2018 Annual Report

Southern Sandoval County Arroyo Flood Control Authority

1041 Commercial Drive SE • Rio Rancho, NM 87124
Ph (505) 892-RAIN (7246) • Fax (505) 892-7241

May 7, 2018

The Southern Sandoval County Arroyo Flood Control Authority (SSCAFCA) is very proud to be able to provide this booklet for you and your staff – this year we have converted the material into an electronic version for your convenience. The booklet contains an update on flood control projects and initiatives that are currently the focus of our organization. This year we are also including an overview of our internal design team, which highlights benefits of being more involved in design, from capital cost savings to enhancing our understanding of how design impacts long-term operations and maintenance.

We have included a summary of all the projects that have received, or are in the process of receiving, the benefit of federal funding. We are very grateful for the federal support that has allowed these projects to move forward and we are pleased to be able to show you the progress we have made on those projects.

Finally, we have updated our strategic plan for flood control through natural arroyo preservation. In a nation with aging infrastructure that is failing faster than it is replaced and no clear answer on how best to fund it, the business model of preserving natural arroyo systems to mitigate flood impacts continues to increase in importance as a solution that does not add new infrastructure. We have consolidated the information that shows the significant advantages to this and will highlight them in this report.

I hope that you find the information in this booklet informative and useful. As always, if you would like further detail or information on any of the enclosed materials, we are available for further discussion.

Sincerely,

James Fahey, Jr., M.D.
Chairman, Board of Directors
SSCAFCA

Southern Sandoval County Arroyo Flood Control Authority

Flood Control Today - for a Safe Tomorrow

What is the Southern Sandoval County Arroyo Flood Control Authority?

The Southern Sandoval County Arroyo Flood Control Authority (SSCAFCA) is an independent corporate political body with an elected board empowered to undertake the acquisition, improvement, maintenance and operation of flood and storm water control facilities on streams and watersheds which enter, originate or cross the Authority's facilities. SSCAFCA was established in 1990 by New Mexico Statute Section 72-19-1 through 72-19-103.

THE MISSION OF SSCAFCA IS TO:

Protect citizens and property by implementing proven flood control solutions that:

- Manage our watersheds prudently for future generations
- Enhance the Quality of Life
- Create the most appealing multi-use facilities
- Set an example of quality, integrity, leadership, and professionalism
- Educate the public concerning flood hazards
- Administer public funds prudently

SSCAFCA Goals and Commitments:

GOAL #1: To provide flood protection up to the 100 year storm for the public health, safety and welfare of residents and properties within its boundaries.

GOAL #2: To recognize the value of land purchased or controlled for floodways as areas with multi-use potential.

GOAL #3: To reduce sediment and erosion within the boundaries of the flood control authority.

GOAL #4: To assist in the coordination of flood control with other entities for the common good of the public.

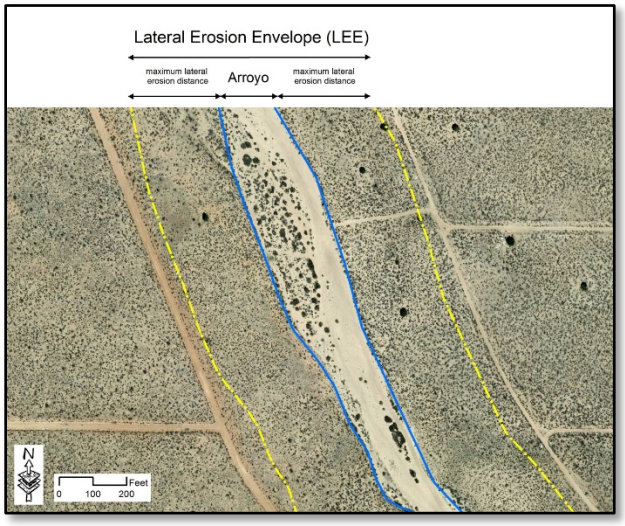
Unique Features of SSCAFCA's Jurisdiction:

