The Broadmoor Project

New Orleans Community Engagement Initiative

Progress Report





A joint project of
the KSG/BCSIA Broadmoor Project
and Bard College

Kennedy School of Government
Harvard University

Kennedy School of Government
at Harvard University

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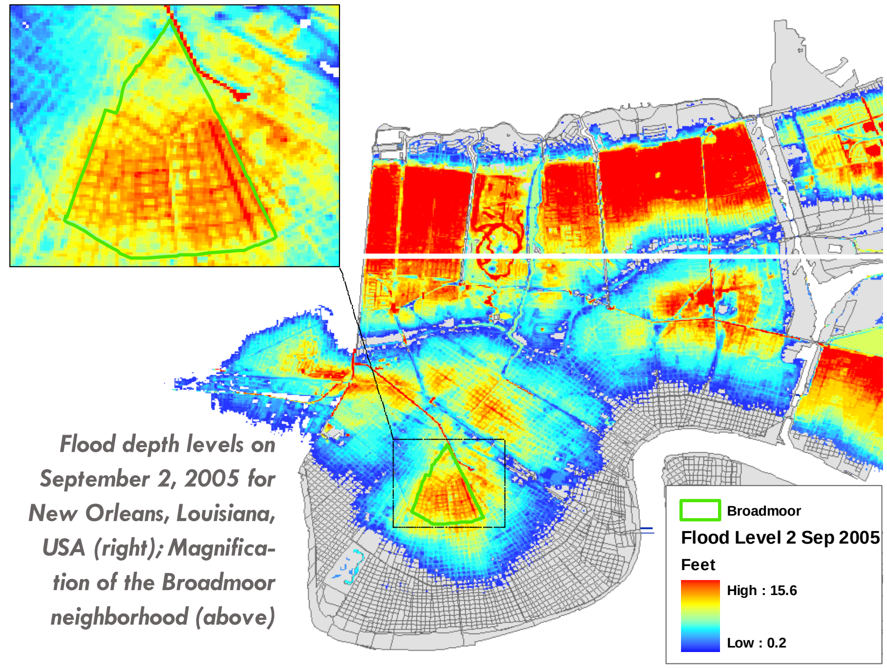


Flood depth levels on September 2, 2005 for New Orleans, Louisiana, USA (right); Magnification of the Broadmoor neighborhood (above)

Source: U.S. Army Corp of Engineers. Data distributed by LSU GIS Information Clearinghouse: CADGIS Research Lab, Louisiana State University, Baton Rouge, LA. 2005/2006.

Context

Hurricane Katrina made landfall in Louisiana the morning of August 29, 2005. Shortly thereafter Katrina's storm surge caused several levees to breach in and around the city of New Orleans, causing substantial flooding and significant devastation throughout most of the city, and resulting in over 1,500 deaths and massive displacement of residents. The economic impact of the storm was far-reaching, as tourism came to a standstill, commercial businesses moved their operations elsewhere, and many residents were left unemployed.

Government officials were slow to intervene in redevelopment and reconstruction plans in the aftermath of the flooding, leaving many New Orleans residents unsure about the future of their communities. When the Bring New Orleans Back Commission (BNOB) finally put forth their recommendations for the future of the city, several areas located in the lowest elevations and which experienced the worst flooding were designated as "green dots", meaning they would be "areas for future parkland." The Broadmoor neighborhood, a community located in the heart of New Orleans, was one of those spaces.

Broadmoor

The Broadmoor neighborhood is an economically and racially diverse community, situated adjacent to New Orleans' historical Garden District and in close proximity to Tulane University. In the aftermath of Katrina, Broadmoor's approximately 7,230 residents experienced average flood levels between 2.2 and 7.4 which damaged or destroyed a majority of the neighborhood's 2,291 houses (residential structures). Residents had already begun the long process of reconstruction when the Commission suggested Broadmoor might be converted into green space. The BNOB indicated that slated neighborhoods must prove future viability by demonstrating 50% repopulation. This incident galvanized the Broadmoor Improvement Association, a community organization in existence prior to Katrina, to accelerate the revitalization process and ensure the future of the neighborhood. In a display of community organizing, neighborhood residents came together to plan for the future of the community, including plans to rebuild the library, introduce new business to the area and reconstruct the local school.

On March 29, 2007, the Broadmoor neighborhood was identified as a "Renewal" zone in New Orleans, recognition of the community's tireless efforts and of their proven viability to bring back their neighborhood and rebuild it to a better than before.

KSG Involvement

The Kennedy School has been involved with the Broadmoor Improvement Association since February of 2006 assisting with redevelopment efforts in a variety of capacities, including the design of a survey to provide a detailed assessment of the redevelopment efforts within the community and to track the progress of these efforts over time. The initiative, sponsored by the KSG Broadmoor Project in partnership with Shell Exploration and Production Co., provided a hands-on opportunity for Kennedy School and other Harvard students to apply their policy analysis training to support community-based recovery and redevelopment efforts in New Orleans. The KSG/Broadmoor Project works closely with the Harvard Graduate Schools of Business, Law, Design, Education, and Public Health to leverage the wealth and range of expertise across Harvard University to provide resources in support of the Broadmoor neighborhood in New Orleans, Louisiana.

Key Research Questions

The key questions addressed in this project were the following:

- What is the current state of Broadmoor's recovery?
- What is the rate of progress for Broadmoor's recovery?
- How does Broadmoor compare to the rest of New Orleans in its recovery efforts?

The Project

In March 2007, Harvard graduate students from the Kennedy School of Government, the Harvard Graduate School of Education, and the Harvard School of Public Health worked with the Broadmoor Improvement Association to report on the current state of Broadmoor's recovery and to design a strategy and metrics to measure and track the neighborhood's efforts against other neighborhoods throughout the city in the future.

Seventeen students were organized into seven teams, including five substantive teams analyzing discrete data sets and two support teams. The five substantive teams analyzed both publicly available data, and data sets unique to the Broadmoor neighborhood, and consisted of the following:

<u>Publicly Available Data</u>
Building Permits
National Change of Address
MLS (real estate data)
<u>Unique Broadmoor Data Sets</u>
Plan-Ready (Broadmoor survey results)
Matched Pairs (creation of comparison data)

The two support teams included a GIS team, which assisted with map-making efforts, and a final report team. This report is being made publicly available so these metrics and Broadmoor's work can

Synthesis of Publicly Available Data

We analyzed three publicly available data sets to understand the impact of Katrina and the pace of recovery in Broadmoor. The data was selected based on its salience as indicators of recovery progress.

***Building Permits**: To examine the **rate of rebuilding**, we conducted an analysis of the number of permits given out in Broadmoor compared with the rest of the city. Categories of permits include commercial, residential, mechanical and electrical.*

***Change of Address**: To examine the **rate of repopulation**, we matched the mailing addresses and property addresses of property owners in Broadmoor before and after Katrina. Through this analysis, we were able to track the change in residence status for members in the community.*

***Multiple Listing Service (MLS)**: To examine the relative value of home prices before and after the hurricane, we analyzed the relative value of homes in this real estate data set. Variables in this data set include sales price, list price, square footage, among other things.*

In this section, we will provide the overview, findings and limitations of each data set along with any additional questions for further research.

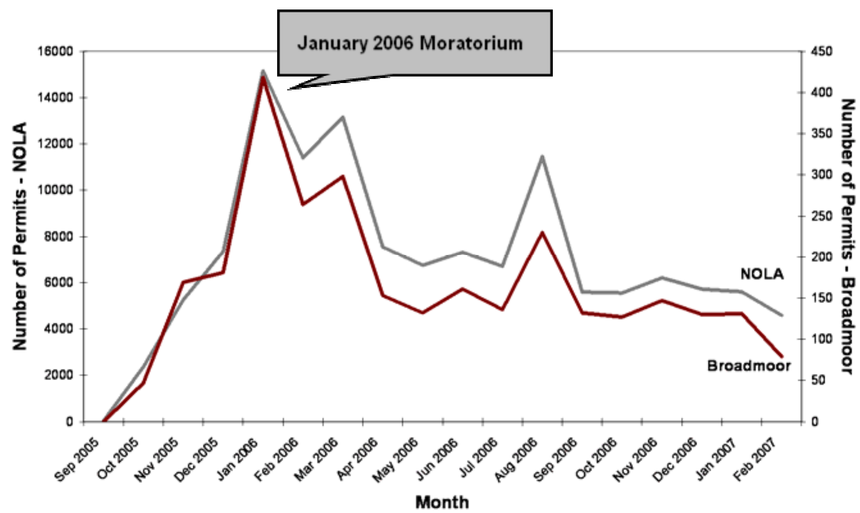
Building Permit Data

Introduction to data set

Provided by the City of New Orleans, this data set consists of the permits issued citywide with permits removed for swimming pools, annual, hoists, hoods, and elevators.

We analyzed this data set for the period of September 2005 through February 2007. When examining building permit data, the permit requests by household provide the best measure of the rate of redevelopment, as one house can request multiple permits.

Building Permit Requests Over Time (Broadmoor vs. NOLA)



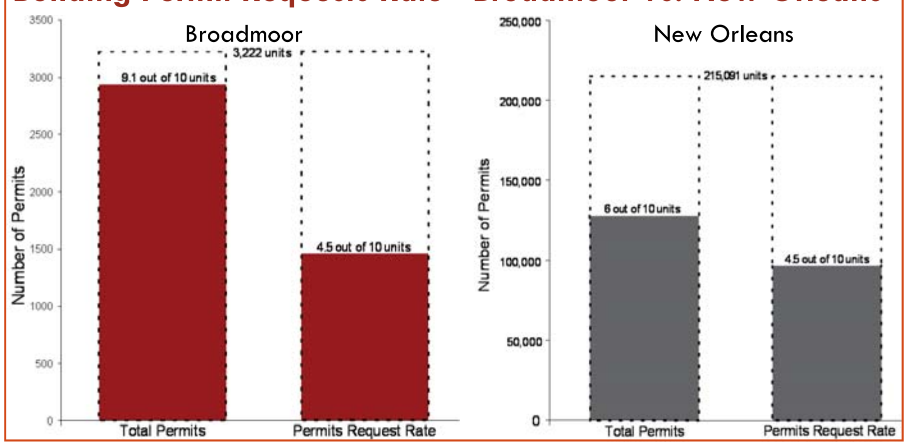
For example, Broadmoor homeowners have requested close to 3,000 permits. When compared to the number of units in the Census 2000, total Broadmoor units were about 3,200, which can lead to the conclusion that 91% of the units have new permits. However, more than half of the permits requested are for the same unit. Therefore, only 45% of Broadmoor homeowners have requested permits, when multiple permits are eliminated. Coincidentally, 45% of NOLA homeowners have requested permits as well, when multiple permits are eliminated.

Building Permit data might provide indicators of the rate of recovery the City of New Orleans is undergoing. Extracting a subset of data for Broadmoor will provide information about how it compares to the city as a whole, and eventually to other neighborhoods as further research is conducted.

Findings

Broadmoor closely follows the trend of NOLA in terms of permits requested from September 2005 to February 2007. There was a spike in permits requested during January 2006. The dramatic increase of permits could be associated with the recommendation of BNOB (Bring New Orleans Back commission) in January 11, 2006, which suggested that the Mayor should put a moratorium on building permits. Because of strong opposition, the moratorium never came into effect, but may be responsible for the dramatic increase in permit requests.

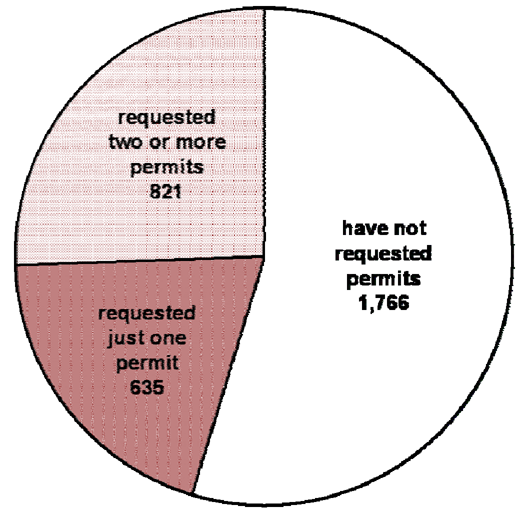
Building Permit Requests Rate - Broadmoor vs. New Orleans



Building Permit Requests Breakdown - Broadmoor

1,456 homeowners have requested a total of 2,935 permits. On average Broadmoor's homeowners request 2 permits per unit.

The average for NOLA is only 1.3 permits per unit.



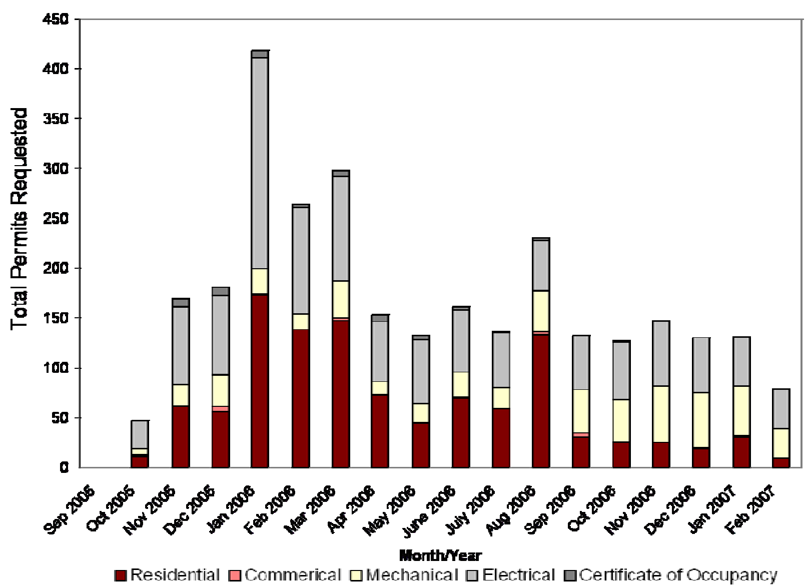
During this time, Broadmoor has consistently held approximately 2% of the permits requested in the city.

Having a multiplicity of permits for a single unit may indicate a stronger commitment to rebuild. From all units that have been granted permits since September 2005, 56% of them have two permits or more. Electrical or mechanical permits, for example, can be required after a residential permit has been granted and reconstruction has started; therefore having multiple permits may indicate that owners have a higher willingness to finish the work.

Finally, related to the amount of permits per unit granted, more permits per residence can point to the extent of the damage. The fact that Broadmoor has a higher number of units with multiple permits could confirm that the extent of the damage here was larger than for the average unit in the city.

Looking at the breakdown of permit types requested by Broadmoor per month, we found that while the number of mechanical and electrical permits remains fairly consistent, there has been a steady decline in the number of residential permits by Broadmoor residents. It is possible that this can be associated with the fairly high number of residents who have already been home and building over the past 18 months. We anticipate the need for new residential permits will continue to decline as the neighborhood becomes increasingly repopulated.

Building Permit Requests Over Time by Type - Broadmoor



While new residential permit requests are likely to decline, we anticipate the continued need for electrical and mechanical permits depending on the extent of damage to individual properties. With additional research, it may be possible to use these requests to assess the magnitude of damage needed to be repaired.

Limitations of data/outstanding questions

- *Assess the depth of damage in the Broadmoor neighborhood overall.* The dataset cannot be used to assess the depth of damage in the neighborhood as a whole. Building permits are not an indicator of the extent of damage to the common infrastructure.

- *Assess the depth of damage per household.* Some residences have multiple permits. It could be useful, but not definitive from this dataset, to identify those residences. The actual data on rebuilding will be needed to confirm the association of the amount of permits with the extent of the damage to a property.

- *Determine if a permit was needed.* Some residents may have begun rebuilding without a permit, but that is impossible to determine from the data. There could be some damages that would not require permits to fix them, thus residents may have started working under the regulations. However, the dataset will not provide how many rebuilding activities were illegal. This is one reason for the detailed survey assessing the state of individual properties.

- *Inconsistent data.* When captured, data was not uniformly inputted. Some fields had multiple house numbers and even notes, which made processing it and reading it difficult. This can also be explained by the recent change in how multifamily houses are numbered (i.e. properties with letter notation are no longer used).

- *Assess the size of residence*. How many households resided in one residence (i.e. upstairs/downstairs apartments)?

- *Differentiate home owners from renters.* This is important because renters and homeowners may have different incentives and urgency to return to their property.

- *Assess true rebuilding rates.* The desire of people to rebuild might drive them to request permits even when they do not have resources to rebuild. Additional data will be required to confirm the completion of a job after the permit was granted.

- *Assess rate of post-Katrina progress to pre-Katrina.* While we can currently assess Broadmoor's current state and rate of progress since Katrina, we have no baseline for comparison to assess the magnitude of these findings. Ideally, we need to look at the total number of permits requested within the city of New Orleans and by Broadmoor pre-Katrina.

Change of Address (COA)

The purpose of this study is to analyze the repopulation trend of resident owners, defined as property owners living in Broadmoor. This is done by tracking the change of property owners' mailing addresses.

Taking resident owners in 2004 as the base population, we sought to answer three key questions:

- How many resident owners moved out between 2004 and 2007?
- How many new resident owners moved in between 2004 and 2007?
- How many resident owners who left immediately post Katrina have returned in 2007?

Data was obtained from the Orleans Parish Assessor's Office. They provided lists of property addresses with corresponding property owner name and mailing address. Three time periods were used for comparison. Sept 2004 was used as a baseline to show pre-Katrina residential status. Changes in status post-Katrina was tracked using data from March 2006 and March 2007.

An important consideration was where we could obtain updated mailing addresses from a reliable source. The decision to use data from the tax assessor's office was based on the following reasons:

- On a per capita basis, Louisiana's local property taxes are low compared to other states (ranked 45th in the nation) and the homestead exemption is among the highest nationally. Owners would have a high incentive to update their mailing information to capitalize on tax benefits.
- After the disaster, revenue from income tax and corporate taxes have taken a hit due to businesses relocating out of the city. The government would have an incentive to ensure accurate records of property owners are kept to minimize further leakage of tax revenue.

Key Assumptions:

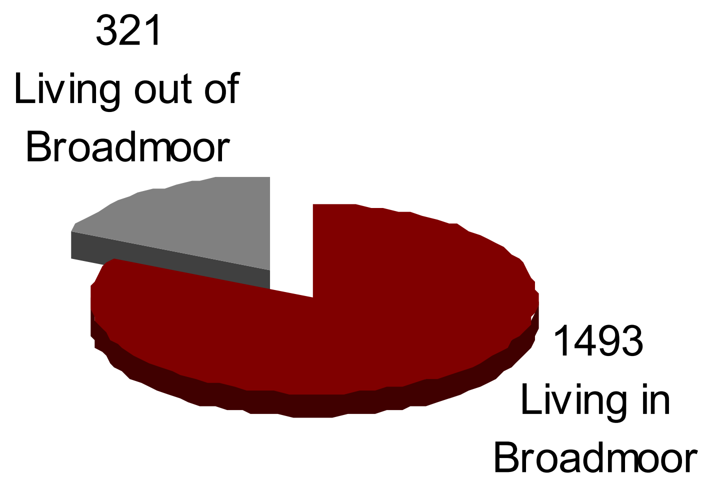
- Resident status of owners is ascertained by comparing property addresses and the mailing address. In this study, we consider an owner as having resident status so long as the mailing address is still located within the Broadmoor community even if it is not an exact match.

- We chose property owners rather than residents as unit of analysis because we assume only the people who own the property would be able to make the decision whether to rebuild the physical infrastructure on the land they own. We filtered out multiple entries and only used unique records of property owners.
- Analyzing the change of residents associated with each property would not give a good indicator of the effect that Katrina has on the repopulation rate since there are other confounding factors that would correspond with the mobility of residents (eg. university students who graduate, professionals who relocate to be near their place of employment).

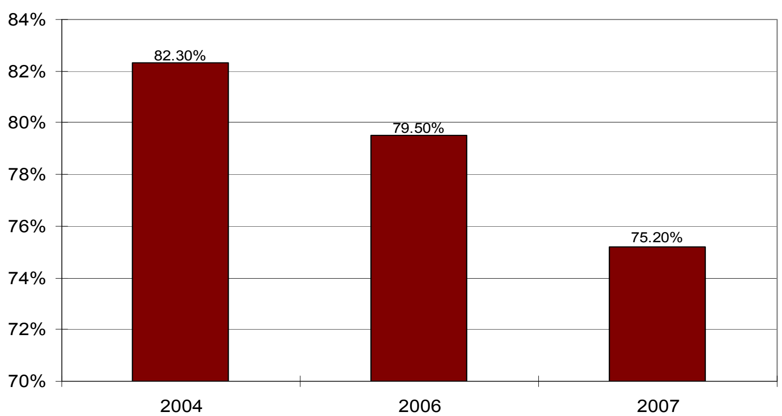
Findings

Data for 2004, pre-Katrina was taken as a baseline. The base group for our analysis were property owners in 2004. Of this group, 82.3% (1493 property owners) were resident owners and 17.7% (321 property owners) were absentee owners.

