

Ecosystem Services Coordinated Case Study: OKLAHOMA SMALL COMMUNITY (ADA, OKLAHOMA)

Background

EPA’s Sustainable and Healthy Communities (SHC) Research Program is working with five communities across the U.S. to develop and apply research that helps the communities solve sustainability-related environmental challenges and provides decision-support.

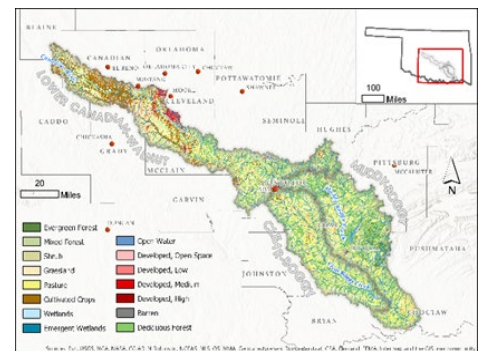
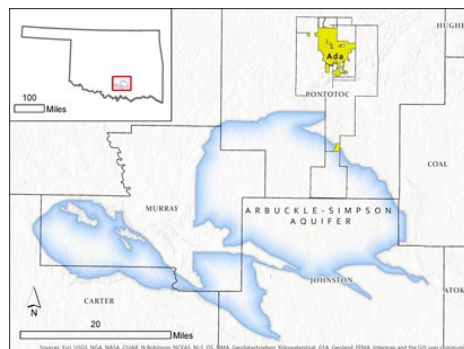
EPA researchers are developing approaches and tools for the communities that integrate ecosystem goods and services (EGS) concepts into community-level decision making, and emphasize *final* EGS since these are “the components of nature, *directly* enjoyed, consumed, or used to yield human well-being.”¹

Results of these five coordinated case studies will offer lessons learned and practical strategies that can be used in other locations and under different conditions.

Research in Oklahoma small communities, the setting of one of the case studies, is working with stakeholders to develop resilience and sustainability plans within communities, with a focus on connections to benefits for human health and well-being.

Issue

In the southern plains region of the U.S., many rural communities rely on and utilize EGS every day to sustain



Left: Map showing the City of Ada Watersheds Land Use – Land Cover 2011. *Right:* Map showing the Arbuckle-Simpson Aquifer in relation to the City of Ada City. *Source:* USGS National Land Cover Database.

and better their communities. Some of these communities rely on ground water sources as a significant source of municipal water supply. Others with little to no access to ground water sources choose to incorporate impoundments of varying sizes to not only provide source water, but to improve numerous EGS such as flood control, recreational activities, irrigation, and wildlife habitat.

There are many challenges that can impact the ability of these systems to provide the EGS that Oklahoma small communities have come to rely on. Many of these communities have developed growth and sustainability plans to increase the development potential and economic viability of the local area to attract businesses and people. This growth, while good for the community, has impacts on the surrounding area and the potential provisioning of the EGS the community relies upon.

Coupled with the frequent conditions of extended drought and interspersing flooding events, these communities have a strong need to develop and implement community sustainability and resilience approaches that seek to understand how economic growth and climatic conditions impact the provisioning of the EGS that support their community viability. As communities grow, strains on resources can increase. Often in Oklahoma small communities, these resources are shared by multiple communities that have their own sets of needs and priorities that rarely consider the needs and priorities of the other communities. This may not be a problem when resource use is far below resource provisioning, but as greater demands on these resources have increased, disagreement about the use of these resources has created concerns between communities.

Developing approaches to provision and share resources between two or more communities is rarely easy and is often contentious. These approaches involve multifaceted, multi-stakeholder planning processes to develop community sustainability and resiliency plans that address the needs and values of all the various stakeholder groups and identify the trade-offs these communities need to make to ensure their sustainable coexistence.

Project Context

This case study will focus on working with the City of Ada, Okla. and the Chickasaw Nation. Ada is trisected by three watersheds, with ~59% in the Lower Canadian-Walnut Watershed, ~37% in the Clear-Boggy Watershed, and ~4% in the Muddy-Boggy Watershed. While Ada is positioned at the bottom third of the Lower Canadian-Walnut Watershed, it is located at the headwaters of both the Clear-Boggy and Muddy-Boggy Watersheds. The Chickasaw Nation is a federally recognized Native American nation, with its headquarters located in Ada, Okla. The nation's jurisdictional territory, 7648 square miles of south-central Oklahoma, includes 13 counties and overlies the Arbuckle-Simpson Aquifer.

The sole source water supply for Ada is the Arbuckle-Simpson Aquifer, which is used as a water supply by the cities of Tishomingo, Durant, Sulphur, Mill Creek and Roff, Okla. and the Chickasaw Nation. Additionally, this aquifer supports numerous EGS as it surfaces and discharges in numerous places supporting fisheries, wildlife, and recreation.

Over time, all these communities and the Chickasaw Nation have grown and are continually looking to grow in the future, putting ever greater demands on the aquifer and forcing these cities to start looking at other options.

Project Objectives

A key objective of EPA's SHC research program is to provide decision tools to help those involved with community-based decision-making choose more sustainable policies and practices that incorporate the concerns, needs and interests of a broad and diverse range of stakeholders.

EPA's SHC program is assisting through this case study to apply decision support tools in local communities in a relatively new practice of "resiliency planning." Communities like Ada and the Chickasaw Nation that share common EGS with multiple communities need assistance in resiliency planning to address issues including changing climate, water resource planning and management, contaminated runoff, sediment impact on water impoundments and expected population increases with community development expansion.

The Oklahoma small communities case study will incorporate broad stakeholder involvement from the start of the project to help the City of Ada and the Chickasaw Nation plan for future development and address the challenges of shared resources impacted by drought and floods. The case study will work with the Oklahoma Conservation Commission, the Oklahoma Water Resources Board, the City of Ada, the Chickasaw Nation, and other stakeholders with interest in

developing these sustainability and resiliency plans.

EPA scientists will implement a structured decision-making approach using a five-step iterative decision process:

1. Understand the decision context
2. Define objectives
3. Develop options
4. Evaluate options
5. Take action

Project Impact

Lessons learned from the case study will be used to apply a management plan to ensure the long-term sustainability and resiliency for the City of Ada, The Chickasaw Nation and surrounding communities. The plan can also serve as a model for other communities with shared resources that may be facing similar sustainability and resiliency issues.

References:

1. Boyd, J.W. and S. Banzhaf. (2007). What are ecosystem services? The need for standardized environmental accounting units. *Ecological Economics*, 63:616-626.

CONTACT:

Tim Canfield
U.S. EPA, Office of Research and Development
580-436-8535 canfield.tim@epa.gov

July 2021