

# School Population Growth Solutions for Northwest Arkansas



Northwest Arkansas has experienced phenomenal population growth during the last decade. Concerns over this rapid growth presented an opportunity for a unique collaborative effort between area community leaders, academia, and local high school students. Since 1999, local high school students involved in the Environmental and Spatial Technology (EAST) initiative have worked each summer to develop a prototype, web-based decision support system to help community leaders identify, plan, and solve real-world problems in local school districts caused by the area's rapidly expanding population.



## What is CADIS?

In 1999, community leaders in Northwest Arkansas formed a summer GIS internship program for local EAST initiative students. This effort became known as the *CADIS project*, which is a partnership between higher education, participating EAST program schools, local community leaders, and the private sector. These high school students have had significant impacts on their community and have influenced GIS adoption by the local school district administration.

This project is made possible by the progressive leadership of community leaders, including the Northwest Arkansas Council, the National Association of County Engineers, Intergraph Corporation, the City of Fayetteville, the Bank of Fayetteville, Fayetteville Public Schools, and the Fayetteville Chamber of Commerce who provide an opportunity for students to apply their technical skills to create a better world for their own community.

CAST has provided geospatial training, support, and data to CADIS students since its beginning. Each year CAST staff members facilitate the CADIS students by serving as resource guides and learner facilitators. Working in CAST's facilities gives students access to state-of-the-art hardware and software.

All CADIS students were first involved in the EAST Initiative in their own local schools. EAST is the result of strong relationships between business, government, and education. Starting at one rural Arkansas high school in 1996, EAST is now found in 120 schools in Arkansas, 45 in California, 13 in Illinois, seven in Hawaii, and three in Alabama, Louisiana, and Mississippi. The EAST model has been recognized nationally as an innovative, relevant, and successful approach to education. EAST students experience an individualized, self-directed, service-oriented project-based curriculum that provides value to local schools and their communities.



## School Population Project – Year One

During a ten week period of the first summer CADIS program, four area high school students worked at CAST to develop a prototype, web-based decision support system they dubbed the Community Asset and Development Information System (CADIS).

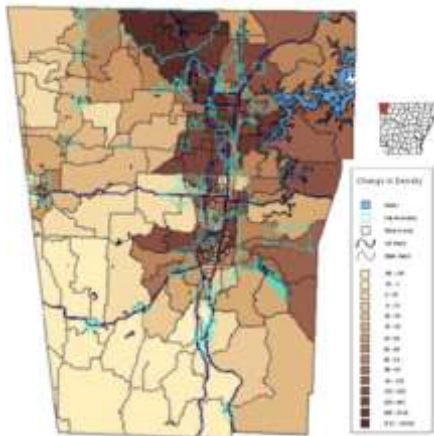
This project resulted in two web-based mapping prototypes they named, *Landfinder* and *CivicCenter*, which were developed for newcomers to Northwest Arkansas.

These projects began the process of providing the community with answers to questions such as: Where do I vote? Where is the local police station? Where will we need a new school? Where is a wetland? Is the proposed school on or near a wetland? How far do I need to go to vote? How many parks are within two miles of my home?

## Community Interest and Commitment

The success of the first CADIS project spawned interest and questions about Geographic Information System (GIS) technologies from local school administrators. Soon after witnessing the first CADIS project final presentation, they wanted to know if GIS technologies could help them with facility planning. Particularly since the local school administrators had received the regional population projections from the Northwest Arkansas Regional Planning Commission for the years 2000 to 2030. There was concern that the regional projections lacked enough *spatial resolution* to support the long term facility and infrastructure expansion plans for each of the individual school districts. The local school boards wanted to know the projected distributions of new students *within* their district and, if possible, *where* student growth clustering would occur within the districts. Some of the community leaders asked if the EAST students could help resolve this issue with GIS, and the prototype project goals for the second year of CADIS were set.

## School Population Project - Year Two



The primary goal for year two of the CADIS project was to determine, specifically, *where* the growth of the school age population in Washington and Benton county school districts might occur. This required the development of methods to model localized growth based upon the regional population projections and trends coupled with key growth suitability factors that would help dictate specifically where future growth would occur within the landscape.

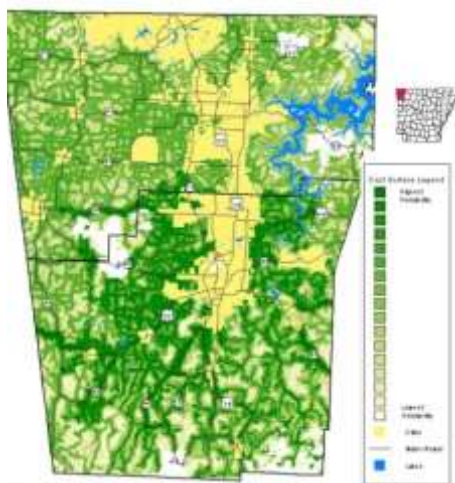
"We [were] concentrating on the growth in Student Populations to predict changes in Student attendance. This should help the School Districts stay ahead of the curve when it comes to the building of new schools, and additions to current ones," said Ryan Bruner, a CADIS student, project member.

Students computed the general population growth trends within Northwest Arkansas using the U.S. Census Bureau data from 1980, 1990 and 1999 census population projections. The CADIS team then generated a 'growth probability map' for the two-county region to demonstrate areas of relative suitability for future development. For the rural areas, the students created a development potential map that merged information on the location of roads and waterlines and the location slope and vegetation. A location near a road and waterline that was flat and pastured would have a different development potential than one far from roads and waterlines that was steep and forested. Projected new construction was distributed across the area within these different development potential areas based on previous housing location distribution. For urban areas new population was distributed both as infill and perimeter growth.

The Growth Probability Map was combined with population growth/decline trends from 1980 to 1999 in order to estimate specific future growth patterns *within* and *adjacent* to the various incorporated cities of Northwest Arkansas out to the year 2030. Growth projections were then merged with the growth probability data and final maps were produced and presented during formal presentations, done by the students, for community leaders

## What Happened Next

The success of these first two experiments with EAST students in the summer CADIS programs has fueled interest by participating EAST students and their community leaders throughout Arkansas. Similar projects have focused on community visualization and geospatial technology demonstrations. Each new project has been slightly different in focus and has typically included at least one, sometimes two returning CADIS alumni from a previous summer. This overlap in experience has aided each new CADIS effort by offering consistency and has resulted in some students traveling from distant communities to participate in the program.



**About CAST:** The Center for Advanced Spatial Technologies (CAST) focuses on education, research, and service to the public, which forms the backbone of the CAST purpose and mission. CAST specializes in serving the academic community through its emphasis on university courses in Geographic Information Systems (GIS), Global Positioning Systems (GPS), and related technologies. CAST's research efforts, through multiple grants awarded each year, compliment and greatly benefit its educational and public service focus by allowing staff and students to stay on the leading edge of emerging technologies. CAST is also active in a wide range of services to the university, community, state, nation, and internationally. By building upon the expertise of the staff; the cooperation of the university community and state, regional, and local governments; the support of corporate sponsors; the assistance of federal agencies; and many others, CAST can blend its focus on education, research, and public service to multiply the benefits of all these cooperative efforts.