

PROJECTIONS OF THE POPULATION OF NEW MEXICO TO THE YEAR 2070

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When I received the invitation to speak at the Thirteenth Annual New Mexico Water Conference, I didn't know whether to feel flattered, flabbergasted, or simply foolish. I am flattered to be asked to participate in a forum which, over the years, has presented so many prestigious speakers. But I must say that I can't help but feel a bit foolish at the prospect of an undertaking that may seem to imply that I have any idea of what the population of New Mexico may be a century from now. I think that the general impression of anyone who would attempt to project the number of people who might live in a given location a hundred years hence is that he must be a fool.

Yet, given man's penchant for controlling - or attempting to control - his environment and planning for the future, projecting and projections are likely to be with us for some time. So we might as well reconcile ourselves to living with this questionable kind of activity and set about learning how to make and use projections with some degree of effectiveness.

Projections of population, sales, production, and other such phenomena are usually based upon some rationale of relationships where there is a known or assumed relationship between the item being projected and the other phenomena about which we have some notion of their course of development. Moreover, it is assumed that the identified relationships will remain constant or that, if they change, they will do so in some explicit manner. So we generally start the projecting process by identifying the relationships which we believe will be the critical ones for the period of the projections and proceed to specify the nature of the relationships and the course of development of the phenomena to which the projections are to be related.

If the projections are to be made for a relatively short span of years, we may have some chance of correctly identifying the critical relationships and anticipating the course of development of the phenomena upon which our projections will be based. Even for short periods, however, the path of the projector is fraught with peril. But when we extend our planning horizon to a full century, our chances of identifying these relationships or of charting the development of the related phenomena are pretty poor. Thus, we might well conclude that any attempt to project the size of New Mexico's population for the next 100 years is an exercise in futility. I will have more to say about that later.

What are the factors that determine the size of the population of a small or sub-national area? To what is the size of the population related? We can hardly claim to know the answers to these questions with respect

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to the present size of the population even though we can pontificate for hours about such things as the nature and extent of the area's resources, the number of jobs available (based upon rational exploitation of the resources), the labor force participation rate, the productivity of labor, standards of living, birth and death rates, population mobility and migration rates and so on. There are other factors or relationships that we may suspect has determining influences upon the size of an area's population, but I doubt that it is fruitful to pursue this train of thought, because, when the projection horizon extends to 100 years hence, the nature of such relationships turn out to be imponderables.

Yet, we like to think that population bears some relationship to an area's resources. Except in the broadest sense, today's resources may not be - and probably won't be - tomorrow's resources. In view of the rapidity of technological development, it is almost certain that the ways in which we use resources today will not be the same as those that will be employed 25 years hence, let alone a century from now. Undoubtedly new uses will be discovered for materials which are not now considered to be resources, and some of the materials which we now regard as resources will be exhausted.

When we stop to consider the relationship between man and resources and the pressure upon some of our resources which he presently exerts, the question might well be, "How many people can live in New Mexico a century from now?" rather than "How many will live here?" For there is little question but that some of our resources as we now know them will have been exhausted and others, such as water, will exercise serious constraints upon the size of the population unless our methods of utilization are drastically modified.

Changes in the ways in which we utilize resources imply changes in the relationship of man to his resources, particularly with respect to the number of jobs that a given level of resources utilization can provide, the relationship between employment and population that might result from changing labor productivity, and changes in the customary number of hours of work that will be required to support a laborer and his family - assuming that the family as we know it still exists. Indeed, it is conceivable that a century hence the economic organization of society which gives significance to the relationship of workers to total population and of worker productivity to levels of living will no longer exist. Maybe at that time each unit of humanity will simply be hooked up by tubes to some common reservoir of sustenance so that such concepts as working for a living, levels of living, and place of residence will cease to have meaning.

