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Report

Watershed Project Distribution

October 26, 2004

**Office of the City Auditor
Austin, Texas**

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NOTE: On November 30th, 2004, map five on pages 16 and 17 of this report was replaced.

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Date: October 26, 2004

To: Mayor and Council Members

From: Stephen L. Morgan, City Auditor

Subject: Assistance project report on Watershed Project Distribution

We are pleased to present our report on the geographic distribution of capital projects and spending in the areas of storm water drainage, flood, erosion, and water quality control. Our purpose in presenting this information is to display the location of the projects and associated dollars spent without evaluating the propriety of the placement of any project in the specific or the distribution of projects and dollars as a whole.

These projects are undertaken by the Watershed Protection and Development Review Department (WPDR) in accordance with a Council approved Master Plan. The Master Plan was adopted in 2001 for the purpose of guiding capital project selection in the seventeen central City watersheds. The plan itself is the product of complex computer modeling developed specifically to enable the City (1) to coordinate efforts to control flooding, erosion, and water quality and (2) to select the best type of solution for problems occurring at any particular location.

We appreciate the assistance and cooperation we received from WPDR during our work on this project.

Stephen L. Morgan, CIA, CGAP, CFE, CGFM
City Auditor

Watershed Project Distribution Report

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Background

The Watershed Protection and Development Review Department (WPDR) is responsible for both construction and maintenance projects to address flood, erosion, and water quality issues in the City of Austin. Projects to address flooding are divided into two categories, those that address localized flooding caused by problems with the storm drain system and those that address flooding along creeks. A map of all Austin watersheds is provided on page 22 of this report.

To identify and prioritize problems specific to watersheds, WPDR uses the Watershed Protection Master Plan. The current Master Plan was developed through:

- 1) **Conducting Watershed Assessments**

WPDR conducted technical assessments of each watershed to identify areas of flooding, erosion and water quality degradation. Problem areas were then prioritized based on the magnitude of the problem and the relative value of the resource being affected. Each technical assessment included using physical modeling of the drainage system and analysis of complaints to evaluate both current problems and expected future conditions for solution development purposes.

- 2) **Collecting Public Input**

WPDR collected input on the Watershed Protection Master Plan through the Master Plan Citizens Advisory Group, an extensive public telephone survey about concerns about flooding, erosion and water quality in each watershed, and public meetings in each of the Phase One watersheds. (The 17 watersheds included in phase one of the Master Plan are identified in Table 2, page 21.)

- 3) **Developing Solutions**

WPDR then developed solutions to address priority problem areas identified through watershed assessments and public input. These were developed and then ranked and selected based on cost-effectiveness, implementation feasibility, and project sustainability. This ranking was done using a combination of database and GIS tools which allow for integration of solutions across erosion, flood, and water quality projects. Recommendations of solutions to implement included prioritized capital projects, ongoing programs, and regulatory changes that address identified flood, erosion and water quality problems.

Findings and recommendations from phase one of the master planning process, which comprises 17 of the 54 area watersheds, were approved by the City Council in 2001. These findings and recommendations have guided the selection and prioritization of flood, erosion, and water quality projects since 2001. In addition to recommendations from the Master Plan, WPDR relies on complaints to identify needed maintenance.

To summarize, WPDR conducts both long-range capital improvement projects and ongoing maintenance projects to address flood, erosion, and water quality issues identified in the Master Plan. Capital improvements and related expenditures are tracked through the City's online project management system (eCAPRIS). Maintenance projects are tracked using in-house databases.

More information about the Watershed Protection Master Plan can be found online at <http://www.ci.austin.tx.us/watershed>.

OBJECTIVE, SCOPE, AND METHODOLOGY

The City Council Audit and Finance Committee approved this project as part of our office's 2004 Service Plan. The Committee later approved a reduction in the project's budget and a change in the nature of the project from a full-scope audit to an assistance project that presents the cost and location of projects undertaken by the Watershed Protection and Development Review (WPDR) department.

Project Objective

Determine what watershed protection projects and maintenance work were funded for the five year period beginning in FY00, where the projects are located, and what the cost to-date has been.

Scope

We collected and included data on all capital improvement and maintenance projects completed or initiated by WPDR in fiscal years 2000 (FY00) to 2004 (FY04). Data for FY04 only includes a partial year of information, ending in July. In the event that a project began outside of our scope, all inception-to-date project cost information was included in our analysis. For projects that have not been completed, there may be additional expenditures for the project in the future.

Flood control (for both stormwater drains and creeks), erosion control, and water quality control projects are included in our analysis. Our work did not extend to the comparison of the maps in this report with those produced in WPDR's 2001 Watershed Master Plan. Some projects within this scope pre-date this Master Plan.

Methodologies

Auditors obtained data on Capital Improvements Program (CIP) projects from a download of the City's online project management system. This included geographic shape and location information in addition to inception-to-date cost information as of July 22, 2004 for each capital improvement project. The CIP is a long-range capital budget that includes major capital purchases and/or construction projects.

There were 84 WPDR capital improvement projects initiated and/or completed between fiscal year 2000 and 2004. Of these projects, 72 had available location information and were included in our mapping analysis. The remaining twelve were projects that for various reasons could not be attributed to a single location (or watershed). These twelve projects were considered 'citywide' and were not included in our maps. For a list of these projects, see Table 1 on page 10 of this report.

Auditors obtained data regarding maintenance projects from two databases maintained by WPDR: the database of pond maintenance work and the database for work orders performed in response to complaints. Addresses in each of these databases were then plotted using Geographical Information Systems (GIS) software. Addresses that did not plot were researched and eventually all locations were plotted. This included 7,578 projects from the pond maintenance database and 1,794 projects from the work order database for the five-year period.

In addition, auditors verified the reliability and completeness of data used to build the maps by testing a small judgmental sample of project data items. We did not conduct any site visits.

Once capital improvement projects were mapped, auditors used analysis tools available in our GIS software to summarize the number and cost of projects within each watershed. For capital improvement projects that crossed multiple watersheds, we allocated project cost based on the percent of project acreage falling within each watershed. Once all maintenance projects were mapped, auditors analyzed the number of maintenance projects within each watershed. We could not include the cost for maintenance projects because this data is not collected at the project level.

Our summary of the number and cost of projects in each watershed is displayed in map and tabular format on the following pages.

This project was conducted in compliance with the general standards of the Generally Accepted Government Auditing Standards (the Yellow Book).

