State of Oklahoma
OWRB
WATER RESOURCES BOARD
the water agency

Oklahoma Comprehensive Water Plan
2012 Update

Wastewater Infrastructure
Needs Assessment by Region

April 2012

This study was funded through an agreement with the Oklahoma Water Resources Board under its authority to update the Oklahoma Comprehensive Water Plan, the state's long-range water planning strategy, due for submittal to the State Legislature in 2012. Results from this and other studies have been incorporated where appropriate in the OCWP's technical and policy considerations. The general goal of the OCWP is to ensure reliable water supplies for all Oklahomans through integrated and coordinated water resources planning and to provide information so that water providers, policy-makers, and water users can make informed decisions concerning the use and management of Oklahoma's water resources.

Oklahoma Comprehensive Water Plan
OCWP

Prepared by CDM Smith under an agreement with the Oklahoma Water Resources Board

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Acronyms

BOD_5	5-day biochemical oxygen demand
CDM Smith	CDM Smith Inc.
CWA	Clean Water Act
CWNS	Clean Watersheds Needs Survey
CWSRF	Clean Water State Revolving Fund
DEP	data entry portal
EPA	United States Environmental Protection Agency
GIS	geographic information system
I/I	infiltration/inflow
IFAS	integrated fixed film activated sludge
MBBR	moving bed biofilm reactor
MBR	membrane bioreactor
mg/L	milligrams per liter
MS4	municipal separate storm sewer system
MUA	Metropolitan Utility Authority
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint Source Pollution
O&M	operation and maintenance
O&M	operation and maintenance
OCWP	Oklahoma Comprehensive Water Plan
OCWUT	Oklahoma City Water Utilities Trust
ODC	Oklahoma Department of Commerce
ODEQ	Oklahoma Department of Environmental Quality
OPDES	Oklahoma Pollutant Discharge Elimination System
OWRB	Oklahoma Water Resources Board
ppm	parts per million
PPWS	public and private water supply
PWA	Public Works Authority
RMUA	Region Metropolitan Utility Authority
SB	Senate Bill
SBR	sequencing batch reactor
TDS	total dissolved solids
TMDLs	total maximum daily loads
TOC	total organic carbon
TSS	total suspended solids
USGS	U.S. Geological Survey

Section 1
Executive Summary

As part of the update to the Oklahoma Comprehensive Water Plan (OCWP), CDM Smith (formerly Camp Dresser & McKee Inc.) prepared cost estimates to meet the wastewater infrastructure needs for the next 50 years. While it is difficult to account for changes that may occur within this extended period, it is necessary to evaluate, at least on the order-of-magnitude level, the long-range costs to treat and dispose of wastewater. It is expected that to meet these needs, support, and funding assistance will be required by various state and federal agencies.

In this study, project cost estimates are developed for a selection of existing wastewater utilities. This project uses the 13 OCWP Watershed Planning Regions, developed as part of the OCWP, as the basis for developing cost estimates. These costs are weighted to develop 13 regional cost estimates. The regional cost estimates then are summed to provide a statewide cost estimate to meet wastewater infrastructure needs through 2060.

This report is organized in three main sections. Section 1 serves as an introduction and summary of the study and includes abbreviated description of methodology and results. Section 2 provides a detailed description of the methodology used to develop cost estimates. This section includes lists of assumptions made, types of projects included, and sources used to develop projects and costs. Section 3 summarizes the regional and statewide cost estimates developed as part of this task. Sections 4 through 16 provide details about each of the regional cost estimates.

1.1 OCWP Methodology

The OCWP methodology is similar to the United States Environmental Protection Agency's (EPA's) methodology presented in the report *2008 Clean Watersheds Needs Survey*. In this OCWP report, the term "2008 CWNS" is used to encompass the EPA methods, cost models, and results associated with the most recent survey. **Figure 1-1** illustrates the OCWP method.

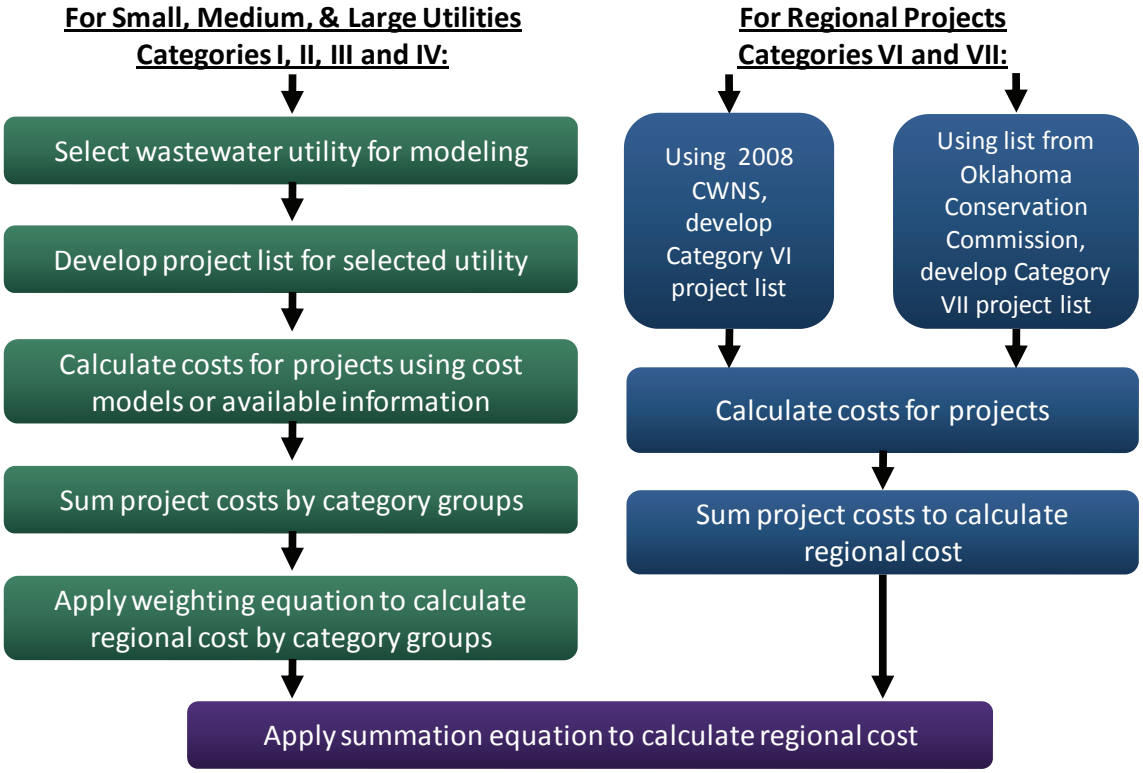


Figure 1-1. OCWP Wastewater Infrastructure Needs Assessment Approach

Equations 1-1 and 1-2 represent the summation equations used to calculate regional costs.

*Wastewater Infrastructure Costs by Infrastructure Type = Number of Systems in Stratum / Number of System Sampled * Sum of Project Costs for Systems Sampled by Infrastructure Type*

Equation 1-1 Cost by Infrastructure Type and by Stratum (or Size)

Wastewater Infrastructure Costs = Sum of Medium System Wastewater Infrastructure Costs by Infrastructure Type

Equation 1-2 Cost by Region

A few of the key similarities between the OCWP and the 2008 CWNS methodologies included the following:

- The OCWP study used the same infrastructure type classification of treatment, collection, and other. Generally, the definitions of each category are the same between the 2008 CWNS and this study.
- The OCWP study used the same definition of project costs. Cost estimates assumed complete construction costs including engineering and design. Costs associated with system operation and maintenance (O&M) were not included.

- The OCWP study used the same 2008 CWNS cost models except where EPA cost models are unavailable or yielded unreasonable results. Documentation on source and cost is provided in the OCWP cost model table, located in Appendix B.

A few of the key differences between the OCWP and 2008 CWNS methodologies are listed below:

- The OCWP study used the following definition for small (systems serving 3,300 and fewer people), medium (systems serving between 3,301 and 100,000), and large (systems serving more than 100,000) systems. Categorization of wastewater utilities was based on projected 2060 population and project size is based on projected 2060 wastewater flows. This size stratum was used so that wastewater infrastructure needs would be consistent with water infrastructure needs (more information on drinking water needs may be found in the OCWP *Drinking Water Infrastructure Needs Assessment by Region* report available on the Oklahoma Water Resources Board [OWRB] website).

- The OCWP study used a 50-year planning horizon compared to the 20-year planning period for the 2008 CWNS.

- The OCWP study used several sources of information including:

  – Oklahoma system-specific information that was available from the 2008 CWNS.

  – OWRB surveyed 23 wastewater utilities, collecting information on their existing treatment and collection systems and known future projects. Responses to survey questions as well as excerpts from master plans submitted with the survey were used to develop utility's project list.

  – Information on nonpoint source pollution control provided by the Oklahoma Conservation Commission.

- The OCWP study developed project lists for selected providers. The process to select wastewater utilities is discussed in Appendix A and more information is provided on the project list development process in Section 2.2.5.

1.2 Wastewater Utility Systems Included in the Study

The OCWP wastewater future costs were calculated for public municipal utilities. However, a correctional facility, state park, industrial park, airport, housing community, or other similar facilities was not included. A total of 476 utilities were used for the costing analysis. Some of these utilities may have more than one facility. The National Pollution Discharge Elimination System (NPDES) database contains 405 municipal utilities and there were an additional 71 utilities with state permits (non-discharging).

1.3 Regional Projects Included in the Study

The study includes two types of region-level projects: stormwater management and nonpoint source pollution control. The stormwater management projects included in this study were taken directly from the 2008 CWNS for Oklahoma wastewater utilities. For nonpoint source pollution control needs, this study used EPA accepted Watershed Based Plans developed by the State of Oklahoma. Plans for nonpoint source pollution control have been developed in the following watersheds:

- Illinois River and Lake Tenkiller;
- Eucha/Spavinaw Watershed;
- Honey Creek of Grand Lake;
- Thunderbird Lake;
- Fort Cobb Lake;
- North Canadian River (between Lakes Canton and Overholser); and
- Elk City Lake.

As the Watershed Based Plans are considered an evolving document, the funding needs estimated may represent either the entire or only a partial estimate of the financial costs necessary to restore beneficial use. The funding needs provided by the Oklahoma Conservation Commission represent an estimate of additional needs that currently lack a funding source and do not include resources that have been indentified or expended. More information on the estimates of nonpoint source pollution control needs is available in Appendix D.

1.4 OCWP Planning Region Cost Estimates

Twenty-three of the 476 OCWP wastewater utilities were selected for cost modeling. The selected utilities, using the methodology outlined above and described in detail in Section 2 of this report, were used to calculate the infrastructure costs at the OCWP watershed planning regional and statewide level.

Across the state, approximately $44 billion (in 2010 dollars) is required to meet the wastewater infrastructure needs for the next 50 years. **Figure 1-2** illustrates the total wastewater infrastructure costs to meet the needs through 2060. The OCWP Central Watershed Planning Region has the largest need, comprising over 26 percent of the state's total need. The Middle Arkansas Region has the second largest need, comprising approximately 15 percent.

Table 1-1 illustrates the costs by size category and period. All costs calculated in this study are clean water state revolving loan fund eligible. Medium providers have the largest overall wastewater need (excluding regional level needs), comprising approximately 63 percent of the state's total need. The largest wastewater infrastructure costs occur in the 2021–2040 period.

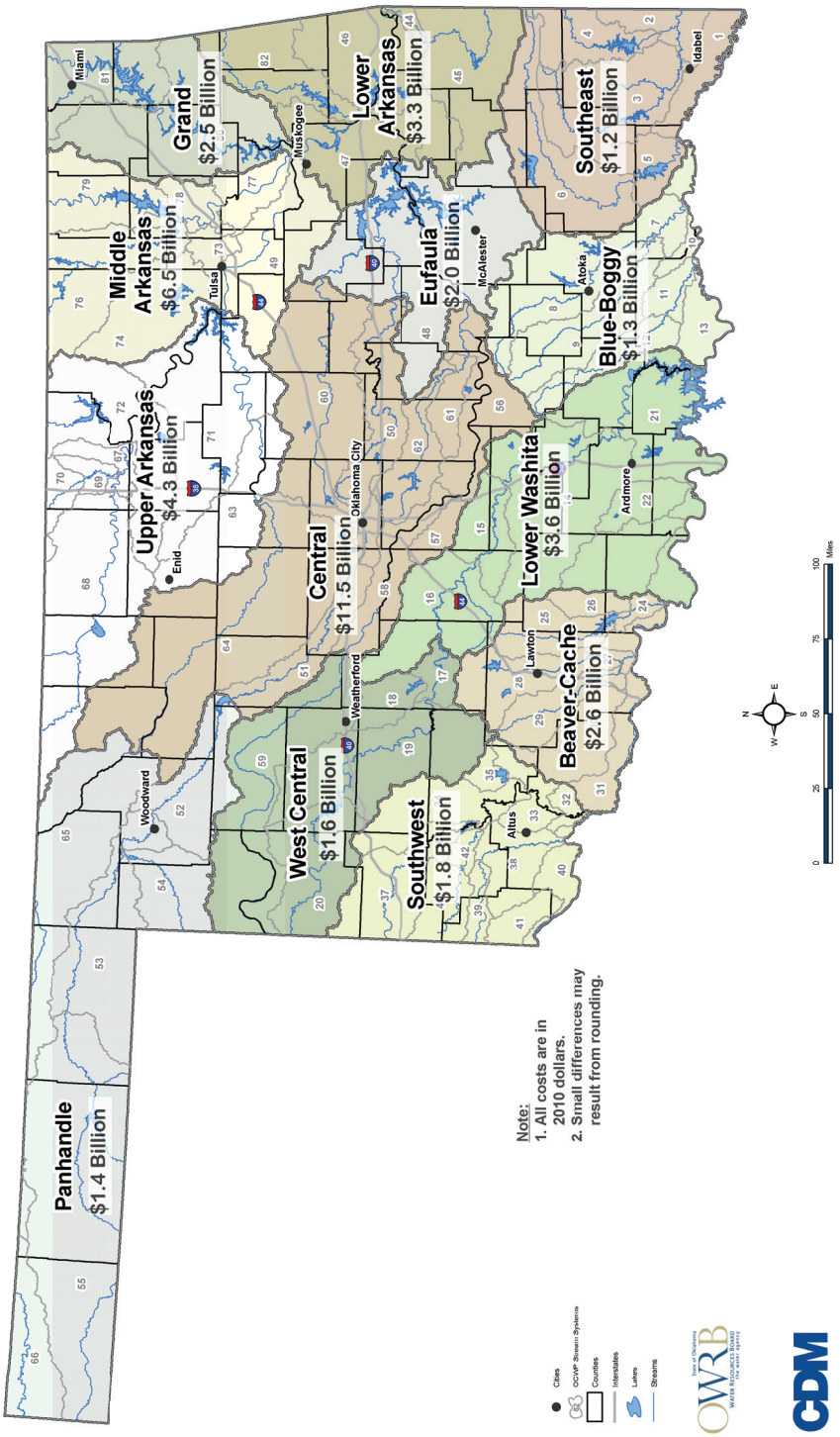


Figure 1-2. Wastewater Infrastructure Needs

Table 1-1. Statewide Wastewater Infrastructure Cost Summary by Category

Category[A]	Official Needs Category Group[B]	Present-2020 Infrastructure Need (millions of 2010 dollars)	2021-2040 Infrastructure Need (millions of 2010 dollars)	2041-2060 Infrastructure Need (millions of 2010 dollars)	Total Period Infrastructure Need (millions of 2010 dollars)[C]	Total Period Infrastructure Need (percent by category)	Total Period Infrastructure Need (percent by population)
Small	I and II	$170	$1,300	$530	$2,000	23%	13%
	III and IV	$2,200	$4,800	$1,100	$8,100		
Medium	I and II	$1,100	$4,000	$1,100	$6,200	63%	51%
	III and IV	$7,500	$10,000	$4,000	$21,500		
Large	I and II	$310	$1,000	$830	$2,140	12%	36%
	III and IV	$900	$1,600	$780	$3,280		
Regional	VI	$240	$0	$0	$240	2%	N/A
	VII	$170	$130	$130	$430		
Total		**$12,590**	**$22,830**	**$8,470**	**$43,890**	**100%**	**100%**

[A] Large systems are those serving more than 100,000; medium systems are those serving between 3,301 and 100,000 people; and small systems are those serving 3,300 and fewer people.

[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems, Category VI includes stormwater management, and Category VII includes nonpoint source pollution control. Costs were not developed for Category V combined sewer overflow correction (Oklahoma does not have CSO systems), Category X recycled water distribution (Oklahoma does not have these systems), and Category XII decentralized wastewater systems (category not consistent with public utilities included in this study).

[C] Small differences in values may result from rounding.

Section 2
Cost Estimating Approach

As part of the update to the OCWP, CDM prepared construction cost estimates to meet the wastewater infrastructure needs for the next 50 years. This section provides detailed information on the cost estimating methodology used in this study. This section begins with a description of the EPA system for determining national clean water infrastructure needs. This subsection provides a foundation of knowledge, since the OCWP method is similar to the EPA system. Next, this section describes the OCWP cost estimating approach. This subsection includes a comparison to the EPA system, assumptions made, and sources of information.

2.1 Background: EPA Clean Water Needs Assessment

The Clean Water Act (CWA) requires EPA to periodically assess the needs of the nation's wastewater systems and use the results for allocating the Clean Water State Revolving Fund (CWSRF).

The most recent 2008 Clean Watersheds Needs Survey (CWNS) was the 15th survey since the 1972 CWA. The report *Clean Watersheds Needs Survey: Report to Congress* presents the methodology utilized by EPA to determine wastewater needs and results from the survey. When cost estimates were unavailable, EPA utilized cost models to estimate the project costs. The report *Clean Watersheds Needs Survey (CWNS) 2008 Cost Curves* (cost models) documents these cost models. In this OCWP report, the term "2008 CWNS" is used to reference the actual survey and all documentation related specifically to this survey.

To develop the wastewater infrastructure costs, EPA established a data entry portal (DEP). This DEP allows wastewater utilities to update and enter new documented costs for projects that existed as of January 1, 2008 or were expected to occur within the next 20 years. Users submitted documentation of needs in the form of engineer's estimates, loan applications, capital improvement plans, etc. When costs were unavailable, the CWNS cost curves could be used. The cost models provide cost in January 2008 dollars. Project costs provided in the survey were adjusted to reflect January 2008 dollars. Projects were limited to wastewater system needs eligible for CWSRF program.

Information was solicited from all wastewater facilities. Cost information from each participant was summed to develop state and national level wastewater infrastructure needs.

Wastewater infrastructure needs were presented for the total state with additional information provided for small communities needs. CWNS defined small communities as those serving 10,000 or less people.

2.2 OCWP Regional Wastewater Infrastructure Cost Development

This section describes the details of the OCWP approach. It starts with a general description and comparison with EPA's method. Then a discussion on how specific providers were selected and sources of information is incorporated. Finally, this section discusses how project lists were developed and provides a list of common assumptions necessary to estimate costs.

2.2.1 OCWP Method: A General Overview

The OCWP method is similar to EPA's 2008 CWNS approach in many ways. This task used the 13 regions, developed as part of other OCWP tasks, as the basis for developing cost estimates. **Figure 2-1** illustrates the OCWP method. Several of these topics are discussed in more detail in subsequent sections.

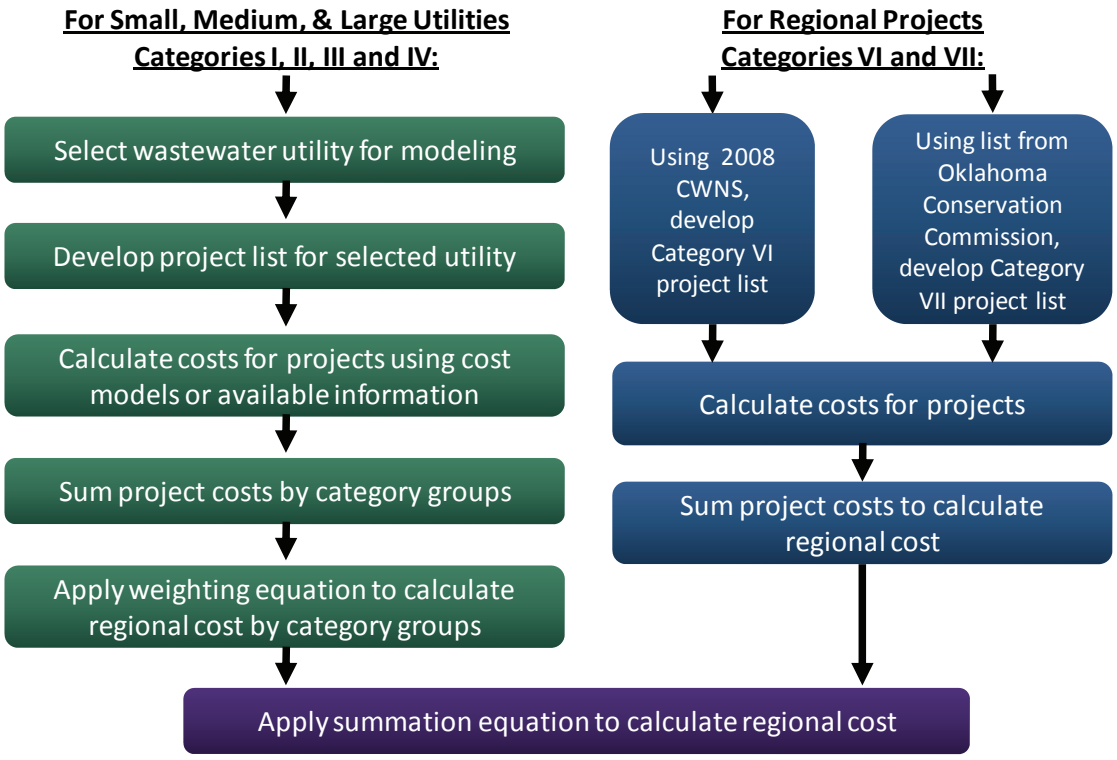


Figure 2-1. OCWP Wastewater Infrastructure Needs Assessment Approach

2.2.2 Wastewater Utility Systems Included in the OCWP

The OCWP wastewater future costs were calculated for public municipal utilities. However, a correctional facility, state park, industrial park, airport, housing community, or other similar facilities would not be included. A total of 476 utilities were used for the costing analysis. Some of these utilities may have more than one facility. The NPDES database contains 405 municipal utilities and there were an additional 71 utilities with state permits (non-discharging).

There were a substantial number of entries in the databases that were not included in the wastewater costing. The majority of these facilities did not have a NPDES permit number. Discussions with Oklahoma Department of Environmental Quality staff indicate that a lack of a permit number typically occurs when a utility begins, but does not finalize a permit application. Facilities also were excluded if they were private, associated with transient customers, did not have information on population served, or could not be located. Additionally, some facilities had both a NPDES and state permit, in these cases only the NPDES permit information was retained. Appendix A contains more information on wastewater utility systems included in the OCWP study.

2.2.3 Regional Projects Included in the Study

The study includes two types of region-level projects: stormwater management and nonpoint source pollution control. The stormwater management projects included in this study were taken directly from the 2008 CWNS for Oklahoma wastewater utilities. For nonpoint source pollution control needs, this study used EPA accepted Watershed Based Plans developed by the State of Oklahoma. Plans for nonpoint source pollution control have been developed in the following watersheds:

- Illinois River and Lake Tenkiller;
- Eucha/Spavinaw Watershed;
- Honey Creek of Grand Lake;
- Thunderbird Lake;
- Fort Cobb Lake;
- North Canadian River (between Lakes Canton and Overholser); and
- Elk City Lake.

As the Watershed Based Plans are considered an evolving document, the funding needs estimated may represent either the entire or only a partial estimate of the financial costs necessary to restore beneficial use. The funding needs provided by the Oklahoma Conservation Commission represent an estimate of additional needs that currently lack a funding source and do not include resources that have been indentified or expended. More information on the estimates of nonpoint source pollution control needs is available in Appendix D.

2.2.4 Similarities between OCWP and 2008 CWNS

Similarities between the OCWP and 2008 CWNS methodologies include the following:

- The OCWP study used the same infrastructure type classification of treatment, collection, and other. Generally, the definitions of each category are the same between the 2008 CWNS and this study.
  - Category I Secondary Wastewater Treatment – This category includes needs and costs necessary to meet the minimum level of treatment that must be maintained by all treatment facilities. Typically, secondary treatment requires an effluent quality of 30 milligrams per liter (mg/L) 5-day biochemical oxygen day demand

(BOD_5) and total suspended solids (TSS). For the OCWP study, secondary treatment is defined as 20 mg/L BOD_5 and 30 mg/L TSS.

- Category II Advanced Wastewater Treatment – This category includes needs and costs necessary to attain a level of treatment that is more stringent than secondary treatment or produce a significant reduction in nonconventional or toxic pollutants present in the wastewater.

- Category III Infiltration/Inflow (I/I) Correction and Sewer Replacement/ Rehabilitation – This category includes needs and costs for correction of sewer system I/I problems and for the maintenance, reinforcement, or reconstruction of structurally deteriorating sanitary systems. Infiltration includes controlling the penetration of water into a sanitary sewer system from the ground through defective pipes or manholes. Inflow includes controlling the penetration of water into the system from drains, storm sewers, and other improper entries.

- Category IV New Collector and Interceptor Sewers and Appurtenances – This category includes needs and costs for constructing new interceptor and collector sewer lines and pump stations to convey water from collection to treatment facility.

- Category VI Stormwater Management Programs – This category includes the needs and costs to plan and implement structural and nonstructural measures to control the runoff water resulting from precipitation. Needs and costs may be reported for Phase I, Phase II, and non-traditional municipal separate storm sewer systems (MS4).

- Category VII Nonpoint Source Pollution (NPS) Control – This category includes needs and costs to address NPS pollution control. NPS does not have a single point of origin and/or are not introduced into a receiving stream from a specific outlet. NPS may be a result of runoff, precipitation, atmospheric deposition, drainage, seepage, or hydrological modification.

- Costs for Categories V (combined sewer overflow correction), X (recycled water distribution), and XII (decentralized wastewater treatment systems), as well as unofficial needs categories, were not developed as part of this study. Oklahoma does not have combined sewer or recycled water systems. Decentralized wastewater systems were outside the scope of this project, which included only public utilities.

- The OCWP study used the same definition of project costs. Cost estimates assumed complete construction costs including engineering and design. Costs associated with system operation and maintenance (O&M) were not included.

- The OCWP study used the same 2008 CWNS cost models except where EPA cost models are unavailable or yielded unreasonable results. Documentation on source and cost is provided in the OCWP cost model table, located in Appendix B.

2.2.5 Differences between OCWP and 2008 CWNS

Differences between the OCWP and 2008 CWNS methodologies are listed below:

- The OCWP study used the following definition for small (systems serving 3,300 and fewer people), medium (systems serving between 3,301 and 100,000) and large (systems serving more than 100,000) systems. Categorization of wastewater utilities was based on projected 2060 population and project size is based on projected 2060 wastewater flows. This size stratum was used so that wastewater infrastructure needs would be consistent with water infrastructure needs (more information on drinking water needs may be found in the OCWP *Drinking Water Infrastructure Needs Assessment by Region* report available on the OWRB website).

- The OCWP used weighting equations to determine regional costs, since information was not available on every wastewater utility. Equations 2-1 through 2-8 are used to calculate regional and state level costs.

Large System Wastewater Infrastructure Costs by Infrastructure Type = Sum of Project Costs for Systems Surveyed by Infrastructure Type

Equation 2-1 Large System Cost by Infrastructure Type

Large System Wastewater Infrastructure Costs = Sum of Large System Wastewater Infrastructure Costs by Infrastructure Type

Equation 2-2 Large System Cost by Region

*Medium System Wastewater Infrastructure Costs by Infrastructure Type = Number of Systems in Stratum / Number of System Sampled * Sum of Project Costs for Systems Sampled by Infrastructure Type*

Equation 2-3 Medium System Cost by Infrastructure Type

Medium System Wastewater Infrastructure Costs = Sum of Medium System Wastewater Infrastructure Costs by Infrastructure Type

Equation 2-4 Medium System Cost by Region

*Small System Wastewater Infrastructure Costs by Infrastructure Type = Number of Systems in Stratum / Number of System Sampled * Sum of Project Costs for Systems Sampled by Infrastructure Type*

Equation 2-5 Small System Cost by Infrastructure Type

Small System Wastewater Infrastructure Costs = Sum of Small System Wastewater Infrastructure Costs by Infrastructure Type

Equation 2-6 Small System Cost by Region

Regional Wastewater Infrastructure Costs = Sum of Small, Medium and Large Systems Sampled by Infrastructure Type + Sum of Regional Category VI and VII Projects

Equation 2-7 Regional Level Cost

State Drinking Water Infrastructure Costs = Sum of Regional Wastewater Infrastructure Costs

Equation 2-8 State Level Costs

- The OCWP study used a 50-year planning horizon compared to the 20-year planning period for the 2008 CWNS.
- The OCWP study used several sources of information including:
  - Oklahoma system specific information that was available from the 2008 CWNS.
  - OWRB surveyed 23 wastewater utilities, collecting information on their existing treatment and collection systems and known future projects. Responses to survey questions as well as excerpts from master plans submitted with the survey were used to develop utility's project list.
  - Information on nonpoint source pollution control provided by the Oklahoma Conservation Commission.
- The OCWP project lists included wastewater treatment infrastructure items necessary to meet the 2060 projected annual average day flows. This study did not evaluate additional infrastructure that may be needed to meet the max month or peak hour flows on which wastewater projects typically are based.
- The OCWP study used incremental periods, present – 2020 (2020), 2021-2040 (2040), and 2041-2060 (2060), to calculate costs.
- The OCWP study developed project lists for selected utilities. The process to select wastewater utilities is discussed in Appendix A.

2.2.6 OCWP Method: Developing Project List

After selecting wastewater utilities to survey, the next cost-modeling step was to develop a project list for each of the selected utilities. To reduce the subjectivity of this step, a list of standard assumptions was developed and used unless better information was available.

The first step in developing the utility's project list was to incorporate any master plan or known projects. If the submitted information contained cost information, it was included in the OCWP study. If the date of identified project was unknown, the project was assumed to occur in the present to 2020 period. Otherwise, if the project timing was known, the project was included in the appropriate time-period.

Project development worksheets were developed. Information from the surveys was used to complete this form. The OCWP standard assumptions supplemented the available information. The worksheet provided a standard method for estimating types of projects needed, project size, and project date. Examples of the worksheets are shown in Appendix C. Descriptions of projects for the selected utilities are in Appendix D.

In the absence of project descriptions, reasonable suppositions were made so that project lists could be developed for individual water providers. The intent was not to make detailed project lists but provide basic project information that enabled use of the cost models listed in Appendix B. The following items were typical of the assumptions:

- Wastewater treatment projects were based on the age of infrastructure and projected 2020, 2040, and 2060 average daily flows. For the purpose of this study, it was assumed that wastewater treatment infrastructure would be rehabilitated every 30 years. If the projected period flow exceed the design flow (or design flow from the previous time period if a project was identified), a treatment plant expansion project was assumed to increase the design capacity.

- The study used the treatment level categories utilized in the 2008 CWNS. The OCWP study assumed the following regarding level of treatment:

  - If the current level of treatment is a mechanical plant with advanced effluent limits (defined for this study as effluent limits lower than 20 milligrams per liter [mg/L] biochemical oxygen demand [BOD] and 30 mg/L total suspended solids), no change in treatment was assumed to occur during the planning period. Cost models CWNS 8, CWNS 29, and MA 1 were used as appropriate to estimate costs. Note: For wastewater treatment plants with flows less than 10 mgd, the 2008 CWNS distinguishes between mechanical advanced treatment with only a BOD effluent limit that is lower than secondary limits (mechanical-advanced-BOD only) and mechanical advanced treatment with BOD and other effluent limits (like total nitrogen and phosphorus) that are lower than secondary limits (mechanical-advanced-BOD plus). The study assumed that in the 2021-2040 period, based on national trends and recent state trends, mechanical-advanced-BOD only plants will increase treatment to mechanical-advanced-BOD plus level.

  - If the current level of treatment is a mechanical plant with secondary effluent limits, no change in treatment was assumed to occur during the present to 2020 period. Cost model CWNS 27 was used as appropriate to estimate costs. The treatment level was increased to a mechanical plant with advanced (BOD plus other) effluent limits in the 2040 period. Cost model CWNS 16 was used as appropriate to estimate costs.

  - If the current level of treatment is a lagoon with secondary effluent limits, no change in treatment was assumed to occur during the present to 2020 period. Cost model LGN 1 was used as appropriate to estimate costs. The treatment level was increased to a mechanical plant with advanced (BOD plus other) effluent limits in the 2040 period. Cost models CWNS 14 and CWNS 21 were used as appropriate to estimate costs.

  - If the current level of treatment is a lagoon with advanced effluent limits, no change in treatment was assumed to occur during the present to 2020 period. The treatment level was increased to a mechanical plant with advanced (BOD plus other) effluent limits in the 2040 period. Cost model CWNS 14 was used as appropriate to estimate costs.

  - If the current level of treatment is a lagoon with no discharge, no change in treatment was assumed to occur throughout the planning period. Cost model LGN 1 was used as appropriate to estimate costs.

- This study assumes that improvements to the solids handling processes will occur in the same period as wastewater treatment plant projects. Project costs were calculated using cost models SH 1 and SH 2.

- This study assumes that lift stations will be replaced or rehabilitated every 25 years. In order to estimate the needs associated with a growing collection system, it was assumed that lift station capacity grows in proportion to current design wastewater treatment plant flow. This study used cost models LS 2 and LS 3 to account for lift station projects.

- In order to estimate the needs associated with a growing collection system piping infrastructure, it was assumed that the collection system total length grows in proportion to annual population growth. Costs were calculated using cost models F 1 through F 4, RF 1 through RF 4, G 1 through G 12, and RG 1 through RG 12.

- While the deterioration rate of collection piping and appurtenances varies considerably based on pipe material, soil conditions, and corrosiveness of the wastewater, this study assumed that pipe would be replaced or rehabilitated every 50 years or, stated in a different way, approximately two percent of the existing inventory would be replaced or rehabilitated annually. Costs were calculated using cost models F 1 through F 4, RF 1 through RF 4, G 1 through G 12, and RG 1 through RG 12.

2.2.7 OCWP Method: Summation of Projects

With completed project lists and costs, Equations 2-1 through 2-8 were used to calculate regional and statewide wastewater infrastructure costs. The results are presented in Section 3 of this report.

Section 3
Summary of Regional Wastewater Infrastructure Costs

Using the methodology outlined in Section 2, wastewater infrastructure cost estimates were developed for each of the 13 regions. This section summarizes the costs. Details on the individual regions can be found in Sections 4 through 16.

There are 476 OCWP wastewater utilities in the state. This study includes public municipal utilities. Table 3-1 shows the number of water providers by stratum. 23 utilities were selected for cost modeling. The selected utilities' costs were extrapolated using the equations presented in Section 2 to calculate the infrastructure costs of the region and state.

Table 3-1. Number of OCWP Wastewater Utilities by Stratum

Provider Size	Population[A]	Mechanical – Advanced [B, C]	Mechanical [B, C]	Lagoon – Advanced [B, C]	Lagoon [B, C]	Lagoon - Total Retention [B, C]	Total
Large	>100,000	4	0	0	0	0	4
Medium	3,301 – 100,000	47	38	15	19	3	122
Small	<3,300	16	24	18	172	120	350
Total		**67**	**62**	**33**	**191**	**123**	**476**

[A] Population based on 2060 projection (see *Appendix A* for more details on projections).
[B] Only public utilities, associated with municipalities, were included in this study.
[C] Utilities may have more than one treatment facility. Treatment stratum is based on the most stringent facility treatment level.

Across the state, approximately $44 billion (in 2010 dollars) is required to meet the wastewater infrastructure needs for the next 50 years. Figure 3-1 illustrates the total wastewater infrastructure costs to meet the needs through 2060. The OCWP Central Watershed Planning Region has the largest need, comprising over 26 percent of the state's total need. The Middle Arkansas Region has the second largest need, comprising approximately 15 percent.

Table 3-2 illustrates the costs by size category and period. All costs calculated in this study are clean water state revolving loan fund eligible. Medium providers have the largest overall wastewater need (excluding regional level needs), comprising approximately 63 percent of the state's total need. The largest wastewater infrastructure costs occur in the 2021–2040 period.

Table 3-3 presents the cost by period and infrastructure type. Collection system projects make up the majority, approximately 75 percent, of the wastewater infrastructure costs in the state.

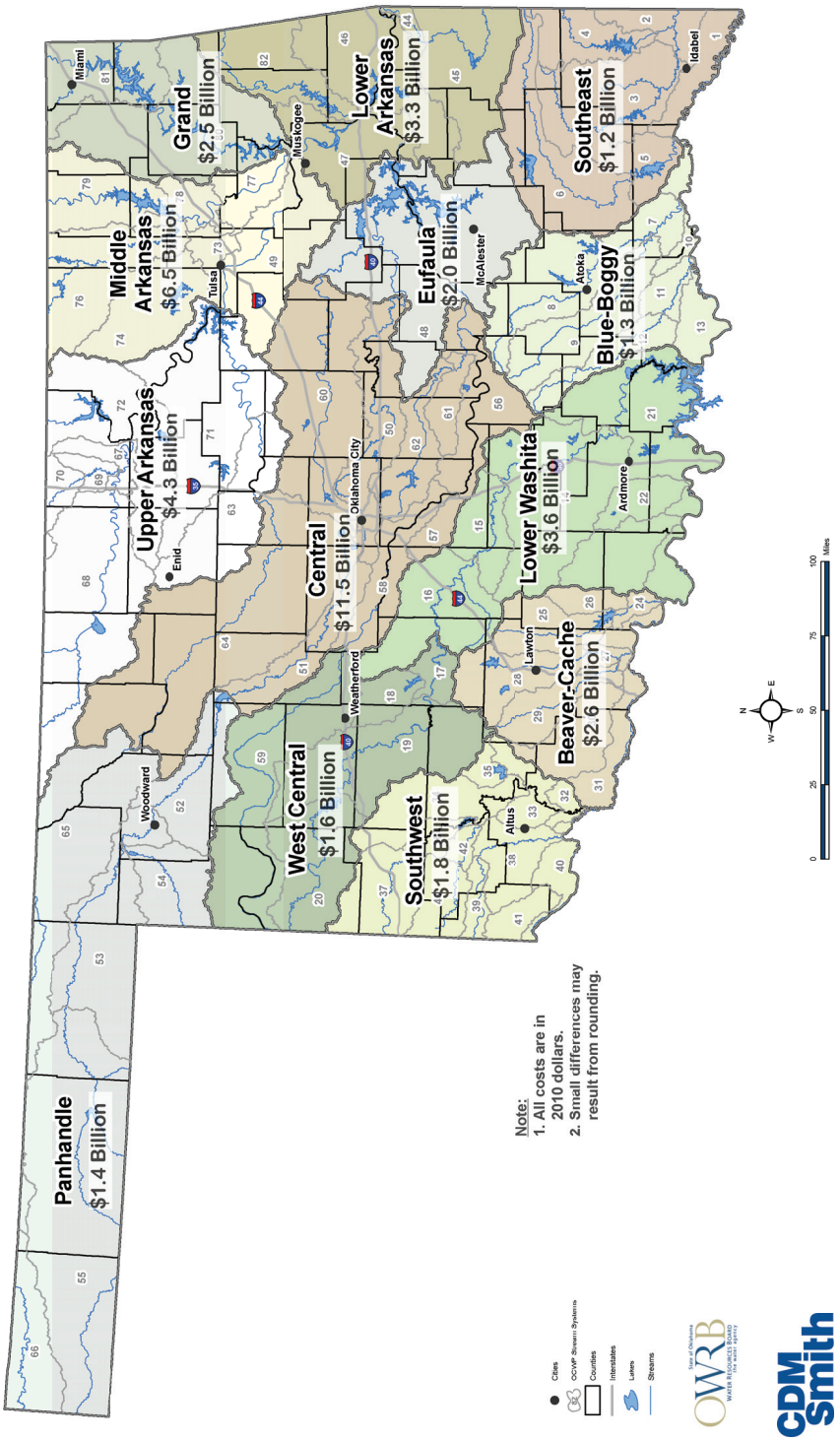


Figure 3-1. Wastewater Infrastructure Needs

Table 3-2. Statewide Wastewater Infrastructure Cost Summary by Category

Category[A]	Official Needs Category Group[B]	Present-2020 Infrastructure Need (millions of 2010 dollars)	2021-2040 Infrastructure Need (millions of 2010 dollars)	2041-2060 Infrastructure Need (millions of 2010 dollars)	Total Period Infrastructure Need (millions of 2010 dollars)[C]	Total Period Infrastructure Need (percent by category)	Total Period Infrastructure Need (percent by population)
Small	I and II	$170	$1,300	$530	$2,000	23%	13%
	III and IV	$2,200	$4,800	$1,100	$8,100		
Medium	I and II	$1,100	$4,000	$1,100	$6,200	63%	51%
	III and IV	$7,500	$10,000	$4,000	$21,500		
Large	I and II	$310	$1,000	$830	$2,140	12%	36%
	III and IV	$900	$1,600	$780	$3,280		
Regional	VI	$240	$0	$0	$240	2%	N/A
	VII	$170	$130	$130	$430		
Total		**$12,590**	**$22,830**	**$8,470**	**$43,890**	**100%**	**100%**

[A] Large systems are those serving more than 100,000; medium systems are those serving between 3,301 and 100,000 people; and small systems are those serving 3,300 and fewer people.

[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems, Category VI includes stormwater management, and Category VII includes nonpoint source pollution control. Costs were not developed for Category V combined sewer overflow correction (Oklahoma does not have CSO systems), Category X recycled water distribution (Oklahoma does not have these systems), and Category XII decentralized wastewater systems (category not consistent with public utilities included in this study).

[C] Small differences in values may result from rounding.

Table 3-3. Statewide Wastewater Infrastructure Costs by Infrastructure Type

Period	Categories I and II (costs in millions of 2010 dollars) [A]	Categories III and IV (costs in millions of 2010 dollars) [A]	Regional Categories VI and VII (costs in millions of 2010 dollars) [A]	Total (costs in millions of 2010 dollars) [B]
Present - 2020	$1,500	$11,000	$410	$12,910
2021 - 2040	$6,400	$16,000	$130	$22,530
2041 - 2060	$2,500	$5,900	$130	$8,530
Total Costs	$10,400	$32,900	$670	$43,970

[A] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems, Category VI includes stormwater management, and Category VII includes nonpoint source pollution control. Costs were not developed for Category V combined sewer overflow correction (Oklahoma does not have CSO systems), Category X recycled water distribution (Oklahoma does not have these systems), and Category XII decentralized wastewater systems (category not consistent with public utilities included in this study).

[B] Small differences in values may result from rounding.

Section 4
Beaver-Cache Regional Infrastructure Costs

This section provides some general information about the OCWP Beaver-Cache Watershed Planning Region and provides a cost summary for this region.

4.1 Beaver-Cache –Regional Description

The Beaver-Cache Region is a 3,288-square-mile area in the southwest quadrant of Oklahoma, spanning from the southern portion of Caddo County in the north to the Red River on the south, and including all or portions of Tillman, Comanche, Cotton, Grady, Stephens, Kiowa, and Jefferson Counties. There are 27 wastewater utilities in this region included in this study. Table 4-1 shows the number of wastewater utilities in the Beaver-Cache Region by stratum.

Table 4-1. Beaver-Cache Region – Number of OCWP Wastewater Utilities by Stratum

Provider Size	Population[A]	Mechanical – Advanced[B, C]	Mechanical[B, C]	Lagoon – Advanced[B, C]	Lagoon[B, C]	Lagoon - Total Retention[B, C]	Total
Large	>100,000	1	0	0	0	0	1
Medium	3,301 – 100,000	0	1	0	1	0	2
Small	<3,300	0	1	0	9	14	24
Total		**1**	**2**	**0**	**10**	**14**	**27**

[A] Population classification was based on 2060 projection (see *Appendix A* for more details on projections).
[B] Only public utilities, associated with municipalities, were included in this study.
[C] Utilities may have more than one treatment facility. Treatment stratum is based on the most stringent facility treatment level.

4.2 Beaver-Cache – Regional Infrastructure Costs

Information about each of the wastewater utilities in the Beaver-Cache Region is included in Table 4-2.

Table 4-2. Beaver-Cache Region – OCWP Wastewater Utilities

Provider Name	County	Treatment Type[A]	Utility Size[B]	Were they selected for cost modeling?[C]
City of Cache / Cache Public Works Authority (PWA)	Comanche	Lagoon	Small	No
Frederick/Frederick PWA	Tillman	Lagoon	Medium	No
City of Indiahoma / Indiahoma PWA	Comanche	Lagoon - Total Retention	Small	No
Indiahoma / Indiahoma PWA	Comanche	Lagoon - Total Retention	Small	No
City of Waurika / Waurika PWA	Jefferson	Mechanical	Small	No
City of Duncan / Duncan Public Utilities Authority	Stephens	Mechanical	Medium	No
Town of Geronimo and/or Geronimo PWA	Comanche	Lagoon - Total Retention	Small	No

Table 4-2. Beaver-Cache Region – OCWP Wastewater Utilities (cont.)

Provider Name	County	Treatment Type [A]	Utility Size [B]	Were they selected for cost modeling? [C]
City of Comanche	Stephens	Lagoon	Small	No
City of Lawton / Lawton Water Authority	Comanche	Mechanical - Advanced	Large	Yes
City of Walters / Walters PWA	Cotton	Lagoon - Total Retention	Small	No
Ryan Utilities Authority	Jefferson	Lagoon	Small	No
Town of Devol	Cotton	Lagoon	Small	No
Town of Manitou	Tillman	Lagoon	Small	No
Town of Chattanooga / Chattanooga PWA	Comanche	Lagoon - Total Retention	Small	No
Cotton Co Rwd #1	Cotton	Lagoon - Total Retention	Small	No
Town of Davidson	Tillman	Lagoon	Small	No
City of Elgin	Comanche	Lagoon	Small	No
City of Grandfield	Tillman	Lagoon	Small	No
Temple Utilities Authority	Cotton	Lagoon	Small	No
Fletcher WWT	Comanche	Lagoon - Total Retention	Small	No
Duggins # 2 WWT	Comanche	Lagoon - Total Retention	Small	No
Hollister	Tillman	Lagoon - Total Retention	Small	No
Hastings Rwd #1 WWT	Jefferson	Lagoon - Total Retention	Small	No
Medicine Park WWT	Comanche	Lagoon - Total Retention	Small	No
Grandfield	Tillman	Lagoon - Total Retention	Small	No
Waurika Sewage Plant	Jefferson	Lagoon - Total Retention	Small	No
Sterling WWT	Comanche	Lagoon - Total Retention	Small	No

[A] Utilities may have more than one treatment facility. Treatment stratum is based on the most stringent facility treatment level.
[B] Utility size classification is based on 2060 population projection (see *Appendix A* for more information on projections).
[C] Project lists for modeled utilities are included in Appendix D.

There is one large wastewater utility in the Beaver-Cache Region. **Table 4-3** presents the wastewater infrastructure costs through 2060 for the large utility stratum by infrastructure type. **Figure 4-1** illustrates the large provider stratum costs over time.

Table 4-3. Beaver-Cache Region – Large Wastewater Utilities Cost by Infrastructure Type

Period [A]	Wastewater Treatment - Categories I and II (millions of 2010 dollars) [B]	Wastewater Collection - Categories III and IV (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$78	$230	$308
2021 - 2040	$250	$410	$660
2041 - 2060	$210	$200	$410
Total	**$538**	**$840**	**$1,378**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems.

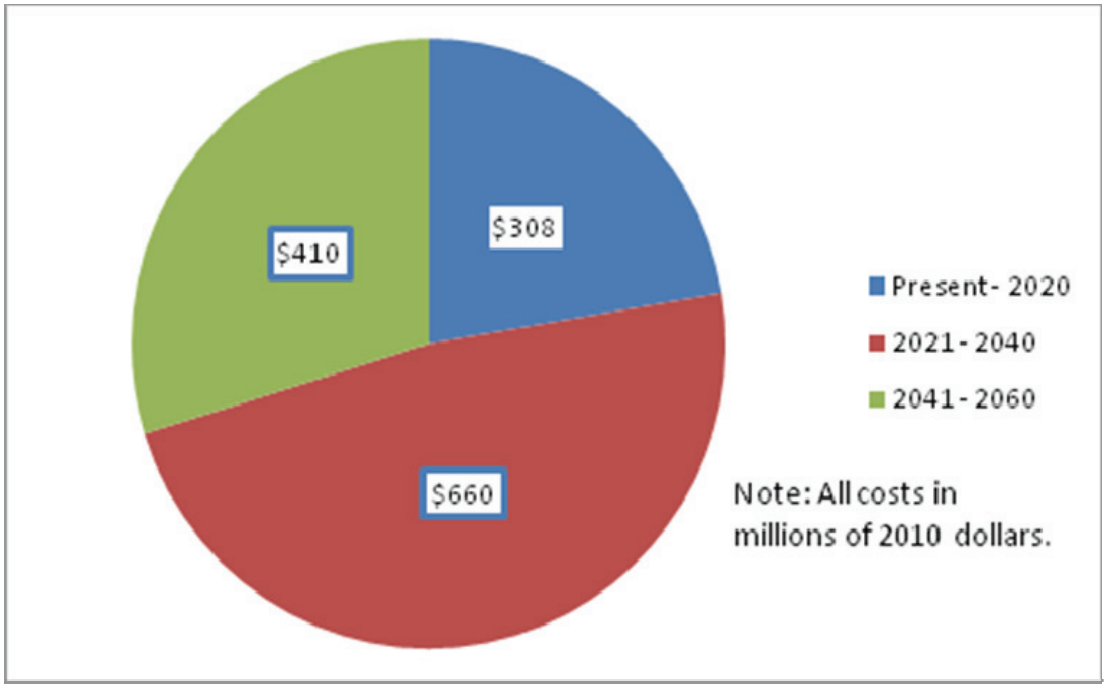


Figure 4-1. Beaver-Cache Region – Large Wastewater Utilities Costs over Time

There are two medium wastewater utilities in the Beaver-Cache Region. Table 4-4 presents the wastewater infrastructure costs through 2060 for the medium utility stratum by infrastructure type. Figure 4-2 illustrates the medium provider stratum costs over time.

Table 4-4. Beaver-Cache Region – Medium Wastewater Utilities Cost by Infrastructure Type

Period [A]	Wastewater Treatment - Categories I and II (millions of 2010 dollars) [B]	Wastewater Collection - Categories III and IV (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$11	$180	$191
2021 - 2040	$57	$160	$217
2041 - 2060	$3	$83	$86
Total	**$71**	**$423**	**$494**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems.

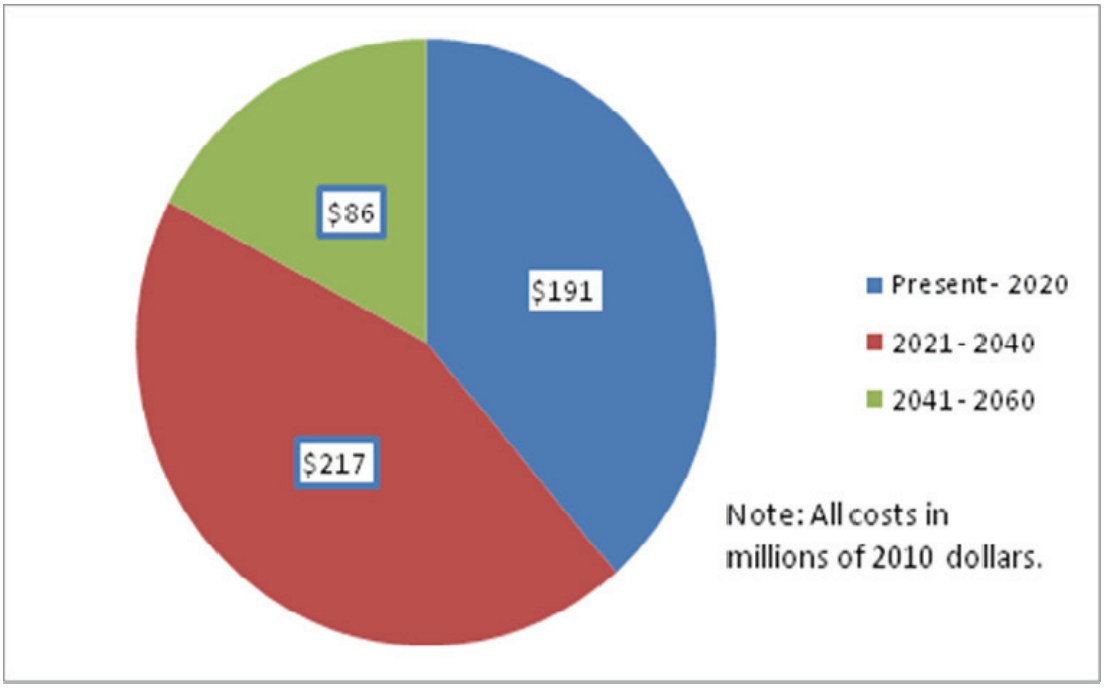


Figure 4-2. Beaver-Cache Region – Medium Wastewater Utilities Costs over Time

There are 24 small wastewater utilities in the Beaver-Cache Region. Table 4-5 presents the wastewater infrastructure costs through 2060 for the small utility stratum by infrastructure type. Figure 4-3 illustrates the small provider stratum costs over time.

Table 4-5. Beaver-Cache Region – Small Wastewater Utilities Cost by Infrastructure Type

Period [A]	Wastewater Treatment - Categories I and II (millions of 2010 dollars) [B]	Wastewater Collection - Categories III and IV (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$13	$200	$213
2021 - 2040	$84	$310	$394
2041 - 2060	$26	$76	$102
Total	**$123**	**$586**	**$709**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems.

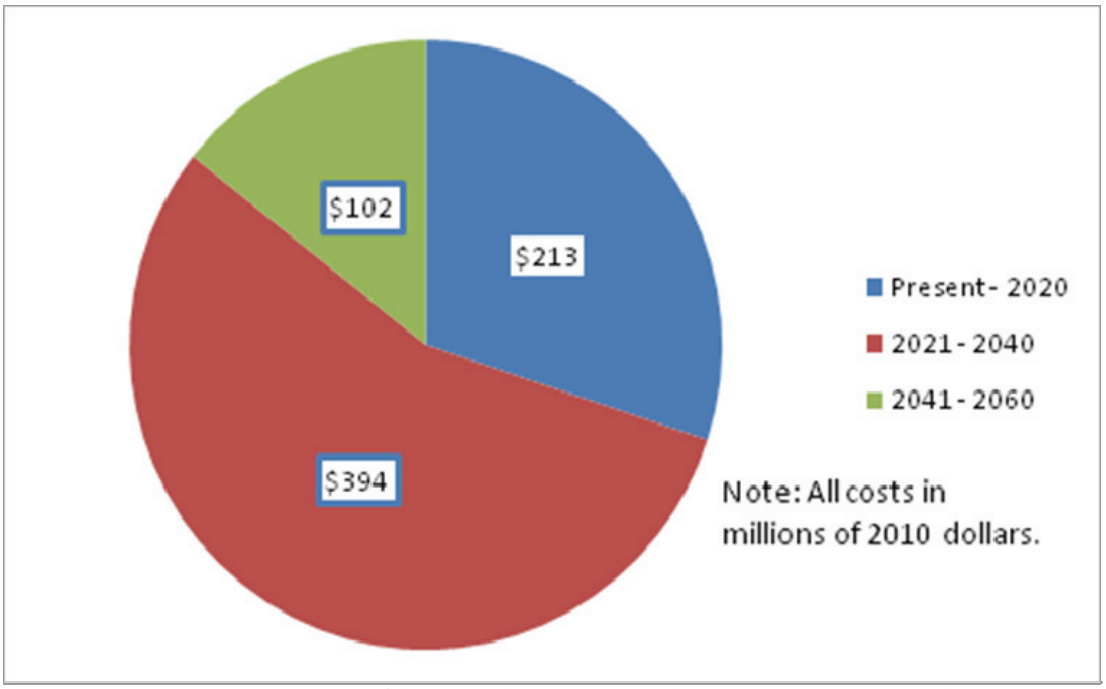


Figure 4-3. Beaver-Cache Region – Small Wastewater Utilities Costs over Time

No category VI projects were identified in the Beaver-Cache Region. Three regional category VII projects were identified. The state, through other work, is currently developing Watershed Based Plans and/or total maximum daily loads (TMDLs). This work will provide a better basis for estimating these needs. **Table 4-6** presents the regional wastewater infrastructure costs through 2060 by infrastructure type. **Figure 4-4** illustrates the regional project costs over time.

Table 4-6. Beaver-Cache Region – Regional Wastewater Project Cost by Infrastructure Type

Period [A]	Stormwater Management – Category VI (millions of 2010 dollars) [B]	Nonpoint Source Pollution Control – Category VII (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$0.0	$1.9	$1.9
2021 - 2040	$0.0	$3.7	$3.7
2041 - 2060	$0.0	$3.7	$3.7
Total	**$0.0**	**$9.3**	**$9.3**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category VI includes stormwater management, and Category VII includes non source pollution control.

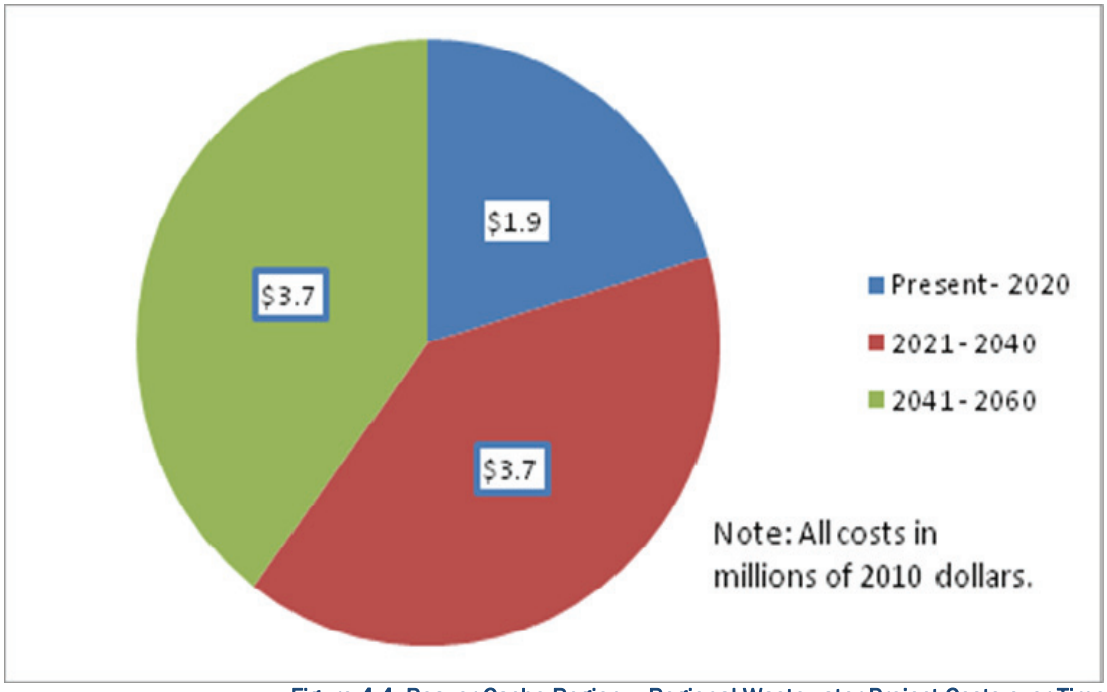


Figure 4-4. Beaver-Cache Region – Regional Wastewater Project Costs over Time

4.3 Beaver-Cache – Regional Cost Summary

This section summarizes the Beaver-Cache Region's wastewater infrastructure costs over the next 50 years. **Table 4-7** identifies costs by utility size and project period. All projects identified in this study were assumed to be CWSRF eligible. **Figure 4-5** illustrates the regional wastewater infrastructure costs over time. **Figure 4-6** illustrates the regional wastewater costs by stratum.