Turning to projections based upon birth and death rates, and migration rates, we are equally at loss to hit upon some relationships the continuity

of which we can rely upon. If one projects the United States' population for 100 years based upon the present rates of reproduction reduced in some logical progression he arrives at a figure that, when related to what we now know of our resources, boggles the imagination. Will the population continue to increase despite the restraints imposed by limited resources, or are our resources really limited only by our ingenuity which will rise to the occasion and make new resources available as we need them?

Will place of residence continue to be related even loosely to the location and utilization of resources or will developments in transportation and in production techniques make it possible for people to reside where ever they want to without reference to jobs or to access to goods and services? In that event, we hardly need concern ourselves with whether people live in New Mexico, Indiana, or at the North Pole.

Such speculations are fascinating, but they provide us with no solid points of reference when faced with the task of setting down actual numbers opposite the names of counties and under the captions "2020," "2030," on out to "2070." As a preface to its own projections of the United States economy to the year 2000, Resources for the Future has said that, "To predict what will happen in the next forty years is a feat beyond the powers of social science." A fitting preface to my attempt to project population and employment for the next century might be that, "There is only one thing about which I am certain and that is that the figures will be wrong."

"In that case," you might very well ask, "what is the point of making the projections? Aren't they useless?"

Strange as it may seem, I think that there is a real point to making such projections. In the first place, they force us to give attention to the magnitude of the problems that we, or our successor, may face in the future. In the second place, they force us to consider the nature of the variables that may determine the size of the population years hence and the ways in which their influences might change. And even though we can't know the ways in which these identifiable influences will change and the nature of other influence which might become operative, we create an atmosphere of testing ideas. The development of assumptions and the actual figures which arise out of them provide a kind of benchmark against which we may appraise actual developments as they occur and discover explanations for the departure of reality from the assumed conditions upon which the projections are based.

The Methods Employed

In making the population projections for New Mexico and its counties, we took the position that the state is necessarily an integral part of the United States and its economy. What happens in New Mexico, therefore, depends in large part upon developments in the United States and how New Mexico participates in those developments. In other words, New Mexico must necessarily play some role in the development of the nation. The job of projecting its population, therefore, consists of determining, or assuming, what that role will be and what are its implications with respect to population.

In making the projections to the year 2000, which we did three years ago and which some of you have seen, we attempted to define New Mexico's role in the United States' economy by determining to what extent it had participated historically in the nation's production and apply this role, with what we thought were appropriate modifications for changing resource conditions, to the United States' needs to the year 2000 as projected by Resources for the Future in their publication Resources in America's Future, by Lansberg, Fischman, and Fisher. The great detail in which their projections were made provided excellent guidelines for estimating what production might be expected of New Mexico and estimating the employment that would be required, or generated, in this state. From there it was relatively easy to move to estimates of labor force and population, and to assign them to the several counties on the basis of the existing location of various activities and our appraisal of what their resources might be for the next thirty years.

In moving beyond the year 2000, as was required by the present study, we had no such guidelines to follow. No one, so far as we could discover in the time allotted for this project, has had the temerity to look much beyond 2000 and to set down for all the world to see actual figures describing the size or character of the population or its economic activities. The Bureau of the Census has made some projections of the gross number of inhabitants of the United States to the year 2015, but even they won't venture fifty years beyond 1970, let alone a full century.

Projections of United States Population

Casting about frantically for some guideline to which we might attach the projections required of us, we finally decided that the most reasonable course of action would be to develop some projections of United States population and relate New Mexico's population to those. To do this, we simply extended the projections made by the Bureau of the Census by examining their assumed rates of fertility to the year 2015 and extending them with

appropriate reductions to the year 2070. This was done for both their high (Series A) projections and their low (Series D) projections. From these two projections we derived a median set of projections as midway between the high and the low.

In moving from our national projections to state projections we adopted the basic assumption that New Mexico will play an increasingly important role in the United States economy if for no other reason than that, given a United States population of the size that our projections indicated (a median of 806,600,000 with a high of 1,133,800,000), New Mexico would simply have to absorb a greater proportion of the total than it now accommodates. But in order to arrive at real figures, we had to set some limits on this proportion.

