

Open Space Proximity and Land Values

Alachua County, Florida

Introduction

The Trust for Public Land, working with the Alachua County Parks Department, asked Cape Ann Economics to explore the impact of proximity to parks and open space on land values in the county.

This was done by performing regression analysis on real estate sales. The Alachua County Property Appraiser's office maintains extensive databases on all parcels in the county, including land use, buildings on the parcel, and data on sales. This database includes the basic information necessary to predict sales price - the size and type of any buildings, the age of the buildings, heating and air conditioning status, and the number of bedrooms and bathrooms.

To this database, additional information has been appended:

- The parcel's census block location gives us data about the population density and average income in the neighborhood in which the parcel is located
- We calculated each parcel's distance to the central business district in downtown Gainesville
- Using GIS map layers for parks, open space, and natural water (lakes, rivers, and creeks), we determined whether parcels were close to water or to open space.

Combining these elements, we successfully estimated regression equations with high predictive power, relating parcel sales prices to parcel size, building size, building age, distance from downtown, proximity to water, and proximity to open space.

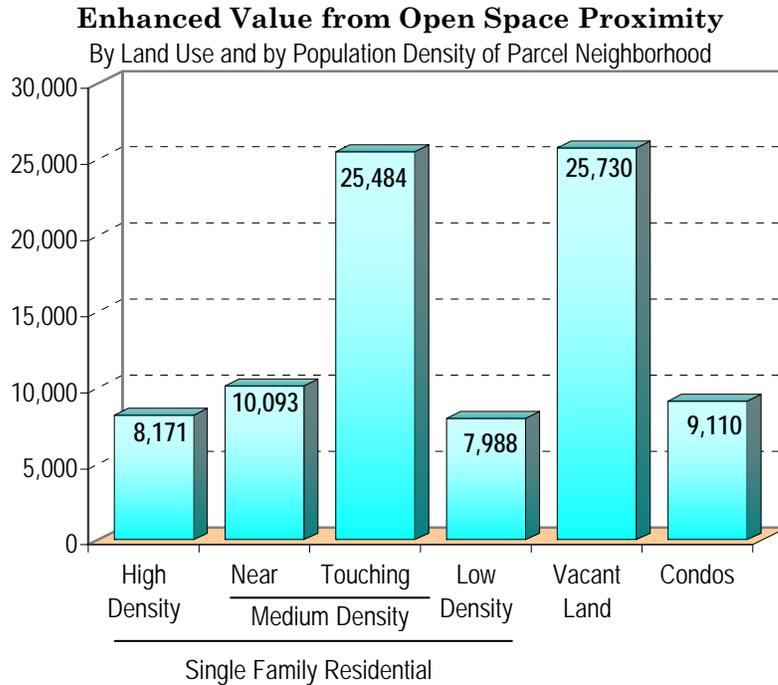
Quick Overview of Results

While the exact coefficients vary by type of parcel (single-family residential as against vacant land or condos) and by where in the county a property is located (parcels in the densely settled parts of Gainesville are impacted differently than parcels in the sparsely settled outer reaches of the county), for most parcel types

CAPE ANN ECONOMICS

40 River Road
Annisquam Village
Gloucester, MA 01930
(978) 281-5004

we found a strong correlation between parcel value and proximity to parks and open space.



The results are summarized in the chart at left.

Proximity to open space generally adds \$8,000 to \$10,000 to parcel value; in the case of parcels in medium-density areas actually touching open space and in the case of vacant land, the impact is as high as \$25,000 per parcel.

Some open space is in the form of lakes and rivers.

Since proximity to water always adds to parcel value, we treated water as a separate factor. These results express the impact of open-space proximity above and beyond the impact of being near water.

All told, some 12,700 parcels in the county are close enough to open space to benefit from this increased value. The total impact on their value is just under \$150 million, and the overall impact on property tax revenues is approximately \$3.5 million per year.

DETAILED ANALYSIS

Detached Single-Family Homes

There were 5,945 separate sales of detached single-family homes during the two-year period of our analysis. We started our analysis with a single county-wide

CAPE ANN ECONOMICS

40 River Road
Annisquam Village
Gloucester, MA 01930
(978) 281-5004

regression; it “explains” some 80% of the variation in home prices – very high explanatory power for a cross-section regression covering so many individual sales. Homes located within 100 feet of open space sold at a premium of \$10,676.