Breakdown of Property Owners in Broadmoor (Sept 2004)

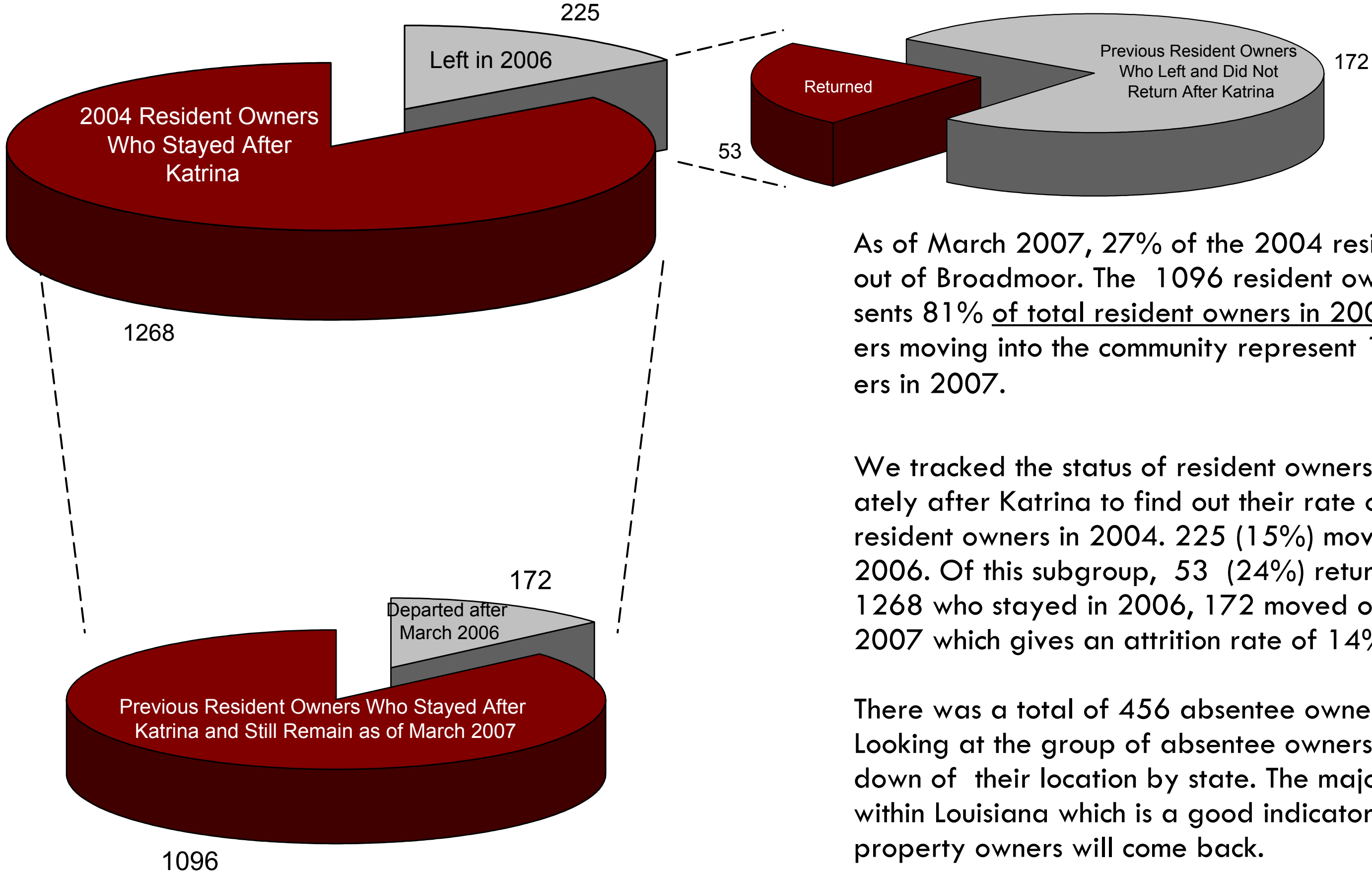


Resident Owners Living in Broadmoor (%)



There is a decrease in the percentage of resident owners relative to property owners from 82.3% in 2004 to 75.2% in 2007. This drop is not an immediate cause for concern and is in fact a logical consequence in the aftermath of the disaster, since houses are still being rebuilt and are uninhabitable. In fact, the decrease can be taken as an indicator that the information provided by the tax assessor's office is reasonably updated. This information takes on greater significance in later years as more data points collected in a longitudinal study will reflect changing trends. It will be especially important after the rebuilding phase is completed to track the changes in residential status of property owners. The implication is that a high percentage of absentee owners means more units are rented out and the transient population will lead to decreased social cohesion in the community.

Changes in Resident Status of 2004 Broadmoor Resident Owners



As of March 2007, 27% of the 2004 resident owners had moved out of Broadmoor. The 1096 resident owners who stayed represents 81% of total resident owners in 2007. 350 new resident owners moving into the community represent 19% of total resident owners in 2007.

We tracked the status of resident owners who evacuated immediately after Katrina to find out their rate of return. There were 1493 resident owners in 2004. 225 (15%) moved out between 2004 and 2006. Of this subgroup, 53 (24%) returned in 2007. Of those 1268 who stayed in 2006, 172 moved out between 2006 and 2007 which gives an attrition rate of 14%.

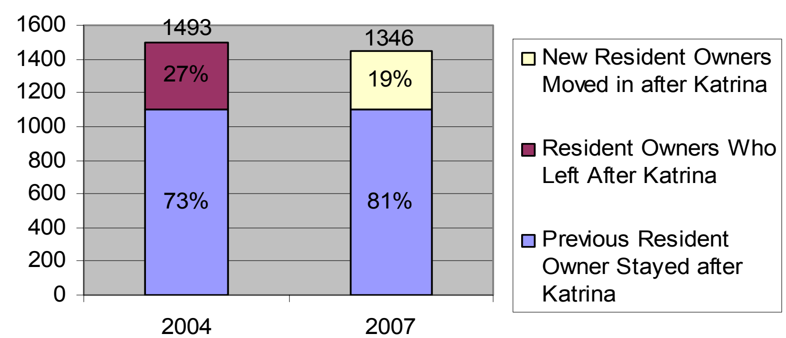
There was a total of 456 absentee owners (including 1 in Canada). Looking at the group of absentee owners in 2007, we did a breakdown of their location by state. The majority of 83% are still living within Louisiana which is a good indicator there is still a chance these property owners will come back.

Location of Absentee Owners by State (March 2007)

AZ	CA	CO	FL	GA	IL	KY	LA	MA
1	15	1	7	7	5	1	379	2

MD	MI	MN	MS	NJ	NY	OR	TX	WA
1	3	1	6	2	3	1	14	6

Resident Owners Living in Broadmoor



Limitations/Outstanding Questions

- In the case of property address and mailing address not matching, it is not possible to differentiate between property owners who have decided to rent out their property in Broadmoor or whether they have decided to leave it vacant.
- The March 2006 data set may have greater degree of inaccuracies due to the difficulty in gathering data immediately post Katrina. As far as possible, 2004 and 2007 data were used for comparison purposes.
- For the purpose of having a common base for comparison, the sample for this particular study is limited to only the dataset in which the property address appears in all three time periods.
- Using information from the tax assessor's office has the following limitations
  - Property owners may know not their affidavit despite the availability of tax incentives.
  - Property owners whose houses are beyond repair or who cannot afford to rebuild may simply abandon their properties and not pay taxes.
  - The dataset does not seem to be comprehensive

ADDITIONAL QUESTIONS

1. Determine accuracy of tax assessor's data.
2. Break down analysis by business and individual residences.
3. Map location of absentee owner properties to get a picture of where these are clustered.

MULTIPLE LISTINGS SERVICE (MLS)

Introduction to data set

Real estate sales data is rather unique among publicly available data sets, in that it represents the combined result of two distinct decisions, the decision to sell and the decision to buy. The data is unable to reveal anything about the intent of the buyer (for instance, to become an owner-occupant vs. to rent out the property) or the nature of the seller (including why they sold their home). Yet it can answer several specific questions about the real estate market in Broadmoor, and, comparatively, across New Orleans.

Questions under analysis:
This analysis used the MLS real estate sales data to answer two major questions:

- What does the housing market look like in Broadmoor before and after Hurricane Katrina?
  - How many homes were sold in an average year before and after Hurricane Katrina?
  - How much were they selling for?
  - How much higher or lower than the list price was the sales price (this indicates level of demand)?
  - To what extent did the condition of the home account for a change in number of sales and sales price differences before and after the flood?
- How does the Broadmoor real estate market compare with other neighborhoods of the city?
  - Relative to Broadmoor, how much would the *same house* sell for in different parts of the city?
  - Relative to Broadmoor, how long would the *same house* stay on the market in different parts of the city?

– Relative to Broadmoor, how in demand would the *same house* be in different parts of the city?

Findings:

The Housing Market in Broadmoor

Raw real estate data can be extremely misleading, especially after a significant natural disaster like Hurricane Katrina, because it does not account for changes in the real estate market (like potential decreases in demand for New Orleans homes) or in the relative value of homes on the market before and after the disaster. For instance, consider the data on the Broadmoor neighborhood pre-and post-Katrina. The raw data suggests a dire situation. Housing prices are lower than they were before the storm, and are declining still further in 2007. It is increasingly a buyer's market, which might encourage speculation, and the number of home sales has increased significantly, suggesting a potentially significant shift in the composition of the neighborhood.

However, the real situation is more complex and far less dire. After a storm, the kinds of homes that are available for sale are likely to be significantly different than those homes that were on sale before the storm. For that reason, this analysis modified the original data to establish housing prices and the extent to which it is a buyer's or seller's market based on a "constant home". Most home buyers consider characteristics like number of bedrooms, total area, and the style of the home when they are buying. In regression analysis, you are able to hold all of these home-level characteristics constant – so that you are looking at essentially the same home, including the condition of the home, pre- and post-Katrina. When you compare the data using a constant home, you similarly find that this is a buyer's market, with people taking significantly less for their homes than the price at which they were listed. At the same time though, this "constant home" is actually selling for more post-Katrina than pre-Katrina. This is driven by differences in condition of the home, with post-Katrina differences in sales price driven by the sale of one new home in the neighborhood, and the significant increase in sales price of homes in "fair condition – on average $40,000 more.

The Comparative New Orleans Housing Market

While it is valuable to look at the difference in the housing market in Broadmoor before and after the hurricane, the current situation is not clear unless compared against other neighborhoods of the city. The second stage of this analysis examined the same "constant home" in different areas of the city pre- and post- Hurricane Katrina to see how the value of the neighborhood itself, separate from the characteristics of the home, was valued when people bought their homes. So for instance, one would expect to see an increase in home prices in the French Quarter for two reasons – both because people might want to live in an area unlikely to flood and because with the rest of the housing stock reduced, the price for a non-damaged home is likely to be driven up. This analysis strives to remove the second factor, by assuming a house that is in the same condition before and after the flood in each part of the city. This allows an analysis of neighborhood choices, independent of damage to individual homes.

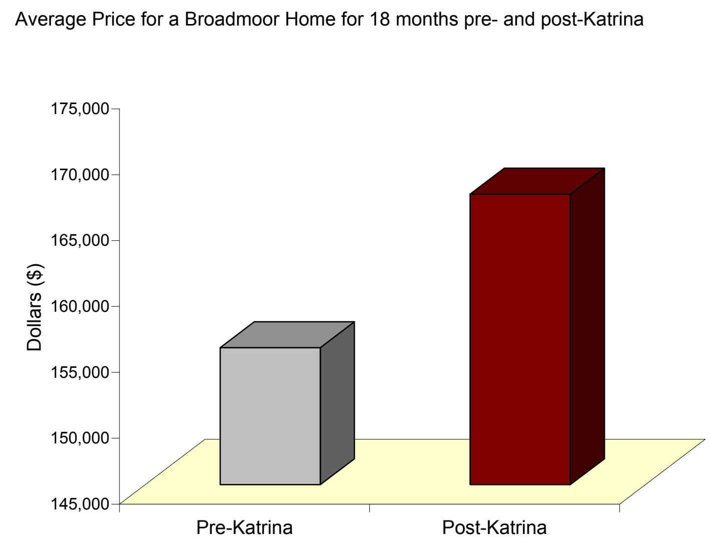
The analysis found significant differences in the number of days a home was on the market, the % difference in sales price and list price, and the sales price for homes across neighborhoods pre- and post- Katrina. Broadmoor's share of the overall real-estate market stayed roughly constant, at 1-2%. Other neighborhoods are indexed against Broadmoor in each of the indicators. For instance, the "constant home" in Algiers went for an average of $50,700 less than that same home in Broadmoor pre-Katrina. Post-Katrina, that same "constant home" would go for $40,300 more in Algiers than in Broadmoor. In all, Algiers, Lakefront below Robert E. Lee/Gentilly, and part of New Orleans East gained in housing prices relative to Broadmoor post-Katrina, from their Pre-Katrina relative value. Central City's relative value post-Katrina fell relative to Broadmoor from pre-Katrina levels.

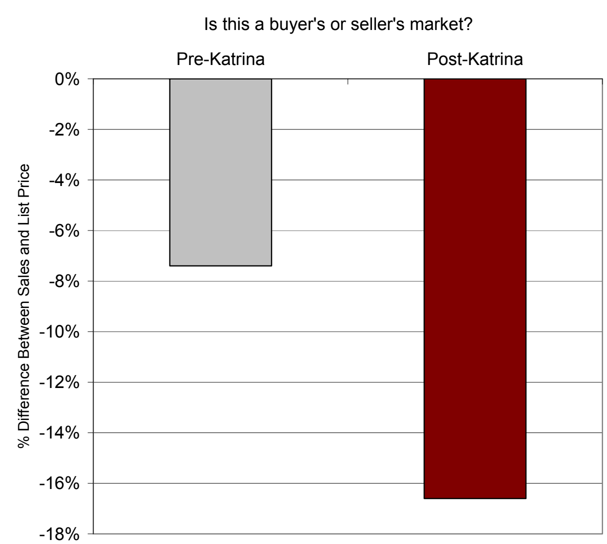
Limitations:

The MLS data only accounts for sales through real estate offices in New Orleans. Because there is significant variation in the real estate market in this city, and because there are relatively few sales in Broadmoor, average values can be somewhat misleading. Though it is possible with this data, this analysis did not break down the real estate market by sections of Broadmoor. It is also not clear the extent to which the realtor definition of Broadmoor matches the neighborhood limits used by the Broadmoor Improvement Association.

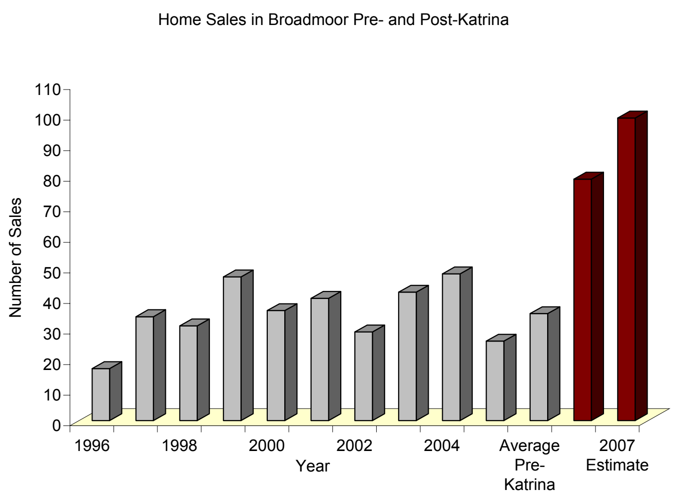
Further Analysis:

This analysis did not look at number of homes listed on the market that were not able to sell, and was not able to break down the eighteen months post-Katrina to look at the shift in trends over time. It is also important to go back and revisit the factors that were included in the analysis of a "constant home" to determine if this analysis indeed was able to isolate neighborhood specific characteristics.

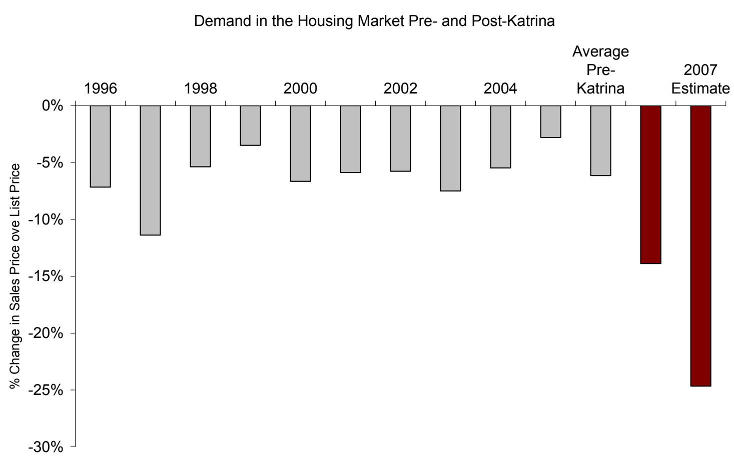




Real Estate Charts

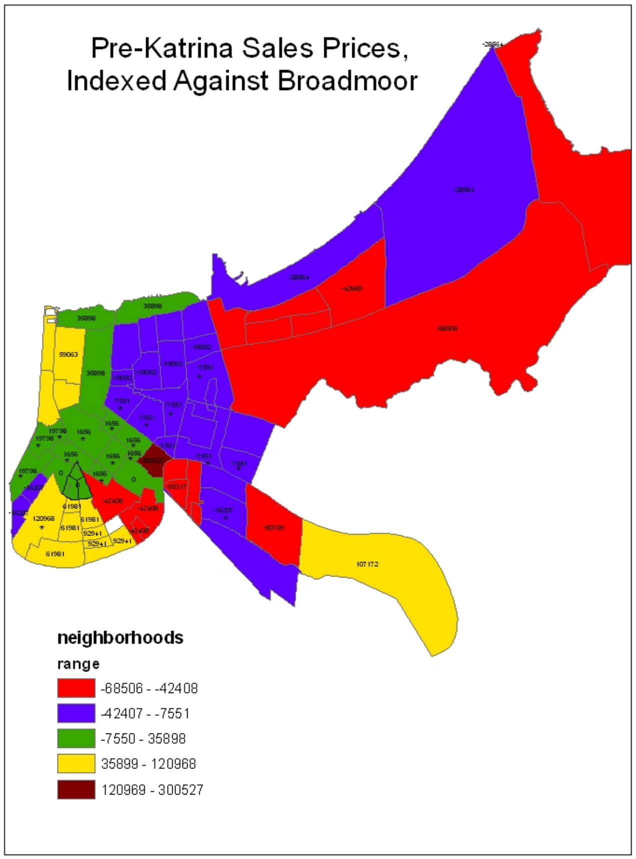


Note: 2007 estimate based on cuadrupled number of sales in first three months.