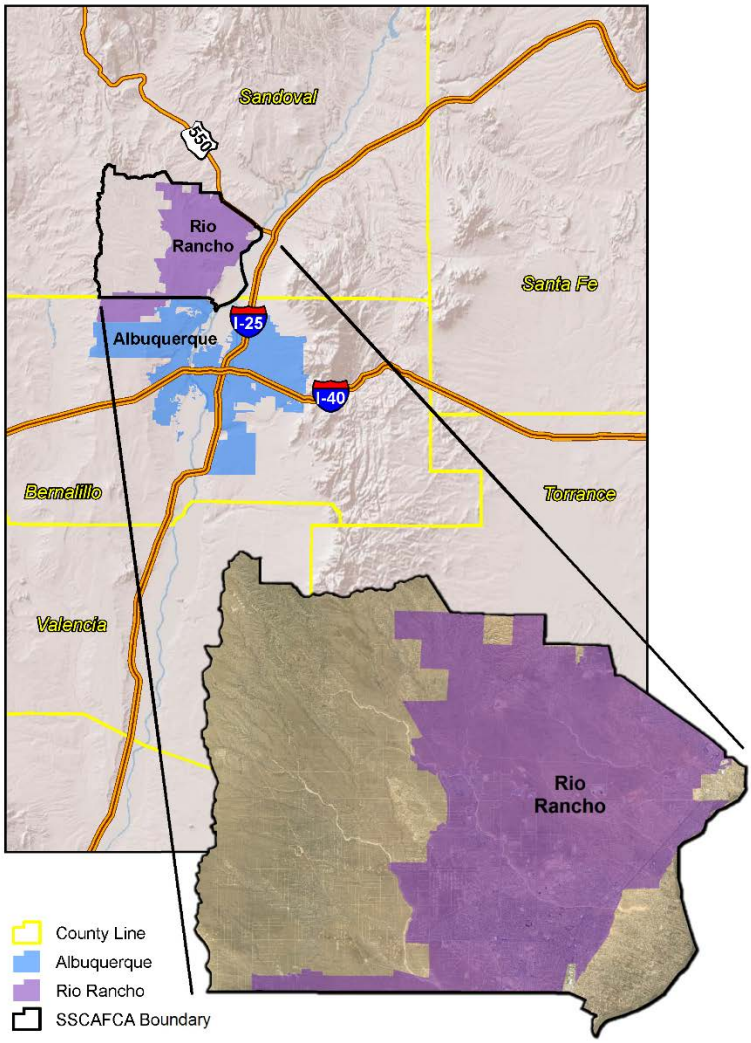
Natural Arroyo Systems

- Increased sediment and erosion
- Lateral channel movement
- Slower moving stormwater
- Improved Wildlife Habitat and corridors
- Opportunity for Multi-use facilities

SSCAFCA's has over 510,000 feet of channel in its jurisdiction and of that only 7% or approximately 33,103 feet is hard-lined channel. The majority of SSCAFCA's water conveyance systems are natural sandy sided and sandy bottom arroyos. Natural arroyos allow for infiltration of rain and snow melt into the ground with the possibility of recharging the aquifer. Another advantage of a natural arroyo is the reduced speed at which the stormwater travels down the arroyo unlike a hard lined channel. On sunny days, citizens can enjoy taking a hike in an arroyo or spend time at a multi-use facility where soccer fields reside in a dam basin. Natural arroyos provide habitat to a wide variety of species, including burrowing owls, pictured here, along with corridors for wildlife to travel.

Although the natural arroyos have many benefits for the community, storm flows will contain large amounts of sediment. The sediment can quickly clog culverts and crossing structures expanding the flooded area. Rapidly moving stormwater has undercut roads and culverts impacting infrastructure. SSCAFCA has established a Lateral Errosion Envelope (LEE Line), similar to the FEMA Erosion Hazard Area, adapted to our arid environment, to protect citizens from buidling too close to the edge of an arroyo.





SSCAFCA Location Map

See Appendix A for detailed maps of our watersheds and flood control assets. Additional information is available at our website – www.sscafca.org.

Federal Funding – Local Benefits

Report on Projects

Executive Summary:

Since 2012, the Southern Sandoval County Arroyo Flood Control Authority has completed several projects that have benefited from federal funding with additional projects that are funded and are currently in design or construction. These projects would not have been possible to complete within this timeframe without the inclusion of federal funding and we feel that it is important to let all of our federal partners know of the success that we have achieved by working together.

In order to achieve the milestones that we have accomplished so far, we have taken a strategic approach to project funding and development which has hinged on three guiding principles:

1. Be Prepared. Before we seek funding to complete a project, SSCAFCA completes a detailed plan of the project, sometimes including a full design. This includes completing a cost-benefit analysis to verify that the benefit provided by the project will exceed the cost of development.

2. Engage our Community. Whether it is ensuring we have met with local residents or working with other state and local partners to secure matching funds, we want to make sure we are proceeding with a project that is fully funded and has broad local support.

3. Be Efficient. In today's economy, we understand that every dollar, federal or otherwise, is a precious resource and we strive to ensure the funding is spent in a timely and effective manner. For the list of projects included in this report, the average time for SSCAFCA to take a project from grant award to completion is only 19.5 months, ***less than two years***. We feel this demonstrates the success of our strategic approach.

In addition to providing details of the flood control projects that SSCAFCA has successfully advanced using federal partnership, we have also provided three graphics on the following page showing where we have achieved these partnerships and, more globally, showing why it is critical to SSCAFCA that these partnerships with federal agencies continue.

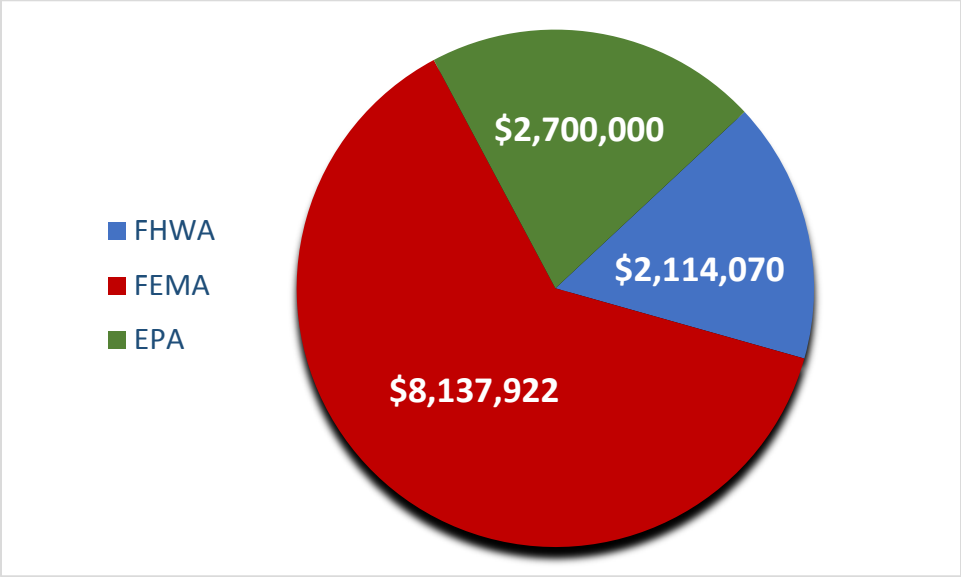
Southern Sandoval County Arroyo Flood Control Authority