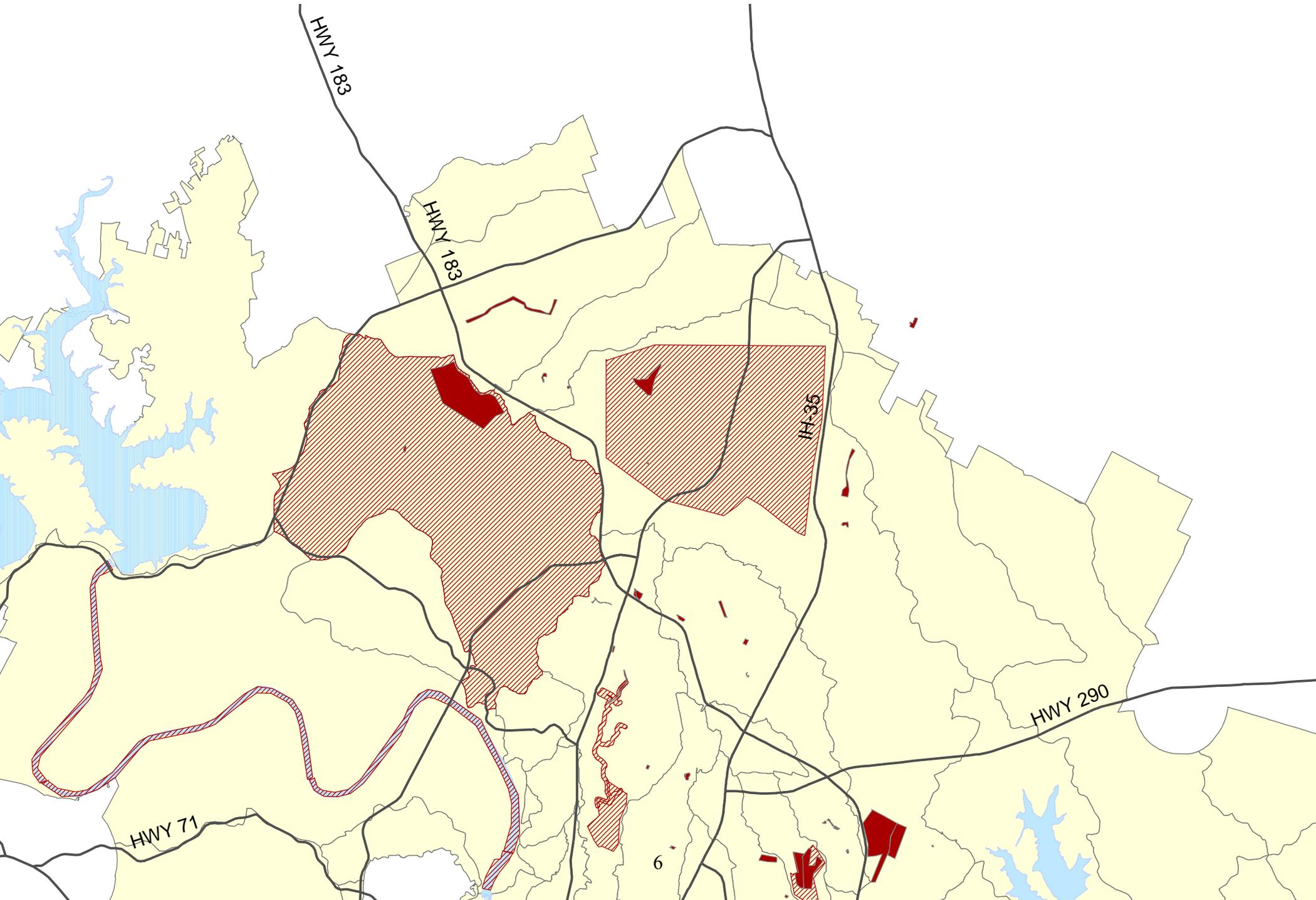
Capital Improvements Program (CIP) Projects

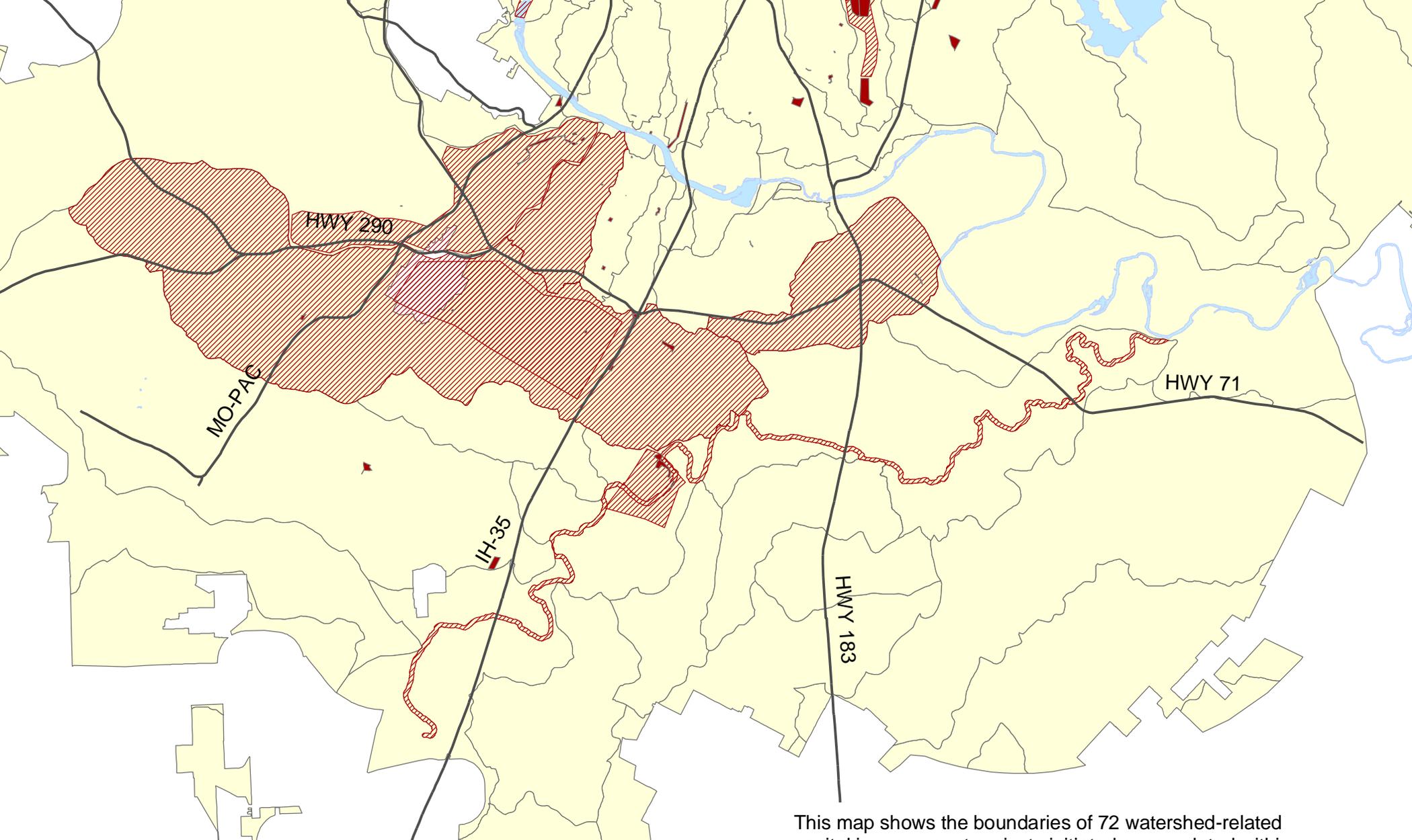
Map 1: CIP Project Locations, FY00 - FY04

