

United States
Department of
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Soil
Conservation
Service

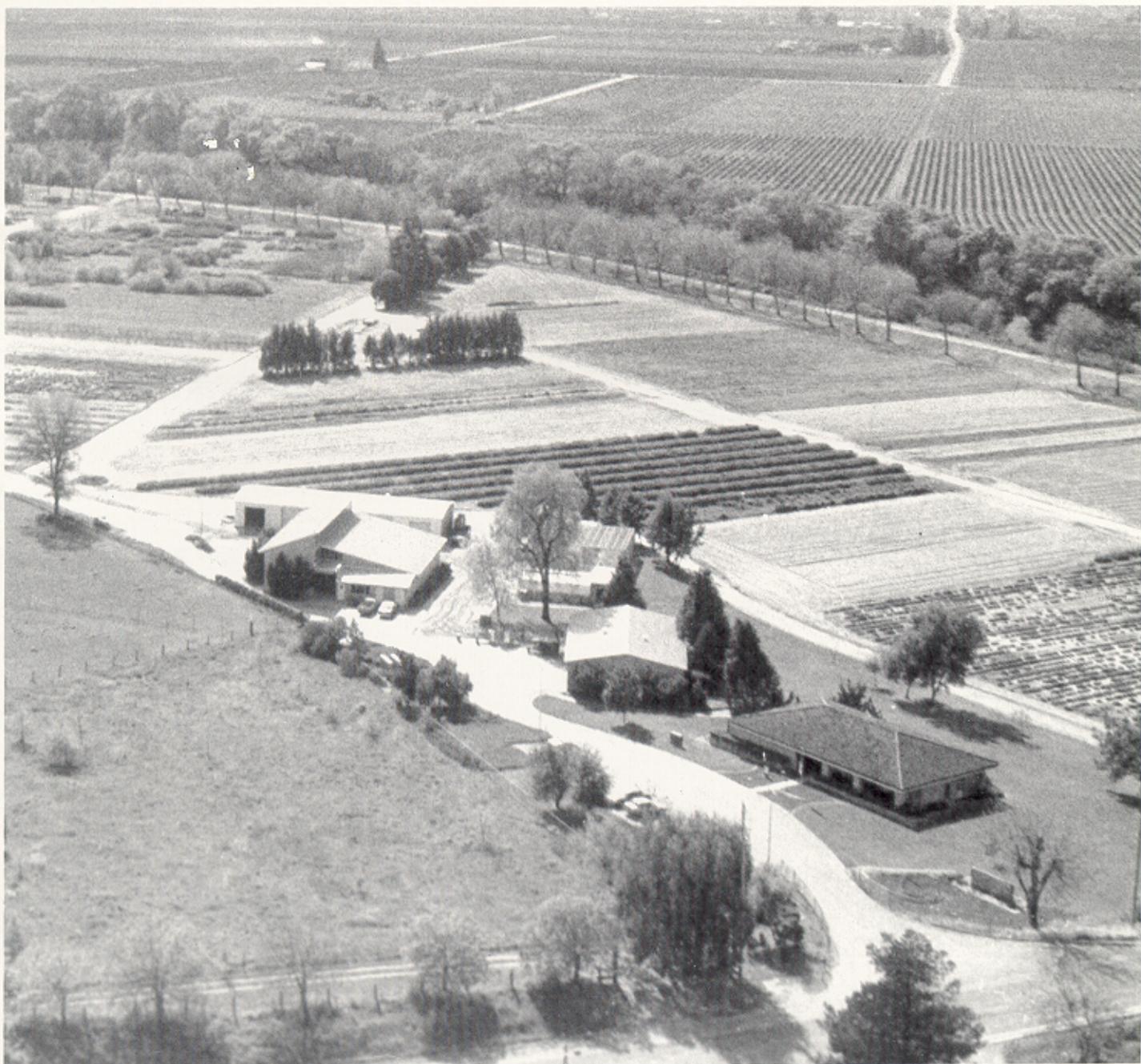
Davis,
California

1989



Lockeford Plant Materials Center

Improving Plants for Conservation



Contents

Preface	1
The PMC Service Area	2
Plant Materials Program	3
Plant Evaluations	4
Seed and Plant Production	5
Conservation Priorities	6
Special Studies	9
Success Stories	10
List of Plants	13

Cover Photo: Aerial view of the Lockeford Plant Materials Center and surrounding area.