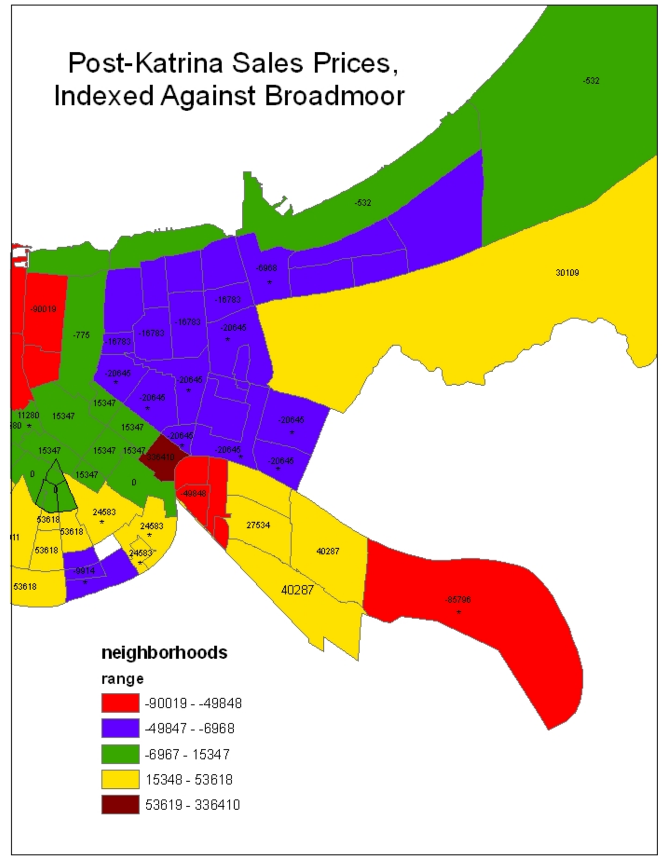


Real Estate Maps

Pre-Katrina Sales



Post-Katrina Sales



Real Estate Tables

Home Sales in Broadmoor for 18 month before and after Hurricane Katrina By House Condition

Pre-Hurricane Katrina			Post- Hurricane Katrina		
Condition of Home	Number of Transactions	Average Price	Condition of Home	Number of Transactions	Average Price
Poor	6	$80,417	Poor	42	$486,217
Fair	6	$84,751	Fair	24	$138,857
Average	9	$278,853	Average	32	$101,332
Very Good	10	$185,812	Very Good	4	$196,875
Excellent	7	$147,150	Excellent	5	$179,055
			New	1	$300,000
Total	38	$155,396	Total	108	$167,056

Real Estate Tables

Sales Price for the Same Home in Comparison to Broadmoor		
Neighborhood	**Pre-Katrina**	**Post-Katrina**
Algier's Point	$ (16,207)	$ 27,534*
Algiers	(50,709)*	40,287*
English Turn	107,172*	(85,796)
Central City	(42,408)	24,583
Lakeview	59,063*	(90,019)*
Carrollton	19,798	11,280
University	120,968	30,911
Uptown	61,981	53,618*
Garden District	92,941*	(9,914)
Warehouse	---	---
City Park	1,656	15,347
Lakefront	35,898*	(775)
Marigny - byway below St. Claude	61,486*	----
French Quarter	300,527*	336,410
Marigny-Bywater	(7,551)	(20,645)
Gentilly Woods	2,405	(32,259)*
Chef Menteur	(34,882)*	(19,007)
Chef Menteur	(18,486)*	(25,602)
Lakefront below Robert E. Lee/Gentilly	(19,092)*	(16,783)*
New Orleans East	(42,669)*	(6,968)
New Orleans East	(28,564)*	(532)
New Orleans East	(55,317)*	(49,849)*
Marigny, Byway East of Inner Harbor	4,015	----
Michoud, Venetian Isles	(68,506)*	30,109

Total Days on Market for Properties in Other New Orleans Neighborhoods Relative to Broadmoor		
Neighborhood	**Pre-Katrina**	**Post-Katrina**
Algier's Point	-5.2	37.8
Algiers	-12.8	41.7
English Turn	4.2	-53.5
Central City	17.2	-13.4
Lakeview	-33.6*	104.8
Carrollton	-16.6	21.5
University	-37.2*	72.7
Uptown	-19.4	-18
Garden District	-9.7	-12.6
Warehouse	---	---
City Park	-11.6	35.2
Lakefront	-3	82.8
Marigny - byway below St. Claude	6.2	---
French Quarter	19.8	-76.6
Marigny-Bywater	-0.09	48.4*
Gentilly Woods	-11.3	93.2*
Chef Menteur	-22.6	63.3*
Chef Menteur	-9.2	71.9*
Lakefront below Robert E. Lee/Gentilly	-11.2	62.5
New Orleans East	-11.5	52
New Orleans East	-16	40.9
New Orleans East	---	54.9
Marigny, Byway East of Inner Harbor	-33.9*	45.6
Michoud, Venetian Isles	-5.2	-17

Real Estate Tables

Days on Market Sold		
Neighborhood	DOM Pre-katrina	DOM Post-Katrina
French Quarter	17.4867	-58.72061
English Turn	9.909132	-47.44092
Uptown	-14.38503	-23.48927
Michoud, Venetian Isles	-28.7926 *	-14.88238
Central City	17.53423	-10.49601
Garden District	-7.060218	-9.426191
Carrollton	-15.46149	22.85166
Marigny-Bywater	1.356846	26.35058
New Orleans East	-10.75	32.30223 *
City Park	-13.25939	35.67693 *
Algiers	-9.599255	42.81938 *
Chef Menteur	-1.51	44.01838 *
Algier's Point	-6.617975	46.54183 *
Lakefront below Robert E. Lee/Gentilly	-4.70024	53.61028 *
New Orleans East	-6.320971	53.89657 *
New Orleans East	-18.43145	60.53995 *
Chef Menteur	-13.08887	64.52396 *
University	-29.14161 *	67.28576 *
Gentilly Woods	-20.66704 *	78.71225 *
Lakefront	-3.364282	87.52815 *
Lakeview	-28.14148 *	96.03256 *
Warehouse	-103.6554 *	--
Marigny - byway below St. Claude	8.540659	--
Marigny, Byway East of Inner Harbor	55.4155	--

% Difference Between Sales and List Price Relative to Broadmoor		
Neighborhood	% diff	% diff
New Orleans East	0.0012391	-0.1520386*
Chef Menteur	0.0132189	-0.2253307*
Lakefront below Robert E. Lee/Gentilly	-0.0016997	-0.1369969*
Lakeview	0.0072895	-0.1173749*
City Park	0.0055122	-0.1628212*
New Orleans East	-0.0149289	-0.1194589*
New Orleans East	0.0042442	-0.1390262*
University	0.0091278	-0.0559728*
Algiers	0.0081799	-0.0439995*
Lakefront	-0.0152499	-0.0641433*
Marigny-Bywater	-0.014969	-0.1536305*
Carrollton	-0.0039061	-0.0540942*
Gentilly Woods	0.0081996	-0.0885686*
Chef Menteur	1.044*	-0.11698
Michoud, Venetian Isles	0.0115989	-0.11217
Algier's Point	-0.0062876	-0.04286
Uptown	-0.004892	-0.03377
English Turn	0.0297218	-0.02504
French Quarter	0.0417448*	-0.02622
Central City	-0.0388139	-0.03042
Garden District	-0.0146782	0.004026
Warehouse	-0.0513315*	--
Marigny, Byway East of Inner Harbor	-0.1664592*	--
Marigny - byway below St. Claude	-0.066865*	--

Broadmoor Today

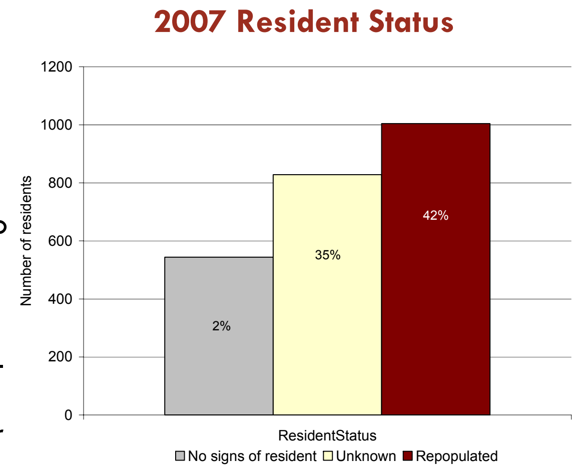
Measuring post disaster recovery requires a unique set of variables. While an analysis of public data can provide a general assessment of a community's state of recovery, it is not designed to provide a specific assessment of Broadmoor's multifaceted recovery process following Hurricane Katrina.

To enable this deeper level of analysis, the Broadmoor Improvement Association (BIA) teamed with Harvard University's John F. Kennedy School of Government (KSG) and Bard College (Bard) to design a survey with variables tailored to the post-Katrina recovery process. This custom survey devised appropriate measurements of community recovery, such as resident re-occupancy status, home repair status, home construction style and home elevation type. Volunteers from Bard collected the survey data in June 2006 and then again in January 2007, spending on average, one-hour at each of Broadmoor's 2,376 housing sites.

The following section presents findings from the June 2006 and January 2007 surveys of the Broadmoor community.

Snapshot of Broadmoor in January 2007

As of January 2007, 42% of Broadmoor's properties had been repopulated.

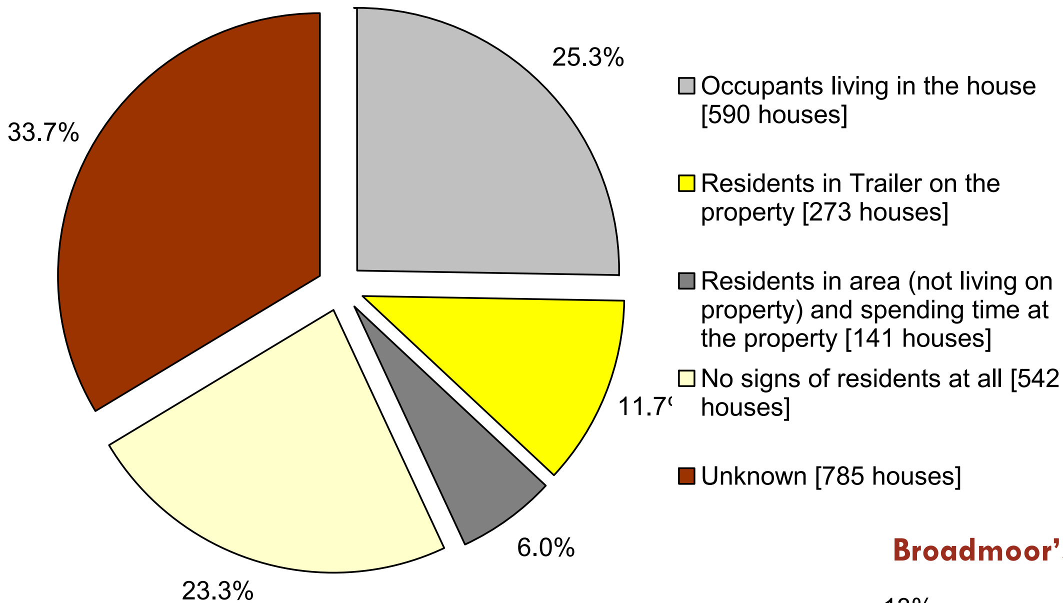


This report disaggregates repopulation into three categories: 1) properties where residents are occupying their homes, 2) properties where residents are occupying a trailer on the site, and 3) properties where residents are living in the area and spending time on the site. As shown below, within these sub-categories, Broadmoor's status is encouraging. 25.3% of total properties contain residents living in their homes, 11.7% contain residents living in a trailer on the property, and 6% contain residents living in the area and spending time on the property. Lastly, 23.3% of properties show no signs of residents.

Summary Statistics for Broadmoor in 2007

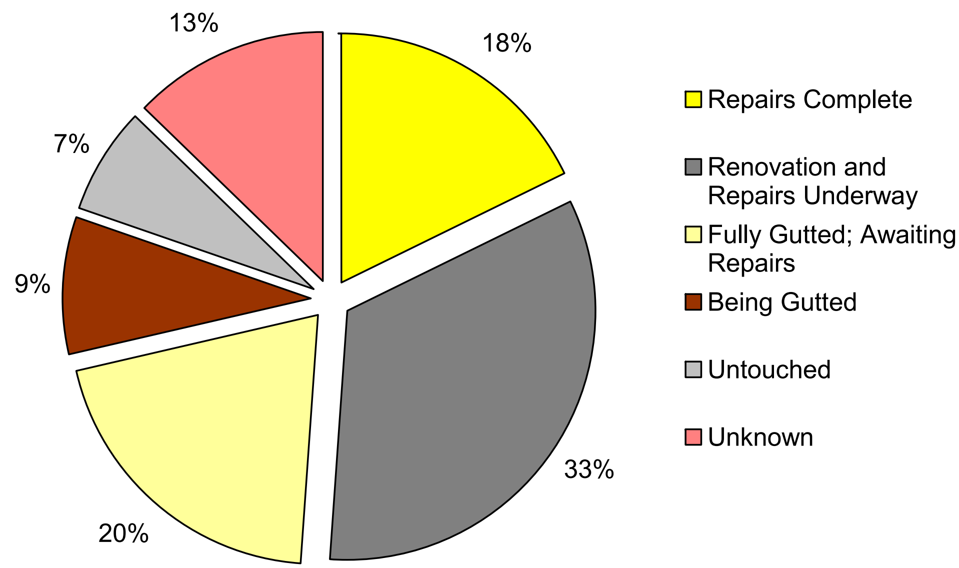
- 85 Commercial Buildings
- 26 Public/Civic Buildings
- 919 Single-family Homes
- 2,146 resident properties
- 1,056 one-story homes
- 1,114 two-story homes
- 45 three-story homes
- 50 Vacant Lots

Resident Status in 2007: Total Repopulation is 43%



Broadmoor's reconstruction status is also encouraging. As of January 2007, over half of all Broadmoor properties had either been fully repaired or were under repair. Disaggregating this percentage, 33% of total Broadmoor properties had been fully repaired as of January 2007 and 18% were under repair. We can also see that only 7% of Broadmoor properties have not begun the gutting process.

Broadmoor's Repair Status is Encouraging



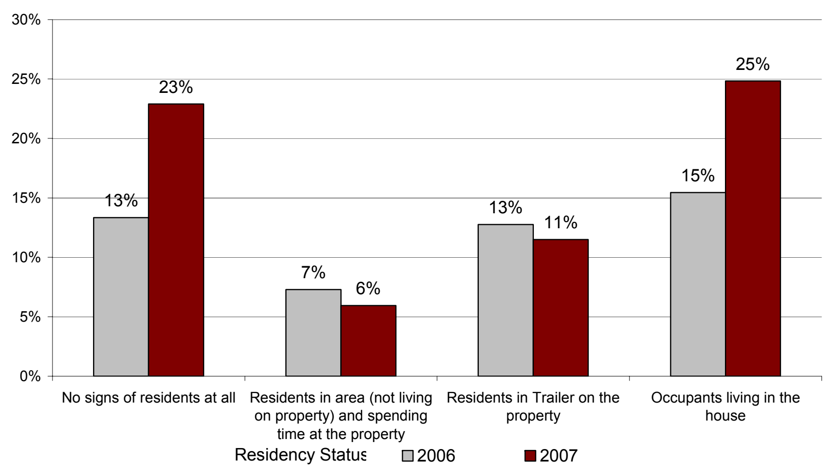
51% of Broadmoor Properties Have Been Repaired or are under repair

SECTION II: MEASURING PROGRESS

Broadmoor is experiencing encouraging repopulation rates

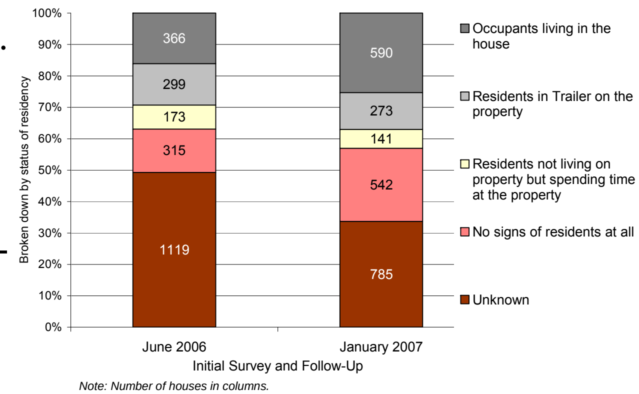
Broadmoor's repopulation rates from June 2006 to January 2007 are also encouraging. Over this six-month time period, Broadmoor experienced a 19% increase in the number of residents living in the area. Within each of the repopulation subcategories, Broadmoor is also exhibiting positive trends. Between June 2006 and January 2007, the number of properties with occupied homes increased by 61% to reach 25% of total properties. In addition, the number of properties with residents living in the area and spending time on the property fell 18% to reach 6% of total properties while properties with residents living in trailers fell 9% to reach 11% of total properties.

House Occupancy Increased 61% from 2006 to 2007



CLARITY IS EMERGING OVER TIME

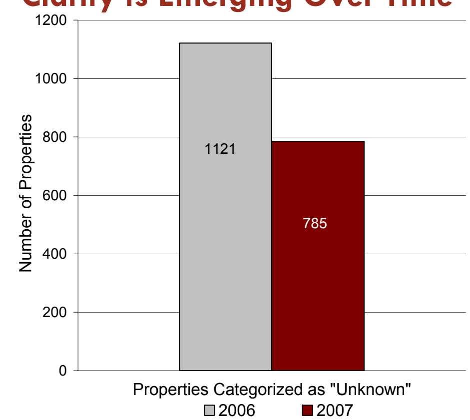
Increase in Repopulation and Increase in Knowledge of Neighborhood



Broadmoor is quickly learning about the status of its properties. When the initial survey was conducted in June 2006, nine months after Katrina, the residency status of approximately 50% of surveyed Broadmoor houses was unknown. Six months later, in January 2007, surveyors were able to identify the residency status of 30% of the previously unknown properties, decreasing the percentage of unknowns from 49.3% to 34.6%.

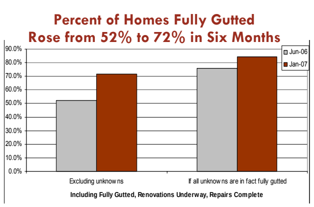
Much of the change in unknown observations can be attributed to the surveyors' increasing confidence in determining whether properties exhibit no signs of residents. Over the six month period, the number of properties exhibiting no signs of residents increased 72%.

Clarity is Emerging Over Time



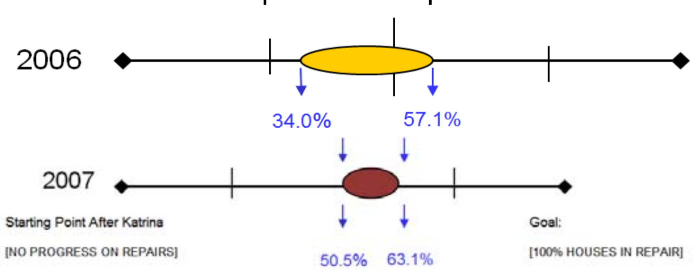
BROADMOOR'S REPAIR PROGRESS

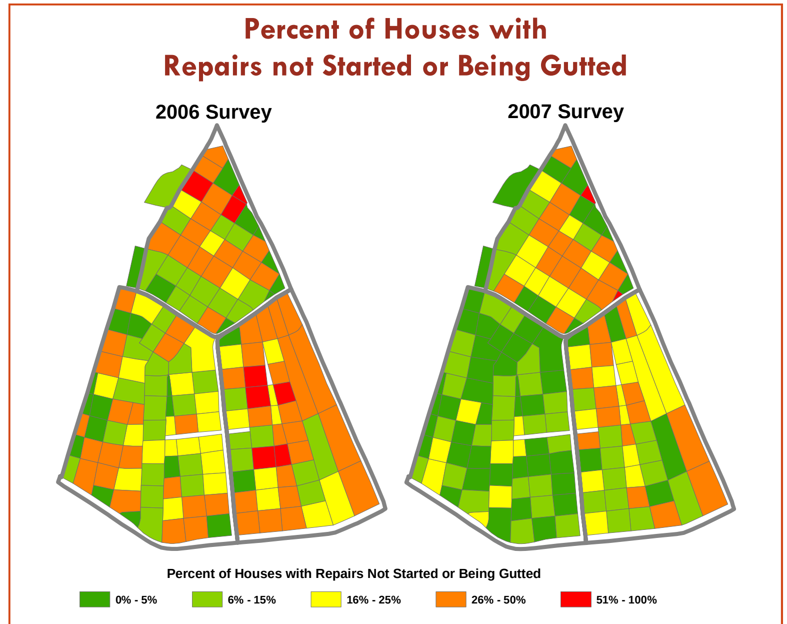
The percentage of homes fully gutted increased from 52.2% in 2006 to 71.5% in 2007 (if homes with repair status unknown were to be included and assumed to be gutted, these figures would increase to 76% in 2006 and 84.3% in 2007).

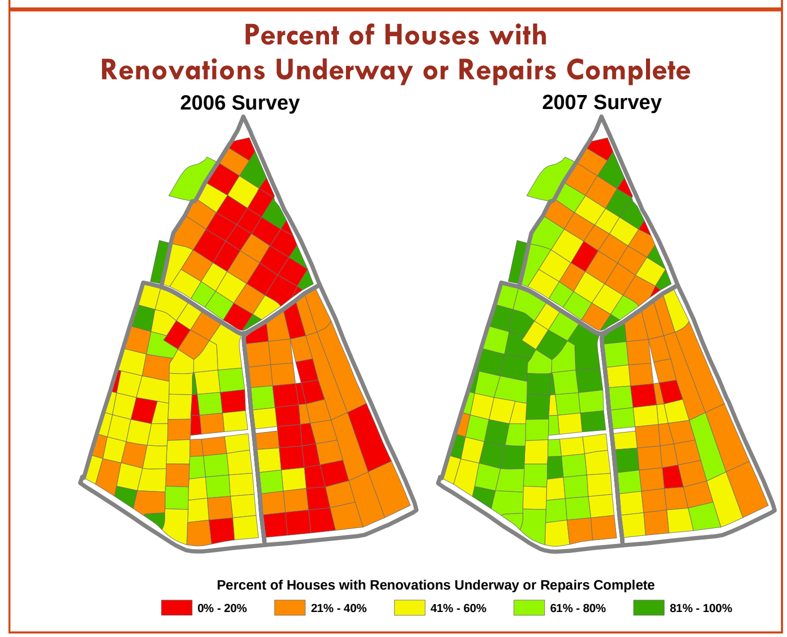


Repair Status, a measure of the relative state of home repair, is disaggregated by state to reflect the progress from June 2006 to January 2007. Though the number of homes with renovations and repairs underway increased by 19% from June 2006 to January 2007, the number of homes having completed renovations and repairs more than tripled (172%) during the same period.