Map 2: Cost and Number of CIP Projects by Watershed, FY00 - FY04

Table 1: Additional CIP Projects, FY 00- FY 04

Map 1: CIP Project Locations, FY00 - FY04



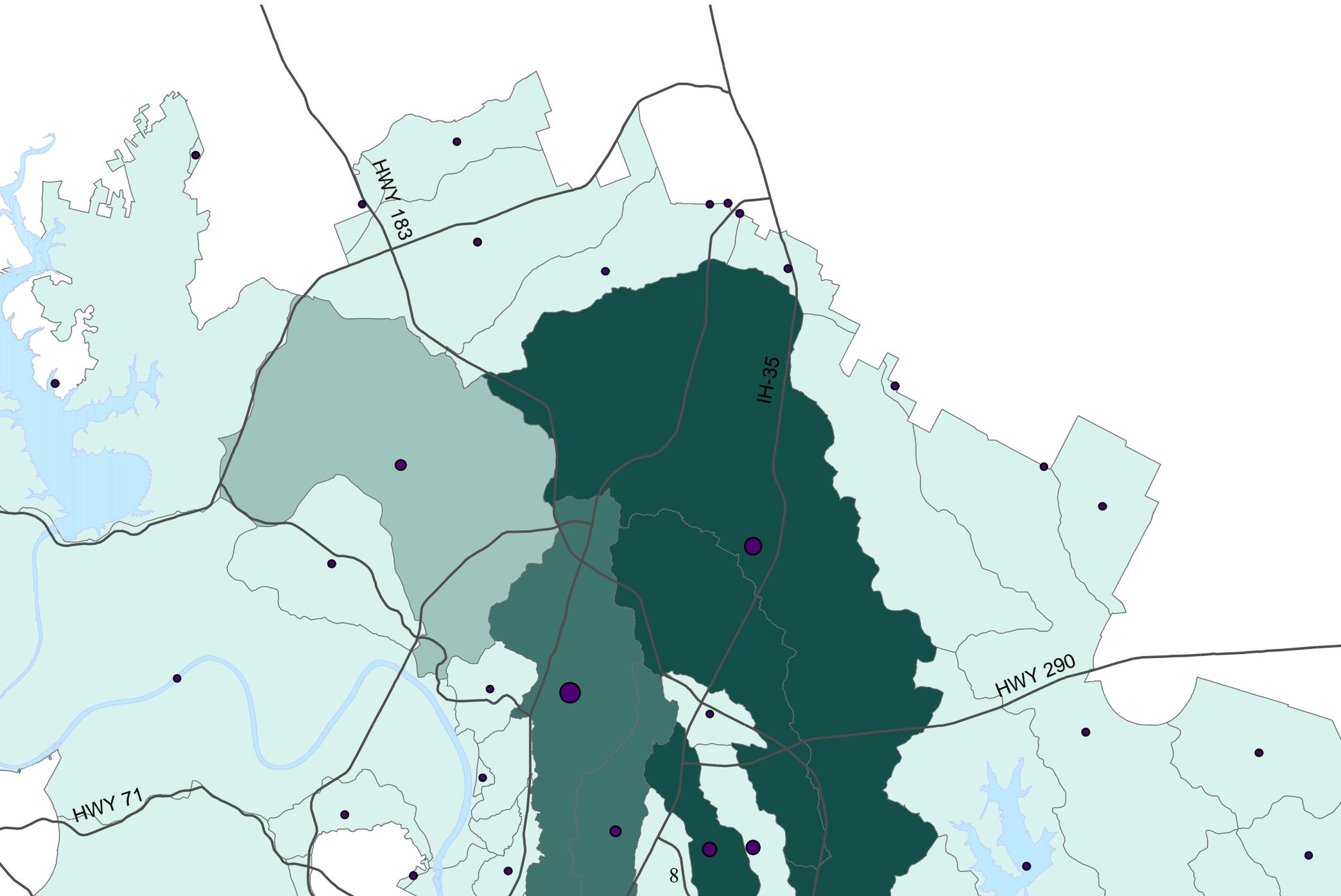


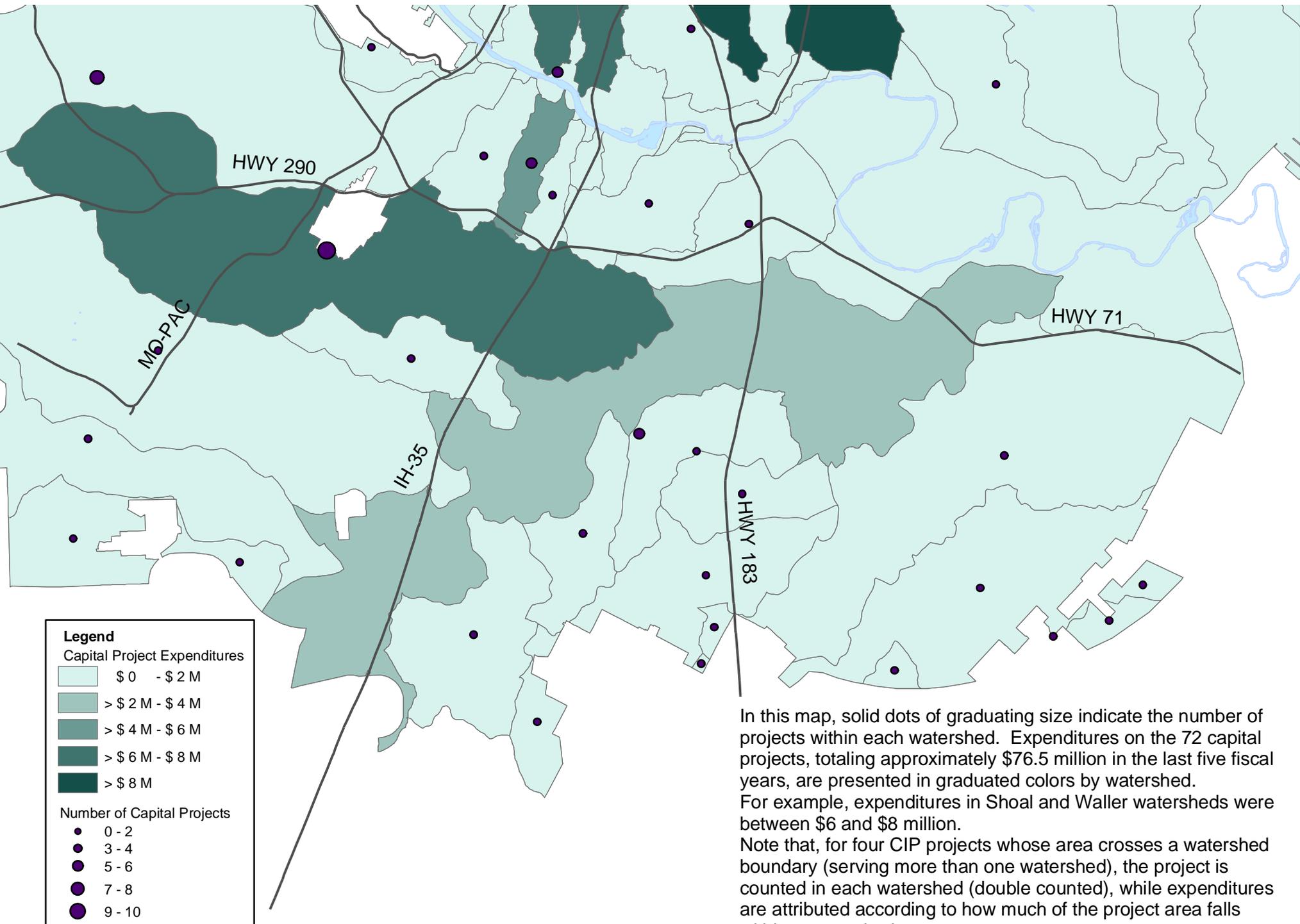
Legend

- Capital Projects - Construction Projects
- Capital Projects - Studies and Mapping Projects
- Austin Watersheds

This map shows the boundaries of 72 watershed-related capital improvement projects initiated or completed within the last five fiscal years. Twelve additional capital improvements that we did not have location information for are listed in Table 1. Many projects covering large areas represent studies or mapping projects conducted to identify locations for specific projects. We have shown these projects using cross-hatching and the remainder of the capital projects using a solid color.