Plants in California are varied and abundant. They perform many vital roles in our environment. Plants release oxygen, provide food and shelter, repair damaged land, prevent erosion and sedimentation, beautify the landscape, and contribute to comfortable and attractive communities for people.

Plants can solve many erosion and other resource problems. The California Plant Materials Center (PMC) in Lockeford collects prom-

ising plants and tests their performance under a variety of soil, climatic and use conditions.

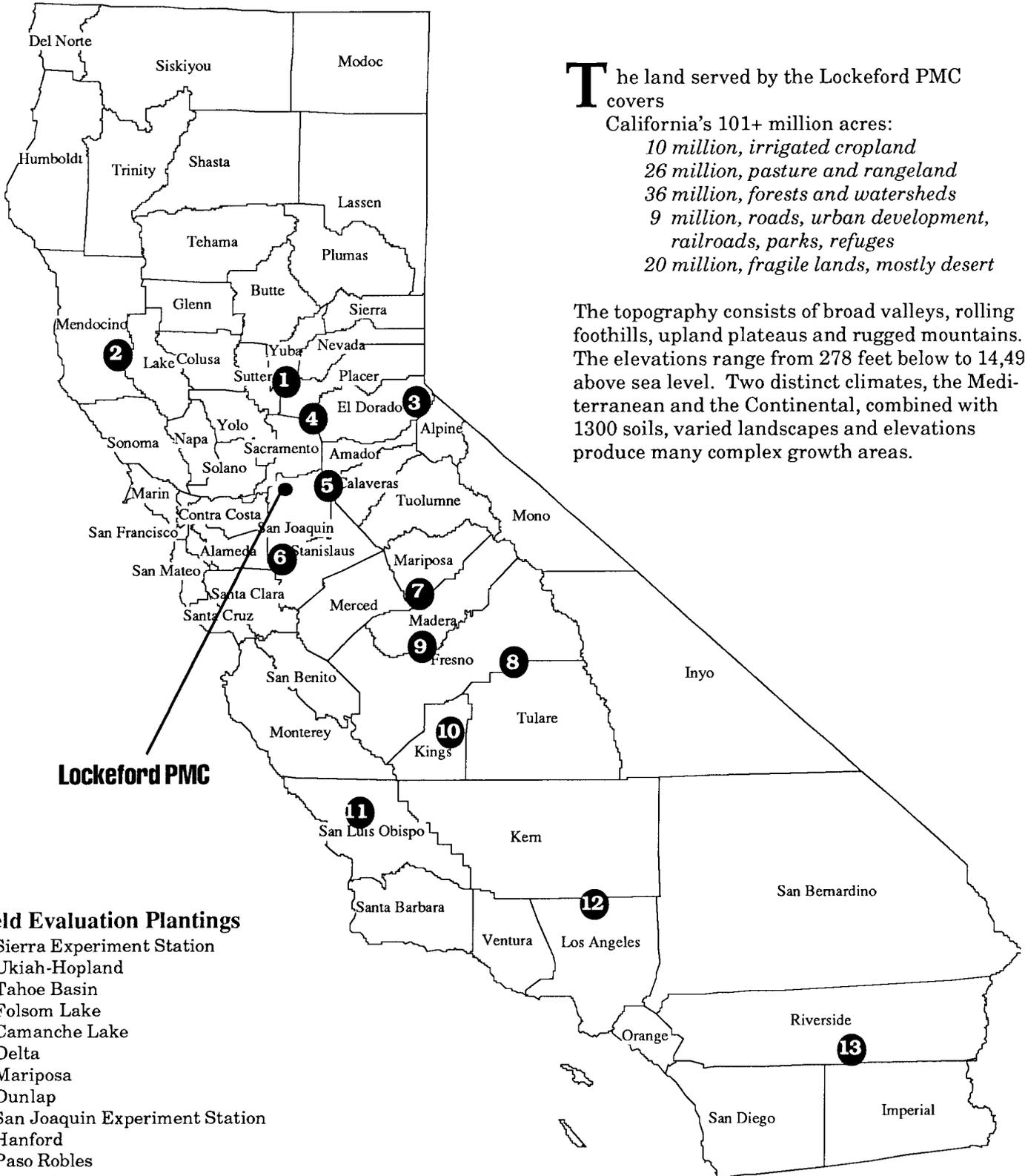
The PMC collects plants for testing from several sources, including California collections, other PMCs, foreign countries, and plant breeders and researchers. Some are native or "wild" plants. The PMC does not breed new plant species but tests existing ones for conservation uses.