Federally Funded Projects

Project Name	Federal Fund Source	Federal Share	Project Cost	Award Date	Completion Date	Project Status
Lower Montoyas Water Quality Improvements	EPA Clean Water State Revolving Fund	$2,000,000.00	$2,138,190	3/5/2013	**10/7/2015**	COMPLETE
Harvey Jones Channel Improvements	FHWA Transportation Improvement Program	$600,000.00	$1,343,330	10/9/2013	**5/22/2015**	COMPLETE
Black Arroyo Bridge & Trails, Phase 1	FHWA Transportation Alternative Program	$620,480.00	$1,115,036	8/8/2014	**4/13/2016**	COMPLETE
Alberta Road Drainage Improvements	FEMA Hazard Mitigation Grant	$1,171,445.00	$1,811,422	2/4/2015	**3/31/2017**	COMPLETE
Black Arroyo Bridge & Trails, Phase 2	FHWA Transportation Alternative Program	$351,422.00	$469,703	9/11/2015	**8/8/2017**	COMPLETE
Montoyas Bank Stabilization	FEMA Hazard Mitigation Grant	$274,538.00	$472,131	9/15/2015	**7/15/2016**	COMPLETE
Lisbon Channel Access and Trail Improvements	FHWA Transportation Alternative Program	$542,168.00	$689,501	3/1/2017	**N/A**	ACTIVE
Natural Playa Preservation	EPA Clean Water State Revolving Fund	$700,000.00	$700,000	10/11/2016	**N/A**	BIDDING
Lomitas Negras Flood Control, Phase 2	FEMA Hazard Mitigation Grant	$4,064,881.00	$5,419,841	3/15/2017	**N/A**	DESIGN
Cactus Ponds Flood Control	FEMA Pre-Disaster Mitigation	$1,405,805.17	$1,874,407	2/2/2018	**N/A**	DESIGN
Lisbon Dam & Channel Improvements	FEMA Hazard Mitigation Grant	$1,221,253.00	$1,744,648	3/1/2018	**N/A**	DESIGN

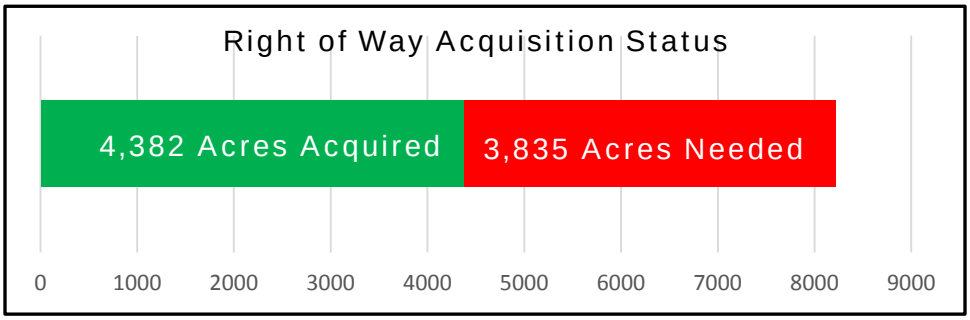
Federal Fund Portfolio (2012 – 2018)*

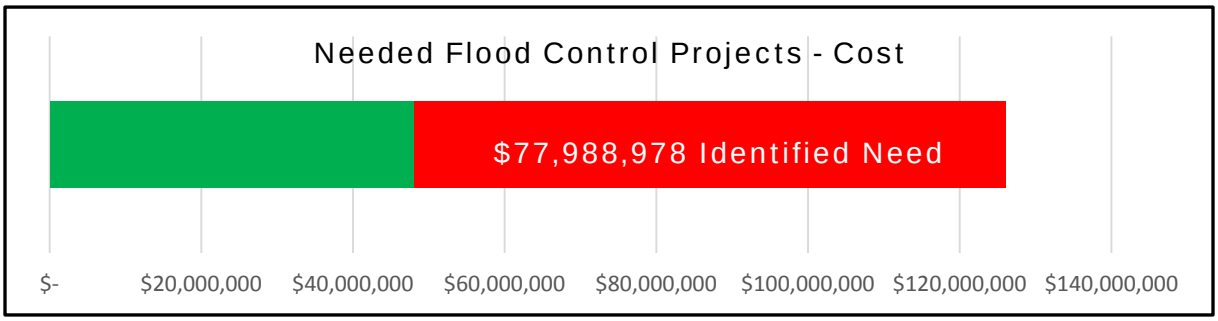
**Includes recently awarded projects*



The following charts identify SSCAFCA's current status in terms of acquiring both the property needed for our projects and completing all of the flood control projects that we have identified as critical to ensure protection of the citizens, property and infrastructure within our jurisdiction.

At an average cost of $10,000 per acre, the right of way needs currently total almost $40 million by itself, and combined with the funding needed for flood control projects, our total fiscal need for the next 15-20 years exceeds $115 million, far beyond the limited bonding capacity authorized by law for our agency, which currently only generates approximately $2 million annually for capital projects.





Flood Protection Through Right of Way (ROW) Acquisition – A Lesson from Hurricane Harvey

Executive Summary:

Hurricane Harvey is tied with Hurricane Katrina as the costliest tropical cyclone on record, inflicting $125 billion in damage, primarily from catastrophic rainfall-triggered flooding in the Houston area. In a four-day period, many areas received more than 40 inches (1,000 mm) of rain as the system slowly meandered over eastern Texas and adjacent waters, causing unprecedented flooding. With peak accumulations of 60.58 in (1,539 mm), Harvey was the wettest tropical cyclone on record in the United States. The resulting floods inundated hundreds of thousands of homes, displaced more than 30,000 people, and prompted more than 17,000 rescues. Sixty eight (68) deaths were directly caused by Harvey.

