Minutes of the 54-3 Meeting of the
PHREATOPHYTE SUBCOMMITTEE
September 7, 1954
Klamath Falls, Oregon

1. The 54-3 meeting of the PSFIATC Phreatophyte Subcommittee was held in the Spanish Room, Wi-ne-Ma Hotel, Klamath Falls, Oregon, on 7 September 1954, with the following members and visitors present:

<table>
<thead>
<tr>
<th>Members</th>
<th>Agency</th>
<th>Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>Henry J. Cremer, Secretary</td>
<td>Corps of Engineers, U. S. Army</td>
<td>Los Angeles, Calif.</td>
</tr>
</tbody>
</table>

2. The following members were absent:

H. C. Fletcher
G. E Barclay
Robert H. Rupkey
H. F. Blaney
W. M. Borland

3. The chairman called the meeting to order at 1:30 p.m. and introduced V. F. Bruns and welcomed him to the meeting. For the benefit of Mr. Bruns the chairman gave a brief outline of the functions of the Phreatophyte Subcommittee problems involved, and some of the methods used in the eradication of undesirable water loving plants.

4. A letter from the chairman dated 9 August 1954, requested all members of the subcommittee to furnish a statement summarizing its agencies' activities on phreatophytes for the current year and problems involving present and future work.

a. The following six members supplied the chairman with his request: H. C. Fletcher, Research Center Leader, Forest Service; H. J. Cremer, Corps of Engineers, U. S. Army; R. H. Rupkey, Bureau of Indian Affairs; Dean C. Muckel, Soil and Water Conservation Research Branch, acting for and in the absence of Mr. Blaney who is presently participating in the meetings of the International Union of Geodesy and Geophysics, September 15-29, Rome, Italy; H. F. Arle, Agricultural Research Service; and J. R Riter, Bureau of Reclamation for W M. Borland.

5. A description was read on some pathological work being conducted at the University of Arizona on parasitic plants that feed on saltcedar.
6. A letter from Mr. Blaney's secretary, dated 11 August, was read, giving the titles of two papers that he will present in the Rome meeting. They are:

"Consumptive Use of Ground Water by Phreatophytes and Hydrophytes," and

"Evapotranspiration Measurements in Western United States."

7. Since there was no quorum at this meeting, no action was taken on any items of business.

8. There being no further business, the subcommittee adjourned at 4:45 p.m.

Respectfully submitted,

H. J. Cremer, Secretary
Phreatophyte Subcommittee
Pacific Southwest Federal Inter-Agency Technical Committee
Mr. T. W. Robinson  
Chairman, Phreatophyte Subcommittee  
1 Homewood Place  
Menlo Park, California

Dear Mr. Robinson:

Reference is made to your memorandum dated August 9, 1954, concerning the 54-3 meeting of the PSFIATC.

Due to an assignment of work to be completed in September I will not be able to attend the meeting. However, the statement which you request concerning this organization's activities on phreatophytes is as follows:

The Bureau of Indian Affairs operates and maintains approximately 2,400 miles of irrigation canals and laterals and 150 miles of drainage canals and ditches on approximately 30 projects in the Pacific Southwest area. The control of water needs and phreatophytes is a continuing operation requiring cutting or spraying with herbicides or oils. The principal types of phreatophytes are willows, salt cedars and arrowweeds. On most projects these plants are kept fairly well controlled on the banks of canals, laterals and drains.

The Bureau of Indian Affairs also is interested in removal and prevention of growth of phreatophytes on farm lands. There has not been a great amount of control work on such lands except for clearing and leveling new farm lands. Approximately 2,500 acres of river bottom lands with medium to heavy growth of mesquite, arrowweed and salt cedars have been cleared and leveled on the Colorado River Reservation during the past year. Similar work on a smaller scale has been carried on at several other reservations. Elimination of the growth is usually done by dragging a heavy ship anchor chain between two heavy tractors (D'8's or equal). The chain forms a loop which engages and pulls down the vegetation, which is burned after drying. The cost on the Colorado Reservation runs to about $20 per acre for clearing only. Subsequent leveling and chiseling work brings roots to the surface and little trouble is experienced with regrowth to the vegetation if farming operations are carried on properly.

