alfalfa ^{1/}	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>
Total lbs./Acre	7	7	9	11	9	9

^{1/} Recommended varieties: Ladak, Vernal, Rambler, Teton, Ranger, and Nomad.

^{2/} Especially adapted for early spring use.

^{3/} Reduces pull-up of big bluegrass.

b. Hay

	(1)	(2)	(3)	(4)
Sherman big bluegrass	6			
Topar pubescent wheatgrass				8
Siberian wheatgrass			6	
Nordan crested wheatgrass		6		
Alfalfa ^{1/}	<u>4</u>	<u>4</u>	<u>4</u>	<u>4</u>
Total lbs./Acre	10	10	10	12

^{1/} Recommended varieties: Ladak, Vernal, Rambler, Teton, Ranger, and Nomad.

4. Effective environment comparable to 15-18 inches precipitation

a. Pasture

(1) Spring and spring-fall use

	(1)	(2)	(3)	(4)	(5)
Greenar intermediate wheatgrass					8
Sherman big bluegrass				6	
Siberian wheatgrass	6				
Nordan crested wheatgrass		6			
Whitmar beardless wheatgrass			8		
Durar hard fescue ^{1/}	4	4	4	4	
Alfalfa ^{2/}	1	1	1	1	1
	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>
Total lbs./Acre	11	11	13	11	9

1/ Better suited to clayey soils than other plants listed.

2/ Recommended varieties: Ladak, Teton, Rambler, Rhizoma, Vernal, and Nomad.

(2) Summer use

	(1)	(2)	(3)	(4)	(5)
Whitmar beardless wheatgrass	8				
Greenar intermediate wheatgrass		8		8	
Manchar smooth brome			6		
Alkar tall wheatgrass ^{1/}					8
Durar hard fescue ^{2/}	4				
Alfalfa ^{3/}	1	1	1	1	1
	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>
Total lbs./Acre	13	9	7	8	8

1/ Restrict to sodic conditions.

2/ Better suited to clayey soils than other plants listed.

3/ Recommended varieties: Ladak, Teton, Rambler, Rhizoma, Vernal, and Nomad.

Comment: 4 lbs. of Dwarf yellow sweet clover can be substituted for alfalfa in mixtures (1), (2), and (3).

Eastern Oregon (continued)

b. Hay

	(1)	(2) ^{2/}	(3) ^{3/}
Greenar intermediate wheatgrass	8		
Alkar tall wheatgrass		8	
Durar hard fescue			4
Alfalfa ^{1/}	<u>4</u>	<u> </u>	<u>4</u>
Total lbs./Acre	12	8	8

1/ Recommended varieties: Ladak, Vernal, Orestan, Ranger, and Lahontan.

2/ Restrict to sodic conditions.

3/ Used for cheatgrass control where minimum grass in hay is desired.

5. Effective environment comparable to 18-25 inches precipitation

a. Pasture, Summer use

	(1)	(2)	(3)	(4)	(5)	(6)
Tall fescue ^{1/}			8			
Greenar intermediate wheatgrass	8					
Manchar smooth brome				8		
Late-season orchardgrass		8				
Alkar tall wheatgrass ^{2/}					8	
Meadow foptail						6
Alfalfa ^{3/ 4/}	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u> </u>	<u>1</u>
Total lbs./Acre	9	9	9	9	8	7

1/ Hard fescue above 5,000'

2/ Restrict to sodic conditions. Granger lotus may be used in mixture.

3/ Recommended varieties: Ladak, Vernal, Orestan, Ranger, and Lahontan.

4/ Birdsfoot trefoil at 1 lb./acre above 4,000' elevation.

Eastern Oregon (continued)

b. Hay

	(1)	(2)	(3)	(4)	(5)
Greenar intermediate wheatgrass		8			
Manchar smooth brome			10		
Late-season orchardgrass	8				
Tall fescue				8	
Meadow foxtail					6
Alfalfa ^{1/}	<u>4</u>	<u>4</u>	<u>4</u>	<u>4</u>	<u>4</u>
Total lbs./Acre	12	12	14	12	10

^{1/} Recommended varieties: Ladak, Vernal, Orestan, Ranger, and Lahontan.

II. OTHER CONSERVATION AND WILDLIFE USE

A. Sand stabilization - effective environment comparable to less than 9 inches precipitation.

Volga wild ryegrass - grown from seed or clones in nursery and transplanted during November through February to the sand area on an 18-24 inch grid spacing, using two plants per hill.