--Wikipedia

The City of Houston was overwhelmed by the storm despite being very well prepared for major flooding, including comprehensive flood protection infrastructure built and operated by the Harris County Flood Control District and the U.S. Army Corps of Engineers. This raises the question of how much flood control is enough? With the effects of climate change increasing the intensity of storm events, how can we predict future storm intensity reliably?

Figure 1 - The City of Houston Before and After Harvey.

We believe that a better answer is to avoid placing people and infrastructure at risk in the first place.

An Ounce of Prevention is Worth a Pound of Cure

As noted in the Pre-Disaster Mitigation Program Information post on the Federal Emergency Management Agency website, "*The goal is to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on Federal funding in future disasters.*"

Further, in the Natural Hazard Mitigation Saves: 2017 Interim Report, published by the National Institute of Building Sciences, the study, "*found that society saves $7 for every $1 spent through mitigation grants funded through select federal agencies*" in the category of riverine flood events, as shown in the table pulled from the report below.

Mitigation Category	Cost	Benefit	BCR
Riverine Flood	$11.51	$82.00	7:1
Wind	$13.60	$70.00	5:1
Earthquake	$2.20	$5.70	3:1
Wildland-Urban Interface Fire	$0.06	$0.17	3:1
Total for federal grants	**$27.40**	**$157.90**	**6:1**

Table 2. Costs and benefits associated with 23 years of federal grants (in $ billions).

Figure 2 - Table showing cost effectiveness of pre-disaster mitigation.

Fundamental Conflict – Flood Protection vs. Development

In the days following the hurricane, investigations were undertaken by dozens of entities, including the the Houston Chronicle, which published a series of news stories, detailed here: https://www.houstonchronicle.com/local/hc-investigations/harvey/developingstorm/

One of the key discoveries in this investigation was that both Harris County and the City of Houston allowed 20,000 parcels worth $13.5 billon to be developed within the floodplain or adjacent to it. This discovery is detailed here: https://www.houstonchronicle.com/news/houston-texas/houston/article/What-s-in-a-floodway-In-Houston-20-000-12409821.php

As noted in this article,

"*Two months after Hurricane Harvey, the city of Houston spent $10.7 million to get nearly 60 damaged houses out of the flood plain. A week later, developers went to City Hall, asking to build 900 new houses in it.*

Meritage Homes, one of the nation's largest homebuilders, proposed a 151-acre development at the former Pine Crest Golf Course in northwest Houston, 2 miles east of Addicks Reservoir. It's on Brickhouse Gully, where city and county officials had already bought out more than 30 homes to reduce flooding before Harvey. They are in the process of buying 15 more."

Figure 3 - Water from Addicks Reservoir flows into neighborhoods as floodwaters from Hurricane Harvey rise.

At the heart of the problem is a fundament conflict between local jurisdictions and flood control: economic development. It is a basic fact that local jurisdictions and counties receive economic benefit from the proper development of vacant land into prosperous businesses and active communities. This places the planning and zoning bodies of these communities in potential conflict with flood control when currently vacant property that is located within a floodplain or floodway is proposed for development.

Acquisition of ROW as a Flood Control Solution

Southern Sandoval County doesn't have to be the next Harvey. As a flood control agency, although our funding is provided through property taxes, our mandate is clear: protect life and property from the devastating impacts of flooding. The following picture series describes the proposed process.

The figure to the left shows a typical one-mile reach of the Calabacillas arroyo. As shown, the arroyo is currently in a natural state and there is no development encroaching on the arroyo. However, when active, this arroyo can experience up to 11,000 cubic feet per second (CFS) of flow in the 100-year storm event.

Figure 4 - A typical one mile reach of the Calabacillas Arroyo.

In this next figure, the local platting has been added, along with current property ownership by SSCAFCA, shown in green. As noted, although SSCAFCA controls the arroyo, we have no ownership of property immediately adjacent to the arroyo. Furthermore, SSCAFCA has no zoning or enforcement authority over ROW – this is controlled by the local municipality and Sandoval County.