Clearing of grazing lands is almost exclusively confined to elimination of junipers and not phreatophytes.

Very truly yours,

s/t/ R. H. Rupkey  
cc: William H. Berry  Civil Engineer
Air Mail

Mr. T. W. Robinson
Chairman, Phreatophyte Subcommittee
Pacific Southwest Federal Inter-Agency Technical Committee
WI-NE-MA Hotel
Klamath Falls, Oregon

Dear Mr. Robinson:

Your letter of August 9, 1954, to Mr. W. M. Borland of this office required us to contact some of our Regional offices for the information you requested on our activities in phreatophyte control. Since Mr. Borland is not going to attend the Klamath Falls meeting, I am furnishing you this brief report for your use in the Phreatophyte Subcommittee meeting.

Our Regions 3, 4, and 5 with headquarters in Boulder City, Salt Lake City, and Amarillo, respectively, have done considerable work in phreatophyte control over the past several years. I will attempt to outline the highlights of their work for your information.

Region 3 has conducted a cooperative investigation with the Department of Agriculture to determine practical methods of salt cedar suppression. A 40-acre tract of river bottom land adjacent to Phoenix, Arizona, was mechanically cleared and broken down into 1/3-acre tract plots separated by access roadways. Experimental applications of herbicides has been made each spring and fall since 1951 to compare the effectiveness of the various types of amine salts and low volatile esters. Several definite trends have become apparent from this demonstration. It was found that a 50-50 mixture of 2,4-D and 2,4,5-T ester has been definitely more effective than the amine salt of 2,4-D at comparable rates. During the past 3 years applications to mature salt cedar have been made to compare the effectiveness of 2,4-D ester, 2,4,5-T, and a mixture of the two herbicides. Very little plant injury has resulted from the 2,4-D alone, whereas 2,4,5-T and the mixture of herbicides has killed 60 percent or more of the salt cedar plants. A study is also being conducted on an area adjacent to Gila River to determine the effectiveness of the various herbicides on seedling salt cedars. This investigation has been underway for only 1 year, so it is not possible at this time to determine any trends on susceptibility of seedling salt cedars to the various herbicides.

Region 3 has also been making an investigation with the University of Arizona of the insect and plant disease relationship of salt cedar. This survey has not revealed any insect that particularly is destructive
to the plants; however, several micro-organisms have been observed feeding heavily on salt cedar and several specific organisms not previously reported or described have been isolated. Subsequent inoculations of healthy plants with these selected organisms indicate that there is a sufficient build-up to destroy the salt cedar plant. Studies are continuing along these lines with the aim of determining basic factors regarding biological control of salt cedars.

In Region 4 a 360-acre plot of mixed stands of willows and wild rose were treated with the herbicide 2,4,5-T. Observations made in June of this year showed that the treatment resulted in a 100 percent willow top kill and an 80 percent average wild rose top kill. The amount of regrowth and final results of the treatment will be observed during the growing season of 1955. The water users organizations in Region 4 have reported controlling willows and other land weeds on 198 miles of ditch banks with chemicals, 54 miles by cutting with hand tools, and 1,256 miles by burning and with mechanical equipment such as the "Briscoe Sloper." It is anticipated that the water users organizations will complete approximately the same amount of work during Calendar Year 1954.

In Region 5 the phreatophyte control program on the Middle Rio Grande Project is a continuation of the work initiated and conducted in Calendar Year 1953. During 1954 approximately 9,700 acres of mixed phreatophytes were sprayed for the purpose of water conservation. The State of New Mexico financed the spraying of an additional 4,500 acres of adult phreatophytes. All of the above spraying was conducted during the early summer of this year and detailed observations will be conducted this fall. Region 5 and the State of New Mexico are also currently conducting a hydrological study on approximately 12,000 acres above Elephant Butte Reservoir on the Rio Grande to determine the effects of the ground-water condition as related to the spraying and channelization program. Currently about 56 miles of channel have been constructed and 6,400 acres of floodway have been cleared to provide water carriage facilities through the Bosque above Elephant Butte Reservoir. Current investigations are being conducted by the Pecos River Commission and the Bureau of Reclamation to ascertain the feasibility of providing a channel and floodway to conduct flood waters through the phreatophyte infestation above McMillan Reservoir.