Eastern Oregon (continued)

B. Roadway stabilization^{1/}

	(1) ^{2/}	(2) ^{2/}	(3) ^{3/}	(4) ^{3/}	(5) ^{4/}	(6) ^{4/}	(7) ^{4/}
Siberian wheatgrass	5						
Nordan crested wheatgrass		5		12	6		
Fairway wheatgrass			12				
Streambank wheatgrass						6	
Pubescent wheatgrass							8
Potomac orchardgrass					3	3	3
Total lbs./Acre	5	5	12	12	9	9	11

1/ Bulbous bluegrass should be used with caution. If seeded on watersheds above cultivated lands, it can become a serious weed in summerfallow or irrigated areas.

2/ Effective environment comparable to less than 9 inches precipitation.

3/ Effective environment comparable to less than 9-12 inches precipitation.

4/ Effective environment comparable to less than 12-15 inches precipitation.

Roadway stabilization (continued)

	(8)	(9) ^{5/}	(10) ^{5/}	(11) ^{5/}	(12) ^{6/}	(13) ^{6/}	(14) ^{6/}
Durar hard fescue			4				4
Topar pubescent wheatgrass	8					8	
Tegmar intermediate wheatgrass		8					
Nordan or Fairway crested wheatgrass				6			
Greenar intermediate wheatgrass					8		
Total lbs./Acre	8	8	4	6	8	8	4

5/ Effective environment comparable to less than 15-18 inches precipitation.

6/ Effective environment comparable to less than 18-25 inches precipitation

Eastern Oregon (continued)

C. Waterway stabilization

	(1) <u>1/</u>	(2) <u>1/</u>	(3) <u>1/</u>	(4) <u>2/</u>	(5) <u>2,3/</u>
Pubescent wheatgrass	16				
Nordan crested wheatgrass		12		12	
Streambank wheatgrass			12		
Topar pubescent wheatgrass				8	16
Total lbs./Acre	16	12	12	20	16

1/ Effective environment comparable to 9-12 inch precipitation.

2/ Effective environment comparable to 12-15 inch precipitation.

3/ Effective environment comparable to 15-18 inch precipitation.

Waterway stabilization (continued)

	(6) <u>3,4/</u>	(7) <u>3/</u>	(8) <u>3/</u>	(9) <u>4/</u>	(10) <u>4/</u>
Durar hard fescue		8			4
Tegmar intermediate wheatgrass			16		
Chewings or creeping red fescue				10	
Tall fescue					16
Topar pubescent wheatgrass	16				
Total lbs./Acre	16	8	16	10	20

3/ Effective environment comparable to 15-18 inch precipitation.

4/ Effective environment comparable to 18-25 inch precipitation.

D. Fencerows

	(1) ^{1/}	(2) ^{1,2/}	(3) ^{2/}	(4) ^{2/}	(5) ^{2/}	(6) ^{2,3/}
Sherman big bluegrass		6				
Sodar streambank wheatgrass	6					
Duram hard fescue						4
Topar pubescent wheatgrass				8		
Tegmar intermediate wheatgrass					8	
Nordan or Fairway crested wheatgrass			6			
Total lbs./Acre	6	6	6	8	8	4

1/ Effective environment comparable to 12-15 inch precipitation.

2/ Effective environment comparable to 15-18 inch precipitation.

3/ Effective environment comparable to 18-25 inch precipitation.

E. Orchard cover crops

1. Annual cover

	(1)	(2)	(3)
Austrian peas	80		
Hairy vetch		20	
Cereal grains			60
Total lbs./Acre	80	20	60

Comment: Disc down or mow to stop use of water by cover crop.
Leave sufficient residue on surface to control erosion.

2. Permanent, irrigated cover

Pounds per acre

1 Orchardgrass	10
2 Tall fescue	12
3 Red clover	8
4 Ladino clover	3
5 Chewings or creeping red fescue ^{1/}	8
6 Perennial ryegrass ^{1/}	12

^{1/} Use for cherry and other orchards where other species may provide too much competition.

Comments: Mow to control growth. Use of cover crops in orchards involves local problems of fertilization.

F. Disturbed soil areas and burns

1. In pine-bunchgrass (dry phase) areas^{1/}

Pounds per acre

Nordan crested wheatgrass	5
Durar hard fescue	3
Late-season orchardgrass	<u>2</u>

Total lbs./Acre 10

^{1/} Effective environment comparable to 15-18 inches precipitation.

2. In pine-fir (moist phase) areas^{1/}

	(1)	(2)	(3)	(4)
Greenar intermediate wheatgrass ^{2/}	4			
Late-season orchardgrass	3	3	4	2
Timothy	1	1		1
Blue wild rye ^{3/}		3		
Hard fescue			2	
Manchar smooth brome				<u>4</u>
Total lbs./Acre	8	7	6	7

^{1/} Effective environment comparable to 18-25 inches precipitation. Add 1-4 lbs. alfalfa or birdsfoot trefoil for big game.

^{2/} May be competitive with reforestation after a burn.

^{3/} Seed supply slowly building.

