



December 2018

# BUREAU OF RECLAMATION

## Water Reuse Grant Program Supports Diverse Projects and Is Managed Consistently with Federal Regulations

# GAO Highlights

Highlights of [GAO-19-110](#), a report to congressional requesters

## Why GAO Did This Study

Population growth and drought are among the factors that have placed increasing demands on the U.S. water supply, particularly in the arid West. The reuse of wastewater can help address water management challenges by treating water that is typically unusable and then reusing it for beneficial purposes, such as irrigation, according to the Environmental Protection Agency. Reclamation's Title XVI program awards grants for the study and construction of water reuse projects in 17 western states and Hawaii. From fiscal years 1992 through 2009, Congress individually authorized some Title XVI projects. In 2016, Congress amended the Title XVI program to allow grants to be awarded to additional water reuse projects.

GAO was asked to review the Title XVI program. This report describes, among other things, for the Title XVI program (1) grants Reclamation has awarded for projects and studies and remaining projects that are eligible for grants, (2) the types and locations of projects and studies that have received grants, and (3) Reclamation's process for selecting projects and studies and its consistency with federal grant regulations as well as how the program's evaluation criteria have changed since 2011. GAO reviewed relevant laws, regulations, and agency guidance; analyzed financial data for fiscal years 1992 through 2017; compared documents related to the project selection process against federal grant regulations; and interviewed agency officials and nonfederal project sponsors with different types of projects.

View [GAO-19-110](#). For more information, contact Anne-Marie Fennell at (202) 512-3841 or [fennella@gao.gov](mailto:fennella@gao.gov).

December 2018

## BUREAU OF RECLAMATION

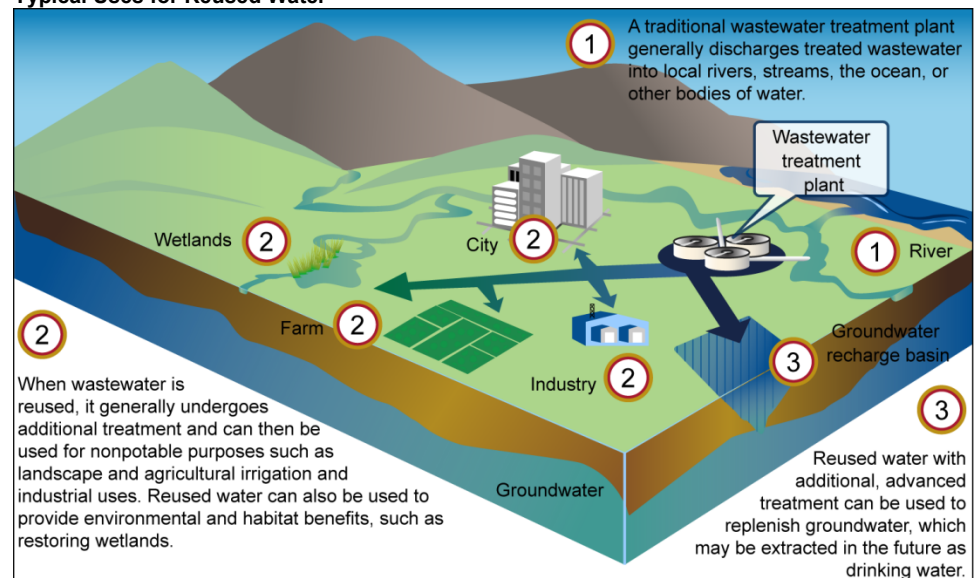
# Water Reuse Grant Program Supports Diverse Projects and Is Managed Consistently with Federal Regulations

## What GAO Found

The Bureau of Reclamation, within the Department of the Interior, awarded about \$715 million in water reuse grants for 46 construction projects and 71 studies under the Title XVI Water Reclamation and Reuse Program (Title XVI) from fiscal year 1992 through fiscal year 2017, according to agency documents. Most of the Title XVI funding—about \$703 million—has been awarded for construction projects. Some construction projects remain eligible for Title XVI grant funding. About \$464 million in eligible Title XVI grant funding not yet awarded remains for projects that Congress individually authorized; for projects eligible under the 2016 amendments to the Title XVI program, about \$513 million remains.

Title XVI projects and studies cover various uses for reused water. For example, many projects GAO reviewed produce reused water for landscape and agricultural irrigation, as well as water that may later be extracted for drinking water, as shown in the figure. Title XVI projects are located in western urban and rural areas, with California accounting for 36 construction projects.

### Typical Uses for Reused Water



Source: GAO analysis of information from reports on water reuse. | [GAO-19-110](#)

Reclamation's process to select Title XVI projects and studies to receive grants involves announcing the funding opportunity, establishing criteria to evaluate potential projects, and reviewing applications to make award decisions, according to agency documents GAO reviewed. GAO found that Reclamation's grant award process is consistent with relevant federal regulations for awarding grants. For example, the Title XVI funding opportunity announcements GAO reviewed contained information required by the regulations, such as the criteria used to evaluate applications. In recent years, Reclamation has changed the criteria it uses to evaluate projects, eliminating or adding some criteria and changing the weighting of others. Reclamation officials said that these changes were made in part in response to statutory changes.

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## Abbreviations

ARRA	American Recovery and Reinvestment Act
FOA	Funding Opportunity Announcement
OMB	Office of Management and Budget
Title XVI	Title XVI Water Reclamation and Reuse Program
Uniform Guidance	Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards
WIIN Act	Water Infrastructure Improvements for the Nation Act

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December 13, 2018

The Honorable Jared Huffman  
Ranking Member  
Subcommittee on Water, Power and Oceans  
Committee on Natural Resources  
House of Representatives

The Honorable Grace F. Napolitano  
Ranking Member  
Subcommittee on Water Resources and Environment  
Committee on Transportation and Infrastructure  
House of Representatives

The Honorable Paul Tonko  
Ranking Member  
Subcommittee on Environment  
Committee on Energy and Commerce  
House of Representatives

Population growth and drought are among the factors that have placed increasing demands on our nation’s water supply, particularly in the arid West. The reuse and recycling of water helps address water management challenges by treating wastewater or other water that is typically unusable and then reusing it for beneficial purposes, such as irrigation, according to the Environmental Protection Agency. The Bureau of Reclamation, within the Department of the Interior, administers the only active federal program focused on water reuse, reclamation, and recycling—the Title XVI Water Reclamation and Reuse Program (Title XVI).<sup>1</sup> This program helps states and communities create supplemental water supplies by identifying opportunities for the reuse of municipal, industrial, domestic, and agricultural wastewater and impaired ground and surface waters.

The Title XVI program provides grants for the study and construction of water reuse projects in the 17 western states under Reclamation’s

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<sup>1</sup>Throughout this report, we refer to water reuse, reclamation, and recycling as water reuse.

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purview and Hawaii.<sup>2</sup> Reclamation is responsible for awarding and monitoring Title XVI grants to nonfederal project sponsors, who are involved in the planning, designing, and constructing of these projects.<sup>3</sup> Title XVI grants generally require a cost share from the project sponsor. For example, federal funding for construction projects under the Title XVI program is generally limited to 25 percent of total project costs—up to \$20 million in federal funding—and requires a 75 percent nonfederal cost share from the project sponsor.<sup>4</sup> Reclamation generally awards Title XVI grants for construction projects to project sponsors in installments over multiple years before the federal funding maximum for each project is reached. As a result, some projects may have remaining project costs eligible for federal grant funding under Title XVI.

The Title XVI program was established by the Secretary of the Interior in response to the enactment in 1992 of the Reclamation Wastewater and Groundwater Studies and Facilities Act, which authorized several studies as well as the construction of 5 wastewater reuse projects—4 in California and 1 in Arizona.<sup>5</sup> From 1992 through 2009, Congress authorized a total of 53 water reuse projects for construction under the Title XVI program. In December 2016, the act was amended through Section 4009 of the Water Infrastructure Improvements for the Nation Act (WIIN Act), which authorized the Secretary of the Interior to provide grants for water reuse projects with agency-approved feasibility studies.<sup>6</sup> The WIIN Act

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<sup>2</sup>The eligible states are Arizona, California, Colorado, Hawaii, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming. Hawaii is generally not under Reclamation's purview but is included by statute in the Title XVI program.

<sup>3</sup>For the purpose of this report, the term project sponsors refers to the nonfederal entities—such as tribes, water districts, and municipalities—that develop projects or studies eligible for Title XVI grants. Eligible applicants include state, regional, or local authorities; Indian tribes or tribal organizations; or other entities, such as water districts, wastewater districts, or rural water districts.

<sup>4</sup>The \$20 million ceiling on the federal share of funding for Title XVI construction projects was enacted as a part of 1996 amendments to the program's authorizing legislation. Reclamation Recycling and Water Conservation Act of 1996, Pub. L. No. 104-266, § 7, 110 Stat. 3290, 3296 (1996) (codified as amended at 43 U.S.C. § 390h-13(d)(1)). The federal ceiling for some projects is less than \$20 million. In addition, legislation enacted after 1996 specifically permitted some Title XVI projects to receive more than \$20 million in federal funding.

<sup>5</sup>Pub. L. No. 102-575, Title XVI, 106 Stat. 4600, 4663 (1992) (codified as amended at 43 U.S.C. §§ 390h to 390h-39).

<sup>6</sup>Pub. L. No. 114-322, § 4009(c), 130 Stat. 1628, 1868 (2016).

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authorized Interior to award grants for projects that had not received specific statutory authorization from Congress.

You asked us to review the Title XVI program for water reuse construction projects and studies. This report describes for the Title XVI program (1) grants Reclamation has awarded for projects and studies and remaining projects that are eligible for grants, (2) the types and locations of projects and studies that have received grants, (3) Reclamation's process for selecting projects and studies and its consistency with federal grant regulations as well as how the program's evaluation criteria have changed since 2011, and (4) Reclamation's process for monitoring grants and its consistency with federal grant regulations.

For the first objective, we reviewed relevant laws, budget justifications, and financial data maintained by Reclamation from fiscal years 1992 through 2017—the most recent data at the time of our review. We selected this time period to cover funding from the inception of the program through the most current data that were available at the time of our review. To determine the reliability of Reclamation's financial data, we reviewed agency documents, compared publicly available information to Reclamation's Title XVI financial data, and interviewed agency officials. We determined that the data were sufficiently reliable for the purpose of our review. To determine the amount Reclamation has awarded to Title XVI studies and projects, we analyzed the agency's financial data. To determine remaining project costs for individually congressionally authorized projects, we further analyzed the financial data to determine the federal share of remaining costs. For individually authorized projects that have not received the full federal funding share, we verified with project sponsors the status of projects in terms of planned construction.<sup>7</sup> To determine remaining project costs for Title XVI projects eligible under the WIIN Act, we reviewed relevant feasibility studies to calculate the federal share of remaining costs.

For the second objective, we reviewed documents from Reclamation and project sponsors that describe the types of projects and studies funded under the Title XVI program. We analyzed the information to categorize each Title XVI project by the purpose or use of the reused water, such as

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<sup>7</sup>This included contacting project sponsors to verify the status of 11 projects that Reclamation's documents listed as having no construction planned. We were unable to contact one of these project sponsors because there was no longer anyone with knowledge of the project at the water district, according to a Reclamation official.



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irrigation, commercial and industrial uses, and indirect-potable reuse. This information was independently verified to confirm the categorization of each project. To learn more about the types of Title XVI projects and studies funded, we interviewed project sponsors from all 17 of the individually authorized projects that Reclamation documents listed as being ongoing at the time of our review, as well as all 3 of the WIIN Act-eligible projects that Reclamation selected for grants in fiscal year 2017. We also interviewed a nonprobability sample (11 of 25) of project sponsors of projects that had been completed, or had already been awarded their full federal cost share. We selected project sponsors from different Reclamation regions and with a variety of project sizes (i.e. amount of water to be delivered) and types.<sup>8</sup> Because this was a nonprobability sample, the views of the sponsors we spoke with are not representative of the views of all Title XVI project sponsors but provide illustrative examples of the views of project sponsors for a range of Title XVI projects. We conducted some of our interviews with project sponsors by telephone and others in person. This included interviews conducted during site visits to 14 Title XVI projects—selected to understand different purposes and types of projects—in central and southern California in March and April 2018. In addition to project sponsors, we also spoke with representatives from eight nongovernmental organizations that sponsor research, have an interest in water reuse, or represent water or wastewater districts. We identified nongovernmental organizations to interview through research and interviews with agency officials, project sponsors, and other nongovernmental organizations.

For the third objective, we reviewed relevant federal grant regulations and agency documents related to the project selection process, including funding opportunity announcements for fiscal years 2011 through 2018 that describe Reclamation’s funding opportunities to applicants and documentation related to Reclamation’s scoring of applications and final selections. We selected this time frame because 2011 was the year that Reclamation introduced a competitive selection process for annual Title XVI grants. To assess the extent to which Reclamation’s process for selecting projects is consistent with relevant federal grant regulations, we compared the process Reclamation uses to select projects against the Office of Management and Budget’s (OMB) Uniform Administrative

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<sup>8</sup>To quantify the number of project sponsors, we use the following modifiers throughout the report: some represents 2 to 3 project sponsors, several represents 4 to 7 project sponsors, and many represents 8 to 18 project sponsors. We interviewed project sponsors of both individually congressionally authorized projects and WIIN Act-eligible projects.

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Requirements, Cost Principles, and Audit Requirements for Federal Awards (Uniform Guidance).<sup>9</sup> For this comparison, we selected relevant provisions from the Uniform Guidance that pertain to the project selection process.<sup>10</sup> To determine how evaluation criteria have changed since 2011, we analyzed the criteria listed in Reclamation’s funding opportunity announcements for fiscal years 2011 through 2018 and discussed the reasons for changes to the criteria with Reclamation officials. To identify project sponsors’ views on the process and changes to the criteria, we interviewed project sponsors and reviewed relevant documentation, including letters project sponsors sent to Reclamation.