As of January 2007, 50.5% of houses in Broadmoor were known to been in the process of repair or have completed repairs. This number represents the lowerbound estimate for the actual number of houses in repair. The upperbound estimate for January 2007, 63.1%, is found by assuming all houses classified as having repair status unknown had repairs in progress or completed. The actual number should fit somewhere within this range. In June 2006, only 34% of houses in Broadmoor were known to been in the process of repair or have completed repairs. The upperbound estimate is 57.1%, which assumes all unknowns are in the process of repair or have finished repairs.





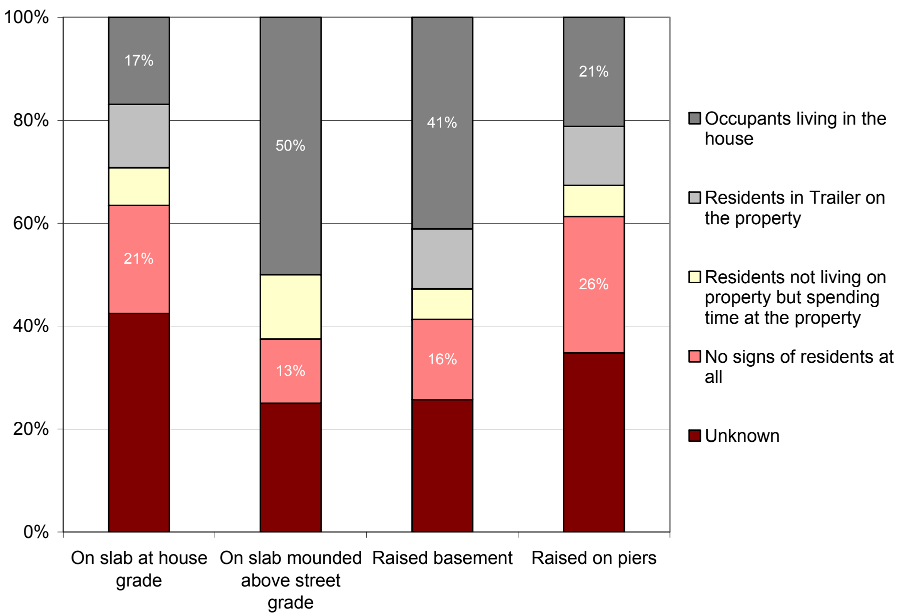


Section III: Additional Repopulation Factors

Residency Status by Elevation Type

Houses constructed as *raised on piers* and *slab at house grade,* which together constitute 77% of all the houses in Broadmoor, had a lower resettlement rate of around 39% and 37% respectively. For *raised basement* houses 41% of residents are living in their house compared to *for slab at house grade* (17%) and for *raised on piers* (21%). Houses classified as *slab on mound* had the highest resettlement rate (63%) in 2007, yet they constituted a mere 1% of all houses in Broadmoor. These interpretations have lower confidence levels as the number of observations "unknown" is high (29% in slab on mound, 35% for raised on piers, 42% for slab at house grade and 26% for raised basements).

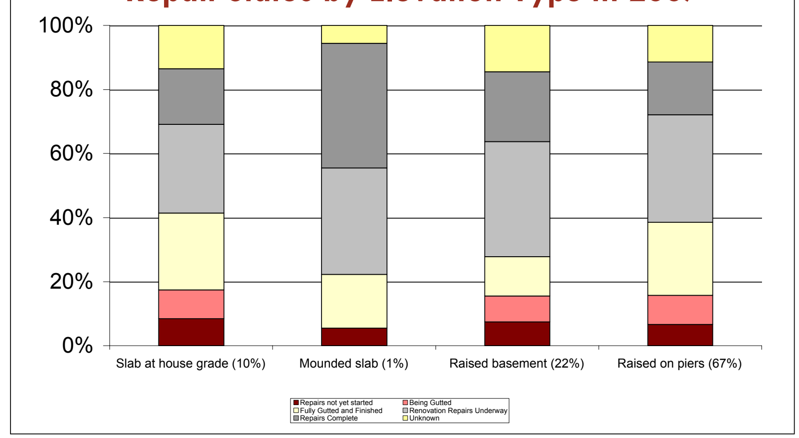
Repopulation Rates Vary by Elevation Type (January 2007)



How does elevation type affect rebuilding rates?

Houses of different elevation types are rebuilding at similar rates with a few exceptions. First, houses built on mounded slab have the highest percentage of completed repairs, yet they represent only 1% of the homes in Broadmoor. Second, houses built on raised basements, which represent 22% of all the homes in Broadmoor, have a significantly lower rate of being fully gutted than other elevation types (excluding homes built on mounded slabs as they comprise of only 1% of all houses in Broadmoor). Possible explanations include but are not limited to: 1) Raised basement houses are less likely to have significant flood related damage that renders the property uninhabitable; 2) A large percentage of unknowns in this elevation type are fully gutted houses; 3) As 58% of raised basement homes are in the repair process, more than half of the homes have already been gutted by January 2007. Third, houses built on raised piers represent 67% of the houses in Broadmoor yet have the lowest percentage of completed repairs. Possible reasons for this include: 1) The expense of repairing a house raised on piers; 2) Repairing

Repair Status by Elevation Type in 2007

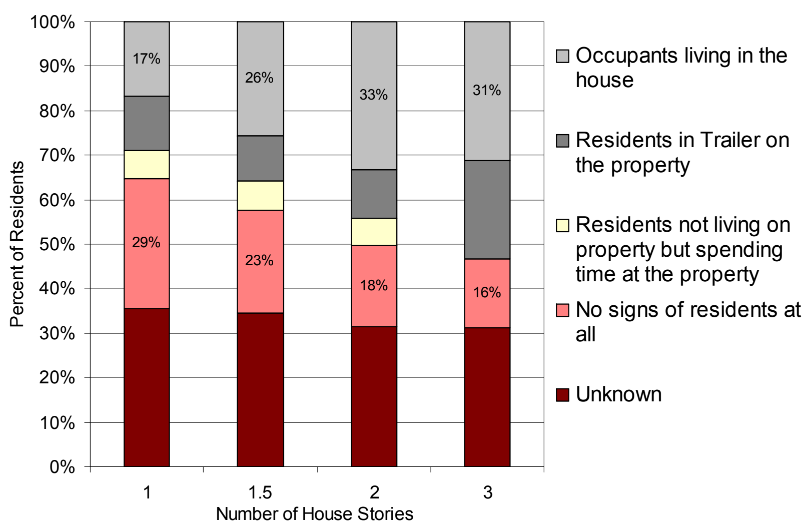


houses raised on piers requires more time than other elevation types; 3) A large percentage of unknowns in this elevation type are under renovation.

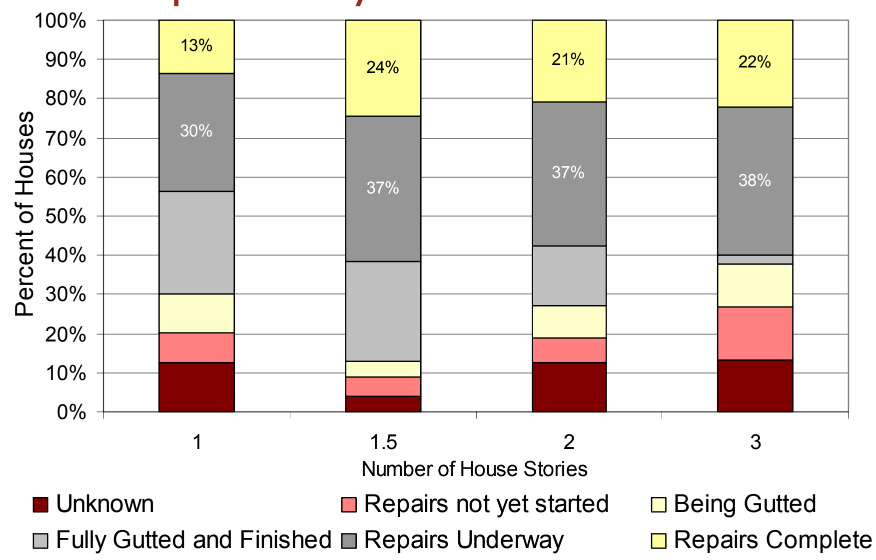
How does the number of stories in a house affect repopulation rates?

Multi-story houses generally offer greater flood protection than single-story houses. Consequently, as the number of stories in a Broadmoor house increases, the likelihood that there are residents occupying that house tends to increase as well. For example, 33% of Broadmoor's two-story houses are occupied while only 17% of Broadmoor's one-story houses are occupied. In addition, the more stories in a house, the lower the likelihood that the house will exhibit no signs of residents. For example, 29% of Broadmoor's one-story homes have no signs of residents at all, while only 18% of two-story houses show no sign of residents.

Resident Status by Number of House Stories (2007)



Repair Status by Number of House Stories



How does the number of stories in a house affect its reconstruction status?

Because a higher percentage of single-story houses show no sign of residents, fewer are categorized as either under repair or fully repaired relative to multi-story houses. In addition, the data reveals little difference in repair status among 1.5, 2, and 3-story houses. This is probably because the basements and first floors of most Broadmoor houses, regardless of size, experienced some damage due to flooding. Thus, most houses required repair, regardless of size. Lastly, the data shows that a higher proportion of 1.5 story houses have been repaired than that of any other category. This is probably because 1.5 story houses comprise such a small proportion of the sample (only 3.4% of houses), and, consequently, are much more sensitive to anomalies in the data than other categories containing more observations.

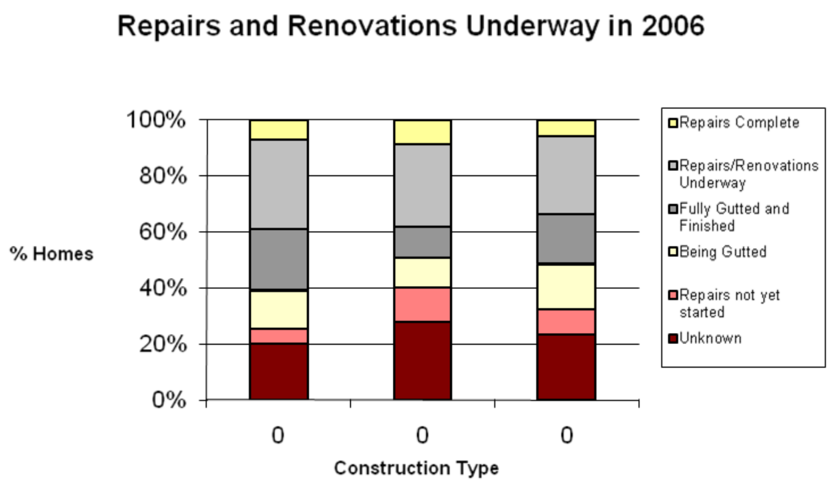
Additional Repopulation Factors (Repair status by construction type)

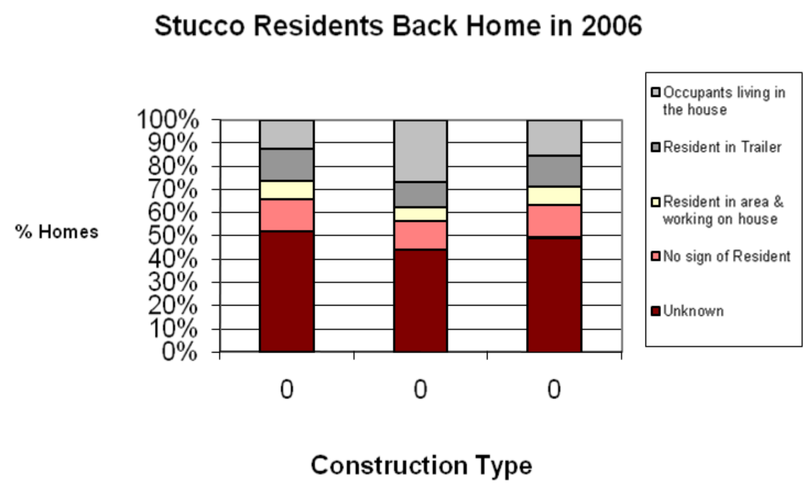
Repopulation is exemplified by residents who lived in homes of various construction type and their ability and willingness, respectively, to repair their homes. Types of construction were disaggregated by homes consisting of brick, stucco, and wood frame. In 2006, while Broadmoor observed only a slight difference in the percentage of residents with repairs/renovations underway on their homes across construction type, they also observed a slight difference in the percentage of residents with repairs and renovations complete on their homes across construction type. Though Broadmoor only observed a slight difference in homes with repairs complete, data reflects that Broadmoor observed a relevant increase in the percentage of brick homes with repairs/renovations underway. In time, the percentage of responses of "unknown" decreased by 45% from 2006 to 2007 improving the accuracy of the statistic on the repair status by construction type in Broadmoor.

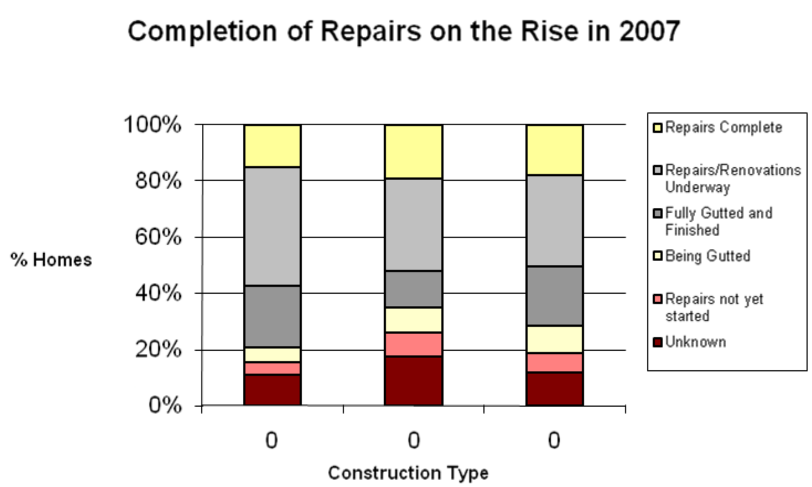
Repopulation is also exemplified by residents who lived in homes of various construction type and their ability and willingness, respectively, to return to their homes and community. Types of construction were disaggregated by homes consisting of brick, stucco, and wood frame. Data reflects that Broadmoor observed a slight distinction in the percentage of residents occupying their home by construction type in 2006.

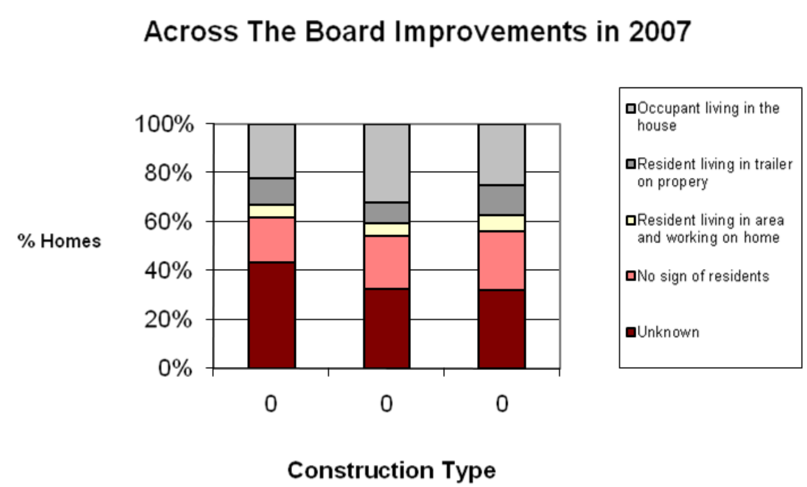
Residents living in stucco homes observed a higher percentage occupying their homes than their counterparts living in brick and wood frame homes in 2006. In 2007, residents in stucco homes only slightly outpaced residents in brick and wood frame homes in their ability to occupy their homes. The percentage decrease in "unknown" responses (30%) from 2006 to 2007 improves the accuracy of the statistic on the percentage of resident's status by construction type. (See Appendix for year-to-year comparison of residence status by construction type.)

Repair Status by Construction Type









Broadmoor and New Orleans

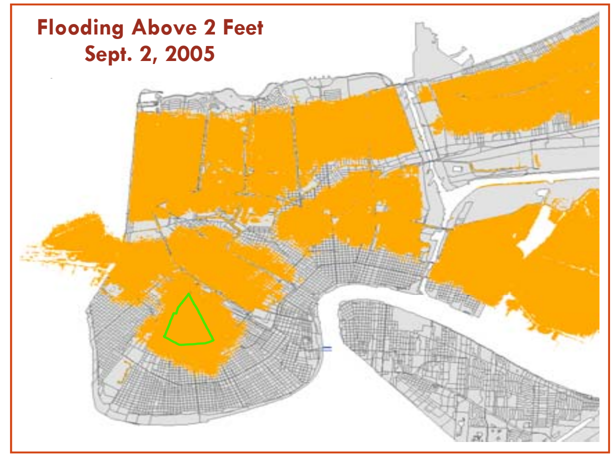
To complement the analysis on the Broadmoor neighborhood and provide an advanced understanding of how the recovery of Broadmoor compares to other affected neighborhoods in New Orleans, random sample and matched-pair surveys are being undertaken in accordance with the following methodology.

Justification for development of Random Sample and Matched-Pair Survey

Both flooding and wind damage resulting from Katrina affected most of the city of New Orleans. Flood damage across the city is shown in the map on the right, with affected areas defined for the purpose of this section as those parts of New Orleans that suffered an average of two feet or more of flooding. All parts of Broadmoor represent an affected area.

To test whether Broadmoor is recovering at a different rate than other affected areas in New Orleans, there are two different comparisons that are relevant. These are:

- whether Broadmoor is recovering at a different rate compared to the average rate of recovery across all other affected areas; and
- whether Broadmoor is recovering at a different rate compared to other affected areas with similar pre-Katrina characteristics that sustained similar levels of damage as a result of Katrina.



In order to make these comparisons, it is necessary to have data on each of the different populations of interest. However, the data available to make reliable comparisons across neighborhoods is very limited. Therefore, it is proposed that additional data be collected, with the collecting of data on each population of interest requiring a different technique. These techniques are random sampling (for comparisons between Broadmoor and the average across all other affected areas) and matched pair analysis (for comparisons between Broadmoor and other affected areas which had similar pre-Katrina characteristics and which suffered similar damage as a result of Katrina).

First, to determine whether Broadmoor is recovering at a different rate compared to other affected areas, random samples of 50 Broadmoor blocks and 100 blocks from other affected areas were drawn. The random sampling of blocks was designed to obtain samples that are representative of each of Broadmoor and other affected areas. These blocks were then surveyed during the first half of 2007 to obtain the data on rates of recovery and from which reliable comparisons will be able to be made.

Second, to determine whether Broadmoor is recovering at a different rate compared to other affected areas with similar pre-Katrina characteristics that sustained similar levels of damage as a result of Katrina, a matched pairs analysis is undertaken. The matched pairs analysis is used to identify the block groups within affected areas that are the most statistically similar to block groups within Broadmoor and is done so according to specific criteria. These criteria are intended to control for basic characteristics that could affect the rate of recovery of different neighborhoods, including socio-economic status, racial composition, household values, and damage from Katrina. After having identified the block groups in affected areas most similar to block groups within Broadmoor, the different block groups will be surveyed during June of 2007 to obtain the data on rates of recovery. Again, this data will allow for reliable comparisons to be made.

A more detailed description of the different techniques is set out below, together with a methodology and a list of the randomly selected blocks and the matched pair block groups (see Appendix for details).

Random Selection of Blocks for Recovery Rate Comparison

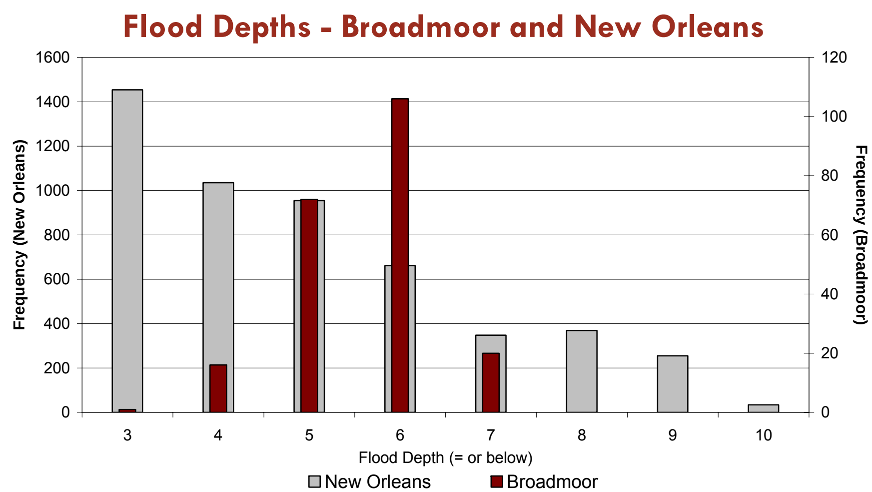
The purpose of this section is to obtain data to answer the following question: *Where does Broadmoor stand, in terms of recovery, compared to other affected areas?*

To answer this question, we sought to establish a base line comparison, where we would use an empirical survey to determine where Broadmoor fits with other affected areas. For that purpose, 50 blocks were selected from Broadmoor and 100 from other affected areas. The selected blocks have been mapped, and were surveyed during the course of April 2007.