G. High elevation or sub-alpine

1. Grassland for soil stability

	<u>Pounds per acre</u>
Pubescent wheatgrass	3
Late-season orchardgrass	2
Timothy	1
Blue wild rye	2
Birdsfoot trefoil	<u>1</u>
Total lbs./Acre	9

Comments: Perennial vetch at 1 or 2 lbs./acre may be added to the above mixture if available. Nitrogen and sulfur bearing fertilizers will speed establishment and increase production.

H. Wildlife habitat development

The following list contains species that can be seeded separately or mixed and added to other conservation seedings to obtain wildlife benefits. Individual species should be selected to fit with the effective environment of the seeding site.

1. Big game

- Crested wheatgrass
- Siberian wheatgrass
- Pubescent wheatgrass
- Intermediate wheatgrass
- Orchardgrass
- Timothy
- Alfalfa
- Bitterbrush
- Birdsfoot trefoil
- Sainfoin (summer rain needed)
- Four-wing saltbush (alkaline soils)
- Mahogany

2. Upland game

- Wheat
- Barley
- Sherman big bluegrass (upland game cover)
- Lana vetch
- Tetra pectus rye
- Alfalfa
- Proso millet
- Barnyard grass
- Corn (sweet or field)

I. Grassland for soil stability

II. Wildlife habitat development

I. Big game

- Crested wheatgrass
- Siberian wheatgrass
- Pubescent wheatgrass
- Intermediate wheatgrass
- Hardtail
- Alfalfa
- Eriogonum
- Grassroot
- Salicornia (amarant rain washed)
- Four-wing saltbush (alkaline soils)
- Mahogany

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SEED CHARACTERISTICS FOR GRASSES & LEGUMES
USED FOR
CONSERVATION AND FORAGE SEEDINGS^{1/}

Scientific Name	Common Name	Seeds Per Pound	Standard Quality % LPS ^{3/}	Standard Seeds/Sq.Ft.		For 6" Drill Spacing ^{2/} Lbs/Ac. Seeds/Lin.Ft.
				@ 1 lbs/Ac.		
Grain:						
<i>Avena sativa</i>	Oats	12,650		0.29		45
<i>Hordeum vulgare</i>	Barley	13,600		0.31		48
<i>Secale cereale</i>	Rye	18,000		0.41		45
<i>Triticum vulgare</i>	Wheat	11,300		0.26		60
Grasses:						
<i>Agropyron cristatum</i>	Fairway crested wheatgrass	200,000	85	4.6		6
<i>Agropyron dasystachyum</i>	Thickspike wheatgrass	156,000	75	3.6		8
<i>Agropyron desertorum</i>	Crested wheatgrass	175,000	85	4.0		6
<i>Agropyron elongatum</i>	Tall wheatgrass	79,000	83	1.8		8
<i>Agropyron inerme</i>	Beardless wheatgrass	135,000	83	3.1		8
<i>Agropyron intermedium</i>	Intermediate wheatgrass	100,000	83	2.3		8
<i>Agropyron riparium</i>	Streambank wheatgrass	170,000	91	3.9		10
<i>Agropyron sibiricum</i>	Siberian wheatgrass	253,000	84	5.8		6
<i>Agropyron smithii</i>	Western wheatgrass	110,000	60	2.5		10
<i>Agropyron spicatum</i>	Bluebunch wheatgrass	140,000	85	3.2		8
<i>Agropyron subsecundum</i>	Bearded wheatgrass	151,000	92	3.5		8
<i>Agropyron trachycaulum</i>	Slender wheatgrass	160,000	86	3.7		8
<i>Agropyron trichophorum</i>	Pubescent wheatgrass	91,000	82	2.1		8
<i>Agrostis alba</i>	Redtop	4,990,000	81	114.5		2
<i>Alopecurus arundinaceus</i>	Creeping meadow foxtail	900,000	55	20.7		5