In addition to the above field tests being accomplished by the Regional offices, additional work is being conducted in the Laboratories Division of the Assistant Commissioner and Chief Engineer's offices in Denver. The research work in the Denver Laboratories in cooperation with the Agricultural Research Services, Section of Weed Investigations, has been incorporated in a report which will shortly be available for publication and general distribution. This report includes studies conducted on the carbohydrate root reserves of field-treated salt cedars and the susceptibility of salt cedars to various growth-regulator formulations under greenhouse conditions.

The Bureau of Reclamation intends to pursue the investigation of phreatophyte control as diligently as possible, as we are convinced that it is a vital factor in our water conservation programs. I hope that the above will be of some assistance to you in your meeting in Klamath Falls. I regret that we are not able to send a representative from this office to participate in the meeting.

Sincerely yours,

s/t J. R. Riter, Chief Development Engr.,
Project Investigations Division
Mr. T. W. Robinson  
Chairman, Phreatophyte Subcommittee  
4 Homewood Place  
Menlo Park, California  

Dear Mr. Robinson:

Receipt is acknowledged of your letter of 9 August 1954, relative to the P.S.F.I.A.T.C. Meeting to be held at Klamath Falls, Oregon, on September 7, 8 and 9, with request for a statement summarizing the Los Angeles District Corps of Engineers activities on phreatophytes for the current year, and problems involving phreatophytes that will require the District's attention in the future.

My reply has been delayed because your letter came at a very inopportune time when other pressing work dealing with flash flood conditions, acquisition and leasing of lands, and conferences with local agencies had priority.

The following is a statement summarizing the activities on Flood-Control matters involving phreatophyte problems in this District.

The District Engineer finds that a flood menace exists along the Gila and Salt Rivers from Gillespie Dam to Granite Reef Dam. He also finds that dense river-bottom growth comprising salt cedar, mesquite and arrowweed within the channels of Gila and Salt Rivers is a major flood hazard and transpires large volumes of water annually. Recommendations were made to provide for the clearing of a 2,000-foot wide channel along the Gila and Salt Rivers.

The District Engineer investigated several flood-control and multiple-purpose projects in this area. He finds that the most justifiable project at the present time would provide for short levees along Salt River between 40th Street, Phoenix and Tempe Butte, Tempe, and for channel improvements along Gila and Salt Rivers from Gillespie Dam to Granite Reef Dam involving elimination of phreatophyte growth.

It is estimated that the total Federal first cost of the improvement would be $3,667,000 and the total non-Federal first cost would be $171,000. The estimated total average annual charges are $210,300, including an average of $75,000 annually for maintenance and operation of the levee and channel improvements. The average annual benefits that would accrue from flood-control and incidental water conservation is estimated at $291,000. The ratio of average annual benefits to average annual charges would be 1.38 to 1. The project would be justified on the basis of the tangible benefits. Consideration of the intangible benefits would add weight to the jurisdiction.

The District Engineer recommends that a flood-control project comprising levee and channel improvements along Gila and Salt Rivers from
Gillespie Dam to Granite Reef Dam, as outlined above, be adopted by the United States subject to the condition that local interests furnish assurances satisfactory to the Secretary of the Army that they will pay for the cost of highway and utility relocations; provide necessary lands, easements, and rights-of-way; maintain and operate the levee and channel improvements in accordance with regulations to be prescribed by the Secretary of the Army; hold and save the United States free from all claims for damages arising from construction and operation of the work; and adjust all water-rights claims resulting from construction, operation, and maintenance of the improvements.