Map 2: Cost and Number of CIP Projects by Watershed, FY00 - FY04





SOURCE: OCA analysis of watershed project data, FY00 - FY04

In this map, solid dots of graduating size indicate the number of projects within each watershed. Expenditures on the 72 capital projects, totaling approximately \$76.5 million in the last five fiscal years, are presented in graduated colors by watershed. For example, expenditures in Shoal and Waller watersheds were between \$6 and \$8 million. Note that, for four CIP projects whose area crosses a watershed boundary (serving more than one watershed), the project is counted in each watershed (double counted), while expenditures are attributed according to how much of the project area falls within a watershed.

Table 1: Additional CIP Projects, FY 00- FY 04

In addition to the 72 capital projects analyzed in Maps 1 and 2 are twelve capital projects not attributable to specific watersheds. For some of these projects, activity occurred in so many locations it is not feasible to research their locations. The list also includes projects of a ‘citywide’ nature, such as evaluations, database management, mapping projects, and equipment replacements.

#	Project ID	Project Name	Project Description	Expenditures FY00-04
1	5282.016	Urban Watersheds Water Quality Retrofit Evaluation	Water Quality Protection - Stormwater Treatment	\$259,319.97
2	5282.017	Urban Watersheds Ordinance (UWO) Fee Evaluation	Water Quality Protection - Stormwater Treatment	\$22,791.60
3	5749.001	Equipment Replacement and Additions	Equipment Replacement & Additions	\$5,997,540.10
4	5754.024	Flood Early Warning System	Flood Control - Creek Flooding Mitigation	\$408,831.73
5	6039.009	Pond Database Project	Multi-Objective Watershed Project	\$165.00 *
6	6039.017	Stormwater Detention Criteria	Multi-Objective Watershed Project	\$89,080.05
7	6039.019	Preliminary Engineering Fund	Multi-Objective Watershed Project	\$268.00 *
8	6039.021	Phase II Master Plan technical assessments	Multi-Objective Watershed Project	\$232.50 *
9	6039.022	Land Use GIS Applications	Multi-Objective Watershed Project	\$69,513.62
10	6039.025	Drainage Infrastructure GIS Field Data Compilation	Multi-Objective Watershed Project	\$9,300.50
11	6279.001	Inspection Automation	Inspection Automation	\$149,073.14
12	6938.001	Watershed and Floodplain Studies	Floodplain Studies & Digital Mapping	\$146,085.28

Total Citywide Expenditures \$7,152,201.49

SOURCE: OCA analysis of watershed project data, FY00 - FY04

* Expenditures for these projects are low either because they are open projects which will have additional expenditures in the future or because they were cancelled before additional expenditures were accumulated.