For the fourth objective, we reviewed relevant federal grant regulations outlined in OMB’s Uniform Guidance as well as agency guidance related to the monitoring process. To assess the extent to which the monitoring process is consistent with relevant federal grant regulations, we compared the process Reclamation uses to monitor grants against relevant sections of OMB’s Uniform Guidance.<sup>11</sup> We analyzed financial and performance reports related to all 56 Title XVI grants that were active at the end of fiscal year 2017 using a standard document review tool to determine the extent to which these reports contained information required by the Uniform Guidance or Reclamation. For financial reports, we determined whether project sponsors submitted required reports by their due dates and whether they submitted these reports on the form required by the agency. For performance reports, we determined whether

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<sup>9</sup>79 Fed. Reg. 75,867 (Dec. 19, 2014) (joint interim final rule implementing OMB’s final Uniform Guidance) (Interior’s implementing regulations codified at 2 C.F.R. pt. 1402); 78 Fed. Reg. 78,590 (Dec. 26, 2013) (OMB’s final Uniform Guidance) (codified as amended at 2 C.F.R. pt. 200). The Uniform Guidance superseded and streamlined requirements from eight OMB grants management circulars, including A–21, *Cost Principles for Educational Institutions*; A–50, *Audit Follow-up* (specifically the guidance on Single Audit Act follow-up); A–87, *Cost Principles for State, Local and Indian Tribal Governments*; A–89, *Federal Domestic Assistance Program Information*; A–102, *Grants and Cooperative Agreements with State and Local Governments*; A–110, *Uniform Administrative Requirements for Grants and Agreements With Institutions of Higher Education, Hospitals, and Other Non-Profit Organizations*; A–122, *Cost Principles for Non-Profit Organizations*; and A–133, *Audits of States, Local Governments and Non-Profit Organizations*. Although the Uniform Guidance became effective in December 2014, it did not substantially revise the provisions analyzed in this report.

<sup>10</sup>See 2 C.F.R. § 200.203, on information agencies are to include in public notices of funding opportunities, such as key dates and the criteria to be used to evaluate applications.

<sup>11</sup>These include 2 C.F.R. § 200.327, on financial reporting, and 2 C.F.R. § 200.328, on monitoring and reporting program performance.

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project sponsors submitted reports by their due dates and whether these reports contained information on progress made toward constructing the Title XVI project. We also analyzed Reclamation documentation related to site visits conducted by agency officials and compared it against requirements outlined in agency guidance. In our interviews with project sponsors, we also asked for their perspectives on Reclamation's monitoring process.

We conducted this performance audit from October 2017 to December 2018 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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## Background

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### Reclamation and the Title XVI Program

As Interior's primary water management agency, Reclamation's mission has been to manage, develop, and protect water and water-related resources in 17 western states since 1902. Reclamation has led or provided assistance in the construction of most of the large dams and water diversion structures in the West for the purpose of developing water supplies for irrigation, municipal water use, flood control, and habitat enhancement, among others. Reclamation is organized into five regions—Great Plains, Lower Colorado, Mid-Pacific, Pacific Northwest, and Upper Colorado<sup>12</sup>—and the agency's central office in Denver provides technical and policy support. Each regional office oversees the water projects, including Title XVI projects and studies, located within its regional boundaries. The types of projects eligible under the Title XVI

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<sup>12</sup>The Great Plains Region covers the eastern part of Colorado, Kansas, Montana, Nebraska, North Dakota, Oklahoma, South Dakota, most of Texas, and part of Wyoming. The Lower Colorado Region covers most of Arizona, the southern part of California, and parts of Nevada, New Mexico, and Utah. The Mid-Pacific Region covers the northern part of California, most of Nevada, and parts of Oregon and Utah. The Pacific Northwest Region covers Idaho and Washington, most of Oregon, and parts of Nevada, Utah, and Wyoming. The Upper Colorado Region covers the northeastern part of Arizona, the western part of Colorado, most of New Mexico, the far western part of Texas, most of Utah, and the southwestern part of Wyoming. The Lower Colorado Region oversees Title XVI projects in Hawaii.

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program include, among others, construction of water treatment facilities, pipelines to distribute reused water, and tanks and reservoirs to store reused water.

The Title XVI program is one of several programs under Interior's WaterSMART (Sustain and Manage America's Resources for Tomorrow) Program. The WaterSMART program is implemented by Reclamation and the U.S. Geological Survey within Interior. According to an Interior document, the WaterSMART program focuses on identifying strategies to help ensure sufficient supplies of clean water for drinking, economic activities, recreation, and ecosystem health. Reclamation carries out its portion of the WaterSMART program by administering grants, including Title XVI grants for water reuse, conducting research, and providing technical assistance and scientific expertise.<sup>13</sup> Reclamation offers three types of grants to project sponsors under the Title XVI program:

- construction projects, which are projects to plan, design, or construct infrastructure for the treatment and distribution of reused water;
- feasibility studies, which are documents that generally identify specific water reuse opportunities, describe alternatives, and incorporate other considerations, such as the financial capability of the project sponsor; and
- research studies, which are studies to help states, tribes, and local communities establish or expand water reuse markets, improve existing water reuse facilities, or streamline the implementation of new water reuse facilities.

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<sup>13</sup>Reclamation's other WaterSMART programs include the Basin Study Program, WaterSMART Grants, the Drought Response Program, and the Cooperative Watershed Management Program.

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### Key Terms Related to Water Reuse

- Acre-foot of water: about 326,000 gallons of water, or enough water to cover an acre of land—about the size of a football field—1 foot deep.
- Construction projects: projects to plan, design, or construct infrastructure for the treatment and distribution of reused water.
- Feasibility studies: documents that generally identify specific water reuse opportunities; describe alternatives; and incorporate other considerations, such as the financial capability of the project sponsor.
- Nonpotable: water that is not suitable for drinking but may be suitable for other purposes.
- Potable: water that is suitable for drinking.
- Project sponsors: water districts, wastewater or sanitation districts, municipalities, tribes, and other entities that develop projects or studies eligible for Title XVI grants.
- Research studies: studies to help states, tribes, and local communities establish or expand water reuse markets, improve existing water reuse facilities, or streamline the implementation of new water reuse facilities.

Source: GAO analysis of information from the Bureau of Reclamation and reports related to water reuse. | GAO-19-110

Federal awards for construction projects under the Title XVI program are generally limited to 25 percent of total project costs—up to \$20 million in federal funding—and require a 75 percent nonfederal cost share from the project sponsor. Federal funding for feasibility studies under the Title XVI program is generally limited to 50 percent of the total study costs, up to \$450,000, and federal funding for research studies is generally limited to 25 percent of the total study costs, up to \$300,000. Reclamation generally awards Title XVI grants for construction projects to project sponsors in installments over multiple years before the federal funding maximum for each project is reached, whereas it generally awards the full amount for feasibility and research study grants in a single year.

From fiscal year 1992, when the Title XVI program was established, through fiscal year 2009, Congress authorized 53 Title XVI projects.<sup>14</sup> Each of these projects was subject to a cap on the federal cost share. In fiscal years 1992 through 2010, Congress generally directed funding for these specific authorized projects each year.<sup>15</sup> Starting in fiscal year 2011, Congress began appropriating funding for the Title XVI program without directing specific funding to individual projects.<sup>16</sup> As a result, Reclamation started using a competitive process to award Title XVI grants to projects and studies, through which project sponsors with authorized projects applied for Title XVI grants.<sup>17</sup> Only the 53 projects that were already authorized by Congress were eligible to apply for grants for construction projects.<sup>18</sup> Section 4009(c) of the WIIN Act,

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<sup>14</sup>Fiscal year 2009 was the last year that Congress authorized any specific Title XVI projects.

<sup>15</sup>Specifically, in fiscal years 1992 through 2010, Congress generally provided funding direction for specific authorized projects in committee reports accompanying the appropriations acts.

<sup>16</sup>Since the beginning of the 112th Congress, convened in January 2011, the House and Senate have observed a ban on earmarks, formally known as congressionally directed spending. House and Senate rules define “congressionally directed spending” to be as a provision in legislation or committee report language included primarily at the request of a specific member of Congress authorizing or recommending specific spending in a specific state, locality, or Congressional district. Congressional Research Service, *Transportation Spending Under an Earmark Ban*, R41544 (Washington, D.C.: January 4, 2017).

<sup>17</sup>Awards for Title XVI feasibility and research studies are not limited to project sponsors with individually congressionally authorized projects.

<sup>18</sup>To be eligible for Title XVI construction grants, projects also were required to meet Title XVI pre-construction requirements, including having a completed and Reclamation-approved feasibility study. See 43 U.S.C. § 390h-13(b).

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enacted in December 2016, authorized an additional \$50 million to be appropriated for water reuse projects.<sup>19</sup> To be eligible to receive Title XVI grants under the WIIN Act, projects must submit a completed feasibility study to Reclamation, and Reclamation must review the study to determine whether, among other things, the project is technically and financially feasible and provides a federal benefit in accordance with the reclamation laws. Reclamation is then to submit a report with the results of its review to Congress, and projects determined to be feasible are then eligible to apply for grants under the competitive grant program established by the WIIN Act.<sup>20</sup> Each feasibility study identifies an estimated project cost. Like most projects individually authorized prior to the WIIN Act, the federal share of this cost is generally capped at 25 percent, up to \$20 million. In addition to construction projects, Reclamation began awarding Title XVI grants to project sponsors for feasibility studies in fiscal year 2011 and for research studies in fiscal year 2016.<sup>21</sup> Figure 1 shows a timeline of the Title XVI program.

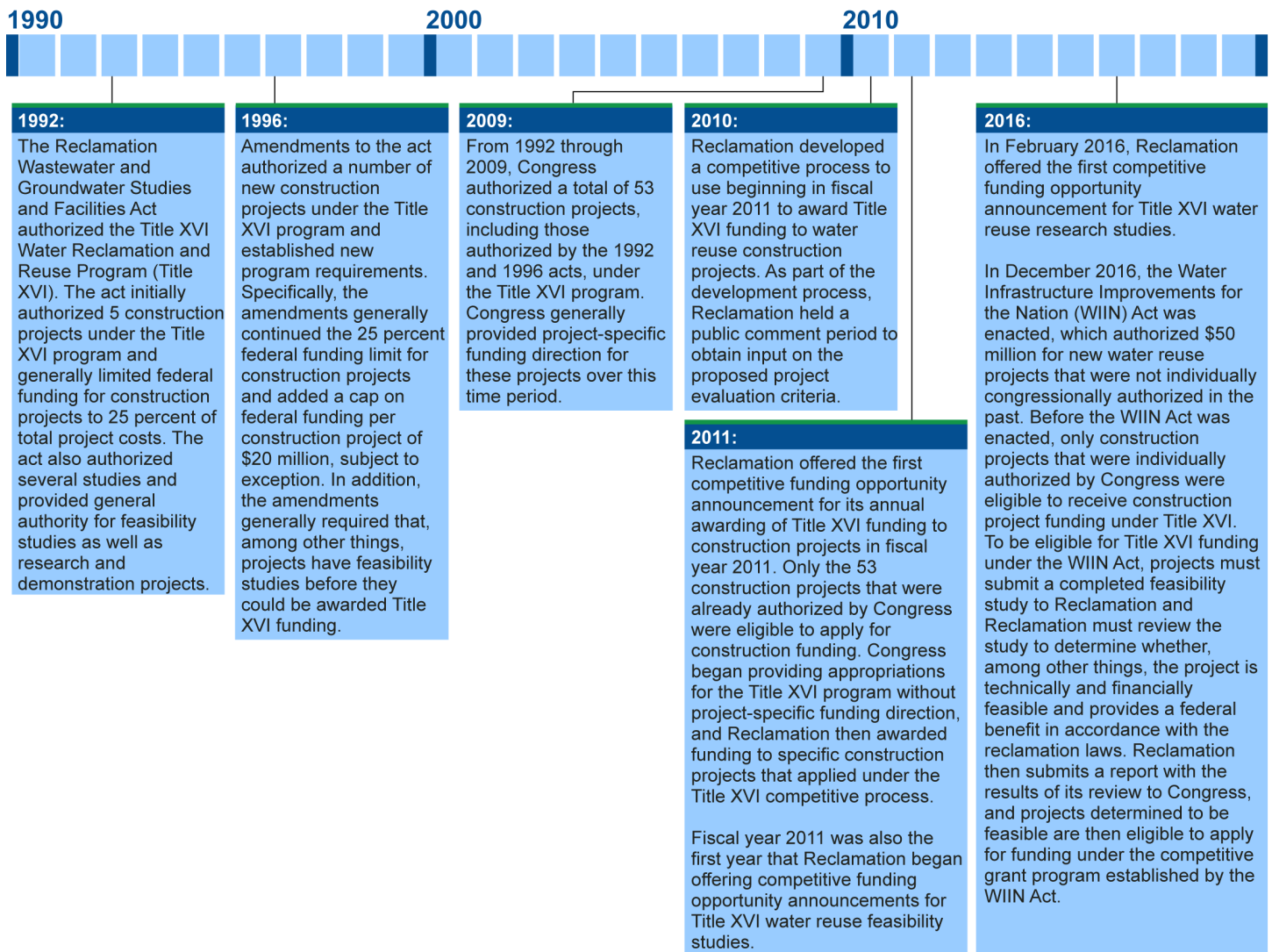
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<sup>19</sup>Pub. L. No. 114-322, § 4009(c), 130 Stat. 1628, 1868 (2016).

<sup>20</sup>Specifically, the WIIN Act directs the Secretary of the Interior to send to Congress (1) the results of the Secretary's review of the feasibility study, including a determination of whether the project is feasible; (2) any recommendations the Secretary may have concerning the plan or design of the project; and (3) any conditions the Secretary may require for construction of the project. 43 U.S.C. § 390h(e)(3).

<sup>21</sup>Reclamation awarded grants for some feasibility and research studies prior to fiscal years 2011 and 2016 but did not award such grants through individual funding opportunity announcements.

**Figure 1: Timeline of Selected Key Events Related to the Bureau of Reclamation’s Title XVI Water Reclamation and Reuse Program**



Source: GAO analysis of relevant laws and Reclamation documents. | GAO-19-110

## Water Reuse

With water reuse, water that is typically unusable, such as municipal or industrial wastewater, undergoes additional treatment to make it suitable for certain purposes. For example, municipal wastewater typically undergoes primary and secondary treatment before it can be discharged

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into a river, stream, or other body of water.<sup>22</sup> With water reuse, wastewater generally undergoes further (tertiary) treatment to remove additional nutrients and suspended solids and to disinfect the water. The treated water can then be reused for nonpotable uses, such as landscape or agricultural irrigation or industrial uses. In some cases, wastewater undergoes additional, advanced treatment—such as microfiltration and reverse osmosis—and may then be suitable for potable uses, such as injection into a groundwater basin or reservoir where it may later be extracted for drinking water.<sup>23</sup> Figure 2 shows some of the typical treatment processes that may be applied to reused water, and figure 3 shows some of the typical uses of reused water.