Analyzing the post-Katrina profile of Broadmoor and of the City, using survey data for flood levels from the Corps of Engineers as well as a damage level survey evaluated at the individual address level, we see that these two profiles differ:

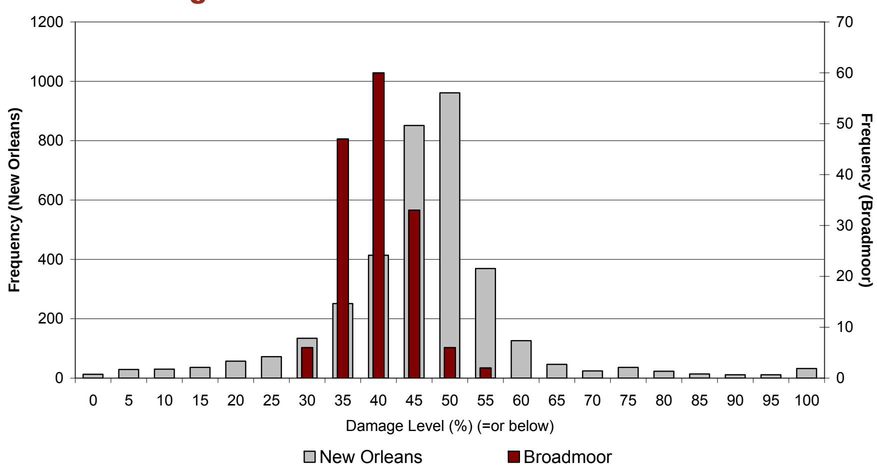
The average flood level in Broadmoor was 5.08 feet, whereas in affected areas, the average flood level was 4.43 feet. Further observation shows that Broadmoor's blocks sustained on average between 2.9 and 6.52 feet of water; whereas in affected areas, the spread ranged from 2 to 9.59 feet.

Added to this discrepancy, the flood distribution is different: as the below graph shows, Broadmoor's blocks' flood depths are clustered around higher values than the median of the distribution for affected areas. This is an expected result, as Broadmoor shares a relatively homogenous topography in terms of elevation, a primary determinant of flood level.



Likewise, analyzing the data for house damage levels shows significant variations between Broadmoor and New Orleans. In Broadmoor, blocks have sustained an average of 37.18% damage; while in affected areas the damage averaged 43.58%. However, the spread of block averages ranged from 26.38 to 52.13% for Broadmoor, versus a spread of 0 to 100% in the affected areas. Notice that the spread of damage per address, which is the base unit for the survey, was larger in Broadmoor, and ranged from 0% to 84.86%. Data at the address level has been aggregated to the block level, subsequently tightening the spread. The distribution of damage levels in both Broadmoor and the affected areas is shown on the following graph:

Damage Levels - Broadmoor and New Orleans



Hence, after establishing a *comparison group*, we then must determine *comparability*: to assess how well Broadmoor has been recovering, it needs to be matched to regions around the city that are similar not only according to the extent of damage due to Katrina, but also to selected socio-economic criteria. This is done using a matched pair analysis, as described in the following section.

Matched Pair Analysis

The 2000 U.S. Census breaks Broadmoor up into three and a half Census tracts, which comprise ten block groups, encompassing 218 individual blocks overall. The block group is the smallest group for which the socio-economic data required for the comparison is available. Because there is significant variation in socio-economic and flood damage characteristics within Broadmoor (see maps on following page), we compare its block groups to other block groups across the city of New Orleans, rather than to other neighborhoods as a whole.

Random Selection Screening

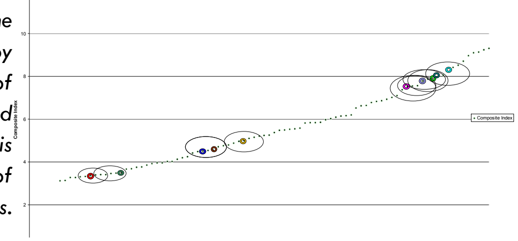
- Flood Depth

Matching Pairs Criteria

1. Flood depth
2. Damage level
3. Race
4. Income
5. Property Values

In determining which communities we may compare Broadmoor to, we applied a matched pairs statistical analysis to Broadmoor's block groups. This involved choosing a set of factors by which to judge whether other block groups are comparable to Broadmoor's. The specific mechanical and mathematical steps this requires are discussed in the Appendix, but the idea is to perform a logit regression on a variety of indicators for each block group, generating a composite index of the overall similarity of each block group to Broadmoor's. By ranking the index scores, we determined

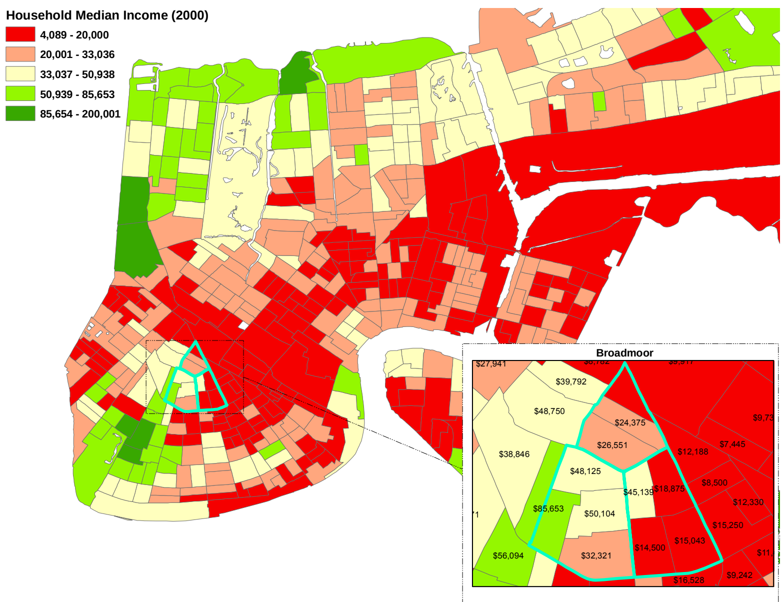
Matched Pairs - Visual Representation



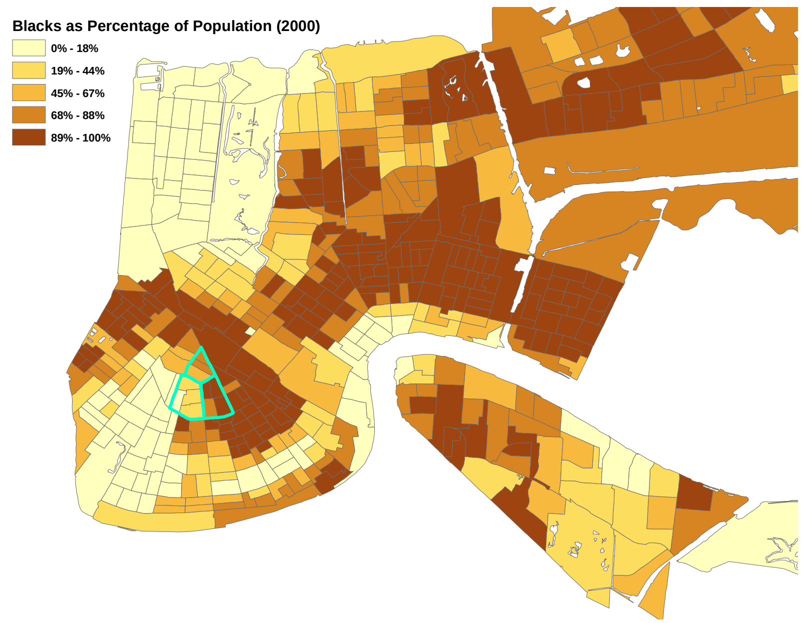
This graph shows each of the Broadmoor block groups, organized by the composite index scores, surrounded by its 5 matched pairs. The overlap of several comparison groups, represented here by the overlap of the ellipses, is caused by the relative homogeneity of Broadmoor's block groups.

Visual representation of two criteria (median income and race) used in matched pairs analysis

Median Income
Broadmoor and New Orleans



Race
New Orleans



which block groups are most comparable to Broadmoor's and selected them for further study through survey. For each of Broadmoor's 10 block groups, we performed the matched pair analysis, identifying and selecting the 5 other block groups from across New Orleans that most closely resembled each individual Broadmoor block group.

Selection Factors & Quality of Data

We measured comparability of block groups according to five factors. Three of the factors measure the socio-economic characteristics of the block groups before Hurricane Katrina and two of them measure Katrina-related damage. The two damage variables we used measure the depth of flood waters and the extent of damage from flooding, as assessed by the City of New Orleans Geographic Information Systems (CNOGIS). Clearly, flood depth is a fundamental consideration in any comparison, as discussed in the section on the random sample of New Orleans blocks. Note that while we used flood depth as a filter for eliminating certain blocks from the random sampling altogether, in the matched pairs analysis, we are both applying the same basic flood depth filter as in the random sample and including it as a variable for measuring comparability. As a filter, flood depth is simply an indicator of whether the block group is part of the recovery area – that is, *whether* it was affected by Katrina. As a variable, flood depth is an indicator of *how much* each block

Profile of Broadmoor Block Groups

Block Group	Percentage Black/ African American (black_pct)	Average Household income (hh_inc)	Median Home Value of Owner-occupied units (med_val)	Percentage Damage (dmg_pct)	Flood Depth (depth)	Propensity Score
220710123001	84.52	24375	70,700	40.05	4.442003	0.0335073
220710112002	29.62	32321	107,700	37.85	4.615537	0.0348401
220710103002	100.00	15043	78,100	41.058	5.187128	0.044998
220710103003	80.06	14500	134,800	40.43	5.196003	0.0455177
220710123002	62.03	26551	103,300	37.231	4.923679	0.0498416
220710122002	1.90	85653	168,300	34.504	4.815535	0.075033
220710103001	92.62	18875	62,900	38.364	5.949719	0.0777908
220710123003	27.02	48125	141,500	33.174	5.124006	0.0790368
220710103004	92.14	45139	75,400	37.37	5.289915	0.0798845
220710112001	33.85	50104	135,100	36.285	5.724347	0.0837928

group was affected by Katrina.

Race has been a major subject of discussion regarding New Orleans' recovery efforts and numerous commentators have both pointed out the disproportionate effect of the hurricane on minorities and suggested racial bias affected the administration of various governmental relief programs. Therefore, we concluded that it was important to control for block groups' racial composition and we did this by including in our regression the simple variable "black_pct." This variable measures the percentage of a community's total population that was identified on the 2000 Census as "black or African American alone" (As opposed to black or African American and other identifications as well, such as Latino/Hispanic or mixed race).

Income is of course important to measure because wealthier communities have more material resources to draw on in rebuilding their homes. We also included property values to capture the larger incentive to return provide by a more valuable home. Although property values should correlate significantly with income levels – wealthier people tend to live in more expensive homes – we included property value as a separate variable, because some people spend a larger share of their income than others on their housing, either by choice (for instance, wealthy people with lower-priced second homes or condominiums) or because they inherited homes they could not have afforded on their own.

The table on the previous page lists the characteristics of each of Broadmoor's block groups according to the eight factors we included in our logit regression.

Regression Results

Putting all these factors together, we generated an equation that models the similarity between a given block group outside of Broadmoor and a given block group inside Broadmoor. This similarity is expressed as the propensity of a block group to be in Broadmoor. By this we mean, "Given a block group's characteristics according to these measures, how likely is it that this block group is in Broadmoor?" We can express this mathematically in the following equation:

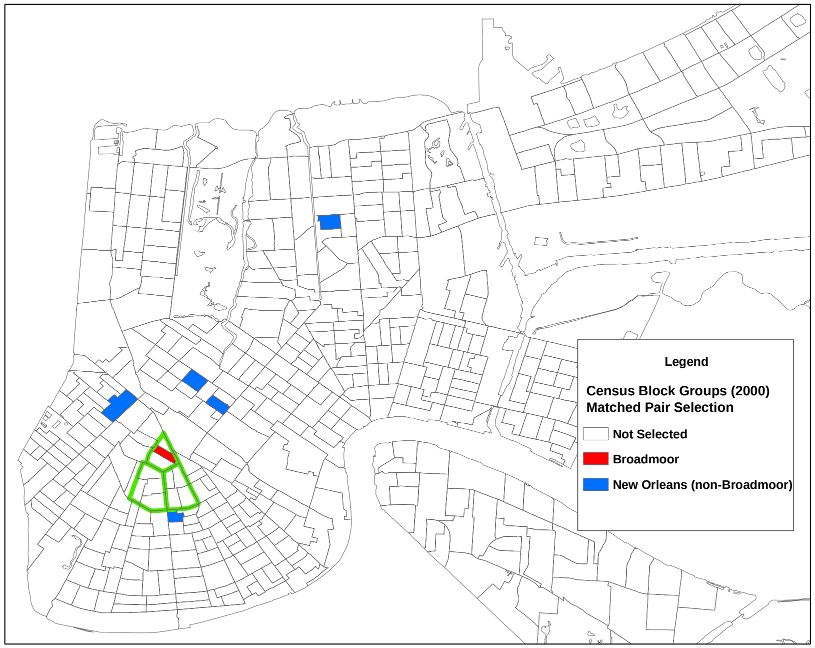
$$P(\text{Broadmoor}) = \beta_0 + \beta_1 \textit{depth} + \beta_2 \textit{dmg\_pct} + \beta_3 \textit{black\_pct} + \beta_4 \textit{hhold\_inc} + \beta_5 \textit{med\_val} + \textit{error}$$

When we ran this regression on the data set prepared, we obtained a list of block groups outside of Broadmoor comparable to each of Broadmoor's block groups. From this list, we picked the five block groups outside Broadmoor that most closely matched each of Broadmoor's 10 block groups. This generated ten sets of five comparison block groups, but because some of the comparison groups overlapped, we only selected 26 different block groups outside Broadmoor in total. For example, the next page displays a map of one of Broadmoor's block groups and its comparison groups. Appendix ____ displays corresponding maps for Broadmoor's other 9 block groups, as well as the Stata output from the regression.

Logit Regression Model

$$\mathbf{P(Broadmoor)} = \beta_0 + \beta_1 \textit{depth} + \beta_2 \textit{dmg\_pct} + \beta_3 \textit{black\_pct} + \beta_4 \textit{hhold\_inc} + \beta_5 \textit{med\_val} + \textit{error}$$

One Set of Matched Pairs



Limitations of the Model

We recognize that there are many other factors that could affect a neighborhood's or block group's recovery from the Katrina disaster that are not represented in this model. There are two reasons we excluded other factors, one of them theoretical and one of them practical. On a practical level, there were factors we wanted to investigate but could not, due to a lack of available data, as we discuss below. On a theoretical level, since the logit regression is providing a composite measure of similarity among communities, the more characteristics that are factored into the composite measure of similarity, the more likely that you will get an imbalanced measure. That is, the more kinds of similarity you measure, the greater the likelihood that you will select some communities that have a very high degree of similarity in one or several areas but very low similarity in others, instead of a community that has a lower but more consistent degree of overall similarity.

For Further Study: Other Factors

When conducting statistical analysis, inadequate data compels researchers to exclude variables they feel will help illuminate answers to important questions. In our study we dealt with this issue in several areas.

As is often the case in post-disaster recovery, and particularly relevant in post-Katrina New Orleans, the actions of state and local governments have a tremendous impact on the rate at which a community can and will recover. At the time of our study, data on key government decisions was largely unavailable as many state and local reconstruction plans were still being developed.

This study would have benefited from data related to knowing whether the city of New Orleans treated storm-damaged neighborhoods differently with regard to: the restoration of utilities, its willingness to issue building permits, commitment of police, fire, or EMT services, and the reopening of local schools and hospitals (among many other infrastructure--related variables). While it is possible to observe many of the aforementioned variables, it is impossible to fairly assess their impact on the return of citizens. It is often unclear whether the decision to commit resources caused residents to return, or whether resources were committed as a result of the return of residents. Therefore, the government's timing of the restoration of services and utilities is of particular importance to the rate at which a neighborhood can recover. This is an area that warrants further study as data becomes available.

Considerations for Future Studies

Throughout the course of our study we discovered a variety of areas that may warrant deeper and more comprehensive research and analysis. One area of interest may be the effect of an individual's job or job sector on a resident's decision to return to the city. This becomes increasingly important if a neighborhood had a high concentration of residents employed by a single employer or within a specific industry that did not return following Hurricane Katrina.

We also gave serious consideration to the effect of population and population density on the recovery rate of a neighborhood. We chose to exclude these variables in our matched pair analysis because we wanted to include only variables that we felt directly contributed to a neighborhood's recovery capacity. However, one can also argue that neighborhoods with higher populations can gather resources more easily or rely on a greater pool of people with skills that may be directly beneficial for recovery (carpenters, plumbers, electricians, contractors, etc.). Therefore, it is worth conducting a study with population and population density taken into account when selecting matched pairs.

And finally, future studies may benefit from exploring variables such as: family composition (marital status and the presence of children in the household) and its effect on a family's decision to return to a neighborhood; the effect of school enrollment levels in a particular neighborhood, the effect of health related issues and disabilities on a resident's decision to return, the average age of the population within a neighborhood, and the amount of equity homeowners have built up in their properties.

Conclusion and Next Steps

Conclusion

There is a substantial volume of publicly available data that can be used to assess both the extent of the damage caused by Hurricane Katrina and the rate at which New Orleans is recovering in the aftermath. In addition to the standard limitations associated with these data sets, all of the post-Katrina data is subject to the additional difficulties of collecting reliable data in the aftermath of a natural disaster. The city's building permit data provides some indication of intent to rehabilitate homes that have been destroyed, however it does not fully represent the work that has been completed, and any work that may be happening in the absence of permits. Similarly, the National Change of Address database is useful for assessing repopulation rates for homeowners, but cannot be used for rental properties. *Finally something about MLS data once Alison submits her results.*

Through its more detailed survey and assessment of home occupancy and repair status for all properties in Broadmoor, the KSG and the Broadmoor Improvement Association have been able to determine that repopulation continues to rise and that 42% of houses are occupied as of January 2007. In addition 72% of homes have been completely gutted, and 18% of homes have completed their repairs.

Next Steps

In order to assess how Broadmoor's improvement efforts compare to other neighborhoods throughout the city, a selection of comparable addresses have been selected throughout the city. In the coming months, the survey will be conducted to assess the status of those houses, which will then allow for analysis on the rate of Broadmoor's improvement vs. New Orleans as a whole.

Appendix A:
History of Broadmoor Improvement Association

“The Broadmoor Improvement Association (BIA) is one of the oldest neighborhood associations in New Orleans. Established in 1930 as the Broadmoor Civic Improvement Association to address the needs of the developing Broadmoor neighborhood, it was incorporated in 1970 as the Broadmoor Improvement Association, Inc. to stop "blockbusting" in Broadmoor, a well-established, multi-racial/multi-ethnic community already living in harmony.

Since that time, the Broadmoor Improvement Association has worked continuously to improve our neighborhood. We have stopped commercialization in our residential core; we have reduced crime; we have secured the Rosa Keller Library; we have joined with Rebuild New Orleans to repair homes of our low-income elderly or handicapped; we have re-treed our neutral grounds and the MLK park area – all in constant effort to improve Broadmoor and maintain a high quality of life for it's residents.

The BIA works closely with the City government and has represented Broadmoor residents in numerous cases concerning zoning and other issues.

The BIA exists for every resident of Broadmoor. Our neighborhood has a sense of awareness, unity, and pride.
In the aftermath of Hurricane Katrina, the time for action is now. It is imperative that we unite as one to rebuild a stronger Broadmoor; not one of us can do it alone. Being faced with the challenges of crafting a vision for the future of our community, BIA needs your presence and voices every step of the way. So lets pull together, join the Broadmoor Improvement Association and put a better Broadmoor in the center of the map of New Orleans.”

From the Broadmoor Improvement Association website (http://broadmoorimprovement.com/node/21, 1/23/06)

Appendix B:
Data Set Descriptions and Analysis Methodology

Data Set Listings

Building Permits
National Change of Address (NCOA)
Multiple Listings Service (MLS)
Broadmoor PlanReady
Matching Pairs
Geographic Information Systems (GIS)

Building Permits Data

Description of Variables
Dataset includes permit types and purposes within each category as associated with a specific address. These permits are issued by the Department of Safety and Permits within the Building Division of the City of NOLA.

Permit Types include:

- Residential
- Commercial
- Electrical
- Mechanical
- Certificate of Occupancy (*Technically not a permit, but a certificate that is issued once a permit is fulfilled and a house is deemed 'living-worthy'.)*

Major purposes within the Permit Type category include:

- Emergency Permits: These permits describe those that were issued for special situations related to Hurricane Katrina. This classification help cuts in processing time.
- Repairs: Can be specified by homeowner repairs or contractor repairs

Methodology/Steps for Data Analysis
Using the provided data file from the I-Site, we did the following:

PREPARE DATA FOR RESEARCH:

1. Imported data (delimited text) into on MS Access file and divided the data into the following fields:
    - ID
    - Permit Type
    - Purpose
    - Date (& Time)
    - Address ID (House Number)
    - N/S
    - Street Name
    - Street Type

   MS Access deleted all blank lines that existed in the file.