In over forty years of the plant materials program, more than 25,000 plants have been tested. Twenty plants have been approved for public use by the Lockeford PMC in cooperation with the University of California, Davis.

Plant materials work is conducted in cooperation with many state and federal agencies and organizations, including: University of California, Division of Agricultural Science, California Department of Transportation (Caltrans), California Department of Forestry, Resource Conservation Districts (RCDs), USDA Forest Service, U.S. Army Corp of Engineers, U.S. Navy and the National Park Service.



PMC Service Area



The land served by the Lockeford PMC covers California's 101+ million acres:

- 10 million, irrigated cropland*
- 26 million, pasture and rangeland*
- 36 million, forests and watersheds*
- 9 million, roads, urban development, railroads, parks, refuges*
- 20 million, fragile lands, mostly desert*

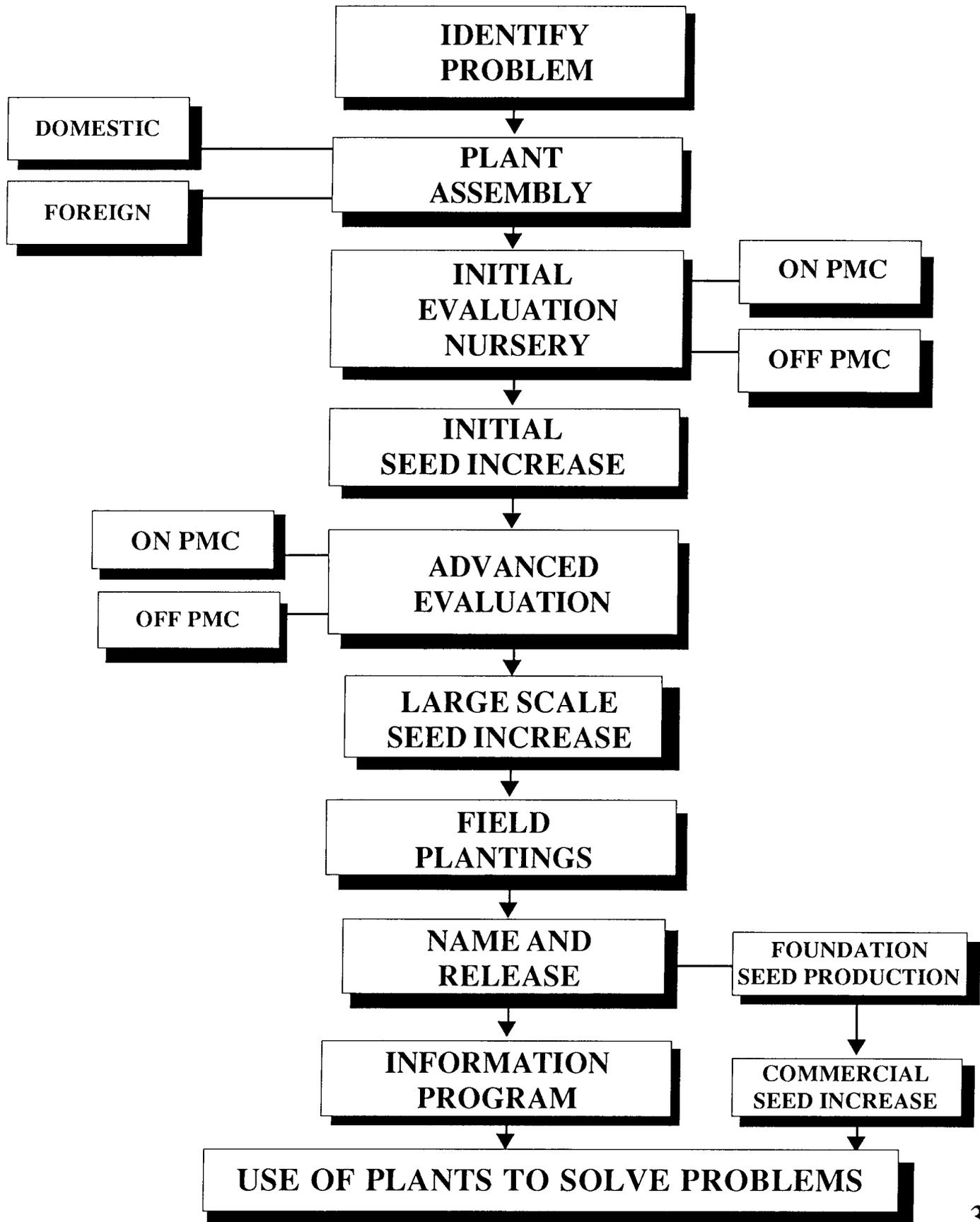
The topography consists of broad valleys, rolling foothills, upland plateaus and rugged mountains. The elevations range from 278 feet below to 14,49 above sea level. Two distinct climates, the Mediterranean and the Continental, combined with 1300 soils, varied landscapes and elevations produce many complex growth areas.