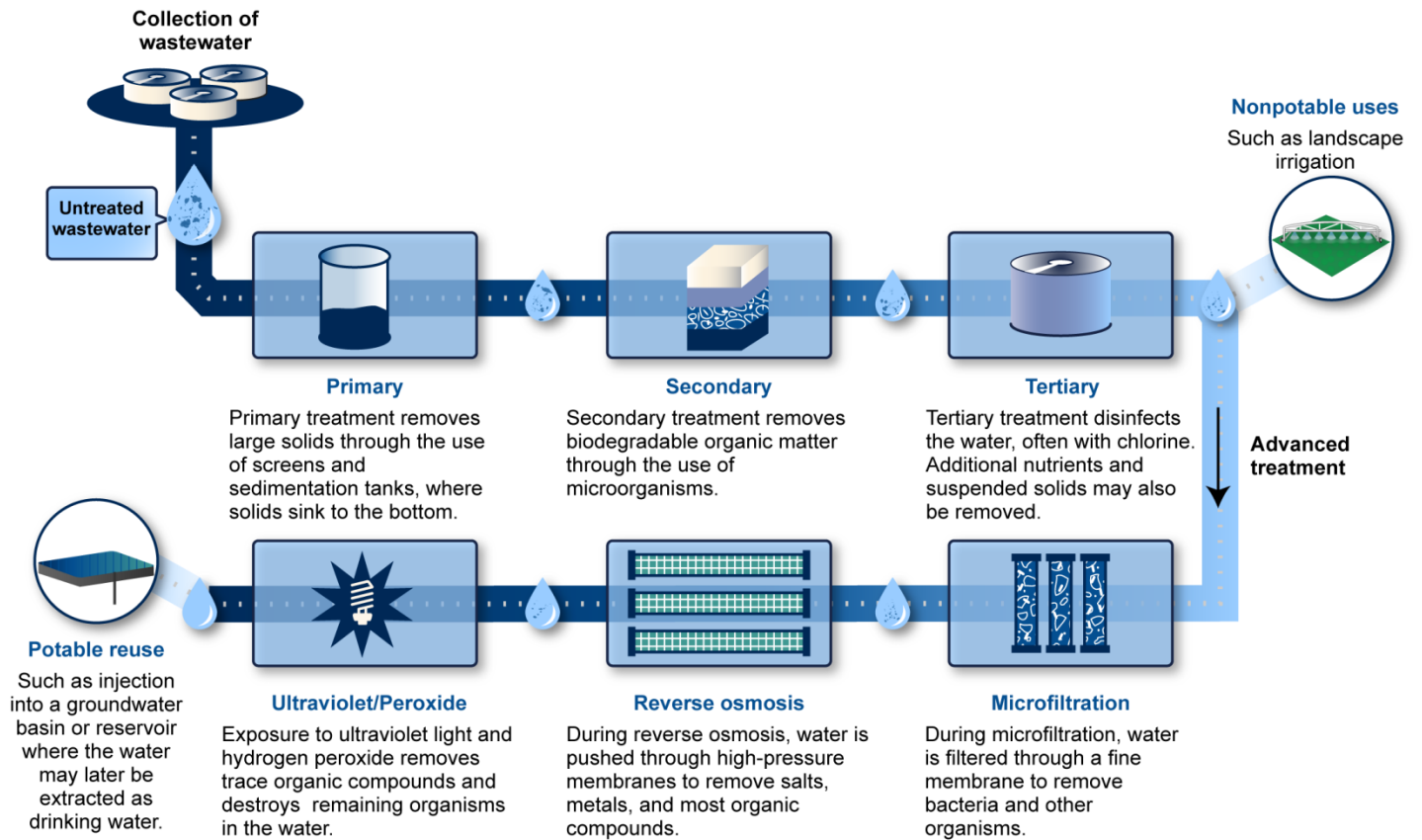
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<sup>22</sup>According to the Environmental Protection Agency, coarse solids are removed from wastewater during the primary stage of treatment. Primary treatment generally includes a sedimentation process, where wastewater enters a sedimentation tank and suspended solids gradually sink to the bottom. After the water has been through primary treatment processes, it flows into the next stage of treatment, called secondary. Secondary treatment processes can remove up to 90 percent of the organic matter in wastewater by using biological treatment processes. Environmental Protection Agency, *Primer for Municipal Wastewater Treatment Systems*, EPA 832-R-04-001 (Washington, D.C.: September 2004). Treated wastewater is generally disinfected before it is discharged into a river, stream, or other water body, according to a Reclamation document.

<sup>23</sup>There are two types of potable reuse: indirect and direct. Indirect-potable reuse is the intentional addition of treated municipal wastewater to a drinking water source such as a lake or reservoir or groundwater aquifer, often referred to as an environmental buffer. When reused water is added to a groundwater aquifer, it may be referred to as groundwater recharge. Typically, groundwater recharge is accomplished through spreading basins that allow the water to naturally percolate through the soil to the aquifer or by means of injection wells that deliver the water directly to a specified location in the aquifer. Direct potable reuse generally eliminates the environmental buffer from the process and instead routes the highly treated wastewater into a drinking water treatment facility for final treatment or into a potable water distribution system downstream of such a facility.



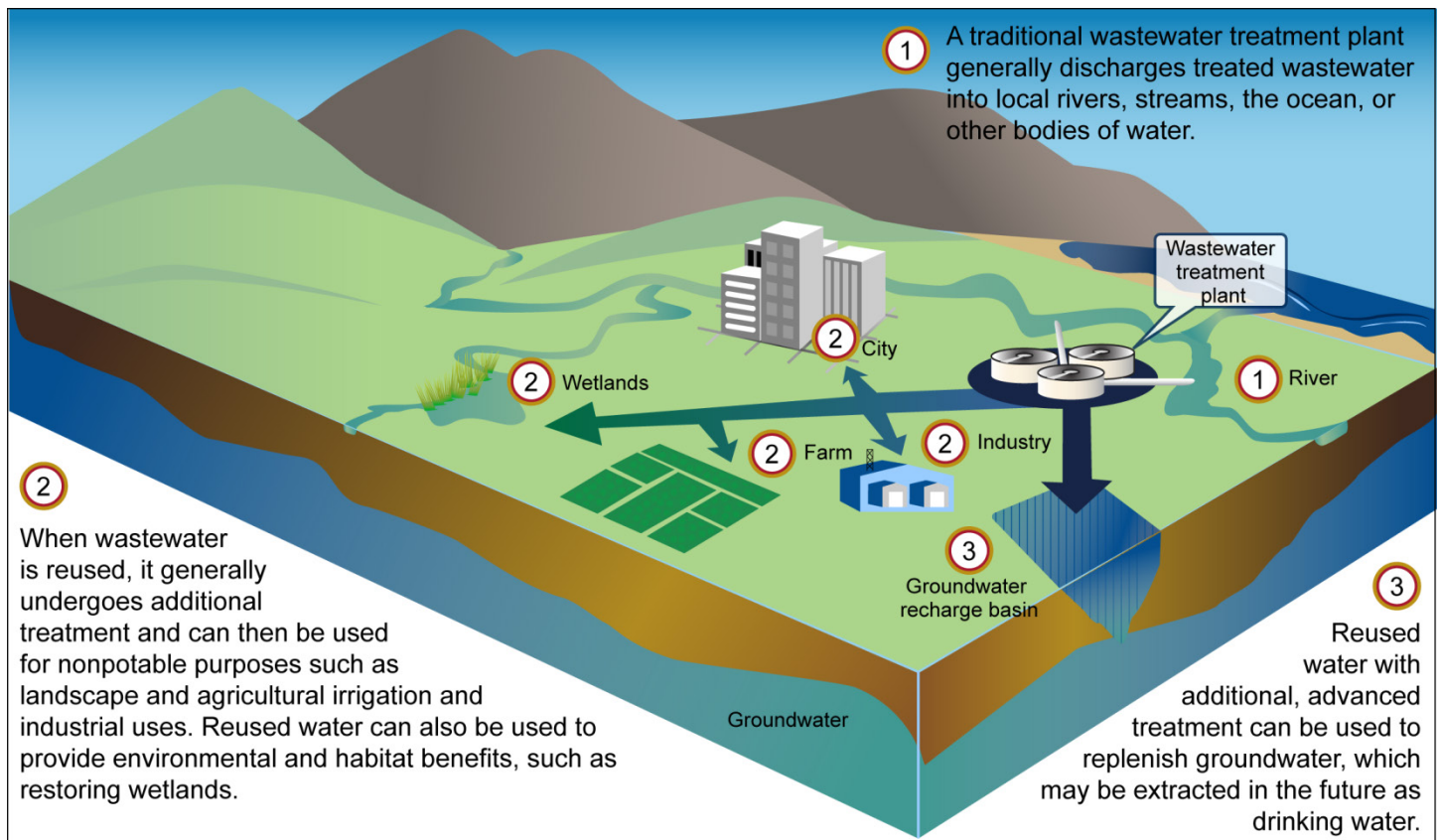
**Figure 2: Examples of Treatment Process Options for Reused Water**



Source: GAO analysis of information from reports on water reuse. | GAO-19-110

Note: While this figure provides examples of the types of treatment that reused water may undergo, it is not representative of the treatment processes for all reused water. For more information on various water treatment processes and technologies, see GAO, *Technology Assessment: Municipal Freshwater Scarcity: Using Technology to Improve Distribution System Efficiency and Tap Nontraditional Water Sources*, GAO-16-474 (Washington, D.C.: Apr. 29, 2016).

Figure 3: Typical Uses for Reused Water



Source: GAO analysis of information from reports on water reuse. | GAO-19-110

Several reports have shown that water reuse could offer significant untapped water supplies, particularly in coastal areas facing water shortages. For example, in a 2012 report on municipal wastewater reuse, the National Research Council of the National Academies estimated that U.S. municipalities discharged about 12 billion gallons of treated municipal wastewater each day into coastal waters.<sup>24</sup> They estimated that reuse of these coastal discharges could directly augment available water sources by providing the equivalent of 27 percent of the municipal supply. Municipalities discharge another 20 billion gallons each day to inland

<sup>24</sup>National Research Council of the National Academies, *Water Reuse: Potential for Expanding the Nation's Water Supply Through Reuse of Municipal Wastewater* (Washington, D.C.: 2012).

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locations. While reuse of inland discharges has the potential to affect the water supply of downstream users by decreasing the amount of water available to them, we previously found that at least some of this volume could also be beneficial.<sup>25</sup> Even with such potential uses, the Environmental Protection Agency reported in 2012 that only 7 to 8 percent of municipal wastewater was being intentionally reused in the United States.<sup>26</sup>

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## Grants Management

In our past work, we have highlighted the importance of awarding competitive grants in a fair and transparent way and monitoring grants.<sup>27</sup> In recent years, OMB has taken actions to help improve the effectiveness and efficiency of grantmaking across the federal government. In particular, in December 2014, OMB's Uniform Guidance became effective for new grant awards after adoption by federal grantmaking agencies, including Interior.<sup>28</sup> The Uniform Guidance requires, among other things, that federal agencies provide public notices of funding opportunities, and these notices are to contain information, such as key dates and the merit and other criteria that the agency will use to evaluate applications.<sup>29</sup> The Uniform Guidance also requires certain monitoring activities for federal grants, such as generally requiring grant recipients to submit financial reports.<sup>30</sup>

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<sup>25</sup>GAO, *Technology Assessment: Municipal Freshwater Scarcity: Using Technology to Improve Distribution System Efficiency and Tap Nontraditional Water Sources*, [GAO-16-474](#) (Washington, D.C.: Apr. 29, 2016).

<sup>26</sup>Environmental Protection Agency, *2012 Guidelines for Water Reuse*, EPA/600/R-12/618 (Washington, D.C.: September 2012).

<sup>27</sup>See, for example, GAO, *Wildlife and Sport Fish Restoration: Competitive Grant Programs Managed Consistently with Relevant Regulations, but Monitoring Could Be Improved*, [GAO-18-303](#) (Washington, D.C.: Feb. 22, 2018); *Grants Management: Selected Agencies Could Clarify Merit-Based Award Criteria and Provide Guidance for Reviewing Potentially Duplicative Awards*, [GAO-17-113](#) (Washington, D.C.: Jan. 12, 2017); and *Grants Management: EPA Could Improve Certain Monitoring Practices*, [GAO-16-530](#) (Washington, D.C.: July 14, 2016).

<sup>28</sup>79 Fed. Reg. 75,867 (Dec. 19, 2014) (joint interim final rule implementing OMB's final Uniform Guidance) (Interior's implementing regulations codified at 2 C.F.R. pt. 1402); 78 Fed. Reg. 78,590 (Dec. 26, 2013) (OMB's final Uniform Guidance) (codified as amended at 2 C.F.R. pt. 200).

<sup>29</sup>2 C.F.R. § 200.203.

<sup>30</sup>See 2 C.F.R. § 200.327.

## Reclamation Awarded About \$715 Million for Title XVI Projects and Studies, and Some Construction Projects Remain Eligible for Title XVI Grants

From fiscal years 1992 through 2017, Reclamation awarded about \$715 million for 46 construction projects and 71 studies under the Title XVI program, based on our review of agency documents.<sup>31</sup> Most of this funding—about \$703 million—went toward construction projects, while the remaining awards were for feasibility and research studies. Some construction projects remain eligible for Title XVI grants. Specifically, about \$464 million in grant funding not yet awarded up to the federal ceiling remains for individually congressionally authorized Title XVI construction projects, and about \$513 million remains in total estimated projects eligible for Title XVI grants under the WIIN Act, as of August 2018.<sup>32</sup>

## Most of the \$715 Million Reclamation Awarded Was for Title XVI Construction Projects

Across the three different types of grants offered under the Title XVI program—construction projects, feasibility studies, and research studies—Reclamation awarded about \$715 million from fiscal years 1992 through 2017, according to agency documents. This \$715 million awarded under Title XVI leveraged more than \$2.8 billion in nonfederal cost share. Reclamation awarded most of this Title XVI funding for construction projects, as shown in table 1.