Table 4-7. Beaver-Cache Region – Wastewater Infrastructure Cost Summary by Category

Category [A, B]	Official Needs Category Group [B]	Present – 2020 Infrastructure Need (millions of 2010 dollars)	2021 – 2040 Infrastructure Need (millions of 2010 dollars)	2041 – 2060 Infrastructure Need (millions of 2010 dollars)	Total Period Infrastructure Need (millions of 2010 dollars)
Small	I and II	$13	$84	$26	$123
	III and IV	$200	$310	$76	$586
Medium	I and II	$11	$57	$2.6	$70.6
	III and IV	$180	$160	$83	$423
Large	I and II	$78	$250	$210	$538
	III and IV	$230	$410	$200	$840
Regional	VI	$0.0	$0.0	$0.0	$0.0
	VII	$1.9	$3.7	$3.7	$9.3
Total Costs		$713.9	$1,274.7	$601.3	$2,589.9

A Population based on 2060 projection (see *Appendix A* for more details on projections). Regional projects include all known category VI and VII projects by watershed.

B Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems, Category VI includes stormwater management, and Category VII includes non source pollution control.

C Small differences in values may result from rounding.

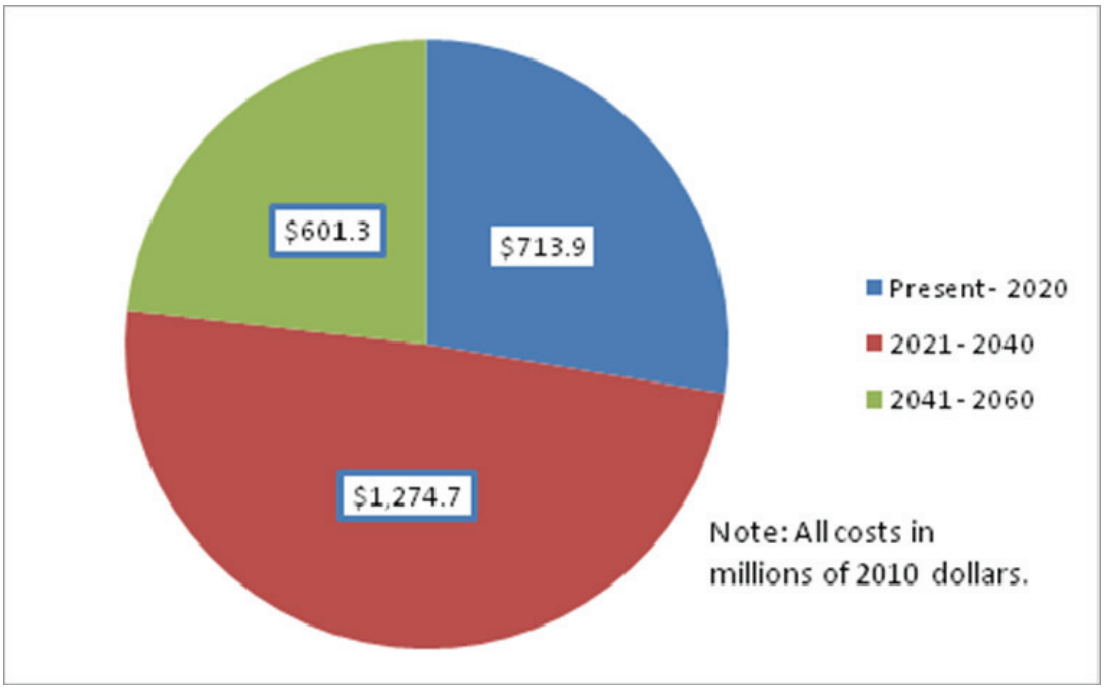


Figure 4-5. Beaver-Cache Region – Regional Costs over Time

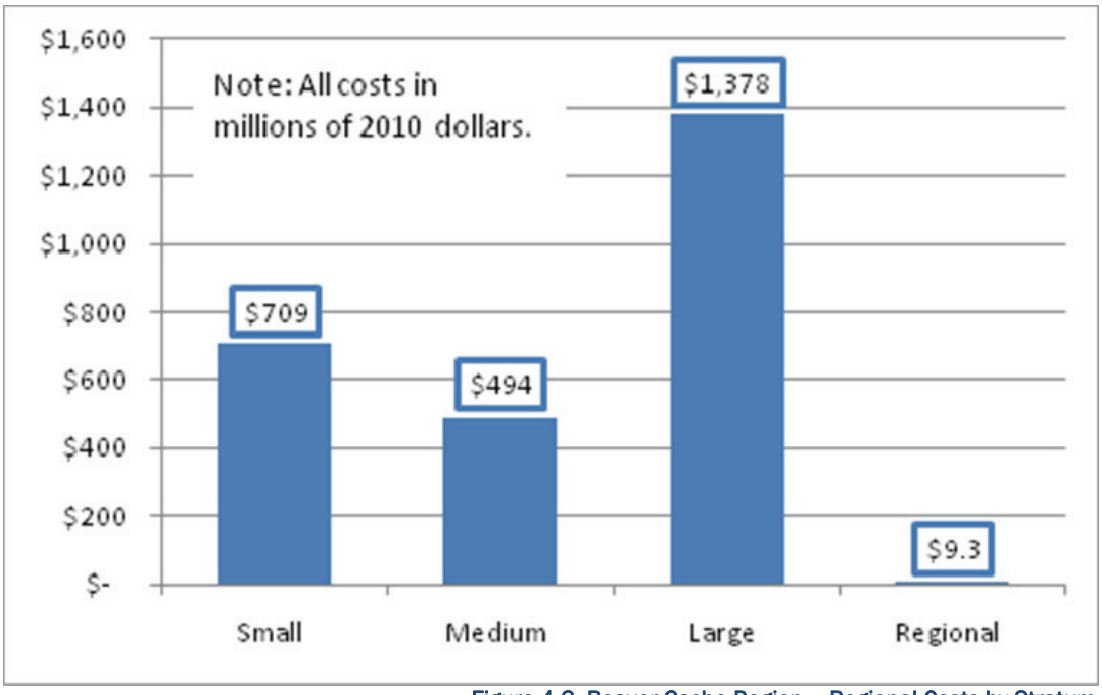


Figure 4-6. Beaver-Cache Region – Regional Costs by Stratum

Section 5
Blue Boggy Regional Infrastructure Costs

This section provides some general information about the OCWP Blue Boggy Watershed Planning Region and provides a cost summary for this region.

5.1 Blue Boggy –Regional Description

The Blue Boggy Region is a 3,670-square-mile area in the southeast quadrant of Oklahoma, reaching from southern Hughes County in the north and the Red River on the south, and including all or portions of Pontotoc, Coal, Pittsburg, Johnston, Atoka, Bryan, Pushmataha, Murray, and Choctaw Counties. There are 21 wastewater utilities in this region included in this study. Table 5-1 shows the number of wastewater utilities in the Blue Boggy Region by stratum.

Table 5-1. Blue Boggy Region – Number of OCWP Wastewater Utilities by Stratum

Provider Size	Population[A]	Mechanical – Advanced[B, C]	Mechanical[B, C]	Lagoon – Advanced[B, C]	Lagoon[B, C]	Lagoon - Total Retention[B, C]	Total
Large	>100,000	0	0	0	0	0	0
Medium	3,301 – 100,000	1	1	1	1	0	4
Small	<3,300	1	0	6	6	4	17
Total		**2**	**1**	**7**	**7**	**4**	**21**

A Population classification was based on 2060 projection (see *Appendix A* for more details on projections).
B Only public utilities, associated with municipalities, were included in this study.
C Utilities may have more than one treatment facility. Treatment stratum is based on the most stringent facility treatment level.

5.2 Blue Boggy – Regional Infrastructure Costs

Information about each of the wastewater utilities in the Blue Boggy region is included in Table 5-2.

Table 5-2. Blue Boggy Region – OCWP Wastewater Utilities

Provider Name	County	Treatment Type[A]	Utility Size[B]	Were they selected for cost modeling?[C]
Hugo Municipal Authority	Choctaw	Mechanical	Medium	No
Atoka Co. Rsd # 2	Atoka	Lagoon - Advanced	Small	No
Caddo PWA	Bryan	Mechanical - Advanced	Small	No
Caney Development Corp.	Atoka	Lagoon	Small	No
City of Atoka / Atoka Municipal Authority	Atoka	Mechanical	Medium	No
City of Bokchito	Bryan	Lagoon	Small	No
City of Soper	Choctaw	Lagoon	Small	No
Coalgate PWA	Coal	Lagoon	Medium	No
Durant City Utility Authority	Bryan	Lagoon - Advanced	Medium	No
Stringtown PWA	Atoka	Lagoon	Small	No
Town of Allen	Pontotoc	Lagoon	Small	No
Town of Boswell	Choctaw	Lagoon - Advanced	Small	No

Table 5-2. Blue Boggy Region – OCWP Wastewater Utilities (cont.)

Provider Name	County	Treatment Type [A]	Utility Size [B]	Were they selected for cost modeling? [C]
Town of Calera / Calera PWA	Bryan	Lagoon - Advanced	Small	No
Town of Colbert / Colbert Public Utility Authority	Bryan	Lagoon	Small	No
Town of Grant / Choctaw Co Rwsd	Choctaw	Lagoon - Advanced	Small	Yes (treatment only)
Town of Stonewall / Stonewall PWA	Pontotoc	Lagoon - Advanced	Small	No
Wapanucka PWA	Johnston	Lagoon - Advanced	Small	No
Bennington PWA	Bryan	Lagoon - Total Retention	Small	No
City of Roff	Pontotoc	Lagoon - Total Retention	Small	No
Atoka Co. Rural Water District # 3 WWT	Atoka	Lagoon - Total Retention	Small	No
Johnston Rwd #1 (Milburn) WWT	Johnston	Lagoon - Total Retention	Small	No

[A] Utilities may have more than one treatment facility. Treatment stratum is based on the most stringent facility treatment level.
[B] Utility size classification is based on 2060 population projection (see *Appendix A* for more information on projections)
[C] Project lists for modeled utilities are included in Appendix D.

There are no large wastewater utilities in the Blue Boggy Region.

There are four medium wastewater utilities in the Blue Boggy Region. Table 5-3 presents the wastewater infrastructure costs through 2060 for the medium utility stratum by infrastructure type. Figure 5-1 illustrates the medium provider stratum costs over time.

Table 5-3. Blue Boggy Region – Medium Wastewater Utilities Cost by Infrastructure Type

Period [A]	Wastewater Treatment - Categories I and II (millions of 2010 dollars) [B]	Wastewater Collection - Categories III and IV (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$28	$250	$278
2021 - 2040	$110	$260	$370
2041 - 2060	$26	$120	$146
Total	**$164**	**$630**	**$794**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems.

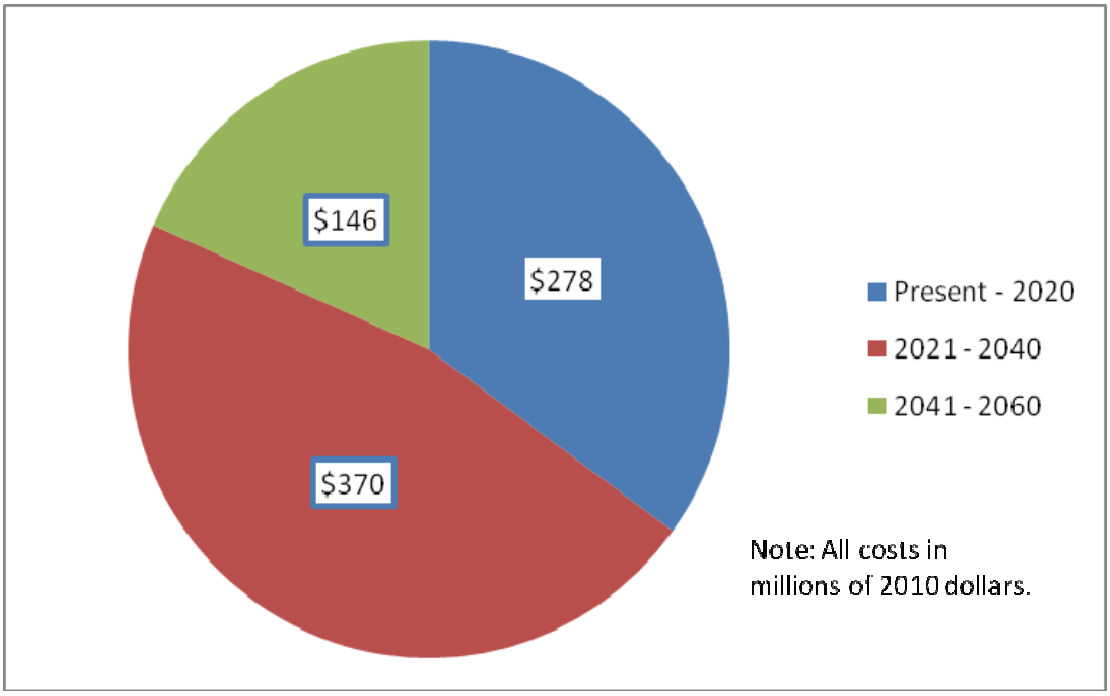


Figure 5-1. Blue Boggy Region – Medium Wastewater Utilities Costs over Time

There are 17 small wastewater utilities in the Blue Boggy Region. **Table 5-4** presents the wastewater infrastructure costs through 2060 for the small utility stratum by infrastructure type. **Figure 5-2** illustrates the small provider stratum costs over time.

Table 5-4. Blue Boggy Region – Small Wastewater Utilities Cost by Infrastructure Type

Period [A]	Wastewater Treatment - Categories I and II (millions of 2010 dollars) [B]	Wastewater Collection - Categories III and IV (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$7	$120	$127
2021 - 2040	$61	$210	$271
2041 - 2060	$23	$52	$75
Total	**$91**	**$382**	**$473**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems.

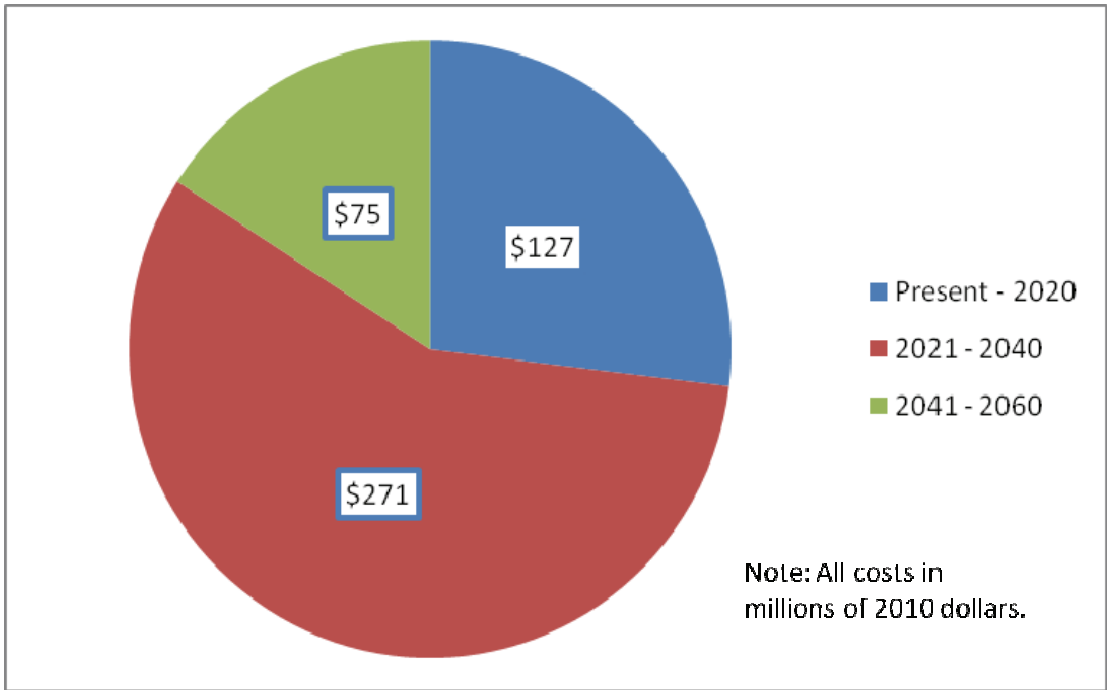


Figure 5-2. Blue Boggy Region – Small Wastewater Utilities Costs over Time

No category VI projects were identified in the Blue Boggy Region. Three regional category VII projects were identified. The state, through other work, is currently developing Watershed Based Plans and/or TMDLs. This work will provide a better basis for estimating these needs. **Table 5-5** presents the regional wastewater infrastructure costs through 2060 by infrastructure type. **Figure 5-3** illustrates the regional project costs over time.

Table 5-5. Blue Boggy Region – Regional Wastewater Project Cost by Infrastructure Type

Period [A]	Stormwater Management – Category VI (millions of 2010 dollars) [B]	Nonpoint Source Pollution Control – Category VII (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$0.0	$1.9	$1.9
2021 - 2040	$0.0	$3.7	$3.7
2041 - 2060	$0.0	$3.7	$3.7
Total	**$0.0**	**$9.3**	**$9.3**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category VI includes stormwater management, and Category VII includes non source pollution control.

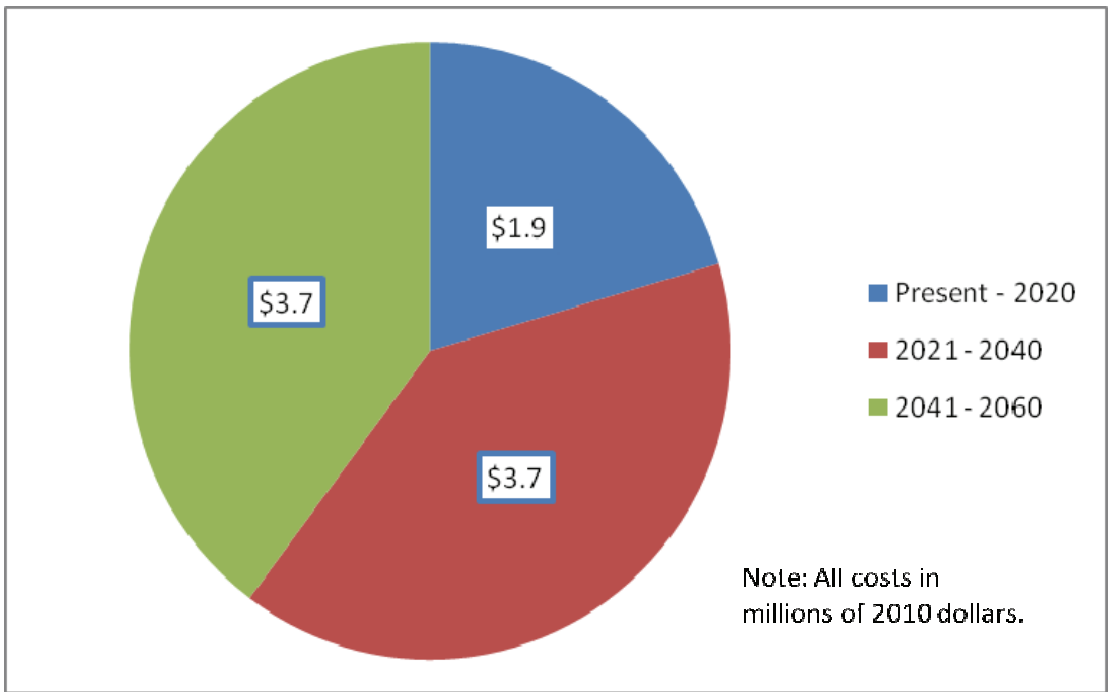


Figure 5-3. Blue Boggy Region – Regional Wastewater Project Costs over Time

5.3 Blue Boggy – Regional Cost Summary

This section summarizes the Blue Boggy Region's wastewater infrastructure costs over the next 50 years. **Table 5-6** identifies costs by utility size and project period. All projects identified in this study were assumed to be CWSRF eligible. **Figure 5-4** illustrates the regional wastewater infrastructure costs over time. **Figure 5-5** illustrates the regional wastewater costs by stratum.

Table 5-6. Blue Boggy Region – Wastewater Infrastructure Cost Summary by Category

Category [A, B]	Official Needs Category Group [B]	Present – 2020 Infrastructure Need (millions of 2010 dollars)	2021 – 2040 Infrastructure Need (millions of 2010 dollars)	2041 – 2060 Infrastructure Need (millions of 2010 dollars)	Total Period Infrastructure Need (millions of 2010 dollars)
Small	I and II	$7.4	$61	$23	$91.4
	III and IV	$120	$210	$52	$382
Medium	I and II	$28	$110	$26	$164
	III and IV	$250	$260	$120	$630
Large	I and II	$0.0	$0.0	$0.0	$0.0
	III and IV	$0.0	$0.0	$0.0	$0.0
Regional	VI	$0.0	$0.0	$0.0	$0.0
	VII	$1.9	$3.7	$3.7	$9.3
Total Costs		$407.3	$644.7	$224.7	$1,276.7

[A] Population based on 2060 projection (see *Appendix A* for more details on projections). Regional projects include all known category VI and VII projects by watershed.
[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems, Category VI includes stormwater management, and Category VII includes non source pollution control.
[C] Small differences in values may result from rounding.

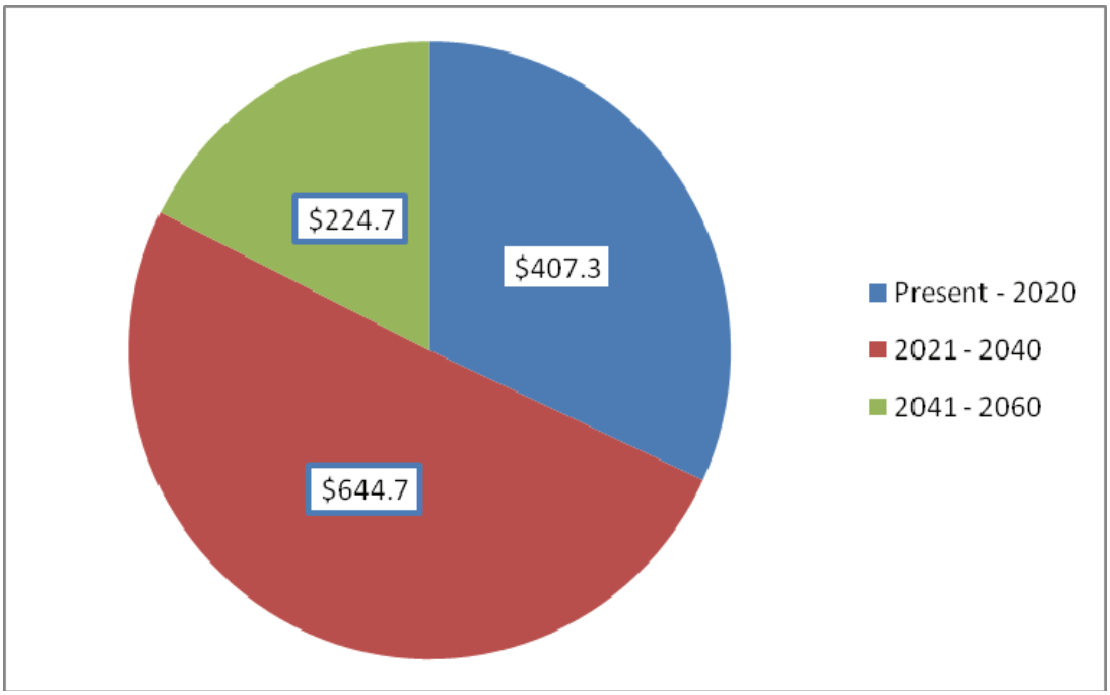


Figure 5-4. Blue Boggy Region – Regional Costs over Time

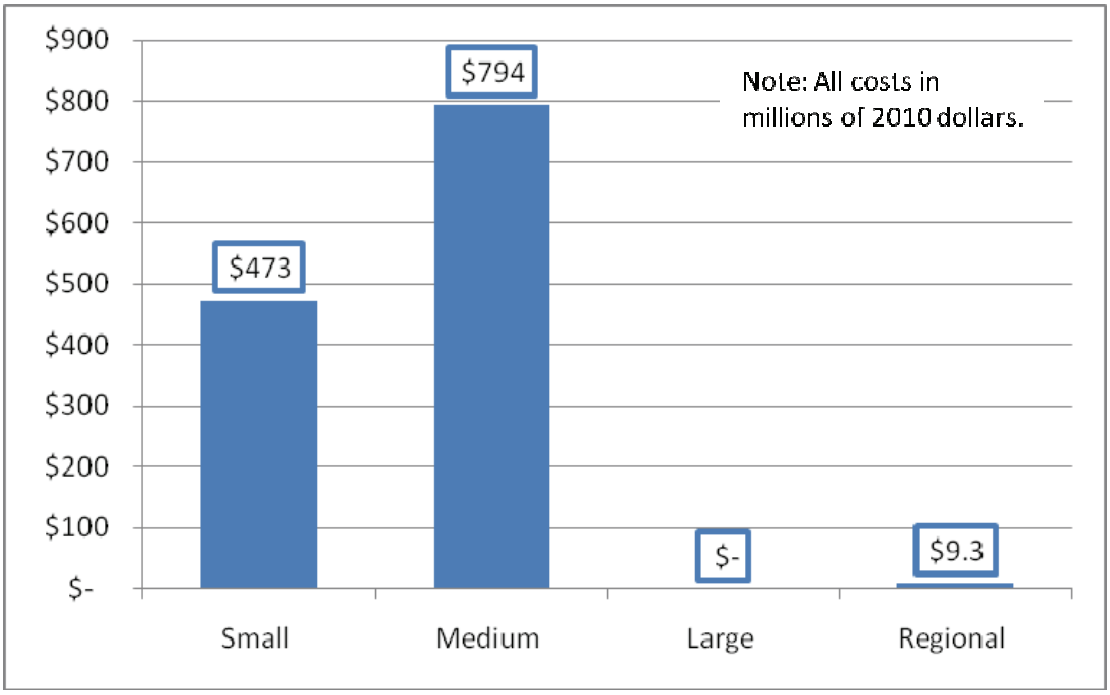


Figure 5-5. Blue Boggy Region – Regional Costs by Stratum

Section 6
Central Regional Infrastructure Costs

This section provides some general information about the OCWP Central Watershed Planning Region and provides a cost summary for this region.

6.1 Central –Regional Description

The Central Region is a 10,142-square-mile area including all or portions of Woods, Woodward, Major, Alfalfa, Garfield, Dewey, Blaine, Kingfisher, Logan, Canadian, Oklahoma, Lincoln, Creek, Okmulgee, Grady, Cleveland, Pottawatomie, Seminole, Okfuskee, Garvin, Pontotoc, Caddo, McClain, and Hughes Counties. There are 94 wastewater utilities in this region included in this study. Table 6-1 shows the number of wastewater utilities in the Central Region by stratum.

Table 6-1. Central Region – Number of OCWP Wastewater Utilities by Stratum

Provider Size	Population[A]	Mechanical – Advanced[B, C]	Mechanical[B, C]	Lagoon – Advanced[B, C]	Lagoon[B, C]	Lagoon - Total Retention[B, C]	Total
Large	>100,000	2	0	0	0	0	2
Medium	3,301 – 100,000	10	12	4	4	1	31
Small	<3,300	2	6	2	30	21	61
Total		**14**	**18**	**6**	**34**	**22**	**94**

A Population classification was based on 2060 projection (see *Appendix A* for more details on projections).
B Only public utilities, associated with municipalities, were included in this study.
C Utilities may have more than one treatment facility. Treatment stratum is based on the most stringent facility treatment level.

6.2 Central – Regional Infrastructure Costs

Information about each of the wastewater utilities in the Central Region is included in Table 6-2.

Table 6-2. Central Region – OCWP Wastewater Utilities

Provider Name	County	Treatment Type[A]	Utility Size[B]	Were they selected for cost modeling?[C]
Town of Newcastle / Newcastle PWA	McClain	Mechanical	Medium	No
City of Noble / Noble Utility Authority	Cleveland	Mechanical	Medium	No
Ofuskee Co Rwd #1	Okfuskee	Lagoon	Small	No
Okemah Utility Authority	Okfuskee	Lagoon - Advanced	Medium	No
Shawnee Municipal Authority	Pottawatomie	Mechanical	Medium	No
Stroud Utilities Authority	Lincoln	Mechanical	Medium	No
Fairview Utilities Authority	Major	Lagoon - Advanced	Medium	No
City of Guthrie / Guthrie PWA	Logan	Mechanical	Medium	Yes

Table 6-2. Central Region – OCWP Wastewater Utilities (cont.)

Provider Name	County	Treatment Type [A]	Utility Size [B]	Were they selected for cost modeling? [C]
Asher Utility Development Authority	Pottawatomie	Lagoon	Small	No
Carney Public Utilities	Lincoln	Lagoon	Small	No
Chandler Municipal Authority	Lincoln	Lagoon - Advanced	Medium	No
City of Bethany / Bethany / Warr Acres PWA	Oklahoma	Mechanical - Advanced	Medium	No
City of Bristow / Bristow Municipal Authority	Creek	Mechanical - Advanced	Medium	No
City of Canton	Blaine	Lagoon	Small	No
City of Choctaw / Choctaw Utility Authority	Oklahoma	Mechanical - Advanced	Medium	No
City of Del City / Del City Municipal Service Auth	Oklahoma	Mechanical	Medium	No
City of Edmond / Edmond PWA	Oklahoma	Mechanical - Advanced	Medium	No
City of Holdenville / Holdenville PWA	Hughes	Mechanical - Advanced	Medium	No
City of Kingfisher / Kingfisher PWA	Kingfisher	Mechanical - Advanced	Medium	No
City of Konawa / Konawa PWA	Seminole	Mechanical - Advanced	Small	No
City of Maud / Maud Municipal Authority	Pottawatomie	Mechanical	Small	No
City of Midwest City	Oklahoma	Mechanical	Medium	Yes
City of Minco	Grady	Lagoon	Small	No
City of Moore / Moore PWA	Cleveland	Mechanical - Advanced	Medium	No
City of Norman / Norman Utility Authority	Cleveland	Mechanical - Advanced	Large	Yes
Oklahoma City Water Utilities Trust	Oklahoma	Mechanical - Advanced	Large	Yes
City of Prague /Prague PWA	Lincoln	Lagoon	Medium	No
City of Purcell	McClain	Mechanical	Medium	No
City of Spencer	Oklahoma	Mechanical	Medium	No
City of Tecumseh / Tecumseh PWA	Pottawatomie	Mechanical - Advanced	Medium	No
City of Union City / Union City Municipal Authority	Canadian	Lagoon	Small	No
City of Watonga	Blaine	Mechanical - Advanced	Medium	No
City of Yukon / Yukon Water Department	Canadian	Mechanical	Medium	No
Crescent / Crescent PWA	Logan	Lagoon	Medium	No
Davenport Utility Authority	Lincoln	Lagoon	Small	No
Francis PWA	Pontotoc	Lagoon	Small	No
Hitchcock Development Inc.	Blaine	Lagoon	Small	No
Piedmont Municipal Water Authority	Canadian	Lagoon - Total Retention	Small	Yes
Lexington PWA	Cleveland	Mechanical	Small	Yes (treatment only)
Lincoln Co. Rwsd # 4	Lincoln	Lagoon - Advanced	Small	No
McCloud PWA	Pottawatomie	Mechanical	Medium	No
Mustang Improvement Authority	Canadian	Mechanical - Advanced	Medium	No

Table 6-2. Central Region – OCWP Wastewater Utilities (cont.)

Provider Name	County	Treatment Type [A]	Utility Size [B]	Were they selected for cost modeling? [C]
Okeene	Blaine	Lagoon	Small	No
Paden Utility Authority	Okfuskee	Lagoon	Small	No
Seminole Co Rwd #3	Seminole	Mechanical	Small	No
Stratford PWA	Garvin	Lagoon	Small	No
Town of Aline	Alfalfa	Lagoon	Small	No
Town of Ames	Major	Lagoon	Small	No
Town of Calvin	Hughes	Lagoon	Small	No
Town of Depew	Creek	Lagoon	Small	No
Town of Dover	Kingfisher	Lagoon	Small	No
Town of Drummond / Drummond PWA	Garfield	Lagoon	Small	No
Town of Harrah / Harrah PWA	Oklahoma	Mechanical	Medium	No
Town of Helena / Helena PWA	Alfalfa	Lagoon - Total Retention	Small	No
Town of Hennessey	Kingfisher	Lagoon - Advanced	Medium	No
Town of Jones, PWA	Oklahoma	Mechanical	Small	No
Town of Lahoma	Garfield	Lagoon	Small	No
Town of Langdale	Blaine	Lagoon - Total Retention	Small	No
Town of Meeker	Lincoln	Mechanical - Advanced	Small	No
Town of Meno	Major	Lagoon	Small	No
Town of Okarche	Kingfisher	Lagoon - Total Retention	Small	No
Town of Ringwood	Major	Lagoon	Small	No
Town of Tuttle	Grady	Lagoon	Medium	No
Town of Valley Brook	Oklahoma	Mechanical	Small	No
Town of Washington/Washington Municipal Authority	McClain	Lagoon	Small	No
Wellston PWA	Lincoln	Lagoon	Small	No
City of Blanchard / Blanchard Mia	McClain	Lagoon	Medium	No
Town of Bowlegs / Bowlegs PWA	Seminole	Lagoon	Small	No
Town of Carmen / Carmen PWA	Alfalfa	Lagoon	Small	No
Town of Cashion	Kingfisher	Lagoon - Total Retention	Small	No
Town of Cleo Springs / Cleo Springs Municipal Auth	Major	Lagoon - Total Retention	Small	No
Town of Dacoma	Woods	Lagoon	Small	No
Town of Dibble	McClain	Lagoon - Total Retention	Small	No
City of El Reno	Canadian	Lagoon - Total Retention	Medium	No
City of Geary / Geary Utility Trust Authority	Blaine	Lagoon - Advanced	Small	No
Goltry PWA	Alfalfa	Lagoon	Small	No
Town of Greenfield / Greenfield Utility Co., Inc.	Blaine	Lagoon - Total Retention	Small	No

Table 6-2. Central Region – OCWP Wastewater Utilities (cont.)

Provider Name	County	Treatment Type [A]	Utility Size [B]	Were they selected for cost modeling? [C]
Luther PWA	Oklahoma	Lagoon	Small	No
Sasakwa Municipal Authority	Seminole	Mechanical	Small	No
Town of Tupelo	Coal	Lagoon	Small	No
City of Wanette	Pottawatomie	Lagoon	Small	No
Agra WWTF c/o Lincoln Rwgsd #4	Lincoln	Lagoon - Total Retention	Small	No
Alva WWTF	Woods	Lagoon - Total Retention	Small	No
Calumet Lagoon	Canadian	Lagoon - Total Retention	Small	No
Cimarron City WWT	Logan	Lagoon - Total Retention	Small	No
Crystall Lakes Lagoons WWT	McClain	Lagoon - Total Retention	Small	No
Garrett Mhp	McClain	Lagoon - Total Retention	Small	No
Hall Park	Cleveland	Lagoon - Total Retention	Small	No
Logan County Rwd # 1 WWT	Logan	Lagoon - Total Retention	Small	No
Longdale WWT	Blaine	Lagoon - Total Retention	Small	No
Pottawatomie Co Sewer Dist #1 WWT	Pottawatomie	Lagoon - Total Retention	Small	No
Summit Ridge	Oklahoma	Lagoon - Total Retention	Small	No
Luther WWT	Oklahoma	Lagoon - Total Retention	Small	No
White Eagle WWT	Woods	Lagoon - Total Retention	Small	No

[A] Utilities may have more than one treatment facility. Treatment stratum is based on the most stringent facility treatment level.
[B] Utility size classification is based on 2060 population projection (see *Appendix A* for more information on projections).
[C] Project lists for modeled utilities are included in Appendix D.

There are two large wastewater utilities in the Central Region. **Table 6-3** presents the wastewater infrastructure costs through 2060 for the large utility stratum by infrastructure type. **Figure 6-1** illustrates the large provider stratum costs over time.

Table 6-3. Central Region – Large Wastewater Utilities Cost by Infrastructure Type

Period [A]	Wastewater Treatment - Categories I and II (millions of 2010 dollars) [B]	Wastewater Collection - Categories III and IV (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$156	$450	$606
2021 - 2040	$510	$810	$1,320
2041 - 2060	$420	$390	$810
Total	**$1,086**	**$1,650**	**$2,736**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems.

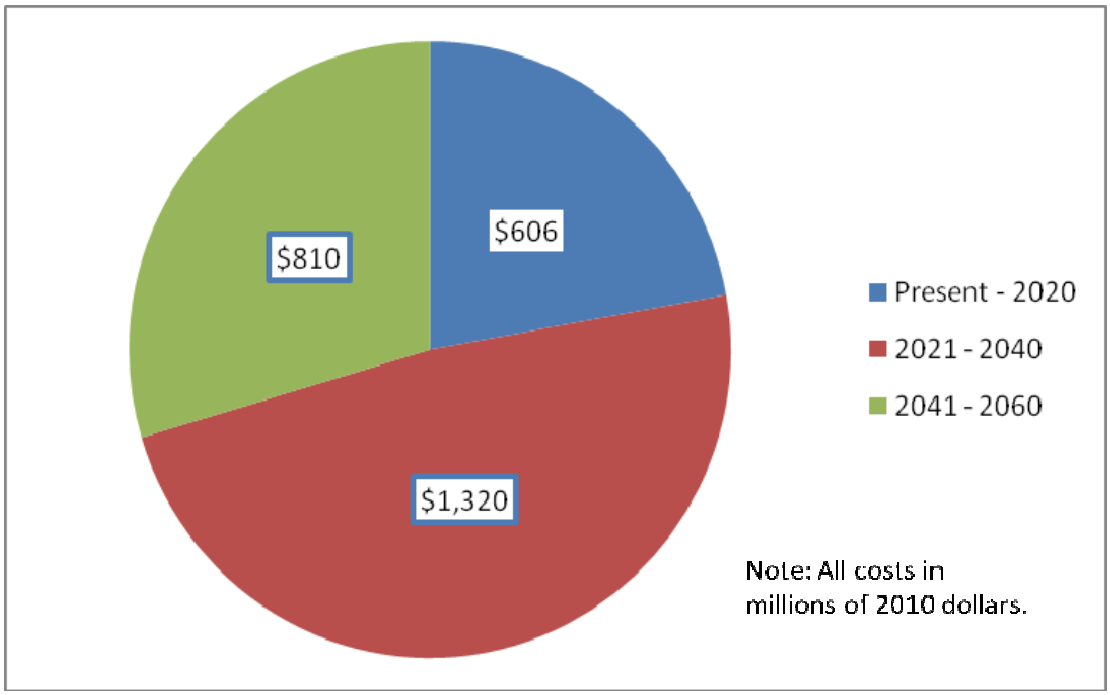


Figure 6-1. Central Region – Large Wastewater Utilities Costs over Time

There are 31 medium wastewater utilities in the Central Region. **Table 6-4** presents the wastewater infrastructure costs through 2060 for the medium utility stratum by infrastructure type. **Figure 6-2** illustrates the medium provider stratum costs over time.

Table 6-4. Central Region – Medium Wastewater Utilities Cost by Infrastructure Type

Period [A]	Wastewater Treatment - Categories I and II (millions of 2010 dollars) [B]	Wastewater Collection - Categories III and IV (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$230	$1,900	$2,130
2021 - 2040	$1,100	$2,500	$3,600
2041 - 2060	$250	$1,000	$1,250
Total	**$1,580**	**$5,400**	**$6,980**

A Small differences in values may result from rounding.
B Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems.

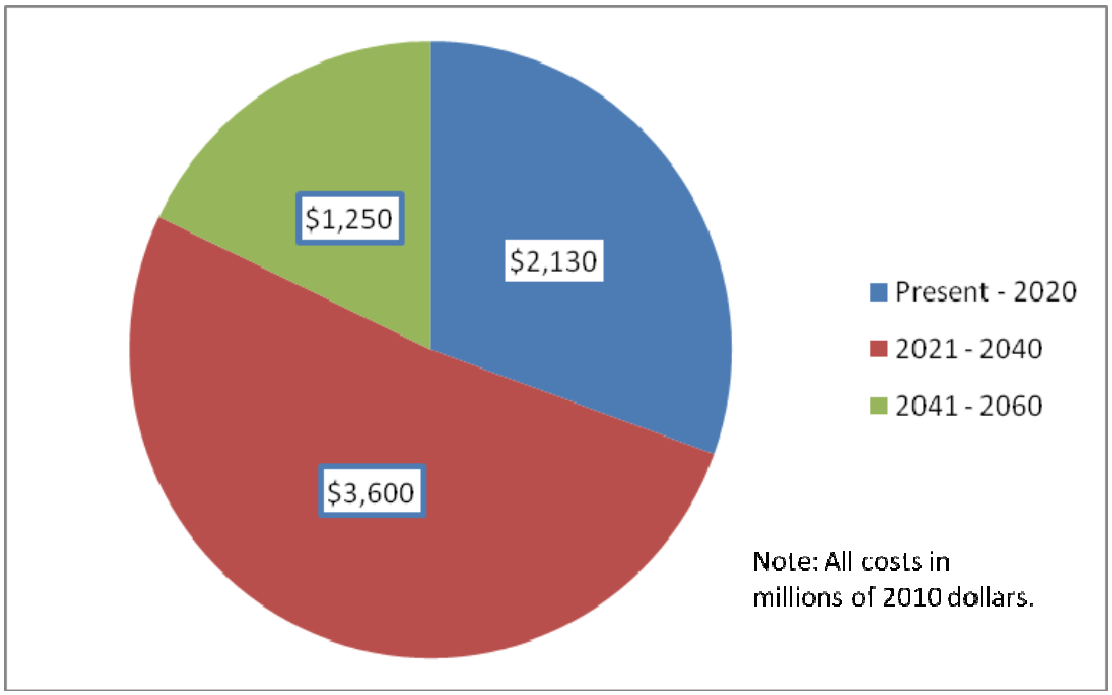


Figure 6-2. Central Region – Medium Wastewater Utilities Costs over Time

There are 61 small wastewater utilities in the Central Region. **Table 6-5** presents the wastewater infrastructure costs through 2060 for the small utility stratum by infrastructure type. **Figure 6-3** illustrates the small provider stratum costs over time.

Table 6-5. Central Region – Small Wastewater Utilities Cost by Infrastructure Type

Period [A]	Wastewater Treatment - Categories I and II (millions of 2010 dollars) [B]	Wastewater Collection - Categories III and IV (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$27	$380	$407
2021 - 2040	$230	$850	$1,080
2041 - 2060	$85	$200	$285
Total	**$342**	**$1,430**	**$1,772**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems.

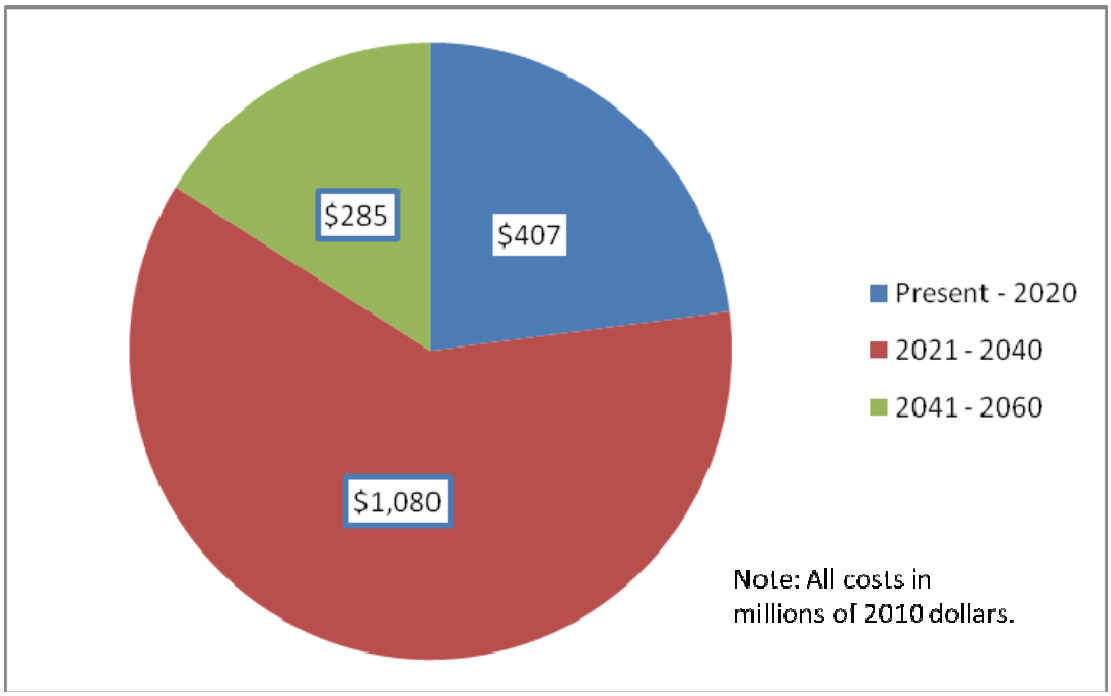


Figure 6-3. Central Region – Small Wastewater Utilities Costs over Time

One category VI projects was identified in the Central Region. Sixteen regional category VII projects were identified. The state, through other work, is currently developing Watershed Based Plans and/or TMDLs. This work will provide a better basis for estimating these needs. Table 6-6 presents the regional wastewater infrastructure costs through 2060 by infrastructure type. Figure 6-4 illustrates the regional project costs over time.

Table 6-6. Central Region – Regional Wastewater Project Cost by Infrastructure Type

Period [A]	Stormwater Management – Category VI (millions of 2010 dollars) [B]	Nonpoint Source Pollution Control – Category VII (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$45	$91	$136
2021 - 2040	$0.0	$8.0	$8.0
2041 - 2060	$0.0	$8.0	$8.0
Total	**$45**	**$107**	**$152**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category VI includes stormwater management, and Category VII includes non source pollution control.

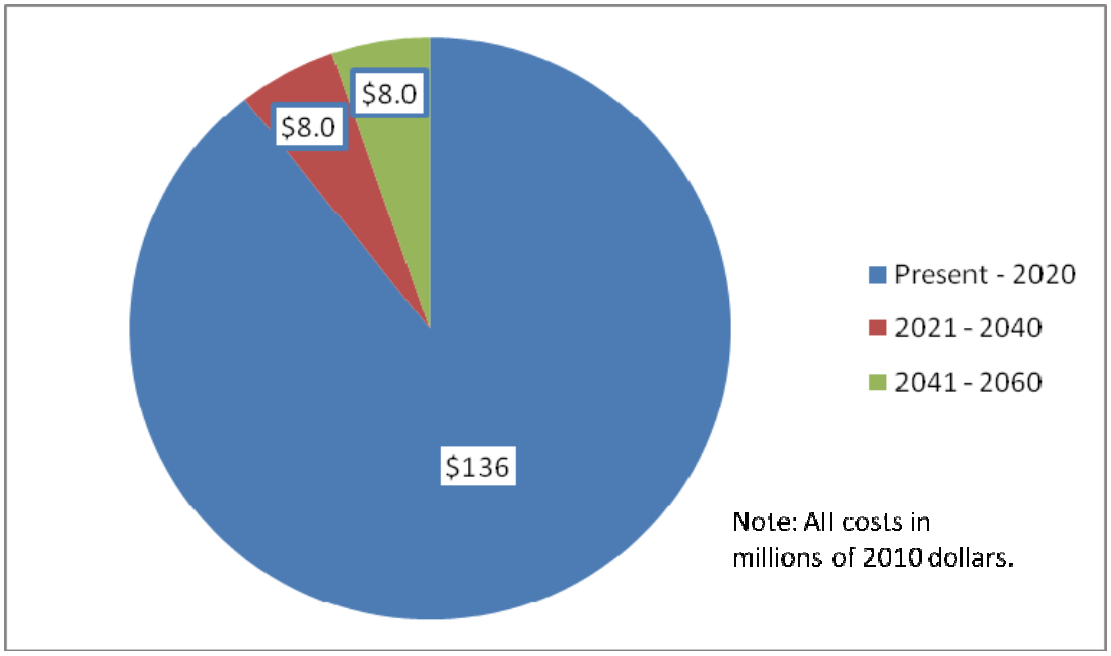


Figure 6-4. Central Region – Regional Wastewater Project Costs over Time

6.3 Central – Regional Cost Summary

This section summarizes the Central Region's wastewater infrastructure costs over the next 50 years. **Table 6-7** identifies costs by utility size and project period. All projects identified in this study were assumed to be CWSRF eligible. **Figure 6-5** illustrates the regional wastewater infrastructure costs over time. **Figure 6-6** illustrates the regional wastewater costs by stratum.

Table 6-7. Central Region – Wastewater Infrastructure Cost Summary by Category

Category [A, B]	Official Needs Category Group [B]	Present – 2020 Infrastructure Need (millions of 2010 dollars)	2021 – 2040 Infrastructure Need (millions of 2010 dollars)	2041 – 2060 Infrastructure Need (millions of 2010 dollars)	Total Period Infrastructure Need (millions of 2010 dollars)
Small	I and II	$27	$230	$85	$342
	III and IV	$380	$850	$200	$1,430
Medium	I and II	$230	$1,100	$250	$1,580
	III and IV	$1,900	$2,500	$1,000	$5,400
Large	I and II	$156	$510	$420	$1,086
	III and IV	$450	$810	$390	$1,650
Regional	VI	$45	$0.0	$0.0	$45
	VII	$91	$8.0	$8.0	$107
Total Costs		$3,279	$6,008	$2,353	$11,640

A Population based on 2060 projection (see *Appendix A* for more details on projections). Regional projects include all known category VI and VII projects by watershed.

B Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems, Category VI includes stormwater management, and Category VII includes non source pollution control.

C Small differences in values may result from rounding.

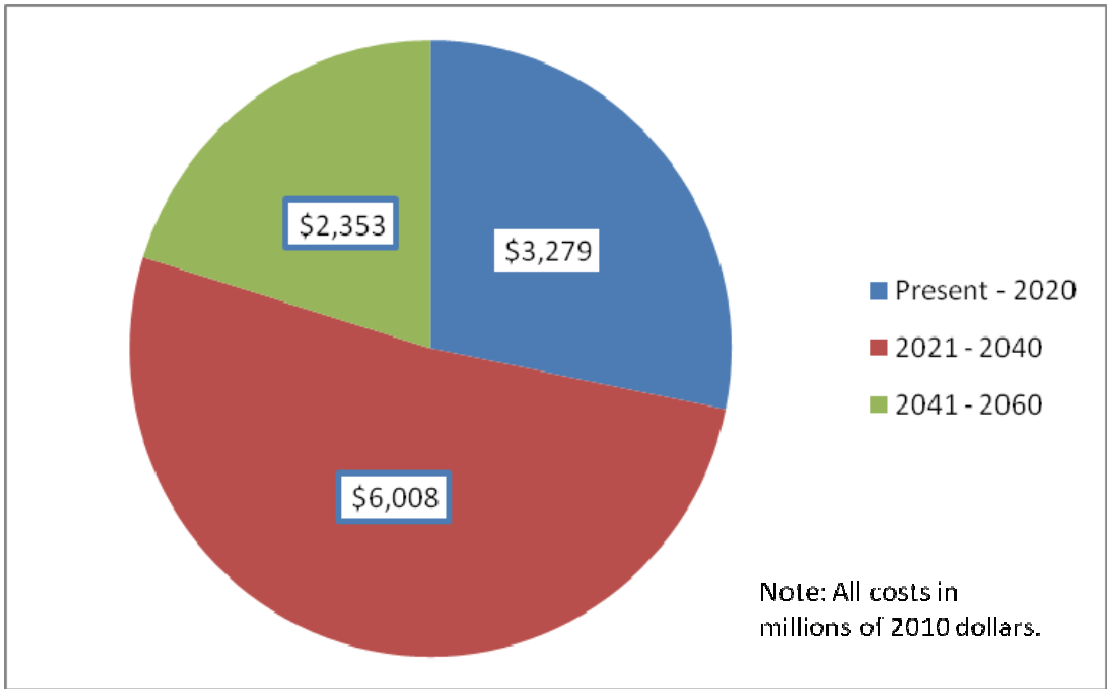


Figure 6-5. Central Region – Regional Costs over Time

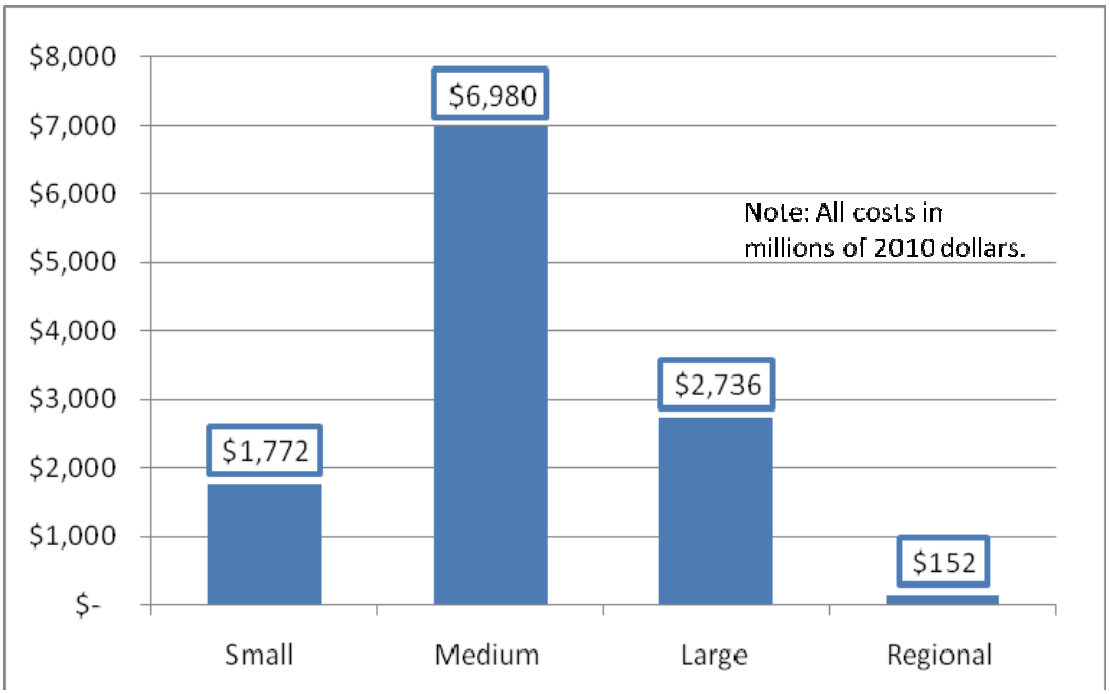


Figure 6-6. Central Region – Regional Costs by Stratum

Section 7
Eufaula Regional Infrastructure Costs

This section provides some general information about the OCWP Eufaula Watershed Planning Region and provides a cost summary for this region.

7.1 Eufaula –Regional Description

The Eufaula Region is a 3,223-square-mile area including all or portions of Okfuskee, Seminole, Hughes, McIntosh, Haskell, Latimer, Okmulgee, Pittsburg, Pottawatomie, and Muskogee Counties. There are 25 wastewater utilities in this region included in this study. Table 7-1 shows the number of wastewater utilities in the Eufaula Region by stratum.

Table 7-1. Eufaula Region – Number of OCWP Wastewater Utilities by Stratum

Provider Size	Population[A]	Mechanical – Advanced [B, C]	Mechanical [B, C]	Lagoon – Advanced [B, C]	Lagoon [B, C]	Lagoon - Total Retention [B, C]	Total
Large	>100,000	0	0	0	0	0	0
Medium	3,301 – 100,000	5	1	0	0	0	6
Small	<3,300	2	2	4	8	3	19
Total		**7**	**3**	**4**	**8**	**3**	**25**

[A] Population classification was based on 2060 projection (see *Appendix A* for more details on projections).
[B] Only public utilities, associated with municipalities, were included in this study.
[C] Utilities may have more than one treatment facility. Treatment stratum is based on the most stringent facility treatment level.

7.2 Eufaula – Regional Infrastructure Costs

Information about each of the wastewater utilities in the Eufaula Region is included in Table 7-2.

Table 7-2. Eufaula Region – OCWP Wastewater Utilities

Provider Name	County	Treatment Type [A]	Utility Size [B]	Were they selected for cost modeling? [C]
City of McAlester	Pittsburg	Mechanical - Advanced	Medium	No
City of Morris / Morris PWA	Okmulgee	Lagoon	Small	No
City of Wetumka	Hughes	Lagoon	Small	No
Canadian PWA	Pittsburg	Mechanical	Small	No
City of Beggs / Beggs PWA	Okmulgee	Lagoon - Advanced	Small	No
City of Eufaula / Eufaula PWA	McIntosh	Mechanical - Advanced	Medium	No
City of Haileyville / Haileyville PWA	Pittsburg	Mechanical - Advanced	Small	No
City of Hartshorne	Pittsburg	Mechanical - Advanced	Small	No
City of Henryetta/Henryetta Municipal Authority	Okmulgee	Mechanical - Advanced	Medium	No

Table 7-2. Eufaula Region – OCWP Wastewater Utilities (cont.)

Provider Name	County	Treatment Type [A]	Utility Size [B]	Were they selected for cost modeling? [C]
City of Okmulgee	Okmulgee	Mechanical - Advanced	Medium	Yes
City of Seminole / Seminole Utility Authority	Seminole	Mechanical - Advanced	Medium	No
City of Wewoka	Seminole	Mechanical	Medium	No
Crowder PWA	Pittsburg	Lagoon - Total Retention	Small	No
Dustin PWA / Town of Dustin	Hughes	Lagoon	Small	No
Earlsboro PWA	Pottawatomie	Lagoon - Advanced	Small	No
Krebs Utility Authority	Pittsburg	Lagoon - Advanced	Small	No
Pittsburg PWA	Pittsburg	Lagoon	Small	No
Savanna PWA	Pittsburg	Lagoon - Advanced	Small	No
Town of Alderson	Pittsburg	Lagoon	Small	No
Town of Dewar / Dewar PWA	Okmulgee	Lagoon	Small	No
Town of Lima / Lima PWA	Seminole	Mechanical	Small	No
Town of Stuart / Stuart PWA	Hughes	Lagoon	Small	No
Town of Weleetka	Okfuskee	Lagoon	Small	No
Atoka County Rsd # 1-Wardville	Atoka	Lagoon - Total Retention	Small	No
Tanglewood Bluff WWT	McIntosh	Lagoon - Total Retention	Small	No

[A] Utilities may have more than one treatment facility. Treatment stratum is based on the most stringent facility treatment level.
[B] Utility size classification is based on 2060 population projection (see *Appendix A* for more information on projections).
[C] Project lists for modeled utilities are included in Appendix D.