Sales Price Factors - Single Family Homes

	County-Wide Regression		Density Grouping		
	Coeff	T	High	Med	Low
<i>R Sq Adjusted</i>		80%	78%	86%	83%
<i>Sales</i>	5,945		2,798	1,921	1,228
Parcel Size - Acres	1,901	21.8	10,721		2,553
Building Size - Sq Ft	73.2	99.8	68.4	89	52
Building Age (Yrs)	-561	-16.3	-392	-533	-1,011
Months during Sales Period	655	8.1	719	645	714
Distance to Downtown	-1,012	-7.6	-2,571	776	-2,200
Block Group Density				53	-61
Bathrooms	3,193	3.9	5,189	1,295	6,849
Heated?	61,866	7.4			
Building Stories	4,668	3.9			
Within 200 ft of Water	33,662	4.3			42,627
Within 100 ft of Open Space	10,676	8.5	8,171	10,093	
Touching Open Space				15,391	7,988

More detail on the regression is reported in the first column of the table above. The coefficients indicate that each extra acre of lot size raised sales price by \$1,901; each extra square foot of building space was worth \$73.20.

All else equal, older houses sold for less; price dropped by \$561 for each year of age. Home prices appreciated at \$655 per month during the two-year period of analysis. All else equal, people prefer to be close to downtown; each extra mile from the city center reduced values by \$1,012. Each extra bathroom added \$3,193 to sales price; a 2-story home was worth \$4,668 more than a one-story home (holding total area constant). Almost all homes are heated, but the few homes that are unheated are worth \$61,886 less.

Finally – of greater interest to us – proximity to lakes adds \$33,662 to home prices¹, and being within 100 feet of open space adds \$10,676 to overall price.

¹ The correlation is between price and proximity to lakes; proximity to creeks and rivers has no statistically measurable impact on price.

CAPE ANN ECONOMICS

40 River Road
Annisquam Village
Gloucester, MA 01930
(978) 281-5004

For single-family homes, there is no difference between parks and non-park open space in terms of impact on real estate prices.

The second column of the table shows the statistical significance of these results. A number in this column of 2 or more suggests that this coefficient falls within the 95% confidence interval.²

Differences by Density of Settlement

The county-wide regression is useful in establishing the strong overall impact on real estate values of proximity to open space. However, the impact of open-space proximity varies across the county; people in the densely settled urban core may look on open space access differently than those in the rural parts of the county. For this reason, regressions run separately in high, medium, and low density portions of the county give a more finely-tuned – and more accurate – measure of the influence of open-space on land values.

