

AN ESTIMATE OF THE PROPERTY TAX IMPACT OF KEYSTONE LAKE*

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The objective of this paper is to estimate the impact of construction of Keystone Lake in northcentral Oklahoma on local property tax base and tax levies in the impacted counties. Prior estimates of changes in land use patterns resulting from the lake are combined with local assessment and millage rates of the four counties in the impacted area to yield estimates of net change in the tax base and tax revenue in each of four counties.

The empirical findings indicate that although the lake caused a reduction in the physical size of the tax base the shift to higher valued uses resulted in an increase in the dollar value of the base and consequently in tax levies. These results, however, are highly dependent upon the performance of county assessors in reclassifying and revaluing land which has shifted from one use category to another. Without fast and equitable reassessment the result could well be a reduction in the tax base and tax levies resulting in fiscal conflicts for the county governments.

INTRODUCTION

The conversion of prime agricultural land into non-agricultural uses has received increasing attention in the past few years. The concern has many dimensions. A diminishing land base for agriculture means that fewer acres must produce more food each year, and urbanization brings with it increasing demands for the preservation of open spaces (4). A related problem that has received less attention is the impact of changing land use patterns on the property tax base. In most states the lost agricultural land is converted into higher-valued urban uses as the urban-rural fringe moves outward from population centers. But in Oklahoma, nearly as much agricultural land has been lost to water resource development projects as to urbanization (1). The effect of either on the land base is the same; but a new lake removes the inundated land from the local tax rolls, possibly reducing the local property tax base.

County assessors contend that the net effect of a water resource development project is to reduce the local tax base. The Corps of Engineers counters that a lake will stimulate local development and encourage new businesses, both of which will result in increased assessed values. The objective of the research reported in this paper is to estimate the net impact the construction of Keystone Lake had on the property tax base of the four counties affected by the lake. To do this, previous estimates of the change in the land use pattern of the uninundated area around Keystone will be used to estimate tax base increases resulting from shifts into higher-value uses which will be compared to the losses resulting from land and property removed from the tax rolls due to inundation.

METHODS

The differential change in land use resulting from construction of Keystone Lake was estimated by Vandever and Drummond (6). Data were collected on land use in two time periods prior to construction of the reservoir and a Markov chain process was used to project the pre-lake land use pattern to 1970. This pattern of land use was compared with the actual 1970 land use to determine the differential change in land use which resulted from construction of the lake.

The study area was the area over which the lake was believed to have an effect on land use patterns. Approximately 3,000 sample areas were quantified representing 91,670 acres of the 181,495 total acres in the study area. These samples were used to estimate the net land use change caused by the construction of Keystone. The estimates

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of net land use change are then allocated to the four counties covered by Keystone proportionately to the number of acres of the study area located in each county. Per acre values for each land use category are then used to derive the net change in property value in each category for each county. The change in net assessed value is derived by applying county assessment rates (3) for each land use to the net change in land value in that use and subtracting the change in homestead exemption for residential property. County millage rates (2) are then used to derive the estimated net change in taxes levied in each county resulting from the construction of the lake.

RESULTS

The estimated differential change in land use resulting from construction of Keystone Lake is shown in Table 1. Column 1 shows the actual number of acres in each land use category in 1970. Column 2 shows the projected acreage in each land use category had the lake not been built. Column 3 (col. 1 minus col. 2) shows the estimated differential land use change resulting from the lake. The data indicate that construction of Keystone resulted in a significant decrease in all agricultural uses accompanied by an increase in most non-agricultural uses. Most of the loss in agricultural land was caused by inundation by the lake with the remainder resulting from a shift of noninundated agricultural land to non-agricultural uses.

The data in Table 1 may be used to estimate the change in the property tax base associated with the construction of Keystone. A new lake affects the tax base in two manners: First, land use patterns will change with some net additions to the high-valued uses such as residential and commercial. As shown in Table 1, there was a net gain of 635 acres of these high-valued uses, which is offset by the loss of 33,440 acres of relatively low-value agricultural land. A second factor which may cause a change in the size of the tax base is a change in the value per acre of property in each land use. Presumably, residential property values per acre will increase as a consequence of the lake being nearby. In order to isolate only one of these two changes associated with the construction of Keystone, it is assumed that per-acre property values before and after the construction of the lake are the same. In doing so, estimates of change in the tax base will certainly be underestimated to the extent of relative price changes.

The estimated change in the property tax base associated with the differential change in land use patterns in Osage County is shown in Table 2. Change in the tax base is equal to change in each land use category times the per-acre value (5) of land in that use. The per-acre values for residential and commercial land uses (column two) are relatively high because of the importance of buildings and improvements in the total property value. As shown in the third col-

TABLE 1. *Differential land use change resulting from construction of Keystone Reservoir*

Land use	Observed land use in 1970 with Keystone (acres)	Estimated 1970 land use without Keystone (acres)	Differential (acres)
Non-Agricultural Uses			
Residential	2,481.60	1,960.14	+ 521.46
Commercial	376.66	181.50	+ 195.16
Extractive	606.07	789.50	- 183.43
Transportation	2,558.20	2,628.04	- 69.84
Utilities	1,111.48	960.11	+ 151.37
Institutional	124.61	103.45	+ 21.16
Sub-total	7,258.62	6,622.74	635.88
Agricultural Uses			
Impoundments	649.92	731.42	- 81.50
Cultivated	4,979.93	13,626.61	- 8,646.68
Woodland	78,406.71	86,255.30	- 7,848.59
Pastureland	57,395.66	74,258.51	- 16,862.85
Sub-total	141,432.22	174,871.84	- 33,439.62
Lake	32,803.74	0	+ 32,803.74
Total	181,494.58	181,494.58	0