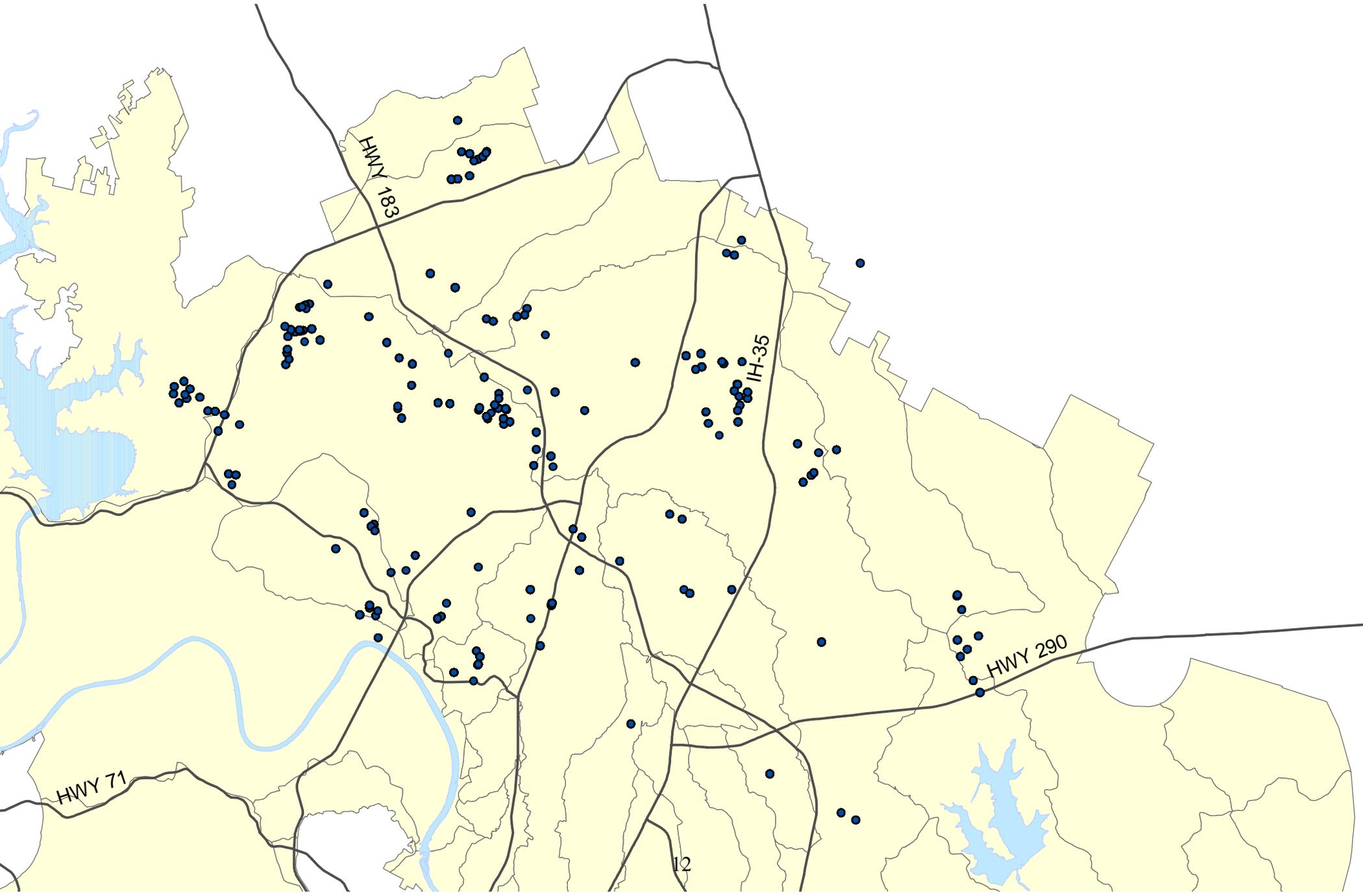
Maintenance Projects

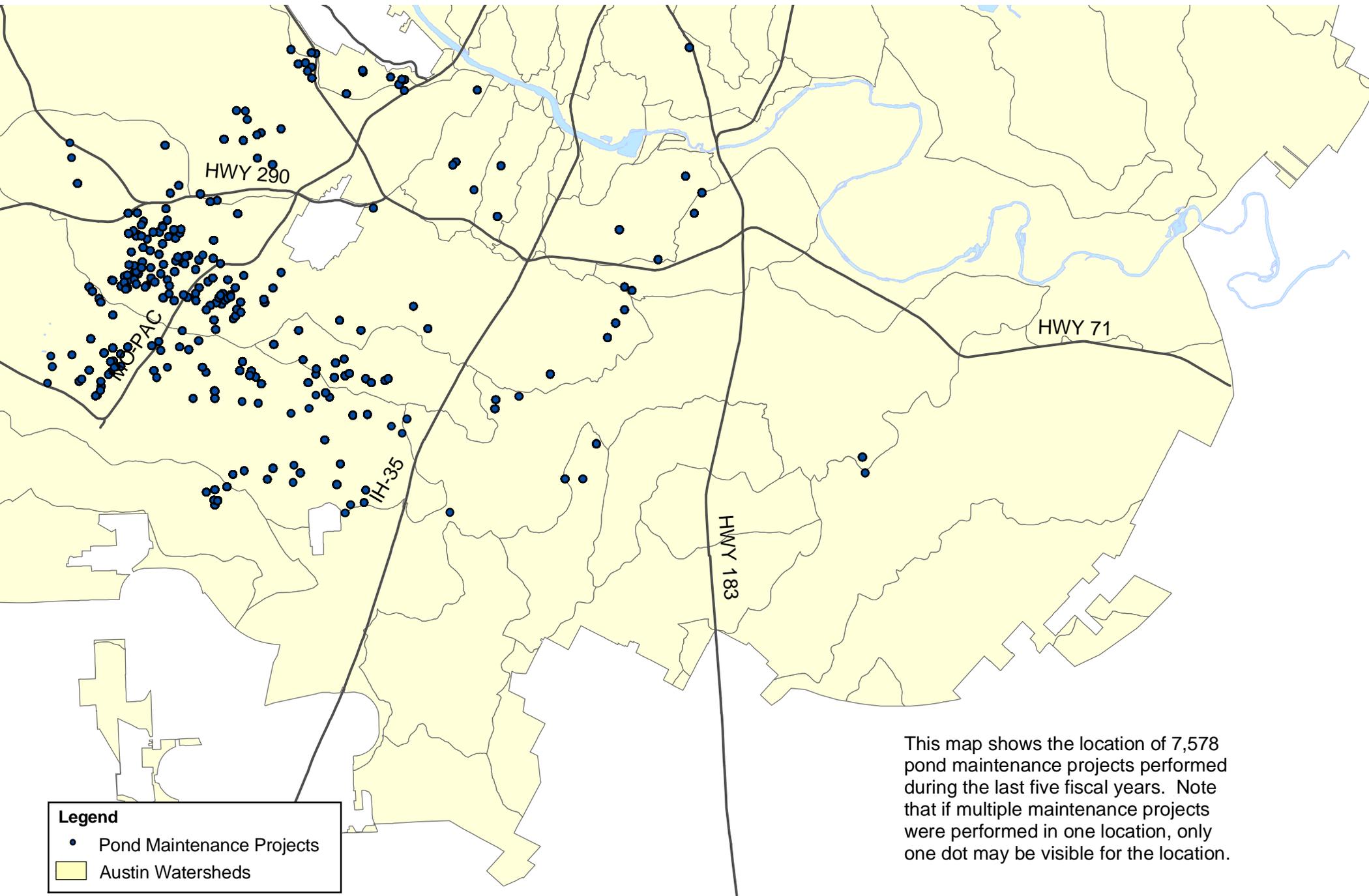
Map 3: Pond Maintenance Projects by Watershed, FY00 - FY04

Map 4: Complaint-Generated Maintenance Projects by Watershed, FY00 - FY04

Map 5: Complaint-Generated Maintenance Activity by Watershed, FY00 - FY04

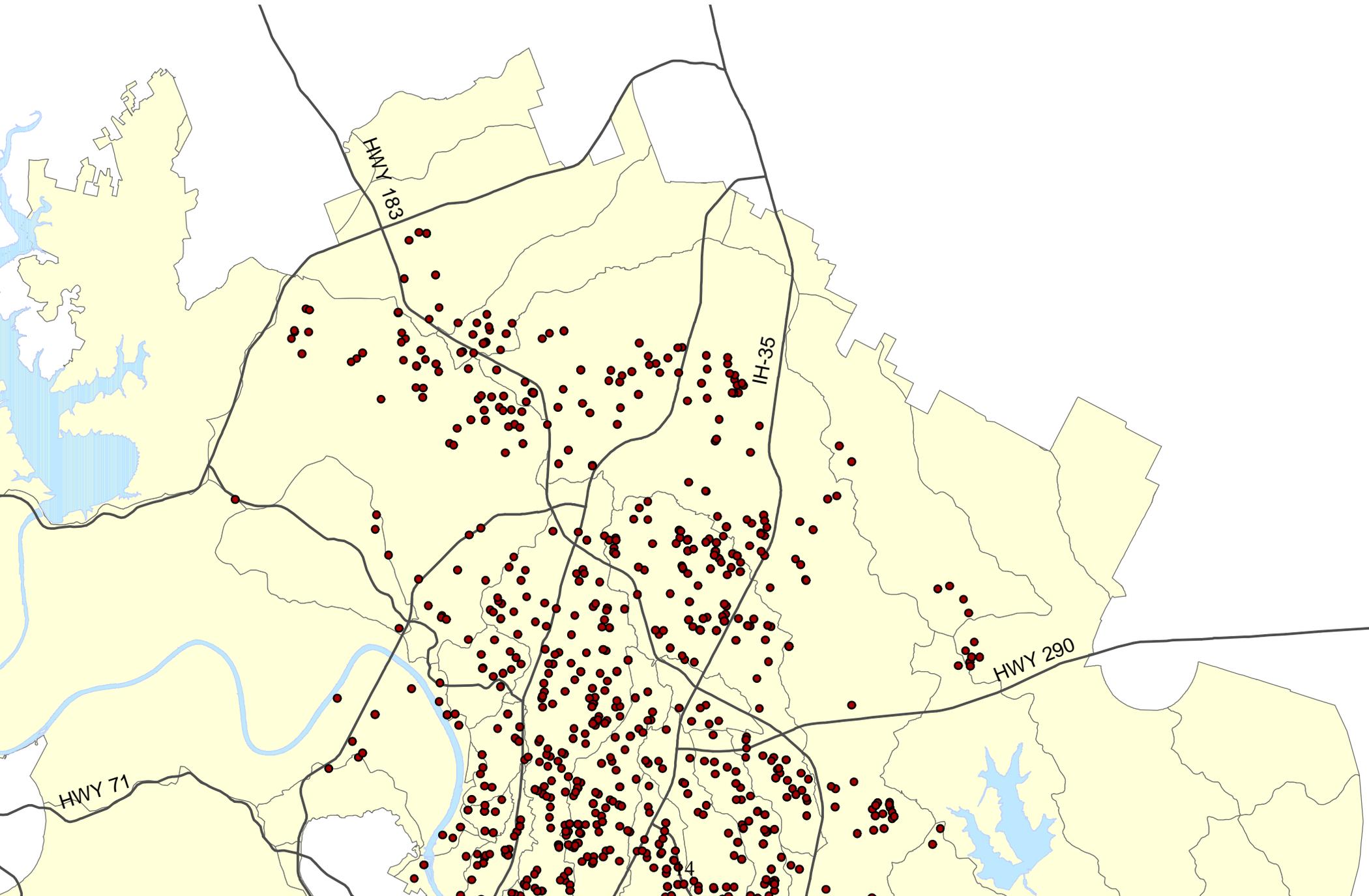
Map 3: Pond Maintenance Projects, FY00 - FY04