Lockeford PMC

Field Evaluation Plantings

- 1 Sierra Experiment Station
- 2 Ukiah-Hopland
- 3 Tahoe Basin
- 4 Folsom Lake
- 5 Camanche Lake
- 6 Delta
- 7 Mariposa
- 8 Dunlap
- 9 San Joaquin Experiment Station
- 10 Hanford
- 11 Paso Robles
- 12 Lancaster
- 13 Palm Springs

Plant Materials Program



Plant Evaluations

Initial Evaluation involves planting grasses, legumes, forbs, shrubs and trees in 20 to 60 foot rows on the PMC grounds. The plants are rated for seedling vigor, seed production, foliage growth rates, and also resistance to disease, insects, cold, and drought. This step involves more than 7,500 plants.

Advanced Evaluation involves trying the most promising plants in small plantings under selected soil and climatic conditions. The California sites represent high priority conservation problems and a variety of climatic conditions and soil. Cultural and management techniques also are studied.

Field Plantings involve trying the best plants under actual use conditions. Field plantings determine if the grass, forb, legume, shrub or tree is adapted to the selected use and if it has wide application. Plants are tested on the land owned or operated by RCD cooperators and other cooperating organizations.

PROMISING HERBACEOUS PLANTS FOR CRITICAL AREA STABILIZATION AND RANGE IMPROVEMENT

PLANT	NUMBER
Subclover	9041172
Bur Clover	9041173
Rose Clover	9041018
Blue Wildry	9041171
Snail Medic	9033078
	9041078

PROMISING WINDBREAK PLANTS INITIAL TESTING

PLANT	NUMBER
Athel	9032616
Guadalupe cypress	9026959
Mondell pine	9018211
Blue leaf wattle	399447
Sydney golden wattle	9032617
Imperial Carolina poplar	432347
Jacometti hybrid poplar	9032617
River she oak	9032618
Swamp she oak	9032619

PROMISING BANK AND SHORE LINE STABILIZATION PLANTS

PLANT	NUMBER
Brunswickgrass	202044
Seashore saltgrass	9006372
	9006373
Willow	9004819
Button bush	9033236
	9033227
Reed canarygrass	9006592

