MINUTES 66-3 MEETING
PHREATOphyTE SUBCOMMITTEE
PACIFIC SOUTHWEST INTERAGENCY COMMITTEE

August 29 to 31, 1966 - Albuquerque, New Mexico

I. Introduction. The 66-3 meeting was called to order at the Downtowner Motor Inn, Albuquerque, New Mexico, at 9:00 a.m. on August 29, 1966, by Chairman Jerome S. Horton.

The following members (or alternates) and guests were present:

Members or Alternates:

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<tr>
<th>Name</th>
<th>Office</th>
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<tr>
<td>Eugene E. Hughes</td>
<td>ARS, Dept. of Agriculture</td>
<td>Los Lunas, New Mexico</td>
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<td>M. G. Sheldon</td>
<td>Bureau of Sport Fisheries &amp; Wildlife</td>
<td>Albuquerque, New Mexico</td>
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<td>T. W. Robinson</td>
<td>U. S. Geological Survey</td>
<td>Menlo Park, California</td>
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<td>Edwin B. Haycock</td>
<td>Utah Water and Power Board</td>
<td>Salt Lake City, Utah</td>
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<td>Myrvyn E. Noble</td>
<td>Bureau of Land Management</td>
<td>Denver, Colorado</td>
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<td>O. J. Lowry</td>
<td>Bureau of Reclamation</td>
<td>Amarillo, Texas</td>
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<td>Jack J. Koogler</td>
<td>State Engineer's Office</td>
<td>Santa Fe, New Mexico</td>
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<td>Fred O. Case</td>
<td>Soil Conservation Service</td>
<td>Denver, Colorado</td>
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<td>J. S. Horton</td>
<td>USDA, Forest Service</td>
<td>Tempe, Arizona</td>
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<td>John W. Shannon</td>
<td>Calif. Dept. Water Resources</td>
<td>Sacramento, California</td>
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<td>Gordon M. Corbin</td>
<td>U. S. Forest Service</td>
<td>Albuquerque, New Mexico</td>
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<tr>
<td>Floyd Farrell</td>
<td>Bureau of Indian Affairs</td>
<td>Phoenix, Arizona</td>
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Guests:

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<tr>
<th>Name</th>
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<tr>
<td>William Warskow</td>
<td>Salt River Project</td>
<td>Phoenix, Arizona</td>
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<td>Arnett C. Mace, Jr.</td>
<td>University of Arizona</td>
<td>Tucson, Arizona</td>
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<td>Kirk M. Sandsals</td>
<td>Soil Conservation Service</td>
<td>Berkeley, California</td>
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<td>Carl Singerland</td>
<td>New Mexico Interstate Stream Commission</td>
<td>Santa Fe, New Mexico</td>
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<td>Creede J. George</td>
<td>Bureau of Reclamation</td>
<td>Phoenix, Arizona</td>
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<td>R. Gene Pollan</td>
<td>Bureau of Reclamation</td>
<td>Sacramento, California</td>
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<tr>
<td>William T. Davoren</td>
<td>Dept. of Interior</td>
<td>San Francisco, California</td>
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II. Task Force Reports

A. Research and coordination - T. W. Robinson

Mr. S. T. Smith, of the Department of Agriculture for Western Australia, called to discuss planting saltcedar to control a rising water level in the farming area of Southwest Australia. It appears that cutting of the natural vegetation on the ridges and slopes of the gently rolling land has resulted in greater infiltration and runoff of precipitation and increased recharge to the ground-water reservoir in the alluvial valleys and lowlands.
Precipitation of from 12 to 14 inches occurs May to October. This result is a rising ground-water level from a score or more of feet to from 3 to 8 feet below the land surface. A partial confining bed allows upward seepage so that the surface soil is continually moist. Evaporation of the ground water, which is saline - about 3% salts - has resulted in the formation of a salt crust in many places. The source of the salt is believed to be wind-blown salt spray from the ocean.

Some planting of saltcedar cuttings as long ago as 15 years has been done in most areas below the ridge tops. These are growing well, but to date no attempt has been made to plant in the saline soil of the low areas.

Mr. Smith reported that he has never seen a seedling in the area of planting. The species planted were thought to be T. pentandra, but in view of lack of seedlings may be another species. Mr. Smith plans to collect specimens for identification by his Department and also send duplicates to Mr. Horton for an additional check.