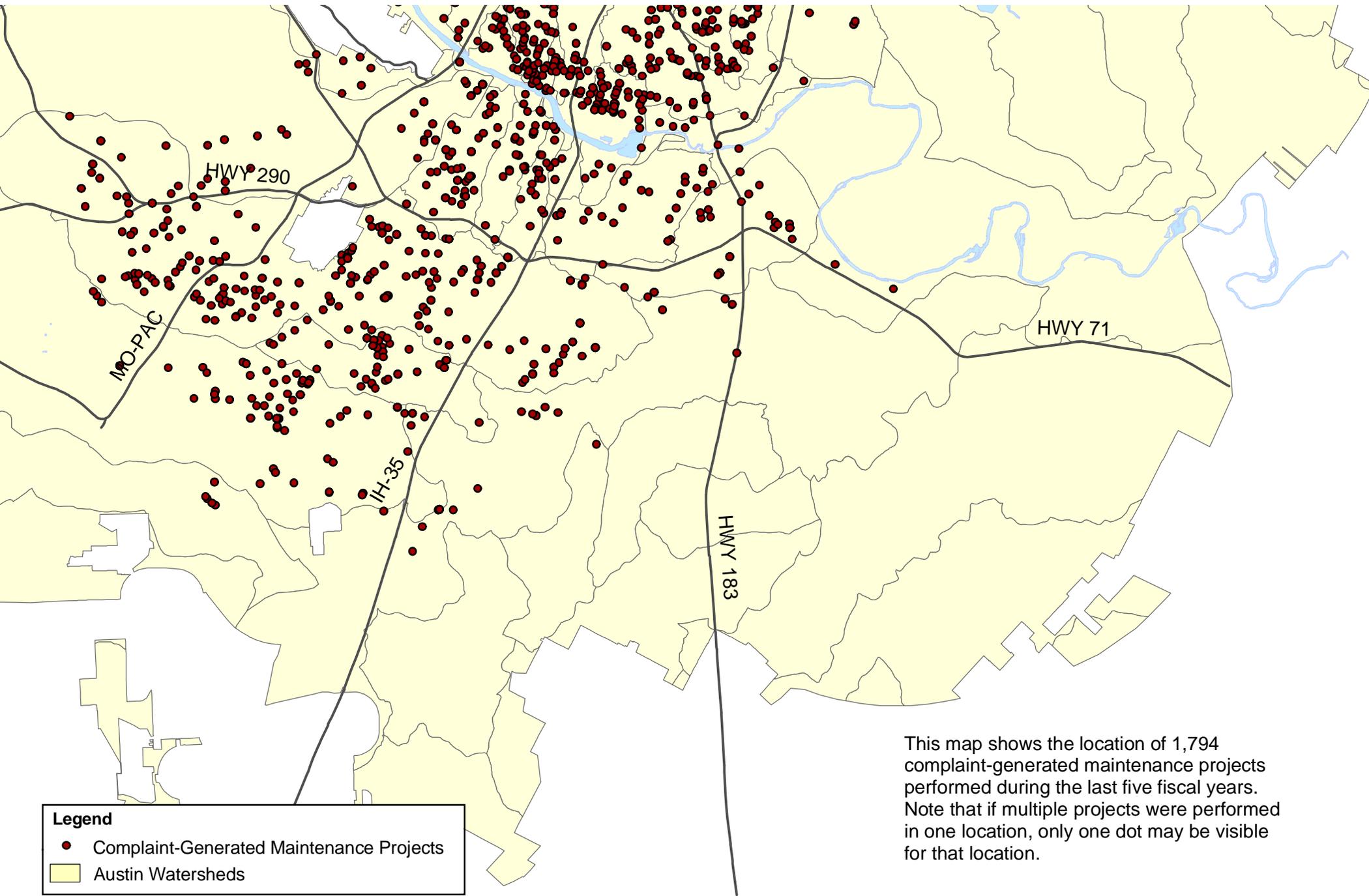




SOURCE: OCA analysis of watershed project data, FY00 - FY04

Map 4: Complaint-Generated Maintenance Projects, FY00 - FY04

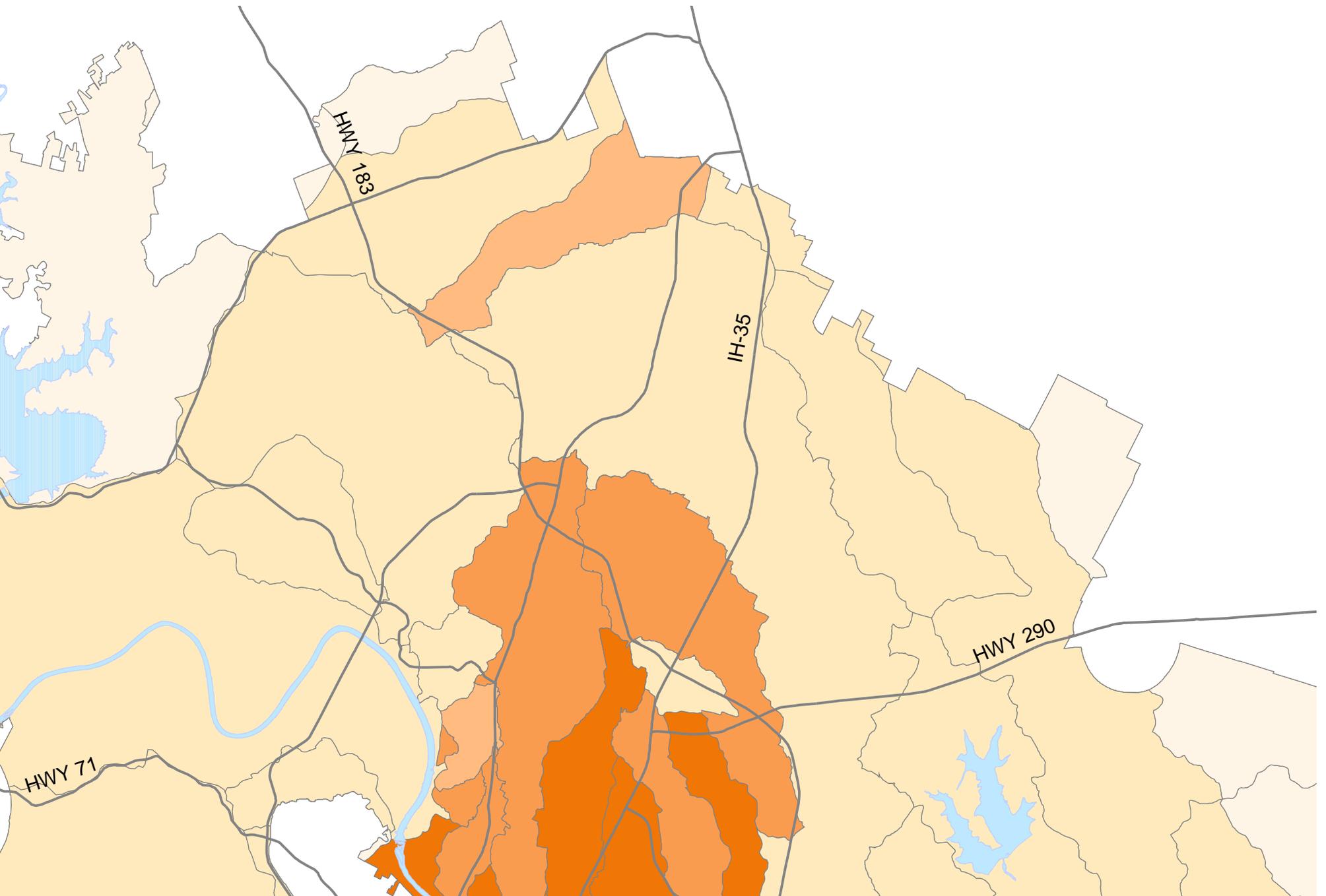


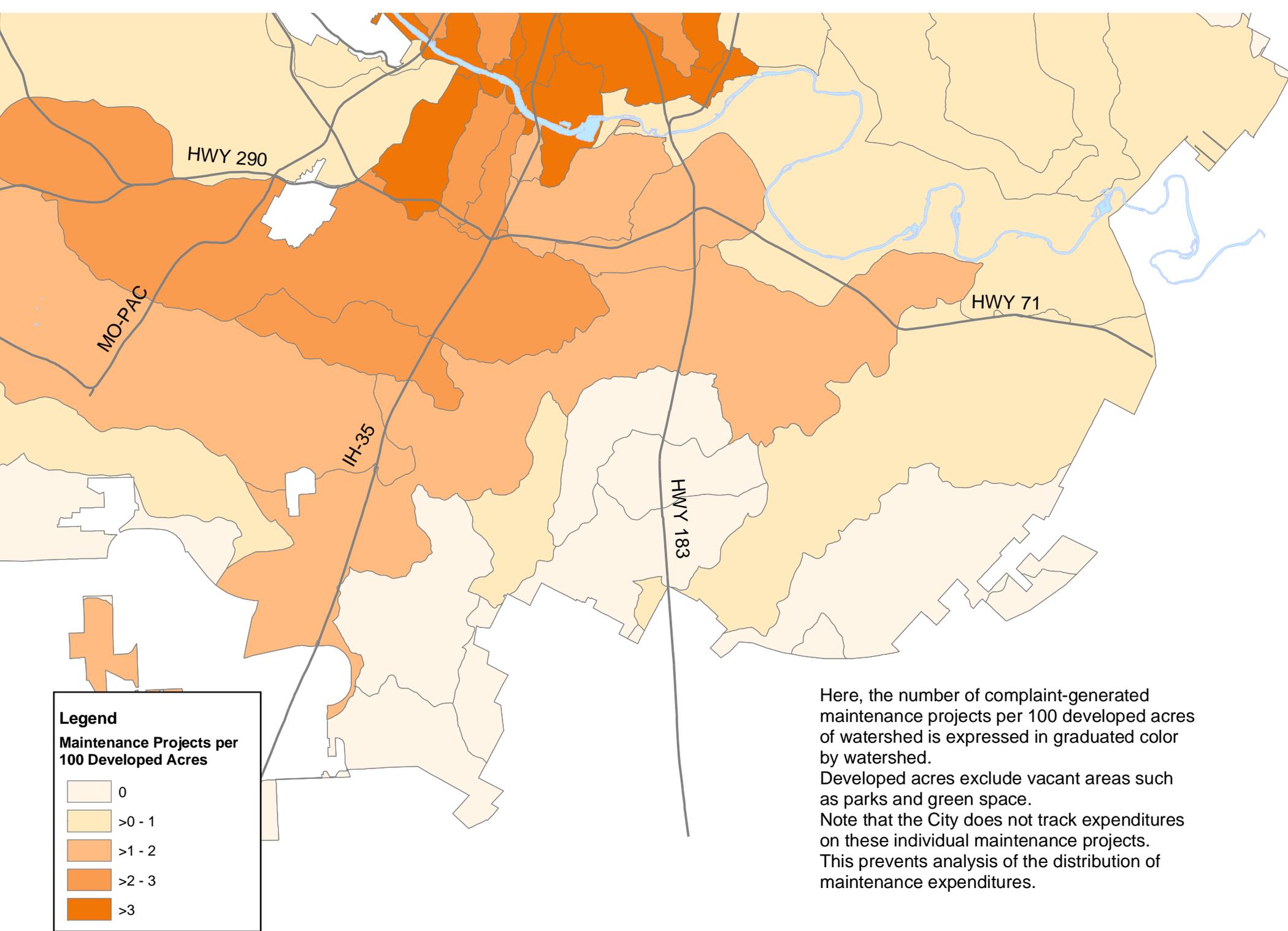


This map shows the location of 1,794 complaint-generated maintenance projects performed during the last five fiscal years. Note that if multiple projects were performed in one location, only one dot may be visible for that location.

SOURCE: OCA analysis of watershed project data, FY00 - FY04

Map 5: Complaint-Generated Maintenance Activity by Watershed, FY00 - FY04





Here, the number of complaint-generated maintenance projects per 100 developed acres of watershed is expressed in graduated color by watershed. Developed acres exclude vacant areas such as parks and green space. Note that the City does not track expenditures on these individual maintenance projects. This prevents analysis of the distribution of maintenance expenditures.