Lower Limit

In order to establish a lower limit, our rationale was as follows.

1. In view of the large size of the projected national population, it is reasonable to expect continued migration to New Mexico, and New Mexico's population will increase by more than its increase by natural means (births over deaths).
2. In view of the fact that New Mexico's natural increase has always been substantially larger than for the country as a whole, it is reasonable to assume that its natural increase in the future will be at least as great as that for the United States. We will assume that the rate of natural increase for New Mexico will be the same as that implied for the median projection for the United States.
3. Our minimum projection for New Mexico will, therefore, be established by:
 - a. natural increase at the median rate for the nation and
 - b. migration at a rate just sufficient to maintain the state's population at 0.86 percent of the United States median projection. This is the percentage given by our previous median projection to the year 2000.

Following through on these assumptions, gave us the low projection you find on the tables which have been distributed to you - 6,275,000 in the year 2070.

Upper Limit

In order to establish the upper limit, our rationale was:

1. New Mexico's rate of natural increase will continue to be higher than that of the United States, but it will decrease gradually until it reaches the rate implied by the high projection for the United States. That would mean a reduction from 1960's rate of 24.6 per thousand to 14.2 per thousand in the 2060 decade.
2. Because of the pressure of increasing national population density, migration to New Mexico will be such as to give the state an increasing proportion of the nation's population. That proportion will increase by gradual steps from the .529 percent in 1960 to the .865 percent of the United States high in 2000 implied by our previous projections to that year, to 2.00 percent of the United States high in the year 2070.

Median Projection

Our median projection, from which we derived the population of the counties, was derived by simply taking the midpoint (modified slightly in a few instances) between the high and low projections. The figures appear on the tables that have been distributed.

Projections for the counties

Having established the projected population for the state and the increases from decade to decade, we had to develop a procedure for allocating population to the counties. First, we assumed that on the average 95 percent of the increase in population during each decade would occur in urban areas of the state as they are now defined. Because the project was intended to provide population figures for the respective drainage basins of the state, we selected for consideration the principal urban areas of each basin and what we thought might become urban complexes, defined as those areas where the urban sprawl of two or more cities might well merge at sometime in the future. Having determined what the rate of increase would be for all urban areas, we then proceeded to allocate this increase among the several drainage basins by assuming a particular rate of increase for each selected urban place and urban complex. These rates of increase were made entirely intuitively after considerable speculation concerning what we thought might be the logical course of development in the several areas considered. We then assumed that these rates of increase would apply to the counties which embraced the selected urban complexes, and we allocated population of each basin among the counties comprising it, again upon an intuitive basis.

In making the allocations to the basins, our rationale very briefly was about as follows.

The Rio Grande Basin has been the locus of most of the state's growth in the past and has accounted for an increasing share of the state's population. This trend will continue through the early part of the next century, after which growth will spread increasingly to other areas, and the Rio Grande Basin will account for a decreasing proportion of the total population.

The south High Plains and the Pecos Basin offer the greatest potentials for growth after about 2000 or 2010, and their rate of growth accelerates to 2070.

Although the population of the Arkansas Basin will grow, it will constitute a stable to declining proportion of the state total.

The central Closed Basin (Estancia to Alamogordo) will maintain about the same proportion of the state's population through 2000, after which it will gain to about 2050. Thereafter, the more rapid growth of other parts of the state will reduce its percentage of the total.

The urban centers of the San Juan Basin, centering on Farmington, will grow less rapidly than the state - and have a decreasing percentage of the population - through 2000, after which the area will gain an increasing share of the state's population.

The only urban center in the lower Colorado Basin (Gallup area) will decline as a percentage of the state through 2010 or 2020, after which it will gain an increasing share of the total population.