PROMISING PLANTS FOR FIELD PLANTINGS

PLANT	NUMBER OR NAME
Ceanothus hybrid	9006522
California buckwheat	DURO
Sulphur flower buckwheat	SIERRA
Beardless wildrye	9006379
Red brome	PANOCHÉ
Dwarf willow	BANKERS
Brewer willow	900660
Erect willow	PLACER
Sandbar willow	9004810

PROMISING SHRUBS INITIAL TESTING CRITICAL AREA STABILIZATION

PLANT	NUMBER
California Coffeeberry	9006449
Buckbrush	9018121
Deerbrush	9006338
Salmon barberry	9006332
Desert Saltbrush	9006316



Dave Dyer, PMC Manager, moves container plants to lathhouse for Yosemite National Park.

Seed and Plant Production

SEED INCREASE

Plants that prove valuable for conservation uses are made available to growers, nurseries, and commercial seed companies. They sell seeds and plants to the public.

The time from when a plant is collected until it is commercially released may take 10 to 15 years. For every 5000 plants tested, only 4 or 5 are released.

GREENHOUSE PROPAGATION

High quality plants of all types are started from seeds or cuttings in the greenhouse. These are used for initial and advanced testing and for field plantings.

About 22,000 shrubs, grass, legume, shrub and tree plants are produced annually. Many shrubs do well when planted as bareroot stock.



Grasses being propagated in greenhouse in various containers.

PROPOSED NATIVE SEED AND PLANT COLLECTIONS IN CALIFORNIA DURING 1989-1994 ARE AS FOLLOWS:

Foothill pine	Salmon barberry	Spikerush
Jeffrey pine	Thickleaf deervetch	Wild grape
Arizona cypress	Wartleaf ceanothus	Big galleta
Incense cedar	Whiteleaf manzanita	Brittlebrush
Brewer oak	Western stipa	Desert Stipa
California fescue	Baltic rush	Desert broom
Coastrange melic	Black willow	Purple threecawn
Deerweed	Buckbrush	Needlegrasses
Foothill stipa	Pinemat manzanita	Mat lupine'
Lemon ceanothus	Mulefat	Mountainpride
Mountain brome	Native sedges	
Purple stipa	Sandbar willow	
Silver lupine		

IV. PLANT MATERIALS FOR BANK AND SHORELINE REVEGETATION IN CALIFORNIA -

Most stream corridors and shorelines are subject to many uses: recreation, urban development, cropping, and grazing among others. As a result of overuse, bank and shoreline erosion are severe problems in some areas. Combined with changes in the hydrology of the watershed, watercourses are more difficult to control. Treatment measures are needed that are cost effective and utilize a combination of vegetative and structural techniques. Recent advancements in bioengineering offer potential for treating problem areas. The problem exists statewide and is not limited to specific vegetative or physiographic zones.

The action plans to combat these problems are the selection and release of plants for channel vegetation and enhancement of fishery habitat, selection of plant materials for the revegetation of drainage canal banks that are saline/alkaline affected areas and the demonstration of bioengineering solutions for streambank erosion.

V. CRITICAL AREA STABILIZATION, SIERRA NEVADA AREA-

Problem areas include recreation and residential development focused in the Lake Tahoe Basin, national parks, and other developments. Emphasis is on controlling sediment from entering streams or lakes, and in re-establishing native plants on disturbed sites. The action plan here includes develop-

ing seed sources and techniques for seed production to develop plants for disturbed sites also being done is the screening of plants selected for forest zones for use in the Sierra Nevada Mountains (testing being done in Lake Tahoe area).



Tuolumne meadows area, Yosemite National Park.

Special Studies

The PMC had three Special Studies projects. The projects involved the National Park Service (NPS), Lake County and the Department of Fish and Game with the East Bay Municipal Utility District.

The National Park Service project required major revegetation of park lands such as roads, trails and campsites. This revegetation is needed at Yosemite National Park for which there is insufficient source of native plant materials. The PMC works with NPS for the purpose of revegetating sub-alpine/alpine plant communities of Yosemite National Park. The NPS shall furnish the PMC with 5,000 native plants and collections of seed from the sub-alpine/alpine zone of the park. The PMC has furnished all facilities, supplies, materials and services to:

1. Determine methods for propagating NPS species.
2. Propagate 15,000 to 20,000 plants from 5,000 stock plants collected and delivered by NPS.
3. Collect and clean all seeds generated by stock plants.
4. Document all aspects of plant propagation, plant care, seed collection, handling and storage.

