

INCOME PRODUCING VALUE OF WATER WHEN USED BY DIFFERENT INDUSTRIES
INCLUDING AGRICULTURE AND IN THE VARIOUS AREAS OF NEW MEXICO

Professor Frank Bromilow*

Before going into a discussion of one specific diversion pattern, it might be well to recapitulate the division of water that was used in all of the diversion patterns. As you will note in Table I, the amount of water available in the San Juan Basin ranged from a maximum of 206,000 Acre Feet allocated to industrial and municipal use to a minimum of 22.6 thousand Acre Feet. In the Rio Grande Basin, the maximum amount was 179,000 Acre Feet, while in two of the patterns no water at all was allocated to the use we planned to study.

The wide range of amounts of water available for municipal and industrial use was a choice not specifically made by our sub-committee. It was a result first of a major decision that two levels of diversion from the San Juan to the Rio Grande valleys would be studied. The first level being 110,000 Acre Feet and the second level being 235,000 Acre Feet. Once this decision had been reached by the entire study group, a meeting in May of 1957, again of the entire study group, made decisions on allocation of water to the following:

1. San Juan Irrigation
2. San Juan Municipal and Industrial
3. San Juan Losses
4. Rio Grande Tributary Irrigation
5. Rio Grande Other Irrigation
6. Rio Grande Municipal and Industrial
7. Rio Grande Water-shed Improvement
8. Pumping Depletion
9. Fish and Wild Life
10. Rio Grande Losses

Once these decisions had been reached, the job of our sub-committee was that of deciding on a division of the municipal and industrial water among the seven major industry classifications which might have possibility of establishment in New Mexico.

Tables in the Sub-committee report show in detail the allocation of this water to various industries and the economic impact of the use of this water by industries. Our reasoning in developing these patterns can best be shown by a few examples.

*Head, Department of Civil Engineering, New Mexico College of A & MA.

Patterns 235a and c, which allocated only 22.6 thousand acre feet for industrial and municipal use in the San Juan Basin, had in it large allocations of water for agricultural use in that same basin. It was our thought that such large quantities of water allocated to agricultural uses would mean that the small amounts allocated to industrial uses would of necessity, have to be used in agricultural supported industries. For this reason, it was assumed that the entire 22.6 thousand acre feet would be used in industries in the class "Food and Kindred Products".

Where larger quantities were available in the San Juan Basin, such as in Pattern 235b, it was assumed that the level of agricultural industry would remain the same and that because of the mineral potential of the area the remainder would be used in the chemical and allied products industry.

Review of all of the patterns in the various ranges of allocated water, mentioned in the opening statement, shows a wide range of population increase which could be supported in the two areas. A low figure of 85,540 people could be supported in Patterns 110a and c with a maximum figure of 534,350 people being supported in Pattern 235b. These figures compare with an estimated population increase to 1975 of 26,800 in the San Juan Basin; 175,000 in the Rio Grande and Otero county areas for a grand total of 201,800.

For a detailed study of the effect of this water use, Table II, Pattern 110b, is the best example, since in this particular pattern a distribution of water uses among all seven of the possible industries in each basin was contemplated. This table is shown in two pages. The first page giving in detail the effect of the distribution of water to seven industry classifications in the San Juan Basin. The second page gives similar information for the Rio Grande Basin and in addition, the second page shows the total impact on the San Juan Basin and the Rio Grande Basin and similarly a grand total. Specific references to this grand total should be fruitful in terms of understanding the Table and I would like to take these figures and discuss them with you. Item No. 1 shows a total population increase supported by this water of 319,550, which you will note, is approximately 50% more than the estimated population increase for these areas to 1975. Study of the other items show specific effects on the various parts of the economy of the State.

In conclusion, I would like to point out that municipal and industrial use of water represents the greatest value for the support of increase in population. There is a range of water needed per person from 1.73 acre feet to a low of .52 acre feet per person added, which compares very favorably to the amount of water needed to support one person in an irrigation agricultural economy. These figures themselves are on the conservative side, since in arriving at them, it was assumed that all municipal water and all industrial water would be consumed. We know from other studies that municipal water, by proper sewage treatment, can be reclaimed. Similarly much of the water used in industry can be reused. For example, water used in cooling operations is available for other uses. It is felt that a broad program of industrial development supported by sufficient water allocated specifically for that purpose could result in tremendous increase in the economic status of the state.

TABLE I

Pattern	Industrial and Municipal Water			Industrial Water	Municipal Water	Population Growth			Acre Feet Per Person
	San Juan	Rio Grande	Total Water			San Juan	Rio Grande	Total	
110a	147.6	0.0	147.6	133.1	14.5	85,540	0	85,540	1.73
110b	206.0	72.0	278.0	225.6	52.4	200,550	119,000	319,550	0.87
110c	147.6	0.0	147.6	133.1	14.5	85,540	0	85,540	1.73
110d	206.0	53.4	259.4	208.2	51.2	200,550	112,000	312,550	0.83
235a	22.6	50.0	72.6	49.6	23.0	39,550	100,100	139,650	0.52
235b	153.8	179.0	332.8	245.3	87.5	89,850	444,500	534,350	0.62
235c	22.6	50.0	72.6	49.6	23.0	29,550	100,100	139,650	0.52
235d	153.8	142.0	295.8	232.1	63.7	89,850	299,600	389,450	0.76