The urban centers of the southwestern Closed Basin (Deming, Lordsburg, and Silver City) will generally grow less rapidly than the state until about midcentury, after which their share of the state's population will stabilize.

I have attempted to give you the highlights of our rationale and procedures. As you may well imagine, there are many details that I haven't mentioned and much agonizing soul-searching and a lot of number-juggling that accompanied the actual working out of the figures. The results you have in your hands, and you can draw your own conclusions concerning the appropriateness or validity of the figures. I think that I would like to say again that we have no illusions (or perhaps I should say delusions) about their accuracy so far as indicating what the actual course of events will be in New Mexico. On the other hand we hope that they will be useful in indicating what the future may hold with respect to the demands upon our resources - whatever those resources may be.

Projections of New Mexico's Population
to the Year 2070
(in thousands)

	<u>1960</u>	<u>1970</u>	<u>1980</u>	<u>1990</u>	<u>2000</u>	<u>2010</u>	<u>2020</u>	<u>2030</u>	<u>2040</u>	<u>2050</u>	<u>2060</u>	<u>2070</u>
Bernalillo	262.2	375.4	531.5	712.8	948.0	1,223.9	1,546.6	1,921.3	2,359.7	2,827.0	3,316.5	3,795.1
Catron	2.8	3.0	4.2	5.9	9.3	11.0	11.9	13.7	16.5	19.3	22.7	26.6
Chaves	57.6	73.3	92.4	114.8	151.4	194.0	253.1	342.8	481.8	646.1	828.0	1,003.6
Colfax	13.8	15.5	18.0	21.5	26.4	32.2	39.2	50.7	68.4	91.3	120.5	157.2
Curry	32.7	45.7	68.1	90.6	123.7	162.4	215.6	282.9	365.1	457.9	561.8	671.0
De Baca	3.0	3.1	4.6	6.3	10.1	11.9	12.9	14.8	17.9	21.0	24.6	28.8
Dona Ana	59.9	95.7	136.3	168.6	224.0	306.9	425.0	569.5	740.0	932.4	1,137.5	1,330.0
Eddy	50.8	55.1	66.5	80.6	104.2	133.4	171.9	229.2	318.2	407.9	505.3	596.2
Grant	18.7	21.2	28.6	34.9	44.8	57.5	73.1	91.9	113.8	141.3	175.6	218.3
Guadalupe	5.6	7.5	8.0	11.6	16.0	19.0	21.8	26.0	32.4	44.1	63.1	93.2
Harding	1.9	2.2	3.8	5.3	8.1	9.6	10.4	12.0	14.5	17.0	19.9	23.3
Hidalgo	5.0	7.3	7.9	8.8	11.8	15.3	19.8	25.5	32.5	41.4	52.6	66.7
Lea	53.4	65.7	84.6	105.0	140.3	184.2	245.4	332.5	460.0	612.2	795.2	1,000.0
Lincoln	7.7	10.2	13.9	18.5	23.9	28.2	30.5	35.2	42.5	49.8	58.4	68.5
Los Alamos	13.0	23.7	34.7	42.8	56.3	73.9	90.3	120.0	159.8	201.4	243.8	276.8
Luna	9.8	13.5	17.4	22.7	30.6	39.7	51.1	65.5	83.7	107.1	136.9	175.0
McKinley	37.2	41.4	58.7	70.8	88.2	111.2	145.0	188.5	250.0	342.5	486.3	710.0
Mora	6.0	4.7	5.3	6.6	10.2	12.1	13.1	15.1	18.2	21.3	25.0	29.2
Otero	37.0	44.5	60.8	77.5	102.6	138.5	194.0	265.8	350.0	444.5	542.3	630.0
Quay	12.3	15.4	16.2	19.7	26.5	31.2	35.5	41.7	49.3	57.7	66.6	77.8
Rio Arriba	24.2	22.2	26.6	36.7	43.6	57.0	70.5	90.1	119.4	150.0	180.8	204.8
Roosevelt	16.2	20.4	26.2	31.1	38.7	56.8	77.4	106.2	144.9	195.1	256.2	329.0
Sandoval	14.2	14.8	18.6	24.3	26.5	36.2	51.0	72.8	103.4	142.2	187.0	234.2
San Juan	53.3	53.3	66.2	82.6	100.5	128.6	175.0	234.5	310.0	399.9	503.9	620.0
San Miguel	23.5	25.4	30.1	36.7	49.0	59.0	69.2	84.0	107.6	148.9	216.7	326.8
Santa Fe	45.0	58.5	82.2	122.2	178.5	233.7	287.2	366.5	480.8	598.6	715.4	808.4
Sierra	6.4	7.9	9.9	12.5	18.0	21.1	24.7	29.9	36.5	48.8	71.2	109.4
Socorro	10.2	10.6	12.7	15.7	21.2	24.8	29.4	25.5	43.2	58.3	84.5	131.0
Taos	15.9	18.6	24.8	31.8	37.9	44.5	52.9	64.2	80.3	108.9	157.6	239.6
Torrance	6.5	6.0	6.5	8.0	10.4	12.2	13.2	15.2	18.4	21.6	25.3	29.7
Union	6.1	7.3	7.2	8.2	10.8	12.9	15.3	18.3	22.3	27.9	35.4	45.0
Valencia	39.1	38.9	57.5	75.9	86.5	114.0	147.4	187.1	236.9	292.5	355.2	420.7
STATE	951.0	1,208.0	1,630.0	2,111.0	2,778.0	3,596.9	4,621.4	5,948.9	7,678.0	9,675.9	11,971.8	14,475.9

