

IRRIGABILITY CLASSIFICATION OF NEW MEXICO LANDS

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This project involves the cooperative efforts of the New Mexico Water Resources Research Institute, the Soil Conservation Service, the U. S. Bureau of Reclamation, the New Mexico Interstates Streams Commission, the Forest Service, and the Bureau of Indian Affairs under the leadership of the NMSU Agronomy Department in classifying the lands of New Mexico on the basis of their suitability for irrigation. This is being done primarily because various water importation plans have been proposed, and are receiving serious consideration. If water is to be imported for any purposes which include irrigated agriculture, we must be able to provide evidence that their uses will be socially and economically beneficial. Justification for importing water for irrigation necessarily raises questions about the extent, nature, and distribution of irrigable land. The primary purpose of this project is to provide answers to these questions.

PROCEDURE

The procedure which is being used consists of obtaining the best available soil survey information, and interpreting this to obtain the irrigation land classification for each soil type. This procedure has several advantages. First, it permits the use of soil survey information which is already available for some of the counties in New Mexico, and is badly needed for the rest. Second, it permits us to make the interpretations from the soil survey information in addition to the irrigation land class; and finally, it permits us to make an irrigation land classification which is consistent throughout the state with respect to soils.

For those counties for which a detailed soil survey is not available, soil association mapping is being used. Because soil associations are groups of soils which occur together, and which are not necessarily similar to one another, the irrigation land classification is applied to the individual soils, and statements about the entire association are based on knowledge of the percent of the various soils in the association.

The irrigation land classification standards which are being used are those proposed at the 1967 conference organized by the Federal Water Resources Council^{1/}, as modified on January 12, 1968. These criteria were agreed upon by authorities from several organizations concerned with soil classification, and thus appear to have particularly high reliability. In order to assure uniform and consistent application of these criteria and standards, the New Mexico Soils Work Group has issued guidelines and clarifications as needed and appropriate. The classification system establishes four classes of irrigable land and one class of non-irrigable land. Class 1 land has few or no limitations for irrigation; class 4 land has very severe limitations; class 6 land is non-irrigable. The

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criteria used to determine irrigation land class are shown in table 1.

These standards do not take into account such factors as climate, availability of water, or relationships to markets. While these and other factors are clearly important it seems more appropriate to consider them separately, and thus avoid confusion with soil variables.

RESULTS

The results thus far show that the suitability of New Mexico lands for irrigation is highly variable, and also that we have a great deal of land which is well suited to irrigation. In the counties which have been studied in eastern New Mexico, the amount of class 1 land varies from 61.5 percent in Curry County to 1 percent in Lea County, and the total irrigable land varies from 94 percent in Curry to 34 percent in Eddy County. In southwestern New Mexico Luna County has 13 percent class 1 and 64 percent total irrigable land. In Hidalgo the comparable figures are 10 and 46 percent. The factors that most frequently limit the suitability of New Mexico soils for irrigation are insufficient available water holding capacity, and insufficient effective soil depth. However, the results do show extensive areas which are in classes 1 and 2, and are thus very well suited to irrigation.

In addition to land classification for irrigation, the reports for all but three counties are to include a soil association map, a brief discussion of each soil association, and information about soil characteristics and the suitability of soils for various purposes. They are, therefore, useful as sources of information about soils for many kinds of general or broad area planning. This information is not included for Curry and Roosevelt counties which have recently published SCS soil surveys, or for Torrance County which is to have such a survey published in the very near future.

Research reports covering the results of this work have now been published for Curry, Roosevelt and San Juan Counties. Similar reports for Eddy, Harding, Hidalgo, Lea and Luna Counties are in press or are awaiting publication. Work is in progress for Dona Ana, Chaves, Lincoln, Quay, Sandoval and Torrance Counties.

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Proceedings Water Resources Council, Irrigation Land Classification Seminar, Salt Lake City, Utah. July 1967.