**Table 1: The Bureau of Reclamation’s Title XVI Water Reclamation and Reuse Program Total Funding Awarded by Project Category, Fiscal Years 1992-2017**

Dollars in thousands

Fiscal year	Construction projects	Feasibility studies <sup>a</sup>	Research studies <sup>b</sup>	Total
1992-2009 <sup>c</sup>	517,870	N/A	N/A	<b>517,870</b>
2010	11,235	N/A	N/A	<b>11,235</b>
2011	21,320	3,308	N/A	<b>24,628</b>
2012	24,704	943	N/A	<b>25,647</b>
2013	18,949	0	N/A	<b>18,949</b>
2014	20,047	2,258	N/A	<b>22,304</b>
2015	23,390	1,648	N/A	<b>25,037</b>
2016	34,328	0	1,157	<b>35,486</b>

<sup>31</sup>For this report, we report all amounts in nominal dollars, which are not adjusted for inflation.

<sup>32</sup>As discussed earlier, the WIIN Act authorized an additional \$50 million to be appropriated for Title XVI projects under the WIIN Act.

Dollars in thousands				
Fiscal year	Construction projects	Feasibility studies <sup>a</sup>	Research studies <sup>b</sup>	Total
2017	30,980 <sup>d</sup>	1,792	848	33,619
<b>Total</b>	<b>702,823</b>	<b>9,947</b>	<b>2,005</b>	<b>714,775</b>

Source: GAO analysis of information provided by Reclamation. | GAO-19-110

Notes: Amounts are in nominal dollars, which are not adjusted for inflation. Totals may not add due to rounding. Reclamation funded some feasibility and research studies prior to fiscal years 2011 and 2016 but did not award such grants through individual funding opportunity announcements.

<sup>a</sup>Feasibility studies are documents that generally identify specific water reuse opportunities, describe alternatives, and incorporate other considerations such as the financial capability of the project sponsor. Reclamation began making awards for feasibility studies under the Title XVI program through separate funding opportunities in fiscal year 2011. Reclamation does not offer funding opportunity announcements for feasibility studies every year and did not offer them in fiscal years 2013 and 2016.

<sup>b</sup>Research studies are for research to develop science and decision-support tools for reuse projects, improve existing reuse facilities, and for state-of-the-art water reuse technology. Reclamation began making awards for research studies under the Title XVI program through separate funding opportunity announcements in fiscal year 2016.

<sup>c</sup>Reclamation generally does not maintain Title XVI funding data by year for fiscal years 1992 through 2009. In 2009, the Title XVI Water Reclamation and Reuse Program received a supplemental appropriation under the American Recovery and Reinvestment Act (ARRA) of 2009, in addition to its fiscal year 2009 appropriation. Pub. L. No. 111-5, 123 Stat. 115, 137 (2009). Of the nearly \$518 million awarded from fiscal year 1992 through fiscal year 2009, about \$127 million, or about 25 percent, was awarded under ARRA.

<sup>d</sup>This figure includes grants for projects eligible under the Water Infrastructure Improvements for the Nation Act (WIIN Act). Three projects were awarded a total of \$10 million in fiscal year 2017.

Overall, Reclamation awarded about \$703 million under Title XVI to 46 construction projects from fiscal years 1992 through 2017. Of these 46 construction projects that received awards, 43 were individually congressionally authorized construction projects and 3 were construction projects that were eligible for Title XVI grants under the WIIN Act, according to agency documents we reviewed. Additionally, Reclamation made awards for 71 studies—58 feasibility study grants since fiscal year 2011 and 13 research study grants since fiscal year 2016.<sup>33</sup>

<sup>33</sup>The number of feasibility and research projects that are eligible for Title XVI in a given year is not static. Title XVI feasibility and research study sponsors must meet general eligibility criteria at the time they choose to apply for grants. Feasibility and research study project sponsors eligible to receive a Title XVI award include state, regional, or local authorities; Indian tribes or tribal organizations; or other entities such as water districts, wastewater districts, or rural water districts. Applicants must be located in the 17 western states or Hawaii. Eligible feasibility studies must evaluate the sources and uses of reclaimed water, as defined in the Reclamation Manual Directives and Standards on water management and development. Eligible research studies must focus on supporting water reuse, such as establishing or expanding water reuse markets, improving existing water reuse facilities, or streamlining the implementation of new reuse facilities.

## Some Construction Projects Remain Eligible for Title XVI Grants

Based on our review of Reclamation financial data, some construction projects remain eligible for Title XVI grants. Eligible project costs fell into two categories: (1) grant funding not yet awarded up to the federal ceiling for individually congressionally authorized Title XVI construction projects, and (2) the federal share of estimated costs identified in feasibility studies for projects eligible for Title XVI grants under the WIIN Act.<sup>34</sup> About \$464 million in not-yet-awarded funding remained for 28 individually congressionally authorized Title XVI construction projects as of August 2018. Also, about \$513 million remained in estimated project costs for the 40 construction projects that were eligible under the WIIN Act, as of August 2018, as shown in table 2 below.<sup>35</sup>

**Table 2: Status of Construction Projects and Remaining Eligible Project Costs under the Bureau of Reclamation’s Title XVI Water Reclamation and Reuse Program, as of August 2018**

Project status	Number of eligible projects	Remaining eligible project costs (dollars in thousands) <sup>a</sup>	Number of projects with remaining eligible project costs
<b>Individually congressionally authorized projects<sup>b</sup></b>			
Projects that were completed or were awarded the maximum federal share	25	0	0
Projects that were ongoing	13	233,157	13
Projects with no construction planned at the time	15	230,795	15
<b>Total</b>	<b>53</b>	<b>463,952</b>	<b>28</b>
<b>Projects eligible under the Water Infrastructure Improvements for the Nation Act (WIIN Act)</b>			
Projects that applied in 2017 <sup>c</sup>	20	268,500	20
Projects that were eligible as of August 2018 but did not apply in 2017 <sup>d</sup>	20	244,106	20
<b>Total</b>	<b>40</b>	<b>512,606</b>	<b>40</b>

Source: GAO analysis of information provided by Reclamation and project sponsors. | GAO-19-110

<sup>34</sup>To calculate the remaining estimated costs for projects eligible for Title XVI grants under the WIIN Act, we first gathered and analyzed the estimated project costs of these projects as identified in each project’s feasibility study and then calculated the maximum federal funding for each WIIN Act-eligible project. The maximum in federal funding for a WIIN Act-eligible project is 25 percent of the total project cost, up to \$20 million dollars. Generally, there are no eligible project costs remaining for Title XVI feasibility and research studies, as Reclamation generally awards the full amount for feasibility and research study grants in a single year.

<sup>35</sup>As of November 2018, Reclamation had approved six additional feasibility studies for WIIN Act-eligible projects but had not yet transmitted them to Congress, according to a Reclamation document. The federal cost share for these six projects is about \$86 million.

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Note: Amounts are in nominal dollars, which are not adjusted for inflation.

<sup>a</sup>Eligible Title XVI construction project costs (i.e. the amount of federal cost share project sponsors could seek from Reclamation) include two categories: (1) individually congressionally authorized Title XVI construction projects that have funding that has not yet been awarded up to the federal ceiling, and (2) remaining total estimated costs for projects eligible under the WIIN Act. To be eligible to receive Title XVI grants under the WIIN Act, projects must have completed a feasibility study that Reclamation has reviewed and submitted to Congress.

<sup>b</sup>From 1992 through 2009, Congress authorized a total of 53 individual Title XVI projects.

<sup>c</sup>Two additional projects applied for Title XVI grants in fiscal year 2017, but, according to Reclamation officials, the applications were deemed ineligible since the funding requested was for projects not identified in the approved feasibility study. Of the 20 projects that applied for Title XVI grants through the Title XVI WIIN Act funding opportunity announcement in fiscal year 2017, Reclamation awarded 3 projects a total of \$10 million.

<sup>d</sup>As of November 2018, Reclamation had approved 6 additional feasibility studies for WIIN Act-eligible projects but had not yet transmitted them to Congress, according to a Reclamation document. The federal cost share for these 6 projects is about \$86 million.

As of August 2018, of the 53 individually congressionally authorized construction projects, more than half—28 projects—had remaining project costs eligible for Title XVI grants.

- The 13 ongoing congressionally authorized projects had about \$233 million in project costs that had not yet been awarded. Some project sponsors told us that they were in the process of designing or constructing projects. Others told us that while they were not currently designing or constructing projects, they had plans to pursue additional Title XVI grant awards in the future. More than one-third of the \$233 million in remaining eligible project costs was for two projects—located in San Diego and San Jose, California—that were two of the projects authorized when the Title XVI program was created in 1992.
- The 15 congressionally authorized projects with no planned construction had remaining project costs of about \$231 million eligible for Title XVI grants. Project sponsors identified several reasons why they were not planning to apply for further grant awards. Specifically, several project sponsors said they had faced challenges in applying for further grants because language in the statutes authorizing the projects limited the scope of their projects. For example, one project sponsor told us that it was interested in expanding its water reuse demonstration facility but that it was not eligible to apply for additional Title XVI grants because the statute that authorized the project specifically authorized a demonstration facility. In addition, one project sponsor stated that its project authorization had already reached its sunset date, which means the project can no longer apply for Title XVI

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grants.<sup>36</sup> Some of the project sponsors with no construction planned said that they may consider applying for additional Title XVI grants under their existing authorizations in the future, should they decide to move forward with construction. However, others said that they had decided not to move forward with authorized projects and had no plans to apply for Title XVI grants in the future. For example, one project sponsor said that it had determined that its project was no longer financially feasible.

In addition, as of August 2018, 40 projects had Reclamation-approved feasibility studies that had been transmitted to Congress, based on our review of agency documents, and were therefore eligible to apply for Title XVI construction grants under the WIIN Act.<sup>37</sup> A total of about \$513 million in project costs across these 40 projects remained eligible for Title XVI grants.<sup>38</sup> Of the 40 projects, 20 applied for Title XVI grants in fiscal year 2017, and Reclamation selected 3 for awards. These 20 projects had about \$269 million in project costs that remained eligible for Title XVI grants. Twenty projects did not apply for Title XVI grants in fiscal year 2017 and had about \$244 million in project costs that remained eligible for these grants, as of August 2018.

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<sup>36</sup>Of the 53 individually congressionally authorized projects, 5 had sunset dates listed in their authorizations and the other 48 did not. Two Title XVI projects with such sunset dates had already reached their sunset dates as of August 2018, and 3 projects will reach their sunset dates on March 30, 2019. Three of the 5 projects with sunset dates were awarded the full amount up to the federal ceiling under Title XVI prior to reaching their sunset dates.

<sup>37</sup>The WIIN Act authorized an additional \$50 million to be appropriated for Title XVI projects. Of Reclamation's fiscal year 2017 and 2018 appropriations to be used for Title XVI, congressional direction in the explanatory statements accompanying the appropriations acts provided that \$10 million was to be used for WIIN Act projects in fiscal year 2017 and \$20 million in fiscal year 2018.

<sup>38</sup>As noted, Reclamation approved six additional feasibility studies for WIIN Act-eligible projects but had not yet transmitted them to Congress as of November 2018, according to a Reclamation document. The federal cost share for these six projects is about \$86 million.



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## Title XVI Projects and Studies Vary in Their Uses of Reused Water and Include Urban and Rural Areas

Title XVI projects and studies for fiscal years 1992 through 2017 cover various uses for reused water and include both urban and rural areas throughout the West, based on our review of agency data as well as documents from and interviews with project sponsors. For example, Title XVI construction projects produce both nonpotable and potable reused water for a variety of purposes, such as landscape and agricultural irrigation, habitat restoration, and extraction as drinking water. The projects and studies funded by the Title XVI program include both urban and rural areas throughout the West, with California accounting for 36 construction projects and about 90 percent of total Title XVI funding.

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## Title XVI Projects Are Generally Large-Scale Infrastructure Projects that Produce Nonpotable and Potable Reused Water for a Variety of Purposes

Title XVI construction projects are generally large-scale infrastructure projects, such as water reuse treatment plants and pipelines, that produce, store, and distribute reused water for a variety of purposes, both nonpotable and potable. Since the inception of the Title XVI program, Reclamation has awarded Title XVI grants to construction projects that cumulatively provided nearly 390,000 acre-feet of reused water in 2017.<sup>39</sup> According to Reclamation data, the projects funded by Title XVI individually delivered between 38 acre-feet of reused water and more than 100,000 acre-feet of water in fiscal year 2017. Most of these construction projects provided reused water for nonpotable uses across four main categories: (1) landscape irrigation, (2) agricultural irrigation, (3) commercial and industrial use, and (4) habitat restoration.

Landscape irrigation. Landscape irrigation—including irrigation of golf courses, road medians, school grounds, parks, sport fields, and other green spaces—is the most common use of reused water produced by Title XVI projects, with 29 Title XVI projects producing reused water for this purpose, based on our analysis of documents from Reclamation and project sponsors. The reused, nonpotable water produced by such projects is generally distributed through purple-colored pipes, to denote that the water is not for drinking purposes. For example, the Title XVI program provided grants to Eastern Municipal Water District—a water district located in Southern California—to help build water reuse

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<sup>39</sup>Not all of the projects that have been awarded Title XVI grants delivered reused water in 2017. Some of these projects are still under construction. In addition, Reclamation did not collect information on the amount of reused water delivered in 2017 by the three projects eligible under the WIIN Act that were selected for fiscal year 2017 Title XVI grants because Reclamation only collects delivery information after projects have received Title XVI grants. See appendix I for acre-feet water delivery information for Title XVI construction projects.

infrastructure, including pipelines, pumping stations, and storage tanks. With this added storage capacity, the district has the ability to store more than 2 billion gallons of reused water, which is used to irrigate sports fields, golf courses, parks, school grounds, and medians, according to the project sponsor. By maximizing use of its reused water, the project sponsor noted that the district is reducing its dependence on water piped in from other parts of the state or region. Similarly, the Title XVI program provided grants to help build pipelines and reservoirs to distribute and store reused water for landscape irrigation and other purposes in other parts of California (see fig. 4).

**Figure 4: Grounds at a Park Irrigated with Reused Water and a Reservoir Storing Reused Water Funded in Part by the Bureau of Reclamation's Title XVI Water Reclamation and Reuse Program**



Photo on the left shows grounds at a park in Antioch, California, irrigated with reused water, and photo on the right shows a reservoir in Sonoma County, California, that stores reused water, as of March 2018. Both projects were funded in part by the Bureau of Reclamation's Title XVI Water Reclamation and Reuse Program.