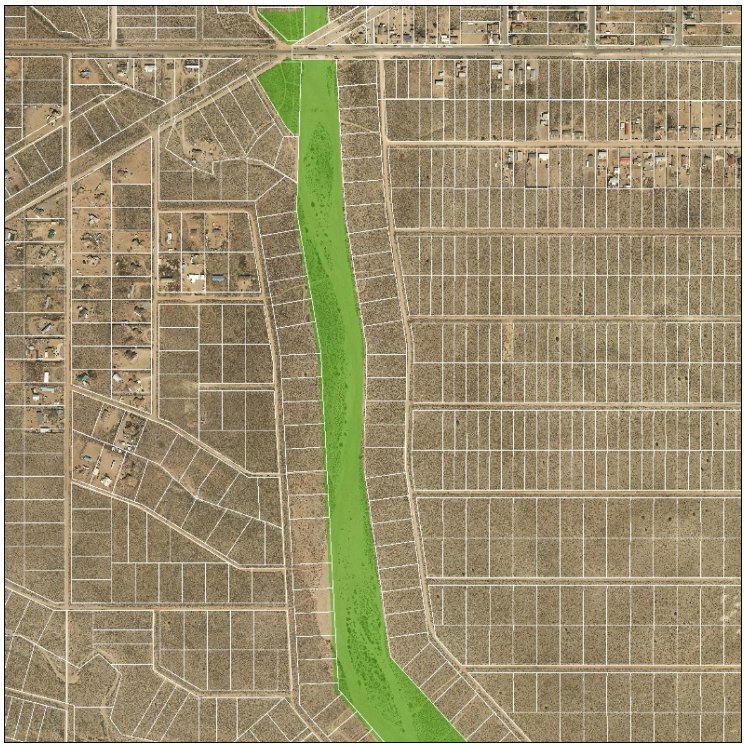
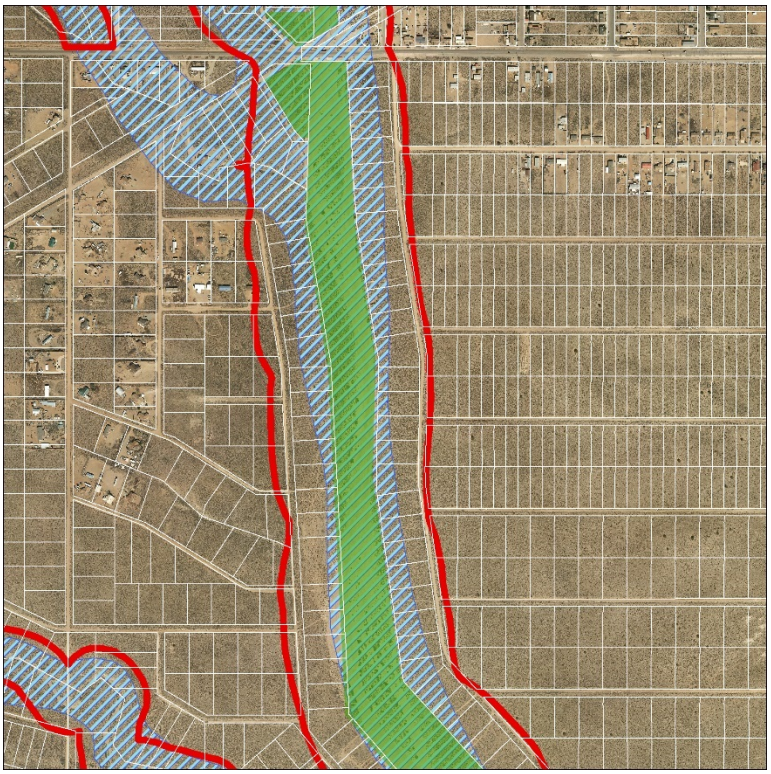


Figure 5 - Current Right of Way Platting and SSCAFCA Property.



In this final figure, the 1% FEMA Floodplain has been added, the blue hatched area, along with the boundaries of the LEE, which defines have far the arroyo may meander naturally over time. The adjacent property is clearly impacted by the floodplain and 100% contained with the boundaries of the LEE line. Any development within this area will require flood mitigation.

Figure 6 - Overlay of FEMA Floodplain (blue hatching) and Lateral Erosion Envelope (LEE).

Cost Comparison

Below is a simple table comparing the cost of acquiring all of the property within the LEE line against completing hardened bank stabilization of both arroyo banks. Both comparisons will cover the identical stretch of arroyo, one mile in length. The property acquisition will conservatively consider acquisition of all parcels shown within the boundaries of the LEE line. The bank stabilization will be estimated as a reinforced shotcrete embankment, similar to our existing Montoyas Bank stabilization Project. As shown below, there is a huge cost savings achieved by removing the impacted property from development and future needed bank stabilization.

Cost Comparison				
Arroyo Buffer Preservation vs. Constructed Bank Protection				
Flood Mitigation Technique	Quantity	Units	Cost/Unit	Total Cost
ROW Acquisition	49.6	Acre	$10,000	$496,000
Bank stabilization	10560	Linear Foot	$472	$4,984,320

An overview of the SSCAFCA jurisdiction shows that if we act soon, over 62 miles of arroyo can be protected using this strategy – a cost savings of $278,275,840 in bank stabilization alone!

SSCAFCA Design Services

Executive Summary:

Beginning in 2012, SSCAFCA began the development of an internal design group, with the goal of completing design and construction support services using staff resources instead of third party private engineering consultants. Taking a deliberate approach, we acquired the correct staff and began our design team conservatively, with small projects such as parking lots incorporating Low Impact Design (LID) techniques to minimize runoff. From those humble beginnings we have successfully created a **full service design team** including: Permitting; Hydrology & Hydraulics Modelling; Civil Design; Civil Drafting, and Construction Observation. Our most recent design efforts include the Rainbow Pond and Channel Improvements Project, with a construction cost of $1.47 million, highlighted in this report.

Role of Consultants

Historically, the need for third party consultants is driven by one of two needs by the funding agency: Either the funding agency does not have the time to complete the work internally, or the funding agency does not have the expertise. In these cases, it is not only acceptable, but desirable to use a third-party consultant to complete the work. The use of consultants has proliferated in recent years, as both public and private agencies have pursued out-sourcing of key design skill sets. However, we believe that this is not the correct course of action for SSCAFCA, a flood control agency. Our core function is the construction and maintenance of flood control assets. If you read any guidance on out-sourcing, the one principle that is present throughout remains, "Do not out-source your core functions".

It is important to understand that the addition of an internal design team does not preclude the use of third party consulting services. In fact, we have found that using a blended approach gives the greatest combination of benefits to SSCAFCA, the funding Agencies and our constituents.

Achievements

- We have completed full design and construction phase services on seven separate projects over the past five and a half years, with a total construction cost of approximately $3.0 million.
- We have completed designs for numerous small repairs and improvements, avoiding tens of thousands of design fees.
- We have effectively used Value Engineering, saving over $1.6 million in construction costs on the listed projects.
- We have published three peer-reviewed articles in the Journal of Hydrologic Engineering

ANDRÉS SANCHEZ/DESIGN SERVICES DIRECTOR

Mr. Sanchez is a licensed professional engineer with over 11 years of experience in the field of civil engineering and water resources in the public and private sector. His work primarily involves hydraulic modeling and design solutions for ephemeral watercourses, floodplain analysis & delineation, scour mitigation in highly erosive environments, and the planning & design development of water resources-related engineering solutions. In addition, Mr. Sanchez is involved in the management of construction projects.