Watershed Summary

Table 2: Summary of Projects by Watershed

Map 6: City of Austin Watersheds

Summary of Construction and Maintenance Projects By Watershed

Watershed Name	CIP Count	CIP Expenditures	Maint. Count
BARTON*	5	\$ 1,333,366.07	411
BEAR	-	\$ -	97
BEE	-	\$ -	3
BLUNN*	1	\$ 66,964.01	23
BOGGY*	2	\$ 48,389.74	116
BRUSHY	-	\$ -	8
BULL*	3	\$ 3,924,311.81	917
BUTTERCUP	-	\$ -	-
BUTTERMILK*	-	\$ -	6
CARSON	2	\$ 162,576.09	98
CEDAR	-	\$ -	-
COLORADO RIVER	-	\$ -	13
COTTONMOUTH	-	\$ -	-
COUNTRY CLUB*	1	\$ 567,648.69	80
DECKER	-	\$ -	37
DRY	-	\$ -	112
EANES	1	\$ 19,988.33	124
EAST BOULDIN*	4	\$ 5,138,342.00	68
ELM	-	\$ -	2
FORT BRANCH*	6	\$ 1,554,443.12	62
GILLELAND	1	\$ 14,817.82	82
HARPERS BRANCH*	-	\$ -	5
HARRIS BRANCH	-	\$ -	56
HUCKS SLOUGH	-	\$ -	2
JOHNSON*	-	\$ -	31
LAKE	1	\$ 659,787.15	228
LAKE AUSTIN	1	\$ 155,279.99	47
LAKE TRAVIS	-	\$ -	137
LITTLE BARTON	-	\$ -	-
LITTLE BEAR	-	\$ -	-
LITTLE BEE	-	\$ -	-
LITTLE WALNUT*	9	\$ 9,446,727.63	233
LOCKWOOD	-	\$ -	-