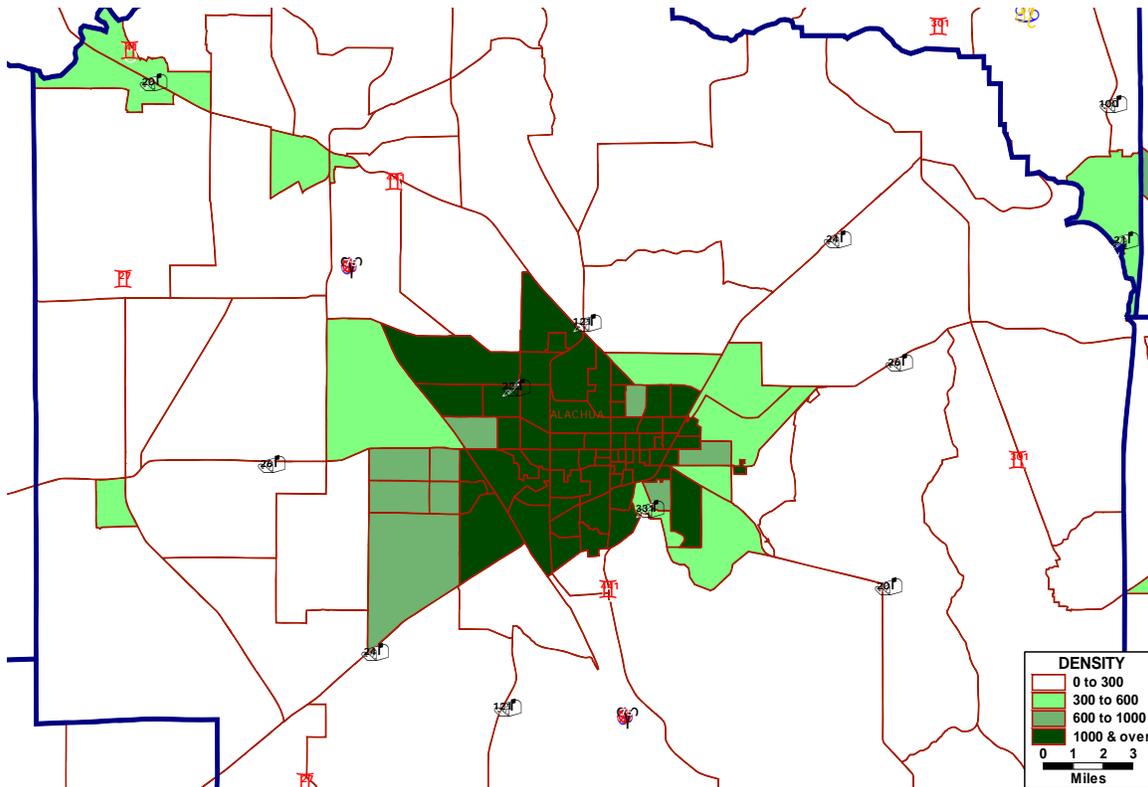
Three separate regressions were run. The first was done for densely settled areas of the county (census block groups with density greater than 1,000 people per square mile, according to the 2000 census); the second for medium-density areas (greater than 300 but less than 1,000, and the third for low-density areas. The map below shows where these areas lie within the county. The areas left white (as well as the areas outside the map) are settled at less than 300 people per square mile. The two intermediate shades of green are settled at densities between 300 and 1,000, and the very dark areas have densities in excess of 1,000.

As the map makes clear, virtually all of the city of Gainesville is in the “high density” category; a relatively small area at the outskirts of the city are medium density, and essentially all of the county’s outer ring are low density.

² The number shown is the T-statistic, which is the ratio between the coefficient and its standard error. A t-value of 2 or more means that the coefficient is at least 2 standard deviations away from zero, meaning that there is a 95% confidence that the true coefficient really is different from zero.

CAPE ANN ECONOMICS

40 River Road
Annisquam Village
Gloucester, MA 01930
(978) 281-5004



The table discussed earlier shows the coefficients for these three separate regressions. The similarities are far greater than the differences. The bigger the building, the greater value, with an extra square foot worth about \$70. Older houses are worth less; each year of age reduces value by about \$500. Prices rose by about \$700 a month during the two-year period of our analysis, and extra bathrooms are worth about \$3,000.

Most important, given the purpose of our study, being close to open space is typically worth at least \$8,000 and sometimes much more.

There are some interesting differences. Being close to lakes is important statistically only in the low density parts of the county. In fact, since there are so few waterfront parcels sold in the thickly settled portion of the county (only 8 in our two-year period, as against 21 in the low-density outer ring), there is not a broad enough sample base to measure the impact of water proximity in the urban core.

CAPE ANN ECONOMICS

40 River Road
Annisquam Village
Gloucester, MA 01930
(978) 281-5004

In the low-density area, the premium for proximity to open space applies only to properties actually touching open space; in the medium and high-density areas, the premium applies to properties within 100 feet. In the low and high density areas, the premium is roughly similar, at \$8,000. In the medium density area, properties within 100 feet command a \$15,000 premium, and those actually touching open space command an additional \$10,000 - \$25,000 in all.

Other Property Types

Proximity to open space raises the value of undeveloped residential land, particularly in the high and medium density sections of the county. Results of the open space regression is shown in the table below:

Vacant Land, Town Houses, Condos

	Vacant Residential Land - Density:		Condos	Town Houses
	Med-High	Low		
<i>R Sq Adjusted</i>	34%	20%	81%	86%
<i>Sales</i>	635	780	745	491
Parcel Size - Acres	12,873	4,816	56,756	62,450
Block Group Density	-11.7		-1.0	-3.6
Block Group Median Inc (000s)			438.4	345.3
Months during Sales Period	691	357	593	549
Distance to Downtown	-2,806	-1,633	-3,376	-4,161
Building Size - Sq Ft			58	41
Building Age (Yrs)			-2,073	-2,923
Heated?				36,712
Within 200 ft of Water	31,187	39,359	17,217	
Within 100 ft of Open Space Touching Open Space	25,730	2,730		
Park Size - Acres			81.9	
Within 200 Feet				2,065

Surprisingly, there were almost as many vacant parcels sold in the medium and high density parts of the county as in the low-density outer ring. Over ¾ of these parcels were in the medium density area (300 to 1,000 people per square mile) on the edge of Gainesville itself.