Education:

BS - Civil Engineering, New Mexico State University

Registration:

Professional Engineer, NM, License No.: 20363

Certified Floodplain Manager - License No.: NM-12-00319

Notable Projects

Design Engineer, Montoyas Bank Stabilization Project– This project included 1000 feet of arroyo bank stabilization. The project elements included: floodplain analysis and coordination with local floodplain administrator, hydraulic modelling, scour analysis and construction-related services.

Design Engineer, Bosque de Bernalillo Water Quality Project – This project implements several Low Impact Development and Green Infrastructure elements to provide passive water treatment to clean storm water before it reaches the Rio Grande in addition to 1400 linear feet of arroyo improvements.

Design Engineer, Rainbow Pond & Downstream Channel Project – This project includes construction of a flood control detention pond, outlet works, downstream channel and concrete box culverts to attenuate flood waters. The project elements included: floodplain analysis and coordination with local floodplain administrator, hydraulic modelling, scour analysis and construction-related services.

Design Engineer, Corrales Heights Maintenance Road Extension and 4-to-1 Trail Improvements – Completion of a maintenance road/pedestrian trail extension and storm drainage improvements. Project elements included 330 feet of sediment retaining wall, 3 separate storm drain inlet improvements, and approximately 400 linear feet of asphalt pavement.

KATHERINE FOURNIER/DRAFTER & DESIGNER

Ms. Fournier has over 39 years of experience in drafting and design for civil engineering and survey companies. She has experience with AutoCAD Civil 3D and ESRI ArcMap. Ms. Fournier has done work for BIA, NMDOT, ADOT, COE, multiple municipalities and private developers. She has prepared ALTA surveys, subdivision plats, improvement district plans, watershed management plans, major road improvements and subdivision development plans. Ms. Fournier has experience using hydrology software and designing geodatabases for drainage and mapping projects.

Education:

AA – Technical Drawing, Mesa Community College
AutoCAD Certified

Notable Projects

Drafting & Design, Bosque de Bernalillo Water Quality Project – This project implements several Low Impact Development and Green Infrastructure elements to provide passive water treatment to clean storm water before it reaches the Rio Grande in addition to 1400 linear feet of arroyo improvements.

Drafting & Design, Rainbow Pond & Downstream Channel Project – This project includes construction of a flood control detention pond, outlet works, downstream channel and concrete box culverts to attenuate flood waters.

GERHARD SCHOENER/ SENIOR HYDROLOGIST

Gerhard Schoener has more than 10 years of experience in building and calibrating regional hydrologic models used for floodplain delineation and infrastructure planning and design. He established and maintains an extensive rain and flow monitoring network with real-time reporting and early warning capabilities. He conducts research to advance our understanding of watershed processes, including infiltration, surface/groundwater interactions, and the role of urban imperviousness on stormwater runoff. Mr. Schoener is pursuing a Ph.D. in Water Resources Engineering at the University of New Mexico.

Education

BS – Forestry, Georg-August-University Göttingen, Germany

MWR – Master of Water Resources University of New Mexico

Journal Articles

Schoener, G. (2017). Urban Runoff in the US Southwest: Importance of Impervious Surfaces for Small-Storm Hydrology. J. Hydrol. Eng., 23(2).

Schoener, G. (2017). Time-Lapse Photography: Low-Cost, Low-Tech Alternative for Monitoring Flow Depth. J. Hydrol. Eng., 23(2).

Schoener G. (2016). Quantifying Transmission Losses in a New Mexico Ephemeral Stream: A Losing Proposition. J. Hydrol. Eng., 22(3).

Technical Reports

Interim Calabacillas Watershed Park Management Plan. Southern Sandoval County Arroyo Flood Control Authority, Rio Rancho, NM, 2015.

Flood Risk Analysis: Potential Impacts of Climate Change on the Upper Calabacillas Arroyo. Southern Sandoval County Arroyo Flood Control Authority, Rio Rancho, NM, 2014.

Willow Creek Watershed Park Management Plan. Southern Sandoval County Arroyo Flood Control Authority, Rio Rancho, NM, 2013.

Unnamed Arroyo Watershed Management Plan. Southern Sandoval County Arroyo Flood Control Authority, Rio Rancho, NM, 2009.

JUNKO BOAT, PE, CFM/DRAINAGE ENGINEER

Junko Boat is a drainage engineer with 9 years of experience in the water resources field. Her expertise includes hydrologic and hydraulic analyses of river system and stormwater compliance. She also reviews drainage reports and grading & drainage plans for development within SSCAFCA jurisdiction.

Registration:

Professional Engineer, NM, License No.: 24552

Certified Floodplain Manager – NM-11-00284

Education:

BS – Civil Engineering, University of New Mexico

BA – Philosophy, Ritsumeikan Univeristy, Japan

Notable Projects

Rainbow Pond and Downstream Channel - Rio Rancho, NM - Provided pond design, culvert sizing of the roadway crossings of the downstream channel, hydraulic analyses of the downstream channel, scour computation, and technical report.

As a Graduate Engineer for URS Corporation (now known as AECOM), from 2008 – 2014 projects included:

- Production and update of Flood Insurance Rate Maps and Flood Insurance Study update for the National Flood Insurance Program within FEMA Region 6.
- Floodplain creation for the Navajo Housing Authority
- Hydraulic modeling of the Souris River for USACE.
- Assisted with dam breach inundation study for multiple dams in New Mexico.

DAVID GATTERMAN, PE / ENVIRONMENTAL SERVICES DIRECTOR

David Gatterman has more than 20 years of experience in project management, grant funding management and regulatory compliance. His current duties with SSCAFCA consist of capital project management, compliance with environmental laws and regulations, development of benefit cost analysis models for FEMA projects, and managing SSCAFCA's MS4 NPDES. Previously, he was the Bureau Chief of Design and Development at New Mexico State Parks, where he administered the capital outlay program for the State Parks system.