Projections of Population to 2070
 United States and New Mexico
 (figures in 000s except percentage)

United States	Median**					
	High	Low	Number	Natural Increase		Migration
				Number	Percent	Number
1960*	180,684	180,684	180,684	22,085	12.22	4,000
1970*	208,615	204,923	206,769	28,308	13.69	4,000
1980*	250,489	227,665	239,077	34,972	14.62	4,000
1990*	300,131	255,967	278,049	39,984	14.38	4,000
2000*	361,424	282,642	322,033	47,723	14.82	4,000
2010*	437,851	309,661	373,756	53,859	14.41	4,000
2020	525,261	337,969	431,615	59,872	13.87	4,000
2030	624,333	366,641	495,487	65,910	13.30	4,000
2040	735,406	395,389	565,397	71,466	12.64	4,000
2050	858,021	423,705	640,863	75,720	11.82	4,000
2060	989,354	451,813	720,583	81,993	11.38	4,000
2070	1,133,842	479,307	806,576	---	--	

New Mexico								% of US	
							Percent	Median	
1960	955	955	955	236	24.71	17	1.8	.529	
1970	1,326	1,114	1,208#	262	21.67	160	13.2	.584	
1980	1,780	1,498	1,630#	342	20.97	139	8.5	.682	
1990	2,345	1,919	2,111#	434	20.55	233	11.0	.759	
2000	3,128	2,507	2,778#	568	20.43	144	6.4	.863	
2010	4,072	2,908	3,490	650	18.63	481	13.8	.934	
2020	5,883	3,359	4,621	822	17.79	574	12.4	1.071	
2030	8,179	3,855	6,017	968	16.08	693	11.5	1.214	
2040	10,958	4,399	7,678	1,168	15.21	811	10.6	1.358	
2050	14,329	4,986	9,657	1,304	13.50	944	9.8	1.507	
2060	18,204	5,606	11,905	1,523	12.79	1,048	8.8	1.652	
2070	22,677	6,275	14,476	---	--	---	--	1.795	

* US Bureau of the Census, Population Estimates, Series P-25 No. 359 2/20/67

** Median figures, including natural increase, derived from Census high and low

As shown by earlier projections to year 2000