2. We choose to initially import data into MS Access because MS Excel could not completely load the data as a whole into one worksheet file.
3. We choose to exclude data from March 2007 because we only had one day of data within the month.
4. Then, we imported the MS Access file into one MS Excel file by separating the data into three different worksheets in 6 month increments.
5. Once data was separated into three worksheets, it was automatically separated into columns that corresponded to the fields we selected in MS Access.
6. Then, we cleaned data in each file to make sure appropriate information fell into the appropriate cells (i.e. move house numbers into house number cell) within each worksheet.
7. Then, we created an aggregated field named "Full Address" within each worksheet by using the function (Fx) CONCATENATE. It included:
    - House Number

- N/S
- Street Name
- Street Type

8. Next, we erased the function (Fx) CONCATENATE formula from our "Full Address" field, while leaving the field information constant through the following steps:
    a. Highlighting and copying the entire column
    b. Then, selecting *Paste Special* over the entirety of the column.
    c. Within *Paste Special*, select paste: *values*
9. This allowed for our next step of pulling out extra spaces within our new aggregated field
    a. While the column is still currently highlighted, we go to Edit menu from the MS Excel toolbar to select the *Replace* feature.
    b. Within the *Replace* feature, we look up places were there are 2 spaces and replace them with 1 space by literally putting two versus one space in the search fields.
10. Data is identified as clean. We have created the necessary fields to make comparisons within our data.

COMPARE NUMBER OF PERMITS BETWEEN BROADMOOR vs. NOLA:

1. In order to compare the number of permits requested by Broadmoor versus those requested by the City of NOLA, we introduced a new MS Excel file that contained all the addresses of Broadmoor residents (3594 addresses). This was provided by our GIS Team. Using this file, we did a VLOOKUP within our current data set of citywide building permits (127754).
    a. The function (Fx) VLOOKUP is located in the Lookup & Reference category of MS Excel functions. You must select the four following inputs to correspond with the following fields:
        i. *Lookup_value:* "Full Address" column in Permit Data
        ii. *Table_array:* "Full Address" column in Broadmoor Addresses (separate MS Excel file)
        iii. Col_index_num: 1
        iv. Range_lookup: FALSE
    b. This allowed us to *flag* Broadmoor residents that have received city permits thus far, separate from NOLA. We labeled this field as: "Broadmoor Yes/No"
        i. If address falls within Broadmoor boundries, repeated addresses will appear in cell
        ii. If address does not fall within Broadmoor boundries, it is apart of the greater NOLA and will appear as #N/A in cell
        - Note: you will receive an error flag, but ignore. It is only present because of the lack of matching addresses it kind find. This is normal and expected
    c. This step was completed in all three worksheets.
2. An additional (perhaps optional) step that we took to further conserve time when later processing and searching data was to eliminate the function (F_x) VLOOKUP formula from our "Broadmoor Yes/No" column. This step was accomplished by following the same procedures as noted above.
    - Note: Keeping formulas in MS Excel with such a large data set tends to slow down the software's ability to process information.
3. Now we can compare requested permits by Broadmoor households vs. permits requested by the rest of NOLA.
4. We used the *AutoFilter* to sort our new "Broadmoor Yes/No" column. In order to separate our "Broadmoor Yes" from our "Broadmoor No," we select: (*CUSTOM*) on our filter and request to show fields where "Broadmoor Yes/No" *does not equal* the field *#N/A*.
    a. Permits were compared within 6 month increments. The following were flagged in Broadmoor:
        i. First 6 month increment (Sept. 2005 – Feb. 2006)
        ii. Second 6 month increment (March 2006 – Aug 2006)
        iii. Third 6 month increment (Sept 2006 – Feb 2007)
5. Then, we selected all "Broadmoor Yes" data and pasted it into a separate worksheet that corresponded with it's original dates. They were labeled:
    a. Broadmoor_Sept 2006-Feb 2006
    b. Broadmoor_Mar 2006-Aug 2006
    c. Broadmoor_Sept 2006-Feb 2007
6. Then, using the *AutoFilter*, we sorted all three new Broadmoor_6months worksheets by date in order to calculate requested permits per month/year
    a. In order to eliminate human error when counting, we used the function (F_x) ROWS to count the total permits requested per month within each worksheet.
    b. This is done by inserting the function (F_x) ROWS to the right of the last column and highlighting one month at a time

- Note: you may receive an (omitting adjacent cells) error pending on what column you choose to select for counting purposes. That is acceptable.

7. Finally, we created another worksheet entitled: Number of Permits. This worksheet was used to list our findings on the number of permits requested by Broadmoor residents versus the entire city of New Orleans. Permits were separated by the month and year.
8. Using this break-down of information, we created three graphs:
    a. Total Number of Braodmoor Permits versus Total Number of NOLA Permits:
        i. In order to compare trends, we used a *Line Graph on Two Axes* to illustrate the relationship between the two groups. A Line Graph on Two Axes was used to show the trend of both groups to scale.
    b. Broadmoor's Share (Percentage) of NOLA Permits:
        i. We calculated Broadmoor's share (percentage) of permits compared to NOLA's total number of permits. This is calculated by dividing Broadmoor's number of permits by NOLA's number of permits and multiplying by 100. A second line graph was created to illustrate this relationship.
    c. Monthly Percentage Change (Trend) of Requested Permits:
        i. We calculated the monthly percent change of requested permits per Braodmoor and NOLA. This was calculated using the percent change formula of: [new-old/old] x 100, or [current month – prior month/prior month] x 100. A third line graph was created to illustrate the same relationship.

TOTAL TYPE OF PERMITS REQUESTED IN BROADMOOR PER MONTH:

1. We began with our total Number of Permits worksheet by copying it into a new MS Excel file. We labeled this file: bldgpermits_by type_broadmoor.
2. Within this file, we selected the *AutoFilter* (located in the Data Menu as a filter option of the MS Excel toolbar) for all variables. Working within the "Permit Type" column, we filtered out each permit type and copied them into their own worksheet. They were labeled accordingly:
    a. Residential
    b. Commerical
    c. Mechanical
    d. Electrical
    e. Certificate of Occupancy
3. Then, we created an additional worksheet entitled: Type of Permits per Month. Within this worksheet, we created an example of the following table:

Month Date	Sept 2005	… …	Feb 2007	TOTAL
PERMIT TYPE				
Residential	0		100	100
Commerical	0		100	100
Mechanical	0		100	100
Electrical	0		100	100
Certificate of Occupancy	0		100	100
TOTAL	**0**		**500**	**500**

    a. This table was used for two purposes:
        i. To hold the monthly breakdowns of each permit type.
        ii. To double check our counting of the monthly breakdown. We accomplished this by summing our inputs at the bottom of each month, which then were added at the end of the table through the function (F_x) formula. We would then compare this to a row counting for formula within each of the aforementioned worksheets.
4. Within each of the aforementioned worksheets, we used the *AutoFilter* to sort the "Date" column in ascending order. This allowed us to accurately separate and count the number of permit types granted per month, which we then placed in our table located in our Types of Permits Per Month worksheet.
    - Note: A time saving step is to right click at the bottom of the MS Excel window and select: *Count*. Then, highlight and drag you cursor from the beginning to end of each month. A total sum of rows (# of permits) will be displayed at the bottom left hand corner of the window.
5. In order to double-check our individual sums of months above, we used the function (F_x) ROWS formula within the *Lookup & Reference* category of MS Excel to sum the total of permits on each worksheet. This number was then inserted into the Total column of our table located in our Types of Permits Per Month worksheet.
6. Upon comparing and double-checking our numbers, we graphed the break-down of this information:

a. Total Number of Permits Requested (by type) in Broadmoor Per Month:

   i. In order to illustrate this data, we used a Stacked Column graph to compare the contribution of each permit type to the total across the category of month and year.

IDENTIFY DUPLICATE PERMIT HOLDERS IN BROADMOOR & NOLA:

1. We began with our total Number of Permits worksheet by copying it into a new MS Excel file.
2. Within this file, we selected the *AutoFilter* (located in the Data Menu as a filter option of the MS Excel toolbar) for all variables. Working within the "Broadmoor Yes/No" column, we filtered out Broadmoor residents from the rest of NOLA. All Broadmoor Yes were then cut and pasted into a separate worksheet from Broadmoor No (NOLA).
3. Then, we selected the *AutoFilter* (located in the Data Menu as a filter option of the MS Excel toolbar) for all variables within the 'Broadmoor Yes' worksheet. This allowed us to appropriately sort data multiple times to identify duplicates.
4. In order to identify duplicates, we sorted the data twice. First, by "Street Name"; then, "House Number".
   a. This allowed us to compare the number of houses that had multiple permits types and/or permit purposes.
5. Once identified, we used a function (F_x) IF formula to easily count and mark the number of addresses that held more than one permit.
   a. The function (F_x) IF is located in the *Logical* category of MS Excel functions. Selecting the first row and column next to the "Broadmoor Yes/No' column within each worksheet, we then inserted our function (F_x). It compared the one cell to the cell above it within the "Broadmoor Yes/No" field.
      i. The formula used can be expressed with through the following : $X_3 = X_2$, "dup", X_2
   b. This allowed us to *flag* Broadmoor residents that have received more than one city permits thus far. We labeled this field as: "Duplicate".
      i. If the top cell (address) matched with the bottom cell (address), then the word 'dup' would appear in our new "Duplicate" field.
      ii. If the top cell (address) did not matched with the bottom cell (address), then the word original, non-matching cell (address) would appear in our new "Duplicate" field.
6. Once again, we selected the *AutoFilter* (located in the Data Menu as a filter option of the MS Excel toolbar) for our "Duplicate" column. Then, sorted by 'dup'. This allowed us to appropriately count the number of 'dup' permits found amongst Broadmoor addresses.
   a. We found that there are 1766 'dup's.
      i. Addresses that have at least two permits are defined as 'dup's
   b. Then, we subtracted our total number of 'dup's (1766) from our total permits (2935). This provided us the total number of permits after eliminating duplicates, which is 1456.
7. This procedure was then replicated for our Broadmoor No worksheet.
8. Upon comparing our numbers, we graphed the break-down of this information:
   a. Total Number of Permits Requested per Unit in Broadmoor vs. NOLA:
      i. In order to illustrate this data, we used a Column graph to compare the total number of permits requested in Broadmoor to the total amount of permits requested in Broadmoor per unit (by eliminating the duplicates). These numbers were framed within the total number of available units in Broadmoor.
      ii. For comparison purposes, we replicated the same graphing steps for permit totals within the city of NOLA.

CHANGE OF ADDRESS (COA)

Research Question

What is the repopulation trend of Broadmoor as measured by property owners leaving or remaining in the community? This can be determined by looking at changes in the mailing addresses of property owners. The following are the relevant subquestions:

1. In 2004, what percentage of property owners were living in Broadmoor and how many were absentee owners? How did those figures change in 2006 and 2007?

2. Of the subgroup of property owners who were living in Broadmoor in 2004, what percentage of these moved out in 2007?
3. Comparing the years 2007 and 2004, how many property owners who actually live in Broadmoor in 2007 are new additions to the community?
4. What percentage of property owners moved out of Broadmoor between 2004 and 2006 and of that subgroup, how many percent have returned?

Key Assumption
Resident status of owners is ascertained by comparing property addresses and the individual or business mailing address. In this study, we consider it a match so long as the mailing address is still located within the Broadmoor community. Changes in the numbers over time will reveal repopulation trends.

Methodology

1. Create a worksheet that lists the combined property addresses corresponding to the time period being studied as well as the owner name and mailing addresses over the different time periods. Add a column named "resident owner" to capture information on whether the property address and mailing address matches.

2. Make a list of street names within Broadmoor community. We obtained information from Geographic Information System (GIS).

3. For each year, compare the property address with mailing address. If there's an exact match, enter 1, if the mailing address is a street in Broadmoor, enter 2. For everything else, enter 3. This means that the sum of property owners with codes 1 and 2 make up all the resident owners. Those with code 3 are absentee owners.

Question 1

- Sort the data for 2004 according to codes.
  - Click on a cell in the code column
  - Click on "sort ascending" icon in the tool bar
- Filter the entries to get unique records
  - Highlight column
  - Go to "data", "filter", "advanced filter", click "unique records only"
- Count the total number of property owners
- Copy the names of property owners labeled 1 and 2 and paste it into another worksheet. These are the resident owners.
- Paste selection into another worksheet
- Count the number of resident owners.
- Calculate that number as a percentage of all property owners for that year.
- Repeat same process for 2006 and 2007.

Question 2

- Extract resident owners for 2004 and 2007. Paste them in adjacent columns.
- Format the names of property owners
  - Create a new column beside the column with names of property owners in 2004
  - Convert all text to uppercase using formula =UPPER(cell number)
  - Replace all spaces by clicking "edit", "replace". In the dialogue box that pops up, enter a space in the upper field. Click "replace all"
  - Click on a cell in 2004, click paintbrush icon and select en-

tire column for 2007 to replicate formatting.

- Run a match for names in the 2 years.
  - Create a new column named "match"
  - Insert formula =match(lookup_value, lookup_array, false) where lookup value is the entry in the corresponding row for 2004 and lookup_array is the range of data for 2007.
- Count the number of matches
  - Create a new column named "count"
  - Insert formula =IF(ISNA(match(lookup_value, lookup_array, false)),0,1)
  - Sum up the number of 1s in the column to get total number of matches.
- Calculate that number as a percentage of total resident owners in 2004.

Question 3

- From the number of matches calculated in the above step, subtract that number from total number of resident owners in 2007.
- This gives the number of new residential owners in 2007.
- Calculate that as a percentage of total resident owners in 2007.

Question 4

- Get the unique records of resident owners for 2004 and 2006.
- Create "match" and "count" columns.
- Save another copy of this same worksheet
- Change the cell inputs in match and count columns from "formula to "value"
  - Select entire column
  - Copy and paste
  - Click on clipboard icon and select "values only"
- Extract subgroup of resident owners that left between 2004 and 2006
  - Click on any cell in the "count" column
  - Sort record in ascending order
  - Copy the names of property owners corresponding to those records with "0" in the "count" column.
  - Paste onto another worksheet
  - Count the number of owners that moved
- Match record of 2004 resident owners who moved in 2006 with unique record of resident owners in 2007 using the process described above.
- Count the number of matches. That number shows the number of 2004 resident owners who have returned in 2007.

Description of Data Set

- We took as our data set information about property owners in the Broadmoor district with their corresponding property addresses and mailing addresses. For the purpose of having a common base for comparison, the sample for this particular study is limited to only the dataset in which the property address appears in all three time periods.
- Property addresses would differ from mailing addresses in the case of absentee owners who
  1. rent out their properties to tenants.
  2. relocate but who decide to leave their properties vacant
- Information was collected for three periods – Sept 2004, March 2006 and March 2007 to enable us to make inferences about short term migratory trends of property owners pre and post Katrina. The deadline for the certification of rolls (i.e property owners to update their records for tax purposes) is in September of every year. In 2005, due to the Hurricane Katrina disaster, proper records were not assem-

bled until March 2006. Even then, the tax assessor's office acknowledged that the particular data set may have gaps.

- Source of information: Orleans Parish Assessor's Office (http://www.opboa.org/Main/Home.aspx). The Assessor's function is to assess properties in order to
  1. ensure a fair distribution of the property tax burden among all property owners
  2. assist homeowners in applying for Homestead Exemptions for which they are eligible

  As a result, the Assessor's office maintains official records of property owners which should be updated each tax cycle.

Description of Variables

- Property Owner: The registered owner of the property for tax purposes in official records
- Property Address: Address of physical plot of land located within Broadmoor
- Mailing Address: Forwarding address provided by property owner
- Resident Owner: Person listed as property owner having a mailing address within the Broadmoor community

Uses/Limitations/Reliability

Reliability

We chose property owners rather than residents as unit of analysis because we assume only the people who own the property would be able to make the decision whether to rebuild the physical infrastructure on the land that they own. Analyzing the change of residents associated with each property would not give a good indicator of the effect that Katrina has on the re-population rate since there are other confounding factors that would correspond with the mobility of residents (eg. university students who graduate, professionals who relocate to be near their place of employment).

Information from the tax assessor's office was chosen as a source of information due to the following reasons:

1. According to the LOUISIANA TAX COMMISSION 2006 FIRST EXTRAORDINARY SPECIAL SESSION REPORT (see Appendix A), property owners are allowed the continuation of the Homestead Exemption (see Appendix B) for property damaged or destroyed during a disaster or emergency and whose owner is unable to occupy the homestead so long as the owner files an affidavit. In this affidavit, the owner is required to provide his mailing address. This is significant because owners would have a high incentive to update their information to capitalize on the tax benefits. On a per capita basis, Louisiana's local property taxes are low compared to other states (ranked 45th in the nation) and the homestead exemption is among the highest nationally. It shields the first $7,500 of assessed value from the tax collector. About two-thirds of the homes in Louisiana are therefore fully exempt from property tax (http://www.lpb.org/programs/LApublicsquare/topic002.html)
2. After the disaster, revenue from income tax and corporate taxes have taken a hit due to businesses relocating out of the city. The government would have an incentive to ensure accurate records of property owners are kept to minimize further leakage of tax revenue.

Limitations

One of the key limitations of this analysis is that in the case of property address and mailing address not matching, it is not possible to differentiate between property owners who have decided to rent out their property in Broadmoor or whether they have decided to leave it vacant. Therefore, a high level of mismatch between the two addresses could be taken to mean a low repopulation rate (if left vacant) or high repopulation rate (if units are rented out).

Due to the unstable situation in the aftermath of Katrina, the March 2006 data set may have inaccuracies and as far as possible, we tried to use 2004 and 2007 for comparison purposes. However, the limitation here is that because of the time lag between the two time periods, there may be other variables that might explain the repopulation trend.

Using information from the tax assessor's office has the following limitations

1. Even though a strong incentive exists for property owners to file their affidavit with change of address, there is no guarantee that they are aware of the new ruling on homestead exemption and are motivated to do so.
2. People whose houses are beyond repair and who still have mortgages to pay may simply abandon their properties and not pay taxes.
3. People who have paid off their mortgages may have let their flood insurance lapse because they were no longer required to have proper insurance coverage by their banks. Consequently, they would therefore have difficulty rebuilding their properties and may also choose to abandon their properties and not pay taxes.
4. The dataset does not seem to be comprehensive. The unit numbers in the property address column was not contiguous. In addition, there were mailing addresses that were ostensibly in Broadmoor, but had no corresponding entry in the property address.

Given the limitation on the reliability of information coming from the tax assessor's office, an alternative is to run a check on the national change of address (NCAO) as recorded by the US Postal Service (USPS). This method may give reliable data on updated mailing addresses insofar as people have an incentive to update their official address promptly in order to receive insurance payouts or other financial aid from the government. The following steps can be taken to generate that list.

1. Obtain a list of property owners in Broadmoor from tax assessor's office.
2. Match property owner mailing address to USPS database to get updated mailing address for each individual property owner. Third party websites that run these services for a fee include NCOA Link Processing (http://www.ncoa-processing.com/what.aspx)
3. Analyze data according to steps listed in methodology section.

Information obtained from NCOA also has its limitations and in our opinion, is inferior to information obtained from the tax assessor's office for the following reasons:

1. People who do not wish to be contacted for tax reasons will similarly choose not to list their change of address
2. The NCOA database is updated based on information voluntarily provided by individuals and businesses. There is no impetus for regular updates such as for tax purposes.
3. The matching process with the NCOA database is an automated process that utilizes algorithms and due to input errors such as formatting or typing mistakes, a match may not be found even though one exists and this may skew the results.

MULTIPLE LISTINGS SERVICE (MLS)

Forthcoming.

BROADMOOR PLANREADY

Data Set Description

In June 2006, Broadmoor's Community Development Corporation (CDC) collected data on each of its 2,376 housing structures using a survey created jointly by the Broadmoor Improvement Association (BIA), Harvard University's John F. Kennedy School of Government (KSG), and Bard College. The survey was conducted by 18 Bard College students over the course of six weeks.

Students were divided into teams of two: a surveyor and a photographer. On average, teams spent one hour surveying each residence. Teams were instructed to use various visual cues to categorize residences based on certain indicators (resident status, visible condition, etc.). While the survey was primarily based on surveyors' visual observations, these observations were supplemented with information gathered from informal interviews with residents when possible. When surveyors were uncertain how to classify a residence on a particular variable, they were instructed to classify the residence as "unknown" rather than classify an observation on incomplete or unclear information. While this classification approach minimized the chance of incorrectly classifying data, it did increase the number of observations categorized as "unknown," thereby limiting our ability to draw robust conclusions from the data.