Education:

BS Civil Engineering, University of New Mexico

Registration:

Professional Engineer, NM, License No.: 14920
FEMA Certified - Benefit Cost Analysis Tool (IS-00276)
Unified Hazard Mitigation Assistance (E0212 – E0214)

Notable Projects

Project Manager, Lower Montoyas Water Quality Facility. This project was undertaken to apply Green Infrastructure (GI) and Low Impact Development (LID) concepts and practices to a large scale regional flood control facility. This project incorporated minimal hardened elements, water harvesting and the use of native vegetation. Project elements included Federal grant management (EPA - CWSRF) and environmental clearance.

Project Manager, Alberta Watershed Improvements, Phase 2. This project resolved chronic flooding with the construction of a detention pond, 2,800 linear feet of storm drain and 3,600 linear feet of residential road paving with drainage. Project elements included completing the Benefit Cost Analysis, Federal grant management (FEMA - HMGP) and environmental clearance.

Project Manager, Black Arroyo Trail, Phase 1 and 2. The Black Arroyo Pedestrian Bridge & Trail network provides children with safe access across the arroyo to Maggie Cordova Elementary School and multi-modal alternatives. Project consisted of 1.2 miles of trail system, 2 single span bridges and a grade control structure. Project elements included Federal grant management (FHWA - TAP) and environmental clearance.

Project Manager, Harvey Jones Channel Improvements. SSCAFCA completed improvements to the Harvey Jones Channel to increase the channel capacity underneath NM 448 consisting of modifying the existing channel to add a trapezoidal cross-section to increase positive grade. Project elements included Federal grant management (FHWA - TIP) and environmental clearance.

Project Manager, Lomitas Negras Water Quality Facility, Phase 1 and 2. The purpose of this project is to provide storm water flow attenuation, permanent facility protection, additional sediment removal and adequate armoring of the arroyo banks. Project elements included completing the Benefit Cost Analysis, Federal grant management (FEMA - HMGP) and environmental clearance.

Southern Sandoval County Arroyo Flood Control Authority

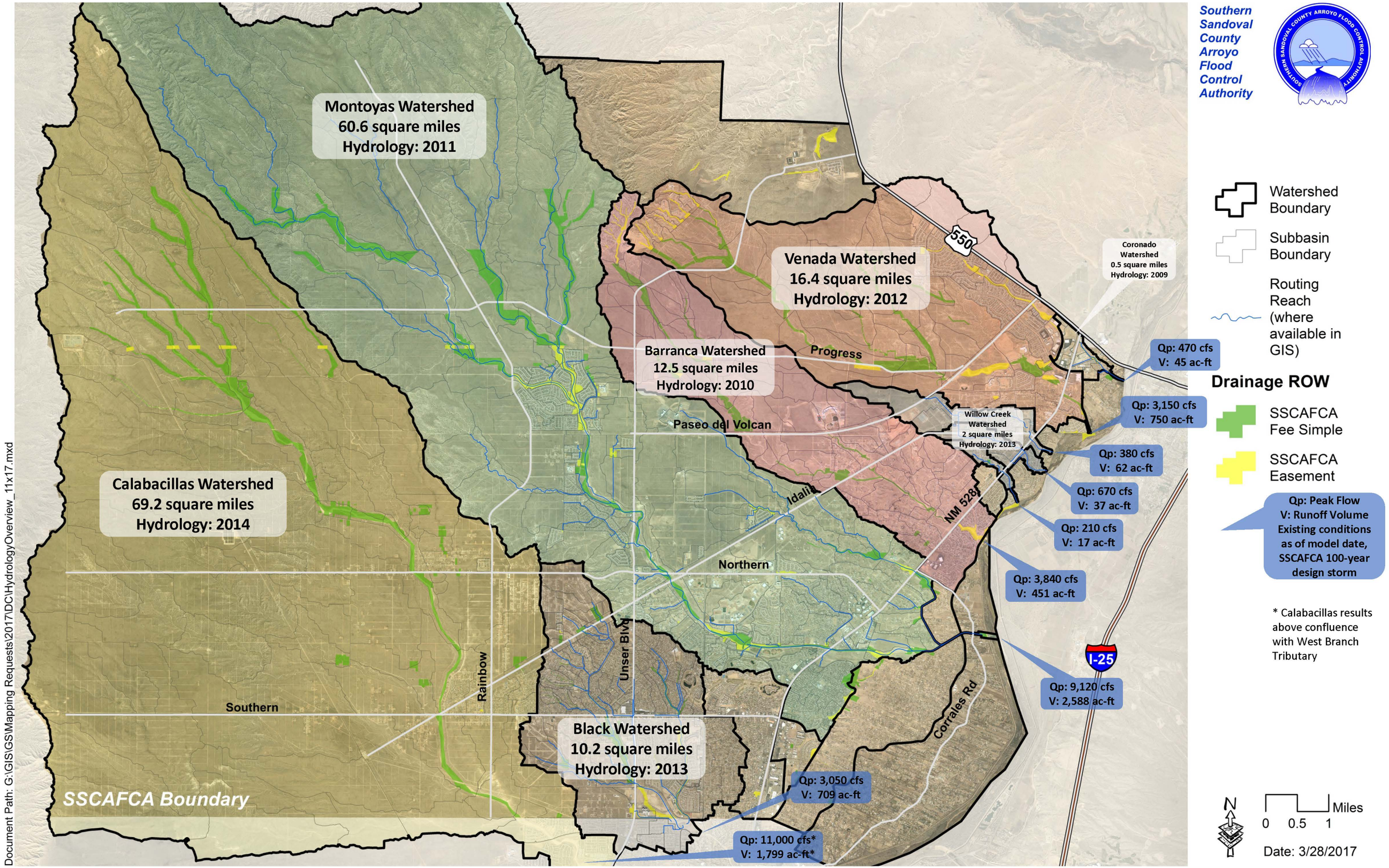
Projects Completed Using In-House Resources