Vacant lots in these denser parts of the county that was within 100 feet of

open space commanded a premium of \$25,730; vacant lots near lakes commanded a premium of over \$30,000 anywhere in the county. Interestingly, size of lot mattered more in the medium than low density areas; within the medium density area, there was a premium to live in the less densely settled neighborhoods.

CAPE ANN ECONOMICS

40 River Road
Annisquam Village
Gloucester, MA 01930
(978) 281-5004

Not surprisingly, perhaps, proximity to open space is less important to lot buyers in the sparsely settled outer ring of the county, where the average lot size is slightly over 2 acres. On average, being within 100 feet of open space adds \$2,730 to the value of a lot, but this coefficient does not meet the 95% confidence level test. This compares to lots of just over ½ acre in the medium and densely settled areas.

The vacant land regressions do not “explain” as much of the variation in prices as is the case with improved lots – 34% for denser areas, 20% for sparsely settled areas, compared with more like 80% for developed lots throughout the county.³ This difference is easily explained – the largest factor in predicting the price of improved lots is the size of the house and, of course, there is no house on a vacant lot – nor are there differences in value to be explained by age of structure or number of bathrooms.

Condos

Proximity to parks is very important to condo purchasers. They are interested in proximity to parks more than to open space; that is, they are looking for land they can walk on. Given that they typically have no yards of their own, this makes perfect sense. For condo owners, the size of the park they are close to makes a difference. The coefficient here is \$81.9 per acre at the near-by park. The typical park is about 111 acres. Being within 200 feet of such a park would raise the value of a condo by just over \$9,000. If the nearby park were only 55 acres, it would raise the condo value by more like \$4,500.

Unlike single-family homes, the value of a condo is affected by the median income in the neighborhood. Condos in the well-off part of town cost more; increasing neighborhood median household income by \$10,000 (from, say, \$40,000 to \$50,000) would increase condo price by over \$4,000. As with single family homes, size of unit is a critical factor and the impact on value (\$58 per square foot) is roughly the same as for detached homes (\$73).

Since almost all the condos are in the densely settled part of Gainesville, there was no need to run separate regressions for the different parts of the county.

³ The “R Square Adjusted” statistic reported in the table is a measure of how much of the sample variation is “explained” by the variables in the analysis.

CAPE ANN ECONOMICS

40 River Road
 Annisquam Village
 Gloucester, MA 01930
 (978) 281-5004

Town Houses

Town houses are legally similar to condos, but in the case of town houses, the owner in fact owns the land immediately under his or her unit – unlike a condo owner, who owns only the apartment itself. Proximity to open space barely matters for town house owners; being within 200 feet of a park raises value by \$2,065, but this coefficient is not within the 95% confidence interval.

Total Increased Value

Using the coefficients generated by our regression analysis, we can calculate the total impact on Alachua County property values and tax receipts.

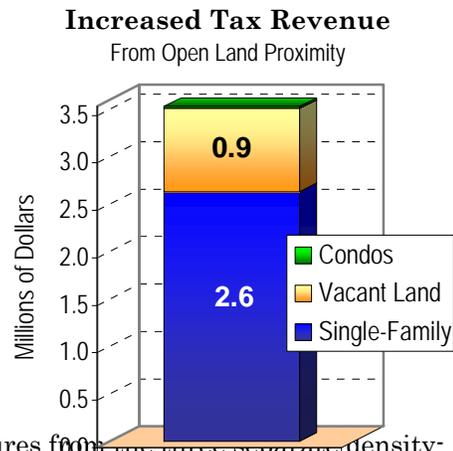
Total Impact, Enhanced Value

	Parcels Affected	Enhanced Value \$ Mns	Increased Tax Receipts
Single-Family	11,244	107	2.63
Vacant Land	1,382	36	0.88
Condos	76	1	0.02
Totals	12,702	143	3.53