TABLE II MUNICIPAL & INDUSTRIAL WATER USE - Pattern 110 b
SAN JUAN BASIN

	1	2	3	4	5	6	7
	Food & Kindred Products	Textile Mill Products	Apparel & Related Products	Chemicals & Allied Products	Stone, Clay & Glass Products	Fabri- cated Metal Products	Electric Machinery & Equipment
1. Population Increase	39,550	7,000	7,000	56,000	14,000	35,000	42,000
2. Industiral Employees	5,650	1,000	1,000	8,000	2,000	5,000	6,000
3. Total Water Acre Feet	22,600	3,000	2,000	152,000	7,400	10,000	9,000
4. Industrial Water Ac. Feet	16,100	1,850	850	143,000	5,100	4,250	2,100
5. Municipal Water Ac. Feet	6,500	1,150	1,150	9,000	2,300	5,750	6,900
	THOUSAND DOLLARS						
6. Sales	152,500	11,000	5,650	182,000	24,260	57,750	88,800
7. Profit	4,900	445	124	24,240	3,030	4,620	8,650
8. Value Added	46,500	4,680	4,400	97,000	14,800	36,500	43,000
9. Salaries and Wages	20,300	3,000	2,750	35,400	7,700	21,300	24,200
10. Prop. Income in State	226	200	103	0	910	1,425	540
11. State and Local Taxes	226	70	40	1,360	180	325	336
12. Depreciation	1,130	165	33	5,000	630	875	1,170
13. Prop. Income Out of State	2,070	20	103	15,300	910	1,425	4,920
14. Federal Taxes Corp.	2,530	268	76	12,100	1,550	2,350	4,420
15. Misc. Deductions	14,400	895	1,295	27,800	2,920	6,300	7,470
16. M'tl Purchased in State	90,000	4,670	930	24,000	3,450	3,950	7,200
17. M'tl Purchased Out of State	9,800	1,015	140	30,720	3,510	11,900	29,400
18. Fuel Cost	848	85	23	3,620	1,100	360	222
19. Elect. Energy Cost	565	105	32	2,000	390	415	366
20. Employee State Taxes	960	140	130	1,672	384	1,000	1,140
21. Employee Fed. Tax	1,240	115	75	3,040	586	1,730	1,830
22. Total Capital Investment	22,600	6,800	4,000	136,000	18,000	32,500	33,800
23. In State Capital Investment	2,260	300	2,000	0	9,000	16,250	3,380
24. Out of State Capital Invest- ment	20,340	6,500	2,000	136,000	9,000	16,250	30,420

TABLE II M. & I. - Pattern 110b Cont.
RIO GRANDE BASIN

	1 Food & Kindred Products	2 Textile Mill Products	3 Apparel & Related Products	4 Chemicals & Allied Products	5 Stone, Clay & Glass Products	6 Fabricated Metal Products	7 Electric Machinery & Equipment	Total San Juan	Total Rio Grande	GRAND TOTAL
1.	7,000	7,000	14,000	14,000	14,000	28,000	35,000	200,550	119,000	319,550
2.	1,000	1,000	2,000	2,000	2,000	4,000	5,000	28,650	17,000	45,650
3.	4,000	3,000	4,000	38,000	7,400	8,000	7,600	206,000	72,000	278,000
4.	2,850	1,850	1,700	35,700	5,100	3,400	1,750	173,250	52,350	225,600
5.	1,150	1,150	2,300	2,300	2,300	4,600	5,850	32,750	19,650	52,400
THOUSAND DOLLARS										
6.	27,000	11,000	11,300	45,400	24,260	46,200	74,000	521,960	239,160	761,120
7.	868	445	248	6,060	3,030	3,700	7,200	46,009	21,551	67,560
8.	8,250	4,680	8,800	24,260	14,800	29,200	35,850	246,880	125,840	372,720
9.	3,600	3,000	5,500	8,860	7,700	17,040	20,150	114,650	65,850	180,500
10.	40	200	206	0	910	1,140	450	3,404	2,946	6,350
11.	40	70	80	340	180	230	280	2,537	1,220	3,757
12.	200	165	66	1,250	630	700	975	9,003	3,986	12,989
13.	365	20	206	3,820	910	1,140	4,100	24,748	10,561	35,309
14.	447	268	152	3,030	1,550	3,680	1,880	23,294	11,007	34,301
15.	2,550	895	2,590	6,960	2,920	5,040	6,220	61,080	27,175	88,255
16.	15,900	4,670	1,860	6,000	3,450	3,160	6,000	134,200	41,040	175,240
17.	1,732	1,015	280	7,680	3,510	9,530	24,500	86,485	48,247	134,732
18.	150	85	46	904	1,100	288	185	6,258	2,758	9,016
19.	100	105	64	498	370	332	305	3,873	1,774	5,647
20.	170	140	260	418	364	800	950	5,426	3,102	8,528
21.	220	115	150	760	586	1,384	1,525	8,616	4,740	13,356
22.	4,000	6,800	8,000	34,000	18,000	26,000	28,000	253,700	124,800	378,500
23.	400	300	4,000	0	9,000	13,000	2,800	33,190	29,500	62,690
24.	3,600	6,500	4,000	34,000	9,000	13,000	25,200	220,510	95,300	315,810