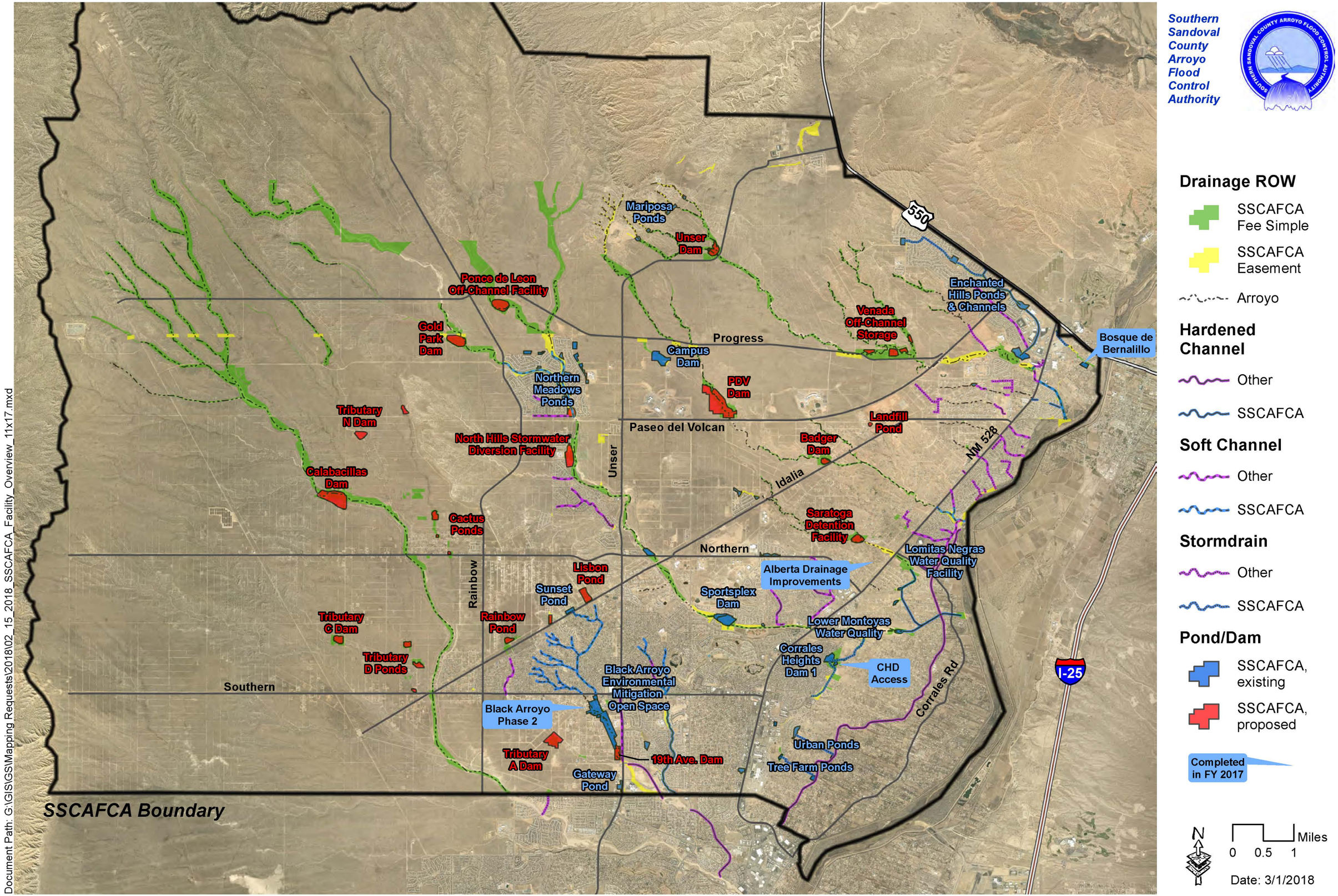
Project Name	Project Description	Project Cost	Federal Funds	Completion Date
Gateway Pond Parking Lot	Permeable surface Low Impact Development Parking Lot with Bio-Retention	$29,048.00	N/A	2/12/2013
Montoyas Bank Stabilization	1,000 linear feet of reinforced shotcrete bank stabilization and off-site drainage control.	$472,131.00	$274,538.00	7/15/2016
Dam 4 to 1 Trail Drainage Improvements	Maintenance road/pedestrian trail improvements including 330 feet of sediment retaining wall and 3 separate storm drain inlet improvements	$124,421.00	N/A	4/21/2015
Corrales Heights Dam Access Improvements	Maintenance road/pedestrian trail extension and storm drainage improvements.	$78,486.00	N/A	11/21/2017
Bosque de Bernalillo	1400 linear feet of arroyo improvements in addition to Low Impact Development and Green Infrastructure elements to provide passive water treatment to clean storm water before it reaches the Rio Grande.	$783,252.00	N/A	6/24/2017
Rainbow Pond	Flood control detention pond, outlet works, downstream channel and concrete box culverts to attenuate flood waters	$1,477,597.00	N/A	In construction
Rain Gauge & Flow Network	Real time reporting, cellular-based, rain gauge and channel flow network.	$48,166.00	N/A	5/4/2015

Notes:

APPENDIX -A-

Hydrology of SSCAFCA





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SOUTHERN SANDOVAL COUNTY ARROYO FLOOD CONTROL AUTHORITY

1041 Commercial Drive SE

Rio Rancho, NM 87124

www.sscafca.org