In January 2007, a follow-up survey was carried out on each previously surveyed residence to determine the status and progress of site improvements relative to the June 2006 baseline data. This follow-on survey was conducted over three days by 50 Bard College students using the same methodology applied in the original survey.

Description of Variables

Property Address
The data was collected at the housing structure level, not the housing unit level. If there is a multi-resident unit, the surveyor aggregated the residences under a single ID number.

Number of Electric Meters
The city generally assigns one electrical meter to every housing unit within a housing structure. A major explanatory constraint of this variable is that when homes were extremely damaged, some meters weren't visible from the home's exterior. Consequently, this tally underestimeates the number of electric meters associated with each home.

Is property currently receiving electricity?
Surveyors were asked to determine this by reading the movement or lack of movement of a home's electrical meter. This variable could be a reasonable proxy for determining whether or not someone was occupying a particular residence. However, there are three caveats with this measure: 1) Electricity is often turned off when construction and renovation commences. Thus, when applied to homes which are under reconstruction *and* have had their electricity turned off, this proxy measure will *understate* re-population rates. 2) Some meters were connected to trailers located on the premises. Consequently, when applied to residences whose meters were connected to trailers (rather than

homes), this variable *overstates* the number of inhabited residences. 3) Because many meters aren't visible from the house's exterior — especially soon after the disaster — the majority of observations were categorized as "Unknown." For example, in the January 2007 survey, just over 60% of observations were categorized as "Unknown." This severely limits the descriptive and analytical value of this variable as many factors may be hidden in these "Unknown" observations.

Elevation

A home's elevation status can indicate its ability to withstand flooding.

Type of Property

In addition to obvious signals of property type (presence of commercial advertisements, signs, etc.), determinations were made by observing how many non-primary entrances, mail boxes, and electrical meters were associated with a particular home.

For Raised Basement Homes; Uses:

Homeowners may have used their raised basement homes for either income generating purposes (i.e. rental) or private use (i.e. storage). In either case, the damage to the space presented a significant challenge to resettling the house. However, when the homeowner relied on the income from the basement rental and the damage to the basement was substantial, the financial obstacles to resettlement were higher (all other things equal). Determinations were typically made by observing how many non-primary entrances, mail boxes, and electrical meters were associated with a particular home.

Type of construction

The type of construction was determined visually by the material used on the home's exterior. As with a home's elevation status, this measure can indicate a home's ability to withstand flooding. However, the construction type may correlate with income level which, alone would affect an individual's decision to return. Hence, construction type may both indicate a significant factor influencing the homeowners' decision to return (sturdy construction) and a signal of the homeowners' ability to face the challenges of returning (income). These two issues should be taken into account when assessing repopulation rates, repair status, and other indicators based on construction type.

Housing Status

Housing status measures the level of damage to a home disaggregated by No Apparent Damage & No Work Needed, Damaged & Needing Repaired, Collapsed/Destroyed/Red Tagged, Vacant Lot, and Unknown. Status was determined by observation.

Repairing Status

While the categories for this variable are well-defined and clearly stated, there are several circumstances in which a house can be classified simultaneously into two categories, resulting in some ambiguity. For example, one portion of a house may be in the process of being gutted while another part has already been fully gutted and is being repaired.

Would you currently categorize this property as inhabited?

Properties were categorized as inhabited by surveyors based on their assessments of various visual aspects such as the apparent use of electricity, the presence of usable furniture in the house, and obvious signs of habitation.

Visible Condition

This measure was based on the proportion of the damages to the house. Surveyors were instructed to base their assessment on the following guidelines:

1 = 100% damaged (red tagged)
2 = 75% damaged
3 = 50% damaged
4 = 25% damaged
5 = 0% damaged (mint condition).

Major concerns with this measure are the degree of subjectivity in defining categories, problems with inconsistent category interpretation across surveyors, and problems with inconsistent interpretation across time periods.

Blue Roof
FEMA supplied plastic blue tarps to protect damaged roofs upon homeowners' request. The "blue roofs," therefore, reflected the self-identified need for roof protection, but failed to indicate the extent of damage. Moreover, because blue roofs were provided only upon request, many of the vacant homes as well as homes that had not been assessed would not have a blue tarp on their roof.

Resident Status
The resident status indicates the presence and the location of residents. The option of "Residents in area (not living on property) and spending time at the property" was utilized only when teams encountered residents and were then provided this information through informal interviews.

Occupied by
This category specifies whether the home is occupied by its owner, renters, or both. This data was also obtained by informal interview when residents were encountered.

Permit
Surveyors noted whether or not a permit was displayed on the building, and, if so, what type of permit was displayed.

Surrounding / Infrastructure Conditions
This measure was originally intended to report service needs to the Department of Public Works and was not intended for analytic purposes.

Emergency Facilities
This measure was originally intended to report service needs to the Department of Public Works and was not intended for analytic purposes.

Commercial Building
This category lists the name of the commercial building, what type of business it is, and whether or not the site has been abandoned. As with other indicators of "repopulation," this variable could be useful in determining the network effects driving repopulation rates.

Uses/Limitations/Reliability

1. Interpreting this data is complicated by the large number of "Unknowns" associated with each variable. For example, the "Unknown" category could be hiding information which, if observed, would greatly alter the observed results.
2. For obvious reasons, the survey could not assess pre-Katrina baseline data before making a determination of a home's status. Therefore, it is difficult to determine how much of a home's damage existed pre-Katrina, or if a pre-existing condition was merely exacerbated by the flooding.
3. Due to logistical and financial obstacles, the survey could not

incorporate resident input from all households in the survey
4. Future data analysis would be easier if all categories were assigned a numeric value rather than a qualitative value when the survey was created.

Variables related to repopulation (e.g. Repairing Status, Residents Status, etc.) could be supplemented with the data from the GIS system to help identify whether a network effect is at work. For example, is there is a threshold percentage of houses occupied or being repaired that makes it a more attractive for the displaced homeowners to return or for new residents to buy houses in that area. In effect, is there a tipping point driving further repopulation, and, if so, what is that tipping point?

Methodology

Preliminary Steps

- The PlanReady team used two spreadsheets pulled directly from the ISITE website:
  - June-July 2006 survey data: *Plan_Ready_T1_-_July_2006_Data.XLS*
  - January 2007 survey data: *Plan_Ready_T2_Data_January_2007.xls*
- The team also acquired the survey questionnaire used for the June 2006 and January 2007 surveys and talked with Doug Ahlers about how the survey was conducted and the definition of each variable.
- The team then brainstormed about:
  - target audience of the data analysis.
  - whether the analysis should be descriptive or prescriptive.
  - format of the final report.
- We then discussed the diagnostic value and potential flaws of each survey question and variable. For example:
  - What is the explanatory power of the variable?
  - Can the variable be combined with other variables to augment its explanatory power?
  - What are some concerns/caveats about how the variable was defined, measured, categorized, interpreted, etc.?
- Each team member then spent time familiarizing themselves with the actual data observations associated with each variable. Several key questions were assessed:
  - Are there missing observations?
  - How does the number of "unknowns" in each category compare with the total number of observations and how does this affect the conclusions we could draw from the analysis?
  - What is the likely bias hidden in the unknowns?

Cleaning the data

- Data entry errors and duplicates in the original data set were categorized as "Deleted" status as opposed to "Active" status. To remove these observations, we first highlighted the *entire* June 2006 dataset and sorted it by "Status." We then removed 183 "Deleted" observations and noted the number of removed observations at the base of the 2006 worksheet. We repeated the same process to remove the "Deleted" observations from the January 2007 dataset. We removed 181 "Deleted" observations and noted the number of removed observations at the base of the 2007 worksheet.

Analyzing the data

- **Creating pivot tables.** We used pivot tables to facilitate our assessment and create the charts most appropriate for presenting the analysis. To create pivot tables, we used the following process:
  - Select *Data_PivotTable and PivotChart Report* from the

dropdown menu.
  - Select Microsoft *Excel list or database* and *PivotTable* from the menu.
  - Select the data source by highlighting the appropriate data.
  - Select a destination for the PivotTable report.
  - Drag and drop the appropriate categories into the *Row field* and *Column field* boxes.
  - Drag and drop the appropriate categories into the *Data items* box.
  - The pivot table is now complete and should disaggregate the highlighted data by sub-category.

- **Creating Charts.** We used the following process to create our charts:
  - Determine which categories in the pivot table are irrelevant for the chart. For example, if we are interested in the repair status of 1, 2, and 3-story homes, we aren't interested in housing sites whose "Stories" category has been categorized as "Blank" or "Unknown." To remove irrelevant categories, select the downward pointing arrow on the appropriate header in the pivot table. Then un-tick the categories you wish to remove. At the base of the worksheet, note the categories and number of observations which have been removed.
  - Make sure that the categories are in the correct order for presentation purposes. For example, the variable "Repair Status" should flow from "Repairs not yet started" to "Being Gutted" to "Fully Gutted and Finished" to "Repairs underway" to "Repairs complete" rather than vice-versa. To adjust the sequence of the categories, click on the left-hand *cell* border within the category header in the pivot table. Then drag the column left or right until the column is in its correct position in the sequence.
  - Determine whether the data should be presented as aggregate numbers or percentages. To change the presentation format, right click inside the pivot table, select *Field Settings* from the drop down menu, select *Options* from the *PivotTable field* box, click the downward arrow on the drop down menu below the *Show data as* header. Then select the desired presentation format (e.g. % of row, % of column, etc.).
  - Finally, generate a chart by highlighting the appropriate columns in the table, selecting *Insert_Chart* from the drop-down menu.
  - ***Note:*** Because we found it more difficult to format charts directly from pivot tables, we chose to cut and paste data from the pivot table to another area on the worksheet. We then used this new table to generate our charts.

GEOGRAPHIC INFORMATION SYSTEMS (GIS)

Data Set Sources and Description

Street level data for the City of Broadmoor—New Urban Research Database (NURD)
Street level data for the City of New Orleans—NURD
Geocoded addresses for the City of Broadmoor—NURD
Percent Damage—City of New Orleans GIS office
Flooding—Louisiana GIS Information Clearinghouse
2000 Census: Race and Median Income—Atlas: The Louisiana Statewide GIS
Tracts, Parcels, Blocks, and Block Groups—NURD

Methodology

Our analysis focuses on the state of recovery in Broadmoor, Broadmoor's rate of recovery in wake of the hurricane, as well as the recovery and redevelopment efforts in comparison to greater New Orleans. GIS serves a central role as the maps offer spatial and analytic support for the team as a whole, working to map and display geographical analysis of the data. Therefore, two aspects of initial focus for the GIS team was to ascertain the amount of flooding that Broadmoor experienced as well the level of damage resulting from flood.

Flood data was obtained from Louisiana State University and the Army Corp of Engineers. The data depicts flooding at the grid and census block levels, measured in feet. We were able to import the flood data into GIS and therefore view the flood levels spatially as well as quantitatively. In terms of our qualitative analysis of the flood data, we performed the zonal statistics function in GIS and therefore were able to compute descriptive statistics of the extent of flooding.

Additionally, we assessed the extent of damage, measured in percent of damage, which was obtained from the City of New Orleans portal GIS website. The data lists the address and the percent of damage. In order to examine the data with GIS, we imported the data and then geocoded the addresses and the percent of damage. Upon making the damage data compatible with the address data, it was necessary to join the two datasets via a common attribute, namely, the numerical parcel and block group identifiers.

Finally, as an initial point of analysis, we examined Broadmoor's socioeconomic characteristics in relation to the amount of flooding and the extent of damage. We obtained census data from Atlas: Louisiana Statewide GIS. This site enabled us to find variables from the 2000 Census describing the statewide racial composition and median household income. Upon adding the census data, we were able to turn on and off different socioeconomic variables and view this data in conjunction flood levels, damage, and other variables of interest.

For the remainder of the analysis, we repeated the aforementioned steps of converting data into GIS format, geocoding, joining, highlighting, and turning on and off relevant layer files, to provide spatial support for the rest of the team.

Uses of Data, Limitations, and Questions

We ran into difficulties in trying to understand the ranking used by the Louisiana GIS Clearinghouse to describe the extent of flooding and the relationship, if any, between flood level and damage rating. For instance, does a certain flood depth translate into specific damage percentages? Therefore, even though we were able to obtain the appropriate data and then map the damage and flood levels, we were unsure as to the methodology used to measure and describe these variables.

Appendix C:
Comparison (Random Sample and Matched Pairs) Data Set

Methodology

a) Obtain census data for Broadmoor and other New Orleans blocks and block groups
Census data for Broadmoor and other parts of New Orleans at the block and block group level is available at the American FactFinder website of the U.S. Census Bureau.
To download census data:

- Go to http://factfinder.census.gov.
- Choose 'Download Center' from the menu on the left-hand side of the screen.
- Select relevant data sets (see individual methodology sections for the random sampling and for matched pairs analysis)
    - For data at the block level (from the 2000 Census), choose Census 2000 Summary File 1 (SF 1) 100-Percent Data (***SF1 data***).
    - For data at the block group level (from the 2000 Census), choose Census 2000 Summary File 3 (SF 3) - Sample Data (***SF3 data***).
- Choose 'All Blocks in a County', 'Louisiana', and 'Orleans Parish'. The county "Orleans Parish" covers all of New Orleans city, but not neighboring suburbs like in Jefferson and Maiterie Parishes.
- Select 'Selected Detailed Tables - up to 50 tables in pipe-delimited format', then click 'Go'.
- Select variables of interest (a maximum of 50 at any one time), click 'Add', 'Next' and 'Start Download'.
- Save data (in zipped form).
- There will be at least three files: one of data, one ending in "geo" and another titled "readme." The readme has background information on file formatting. The "geo" file parses the group identifier numbers for each of the rows in the "data" file into state, county, tract, block group, and block components. In the "data" file, all these numbers are concatenated into one 22-digit identifier, with zeroes interjected between the state and county and between the county and tract identifiers. A further complication is that the first digit of the block number is the same as the number of the block group, which is not repeated. Finally, note that the block group numbers and block numbers repeat across different tracts. That is, each tract has a number of blocks and block groups that may have the same last four digits as blocks and block groups in other tracts.
- Depending on how many variables you selected and downloaded, you may have more than one "data" file. Within each "data" file, each row represents a different block (in sf1) or block group (in sf3) and each column represents a different variable you selected. Note that there will be many more columns than variables you selected, reflecting further subcategorizations. To read about these subcategorizations before downloading, you can inspect them in a more legible vertical arrangement in the PDF files that accompany the data sets, available by clicking "information about summary file downloads" at http://factfinder.census.gov/servlet/DCGeoSelectServlet?ds_name=DEC_2000_SF3_U . Chapter five lists the variables and chapter six lists the subcategorizations.

- The PDF file for sf1 is available at: http://www.census.gov/prod/cen2000/doc/sf1.pdf
- The PDF file for sf3 is available at: http://www.census.gov/prod/cen2000/doc/sf3.pdf
- Open the file containing the data. There should be a number of different folders. Under 'Folder Tasks', click 'Extract All Files'. Use the Compressed (Zipped) Folders Extraction Wizard to extract all files by clicking 'Next' and then 'Finish'.
- Rather than open the data directly as a text document, close the folder and open Microsoft Excel. From Excel, select 'File' and 'Open'. To view saved data, ensure that 'Files of Type' is set to 'All Files'. Then open the saved data (usually the first file).
- If a dialogue box states that the data is not in a recognizable form, it is necessary to import the text. To do so, click 'OK' to start the Text Import Wizard.
  - Step 1: Click 'Delimited' and then 'Next'.
  - Step 2: Click to remove 'Tab' as the delimiter. Click to make 'Other' the delimiter. In the space provided next to 'Other', insert the pipe delimiter (*i.e.* the character '|'). Then click 'Next'.
  - Step 3: Click 'Finish'.
- The data should then be ready to use in Excel format.

b) Performing a Random Sampling

The flood level data were obtained from surveys done by the Corps of Engineers. It was merged using Arch GIS® software and aggregated at the block level. Blocks are the basic unit of the US Census survey. The sampling was done using Microsoft Excel.

- Obtain the listing of blocks for the Orleans Parish from the Census 2000 Summary File 1 (SF 1) 100-Percent Data (SF1 data), as explained above. Open the file in Excel by clicking 'Open' from the Excel 'File' menu.

- Match the flood level data to the respective block in the census list. To do so, we used a Vertical Look-up *(vlookup)* function in Excel, using the block census ID as the matching field (named 'Geography Identifier' in the Census data).

- Drop the entries that have missing flood data.

- Run a filter to discard dry blocks from the survey: Highlighting the 'flood depth' (or any other chosen name for this data) column, select Filters/Automatic Filter from the 'Data' menu under Excel. Clicking on the arrow beside the title of the column, select 'Personalized' and select 'larger or equal than 2'. This will filter blocks that have received less than 2 feet of water, which are considered 'dry' for the purposes of our research.

- Separate the entries for the blocks of Broadmoor. As Broadmoor's block groups are located in tracts 103 (block groups 1 to 4), 112 (block groups 1 and 2), 122 (block group 2 only) and 123 (block groups 1 to 3), select all blocks belonging to those groups and put them in a new spreadsheet. By now, you should have a separate spreadsheet for Broadmoor's blocks, and another for other affected areas.

- To do the random sampling from each of these spreadsheets, select 'Data Analysis' from the 'Tools' menu in Excel. Select 'Sampling'. For 'Input Range', select the column of block IDs; select 'Random Sampling' and input the number of required samples. We generated 50 samples for Broadmoor and 100 samples from other affected areas.
This operation needs to be repeated for the other spreadsheet.

- Using Arch GIS software, map the selected blocks.

c) Matched pairs analysis

To determine whether Broadmoor is recovering at a different rate compared to other affected areas which had similar pre-Katrina characteristics and which suffered similar damage as a result of Katrina, a matched pairs analysis was undertaken. The matched pairs analysis was used to identify the block groups within affected areas that were the most statistically similar to block groups within Broadmoor, and was done so according to specific criteria.

The criteria needed to be selected to control for basic characteristics that could have affected the rate of recovery of different affected areas.

The broad categories of criteria relating to pre-Katrina characteristics that were selected as relevant are socio-economic status, racial composition, and household values. To determine which indicators from the census were to be used in assessing the similarity of different block groups across these categories, all available indicators were examined. These indicators are set out in 'Technical Documentation' at:
http://www.census.gov/prod/cen2000/doc/sf1.pdf
http://www.census.gov/prod/cen2000/doc/sf3.pdf

After examining the lists of data, it was also useful to examine the actual data because the data sets contain many variables that are not obvious from the documentation. Some useful indicators can also be constructed from a combination of different indicators.

Following this examination, the particular indicators selected were:

- % of total population that is black alone
- median household income
- median value of owner-occupied house

In addition to pre-Katrina characteristics, there are post-Katrina characteristics relating to flood damage that could affect the rate of recovery of different neighborhoods. The particular indicators selected to determine the similarity of block groups across flood damage are:

- flood depth
- % of flood damage

A table of data was then constructed in Microsoft Excel which listed data at the block group level across each of the different indicators.

In many cases, the data from sf3 was not complete. Categorical variables like "percent black population" were often blank and we weren't sure if this is because the data was missing or this actually represented a zero value. Therefore, we went back and hand-checked all these entries to confirm those that had zero values (by noting that the counts for complementary subcategories added up the total for the overarching category) and remove those that had missing information. In the end, we excluded 11 block groups for missing socio-economic data.

The final step in constructing the table of data was to apply a filter to block groups to exclude those block groups which were not affected by the Katrina flooding (i.e. non-affected areas), which required the same v-lookup methodology as in the random sampling, which is explained above. The filter we used excluded block groups that reported a flood depth of less than 2 feet on average, since this was the level the City of New Orleans used to distinguish flood-affected from "dry" areas.

After constructing our table of data, we ran a logit regression to determine which block groups throughout the affected area were most similar to each block group within Broadmoor. We did this by converting the data from Excel to a Stata data file and then generating a variable "broadmoor" that had a value of '1' for block groups in Broadmoor and '0' for all other block groups. We then ran a logit regression of the following form:

Then we entered the command "predict phat" which calculated for each block group in New Orleans the probability that it was in Broadmoor. Partially because Broadmoor is such a diverse neighborhood, some block groups outside Broadmoor received higher scores than those in Broadmoor. Nevertheless, for each

```
. logit broadmoor black_pct hhold_inc med_val dmg_pct depth

Iteration 0:   log likelihood = -42.386144
Iteration 1:   log likelihood = -39.171452
Iteration 2:   log likelihood = 38.457261
Iteration 3:   log likelihood = -38.440378
Iteration 4:   log likelihood = -38.440361

Logistic regression                               Number of obs   =        260
                                                  LR chi2(5)      =       7.89
                                                  Prob > chi2     =     0.1623
Log likelihood = -38.440361                       Pseudo R2       =     0.0931

------------------------------------------------------------------------------
broadmoor |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
black_pct |   .0069761   .0148707     0.47   0.639    -.0221699     .03612
hhold_inc |   9.30e-06   .0000319     0.29   0.771    -.0000533    .0000719
med_val   |   1.66e-06   .0000123     0.14   0.893    -.0000224    .0000257
dmg_pct   |    -.09224   .0406651    -2.27   0.023     -.171942   -.0125379
depth     |    .491593   .2247716     2.19   0.029     .0510488    .9321373
_cons     |  -2.784636   2.300785    -1.21   0.226    -7.294092    1.724819
------------------------------------------------------------------------------
```

block group in Broadmoor, we selected the five other non-Broadmoor block groups that had the scores closest to that Broadmoor block group to generate our list of 10 sets of five comparison groups.