The second special studies project involved Lake County. This project, referred to as "Serpentine Grass Seedmix Project", was for the purpose of developing a seedmix capable of perma-

nently revegetating disturbed serpentine soils without the need for periodic additions of soil amendments. Lake County has had seed from native serpentine grasses collected in order to have this seed increased through greenhouse and field plantings for eventual field testing in the Geysers Geothermal area of Lake County. The PMC is increasing seed for three serpentine adapted grasses these are: Big squirreltail, California melic and Torrey melic.

The third project is in cooperation with the California Department of Fish and Game and the East Bay Municipal Utility District. This work will aid the Department of Fish and Game in developing programs for revegetating selected areas of reservoir fluctuation zones. Flooded terrestrial vegetation in the reservoir fluctuation zone provides microcover for juvenile warmwater gamefish. Major benefits include

bank stabilization, sediment reduction and water quality improvement. Information developed by the PMC will be utilized statewide in warmwater reservoir fisheries habitat improvement and erosion control work. Results will be made available to all interested parties. Some of the planned work is as follows:

1. Conduct literature search on California work on reservoir revegetation.
2. Develop a list of potential plant species that includes merits and limits of each.
3. Determine best propagation method for each species on list.
4. Adaption Studies- PMC shall annually plant about 20 species at Camanche Reservoir, Folsom Lake and New Hogan Reservoir. Different planting and seeding techniques will be used.



Tuolumne Meadows, Yosemite National Park camping sites being revegetated.

Success Stories



Above: Berber orchardgrass, and Right: Blando brome. Both grasses are used for range, orchard and vineyard cover, roadside and critical area stabilization.

Of the over 20 plants released and promoted by the Lockford PMC, there are many that stand out as superstars. 'Zorro' annual fescue can be used for that problem site on a steep roadside, hillside orchard and vineyard, mine dump or problem soil. 'Blando brome, an excellent range plant, works well on roadside and cover crop areas. 'Perla' koleagrass is an excellent perennial grass to use on California's annual rangeland, and is excellent wildlife cover and forage plant. For upland game habitat and erosion control, 'Casa' quailbush, 'Marana' fourwing saltbush, and 'Dorado' bladderpod can be used with success. 'Berber' is the "dryland" orchardgrass that is proving to be valuable for hillside cover crops, beside critical area stabilization. 'Mission' veldtgrass is the only plant for the sandy soils of California's south coast. For plantings that count, stick with SCS released plant materials.



'SIERRA' SULPHUR FLOWER BUCKWHEAT

(*Erigonum umbellatum*)

A native evergreen shrub was just released by the PMC in Lockeford, California, for conservation and beautification use on critically eroded areas. In 1972 original seed was collected from a native stand at South Lake Tahoe, El Dorado County, California.

This strain has shown good performance for use as a conservation plant on disturbed sites such as road slopes, house pads, recreational areas and construction sites with medium to coarse-textured, well drained soils where average precipitation is 40 cm or higher. It seems to be well-adapted to the dry Sierra Nevada foothills and mountains where soils and slopes limit competition.

'Sierra' is a good seed producer and can be used in dried flower arrangements. Seed germination has been about 35 percent with some dormant seed. Plants are propagated by seeding directly into containers in the greenhouse. Seedlings in the early stages of growth are somewhat susceptible to "damp-off" and quite sensitive to extreme cold. Plants can also be propagated from cuttings from mature plants.