In all, there are 12,702 real estate parcels that are close enough to open space to benefit from enhanced property value, as measured in our regression analysis. Of these, 11,244 are detached single-family homes and 1,382 are vacant land zoned for residential development.⁴ These figures undoubtedly understate the

long-term impact on vacant land values, since they include only parcels currently available for development. Over time, some of the land currently in agricultural or forest use will undoubtedly be subdivided into residential lots. The reason so few condos are affected is that condo values are enhanced by proximity to parks (but not non-park open space); relatively little of the county's open space is in the form of publicly accessible parks and therefore few condos are within 200 feet of these parks.

The total impact of open space proximity on the value of these parcels, as measured by our equation coefficients, is \$143 million, of which roughly three quarters is in single-family parcels and one quarter in vacant land. Exact tax rates vary across the county,



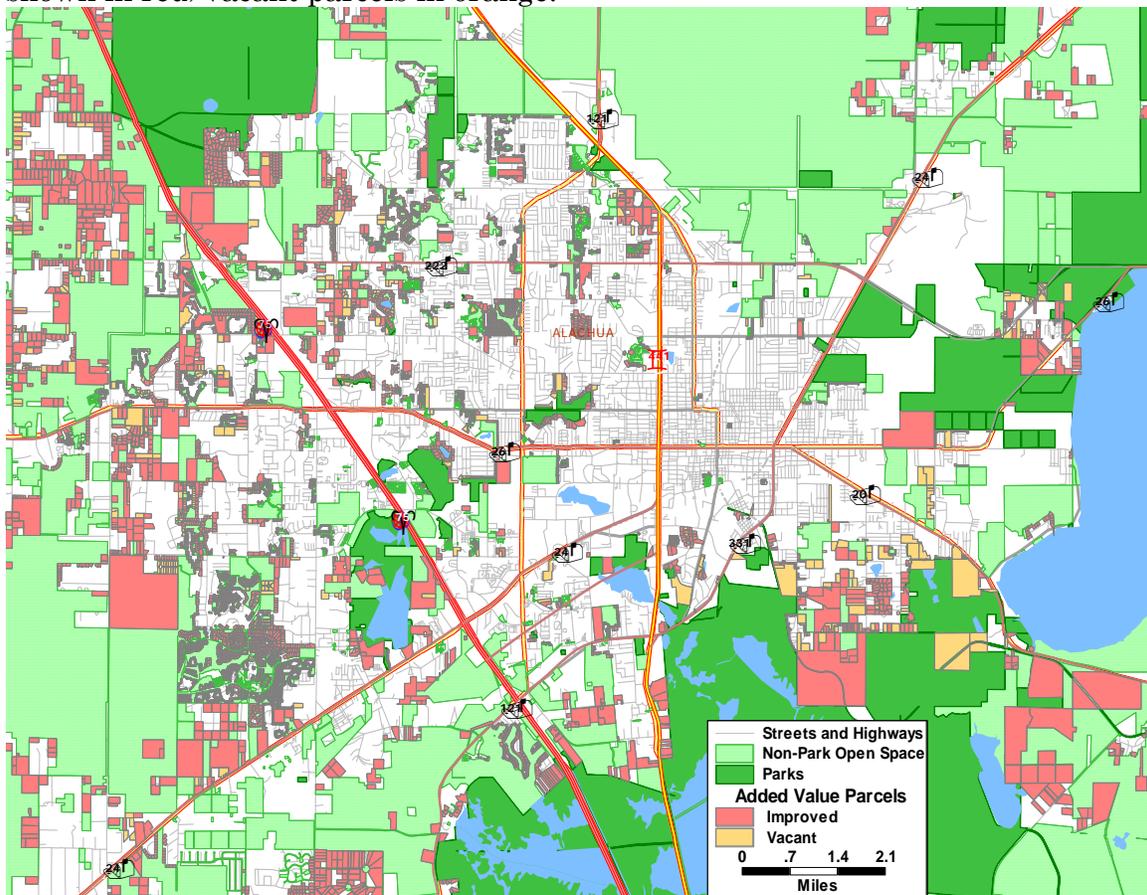
⁴ These are conservative estimates, using the lower figures from the three separate density-zone single-family equations and ignoring the coefficients that don't meet the 95% confidence interval.