Source: GAO. | GAO-19-110

Agricultural irrigation. Reused water produced by Title XVI projects is also used to irrigate a variety of agricultural products, including fruits and vegetables, flowers, and vineyards. For example, the North Valley Regional Recycled Water Program is helping to provide a reliable water source for the Del Puerto Water District, which provides water to approximately 45,000 acres of farmland in California's San Joaquin Valley, according to the project sponsor. The Del Puerto Water District has encountered water shortages in recent years, which have created economic hardships on growers in the area, according to the project sponsor. Title XVI grants provided under WIIN Act authority helped the

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district expand its reused water supply and distribution infrastructure and ensure a reliable, drought-resistant water supply, according to the project sponsor. In addition, reused water produced by the Watsonville Area Water Recycling Project near Watsonville, California, is used to irrigate strawberries and other fruits and vegetables as well as flowers. The groundwater basin that serves the coastal region where Watsonville is located has been overdrafted for a long time, causing groundwater elevations to drop below sea level and leading to seawater intrusion that makes the groundwater unusable in certain areas, according to the project sponsor.<sup>40</sup> This sponsor noted that Watsonville's Title XVI project helps reduce demand on the overdrafted groundwater basin, which in turn helps to protect against further seawater intrusion and also provides a reliable, drought-tolerant water supply to help protect the region's agricultural economy. Figure 5 shows flowers in a greenhouse that are irrigated with reused water from Watsonville's Title XVI project.

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<sup>40</sup>Groundwater overdraft occurs when groundwater use exceeds the amount of recharge into an aquifer, which leads to a decline in groundwater level.

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**Figure 5: Flowers Irrigated with Reused Water Funded in Part by the Bureau of Reclamation's Title XVI Water Reclamation and Reuse Program**



Flowers in a greenhouse near Watsonville, California, irrigated with reused water, as of March 2018. The project was funded in part by the Bureau of Reclamation's Title XVI Water Reclamation and Reuse Program.

Source: GAO. | GAO-19-110

Commercial and industrial use. Reused water produced by Title XVI projects is used for cooling towers at power plants and data centers, oil production, toilet flushing in university and commercial buildings, and for other commercial and industrial purposes, according to project sponsors. For example, some of the reused water produced by the Southern Nevada Title XVI project is used for power plant cooling, and reused water from San Jose's Title XVI project is used for cooling at data centers in California's Silicon Valley. In addition, reused water from the Long Beach Area Reclamation Project is injected into the ground after oil is extracted, which helps prevent the ground from sinking, according to the project sponsor. Having access to a secure source of reused water can attract data centers and other businesses that require large amounts of water to areas that can guarantee access to reused water, according to a project sponsor and representatives from a nongovernmental water reuse organization we interviewed.

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Habitat restoration. Some Title XVI projects use reused water to restore wetlands or supply water to recreational lakes. For example, in California's Napa Valley, reused water from the North Bay Title XVI project is being used to restore the Napa Sonoma Salt Marsh. Some threatened and endangered species, such as the Chinook Salmon, have started returning to the area since the restoration began, according to the project sponsor. Reused water from this Title XVI project also provides other habitat benefits. For example, wineries in the area that irrigate with reused water do not need to divert as much water from streams, which leaves more water for fish, according to the project sponsor. In addition, the North Valley Regional Recycled Water Program in California's San Joaquin Valley supplies reused water to wildlife refuges and wetlands, in addition to agricultural lands. This area has the largest remaining freshwater marsh in the western United States, which provides critical habitat for migratory birds as well as other species, according to the project sponsor (see fig. 6).

**Figure 6: A Wetland Receives Reused Water from a Project Funded in Part by the Bureau of Reclamation's Title XVI Water Reclamation and Reuse Program**



A wetland in California's San Joaquin Valley receives reused water, as of March 2018. The project was funded in part by the Bureau of Reclamation's Title XVI Water Reclamation and Reuse Program.

Source: GAO. | GAO-19-110

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There are also several potable projects that have been funded by Title XVI. These projects generally fall into two categories: (1) indirect-potable reuse and (2) desalination.

Indirect-potable reuse. Title XVI has provided grants for indirect-potable projects, in which wastewater undergoes advanced treatment to obtain potable-quality water. The water is then injected into an environmental buffer, such as a groundwater aquifer, where it is left for a certain amount of time before it is extracted. The water is treated again before it is distributed as drinking water. One use for highly-treated reused water is for seawater barriers, where water is injected into the ground to prevent the intrusion of high-salinity water into groundwater aquifers. Indirect-potable reuse has been gaining prominence, according to some project sponsors and representatives from nongovernmental water reuse organizations, with Title XVI grants going to several project sponsors for both the construction of facilities as well as research into optimal treatment methods. For example, the Groundwater Replenishment System in Orange County, California, which was partially funded by Title XVI, takes highly-treated wastewater that would have previously been discharged into the Pacific Ocean and purifies it using an advanced treatment process.<sup>41</sup> The water is then injected into a groundwater aquifer and is later extracted as drinking water that serves more than 800,000 people, according to the project sponsor. Figure 7 shows reused water at several different points in the treatment process and reverse osmosis treatment equipment at Orange County's Groundwater Replenishment System.<sup>42</sup>

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<sup>41</sup>Other funding sources for the Groundwater Replenishment System include state grants and loans from California's State Revolving Fund, according to the project sponsor.

<sup>42</sup>Reverse osmosis water treatment is used in the production of potable water. It uses high pressure to force water through a nonporous membrane by diffusion, leaving most salts and other dissolved substances trapped on one side of the membrane while fresher water passes through to the other side.

**Figure 7: Indirect-Potable Reuse Project Funded in Part by the Bureau of Reclamation’s Title XVI Water Reclamation and Reuse Program**



Photo on the left shows reused water at different points in the treatment process, and photo on the right shows reverse osmosis equipment at Orange County’s Groundwater Replenishment System, as of April 2018. The Groundwater Replenishment System was funded in part by the Bureau of Reclamation’s Title XVI Water Reclamation and Reuse Program.

Source: GAO. | GAO-19-110

Desalination. Title XVI has provided grants for projects that treat brackish groundwater—water that has a salinity above freshwater but below seawater—and then feed it directly into potable water distribution systems or into a groundwater aquifer or surface water reservoir.<sup>43</sup> For example, the Mission Basin Groundwater Purification Facility in Oceanside, California, desalinates brackish groundwater using reverse osmosis and other treatment methods. The reused water supplies about 15 percent of the city’s water needs, according to the project sponsor.

In addition to Title XVI construction projects, Reclamation’s feasibility and research studies also vary in their planned uses of reused water. For example, one feasibility study project sponsor we interviewed was

<sup>43</sup>The Title XVI program also funded a demonstration project to conduct research on the long-term impacts of the desalination of seawater. In 2016, the WIIN Act authorized Reclamation to participate in eligible desalination projects. Pub. L. No. 114-322, § 4009(a), 130 Stat. 1628, 1867 (2009). While some Title XVI projects in the past treated brackish groundwater, any new projects that began since the WIIN Act was enacted that treat brackish groundwater or seawater would not be eligible for grants under the Title XVI program and instead would need to apply for funding under Reclamation’s new program for desalination construction projects, according to Reclamation officials.

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awarded a Title XVI grant to investigate the feasibility and potential impacts of reusing produced water from oil and gas operations in Oklahoma.<sup>44</sup> The study plans to investigate possible dual benefits of reusing produced water, including (1) providing a new source of water for irrigation and other purposes and (2) reducing the disposal of produced water as a possible means for addressing increased seismic activity associated with oil and gas operations, according to the project sponsor.<sup>45</sup> Another feasibility study project sponsor we interviewed from a rural, landlocked community in Washington State is investigating the feasibility of creating a virtual zero discharge system that would eliminate all wastewater disposal by reusing the wastewater. Similar to feasibility studies, Title XVI research studies address different topics. For example, one project sponsor we interviewed was researching how to optimize filtration of reused water using membrane filtration, which is a critical treatment process to reduce contaminants in water. Another project sponsor was researching impediments and incentives to using reused water for agricultural irrigation.

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### Title XVI Projects and Studies Include Western Urban and Rural Areas

Based on our review of agency documents, project sponsors in 12 of the 18 states eligible to participate in the Title XVI program were awarded at least one type of funding under Title XVI since the inception of the program in 1992, as shown in table 3.<sup>46</sup>

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<sup>44</sup>Produced water is a significant byproduct associated with oil and gas exploration and may contain a variety of contaminants. If produced water is not appropriately managed or treated, these contaminants may present a human health and environmental risk. See GAO, *Drinking Water: EPA Program to Protect Underground Sources from Injection of Fluids Associated with Oil and Gas Production Needs Improvement*, [GAO-14-555](#) (Washington, D.C.: June 27, 2014).

<sup>45</sup>In 2014, we found that seismic activity associated with injection wells has raised awareness of the potential for earthquakes resulting from the underground injection of produced water. [GAO-14-555](#).

<sup>46</sup>Some states have project sponsors that have been awarded more than one type of grant (e.g., grants for both feasibility studies and construction projects).



**Table 3: Total Funding and Number of Studies and Construction Projects Awarded under the Bureau of Reclamation’s Title XVI Water Reclamation and Reuse Program by State, Fiscal Years 1992 through 2017**

Dollars in thousands

State	Amount of feasibility funding awarded <sup>a</sup>	Number of feasibility studies awarded grants	Amount of research funding awarded <sup>b</sup>	Number of research studies awarded grants	Amount of construction funding awarded	Number of construction projects awarded grants <sup>c</sup>	Total amount of funding awarded
Arizona	0	0	0	0	2,810	1	2,810
California	6,210	35	1,345	9	632,681	36	640,236
Colorado	150	1	150	1	0	0	300
Hawaii	0	0	0	0	10	1	10
Idaho	0	0	0	0	0	0	0
Kansas	65	1	199	1	0	0	265
Montana	0	0	0	0	0	0	0
Nebraska	0	0	0	0	0	0	0
Nevada	150	1	0	0	31,321	3	31,471
New Mexico	132	1	0	0	20,000	1	20,132
North Dakota	0	0	0	0	0	0	0
Oklahoma	586	4	0	0	0	0	586
Oregon	0	0	0	0	520	1	520
South Dakota	0	0	0	0	0	0	0
Texas	2,205	12	311	2	12,072	2	14,587
Utah	150	1	0	0	3,409	1	3,559
Washington	300	2	0	0	0	0	300
Wyoming	0	0	0	0	0	0	0
<b>Total</b>	<b>9,947</b>	<b>58</b>	<b>2,005</b>	<b>13</b>	<b>702,823</b>	<b>46</b>	<b>714,775</b>

Source: GAO analysis of information provided by Reclamation. | GAO-19-110

Note: Amounts are in nominal dollars, which are not adjusted for inflation.

<sup>a</sup>Reclamation began funding feasibility studies under the Title XVI program as separate funding opportunities in fiscal year 2011. Reclamation does not offer funding opportunity announcements for feasibility studies every year and did not offer them in fiscal years 2013 and 2016.

<sup>b</sup>Reclamation began funding research studies under the Title XVI program as separate funding opportunities in fiscal year 2016.

<sup>c</sup>This column represents the number of projects that were awarded a Title XVI construction grant in fiscal years 1992 through 2017. Some Title XVI construction projects were awarded multiple grants over several fiscal years.

From fiscal year 1992 through fiscal year 2017, Reclamation awarded about \$640 million—or about 90 percent of total awarded Title XVI funding—to projects in California, the majority of which was for construction projects. The concentration of projects in California reflects

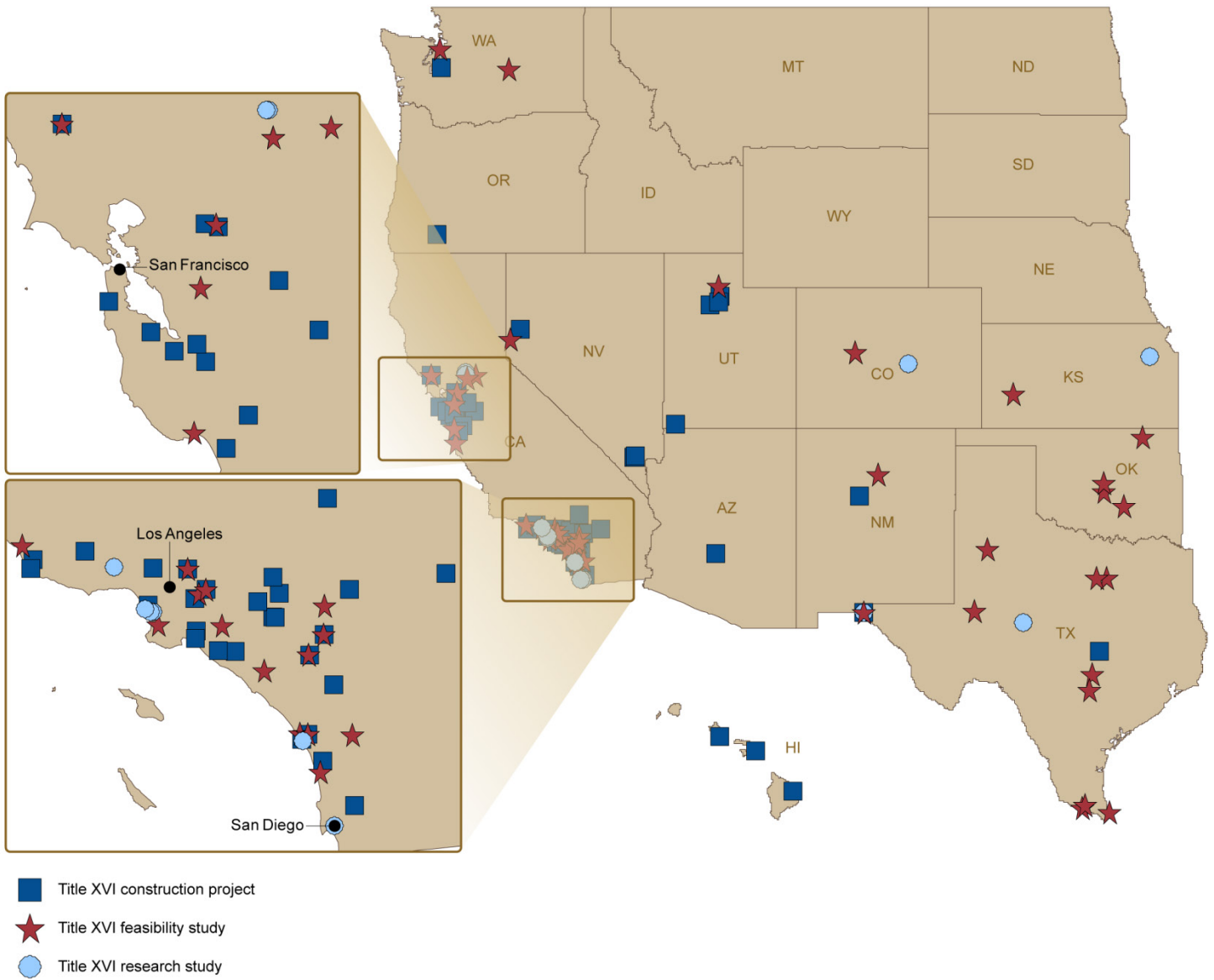
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the early emphasis of the Title XVI program on Southern California and reducing its reliance on water provided by the Colorado River, as well as the high level of interest in the program in the state, according to a 2010 Congressional Research Service report.<sup>47</sup> Overall, project sponsors in 9 states were awarded feasibility study grants, sponsors in 4 states were awarded research study grants, and sponsors in 8 states were awarded construction grants (see fig. 8).