B. Plant succession - No report.

C. Library - J. S. Horton

Mr. Horton reported that he had been unable to locate the 56-4 Phreatophyte Subcommittee minutes for filing in the library at Arizona State University. It was suggested that each member make a search through his files in hopes of locating a copy of the 56-4 minutes for Mr. Horton. In the committee discussion, it was suggested that the minutes be indexed so that subject matter can be adequately identified. Mr. Horton closed the discussion with a statement that the subcommittee would work on an outline for indexing the minutes and that this would be discussed at the Las Vegas meeting. Mr. Arnett Mace, Jr., with the University of Arizona, offered to help with the indexing.

III. Agency Reports.

A. Federal.

1. Department of Agriculture.
   a. Agricultural Research Service - Eugene E. Hughes (See Attachment A).

2. Department of Interior
   a. Geological Survey - T. W. Robinson (See Attachment B)
   b. Bureau of Reclamation - O. J. Lowry (See Attachment C)
   c. Bureau of Sport Fisheries and Wildlife - M. G. Sheldon (See Attachment D; summary attached, final report forthcoming at 66-4 meeting.)
   d. Bureau of Indian Affairs - Robert H. Rupkey (See Attachment E)
B. State.

1. There were no formal state reports to the committee; however, Mr. Edwin Haycock informed the committee that the State of Utah and the Soil Conservation Service were making a joint Land Use Survey. The survey would be made on cultivated lands and riparian areas. Information will be gathered by subareas within each basin according to Mr. Haycock. In concluding his brief statement, he said many states will have to look to phreatophyte areas for additional water supplies.

A discussion concerning the invitation of representatives from other states outside the Pacific Southwest states was encouraged by Mr. Haycock's remarks. Mr. William Davoren stated that he would welcome representatives from other states participating in the phreatophyte subcommittee meetings; however, he said that they would have no official status.

2. Two very welcome guests from the State of Arizona -- Mr. Arnett C. Mace, Jr., representing the University of Arizona, and William Warskow, representing the Salt River Project, gave brief reports to the committee. Summaries of their statements are attached. (See Attachments F and G.)

IV. New Business.

A. The minutes of the 66-2 meeting in Salt Lake City were approved, with the exception of the spelling of the word "micromhos" on page 10, paragraph 2, of the report presented by T. W. Robinson. In the report the word "micromhos" was spelled "microhms".

B. Eugene Hughes reported he had received word from the Kansas State Conservationist with Soil Conservation Service that the spread of Russian Olive had become a serious problem in Kansas. Mr. Hughes stated that before he could assist with their phreatophyte problem, he would need information concerning the condition of growth, such as density, height, and size of plants.

C. Mr. Kirk Sandals outlined the purpose of the Water Resources Council established by authority of the Water Resources Planning Act of 1965, and briefly reviewed the responsibilities and functions exercised under Title I, II, and III of the Act. He mentioned several appointments that have been made to the council.

D. Mr. Horton read an article from the Sierra Club Bulletin entitled "Phreatophyte Control, a highfalutin word for deforestation," and a letter written by him as Chairman of the Phreatophyte Subcommittee in which he expressed feelings of the subcommittee concerning the article. The subcommittee stands ready to inform the Sierra Club of the importance of phreatophyte control, and will welcome an opportunity to discuss this program with them.
E. In addition to other appended material, an excerpt from Forest Service memorandum dated October 5, 1964, is attached which defines the four Types of river basin studies, as requested by members of the committee at the 66-3 meeting in Albuquerque, New Mexico. (See Attachment H.)

F. Mr. Horton announced that Mr. Floyd Farrell had replaced Mr. Robert H. Rupkey as a member of the Phreatophyte Subcommittee and would assume Mr. Rupkey's responsibility as Secretary for the remainder of the year. Mr. Rupkey has been appointed to the Water Management Subcommittee.

G. New business closed with a short discussion by the committee concerning the place and date of the 67-1 meeting. Mr. John Shannon suggested Bakersfield, California, for the 67-1 meeting where research studies of interest to the committee were near by. Mr. Horton welcomed the group to Tempe where he was sure an interesting field trip could be arranged. It was finally decided by the committee that the date and place to meet would be decided at the 66-4 meeting in Las Vegas; however, it was hoped the dates for the Phreatophyte Subcommittee meetings would not be set to conflict with the newly organized Water Management Subcommittee meeting dates.