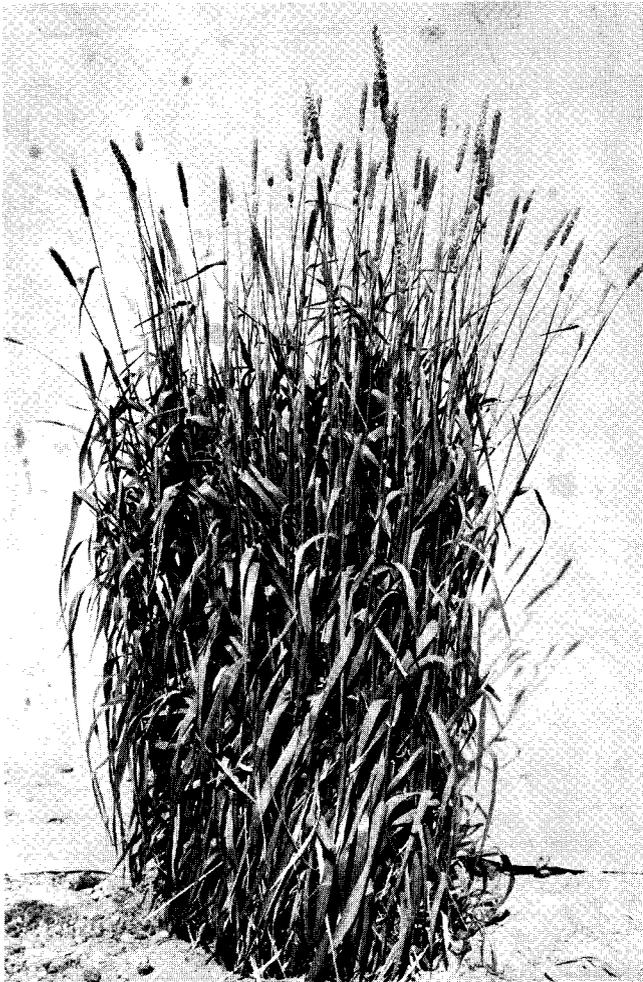


'ZORRO' ANNUAL FESCUE

(*Vulpia myuros*)

'Zorro' annual fescue for that tough site was released by SCS in cooperation with the University of California early in 1977. Among the uses are roadbank stabilization, wildfire burn and mine-spoil revegetation, orchard and vineyard cover crop, and problem soils in the Mediterranean climate. This grass has excellent seedling vigor and emerges in fall very soon after the first rain. It tolerates some problem soils that are acid, serpentine, and have low fertility. 'Zorro' annual fescue is aggressive and short with many fibrous roots and allows native plant development.





Above left: Seedpods of 'Dorado' Bladderpod -- tested for erosion control and wildlife habitat development.

Above right: Lana woollypod vetch -- Excellent range feed, upland game food and erosion control.

Left: Perla koleagrass -- An excellent range plant in California.

Above: Casa quailbush -- provides excellent wildlife cover and erosion control.

List of Plants

Common Name	Variety	Scientific Name
Athel	-	Tamarix aphylla
Arizona cypress	-	Cupressus arizonica
Baltic rush	-	Juncus balticus
Big galleta	-	Hilaria rigida
Big galleta squirreltail	-	Sitanion jubatume
Black willow	-	Salix nigra
Bladderpod	Dorado	Isomeris arborea
Brewer oak	-	Quercus garryana breweri
Brittlebrush	-	Encelia farinosa
Brome, red	Panoche	Bromus rubens
Buckbrush	-	Ceanothus cuneatus
Buckwheat, California	Duro	Eriogonum fasciculatum
Buckwheat, sulfur flower	Sierra	Eriogonum umbellatum
Buttonbush	-	Cephalathus occidentalis
Brunswickgrass	202044	Paspalum nicorae
California fescue	-	Festuca californica
Ceanothus hybrid	9006522	Ceanothus cuneatus xc prostratus
Ceanothus, lemmon	Various	C. lemmonii
Clover, rose	9041078	Trifolium hirtum
Coast range melic	-	Melica imperfecta
Cypress, Guadalupe	9026959	Cupressus guadalupensis
Deerbrush	9006338	Ceanothus integerrimus
Deerweed	-	Lotus scoparius
Desert broom	-	Baccharis sarothroides
Desert stipa	-	Stipa speciosa
Foothill stipa	-	Stipa lepida
Foothill (Digger) pine	-	Pinus sabinana
Fescue, annual	Zorro	Vulpia myuros (Festuca megalura)
Incense cedar		Calocedrus decurrens
Koleagrass	Perla	Phalaris aquatica
Lemon ceanothus	-	Ceanothus lemonii
Manzanita, wartleaf	Various	Arctostaphylos papillosus
Manzanita, pinemat	-	Arctostaphylos nevadensis