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<sup>47</sup>Congressional Research Service, *Water Reuse and the Title XVI Program: Legislative Issues* (Washington, D.C.: November 9, 2010).

**Figure 8: Locations of Construction Projects and Areas Included in Studies Awarded Grants under the Bureau of Reclamation's Title XVI Water Reclamation and Reuse Program (Title XVI)**



Source: GAO analysis of Reclamation data. | GAO-19-110

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**Examples of Sponsors for Projects and Studies under the Bureau of Reclamation's Title XVI Water Reclamation and Reuse Program (Title XVI)**

Title XVI projects and studies are sponsored by various nonfederal entities, including:

- Water districts, such as West Basin Municipal Water District in Los Angeles County, California, and the Albuquerque Bernalillo County Water Utility Authority in Albuquerque, New Mexico;
- Wastewater or sanitation districts, such as Delta Diablo in the San Francisco Bay area and the Orange County Sanitation District in Orange County, California;
- Municipalities, such as San Diego, California, and Round Rock, Texas; and
- Regional partnerships, such as the North San Diego Reuse Coalition and the North Bay Water Reuse Authority.

Source: GAO analysis of information from the Bureau of Reclamation and Title XVI project sponsors. | GAO-19-110

Title XVI projects and studies include western urban and rural areas. In particular, many Title XVI projects are sponsored by entities in urban areas that serve a large population base. For example, the main part of the Los Angeles Area Water Supply Title XVI project is sponsored by the West Basin Municipal Water District, which has a service area of nearly 1 million people in 17 cities and unincorporated areas in Los Angeles County. This Title XVI project produces five different types of reused water to meet the unique needs of West Basin's municipal, commercial, and industrial reuse customers, according to the project sponsor. Similarly, the City of San Diego, which has a population of about 1.4 million, was awarded Title XVI grants for a number of projects, including an indirect-potable reuse project anticipated to provide one-third of San Diego's water supply by 2035, according to the project sponsor. Other Title XVI projects are sponsored by entities in rural areas and small cities. For example, the Hi-Desert Water District project serves a rural and economically disadvantaged community in the town of Yucca Valley, California, that has a population of about 20,000. This Title XVI project will fund facilities to collect, treat, and reuse treated wastewater, thereby eliminating degradation of the local groundwater supply and helping ensure a safer, reliable water supply for this community, according to the project sponsor. Similarly, the city of Round Rock, Texas, which has a population of about 120,000, sponsored the Williamson County Title XVI project. This project produces reused water for landscape irrigation, most of which is used to irrigate a 650-acre park, according to the project sponsor.

Some Title XVI projects are sponsored by regional partnerships composed of different local entities. For example, in the late 1990s, 4 entities in Northern San Diego County—Carlsbad Municipal Water District, Leucadia Wastewater District, Olivenhain Municipal Water District, and San Elijo Joint Powers Authority—formed a coalition to leverage their water reuse programs; the coalition has since grown to 10 entities.<sup>48</sup> This coalition sponsored an individually congressionally authorized Title XVI project, the North San Diego County project, and applied for a Title XVI grant for a new project eligible under the WIIN Act in fiscal year 2017. Similarly, in the northern part of the San Francisco

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<sup>48</sup>As of September 2018, the North San Diego Reuse Coalition was composed of the Carlsbad Municipal Water District, the City of Escondido, the City of Oceanside, Leucadia Wastewater District, Olivenhain Municipal Water District, Rincon del Diablo Municipal Water District, San Elijo Joint Powers Authority, Santa Fe Irrigation District, Vallecitos Water District, and Vista Irrigation District.

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Bay Area, 10 local agencies formed a regional partnership covering 315 square miles across Sonoma, Marin, and Napa Counties to sponsor the North Bay Water Reuse Program. According to the project sponsors involved in this regional partnership, using a regional partnership approach to water reuse projects provides an economy of scale; maximizes the ability to obtain local, state, and federal funding for the projects; and allows smaller, local entities to access funding and expertise for projects that would be out of reach without regional collaboration. See appendix I for more detailed information on specific Title XVI construction projects.

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## Reclamation's Project Selection Process Is Consistent with Relevant Federal Grant Regulations, and Its Evaluation Criteria Have Changed in Recent Years

Reclamation's process for selecting projects and studies to award grants under the Title XVI program involves announcing the funding opportunity, establishing criteria to evaluate potential projects, and reviewing applications to make award decisions. We found that this process is consistent with relevant federal grant regulations outlined in OMB's Uniform Guidance, based on our review of agency documents and federal grant regulations. The criteria Reclamation uses to evaluate Title XVI projects have changed in recent years, with the elimination or addition of some criteria and changes in the weighting of others.

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## Reclamation Publicly Announces Funding Opportunities and Has a Merit Review Process for Applications, which Is Consistent with Relevant Federal Grant Regulations

To start its selection process, Reclamation announces funding opportunities by developing annual funding opportunity announcements (FOA), which are publicly available on its website and on [www.grants.gov](http://www.grants.gov). These FOAs contain information for applicants to consider prior to applying, including the types of eligible projects and studies, estimated funding available, information on the application review process, the application due date, and the criteria that Reclamation will use to score applications.<sup>49</sup>

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<sup>49</sup>Reclamation issues separate FOAs for Title XVI construction projects, feasibility studies, and research studies. Reclamation has issued FOAs for construction projects annually since fiscal year 2011 but has not offered FOAs for feasibility studies and research studies each year (see table 1). Reclamation follows the same general process for selecting construction projects, feasibility studies, and research studies to award grants to, according to Reclamation officials.

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Project sponsors submit applications for Title XVI grants to Reclamation in response to the FOAs, according to Reclamation officials. Reclamation officials then review the applications to ensure the projects are eligible and that applications are complete, according to agency officials we interviewed and documents we reviewed related to the selection process. Next, an application review committee scores eligible applications. The application review committee is composed of Reclamation staff representing the five regions and other staff with technical expertise. Committee members individually review and score each Title XVI application based on the evaluation criteria in the FOA. After the individual scoring, the application review committee meets collectively to discuss the scores; this meeting is generally facilitated by Title XVI program staff from Reclamation's central office in Denver. If there are any outliers in the scores—e.g., if a committee member scores an application significantly higher or lower than the other members—then they are to discuss and may adjust the score to help ensure fairness and consistency in how the applications are scored relative to the evaluation criteria, according to agency officials. Following this discussion, Reclamation averages the members' scores for each application and then ranks the applications based on the average scores. Reclamation creates a list of recommended projects and funding amounts for these projects, based on the rankings and congressional direction on the amount of funding for the Title XVI program in any given year.<sup>50</sup>

Reclamation's process for selecting projects and studies to fund under the Title XVI program is consistent with relevant federal grant regulations outlined in the Uniform Guidance. Based on our review of Title XVI FOAs from fiscal years 2011 through 2018, all FOAs met the requirements prescribed by the Uniform Guidance.<sup>51</sup> Specifically, the Uniform Guidance requires that grant funding opportunities be publicly announced and contain certain information, such as the evaluation criteria, key dates, and the process used to evaluate applications.<sup>52</sup> Based on our review of

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<sup>50</sup>As discussed earlier, in fiscal year 2011, Congress began providing funding for the Title XVI program without project-specific funding direction; Reclamation then determines how much funding to award to specific projects. In fiscal years 2017 and 2018, Congress provided direction on how much funding should go to individually congressionally authorized versus WIIN Act-eligible projects.

<sup>51</sup>As noted previously, although the Uniform Guidance became effective in December 2014, it did not substantially revise the provisions analyzed in this report.

<sup>52</sup>2 C.F.R. § 200.203. See also 2 C.F.R. pt. 200, appx. I, for the required format and contents of a notice of funding opportunity.

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FOAs, Reclamation's FOAs were publicly announced and contained this information.

Many project sponsors we interviewed said that Reclamation's Title XVI application selection process is generally clear and well-managed and that Reclamation officials, at both the regional level and central office in Denver, were responsive and transparent throughout the selection process. Several project sponsors noted that Reclamation offered to debrief with Title XVI applicants after it made its grant selections; further, Reclamation officials provided constructive feedback to applicants to improve their applications in future years.

Some project sponsors raised concerns about how long it takes WIIN Act-eligible Title XVI projects to be awarded grants. In particular, the WIIN Act provides that WIIN Act-eligible projects can only receive funding if an enacted appropriations act designates funding by project name, after Reclamation has recommended specific projects for funding and transmitted its recommendations to Congress.<sup>53</sup> Given the timing of Reclamation's FOA process, WIIN Act-eligible projects selected in a given fiscal year generally need to be included in the subsequent fiscal year's appropriations act.<sup>54</sup> For example, congressional direction in May 2017 provided that \$10 million of the total Title XVI funding was to go to Title XVI WIIN Act-eligible projects, and Reclamation sent Congress its fiscal year 2017 selections for WIIN Act-eligible projects to fund in November 2017. However, according to Reclamation officials, Reclamation could not begin awarding fiscal year 2017 funding to selected projects until March 2018, after enactment of the fiscal year 2018 appropriations act, which listed the selected projects by name. One project sponsor noted that this two-part process created challenges related to the project timeline and budget. Reclamation officials said that project sponsors have also expressed concerns to Reclamation about how any resulting delays may affect the ability of projects to move forward. Reclamation officials noted that this is a statutory requirement and that they had discussed this process with project sponsors to make them aware of the timing for the grants.

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<sup>53</sup>43 U.S.C. § 390h(g)(2).

<sup>54</sup>Title XVI projects are funded through the Water and Related Resources account, which generally receives no-year appropriations. Such appropriations are available for obligation for an indefinite period of time. A no-year appropriation is generally identified by appropriation language, such as "to remain available until expended."

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## Criteria Used to Evaluate Projects Have Changed in Recent Years

Reclamation has changed the evaluation criteria it uses to select projects to fund under the Title XVI program since it began using a competitive process in fiscal year 2011. Reclamation first developed criteria for the annual Title XVI project selection process in 2010, which it applied starting in fiscal year 2011. Prior to that, Congress generally provided project-specific funding direction for individually authorized Title XVI projects. According to agency officials, Reclamation developed the initial evaluation criteria for the annual Title XVI selection process based on (1) the language in the Reclamation Wastewater and Groundwater Studies and Facilities Act, as amended; (2) Reclamation goals and priorities for the program; and (3) the criteria Reclamation used to select projects to fund under the American Recovery and Reinvestment Act of 2009.<sup>55</sup> Reclamation sought and incorporated public comments on the criteria in 2010. After that, Reclamation's evaluation criteria for Title XVI construction projects generally remained unchanged from fiscal years 2011 through 2016.<sup>56</sup>

In fiscal years 2017 and 2018, Reclamation eliminated some criteria in the Title XVI FOAs for construction projects, added some new criteria, and changed the weighting of some criteria, based on our review of FOAs for those years.<sup>57</sup> For example, in 2017, Reclamation more than doubled the weight of the economic criterion for the fiscal year 2017 FOA for WIIN Act-eligible projects, making it worth 35 percent of the points as compared to the previous 13 percent. Reclamation officials told us that these changes were made in response to the language of the WIIN Act—which listed a number of criteria for projects, including projects that provide multiple benefits—and comments they received from OMB during

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<sup>55</sup>After the American Recovery and Reinvestment Act of 2009, which provided a supplemental appropriation to the Title XVI program, was enacted, Reclamation quickly developed criteria to use in awarding funding to authorized Title XVI projects, according to Reclamation officials.

<sup>56</sup>According to agency officials and documents, Reclamation reviews the Title XVI evaluation criteria every year and made some edits to clarify or otherwise improve the criteria it used in fiscal years 2011 through 2016.

<sup>57</sup>For example, in fiscal year 2018, Reclamation added a criterion related to Interior priorities and eliminated a criterion related to energy efficiency. See appendix II for a description of the changes Reclamation made in fiscal years 2017 and 2018 to the evaluation criteria for construction projects. The evaluation criteria for feasibility studies have generally remained the same since they were first used in fiscal year 2011. Reclamation made some changes to the evaluation criteria for research studies in fiscal year 2017.



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the review process for the revised criteria.<sup>58</sup> In March 2018, Reclamation proposed further revisions to the evaluation criteria for the fiscal year 2018 Title XVI program and held a public comment period to solicit input on the proposed changes.<sup>59</sup> The proposed FOA contained one set of criteria applicable to both types of eligible Title XVI construction projects—individually congressionally authorized and WIIN Act-eligible projects.<sup>60</sup> Reclamation received 21 comment letters on the criteria and, after analyzing the comments, officials said that they made additional changes to some of the criteria before issuing the final fiscal year 2018 FOA on May 30, 2018. For example, Reclamation added clarification to the economic criteria. See appendix II for a more detailed description of the final fiscal year 2018 Title XVI criteria, as well as changes to the criteria in fiscal years 2017 and 2018.