There are no large wastewater utilities in the Eufaula Region.

There are six medium wastewater utilities in the Eufaula Region. Table 7-3 presents the wastewater infrastructure costs through 2060 for the medium utility stratum by infrastructure type. Figure 7-1 illustrates the medium provider stratum costs over time.

Table 7-3. Eufaula Region – Medium Wastewater Utilities Cost by Infrastructure Type

Period [A]	Wastewater Treatment - Categories I and II (millions of 2010 dollars) [B]	Wastewater Collection - Categories III and IV (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$87	$310	$397
2021 - 2040	$230	$580	$810
2041 - 2060	$120	$200	$320
Total	**$437**	**$1,090**	**$1,527**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems.

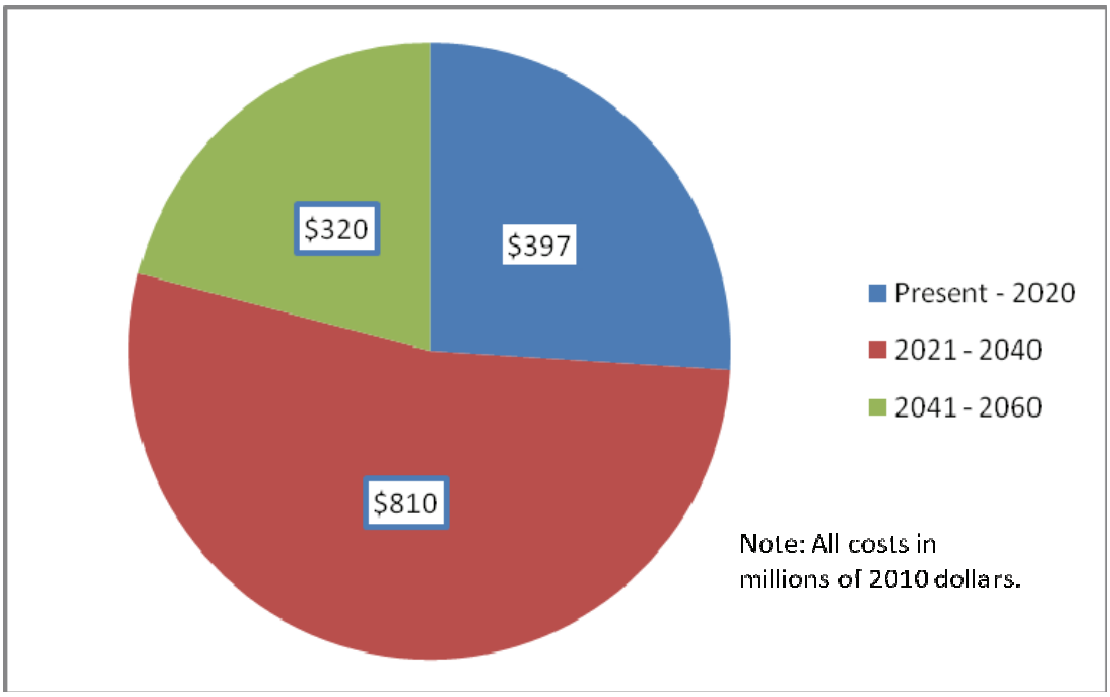


Figure 7-1. Eufaula Region – Medium Wastewater Utilities Costs over Time

There are 19 small wastewater utilities in the Eufaula Region. **Table 7-4** presents the wastewater infrastructure costs through 2060 for the small utility stratum by infrastructure type. **Figure 7-2** illustrates the small provider stratum costs over time.

Table 7-4. Eufaula Region – Small Wastewater Utilities Cost by Infrastructure Type

Period [A]	Wastewater Treatment - Categories I and II (millions of 2010 dollars) [B]	Wastewater Collection - Categories III and IV (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$10	$110	$120
2021 - 2040	$71	$240	$311
2041 - 2060	$36	$58	$94
Total	**$117**	**$408**	**$525**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems.

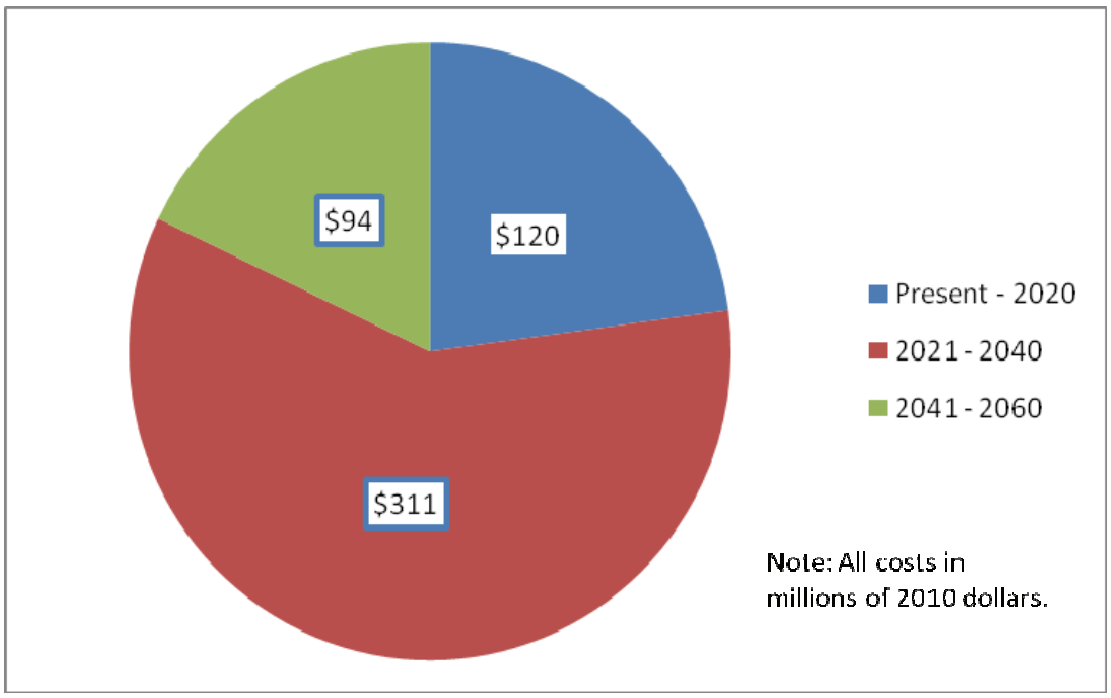


Figure 7-2. Eufaula Region – Small Wastewater Utilities Costs over Time

No category VI projects were identified in the Eufaula Region. Three regional category VII projects were identified. The state, through other work, is currently developing Watershed Based Plans and/or TMDLs. This work will provide a better basis for estimating these needs. **Table 7-5** presents the regional wastewater infrastructure costs through 2060 by infrastructure type. **Figure 7-3** illustrates the regional project costs over time.

Table 7-5. Eufaula Region – Regional Wastewater Project Cost by Infrastructure Type

Period [A]	Stormwater Management – Category VI (millions of 2010 dollars) [B]	Nonpoint Source Pollution Control – Category VII (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$0.0	$1.9	$1.9
2021 - 2040	$0.0	$3.7	$3.7
2041 - 2060	$0.0	$3.7	$3.7
Total	**$0.0**	**$9.3**	**$9.3**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category VI includes stormwater management, and Category VII includes non source pollution control.

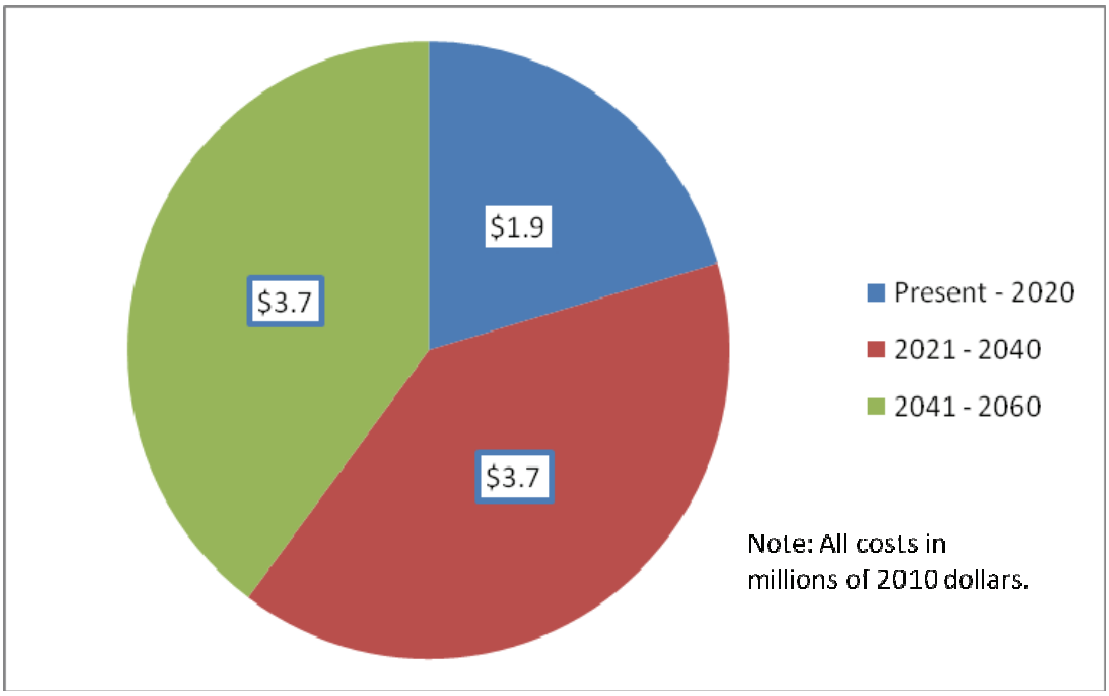


Figure 7-3. Eufaula Region – Regional Wastewater Project Costs over Time

7.3 Eufaula – Regional Cost Summary

This section summarizes the Eufaula Region's wastewater infrastructure costs over the next 50 years. **Table 7-6** identifies costs by utility size and project period. All projects identified in this study were assumed to be CWSRF eligible. **Figure 7-4** illustrates the regional wastewater infrastructure costs over time. **Figure 7-5** illustrates the regional wastewater costs by stratum.

Table 7-6. Eufaula Region – Wastewater Infrastructure Cost Summary by Category

Category [A, B]	Official Needs Category Group [B]	Present – 2020 Infrastructure Need (millions of 2010 dollars)	2021 – 2040 Infrastructure Need (millions of 2010 dollars)	2041 – 2060 Infrastructure Need (millions of 2010 dollars)	Total Period Infrastructure Need (millions of 2010 dollars)
Small	I and II	$10	$71	$36	$117
	III and IV	$110	$240	$58	$408
Medium	I and II	$87	$230	$120	$437
	III and IV	$310	$580	$200	$1,090
Large	I and II	$0.0	$0.0	$0.0	$0.0
	III and IV	$0.0	$0.0	$0.0	$0.0
Regional	VI	$0.0	$0.0	$0.0	$0.0
	VII	$1.9	$3.7	$3.7	$9.3
Total Costs		$518.9	$1,124.7	$417.7	$2,061.3

[A] Population based on 2060 projection (see *Appendix A* for more details on projections). Regional projects include all known category VI and VII projects by watershed.

[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems, Category VI includes stormwater management, and Category VII includes non source pollution control.

[C] Small differences in values may result from rounding.

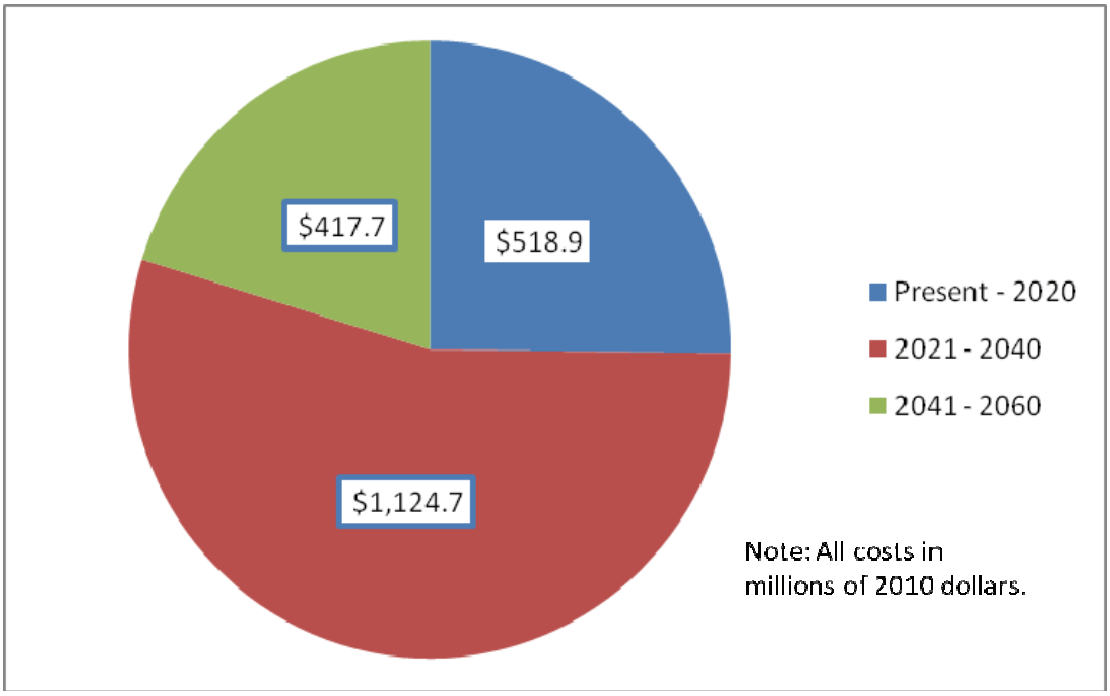


Figure 7-4. Eufaula Region – Regional Costs over Time

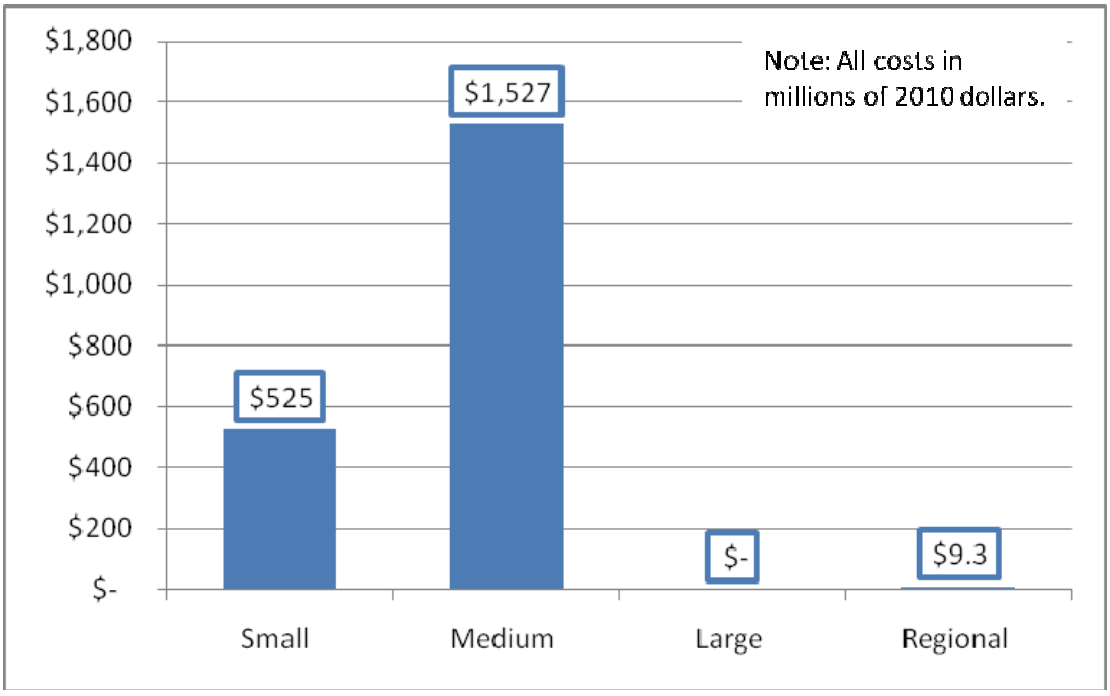


Figure 7-5. Eufaula Region – Regional Costs by Stratum

Section 8
Grand Regional Infrastructure Costs

This section provides some general information about the OCWP Grand Watershed Planning Region and provides a cost summary for this region.

8.1 Grand –Regional Description

The Grand Region is a 2,964-square-mile area including all or portions of Craig, Ottawa, Rogers, Mayes, Delaware, Wagoner, Muskogee, and Cherokee Counties. There are 30 wastewater utilities in this region included in this study. Table 8-1 shows the number of wastewater utilities in the Grand Region by stratum.

Table 8-1. Grand Region – Number of OCWP Wastewater Utilities by Stratum

Provider Size	Population[A]	Mechanical – Advanced [B, C]	Mechanical [B, C]	Lagoon – Advanced [B, C]	Lagoon [B, C]	Lagoon - Total Retention [B, C]	Total
Large	>100,000	0	0	0	0	0	0
Medium	3,301 – 100,000	4	2	2	1	0	9
Small	<3,300	5	3	3	7	3	21
Total		**9**	**5**	**5**	**8**	**3**	**30**

[A] Population classification was based on 2060 projection (see *Appendix A* for more details on projections).
[B] Only public utilities, associated with municipalities, were included in this study.
[C] Utilities may have more than one treatment facility. Treatment stratum is based on the most stringent facility treatment level.

8.2 Grand – Regional Infrastructure Costs

Information about each of the wastewater utilities in the Grand Region is included in Table 8-2.

Table 8-2. Grand Region – OCWP Wastewater Utilities

Provider Name	County	Treatment Type [A]	Utility Size [B]	Were they selected for cost modeling? [C]
City of Fairland / Fairland PWA	Ottawa	Lagoon	Small	No
Grove Municipal Services Authority / City of Grove	Delaware	Mechanical - Advanced	Medium	No
City of Pryor / Municipal Utility Board	Mayes	Mechanical - Advanced	Medium	No
Adair Municipal Authority and Town of Adair	Mayes	Lagoon - Advanced	Small	No
Afton PWA	Ottawa	Mechanical - Advanced	Small	No
Bernice PWA	Delaware	Mechanical	Small	No
Big Cabin PWA	Craig	Lagoon - Advanced	Small	No
Cardin Special Utilities	Ottawa	Lagoon	Small	No
City of Chelsea/Chelsea Economic Development Authority	Rogers	Lagoon - Advanced	Medium	No
City of Commerce	Ottawa	Lagoon - Advanced	Medium	No

Table 8-2. Grand Region – OCWP Wastewater Utilities (cont.)

Provider Name	County	Treatment Type [A]	Utility Size [B]	Were they selected for cost modeling? [C]
City of Picher / Picher PWA	Ottawa	Lagoon - Advanced	Small	No
City of Quapaw / Quapaw PWA	Ottawa	Lagoon	Small	No
City of Sportsman Acres	Mayes	Lagoon - Total Retention	Small	No
City of Vinita /Vinita Utility Trust Authority	Craig	Mechanical - Advanced	Medium	No
Fort Gibson Utility Authority	Muskogee	Lagoon	Medium	No
Hulbert PWA	Cherokee	Lagoon	Small	No
Ketchum PWA	Craig	Mechanical - Advanced	Small	No
Langley PWA	Mayes	Mechanical	Small	No
Locust Grove PWA	Mayes	Mechanical - Advanced	Small	No
Miami Special Utility Authority	Ottawa	Mechanical	Medium	No
Ottawa Co Rwsd #1	Ottawa	Mechanical - Advanced	Small	No
Pensacola PWA	Mayes	Mechanical	Small	No
Salina PWA	Mayes	Lagoon	Small	No
Spavinaw PWA	Mayes	Mechanical - Advanced	Small	No
Town of Choteau / Chouteau PWA	Mayes	Mechanical	Medium	No
Town of Jay / Jay Utilities Authority	Delaware	Mechanical - Advanced	Medium	No
Welch / Welch PWA	Craig	Lagoon	Small	No
Town of Colcord / Colcord PWA	Delaware	Lagoon	Small	No
Kenwood - Cherokee Ntn WWT	Delaware	Lagoon - Total Retention	Small	No
Kansas WWT	Delaware	Lagoon - Total Retention	Small	No

[A] Utilities may have more than one treatment facility. Treatment stratum is based on the most stringent facility treatment level.
[B] Utility size classification is based on 2060 population projection (see *Appendix A* for more information on projections).
[C] Project lists for modeled utilities are included in Appendix D.

There are no large wastewater utilities in the Grand Region.

There are nine medium wastewater utilities in the Grand Region. **Table 8-3** presents the wastewater infrastructure costs through 2060 for the medium utility stratum by infrastructure type. **Figure 8-1** illustrates the medium provider stratum costs over time.

Table 8-3. Grand Region – Medium Wastewater Utilities Cost by Infrastructure Type

Period [A]	Wastewater Treatment - Categories I and II (millions of 2010 dollars) [B]	Wastewater Collection - Categories III and IV (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$80	$480	$560
2021 - 2040	$290	$650	$940
2041 - 2060	$95	$250	$345
Total	**$465**	**$1,380**	**$1,845**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems.

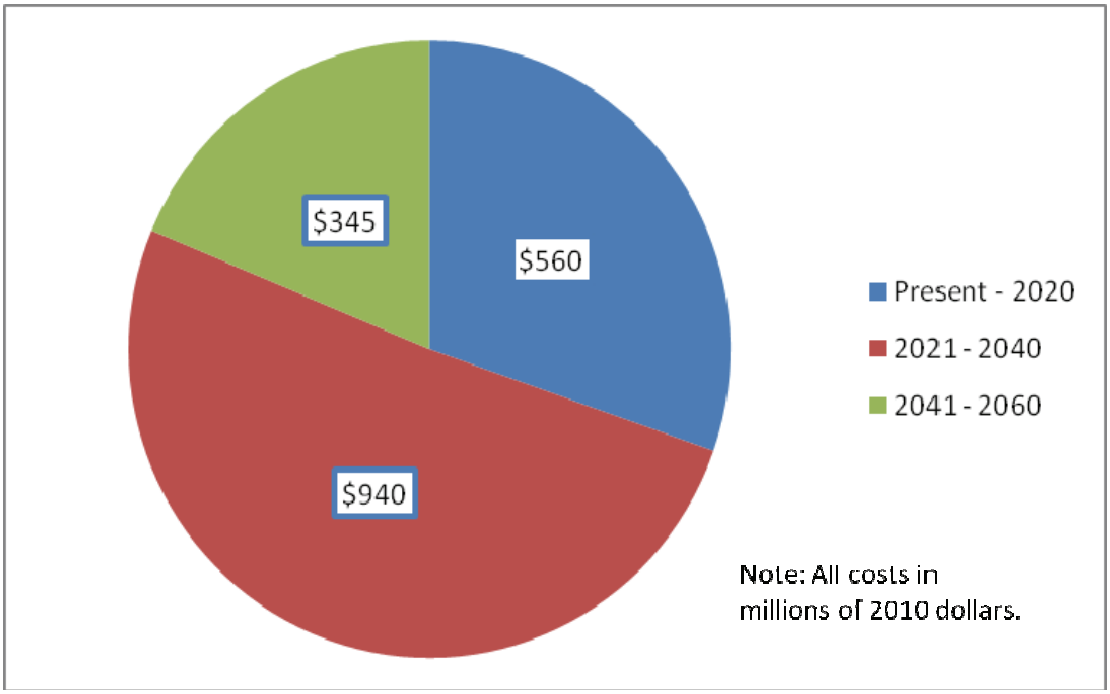


Figure 8-1. Grand Region – Medium Wastewater Utilities Costs over Time

There are 21 small wastewater utilities in the Grand Region. **Table 8-4** presents the wastewater infrastructure costs through 2060 for the small utility stratum by infrastructure type. **Figure 8-2** illustrates the small provider stratum costs over time.

Table 8-4. Grand Region – Small Wastewater Utilities Cost by Infrastructure Type

Period [A]	Wastewater Treatment - Categories I and II (millions of 2010 dollars) [B]	Wastewater Collection - Categories III and IV (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$21	$120	$141
2021 - 2040	$81	$220	$301
2041 - 2060	$65	$59	$124
Total	**$167**	**$399**	**$566**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems.

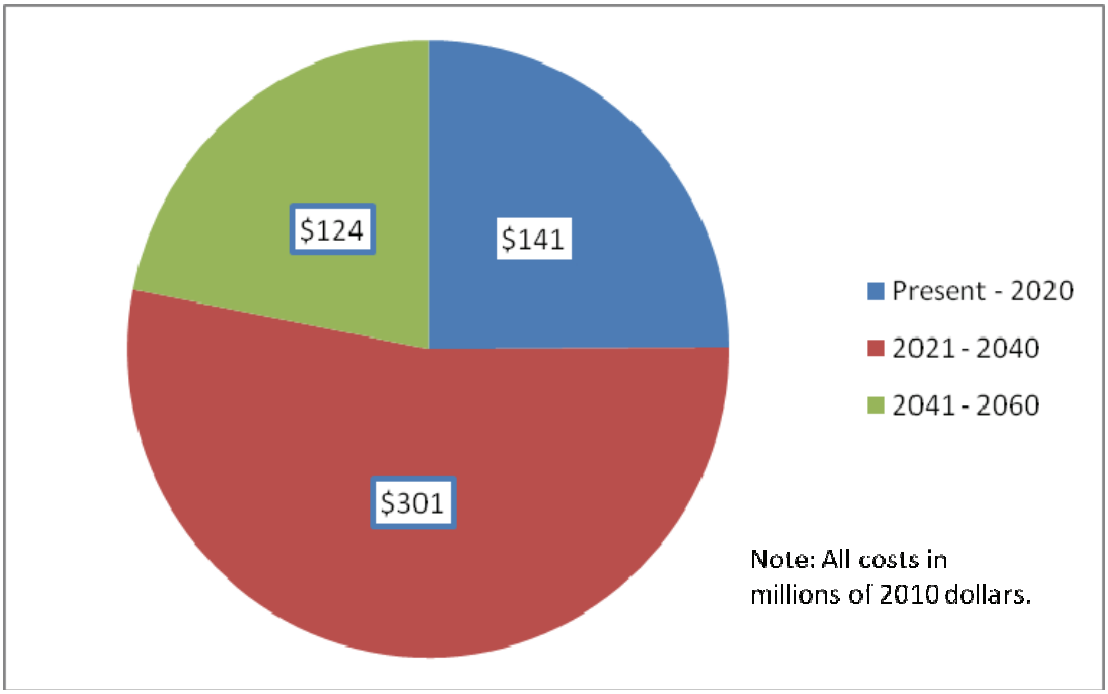


Figure 8-2. Grand Region – Small Wastewater Utilities Costs over Time

No category VI projects were identified in the Grand Region. Thirteen regional category VII projects were identified. The state, through other work, is currently developing Watershed Based Plans and/or TMDLs. This work will provide a better basis for estimating these needs. **Table 8-5** presents the regional wastewater infrastructure costs through 2060 by infrastructure type. **Figure 8-3** illustrates the regional project costs over time.

Table 8-5. Grand Region – Regional Wastewater Project Cost by Infrastructure Type

Period [A]	Stormwater Management – Category VI (millions of 2010 dollars) [B]	Nonpoint Source Pollution Control – Category VII (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$0.0	$20	$20
2021 - 2040	$0.0	$10	$10
2041 - 2060	$0.0	$10	$10
Total	**$0.0**	**$40**	**$40**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category VI includes stormwater management, and Category VII includes non source pollution control.

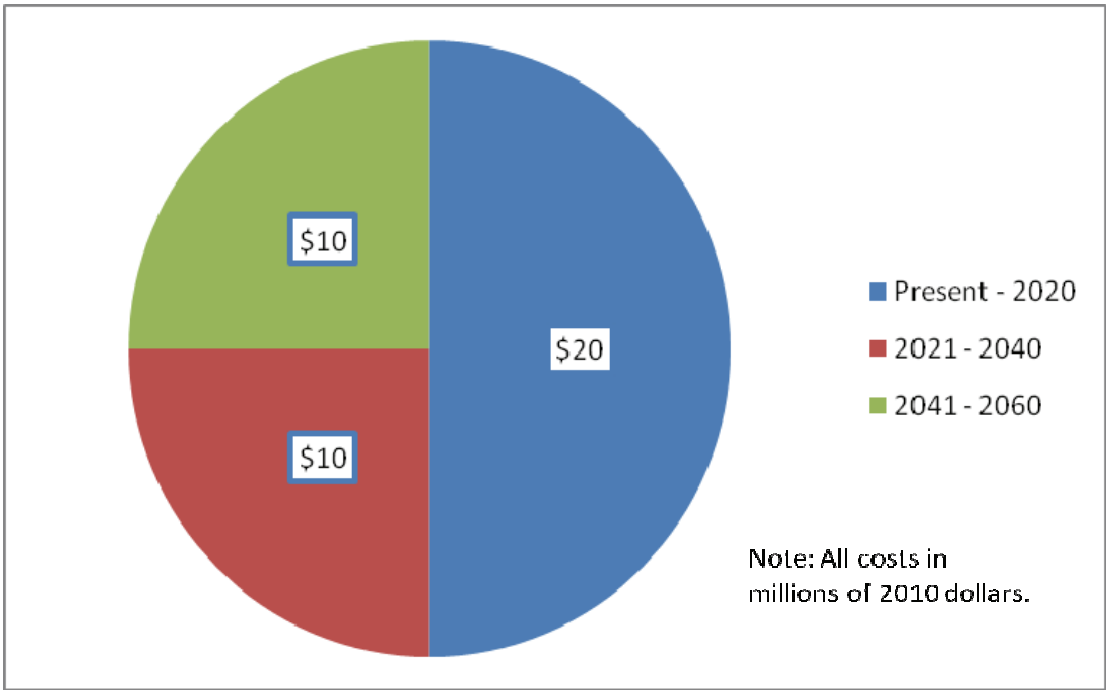


Figure 8-3. Grand Region – Regional Wastewater Project Costs over Time

8.3 Grand – Regional Cost Summary

This section summarizes the Grand Region's wastewater infrastructure costs over the next 50 years. **Table 8-6** identifies costs by utility size and project period. All projects identified in this study were assumed to be CWSRF eligible. **Figure 8-4** illustrates the regional wastewater infrastructure costs over time. **Figure 8-5** illustrates the regional wastewater costs by stratum.

Table 8-6. Grand Region – Wastewater Infrastructure Cost Summary by Category

Category [A, B]	Official Needs Category Group [B]	Present – 2020 Infrastructure Need (millions of 2010 dollars)	2021 – 2040 Infrastructure Need (millions of 2010 dollars)	2041 – 2060 Infrastructure Need (millions of 2010 dollars)	Total Period Infrastructure Need (millions of 2010 dollars)
Small	I and II	$21	$81	$65	$167
	III and IV	$120	$220	$59	$399
Medium	I and II	$80	$290	$95	$465
	III and IV	$480	$650	$250	$1,380
Large	I and II	$0.0	$0.0	$0.0	$0.0
	III and IV	$0.0	$0.0	$0.0	$0.0
Regional	VI	$0.0	$0.0	$0.0	$0.0
	VII	$20	$10	$10	$40
Total Costs		$721	$1,251	$479	$2,451

[A] Population based on 2060 projection (see *Appendix A* for more details on projections). Regional projects include all known category VI and VII projects by watershed.

[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems, Category VI includes stormwater management, and Category VII includes non source pollution control.

[C] Small differences in values may result from rounding.

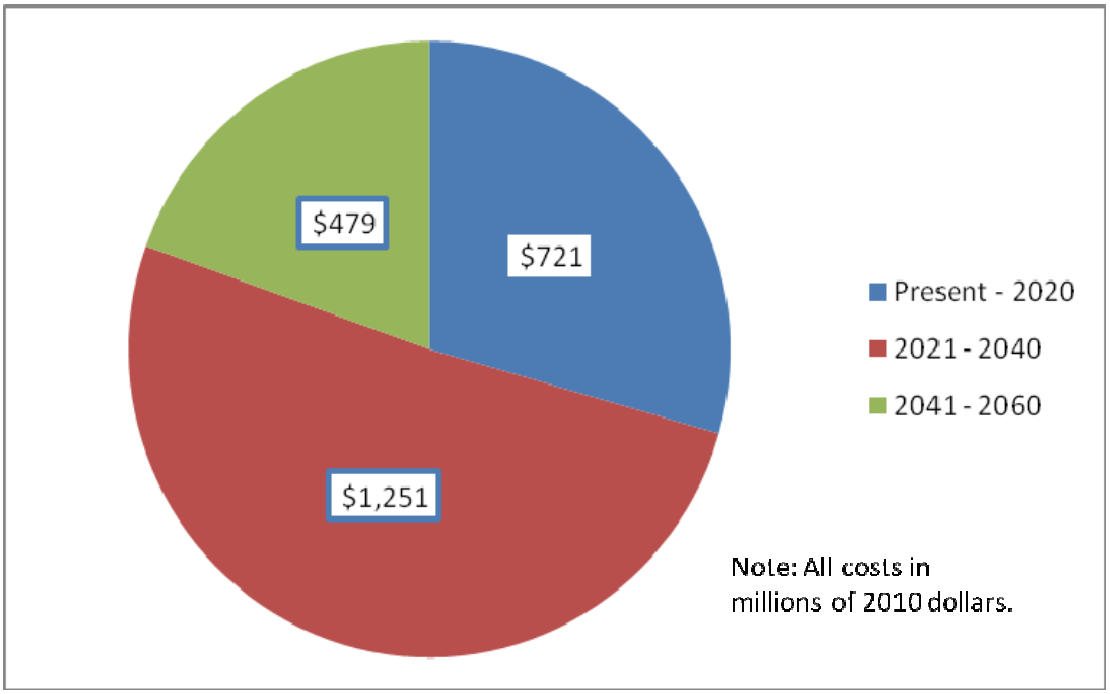


Figure 8-4. Grand Region – Regional Costs over Time

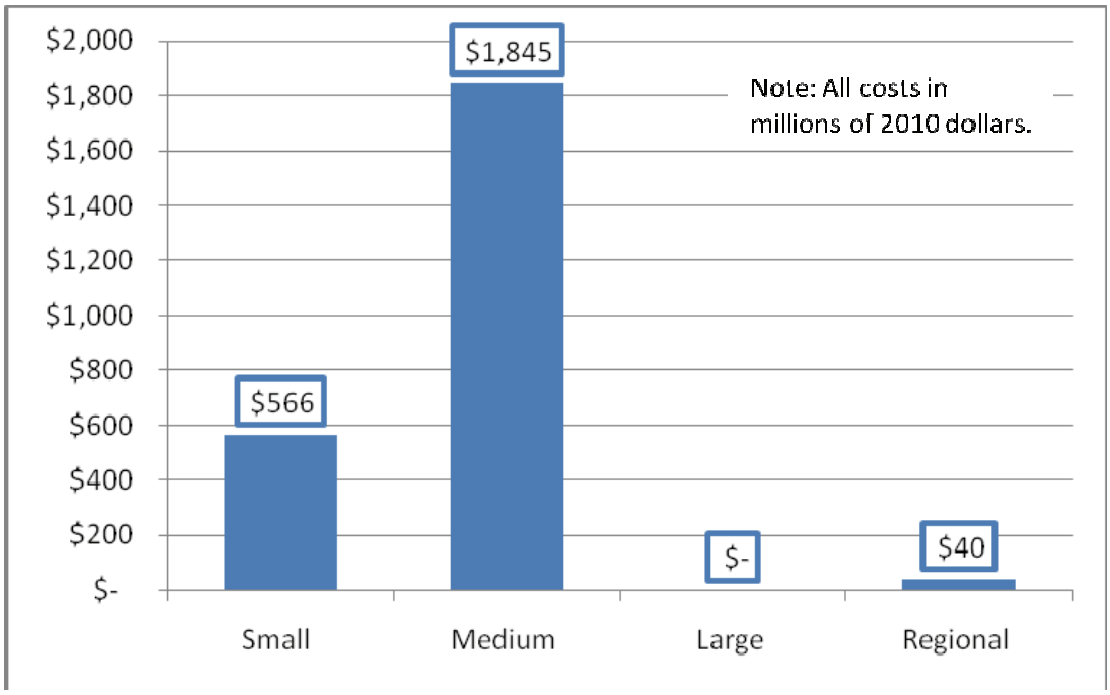


Figure 8-5. Grand Region – Regional Costs by Stratum

Section 9
Lower Arkansas Regional Infrastructure Costs

This section provides some general information about the OCWP Lower Arkansas Watershed Planning Region and provides a cost summary for this region.

9.1 Lower Arkansas –Regional Description

The Lower Arkansas Region is a 4,657-square-mile area including all or portions of Delaware, Cherokee, Adair, Muskogee, Sequoyah, Pittsburg, Haskell, LeFlore, McIntosh, and Latimer Counties. There are 39 wastewater utilities in this region included in this study. Table 9-1 shows the number of wastewater utilities in the Lower Arkansas Region by stratum.

Table 9-1. Lower Arkansas Region – Number of OCWP Wastewater Utilities by Stratum

Provider Size	Population[A]	Mechanical – Advanced [B, C]	Mechanical [B, C]	Lagoon – Advanced [B, C]	Lagoon [B, C]	Lagoon - Total Retention [B, C]	Total
Large	>100,000	0	0	0	0	0	0
Medium	3,301 – 100,000	5	3	3	1	0	12
Small	<3,300	1	3	2	17	4	27
Total		**6**	**6**	**5**	**18**	**4**	**39**

[A] Population classification was based on 2060 projection (see *Appendix A* for more details on projections).
[B] Only public utilities, associated with municipalities, were included in this study.
[C] Utilities may have more than one treatment facility. Treatment stratum is based on the most stringent facility treatment level.

9.2 Lower Arkansas – Regional Infrastructure Costs

Information about each of the wastewater utilities in the Lower Arkansas Region is included in Table 9-2.

Table 9-2. Lower Arkansas Region – OCWP Wastewater Utilities

Provider Name	County	Treatment Type [A]	Utility Size [B]	Were they selected for cost modeling? [C]
City of Poteau / Poteau PWA	Leflore	Mechanical - Advanced	Medium	No
City of Wilburton	Latimer	Lagoon - Advanced	Medium	No
Bokoshe PWA	Leflore	Lagoon	Small	No
City of Checotah/Checotah PWA	McIntosh	Mechanical - Advanced	Medium	No
City of Heavener / Heavener Utility Authority	Leflore	Lagoon - Advanced	Medium	No
City of Muskogee / Muskogee Municipal Authority	Muskogee	Mechanical	Medium	Yes
City of Panama / Panama PWA	Leflore	Lagoon	Small	No
City of Porum	Muskogee	Lagoon	Small	No

Table 9-2. Lower Arkansas Region – OCWP Wastewater Utilities (cont.)

Provider Name	County	Treatment Type [A]	Utility Size [B]	Were they selected for cost modeling? [C]
City of Quinton	Pittsburg	Lagoon	Small	No
City of Sallisaw	Sequoyah	Mechanical - Advanced	Medium	No
City of Stigler / Stigler Municipal Improvement Authority	Haskell	Lagoon	Medium	No
City of Wister	Leflore	Mechanical - Advanced	Small	No
Haskell Co Rwd #2	Haskell	Lagoon	Small	No
Keota PWA	Haskell	Lagoon	Small	No
McCurtain Municipal Authority	Haskell	Lagoon	Small	No
Muldrow PWA	Sequoyah	Mechanical	Medium	No
Roland Utility Authority	Sequoyah	Lagoon - Advanced	Medium	No
Shady Point PWA	Leflore	Lagoon	Small	No
Tahlequah PWA	Cherokee	Mechanical - Advanced	Medium	No
Town of Braggs / Braggs PWA	Muskogee	Mechanical	Small	No
Town of Cameron / Cameron PWA	Leflore	Lagoon	Small	No
Town of Gans / Gans Utility Authority	Sequoyah	Lagoon	Small	No
Town of Gore / Gore PWA	Sequoyah	Lagoon	Small	No
Town of Haworth / Haworth PWA	McCurtain	Lagoon	Small	No
Town of Howe / Howe Rwd #5	Leflore	Mechanical	Small	No
Town of Kingston	Marshall	Mechanical - Advanced	Medium	No
Town of Pocola / Pocola Municipal Authority	Leflore	Mechanical	Medium	No
Town of Red Oak / Red Oak PWA	Latimer	Lagoon	Small	No
Town of Spiro / Spiro Municipal Improvement Authority	Leflore	Mechanical	Small	No
Town of Vian / Vian Utility Authority	Sequoyah	Lagoon - Advanced	Small	No
Town of Warner/Warner Utilities Authority	Muskogee	Lagoon	Small	No
Town of Webbers Falls	Muskogee	Lagoon	Small	No
Watts PWA	Adair	Lagoon - Total Retention	Small	No
Westville Utility Authority	Adair	Lagoon - Advanced	Small	No
City of Kiowa	Pittsburg	Lagoon - Total Retention	Small	No
Town of Oktaha	Muskogee	Lagoon	Small	No
Town of Whitefield / Haskell Rwd #2	Haskell	Lagoon	Small	No
Marble City WWT	Sequoyah	Lagoon - Total Retention	Small	No
Tenkiller Utility Co WWT	Cherokee	Lagoon - Total Retention	Small	No

[A] Utilities may have more than one treatment facility. Treatment stratum is based on the most stringent facility treatment level.
[B] Utility size classification is based on 2060 population projection (see *Appendix A* for more information on projections).
[C] Project lists for modeled utilities are included in Appendix D.

There are no large wastewater utilities in the Lower Arkansas Region.

There are 12 medium wastewater utilities in the Lower Arkansas Region. **Table 9-3** presents the wastewater infrastructure costs through 2060 for the medium utility stratum by infrastructure type. **Figure 9-1** illustrates the medium provider stratum costs over time.

Table 9-3. Lower Arkansas Region – Medium Wastewater Utilities Cost by Infrastructure Type

Period [A]	Wastewater Treatment - Categories I and II (millions of 2010 dollars) [B]	Wastewater Collection - Categories III and IV (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$99	$620	$719
2021 - 2040	$400	$850	$1,250
2041 - 2060	$120	$330	$450
Total	**$619**	**$1,800**	**$2,419**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems.

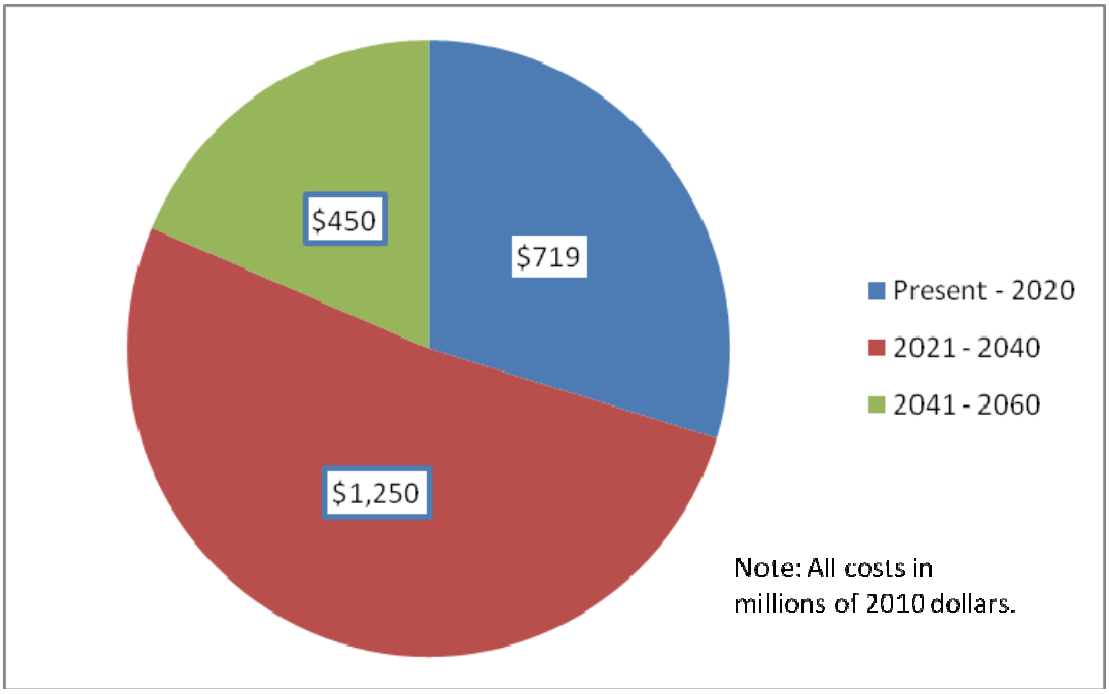


Figure 9-1. Lower Arkansas Region – Medium Wastewater Utilities Costs over Time

There are 27 small wastewater utilities in the Lower Arkansas Region. **Table 9-4** presents the wastewater infrastructure costs through 2060 for the small utility stratum by infrastructure type. **Figure 9-2** illustrates the small provider stratum costs over time.

Table 9-4. Lower Arkansas Region – Small Wastewater Utilities Cost by Infrastructure Type

Period [A]	Wastewater Treatment - Categories I and II (millions of 2010 dollars) [B]	Wastewater Collection - Categories III and IV (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$7	$110	$117
2021 - 2040	$110	$410	$520
2041 - 2060	$40	$89	$129
Total	**$157**	**$609**	**$766**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems.

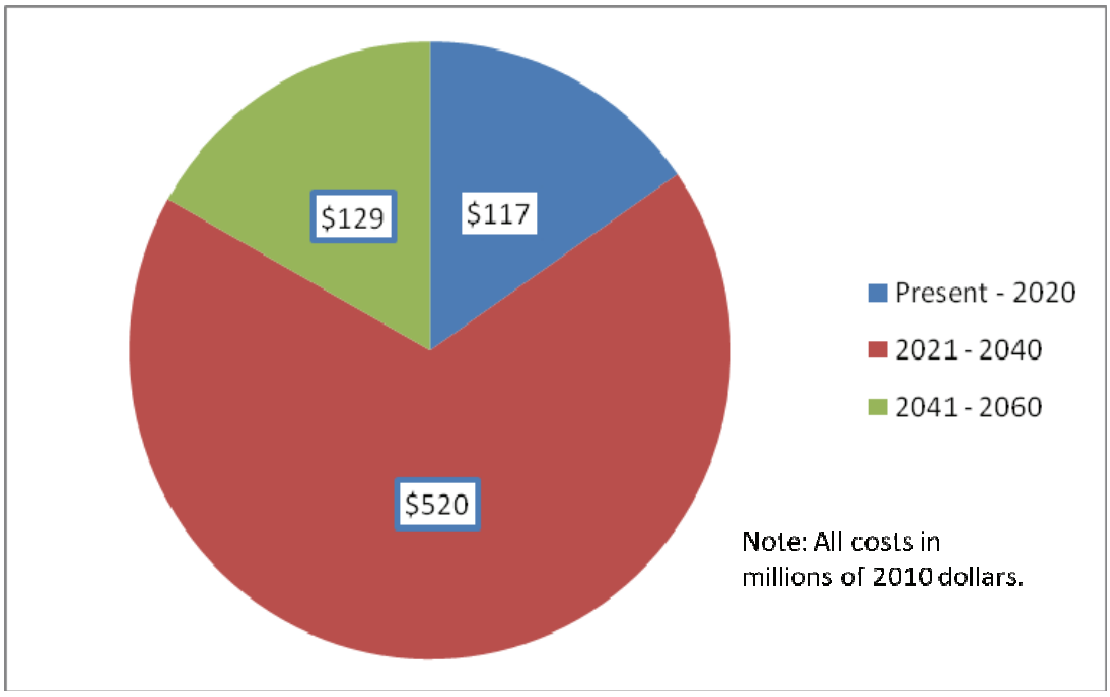


Figure 9-2. Lower Arkansas Region – Small Wastewater Utilities Costs over Time

No category VI projects were identified in the Lower Arkansas Region. Eleven regional category VII projects were identified. The state, through other work, is currently developing Watershed Based Plans and/or TMDLs. This work will provide a better basis for estimating these needs. **Table 9-5** presents the regional wastewater infrastructure costs through 2060 by infrastructure type. **Figure 9-3** illustrates the regional project costs over time.

Table 9-5. Lower Arkansas Region – Regional Wastewater Project Cost by Infrastructure Type

Period [A]	Stormwater Management – Category VI (millions of 2010 dollars) [B]	Nonpoint Source Pollution Control – Category VII (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$0.0	$39	$39
2021 - 2040	$0.0	$70	$70
2041 - 2060	$0.0	$70	$70
Total	**$0.0**	**$179**	**$179**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category VI includes stormwater management, and Category VII includes non source pollution control.

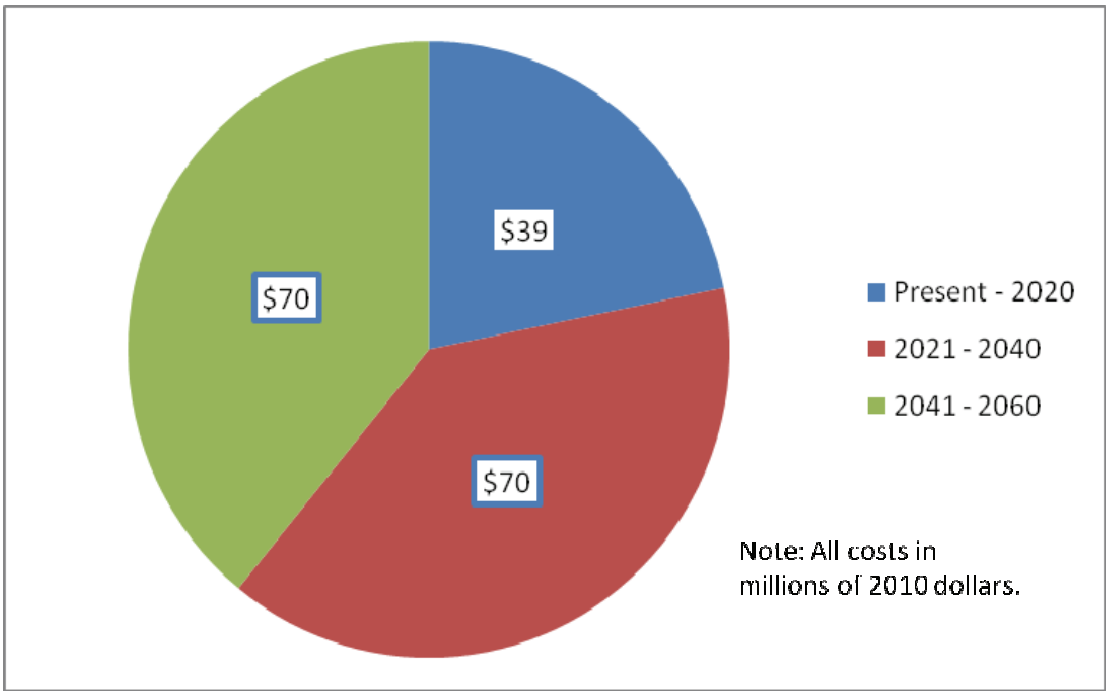


Figure 9-3. Lower Arkansas Region – Regional Wastewater Project Costs over Time

9.3 Lower Arkansas – Regional Cost Summary

This section summarizes the Lower Arkansas Region's wastewater infrastructure costs over the next 50 years. **Table 9-6** identifies costs by utility size and project period. All projects identified in this study were assumed to be CWSRF eligible. **Figure 9-4** illustrates the regional wastewater infrastructure costs over time. **Figure 9-5** illustrates the regional wastewater costs by stratum.

Table 9-6. Lower Arkansas Region – Wastewater Infrastructure Cost Summary by Category

Category [A, B]	Official Needs Category Group [B]	Present – 2020 Infrastructure Need (millions of 2010 dollars)	2021 – 2040 Infrastructure Need (millions of 2010 dollars)	2041 – 2060 Infrastructure Need (millions of 2010 dollars)	Total Period Infrastructure Need (millions of 2010 dollars)
Small	I and II	$7.4	$110	$40	$157.4
	III and IV	$110	$410	$89	$609
Medium	I and II	$99	$400	$120	$619
	III and IV	$620	$850	$330	$1,800
Large	I and II	$0.0	$0.0	$0.0	$0.0
	III and IV	$0.0	$0.0	$0.0	$0.0
Regional	VI	$0.0	$0.0	$0.0	$0.0
	VII	$39	$70	$70	$179
Total Costs		$875	$1,840	$649	$3,364.4

[A] Population based on 2060 projection (see *Appendix A* for more details on projections). Regional projects include all known category VI and VII projects by watershed.

[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems, Category VI includes stormwater management, and Category VII includes non source pollution control.

[C] Small differences in values may result from rounding.

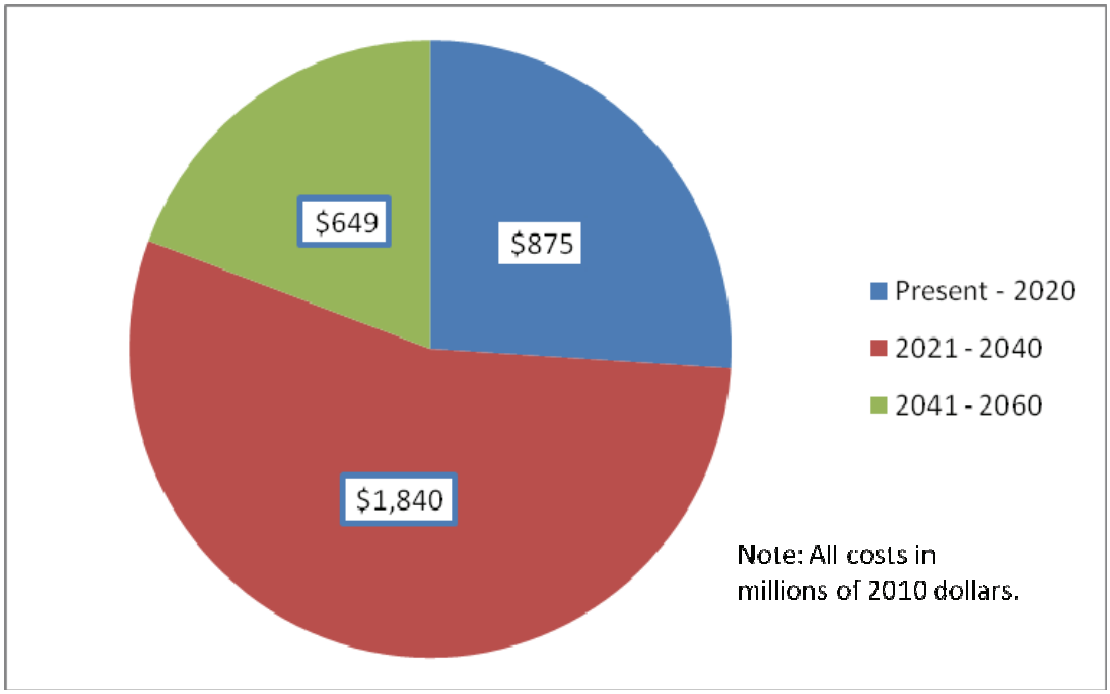


Figure 9-4. Lower Arkansas Region – Regional Costs over Time

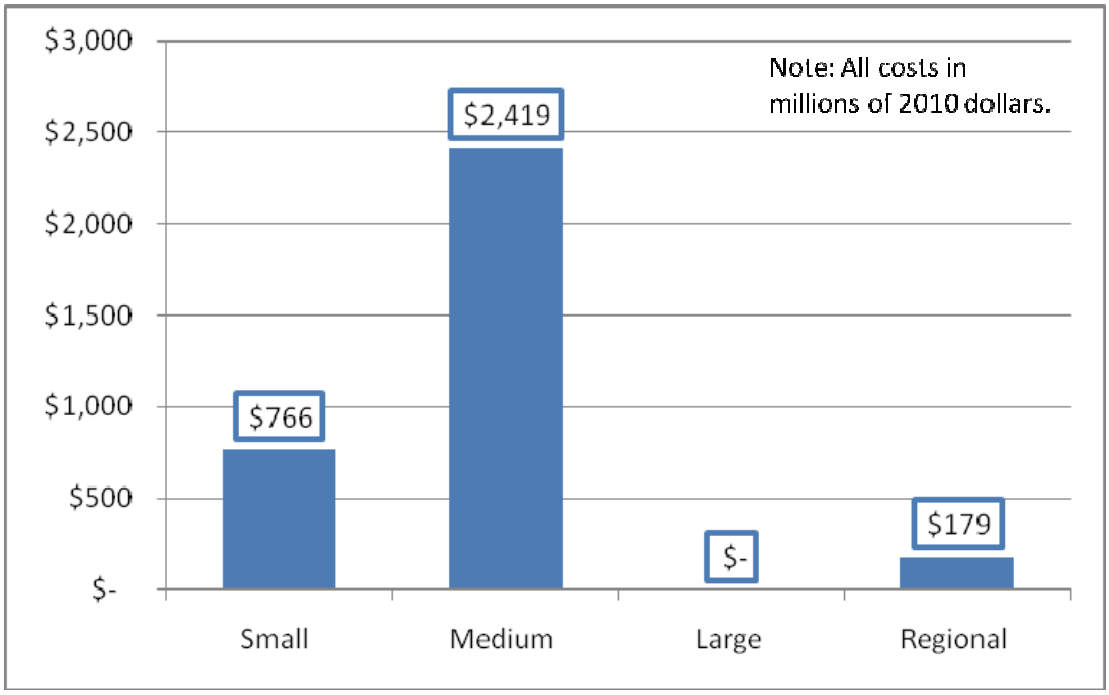


Figure 9-5. Lower Arkansas Region – Regional Costs by Stratum

Section 10
Lower Washita Regional Infrastructure Costs

This section provides some general information about the OCWP Lower Washita Watershed Planning Region and provides a cost summary for this region.

10.1 Lower Washita –Regional Description

The Lower Washita Region is a 6,192-square-mile area including all or portions of Grady, Stephens, Garvin, Murray, Pontotoc, Jefferson, Carter, Love, Johnston, Bryan, Caddo, Canadian, Comanche, McClain, and Marshall Counties. There are 47 wastewater utilities in this region included in this study. Table 10-1 shows the number of wastewater utilities in the Lower Washita Region by stratum.

Table 10-1. Lower Washita Region – Number of OCWP Wastewater Utilities by Stratum

Provider Size	Population[A]	Mechanical – Advanced[B, C]	Mechanical[B, C]	Lagoon – Advanced[B, C]	Lagoon[B, C]	Lagoon - Total Retention[B, C]	Total
Large	>100,000	0	0	0	0	0	0
Medium	3,301 – 100,000	5	4	1	0	1	11
Small	<3,300	0	2	0	18	16	36
Total		**5**	**6**	**1**	**18**	**17**	**47**

[A] Population classification was based on 2060 projection (see *Appendix A* for more details on projections).
[B] Only public utilities, associated with municipalities, were included in this study.
[C] Utilities may have more than one treatment facility. Treatment stratum is based on the most stringent facility treatment level.