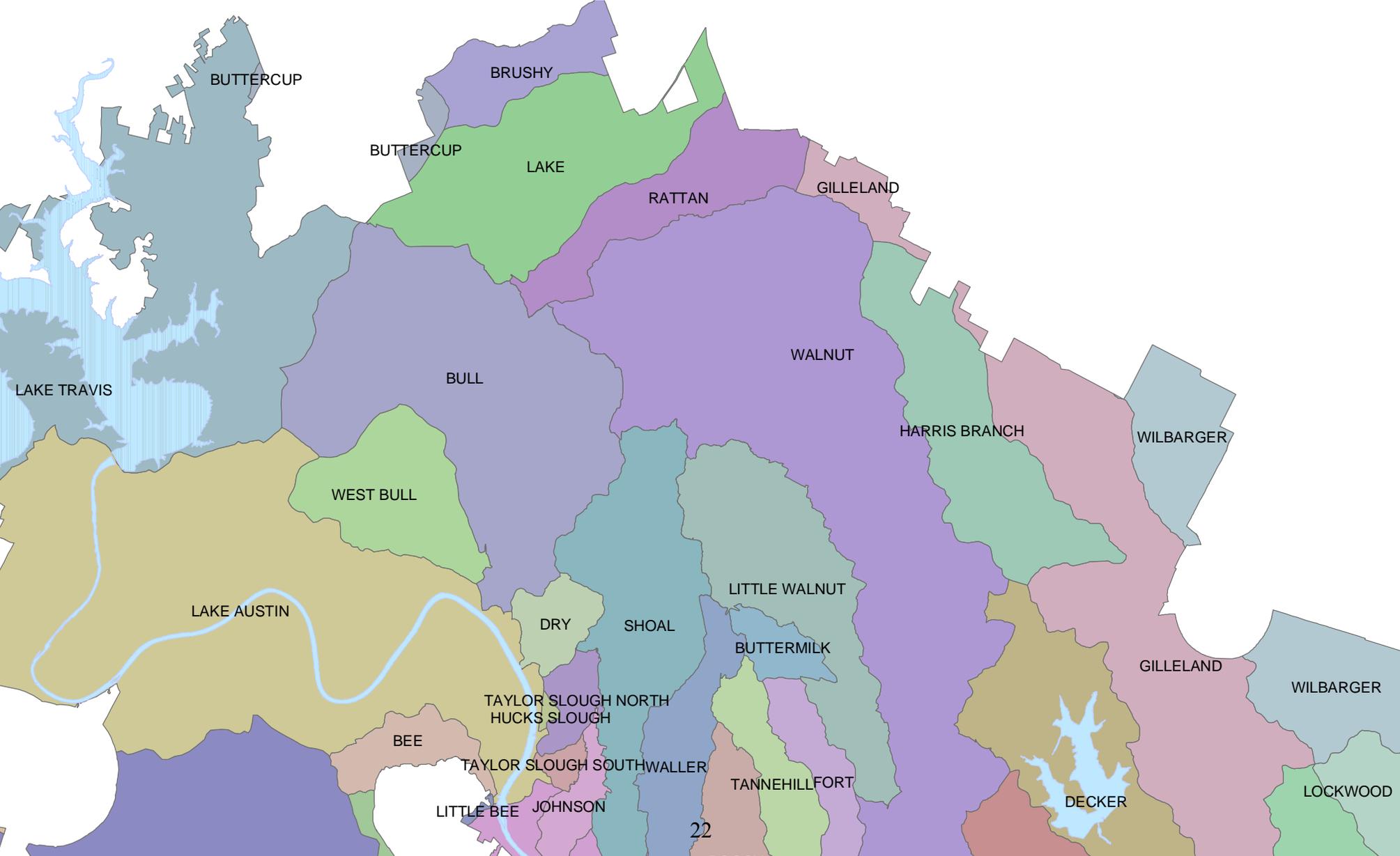
Watershed Name	CIP Count	CIP Expenditures	Maint. Count
MAHA	-	\$ -	-
MARBLE	-	\$ -	29
NORTH FORK	-	\$ -	-
ONION	4	\$ 3,231,393.54	68
RATTAN	2	\$ 44,222.57	59
RINARD	-	\$ -	-
SHOAL*	10	\$ 7,668,722.20	376
SLAUGHTER	2	\$ 237,022.96	1,178
SOUTH BOGGY	-	\$ -	323
SOUTH FORK	-	\$ -	-
TANNEHILL*	6	\$ 8,764,789.81	55
TAYLOR SLOUGH NORTH	-	\$ -	14
TAYLOR SLOUGH SOUTH	-	\$ -	10
TOWN LAKE	3	\$ 108,242.32	113
WALLER*	3	\$ 7,607,921.15	126
WALNUT*	8	\$ 18,905,466.50	625
WEST BOULDIN*	2	\$ 213,450.91	79
WEST BULL	-	\$ -	167
WILBARGER	-	\$ -	-
WILLIAMSON*	7	\$ 6,575,906.13	3,152
	84	** \$76,449,780.55	9,372

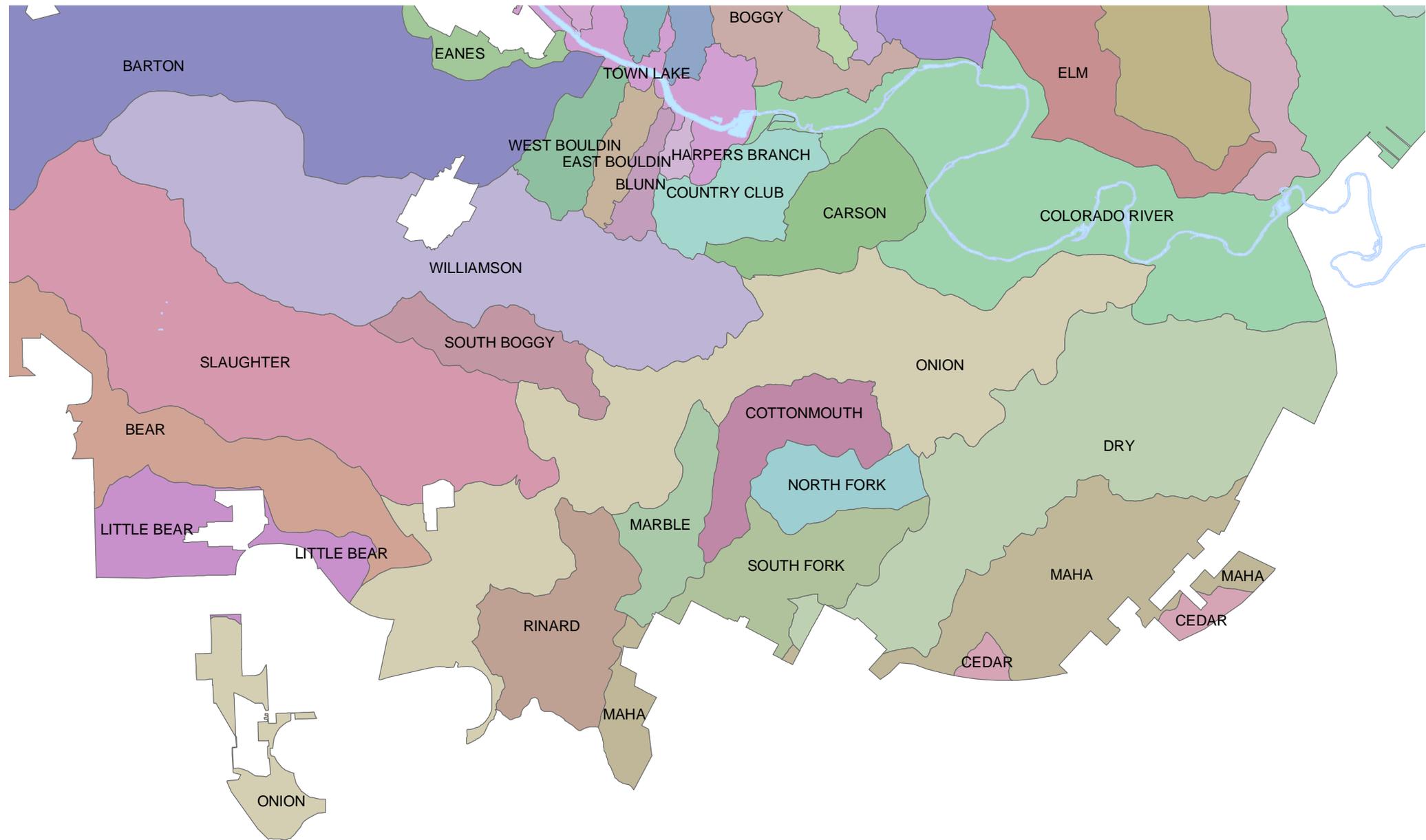
SOURCE: OCA analysis of watershed project data, FY00 - FY04

* Master Plan phase one watershed

** Four projects cross two or more watersheds and therefore are counted in more than one watershed on this table. Project expenditures for these projects were assigned to watersheds based on the area of the project falling within each watershed.

Map 6: Austin Watersheds





SOURCE: City of Austin GIS data