Several project sponsors noted that changes to the evaluation criteria may affect which projects are more competitive in Reclamation's application scoring and project selection process. In particular, several project sponsors and representatives from nongovernmental organizations we interviewed told us they believed that recent changes—particularly the increased weight on economic criteria, including cost effectiveness—may disadvantage small projects. Others said increasing

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<sup>58</sup>Specifically, under the WIIN Act, Reclamation is to give funding priority to Title XVI projects that, among other things, meet one or more of the statutory criteria, which are projects (1) that are likely to provide a more reliable water supply for states and local governments; (2) that are likely to increase the water management flexibility and reduce impacts on environmental resources from projects operated by federal and state agencies; (3) that are regional in nature; (4) with multiple stakeholders; and (5) that provide multiple benefits, including water supply reliability, eco-system benefits, groundwater management and enhancements, and water quality improvements. 43 U.S.C. § 390h(f)(2), (3). According to Reclamation officials, OMB does not review the Title XVI evaluation criteria every year but did so in fiscal year 2017.

<sup>59</sup>Reclamation officials stated that they would have preferred to hold a formal comment period on these changes before issuing the fiscal year 2017 FOA for WIIN Act-eligible projects, as they said it is general practice within the program to hold a comment period when substantial changes are made. However, Reclamation officials stated they did not have time to hold a comment period and also issue the fiscal year 2017 FOA for WIIN Act-eligible projects and select projects to fund before the end of the fiscal year, given that the WIIN Act was enacted in December 2016.

<sup>60</sup>While Reclamation issued one FOA with one set of criteria for individually congressionally authorized and WIIN Act-eligible construction projects in fiscal year 2018, the funding is split, since congressional direction indicated that out of the total for Title XVI projects, \$20 million should go toward WIIN Act-eligible Title XVI projects, leaving the remainder, approximately \$34 million, for individually congressionally authorized Title XVI projects.

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the weight on cost effectiveness may disadvantage new projects that are just beginning construction of costly new treatment facilities versus projects that are expanding existing facilities. Reclamation officials we interviewed stated that the economic criteria take into account the extent to which projects would provide multiple benefits—not just cost effectiveness. They also pointed out that they clarified in the fiscal year 2018 FOA that there are a number of ways to provide information on project benefits in Title XVI applications, including by describing benefits in a qualitative manner. They added that feedback from project sponsors had been positive on the additional changes Reclamation made in response to earlier stakeholder comments on the economic criteria for the final fiscal year 2018 FOA. Furthermore, Reclamation’s increased emphasis on economic criteria is consistent with federal principles on federal spending for water infrastructure projects, which states that federal infrastructure investments are to be based on systematic analysis of expected benefits and costs.<sup>61</sup>

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## Reclamation’s Process for Monitoring Title XVI Grants Is Consistent with Relevant Federal Grant Regulations

To monitor Title XVI grants, Reclamation reviews financial and performance reports submitted by project sponsors, regularly communicates and visits with project sponsors to obtain information on the status of the projects, and collects information on the amount of water Title XVI projects deliver each year, which is included in Interior’s annual performance report.

- **Financial and Performance Reports.** In its financial assistance agreements for Title XVI grants, Reclamation generally requires project sponsors to submit financial and performance reports. Specifically, Reclamation generally requires that project sponsors submit financial and performance reports at least once per year and sometimes more frequently, as determined by the risk that each project poses, according to agency officials. Based on our review of reports, the financial reports list transactions related to Title XVI grants, such as expenditures, and the performance reports provide updates on the status of the Title XVI projects. Reclamation delineates its monitoring requirements, which generally include requirements for financial and performance reports, in the financial

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<sup>61</sup>For example, Executive Order 12893 directs executive agencies to base decisions about federal infrastructure investments on an analysis of benefits and costs, including both quantitative and qualitative measures. Exec. Order No. 12,893, 59 Fed. Reg. 20 (Jan. 26, 1994).

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assistance agreements for Title XVI grants that each project sponsor agrees to prior to receiving funding. In our review of documents related to Reclamation's monitoring process for Title XVI construction grants active in fiscal year 2017, we found that project sponsors submitted all but one financial and performance reports that Reclamation had required, and submitted all but two by their due date or within 2 weeks of this date.<sup>62</sup> We found that Reclamation's requirements are consistent with relevant federal grant regulations in OMB's Uniform Guidance, which provide that federal awarding agencies, including Reclamation, generally are to collect financial reports from project sponsors at least annually.<sup>63</sup>

- Ongoing Communication and Site Visits. To further monitor the performance of Title XVI grants, Reclamation officials communicate regularly with project sponsors via telephone and email and conduct site visits to obtain information on the status of the projects, according to Reclamation officials and project sponsors. Based on our review of agency guidance, Reclamation generally is to conduct at least one site visit per year for projects with significant on-the-ground activities, such as construction projects. During the visits, agency officials generally are to receive updates on progress made on the project and determine if it is on schedule and meets the scope of work identified in the financial assistance agreement.<sup>64</sup> Reclamation generally requires officials to document these visits and other monitoring activities in project files, according to agency documents. Through the site visits

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<sup>62</sup>Of the 18 construction project grants active in fiscal year 2017 with reports required by their financial assistance agreements, all 18 project sponsors submitted all required financial reports and 17 project sponsors submitted all required performance reports. One project sponsor did not submit a financial report and a performance report by their due date or within 2 weeks of this date. In addition, for two grants, it was unclear whether the project sponsors submitted financial and performance reports on time because the reports did not contain dates.

<sup>63</sup>2 C.F.R. § 200.327. For construction performance monitoring, the Uniform Guidance does not prescribe how or in what frequency this monitoring should occur, but says that onsite inspections and certified percentage of completion data are relied on heavily by federal awarding agencies to monitor progress under federal awards for construction. 2 C.F.R. § 200.328(c). As noted previously, although the Uniform Guidance became effective in December 2014, it did not substantially revise the provisions analyzed in this report.

<sup>64</sup>Department of the Interior, Bureau of Reclamation, *The Bureau of Reclamation Acquisition Circular (RAC) No. 16-08, Fiscal Year (FY) 2016 Implementation Requirements for the Reclamation Manual, Directive and Standard (D&S), ACM 01-01* (Denver, CO: March 17, 2016). According to Reclamation, as of September 2018, this was the current version of the implementation policies.

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and other communication with project sponsors, agency officials may also provide information on program requirements and respond to project sponsors' questions about the Title XVI program. For example, during site visits, Reclamation officials have responded to project sponsors' questions about the status of payments and allowable project costs and clarified requirements for financial and performance reports, according to our review of agency documents and interviews with project sponsors. In our review of Reclamation's Title XVI construction grants active in fiscal year 2017, we found that Reclamation generally conducted annual site visits for Title XVI construction projects that year. We found that this is consistent with federal grant regulations in OMB's Uniform Guidance, which state that federal awarding agencies may make site visits as warranted by program needs.<sup>65</sup>

- **Data Collection.** Reclamation also annually collects data on the amount of water delivered from each Title XVI construction project, as well as projected water deliveries for the coming year. Reclamation analyzes the water delivery data, compares projected data to actual deliveries, and follows up with project sponsors to understand any discrepancies, according to agency officials. For example, actual water deliveries could be lower than projected deliveries if communities implement water conservation measures that result in projects having less wastewater to treat and deliver for reuse. According to Reclamation officials, information on the amount of reused water delivered from Title XVI projects helps them to monitor progress on Title XVI projects and helps demonstrate the benefits and accomplishments of the Title XVI program. These data are consolidated and included in Interior's annual performance report to demonstrate how the agency is meeting Interior's objective of achieving a more sustainable and secure water supply. Collecting data on Title XVI water deliveries is consistent with the Title XVI program's purpose of supporting water supply sustainability by providing financial and technical assistance to local water agencies for the planning, design, and construction of water reuse projects.

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## Agency Comments

We provided a draft of this report to the Department of the Interior for review and comment. The Department of the Interior provided technical comments, which we incorporated as appropriate.

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<sup>65</sup>2 C.F.R. § 200.328(e).

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As agreed with your offices, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the report date. At that time, we will send copies to the appropriate congressional committees, the Secretary of the Interior, and other interested parties. In addition, the report will be available at no charge on the GAO website at <http://www.gao.gov>.

If you or your staff members have any questions about this report, please contact me at (202) 512-3841 or [fennella@gao.gov](mailto:fennella@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made major contributions to this report are listed in appendix III.

A handwritten signature in black ink that reads "Anne-Marie Fennell". The signature is written in a cursive style with a horizontal line underneath the name.

Anne-Marie Fennell  
Director, Natural Resources and Environment

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










# Appendix I: Information on Construction Projects Eligible under the Title XVI Water Reclamation and Reuse Program

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This appendix provides information on construction projects that are individually congressionally authorized under the Bureau of Reclamation's Title XVI Water Reclamation and Reuse Program (Title XVI), as well as projects to which Reclamation awarded grants under the Water Infrastructure Improvements for the Nation Act (WIIN Act) funding opportunity in fiscal year 2017. Figure 9 below provides information on the 53 construction projects that have been individually authorized by Congress under the Title XVI program. The projects are ordered by the total amount of Title XVI funding each was awarded from fiscal years 1992 through 2017, from highest to lowest.

**Appendix I: Information on Construction  
Projects Eligible under the Title XVI Water  
Reclamation and Reuse Program**

**Figure 9: Information on Individually Congressionally Authorized Water Reuse Construction Projects under the Bureau of Reclamation’s Title XVI Water Reclamation and Reuse Program, as of August 2018**

Project title	State	Year authorized	Federal ceiling, in dollars	Title XVI funding awarded, in dollars (fiscal years 1992-2017)	Title XVI project costs remaining but grants not awarded up to federal ceiling, in dollars	Acre-feet water delivery, fiscal year 2017	Uses of reused water <sup>a</sup>
San Diego Area Water Reclamation Program	CA	1992	172,590,000	132,185,827	40,404,173	22,308	   
Los Angeles Area Water Reclamation & Reuse Project	CA	1992	69,970,000	69,970,000	0	40,867	  
San Jose Area Water Reclamation & Reuse Program	CA	1992	109,959,000	61,498,450	48,460,550	11,696	  
San Gabriel Basin Demonstration Project	CA	1992	44,590,000	44,590,000	0	39,311	  
Lower Chino Dairy Area Desalination Demonstration & Reclamation Project	CA	2009	26,000,000	26,000,000	0	17,226	
North Bay Water Reuse Program	CA	2009	25,000,000	25,000,000	0	1,722	  
Albuquerque Metropolitan Area Water Reclamation & Reuse Project	NM	1996	20,000,000	20,000,000	0	4,750	 
Calleguas Municipal Water District Recycling Project	CA	1996	20,000,000	20,000,000	0	8,493	  
Inland Empire Regional Water Recycling Project	CA	2008	20,000,000	20,000,000	0	31,624	  
Irvine Ranch Water District (Irvine Basin Groundwater and Surface Water Improvement Projects)	CA	2004	20,000,000	20,000,000	0	6,551	 
North San Diego County Area Water Recycling Project	CA	1996	20,000,000	20,000,000	0	7,711	  
Orange County Regional Water Reclamation Project	CA	1996	20,000,000	20,000,000	0	100,623	
Oxnard, CA, Water Reclamation Reuse & Treatment Project	CA	2009	20,000,000	20,000,000	0	2,132	  
Southern Nevada Water Recycling Project	NV	1996	20,000,000	20,000,000	0	4,697	 

 indirect-potable/recharge<sup>1</sup>     desalination<sup>2</sup>     commercial and industrial     landscape irrigation     agricultural irrigation     habitat restoration<sup>3</sup>

Source: GAO analysis of information from the Bureau of Reclamation and project sponsors. | GAO-19-110

**Appendix I: Information on Construction  
Projects Eligible under the Title XVI Water  
Reclamation and Reuse Program**

Project title	State	Year authorized	Federal ceiling, in dollars	Title XVI funding awarded, in dollars (fiscal years 1992-2017)	Title XVI project costs remaining but grants not awarded up to federal ceiling, in dollars	Acre-feet water delivery, fiscal year 2017	Uses of reused water <sup>a</sup>
Watsonville Area Water Recycling Project	CA	1996	20,000,000	20,000,000	0	3,438	
Treatment of Effluent from the Sanitation Districts of Los Angeles County through the City of Long Beach	CA	1996	20,000,000	16,580,956	3,419,044	8,727	
Upper Mojave South California Desert Region (Southern California Desert Region Integrated Water and Economic Sustainability Plan)	CA	2007	20,000,000	16,294,901	3,705,099	4,064	
Eastern Municipal Water District Recycled Water System Pressurization and Expansion Project, CA	CA	2008	12,000,000	12,000,000	0	44,459	
Long Beach Desalination Research and Development Project	CA	1996	20,000,000	11,516,978	8,483,022	0	N/A <sup>b</sup>
Hi-Desert Water District in Yucca Valley, CA Wastewater Collection and Reuse Facility	CA	1996	20,000,000	10,997,000 <sup>d</sup>	8,668,500	0 <sup>c</sup>	
North Las Vegas Water Reuse	NV	2003	20,000,000	10,822,000	9,178,000	25,146	
El Paso Water Reclamation and Reuse Project	TX	1996	20,000,000	8,842,266	11,157,734	2,498	
South Bay Advanced Recycled Water Treatment Facility	CA	2008	8,250,000	8,250,000	0	4,055	
City of Corona Water Recycling and Reuse Project	CA	2009	20,000,000	7,477,930	12,522,070	10,958	
South Santa Clara County Recycled Water Project	CA	2008	7,000,000	7,000,000	0	1,820	

indirect-potable/recharge<sup>d</sup>    desalination<sup>e</sup>    commercial and industrial    landscape irrigation    agricultural irrigation    habitat restoration<sup>f</sup>

Source: GAO analysis of information from the Bureau of Reclamation and project sponsors. | GAO-19-110





**Appendix I: Information on Construction  
Projects Eligible under the Title XVI Water  
Reclamation and Reuse Program**