Agriculture along the Gila and Salt Rivers from McDowell Dam site to Gillespie Dam is entirely dependent on irrigation.

The principal cultivated areas along Gila and Salt Rivers from McDowell Dam site to Gillespie Dam, Arizona, are listed in the following table:

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<thead>
<tr>
<th>Area</th>
<th>Estimated Acreage Cultivated</th>
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<tbody>
<tr>
<td>Salt River project (lands along both sides of Salt River from the Eastern Canal to New or Agua Fria River)</td>
<td>224,600</td>
</tr>
<tr>
<td>Roosevelt water-conservation district (lands south of Salt River mostly between Auxiliary Eastern Canal and Eastern Canal)</td>
<td>34,400</td>
</tr>
<tr>
<td>Roosevelt irrigation district (lands north of Gila River between Roosevelt Irrigation district canal and Buckeye Canal)</td>
<td>38,100</td>
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<tr>
<td>Buckeye Valley (along Gila River from Agua Fria River to a point below Hassayampa River)</td>
<td>16,200</td>
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<tr>
<td>Arlington Valley (along Gila River from lower end of Buckeye Valley to Gillespie Dam)</td>
<td>3,900</td>
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The water code of Arizona recognizes that both surface flow and underground waters flowing in definite channels belong to the public and are subject to appropriations governed by beneficial use. Percolating water in undefined channels is the property of the overlying land and is not subject to appropriation. Water rights within the Salt River project are adjudicated under the Kent Decree of March 1, 1910. The Benson-Allison Decree of November 14, 1917, adjudicated water rights between the various users of water diverted by several ditches, including the Buckeye Canal, from the Salt, Agua Fria, and Gila Rivers. A court decree January 1, 1944, fixed the amount of water that should be delivered to the Buckeye district by the Salt River project as 1.1 percent of the water actually diverted at Granite Reef Dam.

One of the most significant features in the use of irrigation water, and one that has grown in importance during recent years of deficient water supply is the increasing amount of pumping from underground storage to compensate for deficiencies in stream flow.

Very truly yours,

a/t/ H. J. CREMER, Secretary
Phreatophyte Subcommittee
PSFIATC

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Mr. T. W. Robinson, Chairman  
Phreatophyte Subcommittee  
Pacific Southwest Federal Inter-Agency  
Technical Committee  
Menlo Park, California

Dear Mr. Robinson:

Because of the large volume of work to get out before leaving for his trip to Europe, Mr. Blaney was unable to reply to your letter of July 23. He asked me to acknowledge same for him, to wish you success as Chairman of the Subcommittee for the coming year and his expressed thanks for your good wishes for his trip.

Mr. Blaney will present two papers at the Rome meeting as follows:

"Consumptive Use of Ground Water by Phreatophytes and Hydrophytes"
"Evapo-Transpiration Measurements in Western United States"

Mr. Blaney will spend about two months in Europe touring the various countries and should be back in Los Angeles about October 18.

Very truly yours,

's/t/  
Helen M. Collier  
Chief Clerk
Mr. T. W. Robinson
4 Homewood Place
Menlo Park, California

Dear Mr. Robinson:

It will be impossible for me to attend the next meeting of the phytoreophyte sub-committee being held at Klamath Falls, Oregon on September 7. I am therefore submitting the following statement which summarizes the activities of the Section of Weed Investigations as regards salt cedar control.

As was mentioned at the previous meeting in Denver, the program of experimental spray applications has been continued during the present year. All plots were re-treated during May and those plots which have developed regrowth since that time will be re-sprayed during the latter part of September.

At the present time it is felt that this series of plots can be of little additional value. In all likelihood, a final series of survival counts will be made after the emergency of regrowth in 1955 and the experimental area would then be abandoned.

It is also possible that a new area will be selected to continue experimental work on the eradication of salt cedar. The first series of plots has indicated the need for several changes in the choice of herbicides and their rates of application. These ideas would be incorporated in the planned series of experimental plots.

Very truly yours,

E. Fred Arle

H. Fred Arle
Plant Physiologist