V. Symposium.

The members of the Phreatophyte Subcommittee attended the PSIAC program meeting, where a symposium was presented by members of the subcommittee on "Vegetation Management on Flood Plains and Riparian Lands".

VI. Field Trip

On August 31 the U. S. Corps of Engineers conducted a field trip for members of the PSIAC and subcommittees to observe flood protective work along the Rio Grande River. Projects visited included the new outfall to the Rio Grande River from flood control channels protecting the city of Albuquerque, Kellner Jettys on the Rio Grande, Jemez Dam, and construction activities at Cochite Dam.

Floyd Farrell
Secretary
Phreatophyte Subcommittee, PSIAC
AGRICULTURAL RESEARCH SERVICE  
Crops Research Division  

REPORT TO PHREATOPHYTE SUBCOMMITTEE 66-3 MEETING  

By  
Eugene E. Hughes  

Greenhouse work during the last quarter involved screening new herbicides and carriers for control of saltcedar. A new carrier, hydroxyethyl cellulose (Vistix), appears to have humectant qualities as well as drift-reducing characteristics. This material is inexpensive as well as easy to use and can be applied by conventional spray equipment.

Five new herbicides were received and are presently in greenhouse tests for effectiveness on saltcedar. Field work involved ground-applied foliage spray experiments with various additives involving 84 plots for the control of saltcedar. Results from these tests are not yet available.

Aerial-applied experiments were initiated in March 1966 with a dormant-spray study in Kansas. Five saltcedar plots were treated with silvex ester at 2, 4, 6, and 8 lb/A in diesel oil plus an additive. In May, this series of plots showed nearly 100% top-kill with some regrowth. The regrowth, however, was dying back. Final results will not be known until next spring.

Five more plots were treated on June 16, 1966, in Kansas. The late date was due to a late frost which defoliated the plots. Two of these plots were re-treated on August 11, 1966.

A large-scale, aerial-applied herbicide study with granular dicamba on saltcedar was initiated on June 9, 1966, near Artesia, New Mexico. Dicamba was applied to a 10-acre plot in one location and to a 5-acre plot in another location, at the rate of 10 lb/A of active ingredient. The 5-acre plot was adjacent to another 5-acre plot which was treated, with 20 lb/A active ingredient. These large plots should establish whether dicamba is effective in that area.

Since willows are a major ditchbank problem and grow in areas where crops susceptible to phenoxy herbicides are grown, an experiment was initiated using soil-spray-applied herbicides (biomocil and related compounds).
In connection with operation of the evapotranspiration tanks at Yuma, Arizona, Mr. Otto M. Grosz, recently appointed as research hydrologist, will report at Yuma the last of August to take over operation of the tanks. Mr. Grosz, a graduate of the University of Nevada, is a soil scientist with training in plant physiology.

On July 1 Mr. Robinson began the task of compiling data and information with which to update his phreatophyte area survey of 1952. The compilation will be by States, and where possible by species association. The first State - Nevada - is nearly complete. It is estimated that mapping of phreatophyte areas in the State, which has been done by the Soil Conservation Service and the Geological Survey, is about 70% complete.

The total of the areas mapped amounts to 2,554,000 acres, having an estimated evapotranspiration discharge of 1,040,000 acre-feet.

The seventh Program Report of the Humboldt River Research Project, describing the evapotranspiration studies at Winnemucca, Nevada, for the 1965 growing season, was published in May by the Nevada Department of Conservation and Natural Resources.
Region 5
Bureau of Reclamation

Summary of Phreatophyte Activities Calendar Year 1966

Mr. O. J. Lowry, Chief, Land Management Branch, Region 5, Bureau of Reclamation, presented a paper entitled "Mechanical and Chemical Control of Phreatophytes" at the A.S.C.E. Water Resources Engineering Conference, Denver, Colorado, May 16 - 20, 1966. The paper was published as Conference Print No. 370.

Middle Rio Grande Project.

Operation of the evaporation-transpiration tanks at Bernardo is being continued along with the maintenance of the Bernardo Prototype area. So far this year, approximately 1,500 acres of regrowth have been mowed at an average cost of about $2.25 per acre; about 600 acres have been root plowed at an approximate cost of $4.75 per acre; and approximately 1,350 acres have been sprayed with a ground rig at $7.63 per acre.