Scientific Name	Common Name	Seeds Per Pound	Standard Quality @ 1 Lb/Ac.	For 6" Drill Spacing ^{2/}	
				Seeds/Sq.Ft.	Lbs/Ac. Seeds/Lin. Ft.
<u>Grasses (continued)</u>					
<i>Alopecurus pratensis</i>	Meadow foxtail	900,000	20.7	5	52
<i>Arrhenatherum elatius</i>	Tall oatgrass	150,000*	3.5	6	10
<i>Bromus inermis</i>	Manchar smooth brome	125,000	2.9	6	9
<i>Bromus marginatus</i>	Mountain brome	45,000*	1.0	10	5
<i>Dactylis glomerata</i>	Orchardgrass	540,000	12.4	5	31
<i>Elymus canadensis</i>	Canada wildrye	85,000*	2.0	8	8
<i>Elymus glaucus</i>	Blue wildrye	140,000*	3.2	8	13
<i>Elymus junceus</i>	Russian wildrye	170,000	3.9	6	12
<i>Elymus triticoides</i>	Beardless wildrye	175,000	4.0	10	20
<i>Festuca arundinacea</i>	Tall fescue	230,000	5.2	8	21
<i>Festuca idahoensis</i>	Idaho fescue	493,000	11.3	5	28
<i>Festuca ovina</i>	Sheep fescue	565,000	13.0	4	26
<i>Festuca duriuscula</i>	Hard fescue	565,000	13.0	4	26
<i>Festuca rubra commutata</i>	Chewings fescue	537,000	12.3	4	25
<i>Lolium multiflorum</i>	Italian ryegrass	217,000	5.0	2	5
<i>Lolium perenne</i>	Perennial ryegrass	247,000	5.7	3	9
<i>Oryzopsis hymenoides</i>	Indian ricegrass	235,000	5.4	15	40
<i>Phalaris arundinacea</i>	Reed canarygrass	506,000	11.6	5	29
<i>Phleum pratense</i>	Timothy	1,319,000	30.2	3	45
<i>Poa ampla</i>	Big bluegrass	917,000	21.1	4	42

Scientific Name	Common Name	Seeds Per Pound	Quality % LPS ³	Standard Seeds/Sq.Ft.		For 6" Drill Spacing ² Lbs./Ac. Seeds/Lin.Ft.
				@ 1 Lb./Ac.		
<u>Grasses (continued)</u>						
<i>Poa bulbosa</i>	Bulbous bluegrass	446,000	83	10.2	3	15
<i>Poa nevadensis</i>	Nevada bluegrass	900,000	58	20.7	4	41
<i>Poa pratensis</i>	Kentucky bluegrass	2,156,000	64	49.4	5	124
<i>Poa secunda</i>	Sandberg bluegrass	700,000	57	16.1	4	32
<i>Sorghum sudanense</i>	Sudan	54,000	78	1.2	15	99
<i>Stipa pulchra</i>	Purple needlegrass	166,000*	60	3.8	10	19
<u>Legumes:</u>						
<i>Lotus americanus</i>	Spanish clover	109,000	74	2.5	6	8
<i>Lotus corniculatus</i>	Birdsfoot trefoil	470,000	87	10.8	3	16
<i>Lotus major</i>	Big trefoil	1,092,000	80	25.0	2	25
<i>Medicago sativa</i>	Alfalfa	212,000	90	4.9	2	5
<i>Melilotus spp.</i>	Sweetclover	262,000	88	6.0	5	15
<i>Pisum spp.</i>	Peas	2,600	92	0.06	120	4
<i>Trifolium fragiferum</i>	Strawberry clover	317,000	80	7.3	2	7
<i>Trifolium hybridum</i>	Alsike clover	682,000	88	15.7	2	16
<i>Trifolium incarnatum</i>	Crimson clover	149,000	85	3.4	2	3
<i>Trifolium pratense</i>	Red clover	281,000	90	6.5	2	6
<i>Trifolium repens</i>	White Dutch clover	786,000	88	18.0	2	18
<i>Trifolium repens latum</i>	Ladino clover	897,000	88	20.6	2	21
<i>Trifolium subterraneum</i>	Subterranean clover	75,000	88	1.7	3	3
<i>Vicia sativa</i>	Common vetch	8,300	90	0.2	30	3
<i>Vicia tenuifolia</i>	Perennial vetch	33,000	87	0.75	15	6

Scientific Name	Common Name	Seeds Per Pound	Standard Seeds/Sq.Ft.		For 6" Drill Spacing ^{2/} Lbs/Ac. Seeds/Lin.Ft.
			Quality % LPS ^{3/}	@ 1 Lb/Ac.	
Legumes (continued)					
<i>Vicia villosa</i>	Hairy vetch	21,500	90	0.5	15
Forbs:					
<i>Sanguisorba minor</i>	Burnet	53,000	74	1.2	3
					2

1/ Data in this table were obtained from USDA Misc. Pub. 678, "Grasses and Legumes for Soil Conservation in the Pacific Northwest," and the 1948 Yearbook of Agriculture, "Grass." Some figures have been revised on the basis of laboratory tests, nursery trials, and field-size plantings.

2/ For 7" drill rows multiply seeds per foot by 1.17 to get correct data.
For 8" drill rows multiply seeds per foot by 1.33 to get correct data.

3/ $\frac{\text{Percent Purity} \times \text{Percent Germination}}{100} = \text{Live Pure Seed.}$

* De-awned.

Number of seeds per linear foot of drill row = $\frac{XYZ}{12}$

When:

X = Drill spacing in inches

Y = Number of seeds/foot at 1 lb/Ac.

Z = Seeding rate is lbs/Ac.