TABLE 2. *Estimated change in tax base and tax revenues in Osage County due to Keystone Lake, 1970.*

Land Use	Land Use Differential (acres)	Value/acre	Change in Value	Assessment Rate (percent)	Change in Gross Assessed Value	Change in Homestead Exemption	Change in Net Assessed Value
Non-Agricultural Uses							
Residential	+ 194	\$14,400	\$ 2,790,708	19.34	+ 539,723	178,109	+ 361,614
Commercial	+ 72	15,860	+ 1,149,819	18.93	+ 217,661	0	+ 217,661
Extractive	- 68	119	- 8,122	18.93	- 1,537	0	- 1,537
Sub-Total	+ 198		+ 3,932,405		+ 755,846		+ 577,738
Agricultural Uses							
Impoundments	- 30	119	- 3,608	4.50	- 162	0	- 162
Cultivated	- 3,213	214	- 688,599	4.50	- 30,987	0	- 30,987
Woodland	- 2,916	102	- 297,574	4.50	- 13,391	0	- 13,391
Pastureland	- 6,266	134	- 840,548	4.50	- 37,825	0	- 37,825
Sub-Total	- 12,426		- 1,830,330		- 82,365		- 82,365
Total	- 12,228		+ 2,102,075		+ 673,481		+ 495,373

Note: All data are rounded to nearest integer.

X millage rate .06332
Change in taxes levied + 31,367

umn, increases in these values offset losses due to inundation at a rate of approximately two to one. The \$2,102,075 increase in total property value raised gross assessed value by \$673,481 and net assessed value by \$495,373. The estimated addition to tax receipts based on the county average 1970 millage rate was \$31,367. Thus, the tax base and estimated tax receipts increased although the total acreage in the tax base was reduced by 12,228 acres. The differential change in transportation, utilities, institutional and lake use categories is not included in these calculations because land in these uses is not part of the locally assessed tax base of the county.

Similar computations for the other three counties impacted by Keystone (Pawnee, Creek and Tulsa) were performed, but the details of the computations are not shown here. The total estimated effect of the lake on the four counties is summarized in Table 3. Construction of the reservoir resulted in a 32,909-acre decrease in the tax base of the area, but the value of the tax base was increased by \$5,654,600. The gross assessed value of the area increased by \$1,471,934 while net assessed value rose by \$1,070,166. This increase in tax base resulted in a \$73,949.41 estimated increase in 1970 tax revenues in the area.

DISCUSSION

The primary objective of the research reported in this paper is to determine whether or not a major water resource project adversely affects the property tax base of the impacted county. The results presented for Keystone Lake indicate that the property tax base increased as a consequence of the lake even though approximately 18% of the study area was inundated. The estimated increase occurs as a result of the shift in land use patterns alone since property value changes were not considered. It should be noted that the estimates of property values in the alternative uses were regional in nature and not specific to the study area. Therefore, these are probably better estimates of land value in the absence of the

TABLE 3. *Total effect of Keystone Reservoir on tax base and tax revenues of four surrounding counties, 1970.*

County	Land Use Differential ^a (acres)	Change in Property Value (\$)	Change in Net Assessed Value (\$)	Change Taxes Levied (\$)
Osage	- 12,228	+ 2,102,065	+ 495,373	+ 31,367
Pawnee	- 9,945	+ 1,707,070	+ 152,750	+ 9,807
Tulsa	- 3,579	+ 614,625	+ 162,146	+ 13,325
Creek	- 7,158	+ 1,230,840	+ 259,897	+ 19,451
	- 32,909	+ 5,654,600	+ 1,070,166	+ 73,949

^a Includes all land removed from tax base either by inundation or by land use shift into nontaxable uses.

lake than they are of post-construction land values. The effect of this on the results is probably a downward bias because the increased demand for residential and commercial land in the lake area is expected to have increased land values in the two classes which accounted for all the positive effect on tax base and receipts. If it is safe to assume that the impact of the lake will be to increase per-acre land and improvement values, then the tax base should increase even more than the above estimates suggest.

The argument that projects like Keystone Lake deplete the local tax base would seem to have been refuted by this analysis. However, the effect on tax receipts may be negative if the local assessor fails to reflect the increase in property value in the tax rolls. The general sentiment among assessors that lakes reduce the tax base may reflect upon their performance rather than the behavior of the real estate market.

Another aspect of the problem which has not been considered here involves the cost of providing additional public services to the enlarged residential and commercial sectors. Even if tax receipts are increased by construction of a lake the net effect on the local government may be negative if the increase in expenditures is greater than the increase in receipts. Future work in the area should concentrate on this question. The determining factor once again will be the performance of the local assessor. If he is successful in setting assessment rates on the various use categories of land consistent with the cost of providing services, then the public sector will not be strained by the change in land use patterns. However, if he is not successful in this very important area the results may be disastrous for the local government.

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REFERENCES

1. STATE OF OKLAHOMA, *A Preliminary Description of Oklahoma's Urban Fringe*, draft report prepared by the Department of Economic and Community Affairs for the Land Resources Technical Advisory Committee, July, 1976.
2. OKLAHOMA TAX COMMISSION, unpublished data.
3. PROFESSIONAL APPRAISAL COMPANY, *Report to the Oklahoma Tax Commission*, mimeographed, 1975.
4. UNITED STATES DEPARTMENT OF AGRICULTURE, *Recommendations on Prime Lands*, 1975.
5. L. R. VANDEVEER, *An Economic Analysis of Differential Land Use Change Associated with Water Resource Development: Keystone Lake, Oklahoma*, unpublished M.S. thesis, Oklahoma State University, 1976.
6. L. R. VANDEVEER and H. E. DRUMMOND, *Proc. Okla. Acad. Sci.* 56: 153-158 (1976).