10.2 Lower Washita – Regional Infrastructure Costs

Information about each of the wastewater utilities in the Lower Washita Region is included in Table 10-2.

Table 10-2. Lower Washita Region – OCWP Wastewater Utilities

Provider Name	County	Treatment Type [A]	Utility Size [B]	Were they selected for cost modeling? [C]
City of Ardmore and the Ardmore PWA	Carter	Mechanical - Advanced	Medium	Yes
City of Lone Grove / Water & Sewer Trust	Carter	Lagoon - Advanced	Medium	No
Madill PWA	Marshall	Mechanical - Advanced	Medium	No
City of Marlow	Stephens	Lagoon - Total Retention	Medium	Yes (treatment only)
City of Pauls Valley / Pauls Valley Municipal Auth	Garvin	Mechanical	Medium	No
City of Tishomingo/ Tishomingo Ma	Johnston	Mechanical - Advanced	Medium	No
Caddo Co Rwd #1	Caddo	Mechanical	Small	No

Table 10-2. Lower Washita Region – OCWP Wastewater Utilities (cont.)

Provider Name	County	Treatment Type [A]	Utility Size [B]	Were they selected for cost modeling? [C]
Cement PWA	Caddo	Lagoon	Small	No
Chickasha Municipal Authority	Grady	Mechanical - Advanced	Medium	No
City of Davis	Murray	Mechanical	Medium	No
City of Healdton	Carter	Mechanical	Medium	No
City of Lindsay	Garvin	Lagoon	Small	No
City of Marietta / Marietta PWA	Love	Mechanical	Medium	No
City of Tatum / Tatums Board of Trustees	Carter	Lagoon - Total Retention	Small	No
City of Verden	Grady	Lagoon	Small	No
Gracemont PWA	Caddo	Lagoon	Small	No
Oakland PWA	Marshall	Lagoon	Small	No
Town of Alex	Grady	Lagoon	Small	No
Town of Binger / Binger PWA	Caddo	Lagoon	Small	No
Town of Cyril	Caddo	Lagoon	Small	No
Town of Dougherty	Murray	Lagoon	Small	No
Town of Mansville	Johnston	Lagoon - Total Retention	Small	No
Town of Maysville / Maysville Municipal Authority	Garvin	Lagoon	Small	No
Town of Paoli	Garvin	Lagoon	Small	No
Town of Pocassett	Grady	Lagoon	Small	No
Town of Ringling / Ringling Municipal Authority	Jefferson	Lagoon	Small	No
Town of Velma / Velma PWA	Stephens	Lagoon	Small	No
Wilson PWA	Carter	Lagoon	Small	No
Wynnewood City Utility Authority	Garvin	Mechanical	Small	No
Byars PWA	McClain	Lagoon	Small	No
City of Elmore City	Garvin	Lagoon	Small	No
City of Mill Creek / Mill Creek PWA	Johnston	Lagoon	Small	No
City of Sulphur / Sulphur Municipal Authority	Murray	Mechanical - Advanced	Medium	Yes
City of Ratliff / Ratliff Water Trust Authority	Carter	Lagoon - Total Retention	Small	No
Ravia PWA	Johnston	Lagoon - Total Retention	Small	No

Table 10-2. Lower Washita Region – OCWP Wastewater Utilities (cont.)

Provider Name	County	Treatment Type [A]	Utility Size [B]	Were they selected for cost modeling? [C]
Town of Rush Springs /Rush Spr. Municipal Improvement Authority	Grady	Lagoon - Total Retention	Small	No
Springer PWA	Carter	Lagoon - Total Retention	Small	No
Town of Terral / Terral PWA	Jefferson	Lagoon - Total Retention	Small	No
Byars Lagoon	Mcclain	Lagoon - Total Retention	Small	No
Tatums WWT	Carter	Lagoon - Total Retention	Small	No
Cedar Blue	Murray	Lagoon - Total Retention	Small	No
Fox Rwd # 1 WWT	Carter	Lagoon - Total Retention	Small	No
Grady Co Rwd # 7 (Ninnekah) WWT	Grady	Lagoon - Total Retention	Small	No
Grady Rwd # 2 WWT	Grady	Lagoon - Total Retention	Small	No
Stephens Co Rwd #4 (Loco)	Stephens	Lagoon - Total Retention	Small	No
Mansville WWT	Johnston	Lagoon - Total Retention	Small	No
Stephens Rw&Sd #1 (Velma) WWT	Stephens	Lagoon - Total Retention	Small	No

[A] Utilities may have more than one treatment facility. Treatment stratum is based on the most stringent facility treatment level.
[B] Utility size classification is based on 2060 population projection (see *Appendix A* for more information on projections).
[C] Project lists for modeled utilities are included in Appendix D.

There are no large wastewater utility in the Lower Washita Region.

There are 11 medium wastewater utilities in the Lower Washita Region. **Table 10-3** presents the wastewater infrastructure costs through 2060 for the medium utility stratum by infrastructure type. **Figure 10-1** illustrates the medium provider stratum costs over time.

Table 10-3. Lower Washita Region – Medium Wastewater Utilities Cost by Infrastructure Type

Period [A]	Wastewater Treatment - Categories I and II (millions of 2010 dollars) [B]	Wastewater Collection - Categories III and IV (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$100	$590	$690
2021 - 2040	$400	$940	$1,340
2041 - 2060	$120	$350	$470
Total	**$620**	**$1,880**	**$2,500**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems.

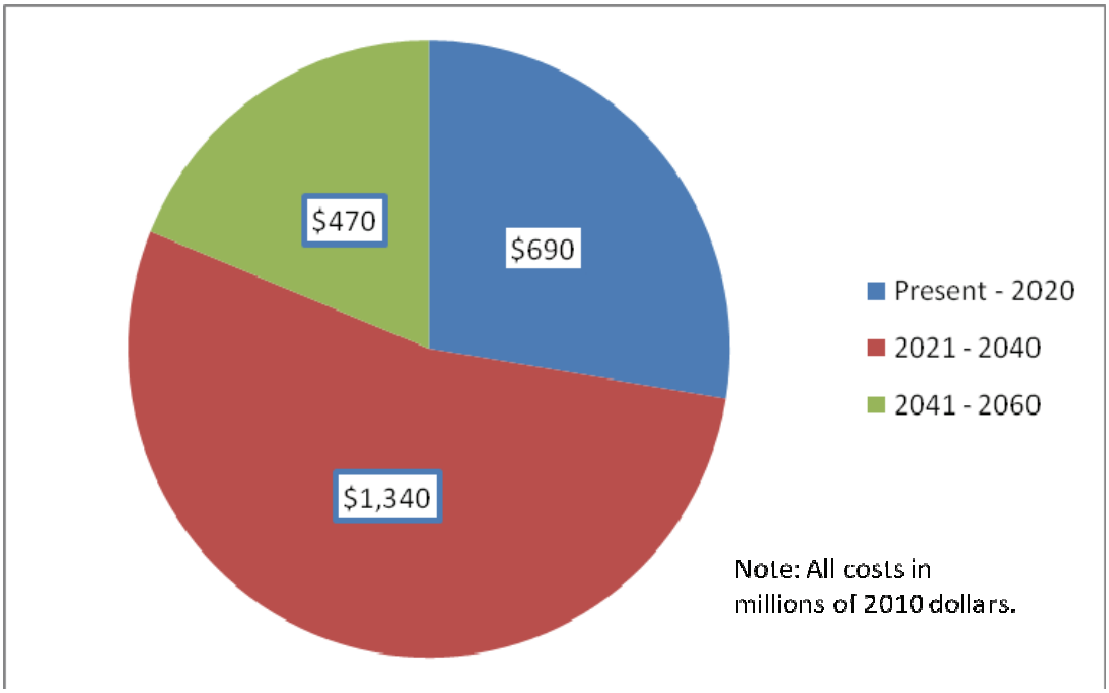


Figure 10-1. Lower Washita Region – Medium Wastewater Utilities Costs over Time

There are 36 small wastewater utilities in the Lower Washita Region. **Table 10-4** presents the wastewater infrastructure costs through 2060 for the small utility stratum by infrastructure type. **Figure 10-2** illustrates the small provider stratum costs over time.

Table 10-4. Lower Washita Region – Small Wastewater Utilities Cost by Infrastructure Type

Period [A]	Wastewater Treatment - Categories I and II (millions of 2010 dollars) [B]	Wastewater Collection - Categories III and IV (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$15	$240	$255
2021 - 2040	$130	$520	$650
2041 - 2060	$42	$120	$162
Total	**$187**	**$880**	**$1,067**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems.

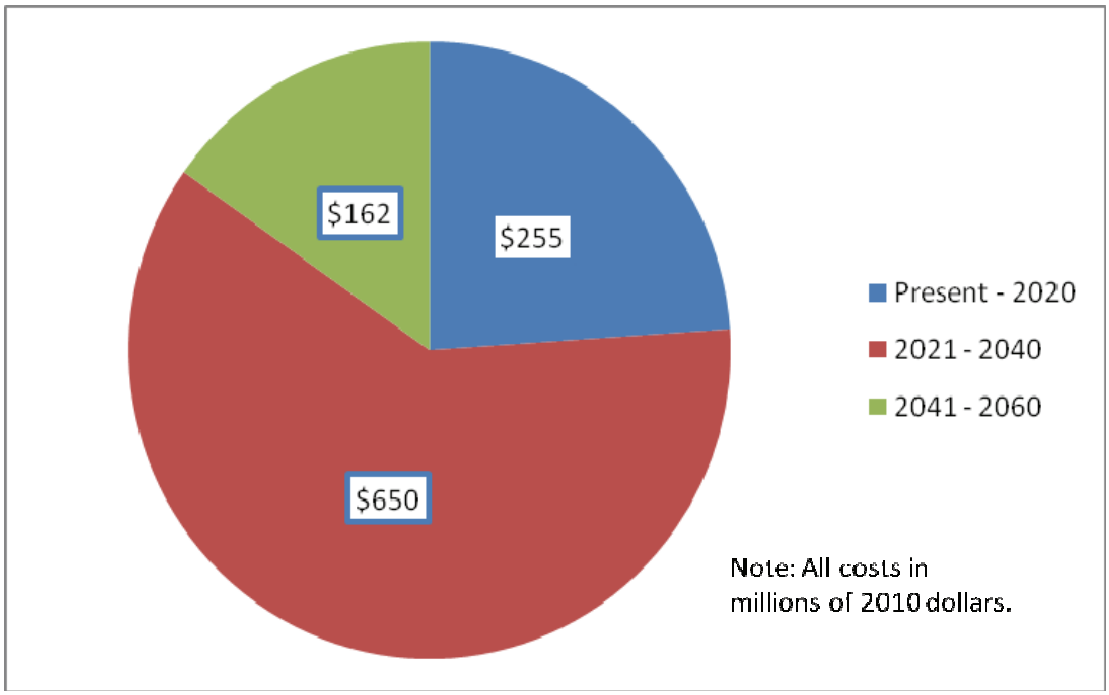


Figure 10-2. Lower Washita Region – Small Wastewater Utilities Costs over Time

No category VI projects were identified in the Lower Washita Region. Three regional category VII projects were identified. The state, through other work, is currently developing Watershed Based Plans and/or TMDLs. This work will provide a better basis for estimating these needs. **Table 10-5** presents the regional wastewater infrastructure costs through 2060 by infrastructure type. **Figure 10-3** illustrates the regional project costs over time.

Table 10-5. Lower Washita Region – Regional Wastewater Project Cost by Infrastructure Type

Period [A]	Stormwater Management – Category VI (millions of 2010 dollars) [B]	Nonpoint Source Pollution Control – Category VII (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$0.0	$1.9	$1.9
2021 - 2040	$0.0	$3.7	$3.7
2041 - 2060	$0.0	$3.7	$3.7
Total	**$0.0**	**$9.3**	**$9.3**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category VI includes stormwater management, and Category VII includes non source pollution control.

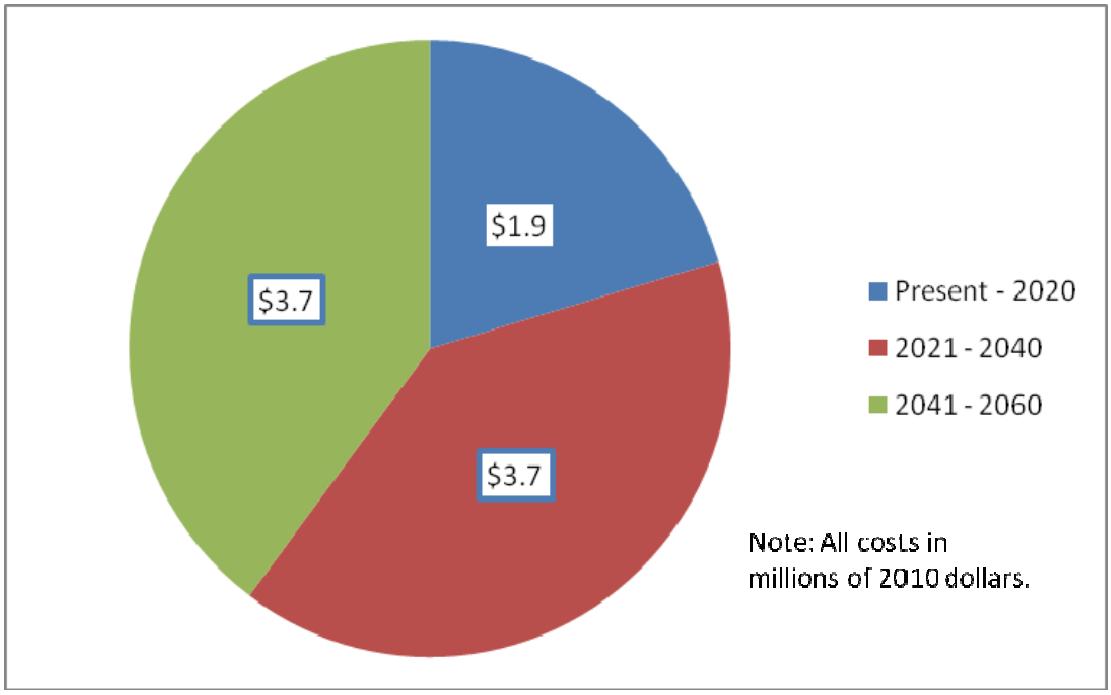


Figure 10-3. Lower Washita Region – Regional Wastewater Project Costs over Time

10.3 Lower Washita – Regional Cost Summary

This section summarizes the Lower Washita Region's wastewater infrastructure costs over the next 50 years. **Table 10-6** identifies costs by utility size and project period. All projects identified in this study were assumed to be CWSRF eligible. **Figure 10-4** illustrates the regional wastewater infrastructure costs over time. **Figure 10-5** illustrates the regional wastewater costs by stratum.

Table 10-6. Lower Washita Region – Wastewater Infrastructure Cost Summary by Category

Category [A, B]	Official Needs Category Group [B]	Present – 2020 Infrastructure Need (millions of 2010 dollars)	2021 – 2040 Infrastructure Need (millions of 2010 dollars)	2041 – 2060 Infrastructure Need (millions of 2010 dollars)	Total Period Infrastructure Need (millions of 2010 dollars)
Small	I and II	$15	$130	$42	$187
	III and IV	$240	$520	$120	$880
Medium	I and II	$100	$400	$120	$620
	III and IV	$590	$940	$350	$1,880
Large	I and II	$0.0	$0.0	$0.0	$0.0
	III and IV	$0.0	$0.0	$0.0	$0.0
Regional	VI	$0.0	$0.0	$0.0	$0.0
	VII	$1.9	$3.7	$3.7	$9.3
Total Costs		$946.9	$1,993.7	$635.7	$3,576.3

[A] Population based on 2060 projection (see *Appendix A* for more details on projections). Regional projects include all known category VI and VII projects by watershed.

[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems, Category VI includes stormwater management, and Category VII includes non source pollution control.

[C] Small differences in values may result from rounding.

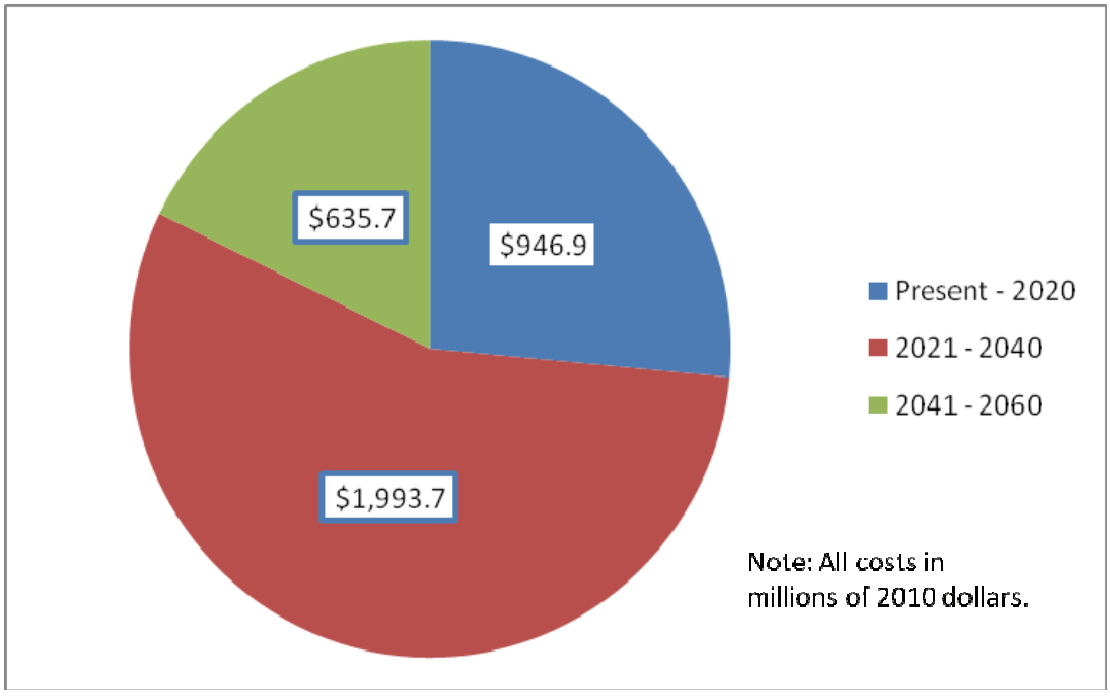


Figure 10-4. Lower Washita Region – Regional Costs over Time

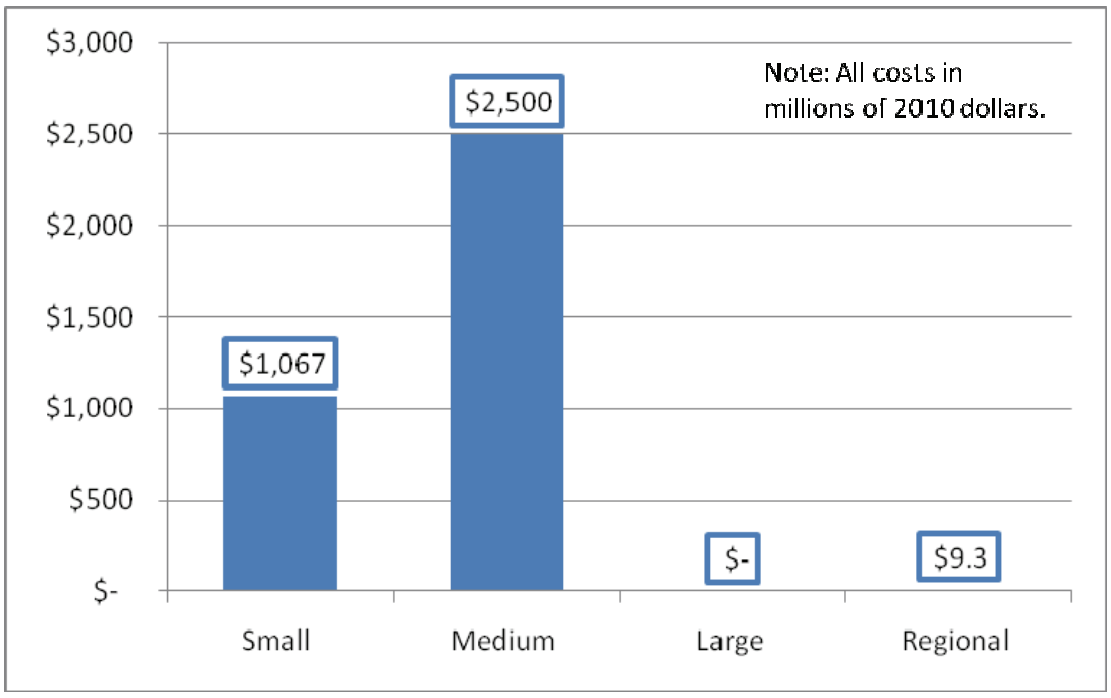


Figure 10-5. Lower Washita Region – Regional Costs by Stratum

Section 11
Middle Arkansas Regional Infrastructure Costs

This section provides some general information about the OCWP Middle Arkansas Watershed Planning Region and provides a cost summary for this region.

11.1 Middle Arkansas –Regional Description

The Middle Arkansas Region is a 5,173-square-mile area including all or portions of Osage, Washington, Nowata, Craig, Tulsa, Rogers, Creek, Okmulgee, Wagoner, Mayes, and Muskogee Counties. There are 42 wastewater utilities in this region included in this study. Table 11-1 shows the number of wastewater utilities in the Middle Arkansas Region by stratum.

Table 11-1. Middle Arkansas Region – Number of OCWP Wastewater Utilities by Stratum

Provider Size	Population[A]	Mechanical – Advanced[B, C]	Mechanical[B, C]	Lagoon – Advanced[B, C]	Lagoon[B, C]	Lagoon - Total Retention[B, C]	Total
Large	>100,000	1	0	0	0	0	1
Medium	3,301 – 100,000	4	6	2	7	0	19
Small	<3,300	1	1	0	18	2	22
Total		**6**	**7**	**2**	**25**	**2**	**42**

[A] Population classification was based on 2060 projection (see *Appendix A* for more details on projections).
[B] Only public utilities, associated with municipalities, were included in this study.
[C] Utilities may have more than one treatment facility. Treatment stratum is based on the most stringent facility treatment level.

11.2 Middle Arkansas – Regional Infrastructure Costs

Information about each of the wastewater utilities in the Middle Arkansas Region is included in Table 11-2.

Table 11-2. Middle Arkansas Region – OCWP Wastewater Utilities

Provider Name	County	Treatment Type[A]	Utility Size[B]	Were they selected for cost modeling?[C]
City of Jenks / Jenks PWA	Tulsa	Mechanical	Medium	No
Bixby PWA	Tulsa	Lagoon	Medium	Yes
Region Metropolitan Utility Authority (RMUA)	Tulsa	Mechanical	Medium	No
City of Sand Springs / Sand Springs Municipal Auth	Tulsa	Mechanical	Medium	No
City of Broken Arrow and Broken Arrow Municipal Authority	Tulsa	Mechanical	Medium	Yes
Town of Skiatook / Skiatook PWA	Tulsa	Lagoon	Medium	No
Wagoner County Rural Water & Sewer Dist. #4	Wagoner	Lagoon - Advanced	Medium	No

Table 11-2. Middle Arkansas Region – OCWP Wastewater Utilities (cont.)

Provider Name	County	Treatment Type [A]	Utility Size [B]	Were they selected for cost modeling? [C]
Wagoner PWA	Wagoner	Mechanical - Advanced	Medium	No
Avant Utilities Authority	Osage	Lagoon	Small	No
City of Barnsdall	Osage	Lagoon	Small	No
City of Bartlesville	Washington	Mechanical - Advanced	Medium	No
City of Delaware	Nowata	Lagoon	Small	No
City of Dewey	Washington	Mechanical	Medium	No
Town of Inola / Inola PWA	Rogers	Lagoon	Small	Yes
City of Hominy / Hominy PWA	Osage	Mechanical - Advanced	Medium	No
City of Kiefer / Kiefer PWA	Creek	Lagoon	Small	No
City of Nowata / Nowata Municipal Authority	Nowata	Mechanical	Medium	No
City of Pawhuska	Osage	Lagoon	Medium	No
City of Owasso / Owasso PWA	Tulsa	Mechanical - Advanced	Medium	Yes
Collinsville Municipal Authority	Tulsa	Lagoon	Medium	No
Coweta PWA	Wagoner	Lagoon	Medium	No
Glenpool Utility Service Authority	Tulsa	Lagoon	Medium	No
Haskell PWA	Muskogee	Lagoon	Small	No
Kellyville PWA	Creek	Lagoon	Small	No
Ochelata Utility Authority	Washington	Lagoon	Small	No
Okay PWA	Wagoner	Lagoon	Small	No
Oolagah PWA	Rogers	Mechanical - Advanced	Small	No
Porter PWA	Wagoner	Mechanical	Small	No
Ramona PWA	Washington	Lagoon	Small	No
Rogers County Rural Sewer District # 1	Rogers	Lagoon	Small	No
Town of Boynton	Muskogee	Lagoon	Small	No
Town of Catoosa / Regional Metropolitan Util Auth.	Rogers	Lagoon - Advanced	Medium	No
Town of Coffeyville, S	Nowata	Lagoon	Small	No
Town of Copan/Copan PWA	Washington	Lagoon	Small	No
Town of Mounds / Mounds PWA	Creek	Lagoon	Small	No
Town of Red Bird / Red Bird PWA	Wagoner	Lagoon - Total Retention	Small	No
Town of Sperry / Sperry Utility Service Authority	Tulsa	Lagoon	Small	No
Town of Talala / Talala PWA	Rogers	Lagoon	Small	No
Wynona Municipal Authority / Town of Wynona	Osage	Lagoon	Small	No
Tulsa Metropolitan Utility Authority	Tulsa	Mechanical - Advanced	Large	Yes
Sapulpa Municipal Authority	Creek	Lagoon	Medium	Yes
Timber Brook WWT	Tulsa	Lagoon - Total Retention	Small	No

[A] Utilities may have more than one treatment facility. Treatment stratum is based on the most stringent facility treatment level.
[B] Utility size classification is based on 2060 population projection (see *Appendix A* for more information on projections).
[C] Project lists for modeled utilities are included in Appendix D.

There is one large wastewater utility in the Middle Arkansas Region. **Table 11-3** presents the wastewater infrastructure costs through 2060 for the large utility stratum by infrastructure type. **Figure 11-1** illustrates the large provider stratum costs over time.

Table 11-3. Middle Arkansas Region – Large Wastewater Utilities Cost by Infrastructure Type

Period [A]	Wastewater Treatment - Categories I and II (millions of 2010 dollars) [B]	Wastewater Collection - Categories III and IV (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$78	$230	$308
2021 - 2040	$250	$410	$660
2041 - 2060	$210	$200	$410
Total	**$538**	**$840**	**$1,378**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems.

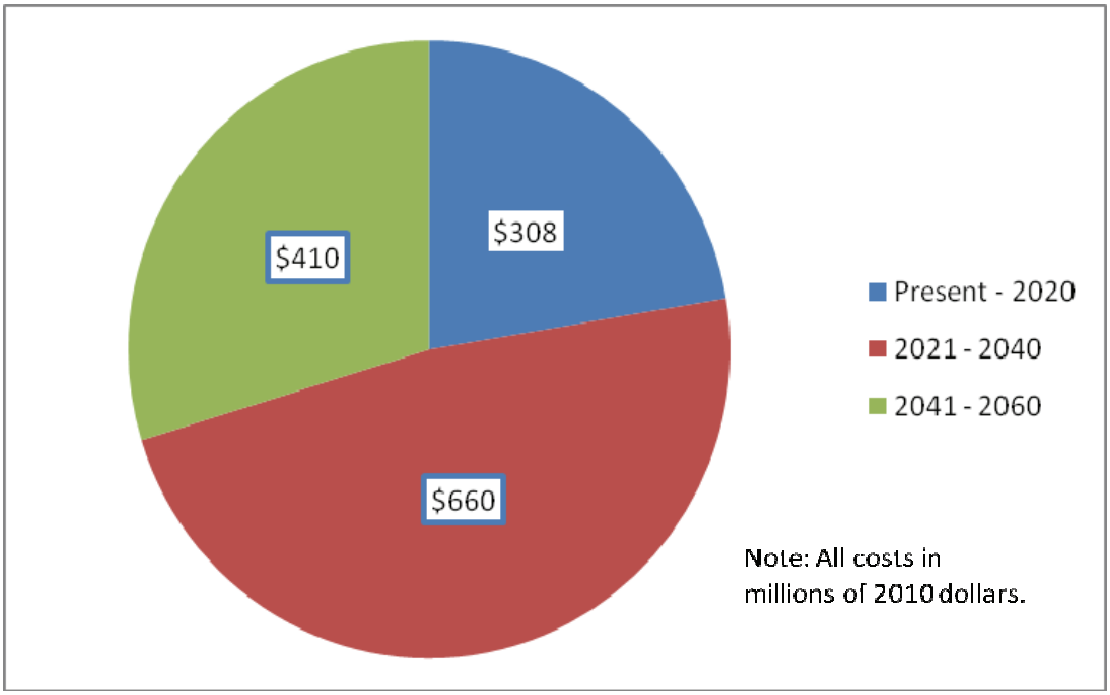


Figure 11-1. Middle Arkansas Region – Large Wastewater Utilities Costs over Time

There are 19 medium wastewater utilities in the Middle Arkansas Region. **Table 11-4** presents the wastewater infrastructure costs through 2060 for the medium utility stratum by infrastructure type. **Figure 11-2** illustrates the medium provider stratum costs over time.

Table 11-4. Middle Arkansas Region – Medium Wastewater Utilities Cost by Infrastructure Type

Period [A]	Wastewater Treatment - Categories I and II (millions of 2010 dollars) [B]	Wastewater Collection - Categories III and IV (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$140	$1,400	$1,540
2021 - 2040	$530	$1,400	$1,930
2041 - 2060	$110	$680	$790
Total	**$780**	**$3,480**	**$4,260**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems.

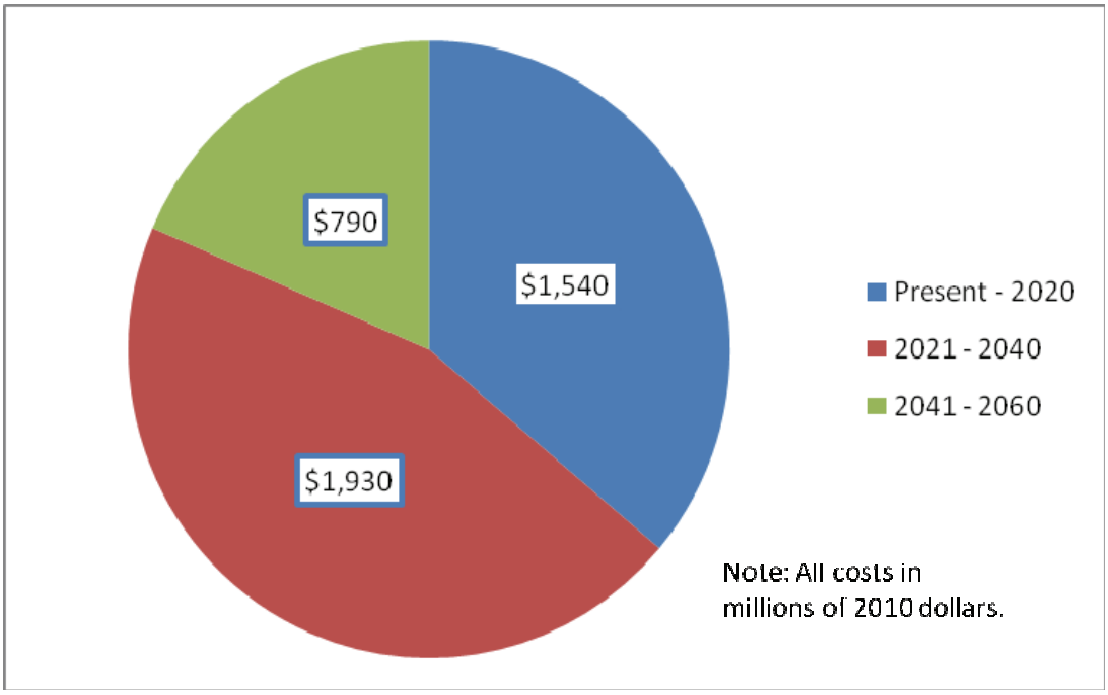


Figure 11-2. Middle Arkansas Region – Medium Wastewater Utilities Costs over Time

There are 22 small wastewater utilities in the Middle Arkansas Region. **Table 11-5** presents the wastewater infrastructure costs through 2060 for the small utility stratum by infrastructure type. **Figure 11-3** illustrates the small provider stratum costs over time.

Table 11-5. Middle Arkansas Region – Small Wastewater Utilities Cost by Infrastructure Type

Period [A]	Wastewater Treatment - Categories I and II (millions of 2010 dollars) [B]	Wastewater Collection - Categories III and IV (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$6	$52	$58
2021 - 2040	$96	$370	$466
2041 - 2060	$39	$75	$114
Total	**$141**	**$497**	**$638**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems.

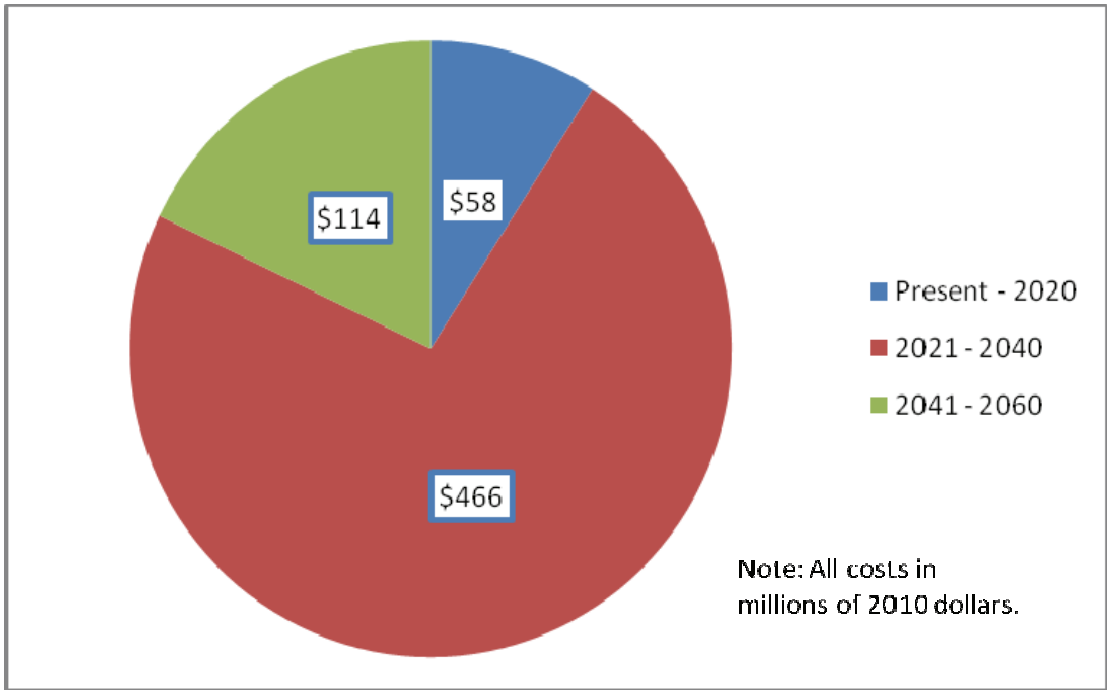


Figure 11-3. Middle Arkansas Region – Small Wastewater Utilities Costs over Time

One category VI project was identified in the Middle Arkansas Region. Three regional category VII projects were identified. The state, through other work, is currently developing Watershed Based Plans and/or TMDLs. This work will provide a better basis for estimating these needs. **Table 11-6** presents the regional wastewater infrastructure costs through 2060 by infrastructure type. **Figure 11-4** illustrates the regional project costs over time.

Table 11-6. Middle Arkansas Region – Regional Wastewater Project Cost by Infrastructure Type

Period [A]	Stormwater Management – Category VI (millions of 2010 dollars) [B]	Nonpoint Source Pollution Control – Category VII (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$190	$1.9	$191.9
2021 - 2040	$0.0	$3.7	$3.7
2041 - 2060	$0.0	$3.7	$3.7
Total	**$190.0**	**$9.3**	**$199.3**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category VI includes stormwater management, and Category VII includes non source pollution control.

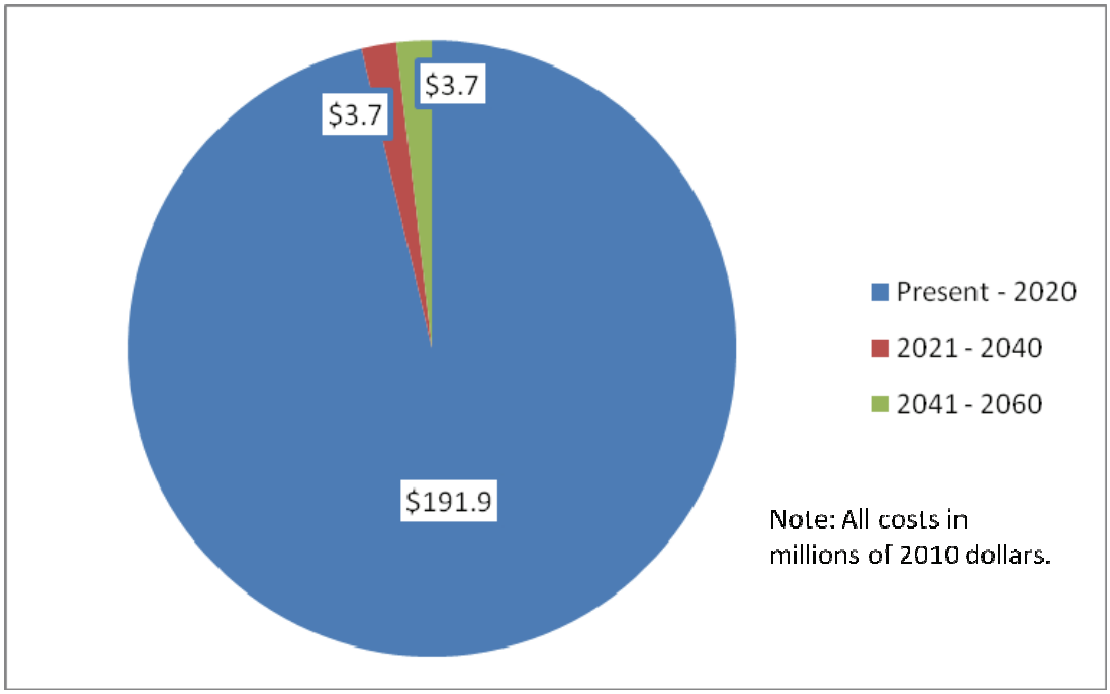


Figure 11-4. Middle Arkansas Region – Regional Wastewater Project Costs over Time

11.3 Middle Arkansas – Regional Cost Summary

This section summarizes the Middle Arkansas Region's wastewater infrastructure costs over the next 50 years. **Table 11-7** identifies costs by utility size and project period. All projects identified in this study were assumed to be CWSRF eligible. **Figure 11-5** illustrates the regional wastewater infrastructure costs over time. **Figure 11-6** illustrates the regional wastewater costs by stratum.

Table 11-7. Middle Arkansas Region – Wastewater Infrastructure Cost Summary by Category

Category [A, B]	Official Needs Category Group [B]	Present – 2020 Infrastructure Need (millions of 2010 dollars)	2021 – 2040 Infrastructure Need (millions of 2010 dollars)	2041 – 2060 Infrastructure Need (millions of 2010 dollars)	Total Period Infrastructure Need (millions of 2010 dollars)
Small	I and II	$5.5	$96	$39	$140.5
	III and IV	$52	$370	$75	$497
Medium	I and II	$140	$530	$110	$780
	III and IV	$1,400	$1,400	$680	$3,480
Large	I and II	$78	$250	$210	$538
	III and IV	$230	$410	$200	$840
Regional	VI	$190	$0.0	$0.0	$190
	VII	$1.9	$3.7	$3.7	$9.3
Total Costs		$2,097.4	$3,059.7	$1,317.7	$6,474.8

[A] Population based on 2060 projection (see *Appendix A* for more details on projections). Regional projects include all known category VI and VII projects by watershed.

[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems, Category VI includes stormwater management, and Category VII includes non source pollution control.

[C] Small differences in values may result from rounding.

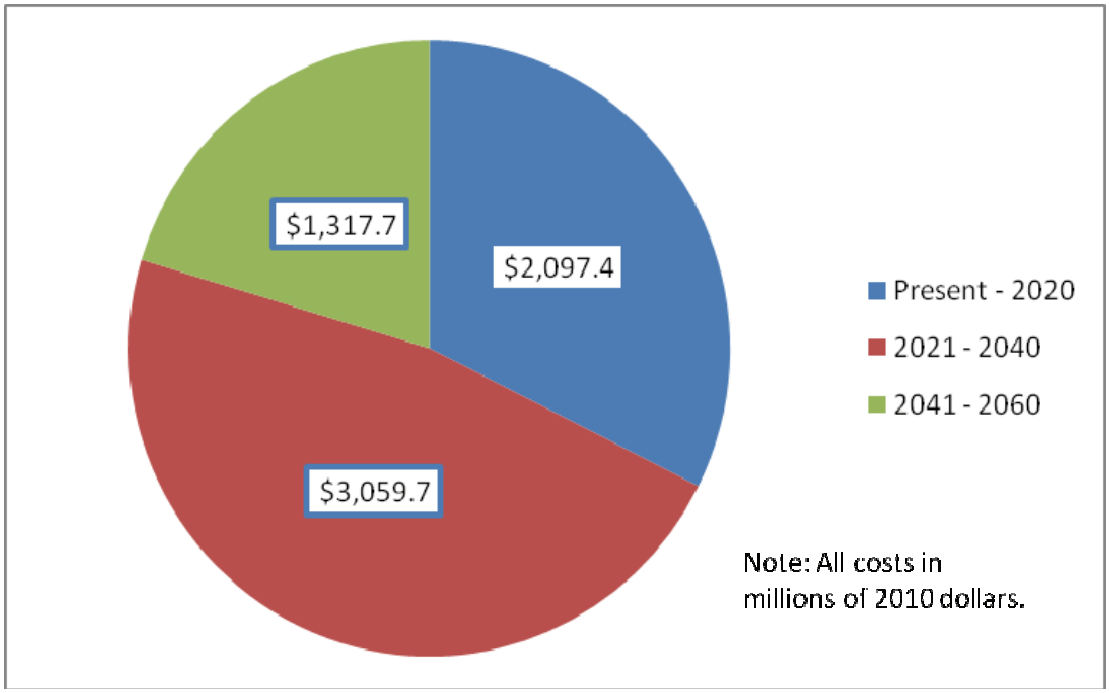


Figure 11-5. Middle Arkansas Region – Regional Costs over Time

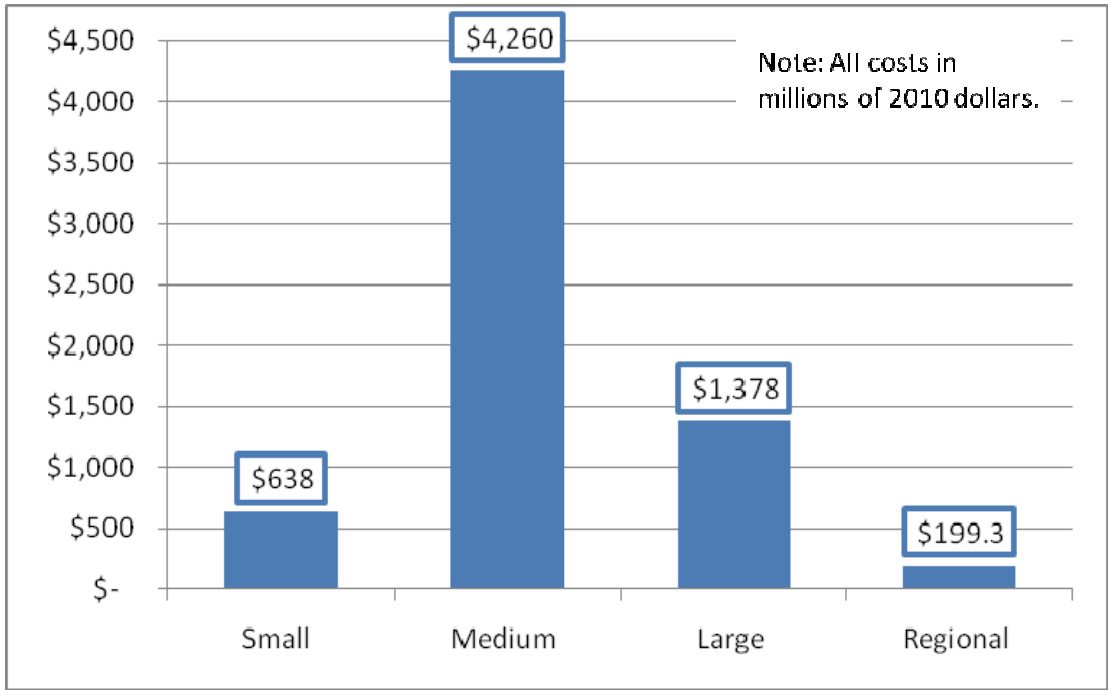


Figure 11-6. Middle Arkansas Region – Regional Costs by Stratum

Section 12
Panhandle Regional Infrastructure Costs

This section provides some general information about the OCWP Panhandle Watershed Planning Region and provides a cost summary for this region.

12.1 Panhandle –Regional Description

The Panhandle Region is a 9,426-square-mile area including all or portions of Cimarron, Texas, Beaver, Harper, Woods, Ellis, Woodward, Dewey, Major, and Blaine Counties. There are 27 wastewater utilities in this region included in this study. Table 12-1 shows the number of wastewater utilities in the Panhandle Region by stratum.

Table 12-1. Panhandle Region – Number of OCWP Wastewater Utilities by Stratum

Provider Size	Population[A]	Mechanical – Advanced [B, C]	Mechanical [B, C]	Lagoon – Advanced [B, C]	Lagoon [B, C]	Lagoon - Total Retention [B, C]	Total
Large	>100,000	0	0	0	0	0	0
Medium	3,301 – 100,000	1	0	0	1	1	3
Small	<3,300	0	1	0	7	16	24
Total		**1**	**1**	**0**	**8**	**17**	**27**

[A] Population classification was based on 2060 projection (see *Appendix A* for more details on projections).
[B] Only public utilities, associated with municipalities, were included in this study.
[C] Utilities may have more than one treatment facility. Treatment stratum is based on the most stringent facility treatment level.

12.2 Panhandle – Regional Infrastructure Costs

Information about each of the wastewater utilities in the Panhandle Region is included in Table 12-2.

Table 12-2. Panhandle Region – OCWP Wastewater Utilities

Provider Name	County	Treatment Type [A]	Utility Size [B]	Were they selected for cost modeling? [C]
Town of Beaver	Beaver	Lagoon	Small	Yes
Beaver Co Rwd #2	Beaver	Lagoon	Small	No
City of Boise City	Cimarron	Lagoon - Total Retention	Small	No
City of Hardesty	Texas	Lagoon - Total Retention	Small	No
City of Waynoka	Woods	Lagoon	Small	No
City of Woodward / Woodward Municipal Authority	Woodward	Mechanical - Advanced	Medium	No
City of Shattuck / Shattuck Municipal Authority	Ellis	Lagoon - Total Retention	Small	Yes
Town of Buffalo	Harper	Lagoon	Small	No
Town of Forgan	Beaver	Lagoon - Total Retention	Small	No
Town of Fort Supply	Woodward	Lagoon	Small	No

Table 12-2. Panhandle Region – OCWP Wastewater Utilities (cont.)

Provider Name	County	Treatment Type [A]	Utility Size [B]	Were they selected for cost modeling? [C]
Town of Gage	Ellis	Lagoon	Small	No
City of Hooker	Texas	Lagoon - Total Retention	Medium	No
Town of Keyes	Cimarron	Lagoon - Total Retention	Small	No
Town of Laverne	Harper	Lagoon	Small	No
Town of Mooreland	Woodward	Lagoon - Total Retention	Small	No
City of Seiling or PWA	Dewey	Lagoon - Total Retention	Small	No
Town of Texhoma / Texhoma PWA	Texas	Mechanical	Small	No
Town of Vici	Dewey	Lagoon - Total Retention	Small	No
Guymon / Guymon Utility Authority	Texas	Lagoon	Medium	Yes
Beaver Co Rsd # 1 WWT	Beaver	Lagoon - Total Retention	Small	No
Fargo WWT	Ellis	Lagoon - Total Retention	Small	No
Freedom WWT	Woods	Lagoon - Total Retention	Small	No
Sharon WWT	Woodward	Lagoon - Total Retention	Small	No
Texas Co Rsd #1 (Adams) WWT	Texas	Lagoon - Total Retention	Small	No
Hardesty Utilities	Texas	Lagoon - Total Retention	Small	No
Blanchard WWT	Woods	Lagoon - Total Retention	Small	No
Bowlegs WWT	Woodward	Lagoon - Total Retention	Small	No

[A] Utilities may have more than one treatment facility. Treatment stratum is based on the most stringent facility treatment level.
[B] Utility size classification is based on 2060 population projection (see *Appendix A* for more information on projections).
[C] Project lists for modeled utilities are included in Appendix D.

There are no large wastewater utilities in the Panhandle Region.

There are three medium wastewater utilities in the Panhandle Region. **Table 12-3** presents the wastewater infrastructure costs through 2060 for the medium utility stratum by infrastructure type. **Figure 12-1** illustrates the medium provider stratum costs over time.

Table 12-3. Panhandle Region – Medium Wastewater Utilities Cost by Infrastructure Type

Period [A]	Wastewater Treatment - Categories I and II (millions of 2010 dollars) [B]	Wastewater Collection - Categories III and IV (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$34	$220	$254
2021 - 2040	$52	$250	$302
2041 - 2060	$25	$110	$135
Total	**$111**	**$580**	**$691**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems.

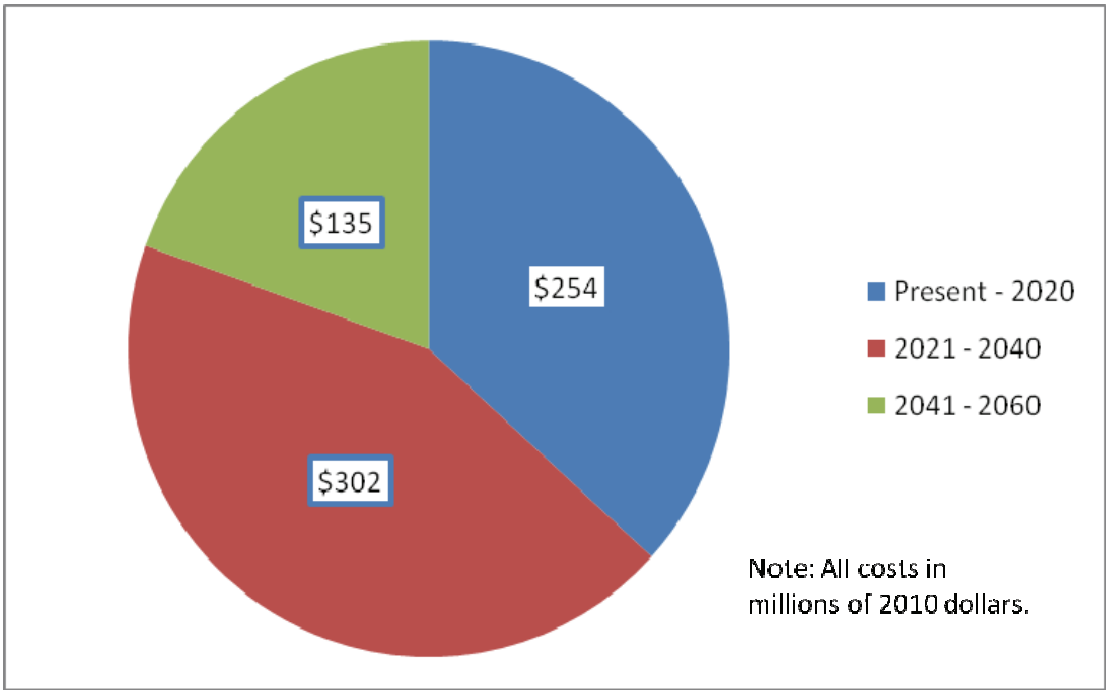


Figure 12-1. Panhandle Region – Medium Wastewater Utilities Costs over Time

There are 24 small wastewater utilities in the Panhandle Region. **Table 12-4** presents the wastewater infrastructure costs through 2060 for the small utility stratum by infrastructure type. **Figure 12-2** illustrates the small provider stratum costs over time.

Table 12-4. Panhandle Region – Small Wastewater Utilities Cost by Infrastructure Type

Period [A]	Wastewater Treatment - Categories I and II (millions of 2010 dollars) [B]	Wastewater Collection - Categories III and IV (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$15	$230	$245
2021 - 2040	$81	$300	$381
2041 - 2060	$25	$75	$100
Total	**$121**	**$605**	**$726**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems.

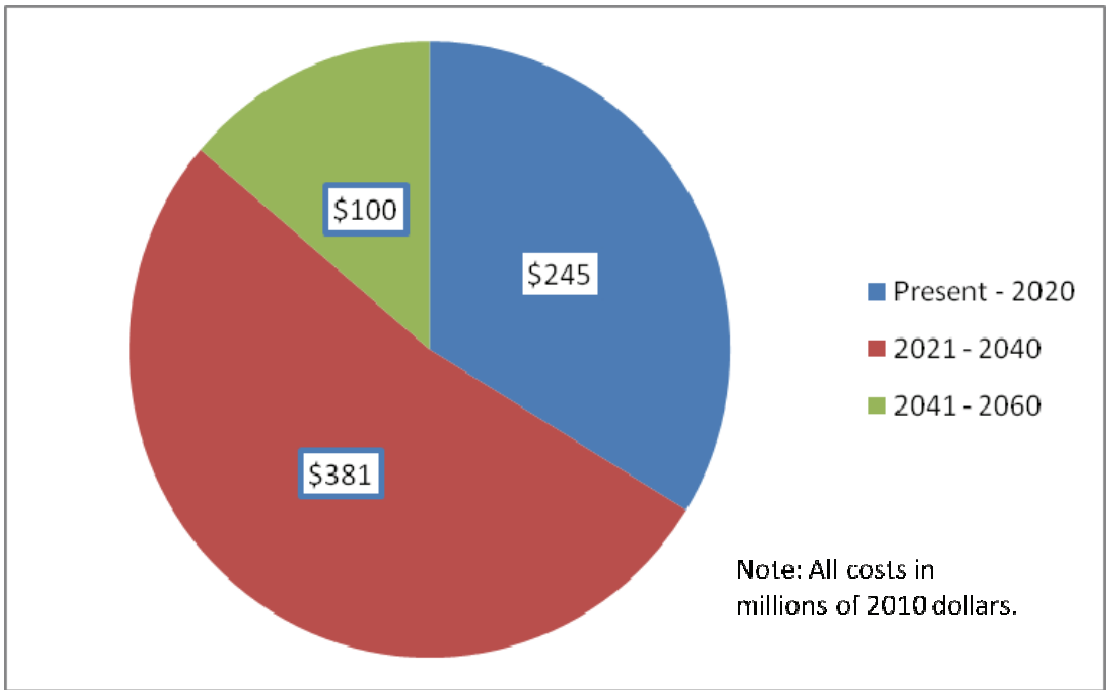


Figure 12-2. Panhandle Region – Small Wastewater Utilities Costs over Time

No category VI projects were identified in the Panhandle Region. Three regional category VII projects were identified. The state, through other work, is currently developing Watershed Based Plans and/or TMDLs. This work will provide a better basis for estimating these needs. **Table 12-5** presents the regional wastewater infrastructure costs through 2060 by infrastructure type. **Figure 12-3** illustrates the regional project costs over time.

Table 12-5. Panhandle Region – Regional Wastewater Project Cost by Infrastructure Type

Period [A]	Stormwater Management – Category VI (millions of 2010 dollars) [B]	Nonpoint Source Pollution Control – Category VII (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$0.0	$1.9	$1.9
2021 - 2040	$0.0	$3.7	$3.7
2041 - 2060	$0.0	$3.7	$3.7
Total	**$0.0**	**$9.3**	**$9.3**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category VI includes stormwater management, and Category VII includes non source pollution control.

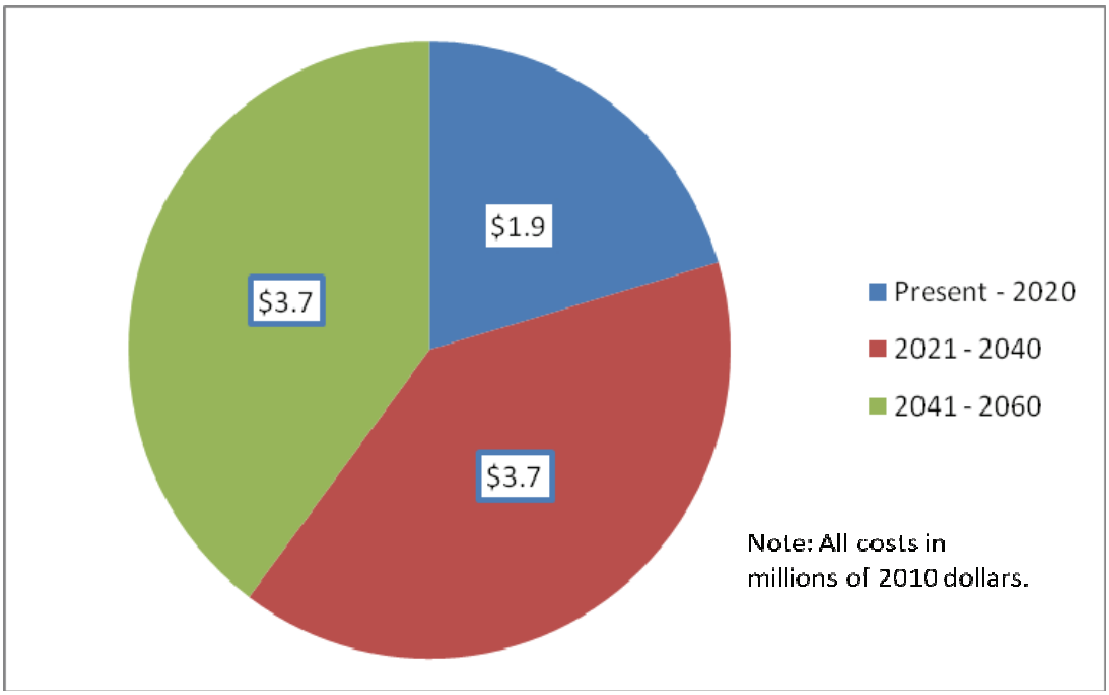


Figure 12-3. Panhandle Region – Regional Wastewater Project Costs over Time

12.3 Panhandle – Regional Cost Summary

This section summarizes the Panhandle Region's wastewater infrastructure costs over the next 50 years. **Table 12-6** identifies costs by utility size and project period. All projects identified in this study were assumed to be CWSRF eligible. **Figure 12-4** illustrates the regional wastewater infrastructure costs over time. **Figure 12-5** illustrates the regional wastewater costs by stratum.