Table 1. Land classification specifications for Pacific Southwest Basin irrigation land classes¹

Land Characteristics	Class 1	Class 2	Class 3	Class 4	Non-irrigable Class 6
Soils					
Texture (Surface 12") ²	LVFS-CL	LS-C Peat, Muck	MS-C	MS-C	All other lands not meeting criteria for arability
Moisture Retention (AWHC-48") ³	> 6.0"	4.5" 6.0"	3.0" 4.5"	2.5" 3.0"	
Effective Depth (inches)	> 40 ⁴	30- 40	20- 30	10- 20	
Salinity (EC _e x 10 ³ - equil.)	< 4	4- 8	8- 12	12- 16	
Sodic Conditions⁵					
Percent area affected	< 5	5- 15	15- 25	25- 35	
Severity of problem ⁶	Slight	Moderate	Moderate	Moderate	
Permeability (in place - in/hr)	0.2-5.0	0.05-5.0	0.05-10.0	Any	
Permissible coarse fragments (% by vol.)					
Gravel	15	35	55	70	
Cobbles	5	10	15 ⁷	35 ⁷	
Rock Outcrops (distance apart in feet)	200	100	50	30	
Soil Erosion (for all classes)	Severely eroded soils will be downgraded one class. Less severely eroded soils may be downgraded one class, depending on other conditions.				
Topography (or land development items)⁸					
Stone for Removal (cubic yards per acre)	10	25	50	70	
Slope (percent)					
Moderately to severely erodible	< 2	2- 5	5- 10	10- 20	
Slightly erodible	< 4	4- 10	10- 20	20- 25	
Surface Leveling or Tree Removal (amount of cover)					
	Light	Medium	Medium heavy	Medium heavy	
Irrigation Method	Lands unsuited to gravity irrigation where land grading would permanently reduce soil fertility below arable limits or exceed permissible costs, or field pattern too complex, may be considered for sprinkler. Land must meet other requirements for arability. Designate by "S" - example, 3-S.				
Drainage					
Soil Wetness (depth to water table during growing season with or without drainage)					
Loam or finer	> 60"	40"- 60"	20"- 40"	10"- 20"	
Sandy	> 50"	30"- 50"	20"- 30"	10"- 20"	
Surface Drainage					
Depth to Drainage Barrier (in feet)	> 7	6- 7	5- 6	1.5- 5	
Air Drainage ⁹	No Problem	Minor	Restricted	Restricted	

¹Specifications are representative of conditions after land is developed for irrigation. Each individual factor represents a minimum requirement, and unless all other factors are near optimum two or more interacting deficiencies may result in land being placed in lower class or designated class 6 -- non-irrigable.

²Finer textures may be required than those indicated for each class in areas subject to critical hot spells or wind; coarser textures may sometimes be permissible.

³In areas of very warm growing season 3" may be required for class 4 and in cold areas as little as 5" may be permitted for class 1.

⁴Depth of 60" or more is required for class 1 where deep-rooted crops are important.

⁵More extensive and severe sodic problems may be tolerated in areas of wide crop adaptability.

⁶Severity of problem: **Slight** - ESP less than 15% or less than 25% if dominated by nonswelling clays; **moderate** - ESP less than 20% or less than 30% if clay minerals favorable; **severe** - ESP less than 30%; with certain soil minerals may range above 50% as measured by usual techniques.

⁷May range above 50% in subsoil for certain crops if surface soil is favorable.

⁸Special crop and management practices may justify exceeding the limits for stone removal or slope in class 4; irregularity of slope may necessitate downgrading of class unless deficiency is compensated for by possibility of sprinkler irrigation.

⁹Air drainage is a consideration mainly in areas adapted to fruit or to early or late vegetables.

Abbreviations:

LVFS - loamy very fine sand
LS - loamy sand
MS - medium sand

CL - clay loam
C - clay
AWHC - available water holding capacity
ESP - exchangeable sodium percentage