Common Name	Variety	Scientific Name
Manzanita, whiteleaf	Various	Arctostaphylos viscida
Mat lupine	-	Lupinus breweri
Meadow barley	-	Hordeum brachyantherum
Medic, burr	9041018	Medicago hispida
Medic, snail	9041078	Medicago scutellata
Mountain brome	-	Bromus marginatus
Mountainpride penstemon	-	Penstemon newberryi
Mulefat	-	Baccharis viminea
Native sedges	-	Carex spp.
Needlegrasses	-	Stipa
Orchardgrass	Akaroa	Dactylis glomerata
Orchardgrass	Berber	Dcatylis glomerata
Pine, Jeffrey	-	Pinus jeffreyi
Pine, Mondell	9018211	Pinus eldarica
Poplar, Carolina	Imperial	Populus Canadensis
Poplar, Jacometti hybrid	9032617	P. euramericana
Poplar, Caudina hybrid	T-326189	Populus euramericana
Poplar, Incrassata hybrid	T-32619	P. euramericana
Poplar, Jacometti hybrid	T-32617	P. euramericana
Purple Stipa	-	Stipa pulchra
Purple threeawn	-	Aristida purpurea
Rose clover	9041171	Trifolium hirtum
Reed canarygrass	9006592	Phalarus arundinacea
Ryegrass, annual	Wimmera 62	Lolium rigidum
Qualbush	Casa	Atriplex lentiformis
Sagebrush, big	Various	Artemisia tridentata
Salmon barberry	-	Berberis aggregata
Saltbush, desert	Various	Atriplex polycarpa
Saltbush, fourwing	Marana	Atriplex canescens
Saltbush, shadscale	Various	Atriplex confertifolia
Saltgrass, seashore	Various	Distichlis spicata
Snow buckwheat	-	Eriogonum niveum
Soft chess (brome)	Blando	Bromus mollis
Soloman tall fescue	-	Festuca arundinacea
Silver lupine	-	Lupinas albifrons
Sulla clover	-	Hedysarum coronarium

Common Name	Variety	Scientific Name
Swamp she oak	-	Casuarina glauca
Spikerush	-	Eleocharis species
Thickleaf deervetch	-	Lotus crassifolius
Veldtgrass	Mission	Ehrharta calycina
Vetch, wollypod	Lana	Vicia dasycarpa
Wattle, blueleaf	PI-399447	Acacia cyanophylla
Wattle, sydney golden	T-26941	Acacia longifolia
Western stipa	-	Stipa occidentalia
Wheatgrass, tall	Largo	Agropyron elongatum
Wild grape	-	Vitis californica
Wildrye, blue	Various	Elymus glaucus
Willow, brewer	9006606	Salix sp.
Willow, dwarf	Bankers	cotteti
Willow, erect	Placer	S. ligulifolia
Willow, sandbar	-	S. hindsidna
Willow, slender	9004810	s. exigua

Information and Training

SCS personnel provide training in all phases of the plant materials program at Lockeford through workshops, field days and small group tours. For more information, contact the PMC personnel at 21001 North Elliott Road, P.O. Box 68, Lockeford, California 95237 (209)727-5319.



Indoor workshop class.



Training session looking at legume plants.



Publications Available

Brochures on: 'Zorro' annual fescue, 'Panoche' red brome, 'Marana' fourwing saltbush, Berber orchardgrass, 'Perla' koleagrass, 'Casa' quailbush, and 'Dorado' bladderpod are now available from Soil Conservation Service and Resource Conservation District offices in California. These brochures will provide more information about the successful use and management of these conservation plants.