Table 12-6. Panhandle Region – Wastewater Infrastructure Cost Summary by Category

Category [A, B]	Official Needs Category Group [B]	Present – 2020 Infrastructure Need (millions of 2010 dollars)	2021 – 2040 Infrastructure Need (millions of 2010 dollars)	2041 – 2060 Infrastructure Need (millions of 2010 dollars)	Total Period Infrastructure Need (millions of 2010 dollars)
Small	I and II	$15	$81	$25	$121
	III and IV	$230	$300	$75	$605
Medium	I and II	$34	$52	$25	$111
	III and IV	$220	$250	$110	$580
Large	I and II	$0.0	$0.0	$0.0	$0.0
	III and IV	$0.0	$0.0	$0.0	$0.0
Regional	VI	$0.0	$0.0	$0.0	$0.0
	VII	$1.9	$3.7	$3.7	$9.3
Total Costs		$500.9	$686.7	$238.7	$1,426.3

[A] Population based on 2060 projection (see *Appendix A* for more details on projections). Regional projects include all known category VI and VII projects by watershed.

[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems, Category VI includes stormwater management, and Category VII includes non source pollution control.

[C] Small differences in values may result from rounding.

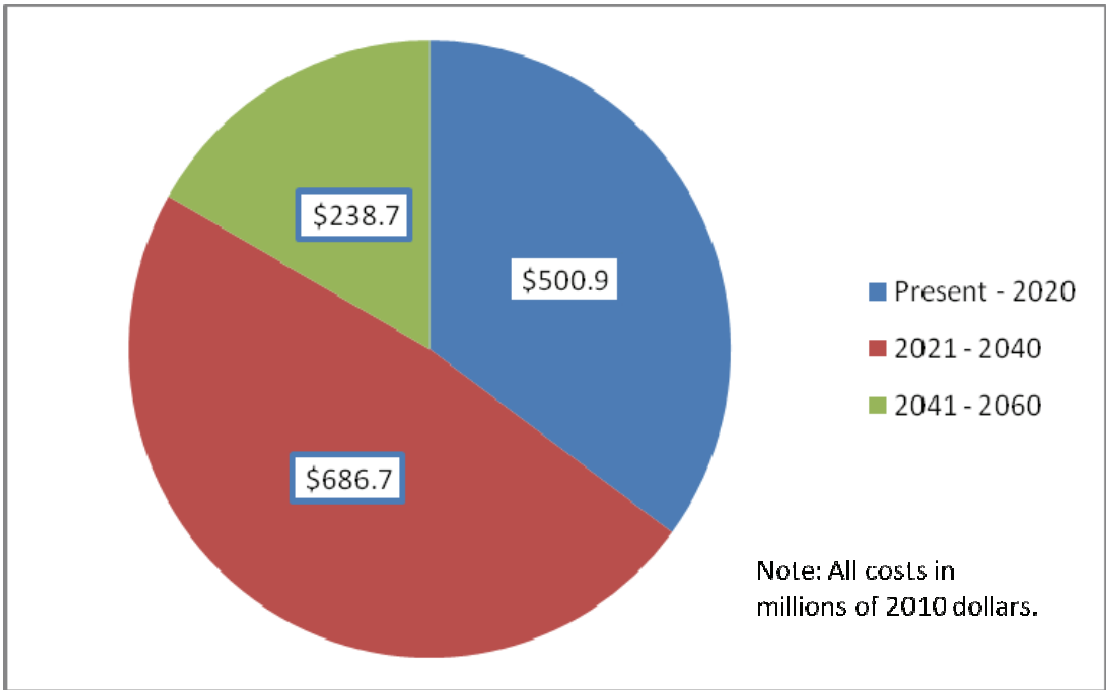


Figure 12-4. Panhandle Region – Regional Costs over Time

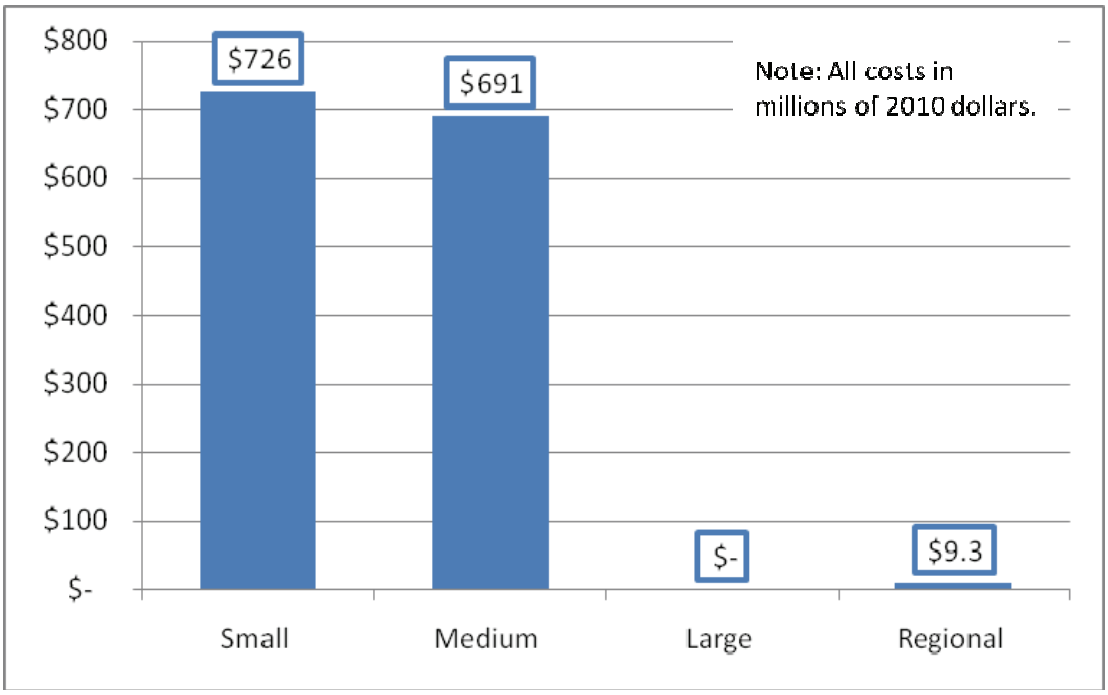


Figure 12-5. Panhandle Region – Regional Costs by Stratum

Section 13
Southeast Regional Infrastructure Costs

This section provides some general information about the OCWP Southeast Watershed Planning Region and provides a cost summary for this region.

13.1 Southeast –Regional Description

The Southeast Region is a 4,437-square-mile area including all or portions of Pittsburg, Latimer, LeFlore, Atoka, Pushmataha, McCurtain, and Choctaw Counties. There are nine wastewater utilities in this region included in this study. Table 13-1 shows the number of wastewater utilities in the Southeast Region by stratum.

Table 13-1. Southeast Region – Number of OCWP Wastewater Utilities by Stratum

Provider Size	Population[A]	Mechanical – Advanced [B, C]	Mechanical [B, C]	Lagoon – Advanced [B, C]	Lagoon [B, C]	Lagoon - Total Retention [B, C]	Total
Large	>100,000	0	0	0	0	0	0
Medium	3,301 – 100,000	3	1	0	0	0	4
Small	<3,300	1	0	0	4	0	5
Total		**4**	**1**	**0**	**4**	**0**	**9**

[A] Population classification was based on 2060 projection (see *Appendix A* for more details on projections).
[B] Only public utilities, associated with municipalities, were included in this study.
[C] Utilities may have more than one treatment facility. Treatment stratum is based on the most stringent facility treatment level.

13.2 Southeast – Regional Infrastructure Costs

Information about each of the wastewater utilities in the Southeast Region is included in Table 13-2.

Table 13-2. Southeast Region – OCWP Wastewater Utilities

Provider Name	County	Treatment Type [A]	Utility Size [B]	Were they selected for cost modeling? [C]
Hugo Municipal Authority	Choctaw	Mechanical	Medium	No
Broken Bow PWA	McCurtain	Mechanical - Advanced	Medium	No
City of Idabel	McCurtain	Mechanical - Advanced	Medium	No
City of Valliant / Valliant PWA	McCurtain	Lagoon	Small	No
Clayton PWA	Pushmataha	Lagoon	Small	No
Millerton PWA	McCurtain	Lagoon	Small	No
Town of Antler / Antlers PWA	Pushmataha	Mechanical - Advanced	Medium	No
Town of Tahilina / Tahilina PWA	Leflore	Lagoon	Small	No
Wright City PWA	McCurtain	Mechanical - Advanced	Small	No

[A] Utilities may have more than one treatment facility. Treatment stratum is based on the most stringent facility treatment level.
[B] Utility size classification is based on 2060 population projection (see *Appendix A* for more information on projections).
[C] Project lists for modeled utilities are included in Appendix D.

There are no large wastewater utilities in the Southeast Region.

There are four medium wastewater utilities in the Southeast Region. **Table 13-3** presents the wastewater infrastructure costs through 2060 for the medium utility stratum by infrastructure type. **Figure 13-1** illustrates the medium provider stratum costs over time.

Table 13-3. Southeast Region – Medium Wastewater Utilities Cost by Infrastructure Type

Period [A]	Wastewater Treatment - Categories I and II (millions of 2010 dollars) [B]	Wastewater Collection - Categories III and IV (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$53	$210	$263
2021 - 2040	$160	$380	$540
2041 - 2060	$70	$140	$210
Total	**$283**	**$730**	**$1,013**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems.

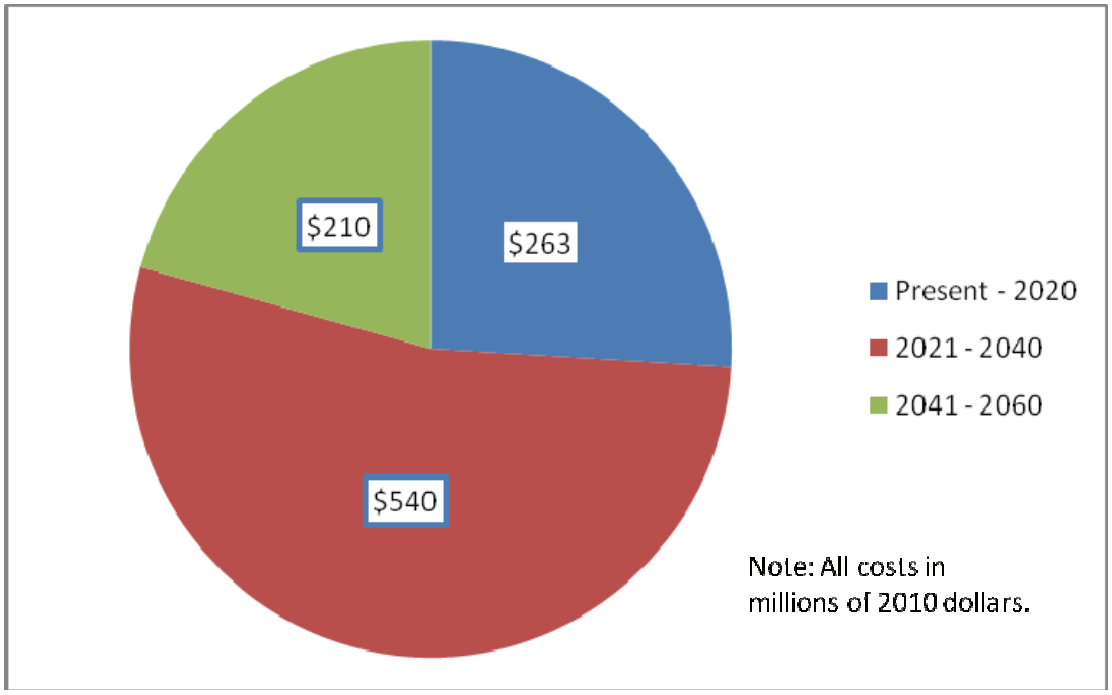


Figure 13-1. Southeast Region – Medium Wastewater Utilities Costs over Time

There are five small wastewater utilities in the Southeast Region. **Table 13-4** presents the wastewater infrastructure costs through 2060 for the small utility stratum by infrastructure type. **Figure 13-2** illustrates the small provider stratum costs over time.

Table 13-4. Southeast Region – Small Wastewater Utilities Cost by Infrastructure Type

Period [A]	Wastewater Treatment - Categories I and II (millions of 2010 dollars) [B]	Wastewater Collection - Categories III and IV (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$4	$7	$11
2021 - 2040	$24	$77	$101
2041 - 2060	$16	$16	$32
Total	**$44**	**$100**	**$144**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems.

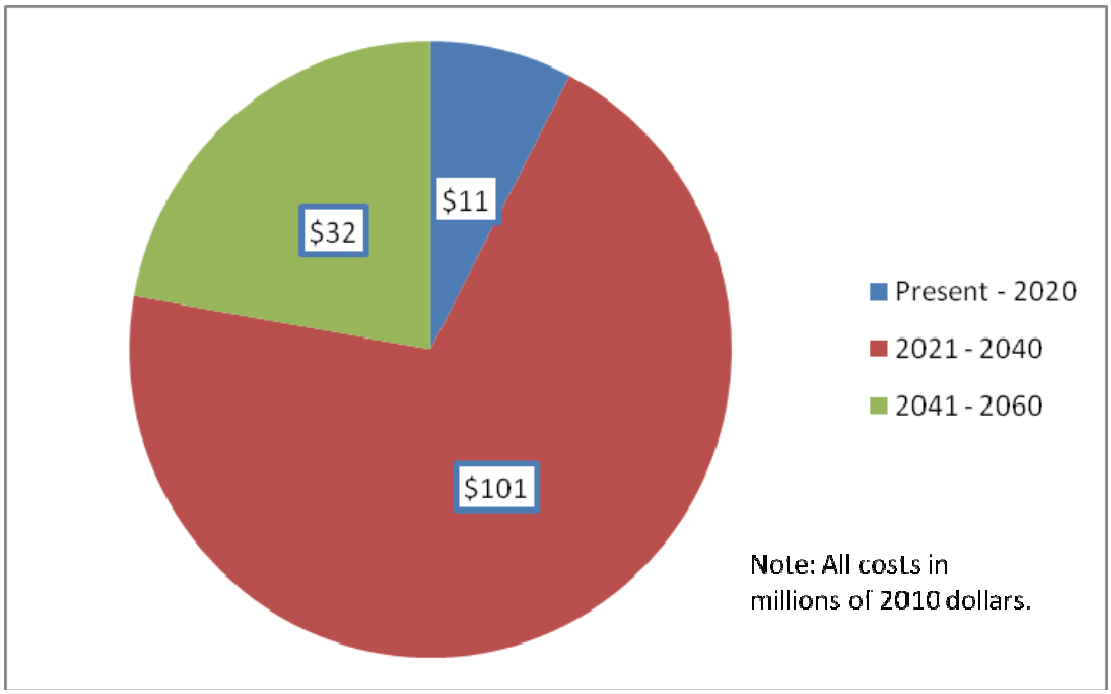


Figure 13-2. Southeast Region – Small Wastewater Utilities Costs over Time

No category VI projects were identified in the Southeast Region. Three regional category VII projects were identified. The state, through other work, is currently developing Watershed Based Plans and/or TMDLs. This work will provide a better basis for estimating these needs. **Table 13-5** presents the regional wastewater infrastructure costs through 2060 by infrastructure type. **Figure 13-3** illustrates the regional project costs over time.

Table 13-5. Southeast Region – Regional Wastewater Project Cost by Infrastructure Type

Period [A]	Stormwater Management – Category VI (millions of 2010 dollars) [B]	Nonpoint Source Pollution Control – Category VII (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$0.0	$1.9	$1.9
2021 - 2040	$0.0	$3.7	$3.7
2041 - 2060	$0.0	$3.7	$3.7
Total	**$0.0**	**$9.3**	**$9.3**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category VI includes stormwater management, and Category VII includes non source pollution control.

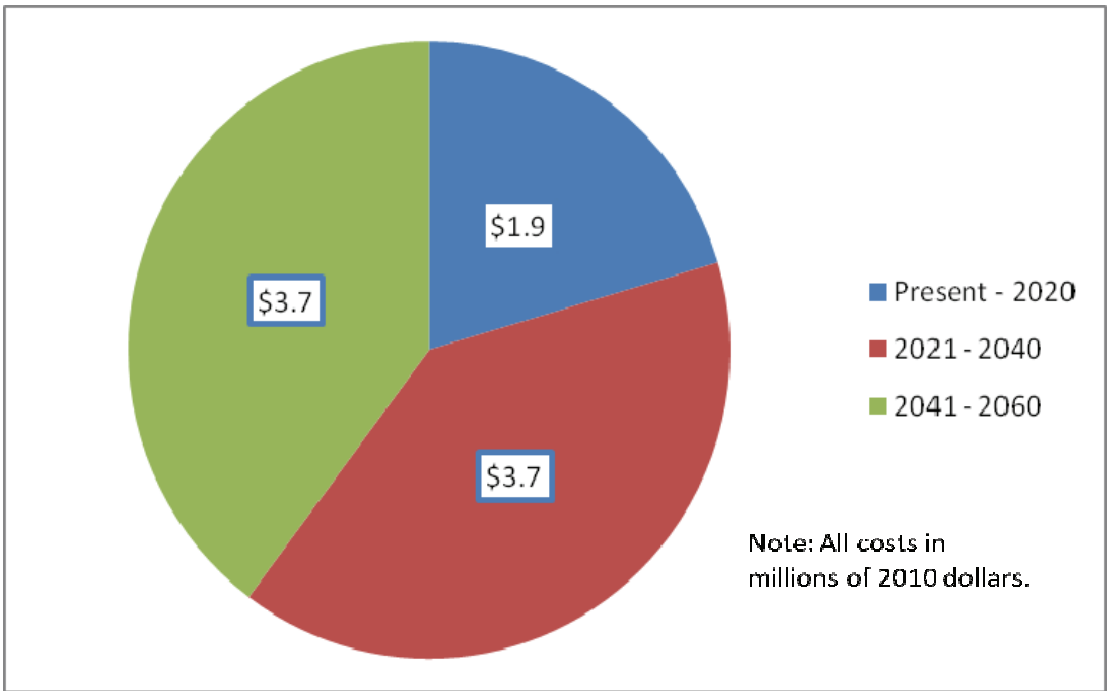


Figure 13-3. Southeast Region – Regional Wastewater Project Costs over Time

13.3 Southeast – Regional Cost Summary

This section summarizes the Southeast Region's wastewater infrastructure costs over the next 50 years. **Table 13-6** identifies costs by utility size and project period. All projects identified in this study were assumed to be CWSRF eligible. **Figure 13-4** illustrates the regional wastewater infrastructure costs over time. **Figure 13-5** illustrates the regional wastewater costs by stratum.

Table 13-6. Southeast Region – Wastewater Infrastructure Cost Summary by Category

Category [A, B]	Official Needs Category Group [B]	Present – 2020 Infrastructure Need (millions of 2010 dollars)	2021 – 2040 Infrastructure Need (millions of 2010 dollars)	2041 – 2060 Infrastructure Need (millions of 2010 dollars)	Total Period Infrastructure Need (millions of 2010 dollars)
Small	I and II	$4	$24	$16	$44
	III and IV	$7	$77	$16	$100
Medium	I and II	$53	$160	$70	$283
	III and IV	$210	$380	$140	$730
Large	I and II	$0.0	$0.0	$0.0	$0.0
	III and IV	$0.0	$0.0	$0.0	$0.0
Regional	VI	$0.0	$0.0	$0.0	$0.0
	VII	$1.9	$3.7	$3.7	$9.3
Total Costs		$275.9	$644.7	$245.7	$1,166.3

[A] Population based on 2060 projection (see *Appendix A* for more details on projections). Regional projects include all known category VI and VII projects by watershed.

[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems, Category VI includes stormwater management, and Category VII includes non source pollution control.

[C] Small differences in values may result from rounding.

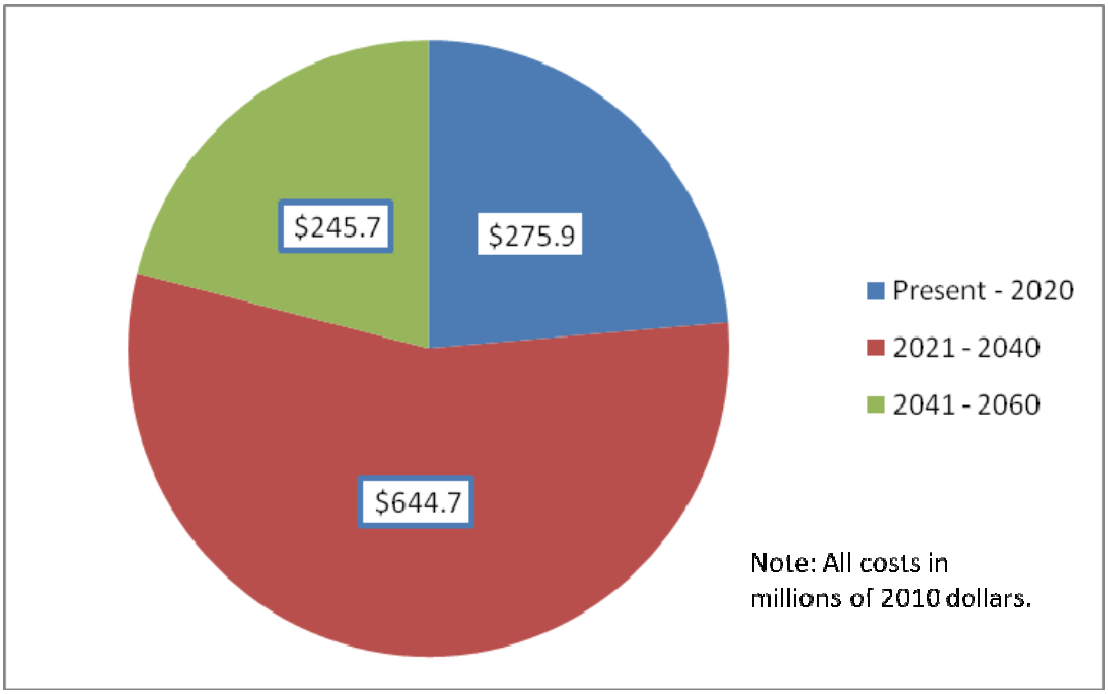


Figure 13-4. Southeast Region – Regional Costs over Time

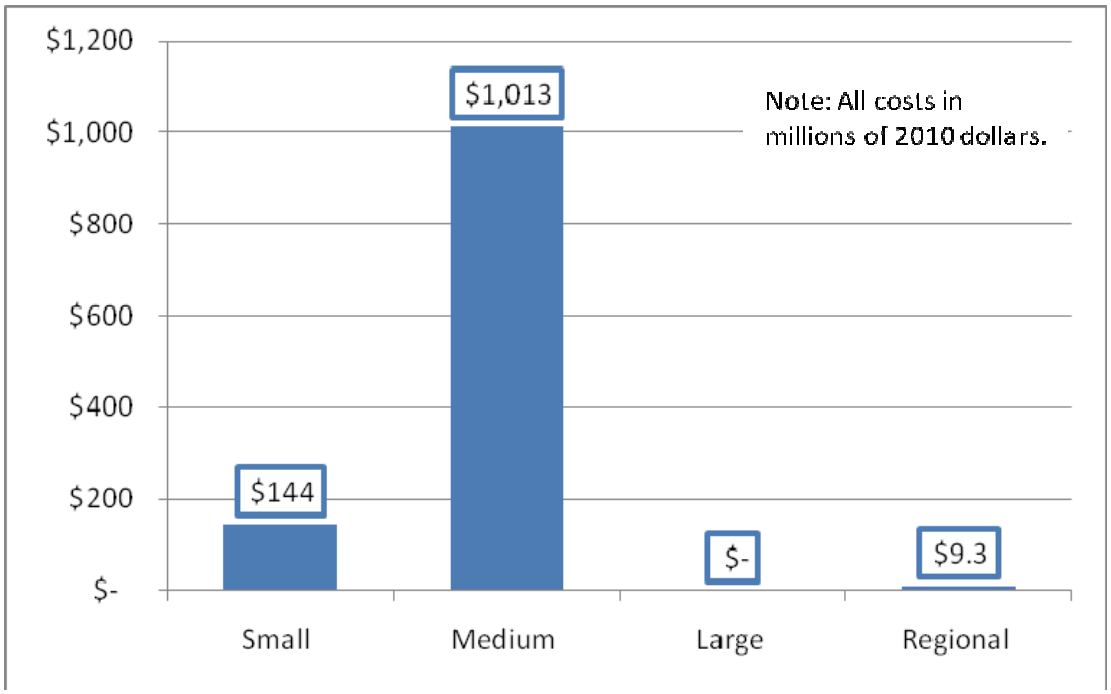


Figure 13-5. Southeast Region – Regional Costs by Stratum

Section 14
Southwest Regional Infrastructure Costs

This section provides some general information about the OCWP Southwest Watershed Planning Region and provides a cost summary for this region.

14.1 Southwest –Regional Description

The Southwest Region is a 4,045-square-mile area including all or portions of Roger Mills, Beckham, Washita, Harmon, Greer, Kiowa, Jackson, Tillman, and Comanche Counties. There are 30 wastewater utilities in this region included in this study. Table 14-1 shows the number of wastewater utilities in the Southwest Region by stratum.

Table 14-1. Southwest Region – Number of OCWP Wastewater Utilities by Stratum

Provider Size	Population[A]	Mechanical – Advanced [B, C]	Mechanical [B, C]	Lagoon – Advanced [B, C]	Lagoon [B, C]	Lagoon - Total Retention [B, C]	Total
Large	>100,000	0	0	0	0	0	0
Medium	3,301 – 100,000	3	1	1	0	0	5
Small	<3,300	0	0	0	12	13	25
Total		**3**	**1**	**1**	**12**	**13**	**30**

[A] Population classification was based on 2060 projection (see *Appendix A* for more details on projections).
[B] Only public utilities, associated with municipalities, were included in this study.
[C] Utilities may have more than one treatment facility. Treatment stratum is based on the most stringent facility treatment level.

14.2 Southwest – Regional Infrastructure Costs

Information about each of the wastewater utilities in the Southwest Region is included in Table 14-2.

Table 14-2. Southwest Region – OCWP Wastewater Utilities

Provider Name	County	Treatment Type [A]	Utility Size [B]	Were they selected for cost modeling? [C]
City of Altus	Jackson	Mechanical - Advanced	Medium	No
City of Ada / Ada PWA	Pontotoc	Mechanical - Advanced	Medium	No
Hobart PWA	Kiowa	Lagoon - Advanced	Medium	Yes
City of Erick	Beckham	Lagoon	Small	No
City of Hollis	Harmon	Lagoon	Small	No
City of Mangum	Greer	Lagoon	Small	No
City of Sayre	Beckham	Mechanical	Medium	No
Town of Duke	Jackson	Lagoon	Small	No
Town of Wayne	McClain	Lagoon	Small	No
Town of Blair / Blair PWA	Jackson	Lagoon - Total Retention	Small	No
Town of Carter	Beckham	Lagoon - Total Retention	Small	No
City of Elk City	Beckham	Mechanical - Advanced	Medium	No
City of Lone Wolf / Lone Wolf PWA	Kiowa	Lagoon	Small	No

Table 14-2. Southwest Region – OCWP Wastewater Utilities (cont.)

Provider Name	County	Treatment Type [A]	Utility Size [B]	Were they selected for cost modeling? [C]
Town of Mountain Park	Kiowa	Lagoon	Small	No
Town of Rocky	Washita	Lagoon	Small	No
City of Roosevelt / Roosevelt PWA	Kiowa	Lagoon	Small	No
Town of Sentinel PWA	Washita	Lagoon - Total Retention	Small	No
City of Snyder / Snyder PWA	Kiowa	Lagoon	Small	No
Town of Tipton / Tipton PWA	Tillman	Lagoon	Small	No
City of Willow / Willow Municipal Authority	Greer	Lagoon	Small	No
Burns Flat-North Lagoon	Washita	Lagoon - Total Retention	Small	No
Dill City WWT	Washita	Lagoon - Total Retention	Small	No
Gould WWT	Harmon	Lagoon - Total Retention	Small	No
Headrick WWT	Jackson	Lagoon - Total Retention	Small	No
Kiowa Co Rws and Swmd #1 WWT	Kiowa	Lagoon - Total Retention	Small	No
Martha WWT	Jackson	Lagoon - Total Retention	Small	No
Olustee WWT	Jackson	Lagoon - Total Retention	Small	No
Snyder WWT	Kiowa	Lagoon - Total Retention	Small	No
Geronimo South WWT	Washita	Lagoon - Total Retention	Small	No
Morrison South WWT	Washita	Lagoon - Total Retention	Small	No

[A] Utilities may have more than one treatment facility. Treatment stratum is based on the most stringent facility treatment level.
[B] Utility size classification is based on 2060 population projection (see *Appendix A* for more information on projections).
[C] Project lists for modeled utilities are included in Appendix D.

There are no large wastewater utilities in the Southwest Region.

There are five medium wastewater utilities in the Southwest Region. **Table 14-3** presents the wastewater infrastructure costs through 2060 for the medium utility stratum by infrastructure type. **Figure 14-1** illustrates the medium provider stratum costs over time.

Table 14-3. Southwest Region – Medium Wastewater Utilities Cost by Infrastructure Type

Period [A]	Wastewater Treatment - Categories I and II (millions of 2010 dollars) [B]	Wastewater Collection - Categories III and IV (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$53	$230	$283
2021 - 2040	$180	$390	$570
2041 - 2060	$70	$140	$210
Total	**$303**	**$760**	**$1,063**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems.

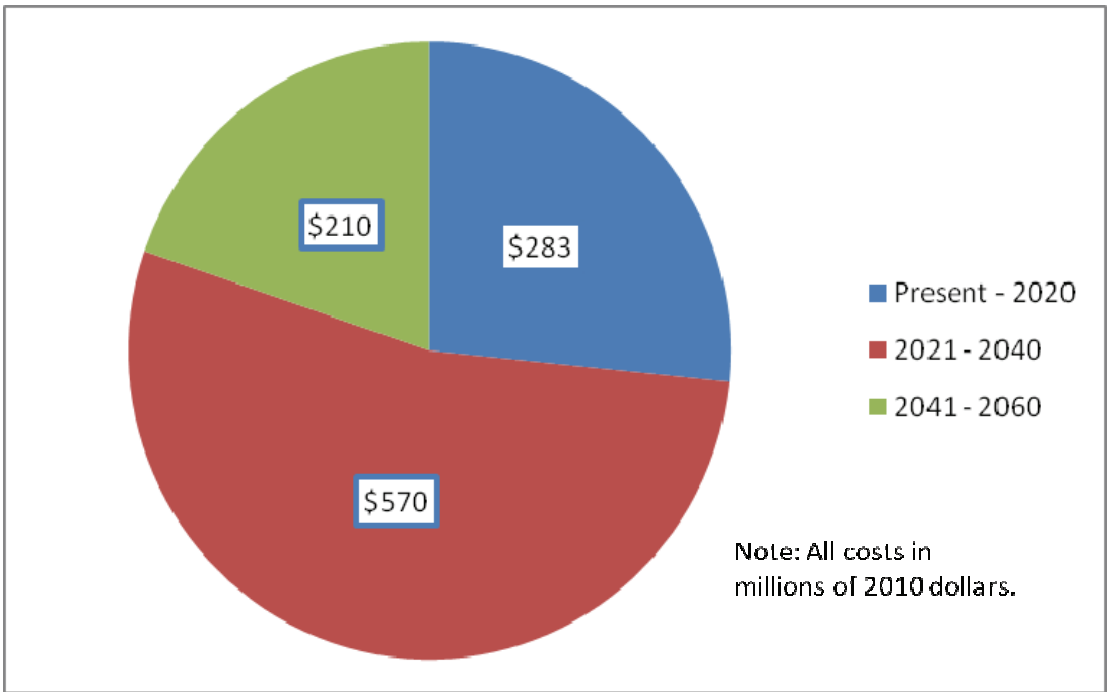


Figure 14-1. Southwest Region – Medium Wastewater Utilities Costs over Time

There are 25 small wastewater utilities in the Southwest Region. **Table 14-4** presents the wastewater infrastructure costs through 2060 for the small utility stratum by infrastructure type. **Figure 14-2** illustrates the small provider stratum costs over time.

Table 14-4. Southwest Region – Small Wastewater Utilities Cost by Infrastructure Type

Period [A]	Wastewater Treatment - Categories I and II (millions of 2010 dollars) [B]	Wastewater Collection - Categories III and IV (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$12	$180	$192
2021 - 2040	$93	$350	$443
2041 - 2060	$30	$81	$111
Total	**$135**	**$611**	**$746**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems.

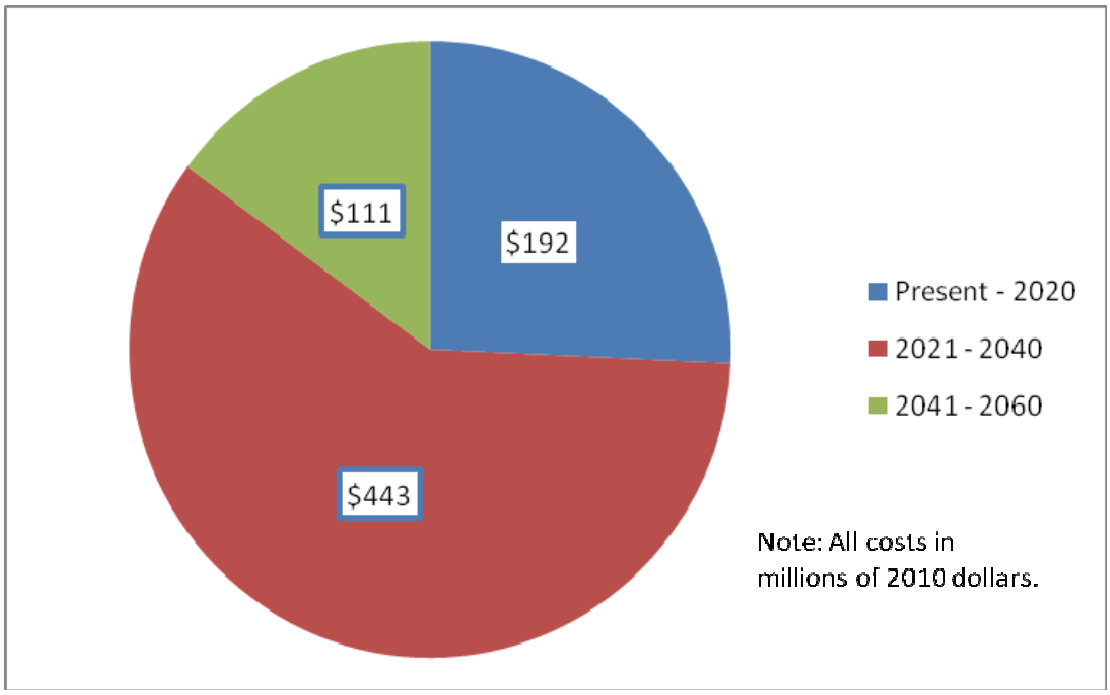


Figure 14-2. Southwest Region – Small Wastewater Utilities Costs over Time

No category VI projects were identified in the Southwest Region. Four regional category VII projects were identified. The state, through other work, is currently developing Watershed Based Plans and/or TMDLs. This work will provide a better basis for estimating these needs. **Table 14-5** presents the regional wastewater infrastructure costs through 2060 by infrastructure type. **Figure 14-3** illustrates the regional project costs over time.

Table 14-5. Southwest Region – Regional Wastewater Project Cost by Infrastructure Type

Period [A]	Stormwater Management – Category VI (millions of 2010 dollars) [B]	Nonpoint Source Pollution Control – Category VII (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$0.0	$5.8	$5.8
2021 - 2040	$0.0	$3.7	$3.7
2041 - 2060	$0.0	$3.7	$3.7
Total	**$0.0**	**$13.2**	**$13.2**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category VI includes stormwater management, and Category VII includes non source pollution control.

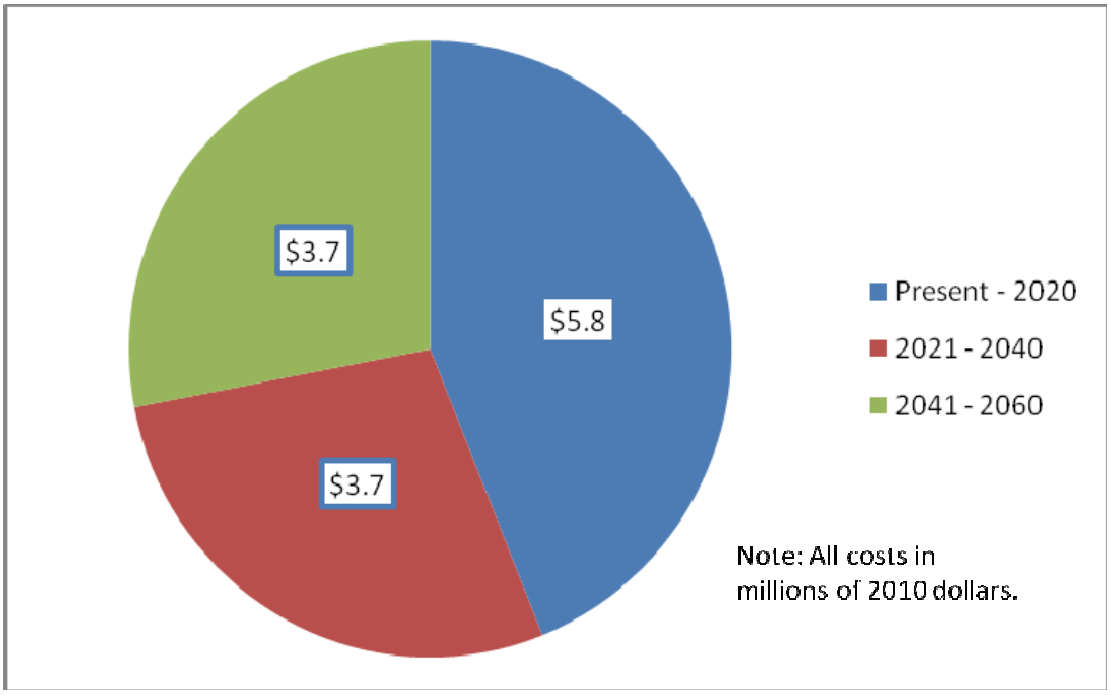


Figure 14-3. Southwest Region – Regional Wastewater Project Costs over Time

14.3 Southwest – Regional Cost Summary

This section summarizes the Southwest Region's wastewater infrastructure costs over the next 50 years. **Table 14-6** identifies costs by utility size and project period. All projects identified in this study were assumed to be CWSRF eligible. **Figure 14-4** illustrates the regional wastewater infrastructure costs over time. **Figure 14-5** illustrates the regional wastewater costs by stratum.

Table 14-6. Southwest Region – Wastewater Infrastructure Cost Summary by Category

Category [A, B]	Official Needs Category Group [B]	Present – 2020 Infrastructure Need (millions of 2010 dollars)	2021 – 2040 Infrastructure Need (millions of 2010 dollars)	2041 – 2060 Infrastructure Need (millions of 2010 dollars)	Total Period Infrastructure Need (millions of 2010 dollars)
Small	I and II	$12	$93	$30	$135
	III and IV	$180	$350	$81	$611
Medium	I and II	$53	$180	$70	$303
	III and IV	$230	$390	$140	$760
Large	I and II	$0.0	$0.0	$0.0	$0.0
	III and IV	$0.0	$0.0	$0.0	$0.0
Regional	VI	$0.0	$0.0	$0.0	$0.0
	VII	$5.8	$3.7	$3.7	$13.2
Total Costs		$480.8	$1,016.7	$324.7	$1,822.2

[A] Population based on 2060 projection (see *Appendix A* for more details on projections). Regional projects include all known category VI and VII projects by watershed.
[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems, Category VI includes stormwater management, and Category VII includes non source pollution control.
[C] Small differences in values may result from rounding.

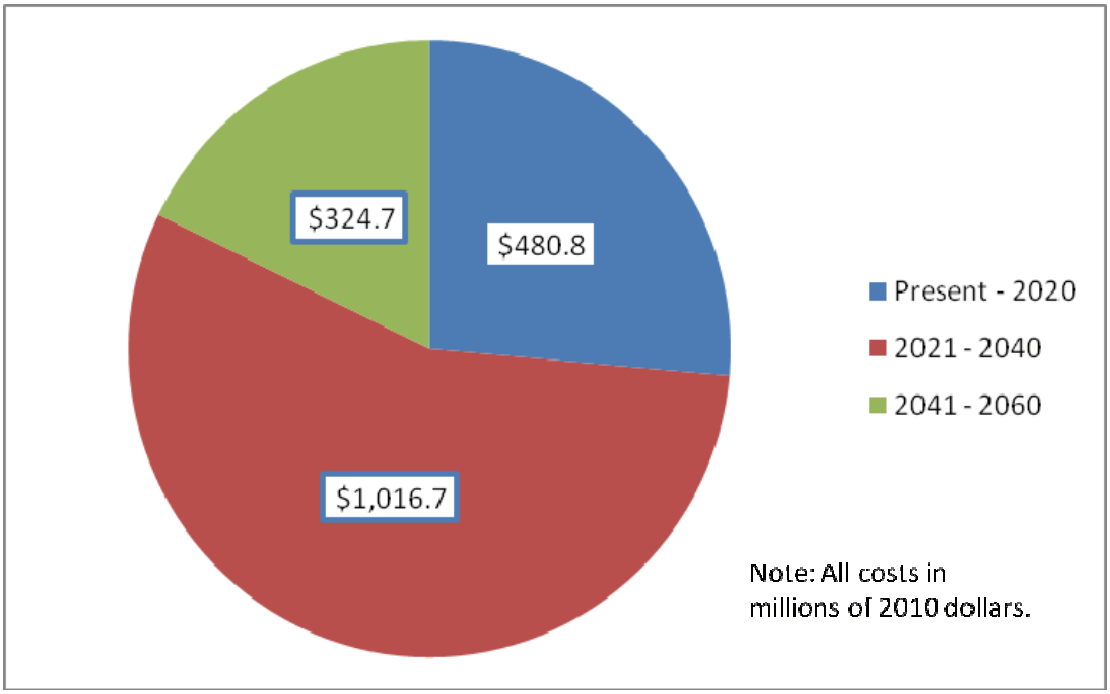


Figure 14-4. Southwest Region – Regional Costs over Time

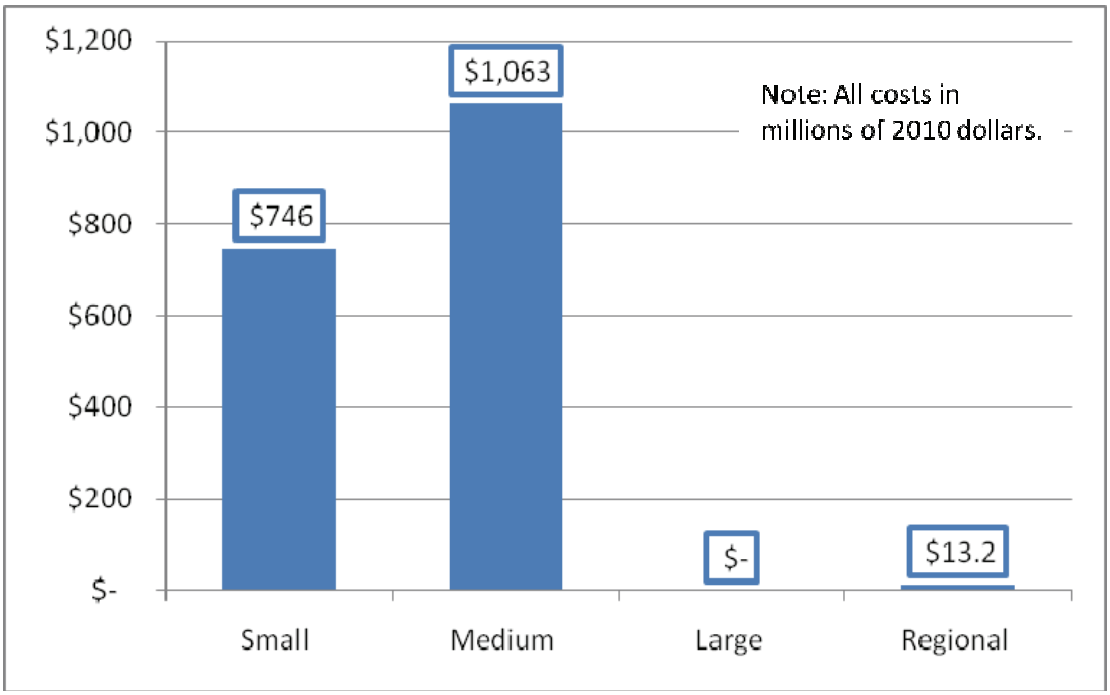


Figure 14-5. Southwest Region – Regional Costs by Stratum

Section 15
Upper Arkansas Regional Infrastructure Costs

This section provides some general information about the OCWP Upper Arkansas Watershed Planning Region and provides a cost summary for this region.

15.1 Upper Arkansas –Regional Description

The Upper Planning Region is a 7,452-square-mile area including all or portions of Woods, Alfalfa, Grant, Kay, Osage, Garfield, Noble, Pawnee, Kingfisher, Logan, Payne, Creek, Tulsa, and Lincoln Counties. There are 61 wastewater utilities in this region included in this study. Table 15-1 shows the number of wastewater utilities in the Upper Arkansas Region by stratum.

Table 15-1. Upper Arkansas Region – Number of OCWP Wastewater Utilities by Stratum

Provider Size	Population[A]	Mechanical – Advanced[B, C]	Mechanical[B, C]	Lagoon – Advanced[B, C]	Lagoon[B, C]	Lagoon - Total Retention[B, C]	Total
Large	>100,000	0	0	0	0	0	0
Medium	3,301 – 100,000	4	6	1	1	0	12
Small	<3,300	3	3	1	26	16	49
Total		**7**	**9**	**2**	**27**	**16**	**61**

[A] Population classification was based on 2060 projection (see *Appendix A* for more details on projections).
[B] Only public utilities, associated with municipalities, were included in this study.
[C] Utilities may have more than one treatment facility. Treatment stratum is based on the most stringent facility treatment level.

15.2 Upper Arkansas – Regional Infrastructure Costs

Information about each of the wastewater utilities in the Upper Arkansas Region is included in Table 15-2.

Table 15-2. Upper Arkansas Region – OCWP Wastewater Utilities

Provider Name	County	Treatment Type[A]	Utility Size[B]	Were they selected for cost modeling?[C]
City of Cleveland / Cleveland PWA	Pawnee	Mechanical	Medium	No
City of Jennings	Pawnee	Lagoon - Total Retention	Small	No
Mannford PWA	Creek	Mechanical	Small	No
Morrison PWA	Noble	Lagoon	Small	No
Blackwell Municipal Authority	Kay	Mechanical	Medium	No
City of Cherokee	Alfalfa	Lagoon	Small	No
City of Cushing	Payne	Mechanical - Advanced	Medium	No
City of Enid and/or Enid Municipal Authority	Garfield	Mechanical - Advanced	Medium	No
City of Enid, N	Garfield	Lagoon	Small	No
City of Garber	Garfield	Lagoon	Small	No

Table 15-2. Upper Arkansas Region – OCWP Wastewater Utilities (cont.)

Provider Name	County	Treatment Type [A]	Utility Size [B]	Were they selected for cost modeling? [C]
City of Jet	Alfalfa	Lagoon	Small	No
City of Medford	Grant	Lagoon	Small	No
City of Newkirk / Newkirk Municipal Authority	Kay	Lagoon	Small	No
City of Perkins / Perkins PWA	Payne	Lagoon	Medium	No
City of Perry	Noble	Mechanical	Medium	No
City of Ponca City / Ponca City PUA	Kay	Mechanical	Medium	No
City of Pond Creek	Grant	Lagoon	Small	No
City of Ralston / Ralston PWA	Pawnee	Lagoon	Small	No
City of Shidler	Osage	Lagoon	Small	No
City of Tonkawa / Tonkawa Municipal Authority	Kay	Lagoon - Advanced	Medium	No
Drumright Utility Trust	Creek	Mechanical	Medium	No
Fairfax PWA	Osage	Lagoon	Small	No
City of Pawnee / Pawnee PWA	Pawnee	Mechanical - Advanced	Medium	Yes
Kendrick Municipal Authority	Lincoln	Lagoon	Small	No
Langston PWA	Logan	Mechanical	Medium	No
Otoe-Missouria Tribe of Oklahoma	Noble	Mechanical - Advanced	Small	No
Town of Burbank	Osage	Lagoon	Small	No
Town of Deer Creek	Grant	Lagoon	Small	No
Town of Fairmont	Garfield	Lagoon	Small	No
Town of Kaw City	Kay	Mechanical	Small	No
Town of Lamont	Grant	Lagoon - Total Retention	Small	No
Town of Marland / Marland PWA	Noble	Lagoon	Small	No
Town of Marshall	Logan	Lagoon	Small	No
Town of Waukomis	Garfield	Lagoon	Small	No
Town of White Eagle	Kay	Lagoon	Small	No
Tryon Utility Authority	Lincoln	Lagoon	Small	No
Stillwater Utilities Authority	Payne	Mechanical - Advanced	Medium	Yes
Town of Amorita	Alfalfa	Lagoon - Total Retention	Small	No
Town of Billings / Billings PWA	Noble	Lagoon - Total Retention	Small	No
City of Braman	Kay	Mechanical	Small	No
Town of Burlington	Alfalfa	Lagoon	Small	No
Town of Covington	Garfield	Lagoon	Small	No
Town of Glencoe	Payne	Mechanical - Advanced	Small	No
Town of Hunter	Garfield	Lagoon	Small	No
Town of Kremlin / Kremlin PWA	Garfield	Lagoon	Small	No
City of Mulhall	Logan	Lagoon - Total Retention	Small	No

Table 15-2. Upper Arkansas Region – OCWP Wastewater Utilities (cont.)

Provider Name	County	Treatment Type [A]	Utility Size [B]	Were they selected for cost modeling? [C]
Town of Nash / Nash PWA	Grant	Lagoon - Advanced	Small	No
Town of Red Rock / Red Rock PWA	Noble	Lagoon	Small	No
Ripley PWA	Payne	Lagoon	Small	No
Yale Water & Sewage Trust	Payne	Mechanical - Advanced	Small	Yes
City of Wakita	Grant	Lagoon - Total Retention	Small	No
Breckenridge WWT	Garfield	Lagoon - Total Retention	Small	No
Mulhall WWT	Logan	Lagoon - Total Retention	Small	No
Cleveland North WWT	Pawnee	Lagoon - Total Retention	Small	No
Coyle PWA WWT	Logan	Lagoon - Total Retention	Small	No
Fort Oakland-Tonkawa Tribal Auth WWT	Kay	Lagoon - Total Retention	Small	No
Glencoe Sw WWT	Payne	Lagoon - Total Retention	Small	No
Hillsdale WWT	Garfield	Lagoon - Total Retention	Small	No
Manchester WWT	Grant	Lagoon - Total Retention	Small	No
Morrison North WWT	Noble	Lagoon - Total Retention	Small	No
Braman WWT	Kay	Lagoon - Total Retention	Small	No

[A] Utilities may have more than one treatment facility. Treatment stratum is based on the most stringent facility treatment level.
[B] Utility size classification is based on 2060 population projection (see *Appendix A* for more information on projections).
[C] Project lists for modeled utilities are included in Appendix D.

There are no large wastewater utilities in the Upper Arkansas Region.

There are 12 medium wastewater utilities in the Upper Arkansas Region. **Table 15-3** presents the wastewater infrastructure costs through 2060 for the medium utility stratum by infrastructure type. **Figure 15-1** illustrates the medium provider stratum costs over time.

Table 15-3. Upper Arkansas Region – Medium Wastewater Utilities Cost by Infrastructure Type

Period [A]	Wastewater Treatment - Categories I and II (millions of 2010 dollars) [B]	Wastewater Collection - Categories III and IV (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$87	$740	$827
2021 - 2040	$470	$1,000	$1,470
2041 - 2060	$99	$400	$499
Total	**$656**	**$2,140**	**$2,796**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems.

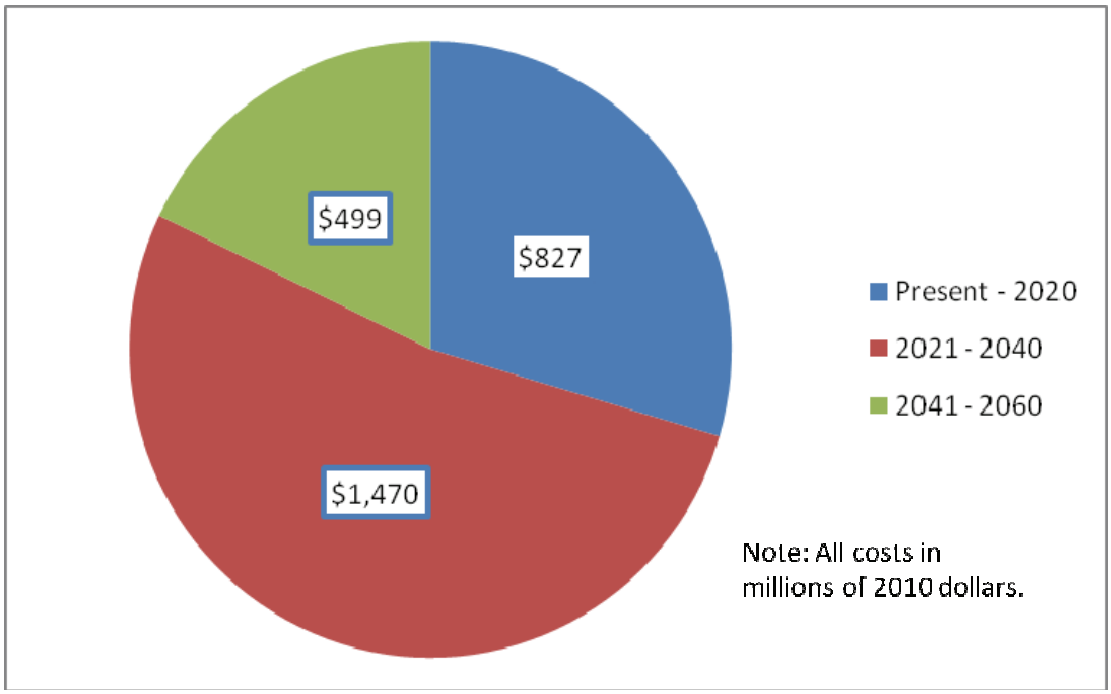


Figure 15-1. Upper Arkansas Region – Medium Wastewater Utilities Costs over Time

There are 19 small wastewater utilities in the Upper Arkansas Region. **Table 15-4** presents the wastewater infrastructure costs through 2060 for the small utility stratum by infrastructure type. **Figure 15-2** illustrates the small provider stratum costs over time.

Table 15-4. Upper Arkansas Region – Small Wastewater Utilities Cost by Infrastructure Type

Period [A]	Wastewater Treatment - Categories I and II (millions of 2010 dollars) [B]	Wastewater Collection - Categories III and IV (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$26	$280	$306
2021 - 2040	$190	$690	$880
2041 - 2060	$85	$160	$245
Total	**$301**	**$1,130**	**$1,431**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems.

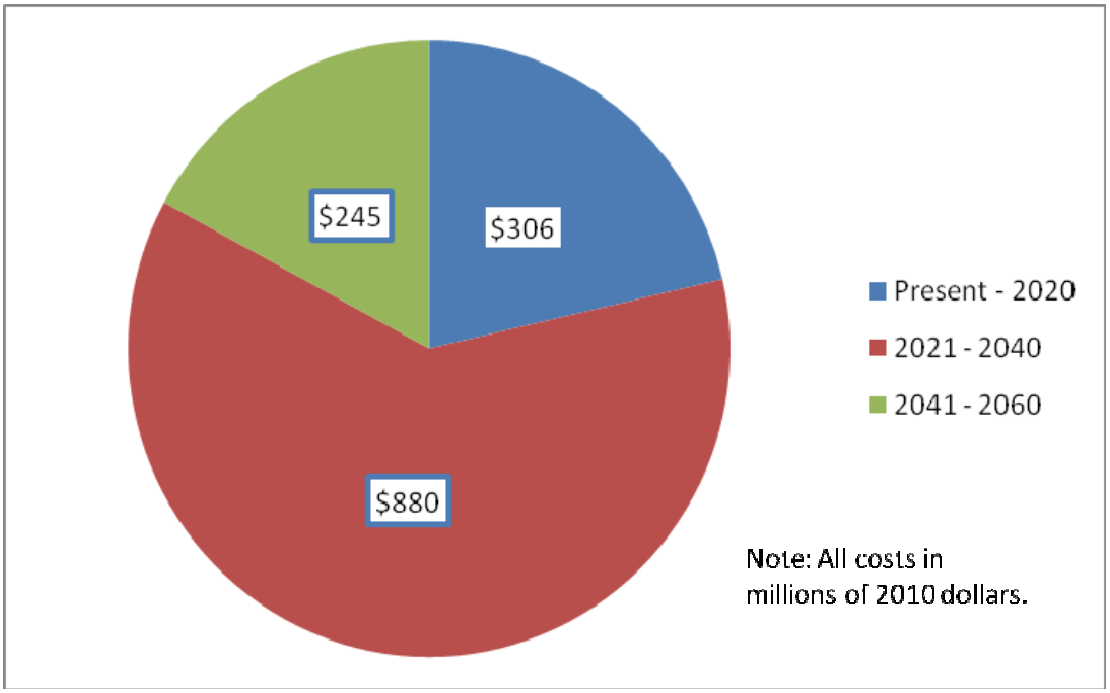


Figure 15-2. Upper Arkansas Region – Small Wastewater Utilities Costs over Time

No category VI projects were identified in the Upper Arkansas Region. Three regional category VII projects were identified. The state, through other work, is currently developing Watershed Based Plans and/or TMDLs. This work will provide a better basis for estimating these needs. **Table 15-5** presents the regional wastewater infrastructure costs through 2060 by infrastructure type. **Figure 15-3** illustrates the regional project costs over time.

Table 15-5. Beaver-Cache Region – Regional Wastewater Project Cost by Infrastructure Type

Period [A]	Stormwater Management – Category VI (millions of 2010 dollars) [B]	Nonpoint Source Pollution Control – Category VII (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$0.0	$1.9	$1.9
2021 - 2040	$0.0	$3.7	$3.7
2041 - 2060	$0.0	$3.7	$3.7
Total	**$0.0**	**$9.3**	**$9.3**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category VI includes stormwater management, and Category VII includes non source pollution control.