Project title	State	Year authorized	Federal ceiling, in dollars	Title XVI funding awarded, in dollars (fiscal years 1992-2017)	Title XVI project costs remaining but grants not awarded up to federal ceiling, in dollars	Acre-feet water delivery, fiscal year 2017	Uses of reused water <sup>a</sup>
Mountain View, Moffett Area Reclaimed Water Pipeline Project	CA	2008	5,000,000	5,000,000	0	444	
Yucaipa Valley Regional Water Supply Renewal Project	CA	2009	20,000,000	4,292,727	15,707,273	4,153	
Rancho California Water District Project	CA	2009	20,000,000	4,008,431	15,991,569	0 <sup>c</sup>	
Port Hueneme Desalination	CA	1992	4,000,000	4,000,000	0	3,297	
Mission Basin Brackish Groundwater Desalting Demonstration Project	CA	1996	20,000,000	3,483,816	16,516,184	1,458	
Tooele Wastewater Treatment and Reuse Project	UT	1996	3,408,553	3,408,553	0	2,120	
Williamson County, TX Water Recycling and Reuse Project	TX	2004	20,000,000	3,229,427	16,770,573	726	
Phoenix Metropolitan Water Reclamation Program	AZ	1992	20,000,000	2,810,000	17,190,000	0	N/A <sup>b,d</sup>
North Coast County Water District Recycled Water Project	CA	2008	2,500,000	2,500,000	0	38	
Reclaimed Water in Pasadena	CA	1996	20,000,000	2,300,233	17,699,767	0 <sup>c</sup>	
Antioch Recycled Water Project	CA	2008	2,250,000	2,250,000	0	300	
Elsinore Valley Municipal Water District Projects	CA	2009	12,500,000	2,142,506	10,357,494	347	
Pittsburg Recycled Water Project	CA	2008	1,750,000	1,750,000	0	400	
Redwood City Recycled Water Project	CA	2008	1,100,000	1,100,000	0	103	

indirect-potable/recharge<sup>e</sup>    
 desalination<sup>g</sup>    
 commercial and industrial    
 landscape irrigation    
 agricultural irrigation    
 habitat restoration<sup>h</sup>

Source: GAO analysis of information from the Bureau of Reclamation and project sponsors. | GAO-19-110

**Appendix I: Information on Construction  
Projects Eligible under the Title XVI Water  
Reclamation and Reuse Program**

Project title	State	Year authorized	Federal ceiling, in dollars	Title XVI funding awarded, in dollars (fiscal years 1992-2017)	Title XVI project costs remaining but grants not awarded up to federal ceiling, in dollars	Acre-feet water delivery, fiscal year 2017	Uses of reused water <sup>a</sup>
Willow Lake Natural Treatment System Project	OR	1998	8,750,000	520,000	8,230,000	0	N/A <sup>b,d</sup>
Las Vegas Area Shallow Aquifer Desalination Research and Development Project	NV	1996	20,000,000	499,404	19,500,596	0	N/A <sup>d</sup>
Los Angeles Basin Augmentation Demo	CA	1992	491,743	491,743	0	0	N/A <sup>b</sup>
Lahaina Water Recycling Project #3	HI	2005	20,000,000	9,662	19,990,338	0	N/A <sup>d</sup>
Kealakehe Water Recycling Project	HI	2005	20,000,000	0	20,000,000	0 <sup>c</sup>	
Kalaeloa Seawater Desalination Project	HI	2005	20,000,000	0	20,000,000	0 <sup>c</sup>	
St. George Area Water Recycling Project <sup>a</sup>	UT	1996	20,000,000	0	0	N/A <sup>e</sup>	N/A <sup>e</sup>
Central Valley Water Recycling Project	UT	1996	20,000,000	0	20,000,000	0	N/A <sup>d</sup>
Cucamonga Valley Water Recycling Project	CA	2007	10,000,000	0	10,000,000	0	N/A <sup>d</sup>
City of West Jordan Water Reuse Project	UT	1996	20,000,000	0	20,000,000	0	N/A <sup>d</sup>
Lakehaven, WA, Water Reclamation and Reuse Project	WA	2002	20,000,000	0	20,000,000	0	N/A <sup>d</sup>
San Joaquin Area Water Recycling and Reuse Project	CA	1996	20,000,000	0	20,000,000	0	N/A <sup>d</sup>
Truckee Watershed Reclamation Project	NV	2000	20,000,000	0	20,000,000	0	N/A <sup>d</sup>
Prado Basin Natural Treatment System Project	CA	2009	10,000,000	0	10,000,000	0	N/A <sup>d</sup>

 indirect-potable/recharge<sup>f</sup>
 desalination<sup>g</sup>
 commercial and industrial
  landscape irrigation
  agricultural irrigation
  habitat restoration<sup>h</sup>

Source: GAO analysis of information from the Bureau of Reclamation and project sponsors. | GAO-19-110

Note: Amounts are in nominal dollars, which are not adjusted for inflation.

<sup>a</sup>This column describes some uses of the reused water produced by each Title XVI project but may not encompass all uses for each project.

<sup>b</sup>This project is a demonstration project with no stated uses of the reused water.

<sup>c</sup>This project was under construction or had plans to be constructed.

<sup>d</sup>There were no plans to move forward with this project as of August 2018.

<sup>e</sup>According to Bureau of Reclamation data, the full federal cost share for this project was met with funding from the Department of the Interior's Bureau of Indian Affairs. The Bureau of Reclamation did not collect water delivery information for this project in 2017.

**Appendix I: Information on Construction Projects Eligible under the Title XVI Water Reclamation and Reuse Program**

<sup>f</sup>Indirect-potable reuse is the intentional addition of treated municipal wastewater to a drinking water source such as a lake or reservoir or groundwater aquifer, often referred to as an environmental buffer. When reused water is added to a groundwater aquifer, it may be referred to as groundwater recharge. Typically, groundwater recharge is accomplished through spreading basins that allow the water to naturally percolate through the soil to the aquifer or by means of injection wells that deliver the water directly to a specified location in the aquifer.





<sup>g</sup>Desalination treats brackish groundwater or seawater and then generally feeds it directly into potable water distribution systems or into a groundwater aquifer or surface water reservoir.




<sup>h</sup>Habitat restoration includes one Title XVI project that built constructed wetlands, which are treatment systems that use natural processes to treat wastewater.

<sup>i</sup>According to Bureau of Reclamation data, this project also received \$334,500 in other federal funding, which is not included in the Title XVI funding awarded but does count toward the federal ceiling.

Figure 10 below provides information on the three construction projects to which Reclamation awarded grants under the Title XVI WIIN Act funding opportunity in fiscal year 2017. The projects are ordered by the total Title XVI funding each was awarded in fiscal year 2017—the first year that grants were awarded under the WIIN Act—from highest to lowest.

**Figure 10: Information on Bureau of Reclamation’s Title XVI Water Reuse Construction Project Awards under the Water Infrastructure Improvements for the Nation Act, as of August 2018**

Project title	State	Title XVI funding awarded, in dollars (fiscal year 2017)	Main type of water usage <sup>a</sup>
Del Puerto Water District, The North Valley Regional Recycled Water Program	CA	4,337,500	 
Water Replenishment District of Southern California, Groundwater Reliability Improvement Program Recycled Water Project	CA	4,337,500	
Orange County Sanitation District, Effluent Reuse Implementation Project - Headworks Segregation	CA	1,325,000	

 indirect-potable/recharge<sup>b</sup>
 agricultural irrigation
  habitat restoration

Source: GAO analysis of information from Reclamation and project sponsors. | GAO-19-110

Note: Amounts are in nominal dollars, which are not adjusted for inflation.

<sup>a</sup>This column describes some uses of the reused water produced by each Title XVI project but may not encompass all uses for each project.

<sup>b</sup>Indirect-potable reuse is the intentional addition of treated municipal wastewater to a drinking water source such as a lake or reservoir or groundwater aquifer, often referred to as an environmental buffer. When reused water is added to a groundwater aquifer, it may be referred to as groundwater recharge. Typically, groundwater recharge is accomplished through spreading basins that allow the water to naturally percolate through the soil to the aquifer or by means of injection wells that deliver the water directly to a specified location in the aquifer.

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# Appendix II: Information on the Evaluation Criteria Used to Select Projects to Award Grants under the Title XVI Program

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This appendix provides detailed information on the evaluation criteria the Bureau of Reclamation used to select projects to award grants under the Title XVI Water Reclamation and Reuse Program (Title XVI). The six evaluation criteria Reclamation used to select construction projects to fund in fiscal year 2018 are as follows (points are out of a total of 110 points).

1. Water Supply (35 points)
  - a. Stretching Water Supplies (18 points): Points will be awarded based on the extent to which the project is expected to secure and stretch reliable water supplies. Consideration will be given to the amount of water expected to be made available by the project and the extent to which the project will reduce demands on existing facilities and otherwise reduce water diversions.
  - b. Contributions to Water Supply Reliability (17 points): Points will be awarded for projects that contribute to a more reliable water supply.
2. Environment and Water Quality (12 points): Points will be awarded based on the extent to which the project will improve surface, groundwater, or effluent discharge quality; will restore or enhance habitat for nonlisted species; will address problems caused by invasive species; or will provide water or habitat for federally listed threatened or endangered species. Indirect benefits of the project will also be considered under this criterion.
3. Economic Benefits (35 points)
  - a. Cost Effectiveness (10 points): Points will be awarded based on the cost per acre-foot of water expected to be delivered upon completion of the project and how the cost of the project compares to a nonreclaimed water alternative.
  - b. Economic Analysis and Project Benefits (25 points): Points will be awarded based on the analysis of the project's benefits relative to the project's costs.
4. Department of Interior Priorities (10 Points): Points will be awarded based on the extent that the proposal demonstrates that the project supports the Department of the Interior priorities, such as utilizing natural resources and modernizing infrastructure.
5. Reclamation's Obligations and Benefits to Rural or Economically Disadvantaged Communities (8 points)

**Appendix II: Information on the Evaluation  
Criteria Used to Select Projects to Award  
Grants under the Title XVI Program**

- a. Legal and Contractual Water Supply Obligations (4 Points): Points will be awarded for projects that help to meet Reclamation’s legal and contractual obligations.
  - b. Benefits to Rural or Economically Disadvantaged Communities (4 Points): Points will be awarded based on the extent to which the project serves rural communities or economically disadvantaged communities in rural or urban areas.
6. Watershed Perspective (10 Points): Points will be awarded based on the extent to which the project promotes or applies a watershed perspective by implementing an integrated resources management approach, implementing a regional planning effort, forming collaborative partnerships with other entities, or conducting public outreach.

Reclamation changed some of its evaluation criteria in fiscal years 2017 and 2018. The fiscal year 2017 changes were made in response to requirements in the Water Infrastructure Improvements for the Nation Act (WIIN Act)—which listed several criteria for projects, including projects that provide multiple benefits—and comments from the Office of Management and Budget, according to Reclamation officials. The fiscal year 2018 changes were generally made in response to comments Reclamation received during the formal comment period it held in March and April 2018 to solicit input on the criteria, according to Reclamation officials. The changes to the criteria are shown in table 4.

**Table 4: Criteria the Bureau of Reclamation Used to Evaluate Title XVI Water Reclamation and Reuse Construction Projects, Fiscal Years (FY) 2017 and 2018**

Evaluation criterion	Evaluation criterion score in Funding Opportunity Announcement (FOA) as a percentage of the total evaluation score		
	FY2017 FOA for individually congressionally authorized Title XVI projects	FY2017 FOA for WIIN Act-eligible Title XVI projects <sup>a</sup>	FY2018 FOA for all Title XVI projects
<b>Water Supply</b>	28	28	32
Stretching Water Supplies	18	18	16
Contributions to Water Supply Reliability <sup>b</sup>	10	10	15
<b>Economic Benefits<sup>c</sup></b>	13	35	32
Cost-Effectiveness <sup>d</sup>	N/A <sup>e</sup>	10	9
Economic Analysis and Project Benefits <sup>f</sup>	N/A	25	23
<b>Environment and Water Quality</b>	15	12	11
<b>Watershed Perspective</b>	8	7	9

**Appendix II: Information on the Evaluation  
Criteria Used to Select Projects to Award  
Grants under the Title XVI Program**

Evaluation criterion	Evaluation criterion score in Funding Opportunity Announcement (FOA) as a percentage of the total evaluation score		
	FY2017 FOA for individually congressionally authorized Title XVI projects	FY2017 FOA for WIIN Act-eligible Title XVI projects <sup>a</sup>	FY2018 FOA for all Title XVI projects
<b>Reclamation's Obligations and Benefits to Rural or Economically Disadvantaged Communities</b>	10	10	7
Legal and Contractual Water Supply Obligations	5	5	4
Benefits to Rural or Economically Disadvantaged Communities	5	5	4
<b>Department of Interior Priorities</b>	N/A	N/A	9
<b>Energy Efficiency<sup>g</sup></b>	13	8	N/A
<b>Status of Title XVI Project</b>	15	N/A	N/A
Progress Toward Completion of Title XVI Project	10	N/A	N/A
Readiness to Proceed	5	N/A	N/A

Source: GAO analysis of Reclamation's FOAs. | GAO-19-110

Note: Due to rounding, percentages may not total when summed.

<sup>a</sup>The Water Infrastructure Improvements for the Nation Act (WIIN Act) provided that projects with feasibility studies that Reclamation had reviewed and submitted to Congress would be eligible for Title XVI grants.

<sup>b</sup>In the fiscal year 2017 FOAs for individually congressionally authorized and WIIN Act-eligible Title XVI projects, Reclamation titled this criterion "contributions to water supply sustainability."

<sup>c</sup>In the fiscal year 2017 FOA for individually congressionally authorized projects, Reclamation titled this criterion "cost per acre-foot of water and other project benefits."

<sup>d</sup>In the fiscal year 2017 FOA for WIIN Act-eligible Title XVI projects, Reclamation titled this subcriterion "cost per acre-foot."

<sup>e</sup>Reclamation made changes to the evaluation criteria and in certain years, certain evaluation criterion or subcriterion were not included. If an evaluation criterion was not included in a certain FOA, this is indicated as not applicable (N/A).

<sup>f</sup>In the fiscal year 2017 FOA for WIIN Act-eligible Title XVI projects, Reclamation titled this subcriterion "economic analysis."

<sup>g</sup>In the fiscal year 2017 FOA for individually congressionally authorized projects, Reclamation titled this criterion "renewable energy and energy efficiency."

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# Appendix III: GAO Contact and Staff Acknowledgments

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## GAO Contact

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## Staff Acknowledgments

In addition to the individual named above, Elizabeth Erdmann (Assistant Director), Lesley Rinner (Analyst-in-Charge), Margaret Childs, and Sierra Hicks made key contributions to this report. Ellen Fried, Timothy Guinane, Thomas M. James, John Mingus, Patricia Moye, Anne Rhodes-Kline, Sheryl Stein, and Sara Sullivan made additional contributions.

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