The Rio Grande floodway is being helicopter sprayed at this time. The area primarily infested with cottonwood is being sprayed with 2.4-D amine at 2 lbs. per acre. The cost of application is $8.85 per acre. The area primarily infested with tamarisk is being sprayed with 3 lbs. of (2) 2,3,5-TP (silvex). The contract cost for this work was $13.00 per acre.

Rio Grande Project

The cooperative work with the State of New Mexico for controlling phreatophytes on Caballo Reservoir is being continued. The phreatophytes are being controlled by chemical and mechanical methods.

Pecos River

Volume I of the Definite Plan Report, Pecos River Basin Water Salvage Project, was completed in June 1966. Public Law 88-594, approved September 12, 1964, authorized a continuing program to reduce nonbeneficial consumptive use of water in the Pecos River basin. Although authorized, no funds have been made available to initiate the fieldwork.
SUMMARY REPORT
Bureau of Sport Fisheries and Wildlife

Refuges' vegetative manipulation is designed primarily to upgrade water use in farmlands by treating "weeds", and to improve the habitat for wildlife utilization. This, in some cases, is the treating of phreatophytes and could be considered as water salvage. Methods used ranged from chemical controls to blasting or digging potholes in dense marsh vegetation to reduce evapotranspiration, and increase "edge" for wildlife benefits.

A Memorandum of Agreement with the Bureau of Reclamation for phreatophyte (salt cedar) removal on Bitter Lake National Wildlife Refuge initiated dove and upland game production and utilization of the woody vegetation prior to and following vegetative manipulation.
Attachment E

BUREAU OF INDIAN AFFAIRS

Report to Phreatophyte Subcommittee
PSIAC - 66-3 Meeting
by
Robert H. Rupkey

Conferences were held June 29th and 30th at Parker between the Bureau of Reclamation, Bureau of Sport Fisheries and Wildlife, Lower California River Land Use Office, Colorado River Tribes, State Game and Fish Departments of Arizona and California, and the Bureau of Indian Affairs, to discuss the channelization program on the Colorado River. The Bureau of Indian Affairs and Colorado River Tribes emphasized their interest in the disputed lands on the California side of the river. Detailed discussion took place regarding the channel to be by-passed in the "Quien Sabe" area. A portion of the Colorado River Reservation now on the east side of the river will be isolated by the proposed new channel. The Bureau of Indian Affairs insisted on access to this tract and that the cut-off channel be reserved for use by fishermen and for development of frontage lots instead of for general water-oriented recreation, which would include water skiing and high power boat use. It was finally agreed that the downstream end of the old channel be separated from the major portion of the channel and be used for docking and servicing high power boats, and that the earthen dam separating the water areas be used as a crossing for vehicles to the cutoff tract of Indian lands, and that a roadway to U.S. Highway 95 from the dam be dedicated for access to the cutoff Indian land. The upper end of the cutoff channel would be separated from the new river channel by an earthen dike and provided with an inlet from the river to provide fresh water. The Bureau of Indian Affairs proposes this type of treatment to all of the cutoff channels in the Colorado River Reservation. It is believed by the Bureau of Indian Affairs and the Colorado River Tribes that water skiing and high power boat use of the cutoff channels would adversely affect other uses, including fishing, river front development, and enjoyment of the river areas by people who would be willing and able to pay for the use of the areas and thus provide maximum income to the Tribe.

The case of Hurley v. Abbott in the U.S. District Court for Arizona, was dismissed without prejudice. In this case the Salt River Valley Water Users' Association attempted to prevent the White River Apache Tribe from developing lakes on the Fort Apache Indian Reservation for fishing and other recreational uses, claiming that water would be used by the lakes which otherwise would be available to the Salt River Valley water users. The judge dismissed the case on the basis that all of the affected parties had not been brought into the case. The Salt River Valley Water Users' Association has indicated that it plans to reinstitute the suit and bring in all of the water users, which may exceed 1,000 in number.
An agreement has been reached between the U. S. Geological Survey and the Bureau of Indian Affairs for removal of the phreatophytic vegetation along the Gila River and along the lower part of the San Carlos River within the San Carlos Indian Reservation. Congress has appropriated $651,000 for this purpose for use in fiscal year 1967. The estimated total cost over a five year period for clearing phreatophytes from the channels and the flood plains is estimated to be $2,109,000. The work will be done by Indian labor, under the supervision of the Bureau of Indian Affairs. The portion of the Gila River Valley east of the San Carlos Reservation will be cleared by the Corps of Engineers as part of the program described in its report entitled "Survey for Flood Control, Gila River, Camelback Site to Salt River, Arizona, Gila River Basin, Arizona and New Mexico, December 31, 1957." The clearing is an essential part of the over-all program, which includes construction of Camelback Dam.
SUMMARY REPORT
by
Arnett C. Mace, Jr.
Instructor-Research Associate
University of Arizona - Department of Watershed Management