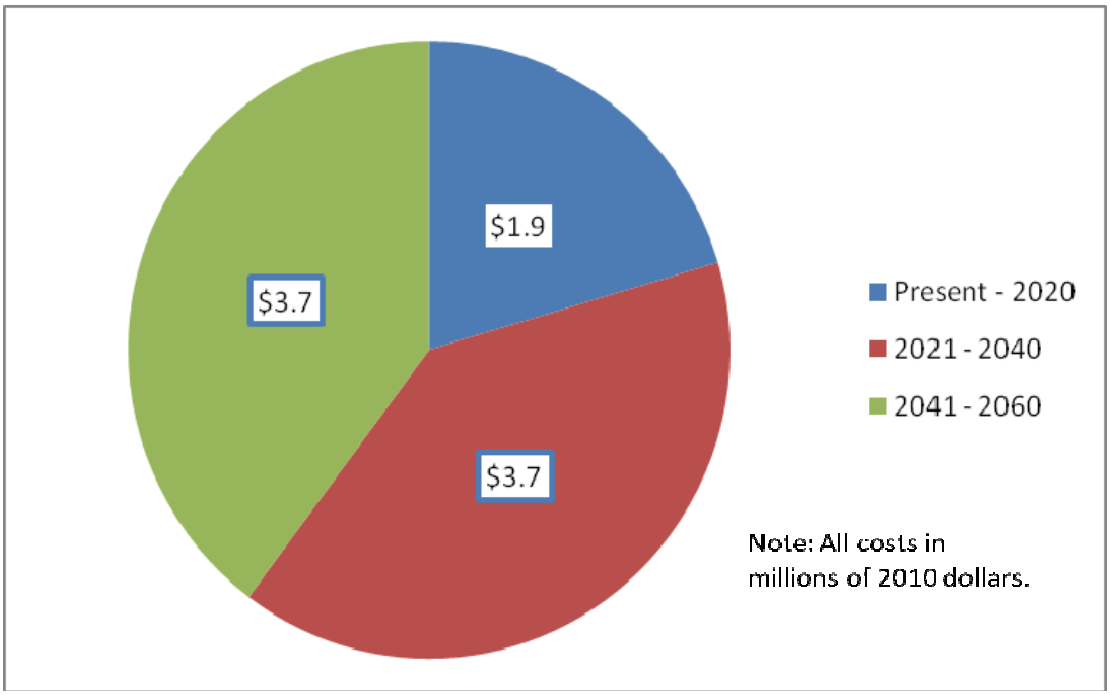


Figure 15-3. Upper Arkansas Region – Regional Wastewater Project Costs over Time

15.3 Upper Arkansas – Regional Cost Summary

This section summarizes the Upper Arkansas Region's wastewater infrastructure costs over the next 50 years. **Table 15-6** identifies costs by utility size and project period. All projects identified in this study were assumed to be CWSRF eligible. **Figure 15-4** illustrates the regional wastewater infrastructure costs over time. **Figure 15-5** illustrates the regional wastewater costs by stratum.

Table 15-6. Upper Arkansas Region – Wastewater Infrastructure Cost Summary by Category

Category [A, B]	Official Needs Category Group [B]	Present – 2020 Infrastructure Need (millions of 2010 dollars)	2021 – 2040 Infrastructure Need (millions of 2010 dollars)	2041 – 2060 Infrastructure Need (millions of 2010 dollars)	Total Period Infrastructure Need (millions of 2010 dollars)
Small	I and II	$26	$190	$85	$301
	III and IV	$280	$690	$160	$1,130
Medium	I and II	$87	$470	$99	$656
	III and IV	$740	$1,000	$400	$2,140
Large	I and II	$0.0	$0.0	$0.0	$0.0
	III and IV	$0.0	$0.0	$0.0	$0.0
Regional	VI	$0.0	$0.0	$0.0	$0.0
	VII	$1.9	$3.7	$3.7	$9.3
Total Costs		$1,134.9	$2,353.7	$747.7	$4,236.3

[A] Population based on 2060 projection (see *Appendix A* for more details on projections). Regional projects include all known category VI and VII projects by watershed.

[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems, Category VI includes stormwater management, and Category VII includes non source pollution control.

[C] Small differences in values may result from rounding.

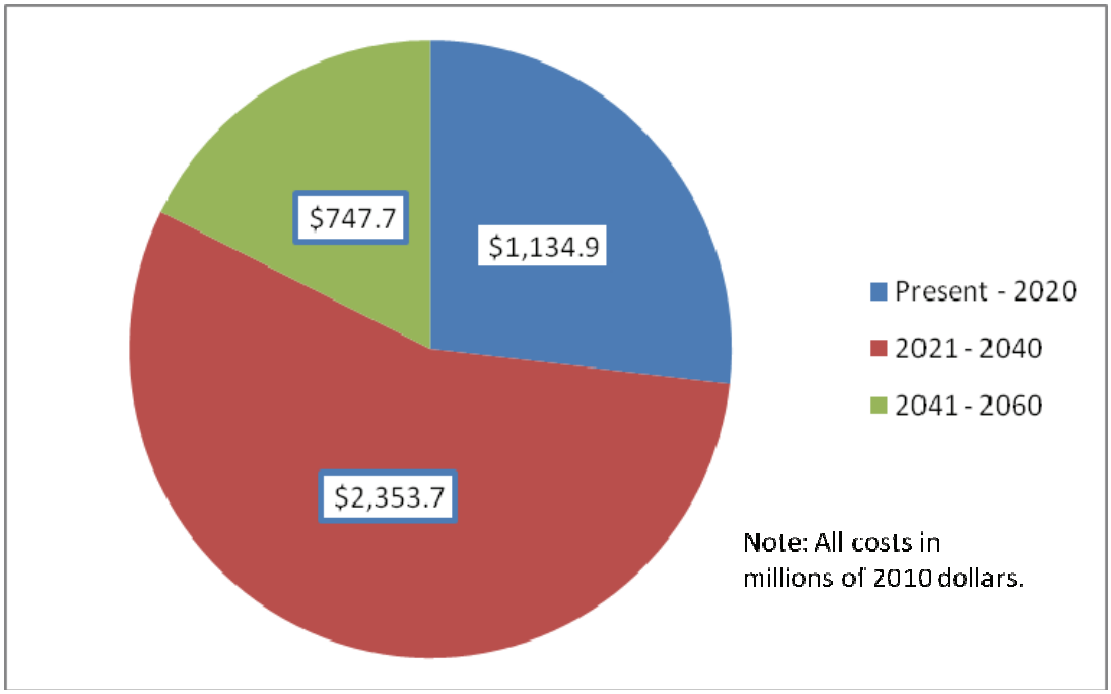


Figure 15-4. Upper Arkansas Region – Regional Costs over Time

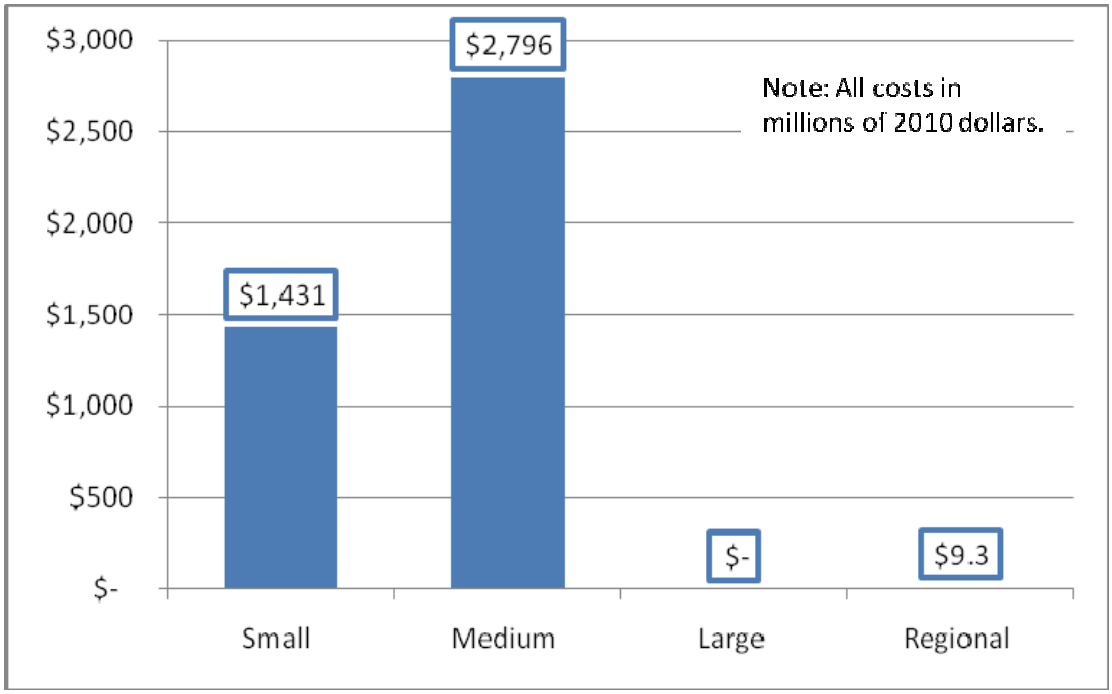


Figure 15-5. Upper Arkansas Region – Regional Costs by Stratum

Section 16
West Central Regional Infrastructure Costs

This section provides some general information about the OCWP West Central Watershed Planning Region and provides a cost summary for this region.

16.1 West Central –Regional Description

The West Central Region is a 5,262-square-mile area including all or portions of Ellis, Woodward, Dewey, Blaine, Canadian, Roger Mills, Custer, Beckham, Washita, Caddo, Kiowa, and Comanche Counties. There are 24 wastewater utilities in this region included in this study. Table 16-1 shows the number of wastewater utilities in the West Central Region by stratum.

Table 16-1. West Central Region – Number of OCWP Wastewater Utilities by Stratum

Provider Size	Population[A]	Mechanical – Advanced [B, C]	Mechanical [B, C]	Lagoon – Advanced [B, C]	Lagoon [B, C]	Lagoon - Total Retention [B, C]	Total
Large	>100,000	0	0	0	0	0	0
Medium	3,301 – 100,000	2	0	0	2	0	4
Small	<3,300	0	2	0	10	8	20
Total		**2**	**2**	**0**	**12**	**8**	**24**

[A] Population classification was based on 2060 projection (see *Appendix A* for more details on projections).
[B] Only public utilities, associated with municipalities, were included in this study.
[C] Utilities may have more than one treatment facility. Treatment stratum is based on the most stringent facility treatment level.

16.2 West Central – Regional Infrastructure Costs

Information about each of the wastewater utilities in the West Central Region is included in Table 16-2.

Table 16-2. West Central Region – OCWP Wastewater Utilities

Provider Name	County	Treatment Type [A]	Utility Size [B]	Were they selected for cost modeling? [C]
Canute PWA	Washita	Lagoon	Small	No
Carnegie Water & Sewer	Caddo	Mechanical	Small	No
City of Anadarko / Anadarko PWA	Caddo	Lagoon	Medium	No
City of Clintion	Custer	Mechanical - Advanced	Medium	No
City of Fort Cobb	Caddo	Lagoon - Total Retention	Small	No
City of Hammon	Roger Mills	Lagoon	Small	No
City of Hydro	Caddo	Mechanical	Small	No
City of New Cordell / New Cordell Authority Utility	Washita	Lagoon	Medium	No
Town of Cheyenne / Cheyenne Utility Authority	Roger Mills	Lagoon - Total Retention	Small	No
Town of Hinton	Caddo	Lagoon	Small	No
Town of Leedey	Dewey	Lagoon	Small	No

Table 16-2. West Central Region – OCWP Wastewater Utilities (cont.)

Provider Name	County	Treatment Type [A]	Utility Size [B]	Were they selected for cost modeling? [C]
Town of Mountain View / Mountain View PWA	Kiowa	Lagoon	Small	No
Town of Taloga	Dewey	Lagoon - Total Retention	Small	No
Town of Thomas	Custer	Lagoon	Small	No
Weatherford PWA	Custer	Mechanical - Advanced	Medium	No
Arapaho PWA	Custer	Lagoon	Small	No
Town of Arnett	Ellis	Lagoon	Small	No
Town of Bessie	Washita	Lagoon	Small	No
City of Custer / Custer City PWA	Custer	Lagoon - Total Retention	Small	No
Dewey Co Rwsd #2	Dewey	Lagoon - Total Retention	Small	No
Town of Foss	Washita	Lagoon	Small	No
Oakwood WWT	Dewey	Lagoon - Total Retention	Small	No
Reydon WWT	Roger Mills	Lagoon - Total Retention	Small	No
Gotebo WWT	Kiowa	Lagoon - Total Retention	Small	No

[A] Utilities may have more than one treatment facility. Treatment stratum is based on the most stringent facility treatment level.
[B] Utility size classification is based on 2060 population projection (see *Appendix A* for more information on projections).
[C] Project lists for modeled utilities are included in Appendix D.

There are no large wastewater utilities in the West Central Region.

There are four medium wastewater utilities in the West Central Region. Table 16-3 presents the wastewater infrastructure costs through 2060 for the medium utility stratum by infrastructure type. Figure 16-1 illustrates the medium provider stratum costs over time.

Table 16-3. West Central Region – Medium Wastewater Utilities Cost by Infrastructure Type

Period [A]	Wastewater Treatment - Categories I and II (millions of 2010 dollars) [B]	Wastewater Collection - Categories III and IV (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$52	$320	$372
2021 - 2040	$89	$340	$429
2041 - 2060	$49	$160	$209
Total	**$190**	**$820**	**$1,010**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems.

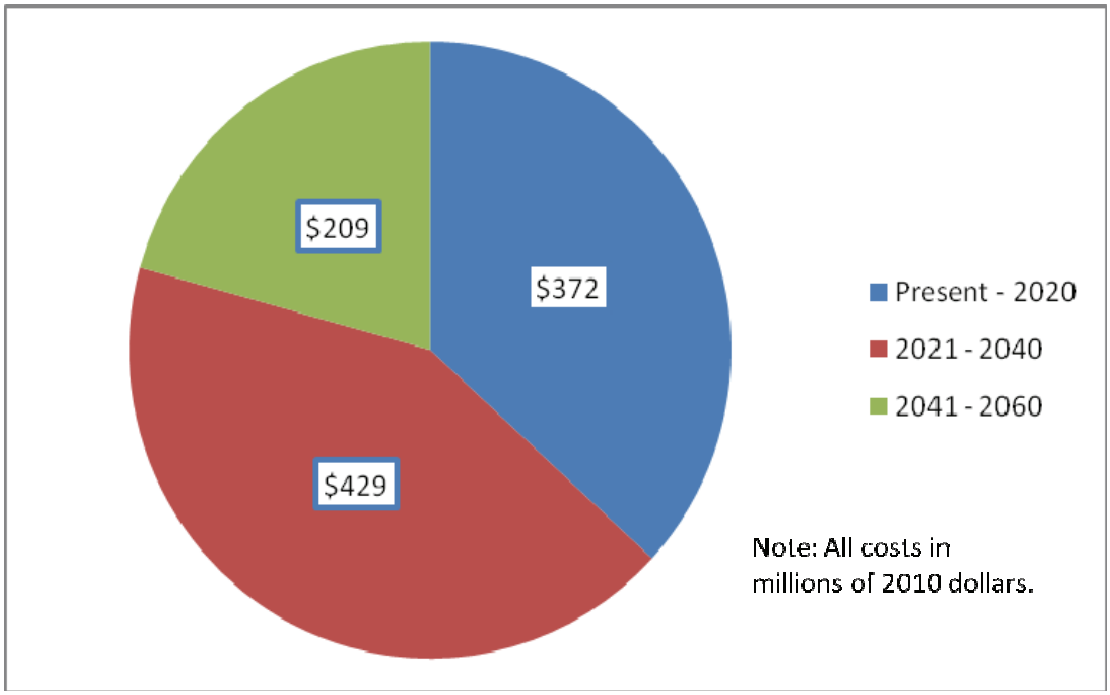


Figure 16-1. West Central Region – Medium Wastewater Utilities Costs over Time

There are 20 small wastewater utilities in the West Central Region. **Table 16-4** presents the wastewater infrastructure costs through 2060 for the small utility stratum by infrastructure type. **Figure 16-2** illustrates the small provider stratum costs over time.

Table 16-4. West Central Region – Small Wastewater Utilities Cost by Infrastructure Type

Period [A]	Wastewater Treatment - Categories I and II (millions of 2010 dollars) [B]	Wastewater Collection - Categories III and IV (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$7.3	$130	$137
2021 - 2040	$73	$290	$363
2041 - 2060	$22	$65	$87
Total	**$102**	**$485**	**$587**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems.

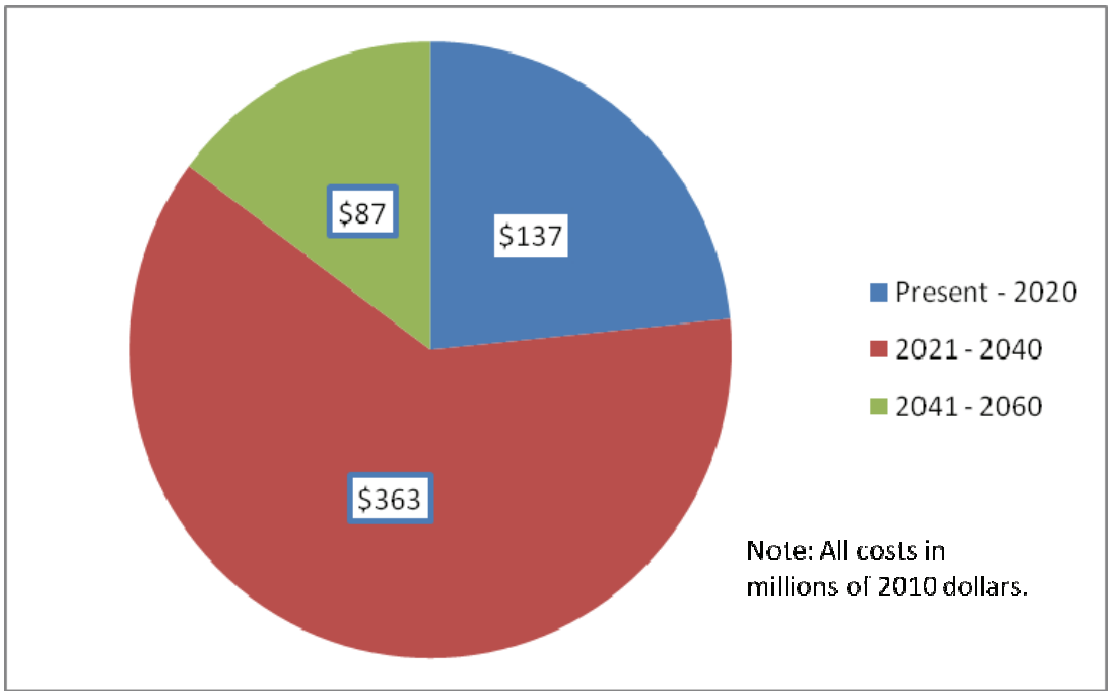


Figure 16-2. West Central Region – Small Wastewater Utilities Costs over Time

No category VI projects were identified in the West Central Region. Four regional category VII projects were identified. The state, through other work, is currently developing Watershed Based Plans and/or TMDLs. This work will provide a better basis for estimating these needs. **Table 16-5** presents the regional wastewater infrastructure costs through 2060 by infrastructure type. **Figure 16-3** illustrates the regional project costs over time.

Table 16-5. West Central Region – Regional Wastewater Project Cost by Infrastructure Type

Period [A]	Stormwater Management – Category VI (millions of 2010 dollars) [B]	Nonpoint Source Pollution Control – Category VII (millions of 2010 dollars) [B]	Total Infrastructure Needs (millions of 2010 dollars)
Present - 2020	$0.0	$2.2	$2.2
2021 - 2040	$0.0	$4.3	$4.3
2041 - 2060	$0.0	$4.3	$4.3
Total	**$0.0**	**$10.8**	**$10.8**

[A] Small differences in values may result from rounding.
[B] Official EPA needs categories where Category VI includes stormwater management, and Category VII includes non source pollution control.

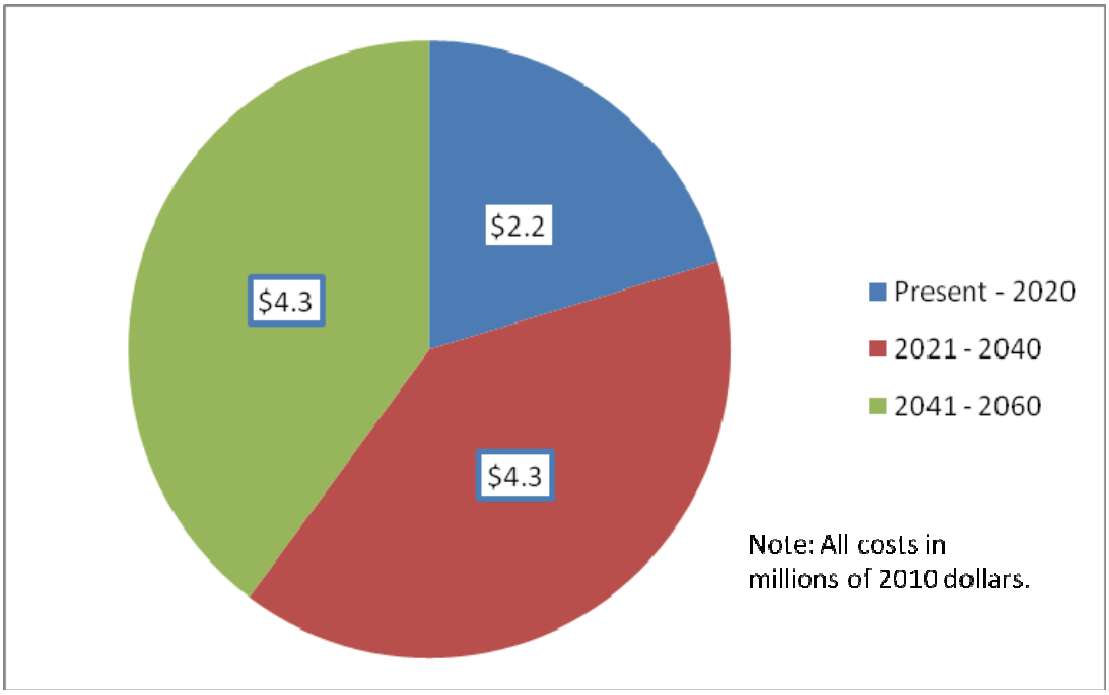


Figure 16-3. West Central Region – Regional Wastewater Project Costs over Time

16.3 West Central – Regional Cost Summary

This section summarizes the West Central Region's wastewater infrastructure costs over the next 50 years. Table 16-6 identifies costs by utility size and project period. All projects identified in this study were assumed to be CWSRF eligible. Figure 16-4 illustrates the regional wastewater infrastructure costs over time. Figure 16-5 illustrates the regional wastewater costs by stratum.

Table 16-6. West Central Region – Wastewater Infrastructure Cost Summary by Category

Category [A, B]	Official Needs Category Group [B]	Present – 2020 Infrastructure Need (millions of 2010 dollars)	2021 – 2040 Infrastructure Need (millions of 2010 dollars)	2041 – 2060 Infrastructure Need (millions of 2010 dollars)	Total Period Infrastructure Need (millions of 2010 dollars)
Small	I and II	$7.3	$73	$22	$102.3
	III and IV	$130	$290	$65	$485
Medium	I and II	$52	$89	$49	$190
	III and IV	$320	$340	$160	$820
Large	I and II	$0.0	$0.0	$0.0	$0.0
	III and IV	$0.0	$0.0	$0.0	$0.0
Regional	VI	$0.0	$0.0	$0.0	$0.0
	VII	$2.2	$4.3	$4.3	$10.8
Total Costs		$511.5	$796.3	$300.3	$1,608.1

[A] Population based on 2060 projection (see *Appendix A* for more details on projections). Regional projects include all known category VI and VII projects by watershed.

[B] Official EPA needs categories where Category I includes secondary wastewater treatment, Category II includes advanced wastewater treatment, Category III is for existing collection systems, Category IV includes new collection systems, Category VI includes stormwater management, and Category VII includes non source pollution control.

[C] Small differences in values may result from rounding.

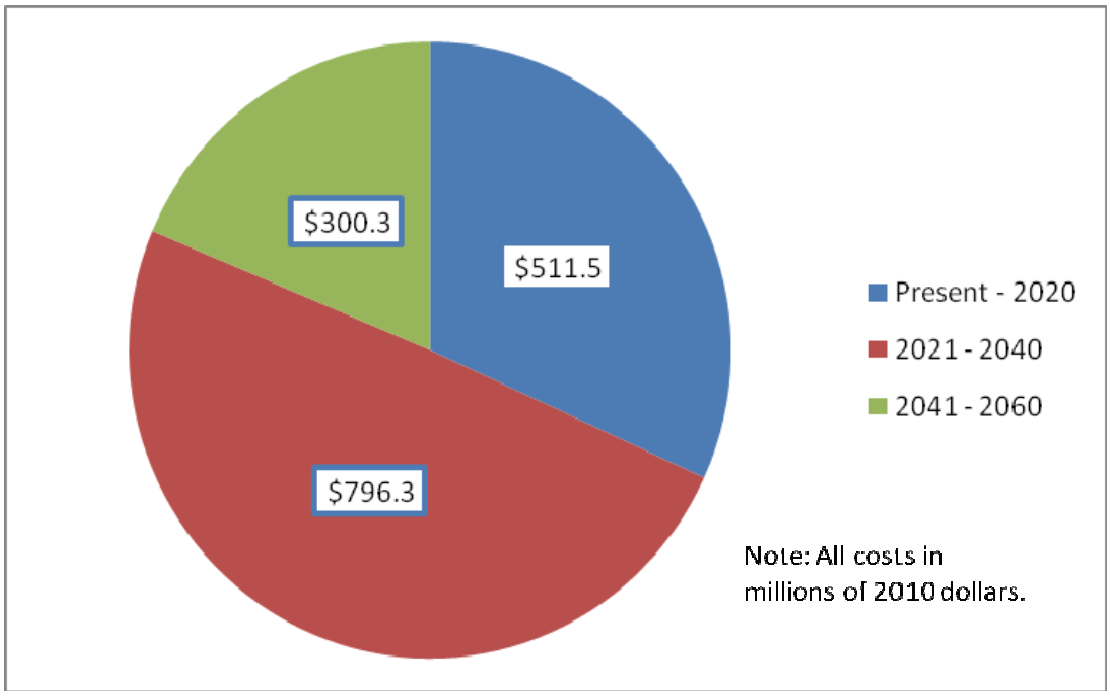


Figure 16-4. West Central Region – Regional Costs over Time

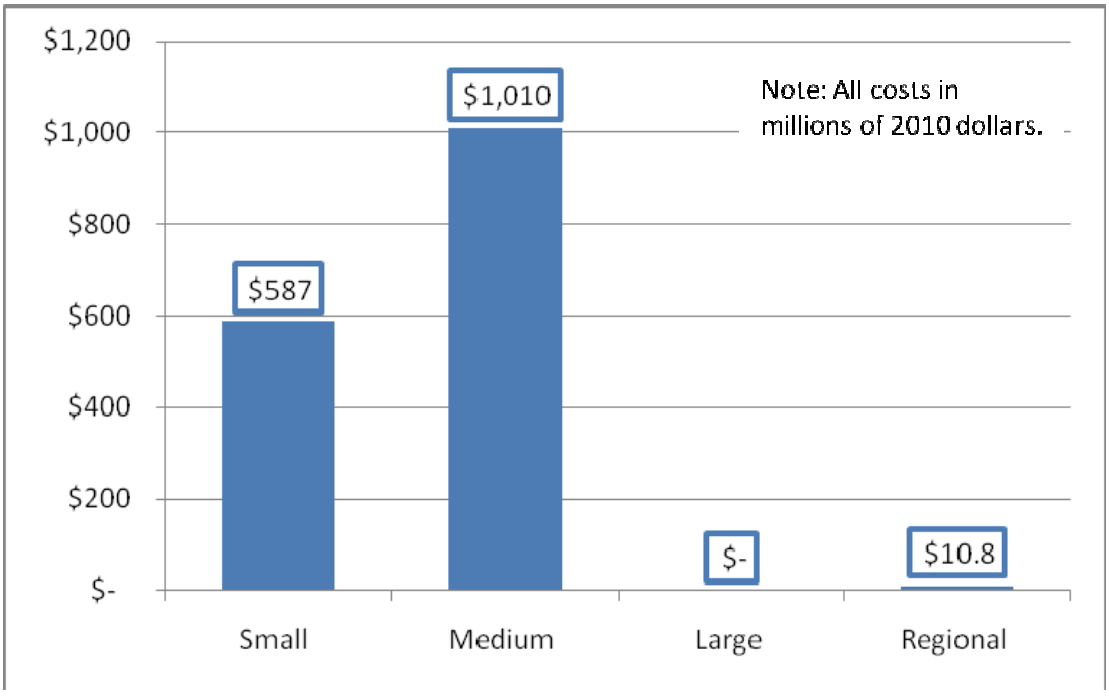


Figure 16-5. West Central Region – Regional Costs by Stratum

Appendix A
OCWP Wastewater Utility Providers

Appendix A
OCWP Wastewater Utility Providers

This section documents the methodology used to identify the following attributes of wastewater utilities in Oklahoma.

- Size of the utility based on 2060 population
- Treatment type
- OCWP region of the utilities

Attributes were developed for municipal utilities across Oklahoma. Information on the utilities was obtained from two sources: the ODEQ NPDES 208 Permit database and the state's general wastewater disposal permit. State permits are issued to small treatment facilities that do not discharge effluent; where NPDES regulations do not apply. Electronic databases of the NPDES and state permits were provided to CDM Smith on June 7, 2011 by ODEQ.

A.1 Utilities Identified for Costing

The OCWP wastewater future costs were calculated for public utilities that were associated with municipalities. However, a correctional facility, state park, industrial park, airport, housing community, or transient facility was not included. A total of 476 utilities were used for the costing analysis. Some of these utilities may have more than one facility. The NPDES database contains 405 municipal utilities and there were an additional 71 utilities with state permits (non-discharging).

There were a substantial number of entries in the databases that were not included in the wastewater costing. The majority of these facilities did not have an NPDES permit number. ODEQ staff indicated that these records typically represent a utility that begins, but does not finalize a permit application. Facilities also were excluded if they were private, associated with transient customers, did not have information on population served, or could not be located. Additionally, some facilities had both a NPDES and state permit; in these cases only the NPDES permit information was retained.

Using the information obtained on these sources, the size, treatment type, and region were determined.

A.1.1 Utilities in OCWP Regions

The OCWP wastewater costs were developed statewide and further grouped by the 13 OCWP watershed planning regions. Future costs were determined for each utility, since a utility can have multiple facilities or outfalls. The region of each OCWP wastewater utility was based on the location of the utility's outfalls. There were no utilities included in the analysis that had outfalls in multiple regions.

ODEQ provided two geographic information system (GIS) shapefiles that contained the location of the utility: NPDES discharge locations and total retention state permits

locations. Using the NPDES permit ID, the NPDES database records were matched with utility locations. Total retention lagoons with and without NPDES permits (no discharge facilities) were matched to the total retention shapefile.

A.1.2 Customers Served in 2060

This study grouped utilities into small, medium, and large based on future customers served.

- Small utilities serve less than or equal to 3,300 customers
- Medium utilities serve between 3,301 and 100,000 customers
- Large utilities serve over 100,000 customers

The NPDES 208 Permit database (NPDES database) includes the population served by each utility at the time of their permit application. These permit application dates can vary from 1984 until 2010. To determine the size of the utility, the number of customers served in 2060 was estimated.

Growth in utilities customers were assumed to mirror growth in the county population that the utility serves. A primary county was chosen for utilities that served multiple counties, based on the NPDES permit database. The United States Census Bureau annual estimates of population by county were used to determine the growth in population for 1984 through 2006. Estimates of population by county were developed for the OCWP water demand projections based on the Oklahoma Department of Commerce (ODC) projections for 2007, 2010, and in 10-year increments through 2060. The number of small, medium, and large utilities in the state are presented in Table A-1.

Table A-1 - Number of OCWP Wastewater Utilities by Size and Region

Region	Facility Size			
	Small	Medium	Large	Total
Beaver-Cache	24	2	1	27
Blue-Boggy	17	4	0	21
Central	61	31	2	94
Eufaula	19	6	0	25
Grand	21	9	0	30
Lower Arkansas	27	12	0	39
Lower Washita	36	11	0	47
Middle Arkansas	21	20	1	42
Panhandle	24	3	0	27
Southeast	5	4	0	9
Southwest	25	5	0	30
Upper Arkansas	49	12	0	61
West Central	20	4	0	24
Statewide	349	122	4	476

The growth in county population varied substantially throughout the state. Between 1980 and 2006, Oklahoma's population grew by over 500,000 people, but 39 of the 66 counties saw a decline in population. These declines were typically seen in rural counties that constitute a small portion of the state's overall population. All counties were expected to increase in population by 2060, except Ellis County.

The distribution of small, medium, and large utilities was consistent with water providers in the state. Large wastewater utilities included Oklahoma City, Tulsa, Norman, and Lawton. Oklahoma City and Tulsa currently serve over 100,000 customers. Lawton currently serves about 97,000 customers and is expected to serve about 118,000 customers by 2060. The City of Norman currently serves about 73,000 customers. The city is expected to grow faster than the county's growth rate due to conversion of private septic systems to municipal wastewater service. This rate of growth is expected to result in over 100,000 customers being served by 2060. Broken Arrow is the largest medium sized wastewater system; it is expected to serve about 92,000 customers in 2060.

A.2 Treatment Type

The 2008 CWNS grouped applicable wastewater treatment types by two general treatment processes:

- Mechanical
- Lagoon

The survey further grouped the wastewater treatment by the quality of the discharge:

- Better than secondary (advanced)
- Secondary
- No discharge (total retention)

The discharge limits associated with secondary treatment varies with the treatment type. For mechanical treatment, ODEQ defines advanced treatment as effluent with less than 20 milligrams per liter (mg/L) carbonaceous biological oxygen demand – 5 days ($cBOD_5$) and 30 mg/L total suspended solids (TSS). For lagoon treatment, advanced treatment was defined as less than 20 mg/L $cBOD^5$ and 90 mg/L TSS. Note, secondary treatment is defined as 30 mg/L $cBOD_5$and 30 mg/L TSS for mechanical treatment by EPA. The ODEQ NPDES database includes information on the treatment type and discharge limits for each NPDES permitted wastewater facility in the state. All of Oklahoma's permitted treatment plants discharge at or better than secondary level.

Categories of treatment plants in Oklahoma were developed based on the treatment types and discharge limits in the NPDES database. These categories are shown below.

- Mechanical Plant with secondary treatment (Mechanical)
- Mechanical Plant with advanced treatment (Mechanical - Advanced)
- Lagoon with secondary treatment (Lagoon)
- Lagoon with advanced treatment (Lagoon – Advanced)
- Lagoon with no discharge (Lagoon - Total Retention)

Examples of mechanical treatment include: activated sludge, moving bed biofilm reactor (MBBR), integrated fixed film activated sludge (IFAS), bio-disc, rotating biological disc, rotating biological contactors, membrane bioreactor (MBR), sequencing batch reactor

(SBR), oxidation ditch, and trickling filter. Lagoons with no discharge may use land application, which by law cannot reach a stream, to dispose of effluent.

Examples of advanced treatment include activated sludge with discharge concentrations less than or equal to the advanced treatment limits and activated sludge followed by filtration. Utilities with advanced treatment are typically identified their discharge concentrations. Discharge limits may vary by season, where some seasons require secondary treatment and others require advanced treatment. In these cases, the treatment plant was classified based on the most stringent effluent permit limits.

There were two additional categories of treatment processes reported by ODEQ—septic tanks and land application. Facility specific information on treatment processes used at these utilities was obtained from local ODEQ offices. In most cases, lagoon systems were used to provide treatment. In most cases, the treated effluent was land applied (typically irrigation), rather than discharges. Septic tanks were not used as primary treatment for the utilities in question. The septic tank treatment process may refer to the use of septic tanks as a pretreatment to reduce sludge loads on the lagoon systems; however, this could not be confirmed in all cases.

The number of utilities with each treatment type in the state are presented in Table A-2.

Table A-2 Number of OCWP Wastewater Utilities by Treatment Type and Region

Region	Treatment Type				
	Mechanical - Advanced	Mechanical	Lagoon	Lagoon - Advanced	Lagoon - Total Retention
Beaver-Cache	3	0	9	1	14
Blue-Boggy	2	1	7	7	4
Central	17	15	33	7	22
Eufaula	7	3	6	6	3
Grand	11	3	8	5	3
Lower Arkansas	8	4	17	6	4
Lower Washita	5	6	17	2	17
Middle Arkansas	8	6	18	8	2
Panhandle	1	1	7	0	17
Southeast	4	1	4	0	0
Southwest	3	1	11	2	13
Upper Arkansas	9	7	25	4	16
West Central	2	2	10	2	8
Statewide	80	50	172	50	123

A.3 Results

The treatment type, size, and region of the OCWP wastewater utilities were determined using the methodology described in the above sections. For each region the size and treatment type have been summarized in Table A-3. A complete list of this information by utility used can be found in Table A-4.

Table A-3 - OCWP Wastewater Utilities by Size and Treatment Type and Region

Region	Treatment Category	Number of Small Utilities	Number of Medium Utilities	Number of Large Utilities	Total Number of Utilities
Beaver-Cache	Mechanical – Advanced	1	1	1	3
	Mechanical	0	0	0	0
	Lagoon	9	0	0	9
	Lagoon – Advanced	0	1	0	1
	Lagoon – Total Retention	14	0	0	14
	Regional Total	24	2	1	27
Blue Boggy	Mechanical – Advanced	1	1	0	2
	Mechanical	0	1	0	1
	Lagoon	6	1	0	7
	Lagoon – Advanced	6	1	0	7
	Lagoon – Total Retention	4	0	0	4
	Regional Total	17	4	0	21
Central	Mechanical – Advanced	4	11	2	17
	Mechanical	4	11	0	15
	Lagoon	29	4	0	33
	Lagoon – Advanced	3	4	0	7
	Lagoon – Total Retention	21	1	0	22
	Regional Total	61	31	2	94
Eufaula	Mechanical – Advanced	2	5	0	7
	Mechanical	2	1	0	3
	Lagoon	6	0	0	6
	Lagoon – Advanced	6	0	0	6
	Lagoon – Total Retention	3	0	0	3
	Regional Total	19	6	0	25
Grand	Mechanical – Advanced	6	5	0	11
	Mechanical	2	1	0	3
	Lagoon	7	1	0	8
	Lagoon – Advanced	3	2	0	5
	Lagoon – Total Retention	3	0	0	3
	Regional Total	21	9	0	30

Table A-3 - OCWP Wastewater Utilities by Size and Treatment Type and Region

Region	Treatment Category	Number of Small Utilities	Number of Medium Utilities	Number of Large Utilities	Total Number of Utilities
Lower Arkansas	Mechanical – Advanced	1	7	0	8
	Mechanical	3	1	0	4
	Lagoon	16	1	0	17
	Lagoon – Advanced	3	3	0	6
	Lagoon – Total Retention	4	0	0	4
	Regional Total	27	12	0	39
Lower Washita	Mechanical – Advanced	0	5	0	5
	Mechanical	2	4	0	6
	Lagoon	17	0	0	17
	Lagoon – Advanced	1	1	0	2
	Lagoon – Total Retention	16	1	0	17
	Regional Total	36	11	0	47
Middle Arkansas	Mechanical – Advanced	1	6	1	8
	Mechanical	1	5	0	6
	Lagoon	12	6	0	18
	Lagoon – Advanced	5	3	0	8
	Lagoon – Total Retention	2	0	0	2
	Regional Total	21	20	1	42
Panhandle	Mechanical – Advanced	0	1	0	1
	Mechanical	1	0	0	1
	Lagoon	7	0	0	7
	Lagoon – Advanced	0	0	0	0
	Lagoon – Total Retention	16	1	0	17
	Regional Total	24	2	0	26
Southeast	Mechanical – Advanced	1	3	0	4
	Mechanical	0	1	0	1
	Lagoon	4	0	0	4
	Lagoon – Advanced	0	0	0	0
	Lagoon – Total Retention	0	0	0	0
	Regional Total	5	4	0	9

Table A-3 - OCWP Wastewater Utilities by Size and Treatment Type and Region

Region	Treatment Category	Number of Small Utilities	Number of Medium Utilities	Number of Large Utilities	Total Number of Utilities
Southwest	Mechanical – Advanced	0	3	0	3
	Mechanical	0	1	0	1
	Lagoon	11	0	0	11
	Lagoon – Advanced	1	1	0	2
	Lagoon – Total Retention	13	0	0	13
	Regional Total	25	5	0	30
Upper Arkansas	Mechanical – Advanced	3	6	0	9
	Mechanical	3	4	0	7
	Lagoon	24	1	0	25
	Lagoon – Advanced	3	1	0	4
	Lagoon – Total Retention	16	0	0	16
	Regional Total	49	12	0	61
West Central	Mechanical – Advanced	0	2	0	2
	Mechanical	2	0	0	2
	Lagoon	9	1	0	10
	Lagoon – Advanced	1	1	0	2
	Lagoon – Total Retention	8	0	0	8
	Regional Total	20	4	0	24

Table A-4 - OCWP Wastewater Utilities by Size and Treatment Type for all Regions

Name of Utility	County	2060 Utility Size	Treatment Type	Region
Adair Municipal Authority and Town of Adair	Mayes	Small	Lagoon - Advanced	Grand
Afton PWA	Ottawa	Small	Mechanical - Advanced	Grand
Agra WWTF c/o Lincoln RW&SD #4	Lincoln	Small	Lagoon - Total Retention	Central
Alva WWTF	Woods	Small	Lagoon - Total Retention	Central
Arapaho PWA	Custer	Small	Lagoon	West Central
Asher Utility Development Authority	Pottawatomie	Small	Lagoon	Central
Atoka Co. RSD # 2	Atoka	Small	Lagoon - Advanced	Blue-Boggy
Atoka Co. Rural Water District #3 WWT	Atoka	Small	Lagoon - Total Retention	Blue-Boggy
Atoka County RSD #1 - Wardville	Atoka	Small	Lagoon - Total Retention	Eufaula
Avant Utilities Authority	Osage	Small	Lagoon	Middle Arkansas
Beaver Co RSD #1 WWT	Beaver	Small	Lagoon - Total Retention	Panhandle
Beaver Co RWD #2	Beaver	Small	Lagoon	Panhandle
Bennington PWA	Bryan	Small	Lagoon - Total Retention	Blue-Boggy
Bernice PWA	Delaware	Small	Mechanical	Grand
Big Cabin PWA	Craig	Small	Lagoon - Advanced	Grand
Bixby PWA	Tulsa	Medium	Lagoon	Middle Arkansas
Blackwell Municipal Authority	Kay	Medium	Mechanical	Upper Arkansas
Blanchard WWT	Woods	Small	Lagoon - Total Retention	Panhandle
Bokoshe PWA	Leflore	Small	Lagoon	Lower Arkansas
Bowlegs WWT	Woodward	Small	Lagoon - Total Retention	Panhandle
Braman WWT	Kay	Small	Lagoon - Total Retention	Upper Arkansas
Breckenridge WWT	Garfield	Small	Lagoon - Total Retention	Upper Arkansas
Broken Bow PWA	McCurtain	Medium	Mechanical - Advanced	Southeast
Burns Flat-North Lagoon	Washita	Small	Lagoon - Total Retention	Southwest
Byars Lagoon	McClain	Small	Lagoon - Total Retention	Lower Washita

Table A-4 - OCWP Wastewater Utilities by Size and Treatment Type for all Regions

Name of Utility	County	2060 Utility Size	Treatment Type	Region
Byars PWA	McClain	Small	Lagoon	Lower Washita
Caddo Co RWD #1	Caddo	Small	Mechanical	Lower Washita
Caddo PWA	Bryan	Small	Mechanical - Advanced	Blue-Boggy
Calumet Lagoon	Canadian	Small	Lagoon - Total Retention	Central
Canadian PWA	Pittsburg	Small	Mechanical	Eufaula
Caney Development Corp.	Atoka	Small	Lagoon	Blue-Boggy
Canute PWA	Washita	Small	Lagoon	West Central
Cardin Special Utilities	Ottawa	Small	Lagoon	Grand
Carnegie Water & Sewer	Caddo	Small	Mechanical	West Central
Carney Public Utilities	Lincoln	Small	Lagoon	Central
Cedar Blue	Murray	Small	Lagoon - Total Retention	Lower Washita
Cement PWA	Caddo	Small	Lagoon	Lower Washita
Chandler Municipal Authority	Lincoln	Medium	Lagoon - Advanced	Central
Chickasha Municipal Authority	Grady	Medium	Mechanical - Advanced	Lower Washita
Cimarron City WWT	Logan	Small	Lagoon - Total Retention	Central
City of Ada / Ada PWA	Pontotoc	Medium	Mechanical - Advanced	Southwest
City of Altus	Jackson	Medium	Mechanical - Advanced	Southwest
City of Anadarko / Anadarko PWA	Caddo	Medium	Lagoon	West Central
City of Ardmore and the Ardmore PWA	Carter	Medium	Mechanical - Advanced	Lower Washita
City of Atoka / Atoka Municipal Authority	Atoka	Medium	Mechanical	Blue-Boggy
City of Barnsdall	Osage	Small	Lagoon	Middle Arkansas
City of Bartlesville	Washington	Medium	Mechanical - Advanced	Middle Arkansas
City of Beggs / Beggs PWA	Okmulgee	Small	Lagoon - Advanced	Eufaula
City of Bethany / Bethany / Warr Acres PWA	Oklahoma	Medium	Mechanical - Advanced	Central
City of Blanchard / Blanchard Mia	McClain	Medium	Lagoon	Central
City of Boise City	Cimarron	Small	Lagoon - Total Retention	Panhandle
City of Bokchito	Bryan	Small	Lagoon	Blue-Boggy
City of Braman	Kay	Small	Mechanical	Upper Arkansas
City of Bristow / Bristow Municipal Authority	Creek	Medium	Mechanical - Advanced	Central
City of Broken Arrow and Broken Arrow Municipal Authority	Tulsa	Medium	Mechanical	Middle Arkansas
City of Cache / Cache PWA	Comanche	Small	Lagoon	Beaver-Cache
City of Canton	Blaine	Small	Lagoon	Central

Table A-4 - OCWP Wastewater Utilities by Size and Treatment Type for all Regions

Name of Utility	County	2060 Utility Size	Treatment Type	Region
City of Checotah/Checotah PWA	McIntosh	Medium	Mechanical - Advanced	Lower Arkansas
City of Chelsea/Chelsea Economic Development Authority	Rogers	Medium	Lagoon - Advanced	Grand
City of Cherokee	Alfalfa	Small	Lagoon	Upper Arkansas
City of Choctaw / Choctaw Utility Authority	Oklahoma	Medium	Mechanical - Advanced	Central
City of Cleveland / Cleveland PWA	Pawnee	Medium	Mechanical	Upper Arkansas
City of Clintion	Custer	Medium	Mechanical - Advanced	West Central
City of Comanche	Stephens	Small	Lagoon	Beaver-Cache
City of Commerce	Ottawa	Medium	Lagoon - Advanced	Grand
City of Cushing	Payne	Medium	Mechanical - Advanced	Upper Arkansas
City of Custer / Custer City PWA	Custer	Small	Lagoon - Total Retention	West Central
City of Davis	Murray	Medium	Mechanical	Lower Washita
City of Del City / Del City Municipal Service Auth	Oklahoma	Medium	Mechanical	Central
City of Delaware	Nowata	Small	Lagoon	Middle Arkansas
City of Dewey	Washington	Medium	Mechanical	Middle Arkansas
City of Duncan / Duncan Public Utilities Authority	Stephens	Medium	Mechanical	Beaver-Cache
City of Edmond / Edmond PWA	Oklahoma	Medium	Mechanical - Advanced	Central
City of El Reno	Canadian	Medium	Lagoon - Total Retention	Central
City of Elgin	Comanche	Small	Lagoon	Beaver-Cache
City of Elk City	Beckham	Medium	Mechanical - Advanced	Southwest
City of Elmore City	Garvin	Small	Lagoon	Lower Washita
City of Enid and/or Enid Municipal Authority	Garfield	Medium	Mechanical - Advanced	Upper Arkansas
City of Enid, N	Garfield	Small	Lagoon	Upper Arkansas
City of Erick	Beckham	Small	Lagoon	Southwest
City of Eufaula / Eufaula PWA	McIntosh	Medium	Mechanical - Advanced	Eufaula
City of Fairland / Fairland PWA	Ottawa	Small	Lagoon	Grand
City of Fort Cobb	Caddo	Small	Lagoon - Total Retention	West Central
City of Garber	Garfield	Small	Lagoon	Upper Arkansas
City of Geary / Geary Utility Trust Authority	Blaine	Small	Lagoon - Advanced	Central
City of Grandfield	Tillman	Small	Lagoon	Beaver-Cache
City of Guthrie / Guthrie PWA	Logan	Medium	Mechanical	Central
City of Haileyville / Haileyville PWA	Pittsburg	Small	Mechanical - Advanced	Eufaula
City of Hammon	Roger Mills	Small	Lagoon	West Central

Table A-4 - OCWP Wastewater Utilities by Size and Treatment Type for all Regions

Name of Utility	County	2060 Utility Size	Treatment Type	Region
City of Hardesty	Texas	Small	Lagoon - Total Retention	Panhandle
City of Hartshorne	Pittsburg	Small	Mechanical - Advanced	Eufaula
City of Healdton	Carter	Medium	Mechanical	Lower Washita
City of Heavener / Heavener Utility Authority	Leflore	Medium	Lagoon - Advanced	Lower Arkansas
City of Henryetta/Henryetta Municipal Authority	Okmulgee	Medium	Mechanical - Advanced	Eufaula
City of Holdenville / Holdenville PWA	Hughes	Medium	Mechanical - Advanced	Central
City of Hollis	Harmon	Small	Lagoon	Southwest
City of Hominy / Hominy PWA	Osage	Medium	Mechanical - Advanced	Middle Arkansas
City of Hooker	Texas	Medium	Lagoon - Total Retention	Panhandle
City of Hydro	Caddo	Small	Mechanical	West Central
City of Idabel	McCurtain	Medium	Mechanical - Advanced	Southeast
City of Indiahoma / Indiahoma PWA	Comanche	Small	Lagoon - Total Retention	Beaver-Cache
City of Jenks / Jenks PWA	Tulsa	Medium	Mechanical	Middle Arkansas
City of Jennings	Pawnee	Small	Lagoon - Total Retention	Upper Arkansas
City of Jet	Alfalfa	Small	Lagoon	Upper Arkansas
City of Kiefer / Kiefer PWA	Creek	Small	Lagoon	Middle Arkansas
City of Kingfisher / Kingfisher PWA	Kingfisher	Medium	Mechanical - Advanced	Central
City of Kiowa	Pittsburg	Small	Lagoon - Total Retention	Lower Arkansas
City of Konawa / Konawa PWA	Seminole	Small	Mechanical - Advanced	Central
City of Lawton / Lawton Water Authority	Comanche	Large	Mechanical - Advanced	Beaver-Cache
City of Lindsay	Garvin	Small	Lagoon	Lower Washita
City of Lone Grove / Water & Sewer Trust	Carter	Medium	Lagoon - Advanced	Lower Washita
City of Lone Wolf / Lone Wolf PWA	Kiowa	Small	Lagoon	Southwest
City of Mangum	Greer	Small	Lagoon	Southwest
City of Marietta / Marietta PWA	Love	Medium	Mechanical	Lower Washita
City of Marlow	Stephens	Medium	Lagoon - Total Retention	Lower Washita
City of Maud / Maud Municipal Authority	Pottawatomie	Small	Mechanical	Central
City of McAlester	Pittsburg	Medium	Mechanical - Advanced	Eufaula
City of Medford	Grant	Small	Lagoon	Upper Arkansas
City of Midwest City	Oklahoma	Medium	Mechanical	Central

Table A-4 - OCWP Wastewater Utilities by Size and Treatment Type for all Regions

Name of Utility	County	2060 Utility Size	Treatment Type	Region
City of Mill Creek / Mill Creek PWA	Johnston	Small	Lagoon	Lower Washita
City of Minco	Grady	Small	Lagoon	Central
City of Moore / Moore PWA	Cleveland	Medium	Mechanical - Advanced	Central
City of Morris / Morris PWA	Okmulgee	Small	Lagoon	Eufaula
City of Mulhall	Logan	Small	Lagoon - Total Retention	Upper Arkansas
City of Muskogee / Muskogee Municipal Authority	Muskogee	Medium	Mechanical	Lower Arkansas
City of New Cordell / New Cordell Authority Utility	Washita	Medium	Lagoon	West Central
City of Newkirk / Newkirk Municipal Authority	Kay	Small	Lagoon	Upper Arkansas
City of Noble / Noble Utility Authority	Cleveland	Medium	Mechanical	Central
City of Norman / Norman Utility Authority	Cleveland	Large	Mechanical - Advanced	Central
City of Nowata / Nowata Municipal Authority	Nowata	Medium	Mechanical	Middle Arkansas
City of Okmulgee	Okmulgee	Medium	Mechanical - Advanced	Eufaula
City of Owasso / Owasso PWA	Tulsa	Medium	Mechanical - Advanced	Middle Arkansas
City of Panama / Panama PWA	Leflore	Small	Lagoon	Lower Arkansas
City of Pauls Valley / Pauls Valley Municipal Auth	Garvin	Medium	Mechanical	Lower Washita
City of Pawhuska	Osage	Medium	Lagoon	Middle Arkansas
City of Pawnee / Pawnee PWA	Pawnee	Medium	Mechanical - Advanced	Upper Arkansas
City of Perkins / Perkins PWA	Payne	Medium	Lagoon	Upper Arkansas
City of Perry	Noble	Medium	Mechanical	Upper Arkansas
City of Picher / Picher PWA	Ottawa	Small	Lagoon - Advanced	Grand
City of Ponca City / Ponca City PUA	Kay	Medium	Mechanical	Upper Arkansas
City of Pond Creek	Grant	Small	Lagoon	Upper Arkansas
City of Porum	Muskogee	Small	Lagoon	Lower Arkansas
City of Poteau / Poteau PWA	Leflore	Medium	Mechanical - Advanced	Lower Arkansas
City of Prague /Prague Public Works Authority	Lincoln	Medium	Lagoon	Central
City of Pryor / Municipal Utility Board	Mayes	Medium	Mechanical - Advanced	Grand
City of Purcell	McClain	Medium	Mechanical	Central
City of Quapaw / Quapaw PWA	Ottawa	Small	Lagoon	Grand
City of Quinton	Pittsburg	Small	Lagoon	Lower Arkansas
City of Ralston / Ralston PWA	Pawnee	Small	Lagoon	Upper Arkansas
City of Ratliff / Ratliff Water Trust Authority	Carter	Small	Lagoon - Total Retention	Lower Washita
City of Roff	Pontotoc	Small	Lagoon - Total Retention	Blue-Boggy

Table A-4 - OCWP Wastewater Utilities by Size and Treatment Type for all Regions

Name of Utility	County	2060 Utility Size	Treatment Type	Region
City of Roosevelt / Roosevelt PWA	Kiowa	Small	Lagoon	Southwest
City of Sallisaw	Sequoyah	Medium	Mechanical - Advanced	Lower Arkansas
City of Sand Springs / Sand Springs Municipal Auth	Tulsa	Medium	Mechanical	Middle Arkansas
City of Sayre	Beckham	Medium	Mechanical	Southwest
City of Seiling or PWA	Dewey	Small	Lagoon - Total Retention	Panhandle
City of Seminole / Seminole Utility Authority	Seminole	Medium	Mechanical - Advanced	Eufaula
City of Shattuck/Shattuck Municipal Authority	Ellis	Small	Lagoon - Total Retention	Panhandle
City of Shidler	Osage	Small	Lagoon	Upper Arkansas
City of Snyder / Snyder PWA	Kiowa	Small	Lagoon	Southwest
City of Soper	Choctaw	Small	Lagoon	Blue-Boggy
City of Spencer	Oklahoma	Medium	Mechanical	Central
City of Sportsman Acres	Mayes	Small	Lagoon - Total Retention	Grand
City of Stigler / Stigler Municipal Improvement Authority	Haskell	Medium	Lagoon	Lower Arkansas
City of Sulphur / Sulphur Municipal Authority	Murray	Medium	Mechanical - Advanced	Lower Washita
City of Tatum / Tatums Board of Trustees	Carter	Small	Lagoon - Total Retention	Lower Washita
City of Tecumseh / Tecumseh PWA	Pottawatomie	Medium	Mechanical - Advanced	Central
City of Tishomingo/Tishomingo Ma	Johnston	Medium	Mechanical - Advanced	Lower Washita
City of Tonkawa / Tonkawa Municipal Authority	Kay	Medium	Lagoon - Advanced	Upper Arkansas
City of Union City / Union City Municipal Authority	Canadian	Small	Lagoon	Central
City of Valliant / Valliant PWA	McCurtain	Small	Lagoon	Southeast
City of Verden	Grady	Small	Lagoon	Lower Washita
City of Vinita /Vinita Utility Trust Authority	Craig	Medium	Mechanical - Advanced	Grand
City of Wakita	Grant	Small	Lagoon - Total Retention	Upper Arkansas
City of Walters / Walters PWA	Cotton	Small	Lagoon - Total Retention	Beaver-Cache
City of Wanette	Pottawatomie	Small	Lagoon	Central
City of Watonga	Blaine	Medium	Mechanical - Advanced	Central
City of Waurika / Waurika PWA	Jefferson	Small	Mechanical	Beaver-Cache
City of Waynoka	Woods	Small	Lagoon	Panhandle
City of Wetumka	Hughes	Small	Lagoon	Eufaula
City of Wewoka	Seminole	Medium	Mechanical	Eufaula

Table A-4 - OCWP Wastewater Utilities by Size and Treatment Type for all Regions

Name of Utility	County	2060 Utility Size	Treatment Type	Region
City of Wilburton	Latimer	Medium	Lagoon - Advanced	Lower Arkansas
City of Willow / Willow Municipal Authority	Greer	Small	Lagoon	Southwest
City of Wister	Leflore	Small	Mechanical - Advanced	Lower Arkansas
City of Woodward/Woodward Municipal Authority	Woodward	Medium	Mechanical - Advanced	Panhandle
City of Yukon / Yukon Water Department	Canadian	Medium	Mechanical	Central
Clayton PWA	Pushmataha	Small	Lagoon	Southeast
Cleveland North WWT	Pawnee	Small	Lagoon - Total Retention	Upper Arkansas
Coalgate PWA	Coal	Medium	Lagoon	Blue-Boggy
Collinsville Municipal Authority	Tulsa	Medium	Lagoon	Middle Arkansas
Cotton Co RWD #1	Cotton	Small	Lagoon - Total Retention	Beaver-Cache
Coweta PWA	Wagoner	Medium	Lagoon	Middle Arkansas
Coyle PWA WWT	Logan	Small	Lagoon - Total Retention	Upper Arkansas
Crescent / Crescent PWA	Logan	Medium	Lagoon	Central
Crowder PWA	Pittsburg	Small	Lagoon - Total Retention	Eufaula
Crystall Lakes Lagoons WWT	McClain	Small	Lagoon - Total Retention	Central
Davenport Utility Authority	Lincoln	Small	Lagoon	Central
Dewey Co RWSD #2	Dewey	Small	Lagoon - Total Retention	West Central
Dill City WWT	Washita	Small	Lagoon - Total Retention	Southwest
Drumright Utility Trust	Creek	Medium	Mechanical	Upper Arkansas
Duggins # 2 WWT	Comanche	Small	Lagoon - Total Retention	Beaver-Cache
Durant City Utility Authority	Bryan	Medium	Lagoon - Advanced	Blue-Boggy
Dustin PWA / Town of Dustin	Hughes	Small	Lagoon	Eufaula
Earlsboro Public Works Authority	Pottawatomie	Small	Lagoon - Advanced	Eufaula
Fairfax PWA	Osage	Small	Lagoon	Upper Arkansas
Fairview Utilities Authority	Major	Medium	Lagoon - Advanced	Central
Fargo WWT	Ellis	Small	Lagoon - Total Retention	Panhandle
Fletcher WWT	Comanche	Small	Lagoon - Total Retention	Beaver-Cache