CAPE ANN ECONOMICS

40 River Road
Annisquam Village
Gloucester, MA 01930
(978) 281-5004

but the most common rate is \$24.68 per thousand.⁵ At this rate, the extra property value attributable to open space proximity accounts for additional property tax revenues of \$3.5 million per year.

The parcels that have added value because they are close to open space are shown in the map below (the map is for the central part of the county – Gainesville and surrounding areas). Improved parcels with added value are shown in red; vacant parcels in orange.



⁵ Phone interview with Alachua County Property Appraiser's office, June 29, 2004

CAPE ANN ECONOMICS

40 River Road
Annisquam Village
Gloucester, MA 01930
(978) 281-5004

Technical Details

Alachua County Appraiser Database – Unique Parcel Values

The Alachua County Appraiser's database is unusual in that it is not restricted to one record for each parcel. If a particular parcel has several different buildings, for example, it will appear several times in the database table of buildings, with one entry for each building. Similarly, there can be multiple entries in the land use and sales tables, while the parcel history table, which shows parcel main use and appraised values has a separate entry for each of the last several years.

This database system is rich with information, but since sales transactions are done on a parcel as a whole, no useful analysis can be done before tables are developed that have unique entries for each parcel. To accomplish this, values for building type for multi-building parcels were determined by selecting the most frequent building type. (If there were 10 subparcels and nine were single-family residences while 1 was a clubhouse, the parcel was treated as single-family residential). Values for land use were determined by calculating the total number of square feet for each use and taking the largest.

Defining Proximity to Water and Open Space

The easiest way to determine parcel distance from open space is to calculate the distance from the park centroid to the parcel centroid. This approach can give very misleading results – particularly for a very large park or open space. A property can actually adjoin a large park but still be a half-mile from the park centroid. What really matters is how far the parcel is from the park boundary.

To measure this, we take advantage of the feature of GIS software which can create a buffer around any property or group of properties and then determine whether other properties fall within this buffer. My associate at GeoVue has built a computer algorithm that creates a series of buffers around each park or open space, and then determines whether each parcel in the county (roughly 90,000 in all) falls within each of these buffers. The distances used are touching, 100 feet (across a narrow street), 200 feet (across a broad street), 500 feet, ¼ mile, ½ mile, 1 mile, and 2 miles. A similar process is followed for water, except that we looked to see only whether the parcel was touching water or was within

CAPE ANN ECONOMICS

40 River Road
Annisquam Village
Gloucester, MA 01930
(978) 281-5004

200 feet. The analysis for water was done separately for lakes and then for rivers and creeks.

For each parcel, the routine then summarizes these calculations by telling us whether the parcel falls within each of these distances (touching, 100 feet, etc.) of a park, of open space, or of water. If it is this close to a park or open space, the routine returns the size of the park or open space involved.

Defining Parks and Open Space

We define open space as any desirable vacant land, including public parks, golf courses, conservation land, woods, etc. Open space can be publicly or privately owned. We exclude non-desirable open space (such as cattle feed lots). The analysis also establishes parks as a subset of the broader category of open space, where parks are defined as open space that is publicly accessible (such as a public park). The theory here is that while people will pay more to be near land with nice vistas (such as a golf course), they might be willing to pay even more to be near land they are allowed to walk on.

Sales Data

The appraiser's database contains data on all parcel sales. In addition to transaction price, it reports on whether or not the sale was qualified (that is, an arms-length transaction between two non-related parties) and on whether the parcel had buildings on it at the time of sale. The data on vacant/improved land is particularly valuable, as parcels which were developed at the time of the most recent assessment may have been vacant at the time of sale, and therefore worth considerably less.

Prices of non-qualified sales – typically \$100 – have no economic meaning and are excluded from the analysis. In a few instances, the database appears to be in error, listing as “qualified” sales with prices of \$100. Such sales were excluded from our sales analysis.

Sales price varies over time, so we limited our attention to sales during the most recent 2-year period, which ran from April 2001 through March of 2003. In addition, we recorded the particular month of the sale and found that sales prices rose during this interval. All else equal, sales later in the period were for a greater price than sales early in the period.