Work presently being conducted by the Department of Watershed Management, University of Arizona, and sponsored by the Bureau of Reclamation consists of two phases: (1) development of a prediction equation for determining evapotranspiration from readily available data, and (2) investigation of the effects of salinity on transpiration.

Empirical formulas such as Thornthwaite, Blaney-Criddle, and Penman are based on the assumption that water is non-limiting. Throughout the phreatophyte zone availability of water to the plants varies due to different soil moisture and depth to the water table. We are presently involved in developing a prediction equation for evapotranspiration which will consider both climatic variables and availability of water. This type of empirical formula or prediction equation will increase the accuracy of estimates of potential water salvage through phreatophyte control.

Evapotranspiration rates of tamarisk collected by the evapotranspiration test on the Gila River above San Carlos Reservoir indicated that salinity may have a significant effect on transpiration rates. A laboratory study is presently being conducted to determine this relationship. Small plants are being grown in a water culture solution containing 0, 5700, 11,800, and 18,500 ppm of sodium chloride in a plant growth chamber at different vapor pressures to determine transpiration rates as effected by salinity and vapor pressure.
VERDE RIVER PHREATOPHYTE CONTROL

by
William L. Warskow
Salt River Project

The Salt River Project is not a research agency. Its interests in phreatophyte research lie primarily in the practical application of the findings of the various research agencies studying phreatophytes.

Findings of cottonwood studies led the Salt River Project to initiate a pilot cottonwood control program on the Verde River 4 miles south of Camp Verde, Arizona, in 1965. The objectives of the project were water salvage, flood prevention, and treatment cost analysis. Treatment consisted of "selectively thinning" cottonwoods on approximately 375 acres of private and state lands. Severity of treatment was dependent upon the landowners' desires and ranged from complete removal to true selective thinning. Densities ranged from 5 mature trees to 450 pole-size trees per acre.

Power saws were used to fell trees in excess of 12" in diameter. Smaller trees were pushed out with track-type, dozer equipped tractors, of at least 175 HP (flywheel rating). Debris was stacked at sites designated by the landowner. Disposal of the stacked debris was the landowner's responsibility. On-site contract costs of treatment were $22.40 per acre, which compared favorably with original treatment cost estimates of $50 per acre.

The encouraging results obtained during 1965 led to an expanded program for 1966. One thousand acres are programmed for treatment at a contract price of $22.28/acre. Densities range from 25 to 30,000 + trees per acre. Freshly cut stumps will be treated with a concentrated solution of ammonium to control the sprouting observed following the 1965 program. Scars left by treatment are expected to be naturally reseeded by the bermuda grass occurring throughout the treated areas. Examination of the pilot area in September, 1966, verified these expectations.
Excerpt From the Chief's, Forest Service, 6520 Memorandum
Dated 10/5/64

The type of river basin studies are defined as follows:

**Type I** - comprehensive framework plans: Studies of water and related land resources of 18 major regions of the U. S. A. that provide long-run economic projections of economic development; translation of such projects into demands for water and related land resource uses; hydrologic projections of water availability both as to quantity and quality; and projections of related land resource availability, so as to outline the characteristics of projected water and land resource problems and the general approaches that appear appropriate for their solution. Inter-agency guidelines for Type I studies are now in preparation and will be furnished to you soon.

**Type II** - comprehensive detailed plans: Same as Type I plans, plus plans in detail sufficient for authorization of one or more projects that are proposed for solution of an area's water and related land problems.

**Type III** - project plans: Plans of narrower geographic and analytic compass and usually related to one project. None of this type are provided for in FY 1965.

**Type IV** - other surveys: Surveys of water resources by USDA agencies usually at State request or at the request of a single Federal agency.