Table A-4 - OCWP Wastewater Utilities by Size and Treatment Type for all Regions

Name of Utility	County	2060 Utility Size	Treatment Type	Region
Fort Gibson Utility Authority	Muskogee	Medium	Lagoon	Grand
Fort Oakland-Tonkawa Tribal Auth WWT	Kay	Small	Lagoon - Total Retention	Upper Arkansas
Fox RWD # 1 WWT	Carter	Small	Lagoon - Total Retention	Lower Washita
Francis PWA	Pontotoc	Small	Lagoon	Central
Frederick / Frederick PWA	Tillman	Medium	Lagoon	Beaver-Cache
Freedom WWT	Woods	Small	Lagoon - Total Retention	Panhandle
Garrett Mhp	McClain	Small	Lagoon - Total Retention	Central
Geronimo South WWT	Washita	Small	Lagoon - Total Retention	Southwest
Glencoe SW WWT	Payne	Small	Lagoon - Total Retention	Upper Arkansas
Glenpool Utility Service Authority	Tulsa	Medium	Lagoon	Middle Arkansas
Goltry PWA	Alfalfa	Small	Lagoon	Central
Gotebo WWT	Kiowa	Small	Lagoon - Total Retention	West Central
Gould WWT	Harmon	Small	Lagoon - Total Retention	Southwest
Gracemont PWA	Caddo	Small	Lagoon	Lower Washita
Grady Co RWD # 7 (Ninnekah) WWT	Grady	Small	Lagoon - Total Retention	Lower Washita
Grady RWD # 2 WWT	Grady	Small	Lagoon - Total Retention	Lower Washita
Grandfield	Tillman	Small	Lagoon - Total Retention	Beaver-Cache
Grove Municipal Services Authority / City of Grove	Delaware	Medium	Mechanical - Advanced	Grand
Guymon / Guymon Utility Authority	Texas	Medium	Lagoon	Panhandle
Hall Park	Cleveland	Small	Lagoon - Total Retention	Central
Hardesty Utilities	Texas	Small	Lagoon - Total Retention	Panhandle
Haskell Co RWD #2	Haskell	Small	Lagoon	Lower Arkansas
Haskell PWA	Muskogee	Small	Lagoon	Middle Arkansas
Hastings RWD #1 WWT	Jefferson	Small	Lagoon - Total Retention	Beaver-Cache

Table A-4 - OCWP Wastewater Utilities by Size and Treatment Type for all Regions

Name of Utility	County	2060 Utility Size	Treatment Type	Region
Headrick WWT	Jackson	Small	Lagoon - Total Retention	Southwest
Hillsdale WWT	Garfield	Small	Lagoon - Total Retention	Upper Arkansas
Hitchcock Development Inc.	Blaine	Small	Lagoon	Central
Hobart Public Works Authority	Kiowa	Medium	Lagoon - Advanced	Southwest
Hollister	Tillman	Small	Lagoon - Total Retention	Beaver-Cache
Hugo Municipal Authority	Choctaw	Medium	Mechanical	Southeast
Hugo Municipal Authority	Choctaw	Medium	Mechanical - Advanced	Blue-Boggy
Hulbert PWA	Cherokee	Small	Lagoon	Grand
Indiahoma / Indiahoma PWA	Comanche	Small	Lagoon - Total Retention	Beaver-Cache
Johnston RWD #1 (Milburn) WWT	Johnston	Small	Lagoon - Total Retention	Blue-Boggy
Kansas WWT	Delaware	Small	Lagoon - Total Retention	Grand
Kellyville PWA	Creek	Small	Lagoon	Middle Arkansas
Kendrick Municipal Authority	Lincoln	Small	Lagoon	Upper Arkansas
Kenwood - Cherokee Ntn WWT	Delaware	Small	Lagoon - Total Retention	Grand
Keota PWA	Haskell	Small	Lagoon	Lower Arkansas
Ketchum PWA	Craig	Small	Mechanical - Advanced	Grand
Kiowa Co Rws And Swmd #1 WWT	Kiowa	Small	Lagoon - Total Retention	Southwest
Krebs Utility Authority	Pittsburg	Small	Lagoon - Advanced	Eufaula
Langley PWA	Mayes	Small	Mechanical	Grand
Langston PWA	Logan	Medium	Mechanical	Upper Arkansas
Lexington PWA	Cleveland	Small	Mechanical	Central
Lincoln Co. RWSD # 4	Lincoln	Small	Lagoon - Advanced	Central
Locust Grove PWA	Mayes	Small	Mechanical - Advanced	Grand
Logan County RWD # 1 WWT	Logan	Small	Lagoon - Total Retention	Central
Longdale WWT	Blaine	Small	Lagoon - Total Retention	Central
Luther PWA	Oklahoma	Small	Lagoon	Central
Luther WWT	Oklahoma	Small	Lagoon - Total Retention	Central

Table A-4 - OCWP Wastewater Utilities by Size and Treatment Type for all Regions

Name of Utility	County	2060 Utility Size	Treatment Type	Region
Madill PWA	Marshall	Medium	Mechanical - Advanced	Lower Washita
Manchester WWT	Grant	Small	Lagoon - Total Retention	Upper Arkansas
Mannford PWA	Creek	Small	Mechanical	Upper Arkansas
Mannsville WWT	Johnston	Small	Lagoon - Total Retention	Lower Washita
Marble City WWT	Sequoyah	Small	Lagoon - Total Retention	Lower Arkansas
Martha WWT	Jackson	Small	Lagoon - Total Retention	Southwest
McCurtain Municipal Authority	Haskell	Small	Lagoon	Lower Arkansas
McLeod PWA	Pottawatomie	Medium	Mechanical	Central
Medicine Park WWT	Comanche	Small	Lagoon - Total Retention	Beaver-Cache
Miami Special Utility Authority	Ottawa	Medium	Mechanical	Grand
Millerton PWA	McCurtain	Small	Lagoon	Southeast
Morrison North WWT	Noble	Small	Lagoon - Total Retention	Upper Arkansas
Morrison PWA	Noble	Small	Lagoon	Upper Arkansas
Morrison South WWT	Washita	Small	Lagoon - Total Retention	Southwest
Muldrow Public Works Authority	Sequoyah	Medium	Mechanical	Lower Arkansas
Mulhall WWT	Logan	Small	Lagoon - Total Retention	Upper Arkansas
Mustang Improvement Authority	Canadian	Medium	Mechanical - Advanced	Central
Oakland PWA	Marshall	Small	Lagoon	Lower Washita
Oakwood WWT	Dewey	Small	Lagoon - Total Retention	West Central
Ochelata Utility Authority	Washington	Small	Lagoon	Middle Arkansas
Ofuskee Co RWD #1	Okfuskee	Small	Lagoon	Central
Okay PWA	Wagoner	Small	Lagoon	Middle Arkansas
Okeene	Blaine	Small	Lagoon	Central
Okemah Utility Authority	Okfuskee	Medium	Lagoon - Advanced	Central
Oklahoma City Water Utilities Trust	Oklahoma	Large	Mechanical - Advanced	Central
Olustee WWT	Jackson	Small	Lagoon - Total Retention	Southwest
Oolagah PWA	Rogers	Small	Mechanical - Advanced	Middle Arkansas
Otoe-Missouria Tribe of Oklahoma	Noble	Small	Mechanical - Advanced	Upper Arkansas

Table A-4 - OCWP Wastewater Utilities by Size and Treatment Type for all Regions

Name of Utility	County	2060 Utility Size	Treatment Type	Region
Ottawa Co RWSD #1	Ottawa	Small	Mechanical - Advanced	Grand
Paden Utility Authority	Okfuskee	Small	Lagoon	Central
Pensacola PWA	Mayes	Small	Mechanical	Grand
Piedmont Municipal Water Authority	Canadian	Small	Lagoon - Total Retention	Central
Pittsburg PWA	Pittsburg	Small	Lagoon	Eufaula
Porter PWA	Wagoner	Small	Mechanical	Middle Arkansas
Pottawatomie Co Sewer Dist #1 WWT	Pottawatomie	Small	Lagoon - Total Retention	Central
Ramona PWA	Washington	Small	Lagoon	Middle Arkansas
Ravia PWA	Johnston	Small	Lagoon - Total Retention	Lower Washita
Region Metropolitan Utility Authority (RMUA)	Tulsa	Medium	Mechanical	Middle Arkansas
Reydon WWT	Roger Mills	Small	Lagoon - Total Retention	West Central
Ripley PWA	Payne	Small	Lagoon	Upper Arkansas
Rogers County Rural Sewer District # 1	Rogers	Small	Lagoon	Middle Arkansas
Roland Utility Authority	Sequoyah	Medium	Lagoon - Advanced	Lower Arkansas
Ryan Utilities Authority	Jefferson	Small	Lagoon	Beaver-Cache
Salina PWA	Mayes	Small	Lagoon	Grand
Sapulpa Municipal Authority	Creek	Medium	Lagoon	Middle Arkansas
Sasakwa Municipal Authority	Seminole	Small	Mechanical	Central
Savanna Public Works Authority	Pittsburg	Small	Lagoon - Advanced	Eufaula
Seminole Co RWD #3	Seminole	Small	Mechanical	Central
Shady Point PWA	Leflore	Small	Lagoon	Lower Arkansas
Sharon WWT	Woodward	Small	Lagoon - Total Retention	Panhandle
Shawnee Municipal Authority	Pottawatomie	Medium	Mechanical	Central
Snyder WWT	Kiowa	Small	Lagoon - Total Retention	Southwest
Spavinaw PWA	Mayes	Small	Mechanical - Advanced	Grand
Springer PWA	Carter	Small	Lagoon - Total Retention	Lower Washita
Stephens Co RWD #4 (Loco)	Stephens	Small	Lagoon - Total Retention	Lower Washita
Stephens RW&SD #1 (Velma) WWT	Stephens	Small	Lagoon - Total Retention	Lower Washita
Sterling WWT	Comanche	Small	Lagoon - Total Retention	Beaver-Cache

Table A-4 - OCWP Wastewater Utilities by Size and Treatment Type for all Regions

Name of Utility	County	2060 Utility Size	Treatment Type	Region
Stillwater Utilities Authority	Payne	Medium	Mechanical - Advanced	Upper Arkansas
Stratford PWA	Garvin	Small	Lagoon	Central
Stringtown PWA	Atoka	Small	Lagoon	Blue-Boggy
Stroud Utilities Authority	Lincoln	Medium	Mechanical	Central
Summit Ridge	Oklahoma	Small	Lagoon - Total Retention	Central
Tahlequah PWA	Cherokee	Medium	Mechanical - Advanced	Lower Arkansas
Tanglewood Bluff WWT	McIntosh	Small	Lagoon - Total Retention	Eufaula
Tatums WWT	Carter	Small	Lagoon - Total Retention	Lower Washita
Temple Utilities Authority	Cotton	Small	Lagoon	Beaver-Cache
Tenkiller Utility Co WWT	Cherokee	Small	Lagoon - Total Retention	Lower Arkansas
Texas Co RSD #1 (Adams) WWT	Texas	Small	Lagoon - Total Retention	Panhandle
Timber Brook WWT	Tulsa	Small	Lagoon - Total Retention	Middle Arkansas
Town of Alderson	Pittsburg	Small	Lagoon	Eufaula
Town of Alex	Grady	Small	Lagoon	Lower Washita
Town of Aline	Alfalfa	Small	Lagoon	Central
Town of Allen	Pontotoc	Small	Lagoon	Blue-Boggy
Town of Ames	Major	Small	Lagoon	Central
Town of Amorita	Alfalfa	Small	Lagoon - Total Retention	Upper Arkansas
Town of Antler / Antlers PWA	Pushmataha	Medium	Mechanical - Advanced	Southeast
Town of Arnett	Ellis	Small	Lagoon	West Central
Town of Beaver	Beaver	Small	Lagoon	Panhandle
Town of Bessie	Washita	Small	Lagoon	West Central
Town of Billings / Billings PWA	Noble	Small	Lagoon - Total Retention	Upper Arkansas
Town of Binger / Binger PWA	Caddo	Small	Lagoon	Lower Washita
Town of Blair / Blair PWA	Jackson	Small	Lagoon - Total Retention	Southwest
Town of Boswell	Choctaw	Small	Lagoon - Advanced	Blue-Boggy
Town of Bowlegs / Bowlegs PWA	Seminole	Small	Lagoon	Central
Town of Boynton	Muskogee	Small	Lagoon	Middle Arkansas
Town of Braggs / Braggs PWA	Muskogee	Small	Mechanical	Lower Arkansas
Town of Buffalo	Harper	Small	Lagoon	Panhandle
Town of Burbank	Osage	Small	Lagoon	Upper Arkansas
Town of Burlington	Alfalfa	Small	Lagoon	Upper Arkansas

Table A-4 - OCWP Wastewater Utilities by Size and Treatment Type for all Regions

Name of Utility	County	2060 Utility Size	Treatment Type	Region
Town of Calera / Calera PWA	Bryan	Small	Lagoon - Advanced	Blue-Boggy
Town of Calvin	Hughes	Small	Lagoon	Central
Town of Cameron / Cameron PWA	Leflore	Small	Lagoon	Lower Arkansas
Town of Carmen / Carmen PWA	Alfalfa	Small	Lagoon	Central
Town of Carter	Beckham	Small	Lagoon - Total Retention	Southwest
Town of Cashion	Kingfisher	Small	Lagoon - Total Retention	Central
Town of Catoosa / Regional Metropolitan Util Auth.	Rogers	Medium	Lagoon - Advanced	Middle Arkansas
Town of Chattanooga / Chattanooga PWA	Comanche	Small	Lagoon - Total Retention	Beaver-Cache
Town of Cheyenne / Cheyenne Utility Authority	Roger Mills	Small	Lagoon - Total Retention	West Central
Town of Choteau / Chouteau PWA	Mayes	Medium	Mechanical	Grand
Town of Cleo Springs / Cleo Springs Municipal Auth	Major	Small	Lagoon - Total Retention	Central
Town of Coffeyville, S	Nowata	Small	Lagoon	Middle Arkansas
Town of Colbert / Colbert Public Utility Authority	Bryan	Small	Lagoon	Blue-Boggy
Town of Colcord / Colcord PWA	Delaware	Small	Lagoon	Grand
Town of Copan/Copan Public Works Authority	Washington	Small	Lagoon	Middle Arkansas
Town of Covington	Garfield	Small	Lagoon	Upper Arkansas
Town of Cyril	Caddo	Small	Lagoon	Lower Washita
Town of Dacoma	Woods	Small	Lagoon	Central
Town of Davidson	Tillman	Small	Lagoon	Beaver-Cache
Town of Deer Creek	Grant	Small	Lagoon	Upper Arkansas
Town of Depew	Creek	Small	Lagoon	Central
Town of Devol	Cotton	Small	Lagoon	Beaver-Cache
Town of Dewar / Dewar PWA	Okmulgee	Small	Lagoon	Eufaula
Town of Dibble	McClain	Small	Lagoon - Total Retention	Central
Town of Dougherty	Murray	Small	Lagoon	Lower Washita
Town of Dover	Kingfisher	Small	Lagoon	Central
Town of Drummond / Drummond Public Work Auth.	Garfield	Small	Lagoon	Central
Town of Duke	Jackson	Small	Lagoon	Southwest
Town of Fairmont	Garfield	Small	Lagoon	Upper Arkansas
Town of Forgan	Beaver	Small	Lagoon - Total Retention	Panhandle
Town of Fort Supply	Woodward	Small	Lagoon	Panhandle
Town of Foss	Washita	Small	Lagoon	West Central
Town of Gage	Ellis	Small	Lagoon	Panhandle

Table A-4 - OCWP Wastewater Utilities by Size and Treatment Type for all Regions

Name of Utility	County	2060 Utility Size	Treatment Type	Region
Town of Gans / Gans Utility Authority	Sequoyah	Small	Lagoon	Lower Arkansas
Town of Geronimo and / or Geronimo Public Works Authority	Comanche	Small	Lagoon - Total Retention	Beaver-Cache
Town of Glencoe	Payne	Small	Mechanical - Advanced	Upper Arkansas
Town of Gore / Gore PWA	Sequoyah	Small	Lagoon	Lower Arkansas
Town of Grant / Choctaw Co RWSD	Choctaw	Small	Lagoon - Advanced	Blue-Boggy
Town of Greenfield / Greenfield Utility Co., Inc.	Blaine	Small	Lagoon - Total Retention	Central
Town of Harrah / Harrah PWA	Oklahoma	Medium	Mechanical	Central
Town of Haworth / Haworth PWA	McCurtain	Small	Lagoon	Lower Arkansas
Town of Helena / Helena PWA	Alfalfa	Small	Lagoon - Total Retention	Central
Town of Hennessey	Kingfisher	Medium	Lagoon - Advanced	Central
Town of Hinton	Caddo	Small	Lagoon	West Central
Town of Howe / Howe RWD #5	Leflore	Small	Mechanical	Lower Arkansas
Town of Hunter	Garfield	Small	Lagoon	Upper Arkansas
Town of Inola / Inola PWA	Rogers	Small	Lagoon	Middle Arkansas
Town of Jay / Jay Utilities Authority	Delaware	Medium	Mechanical - Advanced	Grand
Town of Jones, PWA	Oklahoma	Small	Mechanical	Central
Town of Kaw City	Kay	Small	Mechanical	Upper Arkansas
Town of Keyes	Cimarron	Small	Lagoon - Total Retention	Panhandle
Town of Kingston	Marshall	Medium	Mechanical - Advanced	Lower Arkansas
Town of Kremlin / Kremlin PWA	Garfield	Small	Lagoon	Upper Arkansas
Town of Lahoma	Garfield	Small	Lagoon	Central
Town of Lamont	Grant	Small	Lagoon - Total Retention	Upper Arkansas
Town of Langdale	Blaine	Small	Lagoon - Total Retention	Central
Town of Laverne	Harper	Small	Lagoon	Panhandle
Town of Leedey	Dewey	Small	Lagoon	West Central
Town of Lima / Lima PWA	Seminole	Small	Mechanical	Eufaula
Town of Manitou	Tillman	Small	Lagoon	Beaver-Cache
Town of Mansville	Johnston	Small	Lagoon - Total Retention	Lower Washita
Town of Marland / Marland PWA	Noble	Small	Lagoon	Upper Arkansas
Town of Marshall	Logan	Small	Lagoon	Upper Arkansas
Town of Maysville / Maysville Municipal Authority	Garvin	Small	Lagoon	Lower Washita

Table A-4 - OCWP Wastewater Utilities by Size and Treatment Type for all Regions

Name of Utility	County	2060 Utility Size	Treatment Type	Region
Town of Meeker	Lincoln	Small	Mechanical - Advanced	Central
Town of Meno	Major	Small	Lagoon	Central
Town of Mooreland	Woodward	Small	Lagoon - Total Retention	Panhandle
Town of Mounds / Mounds PWA	Creek	Small	Lagoon	Middle Arkansas
Town of Mountain Park	Kiowa	Small	Lagoon	Southwest
Town of Mountain View / Mountain View PWA	Kiowa	Small	Lagoon	West Central
Town of Nash / Nash PWA	Grant	Small	Lagoon - Advanced	Upper Arkansas
Town of Okarche	Kingfisher	Small	Lagoon - Total Retention	Central
Town of Oktaha	Muskogee	Small	Lagoon	Lower Arkansas
Town of Paoli	Garvin	Small	Lagoon	Lower Washita
Town of Pocassett	Grady	Small	Lagoon	Lower Washita
Town of Pocola / Pocola Municipal Authority	Leflore	Medium	Mechanical	Lower Arkansas
Town of Red Bird / Red Bird PWA	Wagoner	Small	Lagoon - Total Retention	Middle Arkansas
Town of Red Oak / Red Oak PWA	Latimer	Small	Lagoon	Lower Arkansas
Town of Red Rock / Red Rock PWA	Noble	Small	Lagoon	Upper Arkansas
Town of Ringling / Ringling Municipal Authority	Jefferson	Small	Lagoon	Lower Washita
Town of Ringwood	Major	Small	Lagoon	Central
Town of Rocky	Washita	Small	Lagoon	Southwest
Town of Rush Springs /Rush Spr. Municipal Improvement Authority	Grady	Small	Lagoon - Total Retention	Lower Washita
Town of Sentinel PWA	Washita	Small	Lagoon - Total Retention	Southwest
Town of Skiatook / Skiatook Public Work Authority	Tulsa	Medium	Lagoon	Middle Arkansas
Town of Sperry / Sperry Utility Service Authority	Tulsa	Small	Lagoon	Middle Arkansas
Town of Spiro / Spiro Municipal Improvement Authority	Leflore	Small	Mechanical	Lower Arkansas
Town of Stonewall / Stonewall PWA	Pontotoc	Small	Lagoon - Advanced	Blue-Boggy
Town of Stuart / Stuart PWA	Hughes	Small	Lagoon	Eufaula
Town of Tahilina / Tahilina PWA	Leflore	Small	Lagoon	Southeast
Town of Talala / Talala PWA	Rogers	Small	Lagoon	Middle Arkansas
Town of Taloga	Dewey	Small	Lagoon - Total Retention	West Central
Town of Terral / Terral PWA	Jefferson	Small	Lagoon - Total Retention	Lower Washita

Table A-4 - OCWP Wastewater Utilities by Size and Treatment Type for all Regions

Name of Utility	County	2060 Utility Size	Treatment Type	Region
Town of Texhoma / Texhoma PWA	Texas	Small	Mechanical	Panhandle
Town of Thomas	Custer	Small	Lagoon	West Central
Town of Tipton / Tipton PWA	Tillman	Small	Lagoon	Southwest
Town of Tupelo	Coal	Small	Lagoon	Central
Town of Tuttle	Grady	Medium	Lagoon	Central
Town of Valley Brook	Oklahoma	Small	Mechanical	Central
Town of Velma / Velma PWA	Stephens	Small	Lagoon	Lower Washita
Town of Vian / Vian Utility Authority	Sequoyah	Small	Lagoon - Advanced	Lower Arkansas
Town of Vici	Dewey	Small	Lagoon - Total Retention	Panhandle
Town of Warner/Warner Utilities Authority	Muskogee	Small	Lagoon	Lower Arkansas
Town of Washington/Washington Municipal Authority	McClain	Small	Lagoon	Central
Town of Waukomis	Garfield	Small	Lagoon	Upper Arkansas
Town of Wayne	McClain	Small	Lagoon	Southwest
Town of Webbers Falls	Muskogee	Small	Lagoon	Lower Arkansas
Town of Weleetka	Okfuskee	Small	Lagoon	Eufaula
Town of White Eagle	Kay	Small	Lagoon	Upper Arkansas
Town of Whitefield / Haskell RWD #2	Haskell	Small	Lagoon	Lower Arkansas
Town Or Newcastle / Newcastle PWA	McClain	Medium	Mechanical	Central
Tryon Utility Authority	Lincoln	Small	Lagoon	Upper Arkansas
Tulsa Metropolitan Utility Authority	Tulsa	Large	Mechanical - Advanced	Middle Arkansas
Wagoner County Rural Water & Sewer Dist. #4	Wagoner	Medium	Lagoon - Advanced	Middle Arkansas
Wagoner PWA	Wagoner	Medium	Mechanical - Advanced	Middle Arkansas
Wapanucka PWA	Johnston	Small	Lagoon - Advanced	Blue-Boggy
Watts PWA	Adair	Small	Lagoon - Total Retention	Lower Arkansas
Waurika Sewage Plant	Jefferson	Small	Lagoon - Total Retention	Beaver-Cache
Weatherford PWA	Custer	Medium	Mechanical - Advanced	West Central
Welch / Welch PWA	Craig	Small	Lagoon	Grand
Wellston PWA	Lincoln	Small	Lagoon	Central
Westville Utility Authority	Adair	Small	Lagoon - Advanced	Lower Arkansas
White Eagle WWT	Woods	Small	Lagoon - Total Retention	Central
Wilson PWA	Carter	Small	Lagoon	Lower Washita
Wright City PWA	McCurtain	Small	Mechanical - Advanced	Southeast

Table A-4 - OCWP Wastewater Utilities by Size and Treatment Type for all Regions

Name of Utility	County	2060 Utility Size	Treatment Type	Region
Wynnewood City Utility Authority	Garvin	Small	Mechanical	Lower Washita
Wynona Municipal Authority / Town of Wynona	Osage	Small	Lagoon	Middle Arkansas
Yale Water & Sewage Trust	Payne	Small	Mechanical - Advanced	Upper Arkansas

Appendix B
Wastewater Cost Models

Appendix B
Wastewater Cost Models

The cost models used in this study are listed in **Table B-1**. Reference tables for the pipeline cost models are provided in **Table B-2**. Most of the cost models are based on the U.S. Environmental Protection Agency's (EPA) most recent assessment of the nation's wastewater systems and uses the results for allocating the Clean Water State Revolving Fund.

The most recent EPA survey was completed in 2008. The report *Clean Watersheds Needs Survey 2008 Report to Congress* presents the methodology utilized by EPA to determine wastewater needs and results from the survey. When cost estimates were unavailable, EPA utilized cost models to estimate the project costs. The report *Clean Watersheds Needs Survey 2008 Cost Curves* (cost models) documents these cost models. In this OCWP report, the term "2008 CWNS" is used to reference the actual survey and all documentation related specifically to this survey. Cost models from the 2008 CWNS used in the OCWP are designated by "CWNS" in the model name. The 2008 CWNS offered other cost models that were not used in this project either because the type of project described was not applicable or, in the case of lagoon projects, the cost resulting from the model was unreasonable when compared.

The EPA survey did not take into account wastewater treatment plants with design flows of 10 mgd or greater, collection system improvements split by pipeline and lift stations, and solids handling processes. Cost models for these items were developed using CDM Smith's nationwide database of project estimates and bid prices. High level estimates (based on greater than 90 percent design level) plus 30 percent contingency and 20 percent allowance for engineering, administration, and legal costs were used to develop cost models for wastewater treatment plants with flows of 10 mgd or greater, lift station, and solids handling processes. For collection pipeline costs, project cost estimates were developed for a variety of pipeline sizes given typical design parameters such as trench width, depth, and bedding materials. The cost models distinguish between construction in normal and rocky native soils.

Table B-1 OCWP Wastewater Cost Models

Curve Number	Curve Name	Description	Parameter(s) required for modeling	Min Value	Max Value	Cost ENR Value	Equation [A]	R2 Value [B]	Cost Source	CWNS Curve Number Reference
CWNS-8A-Cat II Only	Increase Capacity - Mechanical - Advanced - BOD plus other	Increase Capacity of mechanical treatment plant with advanced treatment requirements (BOD and at least 1 other advanced treatment indicator)	Future Flow (mgd), Present Flow (mgd)	0	0.9999	5523	=((8179.25*1000*FF^1.030 + 0.327*1000*FF^0.496) - (8179.25*1000*PF^1.030 + 0.327*1000*PF^0.496))	n/a	EPA, Clean Watersheds Needs Survey (CWNS) 2008 Cost Curves	2A and 6
CWNS-8B-Cat II Only	Increase Capacity - Mechanical - Advanced - BOD plus other	Increase Capacity of mechanical treatment plant with advanced treatment requirements (BOD and at least 1 other advanced treatment indicator)	Future Flow (mgd), Present Flow (mgd)	1	9.9999	5523	=((8179.25*1000*FF^0.903 + 0.327*1000*FF^0.496) - (8179.25*1000*PF^0.903 + 0.327*1000*PF^0.496))	n/a	EPA, Clean Watersheds Needs Survey (CWNS) 2008 Cost Curves	2A and 6
CWNS-14A-Cat I	Increase Treatment - Mechanical - Primary to Advanced BOD plus other	Increase treatment of mechanical treatment plant from primary to advanced treatment requirements (BOD and at least 1 other advanced treatment indicator)	Future Flow (mgd)	0	0.9999	5523	=0.72*((8179.25*1000*FF^1.030) - (1.195*1000*FF^0.84))	n/a	EPA, Clean Watersheds Needs Survey (CWNS) 2008 Cost Curves	2A and SB

Table B-1 OCWP Wastewater Cost Models

Curve Number	Curve Name	Description	Parameter(s) required for modeling	Min Value	Max Value	Cost ENR Value	Equation [A]	R2 Value [B]	Cost Source	CWNS Curve Number Reference
CWNS-14A-Cat II	Increase Treatment - Mechanical - Primary to Advanced BOD plus other	Increase treatment of mechanical treatment plant from primary to advanced treatment requirements (BOD and at least 1 other advanced treatment indicator)	Future Flow (mgd)	0	0.9999	5523	=.28*((8179.25*1000*FF^1.030) - (1.195*1000*FF^0.84))	n/a	EPA, Clean Watersheds Needs Survey (CWNS) 2008 Cost Curves	2A and SB
CWNS-14A-Cat II Only	Increase Treatment - Mechanical - Primary to Advanced BOD plus other	Increase treatment of mechanical treatment plant from primary to advanced treatment requirements (BOD and at least 1 other advanced treatment indicator)	Future Flow (mgd)	0	0.9999	5523	=((8179.25*1000*FF^1.030) - (1.195*1000*FF^0.84))	n/a	EPA, Clean Watersheds Needs Survey (CWNS) 2008 Cost Curves	2A and SB
CWNS-14B-Cat I	Increase Treatment - Mechanical - Primary to Advanced BOD plus other	Increase treatment of mechanical treatment plant from primary to advanced treatment requirements (BOD and at least 1 other advanced treatment indicator)	Future Flow (mgd)	1	9.9999	5523	=0.72*((8179.25*1000*FF^0.903) - (1.195*1000*FF^0.84))	n/a	EPA, Clean Watersheds Needs Survey (CWNS) 2008 Cost Curves	2A and SB

Table B-1 OCWP Wastewater Cost Models

Curve Number	Curve Name	Description	Parameter(s) required for modeling	Min Value	Max Value	Cost ENR Value	Equation [A]	R2 Value [B]	Cost Source	CWNS Curve Number Reference
CWNS-14B-Cat II	Increase Treatment - Mechanical - Primary to Advanced BOD plus other	Increase treatment of mechanical treatment plant from primary to advanced treatment requirements (BOD and at least 1 other advanced treatment indicator)	Future Flow (mgd)	1	9.9999	5523	=0.28*((8179.25*1000*FF^0.903) - (1.195*1000*FF^0.84))	n/a	EPA, Clean Watersheds Needs Survey (CWNS) 2008 Cost Curves	2A and SB
CWNS-16A	Increase Treatment - Mechanical - Secondary to Advanced BOD plus other	Increase treatment of mechanical plant from secondary to advanced treatment requirements (BOD and at least 1 other advanced treatment indicator)	Future Flow (mgd)	0	0.9999	5523	=(8179.25*1000*FF^1.030) - (5188.73*1000*FF^0.835)	n/a	EPA, Clean Watersheds Needs Survey (CWNS) 2008 Cost Curves	2A and 1
CWNS-16B	Increase Treatment - Mechanical - Secondary to Advanced BOD plus other	Increase treatment of mechanical plant from secondary to advanced treatment requirements (BOD and at least 1 other advanced treatment indicator)	Future Flow (mgd)	1	9.9999	5523	=(8179.25*1000*FF^0.903) - (5188.73*1000*FF^0.835)	n/a	EPA, Clean Watersheds Needs Survey (CWNS) 2008 Cost Curves	2A and 1

Table B-1 OCWP Wastewater Cost Models

Curve Number	Curve Name	Description	Parameter(s) required for modeling	Min Value	Max Value	Cost ENR Value	Equation [A]	R2 Value [B]	Cost Source	CWNS Curve Number Reference
CWNS-21B-Cat I	Increase Treatment and Capacity - Mechanical - Primary to Advanced BOD plus other	Increase treatment of mechanical treatment plant from primary to advanced treatment requirements (BOD and at least 1 other advanced treatment indicator)	Future Flow (mgd), Present Flow (mgd)	1	9.9999	5523	=0.72*(((8179.25*1000*FF^0.903) - (1.195*1000*FF^0.84)) - ((8179.25*1000*PF^0.903) - (1.195*1000*PF^0.84)))	n/a	EPA, Clean Watersheds Needs Survey (CWNS) 2008 Cost Curves	2A and SB
CWNS-21B-Cat II	Increase Treatment and Capacity - Mechanical - Primary to Advanced BOD plus other	Increase treatment of mechanical treatment plant from primary to advanced treatment requirements (BOD and at least 1 other advanced treatment indicator)	Future Flow (mgd), Present Flow (mgd)	1	9.9999	5523	=0.28*(((8179.25*1000*FF^0.903) - (1.195*1000*FF^0.84)) - ((8179.25*1000*PF^0.903) - (1.195*1000*PF^0.84)))	n/a	EPA, Clean Watersheds Needs Survey (CWNS) 2008 Cost Curves	2A and SB
CWNS-27	Replace Treatment - Mechanical - Secondary	Replace treatment with mechanical plant with secondary effluent limits	Future Flow (mgd)	0	9.9999	5523	=(5188.73*1000*FF^0.853) + (0.327*1000*FF^0.496) + (0.77*1000*FF^0.527)	n/a	EPA, Clean Watersheds Needs Survey (CWNS) 2008 Cost Curves	1, 6, and 5

Table B-1 OCWP Wastewater Cost Models

Curve Number	Curve Name	Description	Parameter(s) required for modeling	Min Value	Max Value	Cost ENR Value	Equation [A]	R2 Value [B]	Cost Source	CWNS Curve Number Reference
CWNS-29A-Cat II Only	Replace Treatment - Mechanical - Advanced BOD plus other	Replace treatment with mechanical plant with advanced treatment requirements (BOD and at least one other advanced treatment indicator)	Future Flow (mgd)	0	0.9999	5523	=((8179.25*1000*FF^1.030) + (0.327*1000*FF^0.496) + (0.77*1000*FF^0.527))	n/a	EPA, Clean Watersheds Needs Survey (CWNS) 2008 Cost Curves	2A, 6 and 5
CWNS-29B-Cat II Only	Replace Treatment - Mechanical - Advanced BOD plus other	Replace treatment with mechanical plant with advanced treatment requirements (BOD and at least one other advanced treatment indicator)	Future Flow (mgd)	1	9.9999	5523	=((8179.25*1000*FF^0.903) + (0.327*1000*FF^0.496) + (0.77*1000*FF^0.527))	n/a	EPA, Clean Watersheds Needs Survey (CWNS) 2008 Cost Curves	2A, 6 and 5
LGN-1	Replace Treatment - Lagoon - Secondary	Replace treatment with lagoon plant with secondary effluent limits	Future Flow (mgd)	0	0.9999	5523	=7000000*FF + 40000	n/a	CDM Smith CCI estimation	n/a
LS-2	LS greater than 25 and less than or equal to 100 mgd	Lift Stations with design flows greater than 25 mgd and less than or equal to 100 mgd	Future Flow (mgd)	25.0001	100	8802	=3789.6*FF^2 - 60451*FF + 6000000	0.764	CDM Smith historical project data	n/a
LS-3	LS less than or equal to 25 mgd	Lift Stations with design flows less than or equal to 25 mgd	Future Flow (mgd)	0	25	8802	=-2842.6*FF^2 + 329965*FF + 1000000	0.7931	CDM Smith historical project data	n/a

Table B-1 OCWP Wastewater Cost Models

Curve Number	Curve Name	Description	Parameter(s) required for modeling	Min Value	Max Value	Cost ENR Value	Equation [A]	R2 Value [B]	Cost Source	CWNS Curve Number Reference
SH-1A-Cat I	Replace Solids Handling Capacity	Replace Solids Handling with design flows less than or equal to 3 mgd	Future Flow (mgd)	0	3	8802	=0.72*(3000000*FF + 1000000)	0.9882	CDM Smith historical project data	n/a
SH-1A-Cat II	Replace Solids Handling Capacity	Replace Solids Handling with design flows less than or equal to 3 mgd	Future Flow (mgd)	0	3	8802	=0.28*(3000000*FF + 1000000)	0.9882	CDM Smith historical project data	n/a
SH-1A-Cat II Only	Replace Solids Handling Capacity	Replace Solids Handling with design flows less than or equal to 3 mgd	Future Flow (mgd)	0	3	8802	=3000000*FF + 1000000	0.9882	CDM Smith historical project data	n/a
SH-1B-Cat II Only	Replace Solids Handling Capacity	Replace Solids Handling with design flows between 3 mgd and 10 mgd	Future Flow (mgd)	3.00001	10	8802	=1000000*FF + 5000000	0.9966	CDM Smith historical project data	n/a
SH-1C-Cat I	Replace Solids Handling Capacity	Replace Solids Handling with design flows greater than 10 mgd	Future Flow (mgd)	10.00001	350	8802	=0.72*(380283*FF + 2000000)	0.8982	CDM Smith historical project data	n/a
SH-1C-Cat II	Replace Solids Handling Capacity	Replace Solids Handling with design flows greater than 10 mgd	Future Flow (mgd)	10.00001	350	8802	=0.28*(380283*FF + 2000000)	0.8982	CDM Smith historical project data	n/a
SH-1C-Cat II Only	Replace Solids Handling Capacity	Replace Solids Handling with design flows greater than 10 mgd	Future Flow (mgd)	10.00001	350	8802	=380283*FF + 2000000	0.8982	CDM Smith historical project data	n/a

Table B-1 OCWP Wastewater Cost Models

Curve Number	Curve Name	Description	Parameter(s) required for modeling	Min Value	Max Value	Cost ENR Value	Equation [A]	R2 Value [B]	Cost Source	CWNS Curve Number Reference
SH-2A-Cat I	Increase Solids Handling Capacity	Increase Solids Handling with design flows less than or equal to 3 mgd	Future Flow (mgd), Present Flow (mgd)	0	3	8802	=0.72*(3000000*(FF-PF) + 1000000)	0.9882	CDM Smith historical project data	n/a
SH-2A-Cat II	Increase Solids Handling Capacity	Increase Solids Handling with design flows less than or equal to 3 mgd	Future Flow (mgd), Present Flow (mgd)	0	3	8802	=0.28*(3000000*(FF-PF) + 1000000)	0.9882	CDM Smith historical project data	n/a
SH-2A-Cat II Only	Increase Solids Handling Capacity	Increase Solids Handling with design flows less than or equal to 3 mgd	Future Flow (mgd), Present Flow (mgd)	0	3	8802	=3000000*(FF-PF) + 1000000	0.9882	CDM Smith historical project data	n/a
MA-1-Cat I	Mechanical - Advanced - Flow 10+	Mechanical - Advanced Treatment - plant flow equal or greater than 10 mgd	Future Flow (mgd)	10	150	8802	=0.72*(2000000*FF + 50000000)	0.8613	CDM Smith historical project data	n/a
MA-1-Cat II	Mechanical - Advanced - Flow 10+	Mechanical - Advanced Treatment - plant flow equal or greater than 10 mgd	Future Flow (mgd)	10	150	8802	=0.28*(2000000*FF + 50000000)	0.8613	CDM Smith historical project data	n/a
MA-1-Cat II Only	Mechanical - Advanced - Flow 10+	Mechanical - Advanced Treatment - plant flow equal or greater than 10 mgd	Future Flow (mgd)	10	150	8802	=(2000000*FF + 50000000)	0.8613	CDM Smith historical project data	n/a

Table B-1 OCWP Wastewater Cost Models

Curve Number	Curve Name	Description	Parameter(s) required for modeling	Min Value	Max Value	Cost ENR Value	Equation [A]	R2 Value [B]	Cost Source	CWNS Curve Number Reference
G-1	Gravity - diameter <= 6" and depth <=8'	Gravity pipeline new/repair/replace for pipe diameters less than or equal to 6 inches and depths less than or equal to 8 feet	Length (LF)			8802	=L * VLOOKUP("G-1",'Pipeline Cost'!$E$2:$G$15,2,False)	n/a	CDM Smith CCI estimation	n/a
G-2	Gravity - diameter <= 6" and depth 8-15'	Gravity pipeline new/repair/replace for pipe diameters less than or equal to 6 inches and depths between 8-15 feet	Length (LF)			8802	=L * VLOOKUP("G-2",'Pipeline Cost'!$E$2:$G$15,2,False)	n/a	CDM Smith CCI estimation	n/a
G-3	Gravity - diameter <= 6" and depth >15'	Gravity pipeline new/repair/replace for pipe diameters less than or equal to 6 inches and depths greater than 15 feet	Length (LF)			8802	=L * VLOOKUP("G-3",'Pipeline Cost'!$E$2:$G$15,2,False)	n/a	CDM Smith CCI estimation	n/a
G-4	Gravity - diameter 8-12" and depth <=8'	Gravity pipeline new/repair/replace for pipe diameters between 8-12 inches and depths less than or equal to 8 feet	Length (LF)			8802	=L * VLOOKUP("G-4",'Pipeline Cost'!$E$2:$G$15,2,False)	n/a	CDM Smith CCI estimation	n/a
G-5	Gravity - diameter 8-12" and depth 8-15'	Gravity pipeline new/repair/replace for pipe diameters between 8-12 inches and depths between 8-15 feet	Length (LF)			8802	=L * VLOOKUP("G-5",'Pipeline Cost'!$E$2:$G$15,2,False)	n/a	CDM Smith CCI estimation	n/a

Table B-1 OCWP Wastewater Cost Models

Curve Number	Curve Name	Description	Parameter(s) required for modeling	Min Value	Max Value	Cost ENR Value	Equation [A]	R2 Value [B]	Cost Source	CWNS Curve Number Reference
G-6	Gravity - diameter 8-12" and depth >15'	Gravity pipeline new/repair/replace for pipe diameters between 8-12 inches and depths greater than 15 feet	Length (LF)			8802	=L * VLOOKUP("G-6",'Pipeline Cost'!$E$2:$G$15,2,False)	n/a	CDM Smith CCI estimation	n/a
G-7	Gravity - diameter 15-20" and depth <=8'	Gravity pipeline new/repair/replace for pipe diameters between 15-20 inches and depths less than or equal to 8 feet	Length (LF)			8802	=L * VLOOKUP("G-7",'Pipeline Cost'!$E$2:$G$15,2,False)	n/a	CDM Smith CCI estimation	n/a
G-8	Gravity - diameter 15-20" and depth 8-15'	Gravity pipeline new/repair/replace for pipe diameters between 15-20 inches and depths between 8-15 feet	Length (LF)			8802	=L * VLOOKUP("G-8",'Pipeline Cost'!$E$2:$G$15,2,False)	n/a	CDM Smith CCI estimation	n/a
G-9	Gravity - diameter 15-20" and depth >15'	Gravity pipeline new/repair/replace for pipe diameters between 15-20 inches and depths greater than 15 feet	Length (LF)			8802	=L * VLOOKUP("G-9",'Pipeline Cost'!$E$2:$G$15,2,False)	n/a	CDM Smith CCI estimation	n/a
G-10	Gravity - diameter >24" and depth <=8'	Gravity pipeline new/repair/replace for pipe diameters greater than or equal to 24 inches and depths less than or equal to 8 feet	Length (LF)			8802	=L * VLOOKUP("G-10",'Pipeline Cost'!$E$2:$G$15,2,False)	n/a	CDM Smith CCI estimation	n/a

Table B-1 OCWP Wastewater Cost Models

Curve Number	Curve Name	Description	Parameter(s) required for modeling	Min Value	Max Value	Cost ENR Value	Equation [A]	R2 Value [B]	Cost Source	CWNS Curve Number Reference
G-11	Gravity - diameter >24" and depth 8-15'	Gravity pipeline new/repair/replace for pipe diameters greater than or equal to 24 inches and depths between 8-15 feet	Length (LF)			8802	=L * VLOOKUP("G-11",'Pipeline Cost'!$E$2:$G$15,2,False)	n/a	CDM Smith CCI estimation	n/a
G-12	Gravity - diameter >24" and depth >15'	Gravity pipeline new/repair/replace for pipe diameters greater than or equal to 24 inches and depths greater than 15 feet	Length (LF)			8802	=L * VLOOKUP("G-12",'Pipeline Cost'!$E$2:$G$15,2,False)	n/a	CDM Smith CCI estimation	n/a
F-1	Force Main - diameter<= 6"	Force main pipeline new/repair/replace for pipe diameters less than or equal to 6 inches	Length (LF)			8802	=L * VLOOKUP("F-1",'Pipeline Cost'!$I$2:$K$15,2,False)	n/a	CDM Smith CCI estimation	n/a
F-2	Force Main - diameter 8-12"	Force main pipeline new/repair/replace for pipe diameters between 8-12 inches	Length (LF)			8802	=L * VLOOKUP("F-2",'Pipeline Cost'!$I$2:$K$15,2,False)	n/a	CDM Smith CCI estimation	n/a
F-3	Force Main - diameter 15-20"	Force main pipeline new/repair/replace for pipe diameters between 15-20 inches	Length (LF)			8802	=L * VLOOKUP("F-3",'Pipeline Cost'!$I$2:$K$15,2,False)	n/a	CDM Smith CCI estimation	n/a

Table B-1 OCWP Wastewater Cost Models

Curve Number	Curve Name	Description	Parameter(s) required for modeling	Min Value	Max Value	Cost ENR Value	Equation [A]	R2 Value [B]	Cost Source	CWNS Curve Number Reference
F-4	Force Main - diameter >24"	Force main pipeline new/repair/replace for pipe diameters greater than 24 inches	Length (LF)			8802	=L * VLOOKUP("F-4",'Pipeline Cost'!$I$2:$K$15,2,False)	n/a	CDM Smith CCI estimation	n/a
RG-1	Gravity Rock - diameter <= 6" and depth <=8'	Gravity - rock - pipeline new/repair/replace for pipe diameters less than or equal to 6 inches and depths less than or equal to 8 feet	Length (LF)			8802	=L * VLOOKUP("RG-1",'Pipeline Cost'!$M$2:$O$15,2,False)	n/a	CDM Smith CCI estimation	n/a
RG-2	Gravity Rock - diameter <= 6" and depth 8-15'	Gravity - rock - pipeline new/repair/replace for pipe diameters less than or equal to 6 inches and depths between 8-15 feet	Length (LF)			8802	=L * VLOOKUP("RG-2",'Pipeline Cost'!$M$2:$O$15,2,False)	n/a	CDM Smith CCI estimation	n/a
RG-3	Gravity Rock - diameter <= 6" and depth >15'	Gravity - rock - pipeline new/repair/replace for pipe diameters less than or equal to 6 inches and depths greater than 15 feet	Length (LF)			8802	=L * VLOOKUP("RG-3",'Pipeline Cost'!$M$2:$O$15,2,False)	n/a	CDM Smith CCI estimation	n/a
RG-4	Gravity Rock - diameter 8-12" and depth <=8'	Gravity - rock - pipeline new/repair/replace for pipe diameters between 8-12 inches and depths less than or equal to 8 feet	Length (LF)			8802	=L * VLOOKUP("RG-4",'Pipeline Cost'!$M$2:$O$15,2,False)	n/a	CDM Smith CCI estimation	n/a

Table B-1 OCWP Wastewater Cost Models

Curve Number	Curve Name	Description	Parameter(s) required for modeling	Min Value	Max Value	Cost ENR Value	Equation [A]	R2 Value [B]	Cost Source	CWNS Curve Number Reference
RG-5	Gravity Rock - diameter 8-12" and depth 8-15'	Gravity - rock - pipeline new/repair/replace for pipe diameters between 8-12 inches and depths between 8-15 feet	Length (LF)			8802	=L * VLOOKUP("RG-5",'Pipeline Cost'!$M$2:$O$15,2,False)	n/a	CDM Smith CCI estimation	n/a
RG-6	Gravity Rock - diameter 8-12" and depth >15'	Gravity - rock - pipeline new/repair/replace for pipe diameters between 8-12 inches and depths greater than 15 feet	Length (LF)			8802	=L * VLOOKUP("RG-6",'Pipeline Cost'!$M$2:$O$15,2,False)	n/a	CDM Smith CCI estimation	n/a
RG-7	Gravity Rock - diameter 15-20" and depth <=8'	Gravity - rock - pipeline new/repair/replace for pipe diameters between 15-20 inches and depths less than or equal to 8 feet	Length (LF)			8802	=L * VLOOKUP("RG-7",'Pipeline Cost'!$M$2:$O$15,2,False)	n/a	CDM Smith CCI estimation	n/a
RG-8	Gravity Rock - diameter 15-20" and depth 8-15'	Gravity - rock - pipeline new/repair/replace for pipe diameters between 15-20 inches and depths between 8-15 feet	Length (LF)			8802	=L * VLOOKUP("RG-8",'Pipeline Cost'!$M$2:$O$15,2,False)	n/a	CDM Smith CCI estimation	n/a
RG-9	Gravity Rock - diameter 15-20" and depth >15'	Gravity - rock - pipeline new/repair/replace for pipe diameters between 15-20 inches and depths greater than 15 feet	Length (LF)			8802	=L * VLOOKUP("RG-9",'Pipeline Cost'!$M$2:$O$15,2,False)	n/a	CDM Smith CCI estimation	n/a

Table B-1 OCWP Wastewater Cost Models

Curve Number	Curve Name	Description	Parameter(s) required for modeling	Min Value	Max Value	Cost ENR Value	Equation [A]	R2 Value [B]	Cost Source	CWNS Curve Number Reference
RG-10	Gravity Rock - diameter >24" and depth <=8'	Gravity - rock - pipeline new/repair/replace for pipe diameters greater than or equal to 24 inches and depths less than or equal to 8 feet	Length (LF)			8802	=L * VLOOKUP("RG-10",'Pipeline Cost'!$M$2:$O$15,2,False)	n/a	CDM Smith CCI estimation	n/a
RG-11	Gravity Rock - diameter >24" and depth 8-15'	Gravity - rock - pipeline new/repair/replace for pipe diameters greater than or equal to 24 inches and depths between 8-15 feet	Length (LF)			8802	=L * VLOOKUP("RG-11",'Pipeline Cost'!$M$2:$O$15,2,False)	n/a	CDM Smith CCI estimation	n/a
RG-12	Gravity Rock - diameter >24" and depth >15'	Gravity - rock - pipeline new/repair/replace for pipe diameters greater than or equal to 24 inches and depths greater than 15 feet	Length (LF)			8802	=L * VLOOKUP("RG-12",'Pipeline Cost'!$M$2:$O$15,2,False)	n/a	CDM Smith CCI estimation	n/a
RF-1	Force Main Rock - diameter<= 6"	Force main - rock - pipeline new/repair/replace for pipe diameters less than or equal to 6 inches	Length (LF)			8802	=L * VLOOKUP("RF-1",'Pipeline Cost'!$Q$2:$S$15,2,False)	n/a	CDM Smith CCI estimation	n/a
RF-2	Force Main Rock - diameter 8-12"	Force main - rock - pipeline new/repair/replace for pipe diameters between 8-12 inches	Length (LF)			8802	=L * VLOOKUP("RF-2",'Pipeline Cost'!$Q$2:$S$15,2,False)	n/a	CDM Smith CCI estimation	n/a

Table B-1 OCWP Wastewater Cost Models

Curve Number	Curve Name	Description	Parameter(s) required for modeling	Min Value	Max Value	Cost ENR Value	Equation [A]	R2 Value [B]	Cost Source	CWNS Curve Number Reference
RF-3	Force Main Rock - diameter 15-20"	Force main - rock - pipeline new/repair/replace for pipe diameters between 15-20 inches	Length (LF)			8802	=L * VLOOKUP("RF-3",'Pipeline Cost'!$Q$2:$S$15,2,False)	n/a	CDM Smith CCI estimation	n/a
RF-4	Force Main Rock - diameter >24"	Force main - rock - pipeline new/repair/replace for pipe diameters greater than 24 inches	Length (LF)			8802	=L * VLOOKUP("RF-4",'Pipeline Cost'!$Q$2:$S$15,2,False)	n/a	CDM Smith CCI estimation	n/a

[A] The following variables are used:
a. PP = Present Flow
b. FF = Future (or projected) Flow
c. L = Length

[B] R-squared (or coefficient of determination) values are provided for each of the models based on CDM Smith historical project cost database. This is an indicator of how well the linear regression model explains the variation in the data with a higher value indicating a better correlation. When all variation is explained by the regression equation, R-squared is equal to one. Generally, new or replacement projects have higher R-squared values than rehabilitation projects reflecting the wide variability inherent to rehabilitation projects.

Table B-2 Pipeline Costs

Cost Model	Gravity-Developed	Gravity-Undeveloped	Cost Model	Forcemain-Developed	Forcemain-Undeveloped	Cost Model	Rocky Soils Gravity-Developed	Rocky Soils Gravity-Undeveloped	Cost Model	Rocky Soils Forcemain-Developed	Rocky Soils Forcemain-Undeveloped
G-1	$ 98	$ 46	F-1	$ 146	$ 146	RG-1	$ 137	$ 105	RF-1	$ 184	$ 184
G-2	$ 103	$ 51	F-1	$ 146	$ 146	RG-2	$ 172	$ 150	RF-1	$ 184	$ 184
G-3	$ 112	$ 59	F-1	$ 146	$ 146	RG-3	$ 224	$ 215	RF-1	$ 184	$ 184
G-4	$ 117	$ 64	F-2	$ 174	$ 148	RG-4	$ 163	$ 138	RF-2	$ 221	$ 194
G-5	$ 123	$ 69	F-2	$ 174	$ 148	RG-5	$ 206	$ 190	RF-2	$ 221	$ 194
G-6	$ 132	$ 79	F-2	$ 174	$ 148	RG-6	$ 266	$ 267	RF-2	$ 221	$ 194
G-7	$ 172	$ 108	F-3	$ 240	$ 171	RG-7	$ 229	$ 206	RF-3	$ 297	$ 228
G-8	$ 178	$ 114	F-3	$ 240	$ 171	RG-8	$ 279	$ 269	RF-3	$ 297	$ 228
G-9	$ 189	$ 126	F-3	$ 240	$ 171	RG-9	$ 354	$ 363	RF-3	$ 297	$ 228
G-10	$ 218	$ 152	F-4	$ 404	$ 256	RG-10	$ 280	$ 267	RF-4	$ 466	$ 318
G-11	$ 224	$ 159	F-4	$ 404	$ 256	RG-11	$ 335	$ 337	RF-4	$ 466	$ 318
G-12	$ 238	$ 173	F-4	$ 404	$ 256	RG-12	$ 418	$ 441	RF-4	$ 466	$ 318

Appendix C
Wastewater Project Development Worksheet

Appendix C
Wastewater Project Development Worksheet

Examples of the project development worksheet is included. The worksheet provides a standard method for estimating types of projects needed, project size, and project date. Information developed as part of this task and provided in the survey were used to complete this form. The OCWP standard assumptions supplemented the available information.

Provider:		General Information	
Summary and Lift Station ID		Region	#N/A
WWTP ID - 1		Provider Classification (2060)	#N/A
WWTP ID - 2		Provider Classification (Treatment)	#N/A
WWTP ID - 3		2010 Population	#N/A
WWTP ID - 4		**2060 Population**	**#N/A**
WWTP ID - 5			
WWTP ID - 6			

Wastewater Treatment											
WWTP ID - 1		WWTP ID - 2		WWTP ID - 3		WWTP ID - 4		WWTP ID - 5		WWTP ID - 6	
WWTP Name - 1		WWTP Name - 2		WWTP Name - 3		WWTP Name - 4		WWTP Name - 5		WWTP Name - 6	
Design Flow (mgd)		Design Flow (mgd)		Design Flow (mgd)		Design Flow (mgd)		Design Flow (mgd)		Design Flow (mgd)	
2008-2010 ADF (mgd)		2008-2010 ADF (mgd)		2008-2010 ADF (mgd)		2008-2010 ADF (mgd)		2008-2010 ADF (mgd)		2008-2010 ADF (mgd)	
2008-2010 Peak Flow (mgd)		2008-2010 Peak Flow (mgd)		2008-2010 Peak Flow (mgd)		2008-2010 Peak Flow (mgd)		2008-2010 Peak Flow (mgd)		2008-2010 Peak Flow (mgd)	
Most recent upgrade or year built		Most recent upgrade or year built		Most recent upgrade or year built		Most recent upgrade or year built		Most recent upgrade or year built		Most recent upgrade or year built	
Treatment Category		Treatment Category		Treatment Category		Treatment Category		Treatment Category		Treatment Category	
2020 Projected Flows (mgd)		2020 Projected Flows (mgd)		2020 Projected Flows (mgd)		2020 Projected Flows (mgd)		2020 Projected Flows (mgd)		2020 Projected Flows (mgd)	
2040 Projected Flows (mgd)		2040 Projected Flows (mgd)		2040 Projected Flows (mgd)		2040 Projected Flows (mgd)		2040 Projected Flows (mgd)		2040 Projected Flows (mgd)	
2060 Projected Flows (mgd)		2060 Projected Flows (mgd)		2060 Projected Flows (mgd)		2060 Projected Flows (mgd)		2060 Projected Flows (mgd)		2060 Projected Flows (mgd)	
2020 Project needed - based on flow?	No	2020 Project needed - based on flow?	No	2020 Project needed - based on flow?	No	2020 Project needed - based on flow?	No	2020 Project needed - based on flow?	No	2020 Project needed - based on flow?	No
2020 Project needed - based on age of WWTP?	#VALUE!	2020 Project needed - based on age of WWTP?	#VALUE!	2020 Project needed - based on age of WWTP?	#VALUE!	2020 Project needed - based on age of WWTP?	#VALUE!	2020 Project needed - based on age of WWTP?	#VALUE!	2020 Project needed - based on age of WWTP?	#VALUE!
2020 Project Name	N/A	2020 Project Name	N/A	2020 Project Name	N/A	2020 Project Name	N/A	2020 Project Name	N/A	2020 Project Name	N/A
2020 Project Size (mgd) - Future Flow	N/A	2020 Project Size (mgd) - Future Flow	N/A	2020 Project Size (mgd) - Future Flow	N/A	2020 Project Size (mgd) - Future Flow	N/A	2020 Project Size (mgd) - Future Flow	N/A	2020 Project Size (mgd) - Future Flow	N/A
2020 Project Type	N/A	2020 Project Type	N/A	2020 Project Type	N/A	2020 Project Type	N/A	2020 Project Type	N/A	2020 Project Type	N/A
2040 Project needed - based on flow?	No	2040 Project needed - based on flow?	No	2040 Project needed - based on flow?	No	2040 Project needed - based on flow?	No	2040 Project needed - based on flow?	No	2040 Project needed - based on flow?	No
2040 Project needed - based on age of WWTP?	#VALUE!	2040 Project needed - based on age of WWTP?	#VALUE!	2040 Project needed - based on age of WWTP?	#VALUE!	2040 Project needed - based on age of WWTP?	#VALUE!	2040 Project needed - based on age of WWTP?	#VALUE!	2040 Project needed - based on age of WWTP?	#VALUE!
2040 Project Name	N/A	2040 Project Name	N/A	2040 Project Name	N/A	2040 Project Name	N/A	2040 Project Name	N/A	2040 Project Name	N/A
2040 Project Size (mgd)	N/A	2040 Project Size (mgd)	N/A	2040 Project Size (mgd)	N/A	2040 Project Size (mgd)	N/A	2040 Project Size (mgd)	N/A	2040 Project Size (mgd)	N/A
2040 Project Type	N/A	2040 Project Type	N/A	2040 Project Type	N/A	2040 Project Type	N/A	2040 Project Type	N/A	2040 Project Type	N/A
2060 Project needed - based on flow?	No	2060 Project needed - based on flow?	No	2060 Project needed - based on flow?	No	2060 Project needed - based on flow?	No	2060 Project needed - based on flow?	No	2060 Project needed - based on flow?	No
2060 Project needed - based on age of WWTP?	#VALUE!	2060 Project needed - based on age of WWTP?	#VALUE!	2060 Project needed - based on age of WWTP?	#VALUE!	2060 Project needed - based on age of WWTP?	#VALUE!	2060 Project needed - based on age of WWTP?	#VALUE!	2060 Project needed - based on age of WWTP?	#VALUE!
2060 Project Name	N/A	2060 Project Name	N/A	2060 Project Name	N/A	2060 Project Name	N/A	2060 Project Name	N/A	2060 Project Name	N/A
2060 Project Size (mgd)	N/A	2060 Project Size (mgd)	N/A	2060 Project Size (mgd)	N/A	2060 Project Size (mgd)	N/A	2060 Project Size (mgd)	N/A	2060 Project Size (mgd)	N/A
2060 Project Type	N/A	2060 Project Type	N/A	2060 Project Type	N/A	2060 Project Type	N/A	2060 Project Type	N/A	2060 Project Type	N/A

Collection System - Piping - Gravity

Summary ID		0	Pipe Repair/Replace/Rehab						Pipe Repair/Replace/Rehab				
Service Area Population	#N/A		Diameter (in)	Depth (ft)	Cost Lookup Value	Age (years)	Amount of Pipe	Project Year	Diameter (in)	Depth (ft)	Cost Lookup Value	Age (years)	Amount of Pipe	Project Year
Service Area (sq. mi)	#N/A		<= 6"	<=8'	diameter <= 6" and depth <=8'	>40 yr	#N/A	2020	>24"	8-15'	diameter 15-20" and depth >15'	10-20 yr	#N/A	2040
Gravity - Total Length (mi)	#N/A		<= 6"	8-15'	diameter <= 6" and depth 8-15'	>40 yr	#N/A	2020	>24"	8-15'	diameter >24" and depth <=8'	21-40 yr	#N/A	2040
Gravity - Length per person (ft/per)	#N/A		<= 6"	>15'	diameter <= 6" and depth >15'	>40 yr	#N/A	2020	>24"	>15'	diameter >24" and depth 8-15'	10-20 yr	#N/A	2040
Gravity - Length per sq mi service area (ft/sq mi)	#N/A		8-12"	<=8'	diameter 8-12" and depth <=8'	>40 yr	#N/A	2020	>24"	>15'	diameter >24" and depth >15'	21-40 yr	#N/A	2040
2020-2060 Annual Growth (%)	#N/A		8-12"	8-15'	diameter 8-12" and depth 8-15'	>40 yr	#N/A	2020	<= 6"	<=8'	diameter <= 6" and depth <=8'	<=10 yr	#N/A	2060
			8-12"	>15'	diameter 8-12" and depth >15'	>40 yr	#N/A	2020	<= 6"	8-15'	diameter <= 6" and depth 8-15'	<=10 yr	#N/A	2060
	Percent		15-20"	<=8'	diameter 15-20" and depth <=8'	>40 yr	#N/A	2020	<= 6"	>15'	diameter <= 6" and depth >15'	<=10 yr	#N/A	2060
Gravity - diameter <=6"	#N/A		15-20"	8-15'	diameter 15-20" and depth 8-15'	>40 yr	#N/A	2020	8-12"	<=8'	diameter 8-12" and depth <=8'	<=10 yr	#N/A	2060
Gravity - diameter = 8-12"	#N/A		15-20"	>15'	diameter 15-20" and depth >15'	>40 yr	#N/A	2020	8-12"	8-15'	diameter 8-12" and depth 8-15'	<=10 yr	#N/A	2060
Gravity - diameter = 15-20"	#N/A		>24"	<=8'	diameter >24" and depth <=8'	>40 yr	#N/A	2020	8-12"	>15'	diameter 8-12" and depth >15'	<=10 yr	#N/A	2060
Gravity - diameter >= 24"	#N/A		>24"	8-15'	diameter >24" and depth 8-15'	>40 yr	#N/A	2020	15-20"	<=8'	diameter 15-20" and depth <=8'	<=10 yr	#N/A	2060
Gravity - depth <= 8'	#N/A		>24"	>15'	diameter >24" and depth >15'	>40 yr	#N/A	2020	15-20"	8-15'	diameter 15-20" and depth 8-15'	<=10 yr	#N/A	2060
Gravity - depth = 8-15'	#N/A		<= 6"	<=8'	diameter <= 6" and depth <=8'	10-20 yr	#N/A	2040	15-20"	>15'	diameter 15-20" and depth >15'	<=10 yr	#N/A	2060
Gravity depth >= 15'	#N/A		<= 6"	<=8'	diameter <= 6" and depth 8-15'	21-40 yr	#N/A	2040	>24"	<=8'	diameter >24" and depth <=8'	<=10 yr	#N/A	2060
Gravity - Age <=10 years	#N/A		<= 6"	8-15'	diameter <= 6" and depth >15'	10-20 yr	#N/A	2040	>24"	8-15'	diameter >24" and depth 8-15'	<=10 yr	#N/A	2060
Gravity - Age = 10-20 years	#N/A		<= 6"	8-15'	diameter 8-12" and depth <=8'	21-40 yr	#N/A	2040	>24"	>15'	diameter >24" and depth >15'	<=10 yr	#N/A	2060
Gravity - Age = 21-40 years	#N/A		<= 6"	>15'	diameter 8-12" and depth 8-15'	10-20 yr	#N/A	2040				total pipe (miles)	#N/A	
Gravity - Age >40 years	#N/A		<= 6"	>15'	diameter 8-12" and depth >15'	21-40 yr	#N/A	2040						
			8-12"	<=8'	diameter 15-20" and depth <=8'	10-20 yr	#N/A	2040	Pipe to accommodate new growth					
			8-12"	<=8'	diameter 15-20" and depth 8-15'	21-40 yr	#N/A	2040	Diameter (in)	Depth (ft)	Cost Lookup Value	Amount of Pipe Existing (LF)	Amount of Pipe New Growth (LF) - Each year	
			8-12"	8-15'	diameter 15-20" and depth >15'	10-20 yr	#N/A	2040	<= 6"	<=8'	diameter <= 6" and depth <=8'	#N/A	#N/A	
			8-12"	8-15'	diameter >24" and depth <=8'	21-40 yr	#N/A	2040	<= 6"	8-15'	diameter <= 6" and depth 8-15'	#N/A	#N/A	
			8-12"	>15'	diameter >24" and depth 8-15'	10-20 yr	#N/A	2040	<= 6"	>15'	diameter <= 6" and depth >15'	#N/A	#N/A	
			8-12"	>15'	diameter >24" and depth >15'	21-40 yr	#N/A	2040	8-12"	<=8'	diameter 8-12" and depth <=8'	#N/A	#N/A	
			15-20"	<=8'	diameter <= 6" and depth <=8'	10-20 yr	#N/A	2040	8-12"	8-15'	diameter 8-12" and depth 8-15'	#N/A	#N/A	
			15-20"	<=8'	diameter <= 6" and depth 8-15'	21-40 yr	#N/A	2040	8-12"	>15'	diameter 8-12" and depth >15'	#N/A	#N/A	
			15-20"	8-15'	diameter <= 6" and depth >15'	10-20 yr	#N/A	2040	15-20"	<=8'	diameter 15-20" and depth <=8'	#N/A	#N/A	
			15-20"	8-15'	diameter 8-12" and depth <=8'	21-40 yr	#N/A	2040	15-20"	8-15'	diameter 15-20" and depth 8-15'	#N/A	#N/A	
			15-20"	>15'	diameter 8-12" and depth 8-15'	10-20 yr	#N/A	2040	15-20"	>15'	diameter 15-20" and depth >15'	#N/A	#N/A	
			15-20"	>15'	diameter 8-12" and depth >15'	21-40 yr	#N/A	2040	>24"	<=8'	diameter >24" and depth <=8'	#N/A	#N/A	
			>24"	<=8'	diameter 15-20" and depth <=8'	10-20 yr	#N/A	2040	>24"	8-15'	diameter >24" and depth 8-15'	#N/A	#N/A	
			>24"	<=8'	diameter 15-20" and depth 8-15'	21-40 yr	#N/A	2040	>24"	>15'	diameter >24" and depth >15'	#N/A	#N/A	

Collection System - Piping -Force Main

Summary ID		0	Pipe Repair/Replace/Rehab						Pipe to accommodate new growth				
Service Area Population	#N/A		Diameter (in)	Depth (ft)	Cost Lookup Value	Age (years)	Amount of Pipe	Project Year	Diameter (in)	Depth (ft)	Cost Lookup Value	Amount of Pipe Existing (LF)	Amount of Pipe New Growth (LF) - Each year
Service Area (sq. mi)	#N/A		<= 6"	n/a	diameter<= 6"	>50 yr	#N/A	2020	<= 6"	n/a	diameter<= 6"	#N/A	#N/A
Force Main - Total Length (mi)	#N/A		8-12"	n/a	diameter 8-12"	>50 yr	#N/A	2020	8-12"	n/a	diameter 8-12"	#N/A	#N/A
Force Main - Length per person (ft/per)	#N/A		15-20"	n/a	diameter 15-20"	>50 yr	#N/A	2020	15-20"	n/a	diameter 15-20"	#N/A	#N/A
Force Main - Length per sq mi service area (ft/sq mi)	#N/A		>24"	n/a	diameter >24"	>50 yr	#N/A	2020	>24"	n/a	diameter >24"	#N/A	#N/A
2020-2060 Annual Growth (%)	#N/A		<= 6"	n/a	diameter<= 6"	25-50 yr	#N/A	2040					
			8-12"	n/a	diameter 8-12"	25-50 yr	#N/A	2040					
	Percent		15-20"	n/a	diameter 15-20"	25-50 yr	#N/A	2040					
Force Main - diameter <=6"	#N/A		>24"	n/a	diameter >24"	25-50 yr	#N/A	2040					
Force Main - diameter = 8-12"	#N/A		<= 6"	n/a	diameter<= 6"	<25 yr	#N/A	2060					
Force Main - diameter = 15-20"	#N/A		8-12"	n/a	diameter 8-12"	<25 yr	#N/A	2060					
Force Main - diameter >= 24"	#N/A		15-20"	n/a	diameter 15-20"	<25 yr	#N/A	2060					
Force Main - Age <= 25 years	#N/A		>24"	n/a	diameter >24"	<25 yr	#N/A	2060					
Force Main - Age = 25-50 years	#N/A					total pipe (miles)	#N/A						
Force Main - Age > 50 years	#N/A												

Capital Improvement Plan

Summary ID		0			
Number	Project Description	Project Cost	Size	Project Year	Notes
1	#N/A	#N/A		2020	Account for in WWTP projects
2	#N/A	#N/A		2020	Account for in Lift Station Projects
3	#N/A	#N/A		2020	Account for in Lift Station Projects
4	#N/A	#N/A			
5	#N/A	#N/A			
6	#N/A	#N/A			

Collection System - Lift Station

Summary ID	0
Total LS peak capacity (mgd)	0
Ratio of LS Capacity to WWTP Design Flow (%)	#VALUE!
New LS Capacity Check	Likely new LS capacity is NOT needed

Repair/Rehab/Replace Existing Lift Stations

Lift Station Designnation	Year Built	Peak Capacity from Survey (mgd)	Peak Capacity Calculated (mgd)	Project Year for replacement due to age	Project Year for replacement due to age	Project Year for replacement due to age
	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

New Lift Stations

Project Name	Project Year	New LS Capacity Needed (mgd)	WWTP ID-1, Peak Capacity (mgd)	WWTP ID-2, Peak Capacity (mgd)	WWTP ID-3, Peak Capacity (mgd)	WWTP ID-4, Peak Capacity (mgd)	WWTP ID-5, Peak Capacity (mgd)	WWTP ID-6, Peak Capacity (mgd)
New Lift St	2020	0	0	0	0	0	0	0
New Lift St	2040	0	0	0	0	0	0	0
New Lift St	2060	0	0	0	0	0	0	0

Appendix D
Selected Wastewater Utility Providers

Appendix D
Selected Wastewater Utility Providers

As discussed in previous sections, several wastewater utility providers were selected for cost modeling. Figure D-1 shows the surveyed wastewater utilities by size and treatment type. The following subsections describe the project lists developed for each of these providers.

D.1 Lawton

Lawton is classified as a large utility in the mechanical-advanced treatment stratum. Lawton is located in the Beaver-Cache Watershed Planning Region. Using the methodology described in Section 2.2, the following project list was created.

D.1.1 Known Capital Improvement Projects

Lawton did not provide specific capital improvement cost estimates in the survey. Projects listed were assumed to be covered by projects developed using the worksheet.

D.1.2 Wastewater Treatment Improvements

Lawton currently has one wastewater treatment plant (WWTP). Using the project development worksheet, an 18-million-gallons-per-day (mgd) WWTP rehabilitation and solids handling process rehabilitation projects are included in the 2060 period.

D.1.3 Collection System Piping Improvements

D.1.3.1 Gravity Piping

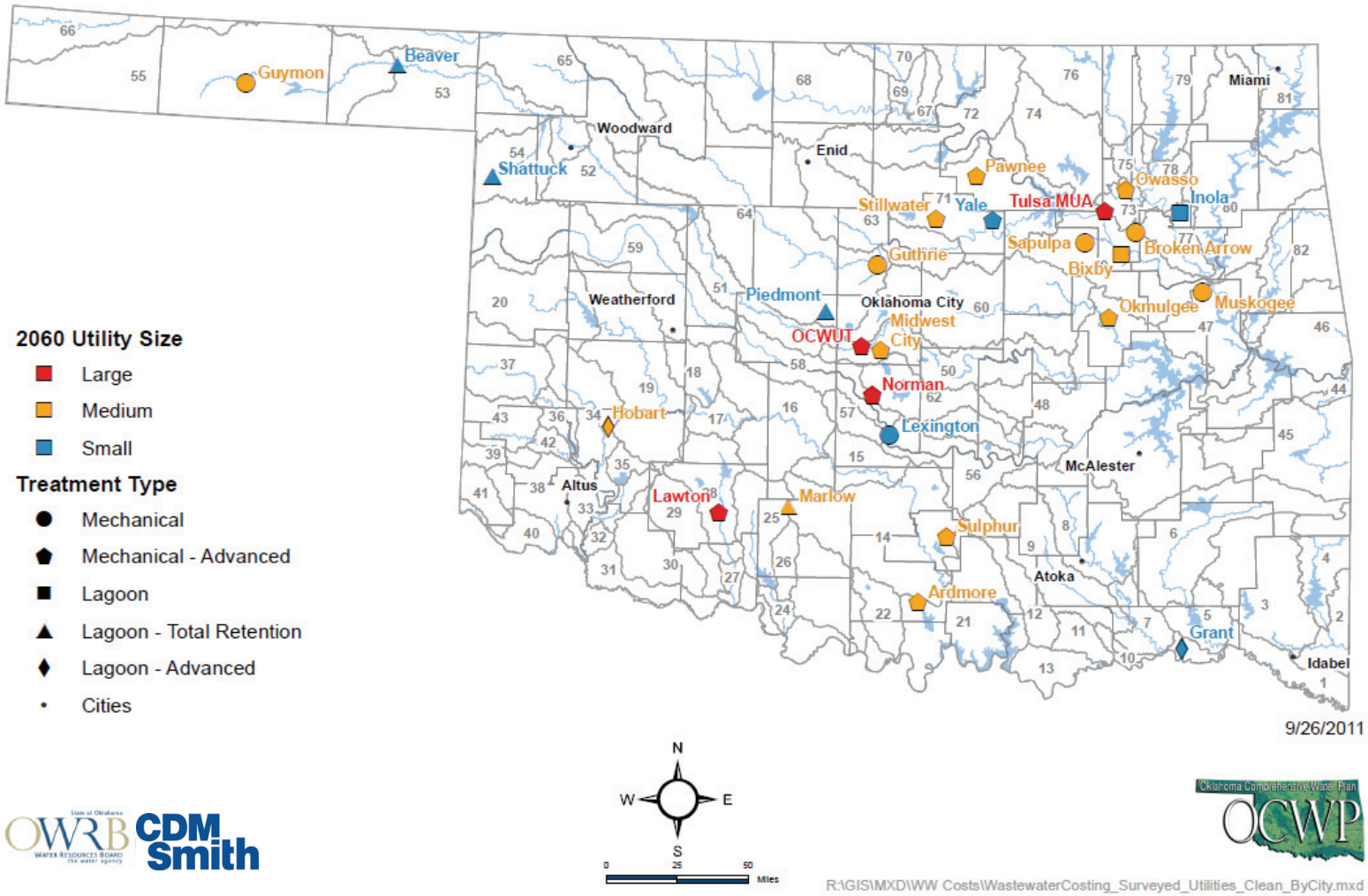
Lawton reported approximately 430 miles of gravity piping ranging in size from less than 6 inches to greater than 24 inches in the survey. Age distribution data from Oklahoma City Water Utilities Trust (OCWUT) was used since information for Lawton was unavailable. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter, pipe depth, and age distribution. Projects for installation of new gravity piping to accommodate anticipated growth also were included in this study.

D.1.3.2 Force Mains

Lawton reported only one mile of force main piping in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed base on pipe diameter and pipe age. Projects for installation of new force main piping to accommodate anticipated growth were also included in this study.

D.1.4 Collection System Lift Station Improvements

Lawton reported six lift stations with an approximate total capacity of 2.4 mgd. Using the project development worksheet, rehabilitation/replacement projects were developed based on capacity and age. No new lift station projects are proposed in this study.


Guymon
Beaver
Woodward
Shattuck
Enid
Pawnee
Owasso
Inola
Miami
Stillwater
Yale
Tulsa MUA
Sapulpa
Broken Arrow
Bixby
Guthrie
Weatherford
Piedmont
Oklahoma City
Okmulgee
Muskogee
Midwest City
OCWUT
Norman
Hobart
Lexington
McAlester
Altus
Lawton
Marlow
Sulphur
Atoka
Ardmore
Grant
Idabel
2060 Utility Size
Large
Medium
Small
Treatment Type
Mechanical
Mechanical - Advanced
Lagoon
Lagoon - Total Retention
Lagoon - Advanced
Cities
9/26/2011
N
W
E
S
0
25
50
Miles
R:\GIS\MXD\WW Costs\WastewaterCosting_Surveyed_Utilities_Clean_ByCity.mxd

D.2 Norman

Norman is classified as a large utility in the mechanical-advanced treatment stratum. Norman is located in the Central Watershed Planning Region. Using the methodology described in Section 2.2, the following project list was created.

D.2.1 Known Capital Improvement Projects

Norman identified several capital improvement projects. All projects with identified cost were included in this study. Other projects listed were assumed to be covered by projects developed using the worksheet.

D.2.2 Wastewater Treatment Improvements

Norman currently has one WWTP. Using the project development worksheet, an approximate 16-mgd and 20-mgd increase in treatment capacity and solids handling process projects are included in the 2040 and 2060 periods, respectively.

D.2.3 Collection System Piping Improvements

D.2.3.1 Gravity Piping

Norman reported approximately 460 miles of gravity piping ranging in size from less than 6 inches to greater than 24 inches in the survey. Age distribution data from OCWUT was used since information for Norman was unavailable. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter, pipe depth, and age distribution. Projects for installation of new gravity piping to accommodate anticipated growth also were included in this study.

D.2.3.2 Force Mains

Norman reported approximately 16 miles of force main piping in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter and pipe age. Projects for installation of new force main piping to accommodate anticipated growth also were included in this study.

D.2.4 Collection System Lift Station Improvements

Norman reported 19 lift stations with an approximate total capacity of 18 mgd. Using the project development worksheet, rehabilitation/replacement projects were developed based on capacity and age. Projects for installation of new lift station also were included in this study.

D.3 Oklahoma City Water Utilities Trust

OCWUT is classified as a large utility in the mechanical-advanced treatment stratum. OCWUT is located in the Central Watershed Planning Region. Using the methodology described in Section 2.2, the following project list was created.

D.3.1 Known Capital Improvement Projects

OCWUT identified several capital improvement projects from present through 2031. All projects with identified costs were included in this study.

D.3.2 Wastewater Treatment Improvements

OCWUT currently has four mechanical-advanced WWTPs and two lagoons. Using the project development worksheet, mechanical WWTP rehabilitation (approximate combined capacity of 110 mgd) and solids handling process projects for all facilities were included in the 2060 period. An approximate 0.02-mgd project for rehabilitation of the lagoons was included in the 2040 period.

D.3.3 Collection System Piping Improvements

D.3.3.1 Gravity Piping

OCWUT reported approximately 2,700 miles of gravity piping ranging in size from less than 6 inches to greater than 24 inches in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter, pipe depth, and age distribution. Projects for installation of new gravity piping to accommodate anticipated growth also were included in this study. The project development worksheet was used to develop projects in the 2040 and 2060 periods only. Earlier period projects were listed in the capital improvement plan described above.

D.3.3.2 Force Mains

OCWUT reported approximately 55 miles of force main piping in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter and pipe age. Projects for installation of new force main piping to accommodate anticipated growth also were included in this study. The project development worksheet was used to develop projects in the 2040 and 2060 periods only. Earlier period projects were listed in the capital improvement plan described above.

D.3.4 Collection System Lift Station Improvements

OCWUT reported 76 lift stations with an approximate total capacity of 81 mgd. Using the project development worksheet, rehabilitation/replacement projects were developed based on capacity and age. Projects for installation of new lift station also were included in this study.

D.4 Tulsa Metropolitan Utility Authority

Tulsa Metropolitan Utility Authority (MUA) is classified as a large utility in the mechanical-advanced treatment stratum. Tulsa MUA is located in the Middle Arkansas Watershed Planning Region. Using the methodology described in Section 2.2, the following project list was created.

D.4.1 Known Capital Improvement Projects

Tulsa MUA identified several capital improvement projects from present through 2026. All projects with identified costs were included in this study.

D.4.2 Wastewater Treatment Improvements

Tulsa MUA currently has five WWTPs. Using the project development worksheet, increased treatment level (approximate combined capacity of 42 mgd), and WWTP rehabilitation (approximate combined capacity of 45 mgd) and solids handling process projects were included in the 2040 and 2060 periods, respectively.

D.4.3 Collection System Piping Improvements

D.4.3.1 Gravity Piping

Tulsa MUA reported approximately 2,000 miles of gravity piping ranging in size from less than 6 inches to greater than 24 inches in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter, pipe depth, and age distribution. Projects for installation of new gravity piping to accommodate anticipated growth also were included in this study. The project development worksheet was used to develop projects in the 2040 and 2060 periods only. Earlier period projects were listed in the capital improvement plan described above.

D.4.3.2 Force Mains

Tulsa MUA reported approximately 22 miles of force main piping in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter and pipe age. Projects for installation of new force main piping to accommodate anticipated growth also were included in this study. The project development worksheet was used to develop projects in the 2040 and 2060 periods only. Earlier period projects were listed in the capital improvement plan described above.

D.4.4 Collection System Lift Station Improvements

Tulsa MUA reported 60 lift stations with an approximate total capacity of 360 mgd. Using the project development worksheet, rehabilitation/replacement projects were developed based on capacity and age. No new lift station projects are proposed in this study.

D.5 Ardmore

Ardmore is classified as a medium utility in the mechanical-advanced treatment stratum. Ardmore is located in the Lower Washita Watershed Planning Region. Using the methodology described in Section 2.2, the following project list was created.

D.5.1 Known Capital Improvement Projects

Ardmore did not provide specific capital improvement cost estimates in the survey. Projects listed were assumed to be covered by projects developed using the worksheet.

D.5.2 Wastewater Treatment Improvements

Ardmore currently has two WWTPs. Using the project development worksheet, WWTP rehabilitation (approximate combined capacity of 6.0 mgd) and increased treatment level (approximate combined capacity of 0.1 mgd) and solids handling process projects were included in the 2020 and 2040 periods.

D.5.3 Collection System Piping Improvements

D.5.3.1 Gravity Piping

Ardmore reported approximately 230 miles of gravity piping ranging in size from less than 6 inches to greater than 24 inches in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter, pipe depth, and age distribution. Projects for installation of new gravity piping to accommodate anticipated growth also were included in this study.

D.5.3.2 Force Mains

Ardmore reported approximately 26 miles of force main piping in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter and pipe age. Projects for installation of new force main piping to accommodate anticipated growth also were included in this study.

D.5.4 Collection System Lift Station Improvements

Ardmore reported 18 lift stations with an approximate total capacity of 26 mgd. Using the project development worksheet, rehabilitation/replacement projects were developed based on capacity and age. No new lift station projects are proposed in this study.

D.6 Bixby

Bixby is classified as a medium utility in the lagoon treatment stratum. Bixby is located in the Middle Arkansas Watershed Planning Region. Using the methodology described in Section 2.2, the following project list was created.

D.6.1 Known Capital Improvement Projects

Bixby did not provide specific capital improvement projects or cost estimates in the survey. Projects listed were assumed to be covered by projects developed using the worksheet.

D.6.2 Wastewater Treatment Improvements

Bixby currently has two WWTPs. Using the project development worksheet, increased treatment (approximate combined capacity of 1.8 mgd) and/or increased capacity (approximate combined capacity of 1.1 mgd) and solids handling process projects were included in the 2020, 2040, and 2060 periods.

D.6.3 Collection System Piping Improvements

D.6.3.1 Gravity Piping

Bixby reported approximately 170 miles of gravity piping ranging in size from less than 6 inches to 20 inches in the survey. Age distribution data from Guthrie was used since information from Bixby was unavailable. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter, pipe depth, and age distribution. Projects for installation of new gravity piping to accommodate anticipated growth also were included in this study.

D.6.3.2 Force Mains

Bixby reported approximately 17 miles of force main piping in the survey. Age and pipe size distribution data from Guthrie was used since information from Bixby was unavailable. Using the project development worksheet, rehabilitation/replacement projects were developed base on pipe diameter and pipe age. Projects for installation of new force main piping to accommodate anticipated growth also were included in this study.

D.6.4 Collection System Lift Station Improvements

Bixby reported 19 lift stations with an approximate total capacity of 48 mgd. Using the project development worksheet, rehabilitation/replacement projects were developed based on capacity and age. Projects for installation of new lift stations also were included in this study.

D.7 Broken Arrow

Broken Arrow is classified as a medium utility in the mechanical treatment stratum. Broken Arrow is located in the Middle Arkansas Watershed Planning Region. Using the methodology described in Section 2.2, the following project list was created.

D.7.1 Known Capital Improvement Projects

Broken Arrow identified several capital improvement projects. All projects with identified costs were included in this study. Other projects listed were assumed to be covered by projects developed using the worksheet.

D.7.2 Wastewater Treatment Improvements

Broken Arrow currently has one WWTP. Using the project development worksheet, an approximate 8-mgd increase treatment level and solids handling process projects were included in the 2040 period.

D.7.3 Collection System Piping Improvements

D.7.3.1 Gravity Piping

Broken Arrow reported approximately 460 miles of gravity piping ranging in size from 8 inches to greater than 24 inches in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter,

pipe depth, and age distribution. Projects for installation of new gravity piping to accommodate anticipated growth also were included in this study.

D.7.3.2 Force Mains

Broken Arrow reported approximately 60 miles of force main piping in the survey. Age distribution data from Muskogee was used since information for Broken Arrow was unavailable. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter and pipe age. Projects for installation of new force main piping to accommodate anticipated growth also were included in this study.

D.7.4 Collection System Lift Station Improvements

Broken Arrow reported 27 lift stations with an approximate total capacity of 25 mgd. Using the project development worksheet, rehabilitation/replacement projects were developed based on capacity and age. No new lift station projects are proposed in this study.

D.8 Guthrie

Guthrie is classified as a medium utility in the mechanical treatment stratum. Guthrie is located in the Central Watershed Planning Region. Using the methodology described in Section 2.2, the following project list was created.

D.8.1 Known Capital Improvement Projects

Guthrie did not provide specific capital improvement cost estimates in the survey. Projects listed were assumed to be covered by project developed using the worksheet.

D.8.2 Wastewater Treatment Improvements

Guthrie currently has one WWTP. Using the project development worksheet, an approximate 1.5-mgd increase treatment level and solids handling process projects were included in the 2040 period.

D.8.3 Collection System Piping Improvements

D.8.3.1 Gravity Piping

Guthrie reported approximately 65 miles of gravity piping ranging in size from less than 6 inches to greater than 24 inches in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter, pipe depth, and age distribution. Projects for installation of new gravity piping to accommodate anticipated growth also were included in this study.

D.8.3.2 Force Mains

Guthrie reported approximately 1.5 miles of force main piping in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter and pipe age. Projects for installation of new force main piping to accommodate anticipated growth also were included in this study.

D.8.4 Collection System Lift Station Improvements

Guthrie reported seven lift stations with an approximate total capacity of 1.9 mgd. Using the project development worksheet, rehabilitation/replacement projects were developed based on capacity and age. No new lift station projects are proposed in this study.

D.9 Guymon

Guymon is classified as a medium utility in the mechanical treatment stratum. Guymon is located in the Panhandle Watershed Planning Region. Using the methodology described in Section 2.2, the following project list was created.

D.9.1 Known Capital Improvement Projects

Guymon did not provide specific capital improvement cost estimates in the survey. Projects listed were assumed to be covered by projects developed using the worksheet.

D.9.2 Wastewater Treatment Improvements

Guymon currently has one WWTP. Using the project development worksheet, an approximate 3-mgd increase treatment level and solids handling process projects were included in the 2040 period.

D.9.3 Collection System Piping Improvements

D.9.3.1 Gravity Piping

Guymon reported approximately 46 miles of gravity piping ranging in size from less than 6 inches to 20 inches in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter, pipe depth, and age distribution. Projects for installation of new gravity piping to accommodate anticipated growth also were included in this study.

D.9.3.2 Force Mains

Guymon reported approximately 1.5 miles of force main piping in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter and pipe age. Projects for installation of new force main piping to accommodate anticipated growth also were included in this study.

D.9.4 Collection System Lift Station Improvements

Guymon reported 10 lift stations; however, capacity information was not provided. An average ratio of lift station to capacity to WWTP flow was used to determine lift station capacity and size for lift station projects. Using the project development worksheet, rehabilitation/replacement projects were developed based on capacity and age. No new lift station projects are proposed in this study.

D.10 Hobart

Hobart is classified as a medium utility in the lagoon-advanced treatment stratum. Hobart is located in the Southwest Watershed Planning Region. Using the methodology described in Section 2.2, the following project list was created.

D.10.1 Known Capital Improvement Projects

Hobart did not provide specific capital improvement projects in the survey.

D.10.2 Wastewater Treatment Improvements

Hobart currently has one WWTP. Using the project development worksheet, an approximate 1.2 mgd increase treatment level and solids handling process projects were included in the 2040 period.

D.10.3 Collection System Piping Improvements

D.10.3.1 Gravity Piping

Hobart reported approximately 27 miles of gravity piping ranging in size from less than 6 inches to 15 inches in the survey. Age distribution from Beaver was used since information on Hobart was unavailable. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter, pipe depth, and age distribution. Projects for installation of new gravity piping to accommodate anticipated growth also were included in this study.

D.10.3.2 Force Mains

Hobart did not report length of force main piping in the survey. Beaver's ratio of force main length to service area was used to estimate the length of force main. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter and pipe age. Projects for installation of new force main piping to accommodate anticipated growth also were included in this study.

D.10.4 Collection System Lift Station Improvements

Hobart reported four lift stations with an approximate total capacity of 3.7 mgd. Using the project development worksheet, rehabilitation/replacement projects were developed based on capacity and age. No new lift station projects are proposed in this study.

D.11 Midwest City

Midwest City is classified as a medium utility in the mechanical-advanced treatment stratum. Midwest City is located in the Central Watershed Planning Region. Using the methodology described in Section 2.2, the following project list was created.

D.11.1 Known Capital Improvement Projects

Midwest City identified several capital improvement projects. All projects with identified costs were included in the study. Other projects listed were assumed to be covered by projects developed using the worksheet.

D.11.2 Wastewater Treatment Improvements

Midwest City currently has one WWTP. Using the project development worksheet, an approximate 12-mgd WWTP rehabilitation and solids handling process projects were included in the 2060 period.

D.11.3 Collection System Piping Improvements

D.11.3.1 Gravity Piping

Midwest City reported approximately 280 miles of gravity piping ranging in size from less than 6 inches to greater than 24 inches in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter, pipe depth, and age distribution. Projects for installation of new gravity piping to accommodate anticipated growth also were included in this study.

D.11.3.2 Force Mains

Midwest City reported approximately 5 miles of force main piping in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter and pipe age. Projects for installation of new force main piping to accommodate anticipated growth also were included in this study.

D.11.4 Collection System Lift Station Improvements

Midwest City reported 11 lift stations with an approximate total capacity of 9.8 mgd. Using the project development worksheet, rehabilitation/replacement projects were developed base on capacity and age. No new lift station projects are proposed in this study.

D.12 Muskogee

Muskogee is classified as a medium utility in the mechanical treatment stratum. Muskogee is located in the Lower Washita Watershed Planning Region. Using the methodology described in Section 2.2, the following project list was created.

D.12.1 Known Capital Improvement Projects

Muskogee identified several capital improvement projects. These projects were included in this study with costs provided by Muskogee.

D.12.2 Wastewater Treatment Improvements

Muskogee currently has one WWTP. Using the project development worksheet, an approximate 14-mgd WWTP rehabilitation and solids handling process projects were included in the 2040 period.

D.12.3 Collection System Piping Improvements

D.12.3.1 Gravity Piping

Muskogee reported approximately 290 miles of gravity piping ranging in size from less than 6 inches to greater than 24 inches in the survey. Using the project development worksheet, rehabilitation/replacement projects for the 2040 and 2060 periods were

developed based on pipe diameter, pipe depth, and age distribution. 2020 projects were included in the capital improvement projects. Projects for installation of new gravity piping to accommodate anticipated growth also were included in this study.

D.12.3.2 Force Mains

Muskogee reported approximately 15 miles of force main piping in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter and pipe age. Projects for installation of new force main piping to accommodate anticipated growth also were included in this study.

D.12.4 Collection System Lift Station Improvements

Muskogee reported 18 lift stations with an approximate total capacity of 14 mgd. Using the project development worksheet, rehabilitation/replacement projects were developed based on capacity and age. No new lift station projects are proposed in this study.

D.13 Okmulgee

Okmulgee is classified as a medium utility in the mechanical-advanced treatment stratum. Okmulgee is located in the Eufaula Watershed Planning Region. Using the methodology described in Section 2.2, the following project list was created.

D.13.1 Known Capital Improvement Projects

Okmulgee did not provide specific capital improvement cost estimates in the survey. Projects listed were assumed to be covered by projects developed using the worksheet.

D.13.2 Wastewater Treatment Improvements

Okmulgee currently has one WWTP. Using the project development worksheet, an approximate 4.1-mgd WWTP rehabilitation and solids handling process projects were included in the 2040 period.

D.13.3 Collection System Piping Improvements

D.13.3.1 Gravity Piping

Okmulgee reported approximately 72 miles of gravity piping ranging in size from less than 6 inches to greater than 24 inches in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter, pipe depth, and age distribution. Projects for installation of new gravity piping to accommodate anticipated growth also were included in this study.

D.13.3.2 Force Mains

Okmulgee reported approximately 2.8 miles of force main piping in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter and pipe age. Projects for installation of new force main piping to accommodate anticipated growth also were included in this study.

D.13.4 Collection System Lift Station Improvements

Okmulgee reported eight lift stations with an approximate total capacity of 2.8 mgd. Using the project development worksheet, rehabilitation/replacement projects were developed based on capacity and age. No new lift station projects are proposed in this study.

D.14 Owasso

Owasso is classified as a medium utility in the mechanical-advanced treatment stratum. Owasso is located in the Middle Arkansas Watershed Planning Region. Using the methodology described in Section 2.2, the following project list was created.

D.14.1 Known Capital Improvement Projects

Owasso did not provide specific capital improvement cost estimates in the survey. Projects listed were assumed to be covered by project developed using the worksheet.

D.14.2 Wastewater Treatment Improvements

Owasso currently has one WWTP. Using the project development worksheet, approximately 3.3-mgd, 3.5-mgd, and 3.8-mgd WWTP rehabilitation and solids handling process projects were included in the 2020, 2040, and 2060 periods respectively.

D.14.3 Collection System Piping Improvements

D.14.3.1 Gravity Piping

Owasso reported approximately 165 miles of gravity piping ranging in size from less than 6 inches to greater than 24 inches in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter, pipe depth, and age distribution. Projects for installation of new gravity piping to accommodate anticipated growth also were included in this study.

D.14.3.2 Force Mains

Owasso reported approximately 8.7 miles of force main piping in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter and pipe age. Projects for installation of new force main piping to accommodate anticipated growth also were included in this study.

D.14.4 Collection System Lift Station Improvements

Owasso reported 11 lift stations with an approximate total capacity of 40 mgd. Using the project development worksheet, rehabilitation/replacement projects were developed based on capacity and age. Projects for installation of new lift station also were included in this study.

D.15 Pawnee

Pawnee is classified as a medium utility in the mechanical-advanced treatment stratum. Pawnee is located in the Upper Arkansas Watershed Planning Region. Using the methodology described in Section 2.2, the following project list was created.

D.15.1 Known Capital Improvement Projects

Pawnee did not provide specific capital improvement cost estimates in the survey. Projects listed were assumed to be covered by project developed using the worksheet.

D.15.2 Wastewater Treatment Improvements

Pawnee currently has one WWTP. Using the project development worksheet, an approximate 0.3-mgd WWTP rehabilitation and solids handling process projects were included in the 2020 and 2060 periods.

D.15.3 Collection System Piping Improvements

D.15.3.1 Gravity Piping

Pawnee reported approximately 12 miles of gravity piping ranging in size from less than 6 inches to 20 inches in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter, pipe depth, and age distribution. Projects for installation of new gravity piping to accommodate anticipated growth also were included in this study.

D.15.3.2 Force Mains

Pawnee reported approximately 0.5 miles of force main piping in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter and pipe age. Projects for installation of new force main piping to accommodate anticipated growth also were included in this study.

D.15.4 Collection System Lift Station Improvements

Pawnee reported seven lift stations with an approximate total capacity of 3.2 mgd. Using the project development worksheet, rehabilitation/replacement projects were developed based on capacity and age. No new lift station projects are proposed in this study.

D.16 Sapulpa

Sapulpa is classified as a medium utility in the mechanical treatment stratum. Sapulpa is located in the Middle Arkansas Watershed Planning Region. Using the methodology described in Section 2.2, the following project list was created.

D.16.1 Known Capital Improvement Projects

Sapulpa did not provide specific capital improvement cost estimates in the survey. Projects listed were assumed to be covered by projects developed using the worksheet.

D.16.2 Wastewater Treatment Improvements

Sapulpa currently has one WWTP. Using the project development worksheet, approximately 3.8 mgd and 4.1 mgd WWTP rehabilitation and solids handling process projects were included in the 2040 and 2060 periods respectively.

D.16.3 Collection System Piping Improvements

D.16.3.1 Gravity Piping

Sapulpa reported approximately 100 miles of gravity piping ranging in size from less than 6 inches to greater than 24-inches in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter, pipe depth, and age distribution. Projects for installation of new gravity piping to accommodate anticipated growth also were included in this study.

D.16.3.2 Force Mains

Sapulpa reported approximately 10 miles of force main piping in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter and pipe age. Projects for installation of new force main piping to accommodate anticipated growth also were included in this study.

D.16.4 Collection System Lift Station Improvements

Sapulpa reported 17 lift stations; however, capacity information was not provided. The ratio of lift station to capacity to WWTP flow from Owasso was used since information for Sapulpa was unavailable. Using the project development worksheet, rehabilitation/ replacement projects were developed based on capacity and age. Projects for installation of new lift station also were included in this study.

D.17 Stillwater

Stillwater is classified as a medium utility in the mechanical-advanced treatment stratum. Stillwater is located in the Upper Arkansas Watershed Planning Region. Using the methodology described in Section 2.2, the following project list was created.

D.17.1 Known Capital Improvement Projects

Stillwater did not provide specific capital improvement cost estimates in the survey. Projects listed were assumed to be covered by project developed using the worksheet.

D.17.2 Wastewater Treatment Improvements

Stillwater currently has one WWTP. Using the project development worksheet, approximately 11 mgd and 12 mgd WWTP rehabilitation and solids handling process projects were included in the 2040 and 2060 periods respectively.

D.17.3 Collection System Piping Improvements

D.17.3.1 Gravity Piping

Stillwater reported approximately 230 miles of gravity piping ranging in size from less than 6 inches to greater than 24-inches in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter, pipe depth, and age distribution. Projects for installation of new gravity piping to accommodate anticipated growth also were included in this study.

D.17.3.2 Force Mains

Stillwater reported approximately 6.5 miles of force main piping in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter and pipe age. Projects for installation of new force main piping to accommodate anticipated growth also were included in this study.

D.17.4 Collection System Lift Station Improvements

Stillwater reported 15 lift stations with an approximate total capacity of 3.6 mgd. Using the project development worksheet, rehabilitation/replacement projects were developed based on capacity and age. Projects for installation of new lift station also were included in this study.

D.18 Sulphur

Sulphur is classified as a medium utility in the mechanical-advanced treatment stratum. Sulphur is located in the Lower Washita Watershed Planning Region. Using the methodology described in Section 2.2, the following project list was created.

D.18.1 Known Capital Improvement Projects

Sulphur did not provide specific capital improvement cost estimates in the survey. Projects listed were assumed to be covered by projects developed using the worksheet.

D.18.2 Wastewater Treatment Improvements

Sulphur currently has one WWTP. Using the project development worksheet, approximately 0.8 mgd and 1.0 mgd WWTP rehabilitation and solids handling process projects were included in the 2040 and 2060 periods respectively.

D.18.3 Collection System Piping Improvements

D.18.3.1 Gravity Piping

Sulphur reported approximately 53 miles of gravity piping ranging in size from less than 6 inches to 20 inches in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter, pipe depth, and age distribution. Projects for installation of new gravity piping to accommodate anticipated growth also were included in this study.

D.18.3.2 Force Mains

Sulphur reported approximately 0.5 miles of force main piping in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter and pipe age. Projects for installation of new force main piping to accommodate anticipated growth also were included in this study.

D.18.4 Collection System Lift Station Improvements

Sulphur reported two lift stations with an approximate total capacity of 0.5 mgd. Using the project development worksheet, rehabilitation/replacement projects were developed

based on capacity and age. Projects for installation of new lift station also were included in this study.

D.19 Beaver

Beaver is classified as a small utility in the lagoon-total retention stratum. Beaver is located in the Panhandle Watershed Planning Region. Using the methodology described in Section 2.2, the following project list was created.

D.19.1 Known Capital Improvement Projects

Beaver did not identify any capital improvement projects in the survey.

D.19.2 Wastewater Treatment Improvements

Beaver currently has one WWTP. Using the project development worksheet, approximately 0.2 mgd WWTP rehabilitation and solids handling process projects were included in the 2020 and 2060 periods.

D.19.3 Collection System Piping Improvements

D.19.3.1 Gravity Piping

Beaver reported approximately 50 miles of gravity piping ranging in size from less than 6 inches to 12 inches in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter, pipe depth, and age distribution. Projects for installation of new gravity piping to accommodate anticipated growth also were included in this study.

D.19.3.2 Force Mains

Beaver reported approximately 6 miles of force main piping in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter and pipe age. Projects for installation of new force main piping to accommodate anticipated growth also were included in this study.

D.19.4 Collection System Lift Station Improvements

Beaver reported one lift station with an approximate total capacity of 1.0 mgd. Using the project development worksheet, rehabilitation/replacement projects were developed based on capacity and age. No new lift station projects are proposed in this study.

D.20 Inola

Inola is classified as a small utility in the lagoon stratum. Inola is located in the Middle Arkansas Watershed Planning Region. Using the methodology described in Section 2.2, the following project list was created.

D.20.1 Known Capital Improvement Projects

Inola did not provide specific capital improvement cost estimates in the survey. Projects listed were assumed to be covered by project developed using the worksheet.

D.20.2 Wastewater Treatment Improvements

Inola currently has one WWTP. Using the project development worksheet, approximately 0.2 mgd increase treatment and approximately 0.3 mgd increase capacity and solids handling process projects were included in the 2040 and 2060 periods respectively.

D.20.3 Collection System Piping Improvements

D.20.3.1 Gravity Piping

Inola reported approximately 11 miles of gravity piping ranging in size from less than 6 inches to 12 inches in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter, pipe depth, and age distribution. Projects for installation of new gravity piping to accommodate anticipated growth also were included in this study.

D.20.3.2 Force Mains

Inola reported approximately 2.5 miles of force main piping in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter and pipe age. Projects for installation of new force main piping to accommodate anticipated growth also were included in this study.

D.20.4 Collection System Lift Station Improvements

Inola reported four lift stations with an approximate total capacity of 3.7 mgd. Using the project development worksheet, rehabilitation/replacement projects were developed based on capacity and age. Projects for installation of new lift station also were included in this study.

D.21 Piedmont

Piedmont is classified as a small utility in the mechanical-advanced treatment stratum. Piedmont is located in the Middle Arkansas Watershed Planning Region. Using the methodology described in Section 2.2, the following project list was created.

D.21.1 Known Capital Improvement Projects

Piedmont did not provide specific capital improvement cost estimates in the survey. Projects listed were assumed to be covered by project developed using the worksheet.

D.21.2 Wastewater Treatment Improvements

Piedmont currently has one WWTP. Using the project development worksheet, approximately 0.2-mgd increase treatment and increase capacity and solids handling process projects were included in the 2040 period.

D.21.3 Collection System Piping Improvements

D.21.3.1 Gravity Piping

Since information for Piedmont was unavailable, Inola's ratio of gravity piping per person and pipe size and age distributions were used to estimate projects. Using the project

development worksheet, rehabilitation/replacement projects were developed based on pipe diameter, pipe depth, and age distribution. Projects for installation of new gravity piping to accommodate anticipated growth also were included in this study.

D.21.3.2 Force Mains

Since information for Piedmont was unavailable, Inola's ratio of force main piping per person and pipe size and age distributions were used to estimate projects. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter and pipe age. Projects for installation of new force main piping to accommodate anticipated growth also were included in this study.

D.21.4 Collection System Lift Station Improvements

Piedmont reported four lift stations; however, capacity information was not provided. Information from Inola was used to determine lift station capacity and size for lift station projects. Using the project development worksheet, rehabilitation/replacement projects were developed based on capacity and age. No new lift station projects are proposed in this study.

D.22 Shattuck

Shattuck is classified as a small utility in the lagoon-total retention stratum. Shattuck is located in the Panhandle Watershed Planning Region. Using the methodology described in Section 2.2, the following project list was created.

D.22.1 Known Capital Improvement Projects

Shattuck did not identify any capital improvement projects in the survey.

D.22.2 Wastewater Treatment Improvements

Shattuck currently has one WWTP. Using the project development worksheet, approximately 0.4-mgd WWTP rehabilitation and solids handling process projects were included in the 2040 period.

D.22.3 Collection System Piping Improvements

D.22.3.1 Gravity Piping

Shattuck reported approximately 17 miles of gravity piping ranging in size from less than 6 inches to 20 inches in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter, pipe depth, and age distribution. Projects for installation of new gravity piping to accommodate anticipated growth also were included in this study.

D.22.3.2 Force Mains

Shattuck reported approximately 2.5 miles of force main piping in the survey. Using the project development worksheet, rehabilitation/replacement projects were developed

based on pipe diameter and pipe age. Projects for installation of new force main piping to accommodate anticipated growth also were included in this study.

D.22.4 Collection System Lift Station Improvements

Shattuck reported three lift stations with an approximate total capacity of 2.8 mgd. Using the project development worksheet, rehabilitation/replacement projects were developed based on capacity and age. No new lift station projects are proposed in this study.

D.23 Yale

Yale is classified as a small utility in the mechanical-advanced treatment stratum. Yale is located in the Upper Arkansas Watershed Planning Region. Using the methodology described in Section 2.2, the following project list was created.

D.23.1 Known Capital Improvement Projects

Yale did not identify any capital improvement projects in the survey.

D.23.2 Wastewater Treatment Improvements

Yale currently has one WWTP. Using the project development worksheet, approximately 0.22-mgd, 0.25-mgd, and 0.27-mgd increasing capacity and solids handling process projects were included in the 2020, 2040, and 2060 periods.

D.23.3 Collection System Piping Improvements

D.23.3.1 Gravity Piping

Yale reported approximately 6 miles of gravity piping ranging in size from less than 6 inches to 20 inches in the survey. Information from Pawnee was used to estimate gravity pipeline size and age since information on Yale's system was unavailable. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter, pipe depth, and age distribution. Projects for installation of new gravity piping to accommodate anticipated growth also were included in this study.

D.23.3.2 Force Mains

Yale reported approximately 0.3 miles of force main piping in the survey. Pipe size and age distribution data from Pawnee was used since information for Yale was unavailable. Using the project development worksheet, rehabilitation/replacement projects were developed based on pipe diameter and pipe age. Projects for installation of new force main piping to accommodate anticipated growth also were included in this study.

D.23.4 Collection System Lift Station Improvements

Yale reported one lift station with an approximate total capacity of 1 gpm. Using the project development worksheet, rehabilitation/replacement projects were developed based on capacity and age. No new lift station projects are proposed in this study.

D.24 Non-surveyed Wastewater Utilities

Marlow, Grant, and Lexington were not surveyed; however, these utilities were used to estimate wastewater treatment improvements for cost modeling.

D.24.1 Marlow

Marlow is classified as a medium utility in the lagoon-total retention stratum. Marlow is located in the Lower Washita Watershed Planning Region. Marlow currently has one WWTP. Using the project development worksheet, approximately 0.7-mgd WWTP rehabilitation and solids handling process projects were included in the 2020 and 2060 periods.

D.24.2 Grant

Grant is classified as a small utility in the lagoon-advanced treatment stratum. Grant is located in the Blue Boggy Watershed Planning Region. Grant currently has one WWTP. Using the project development worksheet, approximately 0.1-mgd WWTP rehabilitation and solids handling process projects were included in the 2040 period.

D.24.3 Lexington

Lexington is classified as a small utility in the mechanical treatment stratum. Lexington is located in the Central Watershed Planning Region. Lexington currently has one WWTP. Using the project development worksheet, approximately 0.3-mgd WWTP rehabilitation and solids handling process projects were included in the 2040 period.

Appendix E
Estimate of NPS Needs for Clean Water Needs Survey

The Oklahoma Nonpoint Source Program currently receives approximately $3 million annually from US EPA Clean Water Act §319 Nonpoint Source funds. However, these funds are slated for an approximately 20% reduction beginning in calendar year 2013. Oklahoma utilizes these funds to 1) assess the sources and causes of nonpoint source pollution in the states waters as well as to determining waters of the state impacted by nonpoint source pollution, 2) educate citizens about the importance of protecting water resources and about what they can do to reduce nonpoint source pollution, 3) plan for and evaluate programs by which nonpoint source pollution is addressed including the development of Watershed Based Plan, and 4) implementation of best management practices to reduce nonpoint source pollution to waters of the state. These federal funds must be match by 40% non-federal funds. Currently, the state uses a portion of the Gross Production Tax income for the Infrastructure Revolving Fund Program which funds the installation of best management practices and provides a portion of the required $2 million of matching funds. This combination of federal and state dollars is only a small fraction of the resources needed to adequately address nonpoint source pollution to waters of our state.

Estimates of funding necessary to address nonpoint source (NPS) pollution in impaired watersheds in the State of Oklahoma are even more difficult to prepare than determinant assessments of the sources of pollution and the degree to which each source must be addressed in order to achieve water quality success. For instance, we know for example, that in some smaller NPS impaired watersheds, that investments by USDA Natural Resources Conservation Service of as little as $96,860 worth of investment in the implementation of best management practices (BMPs) in Wolf Creek in northwestern Oklahoma as necessary to reduce turbidity sufficiently to fully attain the fish and wildlife beneficial use (http://water.epa.gov/polwaste/nps/success319/ok_wolf.cfm) . We know that in other, similarly sized watersheds, restoration has not been achieved with investments greater than tenfold that investment in BMPs. Therefore, estimation of NPS needs is far from an exact science, however, the Oklahoma NPS program does have published, EPA-accepted estimates of NPS needs in several Watershed Based Plans, which provide a preliminary, but far from comprehensive estimate of the state's resource needs related to reductions in NPS-impaired waterbodies in the state.

The most critical and overarching need related to NPS pollution reduction pertains to the cost of monitoring Oklahoma waters for impacts of NPS pollution. Without dedicated, NPS-focused stream monitoring, evaluation of causes and sources of NPS pollution **or** success at reducing NPS pollution cannot be determined. The state currently devotes approximately $1.1 million per year in federal EPA Clean Water Act §319 Nonpoint Source funds toward this monitoring program. However, these federal funds are under significant threat of reductions and therefore the state should make plans to utilize state funding to cover these costs.

The State of Oklahoma has developed Watershed Based Plans that have been accepted by EPA in the following watersheds: Illinois River and Lake Tenkiller, Eucha/Spavinaw Watershed, Honey Creek of Grand Lake, Thunderbird Lake, Fort Cobb Lake, North Canadian River (between Lakes Canton and Overholser), and Elk City Lake. One critical component of an accepted plan is an estimate of financial resources necessary to address NPS pollution in the watershed. However, these plans are intended to be evolving documents and therefore, may or may not include an estimate of the entirety of funding

necessary to resolve NPS needs. Many include only partial estimates necessary to restore beneficial use support impaired by nonpoint source pollution in that they include an estimate of funds needed to for demonstration purposes or only partially implement the measures needed to solve water quality problems.

Finally, although watershed plans have only been developed for a fraction of NPS-impaired waterbodies, we can extrapolate these estimates to additional watersheds to provide a preliminary estimate of resources required to restore NPS pollution in the top ten and top 25 NPS impaired waterbodies. However, it is important to note that the figures presented below represent an estimate of additional needs that currently lack a funding source, but do not include resources that have already been identified or expended. Therefore, these estimates are likely a conservative estimate of NPS needs.

Watershed/Area	Type of Activity	Funding Needs	Partial or Total Estimate
Statewide	Blue Thumb Education Program and Volunteer Monitoring	$600,000 annually	Total
	NPS Water Quality Monitoring on small, wade-able streams	$1,100,000 annually	Total
	Locally Led Cost Share Implementation (state funds)	$730,000 annually (approx.)	Partial
Illinois River[1]	Riparian Protection Program (Conservation Reserve Enhancement Program and State funded Program)	$3,925,000	Partial
	Illinois River BMP Cost-Share (including state and federal EPA 319 funds)	$500,000[2] annually	Partial
	City of Tahlequah Stormwater BMPS	$282,200 annually	Total
	USDA NRCS Cost-Share Programs	$250,000 annually	Partial
	ODAFF Pollution Prevention at poultry feeding operations and soil testing	$44,676 annually	Total
	Education Programs including Blue Thumb, City of Tahlequah, Oklahoma Scenic Rivers Commission, ODAFF, etc.	$50,000 annually	Partial
	Water Quality Monitoring (USGS, OWRB, OCC, City of Tahlequah)	$550,230 annually	Partial
	Conversion of Poultry Waste to Fertilizer/Energy	$1,650,000[2]	Total
Eucha/Spavinaw[1]	USDA NRCS Cost-Share Programs	$125,000 - $250,000 annually	Partial
	ODAFF Implementation of Soil Phosphorus Index for Litter Application	$100,000 annually	Total
	Riparian Protection Program (Conservation Reserve Enhancement Program and State funded Program)	$12,218,856	Partial

Watershed/Area	Type of Activity	Funding Needs	Partial or Total Estimate
	OSU Cooperative Extension Nonpoint Source Education Program for Producers in Watershed (federal and state funds)	$288,968	Total
	Soil Sampling Technique and Nutrient Variability Demonstration	$47,337	Total
	City of Tulsa Monitoring	$465,000	Total
	USGS Monitoring in Watershed	$24,000 annually	Total
	OCC 319 Project Monitoring	$235,856	Total
	Modeling to Target NPS Pollution in Watershed	$70,000	Total
	Eucha/Spavinaw BMP Cost-Share (including state and federal EPA 319 funds)	$1,484,848	Total
North Canadian River[1]	Education Programs through Blue Thumb	$132,366	Total
	OCC 319 Project Monitoring	$41,940	Total
	USGS Monitoring in Watershed	$24,000 annually	Total
	Modeling to Target NPS Pollution in Watershed	$166,667	Total
	Norht Canadian BMP Cost-Share (including state and federal EPA 319 funds)	$588,583	Partial
	USDA NRCS Cost-Share Programs	$125,000 - $250,000 annually	Partial
Elk City Lake[1]	319 and CREP Implementation of BMPs to Address NPS in Watershed	$3,913,757	Total (for 15 years)
Honey Creek[3]	319 BMP Implementation	$1,546,115	Partial
Lake Thunderbird[1]	319 Low Impact Development Project-Phase 1	$512,234	Total
	Lake Aeration Project	$692,773	Partial
	City of Norman Stormwater Master Plan Projects	$83,000,000	Total
	319 Project Education/Outreach	$182,724	Total
	OCC 319 Project Monitoring	$44,940	Total
	Modeling for Lake	$244,774	Total
Ft. Cobb Lake[1]	Watershed Monitoring	$30,000 annually	Total

1- As referenced in the Watershed Based Plan (http://www.ok.gov/conservation/Agency_Divisions/Water_Quality_Division/WQ_Reports/WQ_Reports_Watershed_Based_Plans/).

2- Project listed in approved watershed plan, but necessary funding amount has been updated based on more recent reporting.

3- Based on current workplan for this project.

In summary, NPS needs to address some of the state's most critical watersheds currently include more than $115,991,090. In general, this amounts to between $5 to $20 million per watershed to even begin to address nonpoint source pollution concerns. Therefore, a starting point to address NPS pollution in the top 25 priority watersheds in the state would likely range between $125 and $500 million dollars. Federal partners such as the USDA Natural Resource Conservation Service have been devoting significant amounts of conservation funding towards these resources annually (at least $50 million dollars in 2010). However, these programs focus statewide, and not just in priority watersheds. In addition, these programs focus on additional natural resource needs other than reductions in NPS pollution. Therefore, Oklahoma will need to contribute a significant amount of state resources toward reducing nonpoint source pollution to our water resources in order to make the most of the federal dollars we receive.