Figure: Matched Pairs of Block Groups

	Broadmoor	*comparison groups*
1)	◙	◘◘◘◘◘
2)	◙	◘◘◘◘◘
:	:	:
:	:	:
10)	◙	◘◘◘◘◘

Appendix D:
Randomly Selected Blocks from Affected Areas other than Broadmoor

The following list shows the randomly selected blocks from Broadmoor and from other affected areas. The block numbers can be used to identify the exact location of the different blocks using the maps section at the American FactFinder website of the U.S. Census Bureau (see http://factfinder.census.gov).

Block No.	Geographic location
220710025011016	Block 1016, Block Group 1, Census Tract 25.01
220710017241012	Block 1012, Block Group 1, Census Tract 17.24
220710033071001	Block 1001, Block Group 1, Census Tract 33.07
220710109001011	Block 1011, Block Group 1, Census Tract 109
220710056032003	Block 2003, Block Group 2, Census Tract 56.03
220710094001002	Block 1002, Block Group 1, Census Tract 94
220710017031036	Block 1036, Block Group 1, Census Tract 17.03
220710014022008	Block 2008, Block Group 2, Census Tract 14.02
220710025021023	Block 1023, Block Group 1, Census Tract 25.02
220710075014016	Block 4016, Block Group 4, Census Tract 75.01
220710007021019	Block 1019, Block Group 1, Census Tract 7.02
220710102003007	Block 3007, Block Group 3, Census Tract 102
220710075014010	Block 4010, Block Group 4, Census Tract 75.01
220710009031017	Block 1017, Block Group 1, Census Tract 9.03
220710017227000	Block 7000, Block Group 7, Census Tract 17.22
220710064001003	Block 1003, Block Group 1, Census Tract 64
220710075023008	Block 3008, Block Group 3, Census Tract 75.02
220710024022017	Block 2017, Block Group 2, Census Tract 24.02
220710075024007	Block 4007, Block Group 4, Census Tract 75.02
220710009034003	Block 4003, Block Group 4, Census Tract 9.03
220710025041011	Block 1011, Block Group 1, Census Tract 25.04
220710017402010	Block 2010, Block Group 2, Census Tract 17.40
220710014011009	Block 1009, Block Group 1, Census Tract 14.01
220710119001001	Block 1001, Block Group 1, Census Tract 119
220710014023009	Block 3009, Block Group 3, Census Tract 14.02
220710033085009	Block 5009, Block Group 5, Census Tract 33.08
220710023005045	Block 5045, Block Group 5, Census Tract 23
220710017227003	Block 7003, Block Group 7, Census Tract 17.22
220710101001012	Block 1005, Block Group 1, Census Tract 13.02
220710013021005	Block 1005, Block Group 1, Census Tract 13.02
220710111003012	Block 3012, Block Group 3, Census Tract 111
220710064003004	Block 3004, Block Group 3, Census Tract 64
220710119001010	Block 1010, Block Group 1, Census Tract 19
220710049002031	Block 2031, Block Group 2, Census Tract 49
220710056024001	Block 4001, Block Group 4, Census Tract 56.02
220710029004010	Block 4010, Block Group 4, Census Tract 29
220710025033002	Block 3002, Block Group 3, Census Tract 25.03
220710054003003	Block 3003, Block Group 3, Census Tract 54

Block No.	Geographic location
220710009013005	Block 3005, Block Group 3, Census Tract 9.01
220710017243014	Block 3014, Block Group 3, Census Tract 17.24
220710055001018	Block 1018, Block Group 1, Census Tract 55
220710020002002	Block 2002, Block Group 2, Census Tract 20
220710017201010	Block 1010, Block Group 1, Census Tract 17.20
220710046002014	Block 2014, Block Group 2, Census Tract 46
220710017373007	Block 3007, Block Group 3, Census Tract 17.37
220710024022002	Block 2002, Block Group 2, Census Tract 24.02
220710017203012	Block 3012, Block Group 3, Census Tract 17.20
220710037023009	Block 3009, Block Group 3, Census Tract 37.02
220710056021008	Block 1008, Block Group 1, Census Tract 56.02
220710124002033	Block 2033, Block Group 2, Census Tract 124
220710017362013	Block 2013, Block Group 2, Census Tract 17.36
220710037023000	Block 3000, Block Group 3, Census Tract 37.02
220710009022010	Block 2010, Block Group 2, Census Tract 9.02
220710017202007	Block 2007, Block Group 2, Census Tract 17.20
220710124002008	Block 2008, Block Group 2, Census Tract 124
220710072003019	Block 3019, Block Group 3, Census Tract 72
220710017022000	Block 2000, Block Group 2, Census Tract 17.02
220710076051007	Block 1007, Block Group 1, Census Tract 76.05
220710132001001	Block 1001, Block Group 1, Census Tract 32
220710017401008	Block 1008, Block Group 1, Census Tract 17.40
220710056042012	Block 2012, Block Group 2, Census Tract 56.04
220710094002013	Block 2013, Block Group 2, Census Tract 94
220710037022011	Block 2011, Block Group 2, Census Tract 37.02
220710009042012	Block 2012, Block Group 2, Census Tract 9.04
220710023005013	Block 5013, Block Group 5, Census Tract 23
220710080001009	Block 1009, Block Group 1, Census Tract 80
220710017204000	Block 4000, Block Group 4, Census Tract 17.20
220710017382037	Block 2037, Block Group 2, Census Tract 17.38
220710025013002	Block 3002, Block Group 3, Census Tract 25.01
220710017242019	Block 2019, Block Group 2, Census Tract 17.24
220710086002005	Block 2005, Block Group 2, Census Tract 86
220710014023010	Block 3010, Block Group 3, Census Tract 14.02
220710007022002	Block 2002, Block Group 2, Census Tract 7.02
220710072003017	Block 3017, Block Group 3, Census Tract 72
220710025014013	Block 4013, Block Group 4, Census Tract 25.01
220710023005015	Block 5015, Block Group 5, Census Tract 23
220710025022013	Block 2013, Block Group 2, Census Tract 25.02
220710075022005	Block 2005, Block Group 2, Census Tract 75.02
220710054001016	Block 1016, Block Group 1, Census Tract 54
220710071003013	Block 3013, Block Group 3, Census Tract 71
220710017325020	Block 5020, Block Group 5, Census Tract 17.32
220710056024007	Block 4007, Block Group 4, Census Tract 56.02
220710015001033	Block 1033, Block Group 1, Census Tract 15
220710049003025	Block 3025, Block Group 3, Census Tract 49
220710017227009	Block 7009, Block Group 7, Census Tract 17.22
220710076052016	Block 2016, Block Group 2, Census Tract 76.05
220710101001011	Block 1011, Block Group 1, Census Tract 101

Appendix E:
Matched Pair Selections in Table Format

The following list shows each block group in Broadmoor, and the five most similar block groups in other affected areas to each of those Broadmoor block groups. It also shows the different indicators across which the blocks were selected, and the propensity for each different block group to match the overall characteristics of Broadmoor.

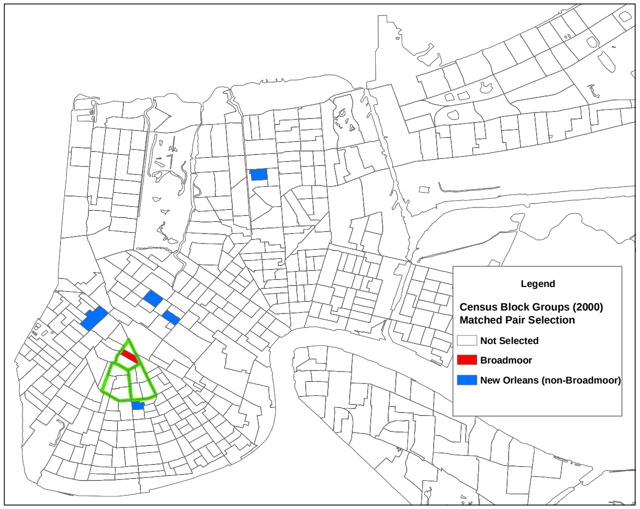
The block group numbers can be used to identify the exact location of the different blocks using the maps section at the American FactFinder website of the U.S. Census Bureau (see http://factfinder.census.gov).

No.	Block group No.	Indicators					Propensity
		% black	hhold inc	med val	% damage	depth	
1	220710123001	84.52	24375	70,700	40.05	4.442003	0.0335073
	220710072001	83.37	22847	57,700	30.816	2.780862	0.0332294
	220710033086	96.01	25139	73,300	44.227	5.061021	0.0338517
	220710064002	46.32	21122	77,700	40.191	5.077145	0.0339667
	220710102005	93.39	20250	74,200	40.341	4.467323	0.0339943
	220710063003	78.64	20938	71,500	44.456	5.377698	0.0329269
2	220710112002	29.62	32321	107,700	37.85	4.615537	0.0348401
	220710094001	100.00	12188	30,200	41.869	4.999401	0.0346215
	220710111002	85.66	25149	84,300	29.744	2.490969	0.0344652
	220710102005	93.39	20250	74,200	40.341	4.467323	0.0339943
	220710064002	46.32	21122	77,700	40.191	5.077145	0.0339667
	220710033086	96.01	25139	73,300	44.227	5.061021	0.0338517
3	220710103002	100.00	15043	78,100	41.058	5.187128	0.044998
	220710017371	81.80	48611	75,600	28.787	2.507795	0.0448126
	220710037012	59.41	26702	77,000	23.935	2.345287	0.0452477
	220710063001	60.14	21307	65,000	40.568	5.544629	0.0441215
	220710017352	95.85	30016	68,400	42.737	5.402591	0.0469819
	220710017362	95.50	29500	89,500	41.438	5.123435	0.0474448
4	220710103003	80.06	14500	134,800	40.43	5.196003	0.0455177
	220710037012	59.41	26702	77,000	23.935	2.345287	0.0452477
	220710017371	81.80	48611	75,600	28.787	2.507795	0.0448126
	220710063001	60.14	21307	65,000	40.568	5.544629	0.0441215
	220710017352	95.85	30016	68,400	42.737	5.402591	0.0469819
	220710017362	95.50	29500	89,500	41.438	5.123435	0.0474448
5	220710123002	62.03	26551	103,300	37.231	4.923679	0.0498416
	220710033011	23.92	57969	143,200	48.298	6.798575	0.0495177
	220710056042	2.13	64821	181,900	46.556	6.486179	0.0487182
	220710121012	7.08	33971	248,700	22.846	2.423029	0.0509896
	220710122001	15.26	38846	166,400	20.221	2.017298	0.051416
	220710017224	100.00	52798	71,800	44.222	5.217718	0.0478173
6	220710122002	1.90	85653	168,300	34.504	4.815535	0.075033
	220710025011	52.60	38875	89,300	46.592	7.527225	0.0754557
	220710056033	3.29	51544	175,900	42.393	6.909803	0.0755239
	220710056023	0.00	62083	181,500	45.561	7.279277	0.0737085
	220710017391	92.07	56332	122,400	39.915	5.361489	0.0785586
	220710017402	95.07	37831	98,900	40.943	5.718094	0.0709899
7	220710103001	92.62	18875	62,900	38.364	5.949719	0.0777908
	220710017391	92.07	56332	122,400	39.915	5.361489	0.0785586
	220710056033	3.29	51544	175,900	42.393	6.909803	0.0755239
	220710025011	52.60	38875	89,300	46.592	7.527225	0.0754557
	220710056013	2.63	46583	159,300	45.588	7.809405	0.0805087
	220710056023	0.00	62083	181,500	45.561	7.279277	0.0737085
8	220710123003	27.02	48125	141,500	33.174	5.124006	0.0790368

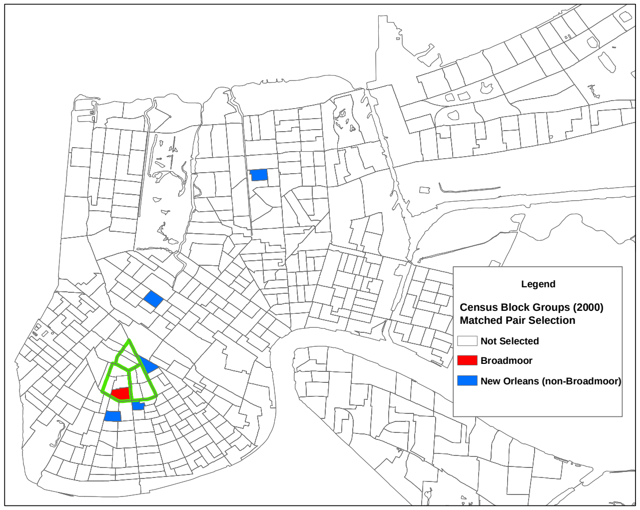
Appendix F:
Matched Pair Selections

These are maps of the matched pair selections by block group

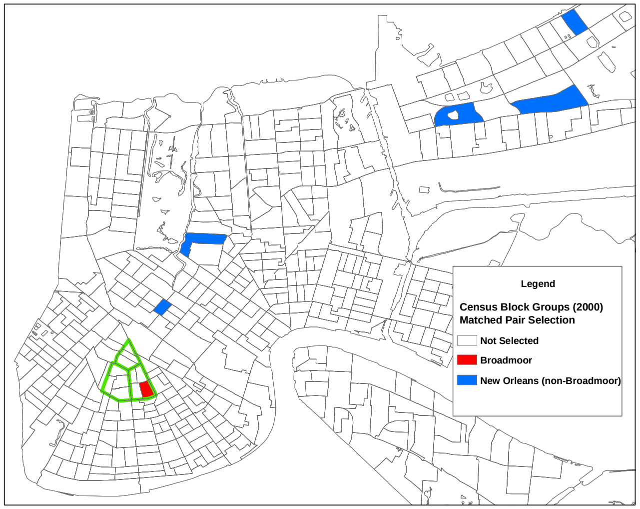
Block Group 1



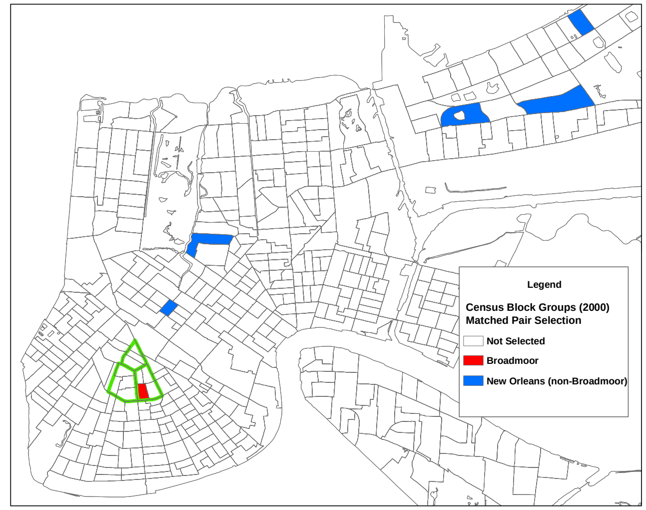
Block Group 2



Block Group 3

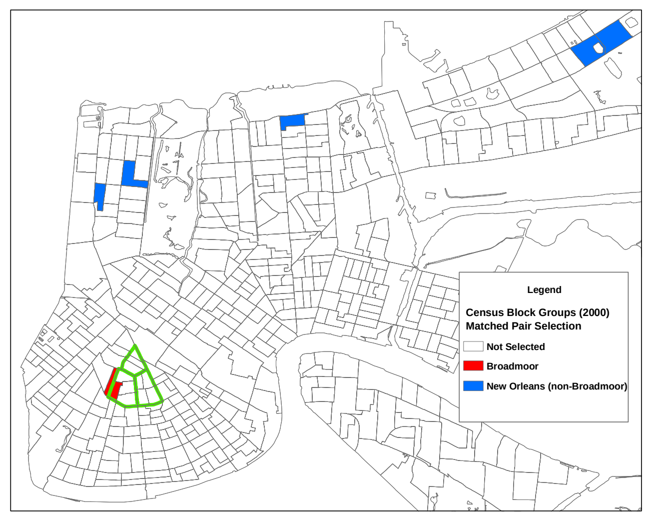


Block Group 4

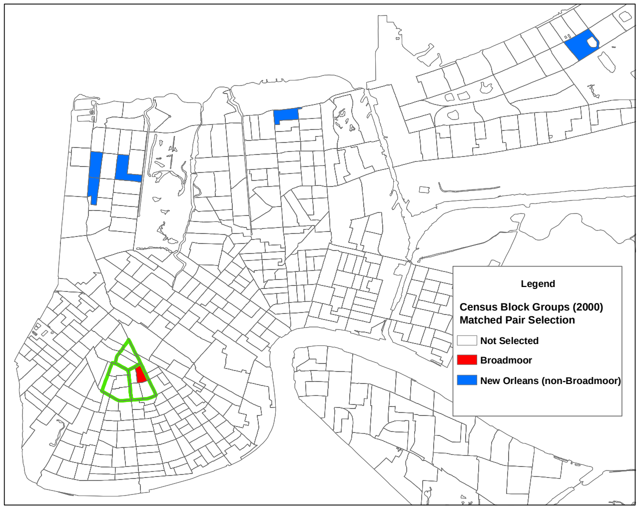


Block Group 5

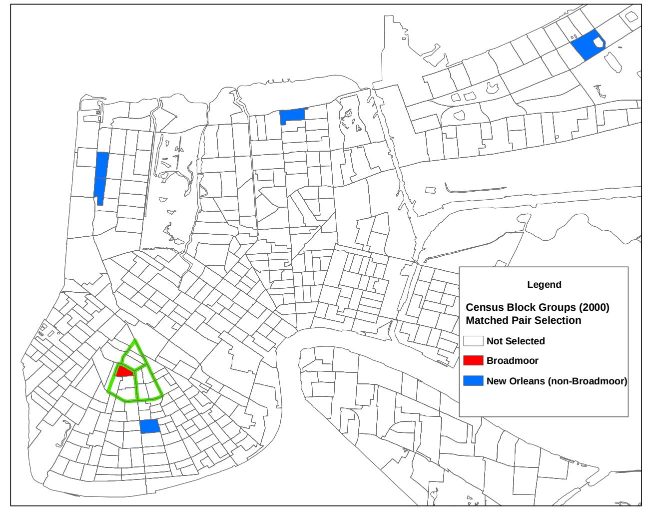
Block Group 6



Block Group 7



Block Group 8



Block Group 9

Block Group 10

Survey Data Sheet

Recorder: **Date:** **Time:**

Photographer:

Census Tract Identifier (15 Digit Number):

State		County		Tract (5 digits)	Block (4 digits)
22	0	71	0		

Property Address:

Street #	Street Name	Apt/Suite/Letter

Parcel Number:

Building Color:

Stories: ____ Single story; ____ 1.5 story; ____ 2-story; ____ 3-story; ____ 4-story; ____Unknown

Number of Electric Meters: _____; ____Unknown

Is the property currently receiving electricity? Yes/No/Unknown

Elevation:

_____ on slab at house grade;

_____ on slab mounded above street grade;

_____ raised on piers;

_____ raised basement;

_____ unknown

Type of Property: _____ single-family; _____ double; ____ triplex; _____ fourplex;

_____ 5+ rental units; _____raised basement; _____commercial building; _____ public/civic building;

_____ Unknown

For Raised Basement Homes; Use:

_____ Storage and/or garage, etc. (non-livable space)

_____ Converted to a rental housing unit

_____ Unknown

Type of Construction: __ Wood frame; __ Brick; __ Stucco; __ Other________; ____Unknown

Housing Status:

_____ No Apparent Damage & no work needed; _____ Damaged & Needing Repaired;

_____ Collapsed/Destroyed/Red Tagged;

_____ Vacant Lot(__Uncleared, ___Cleared); _____ Unknown;

Repairing Status:

_____ Repairs not yet started

_____ Being Gutted

_____ Fully Gutted and Finished

_____ Renovation Repairs Underway

_____ Repairs Complete

_____ Unknown

Would you currently categorize this property as inhabited? Yes / No / Unknown

Visible Condition: (1=Red Tagged) **1 2 3 4 5** (5=Mint)

Blue Roof: _____Yes; _____No

Residents Status

_____ Occupants living in the house

_____ Residents in Trailer on the property

_____ Residents in area (not living on property) and spending time at the property

_____ No signs of residents at all

_____ Unknown

Owner-occupied____; Rental_____; Both_____; Unknown

Is there a permit displayed on the building? ____Yes; ____ No; ____Unknown

If yes, what is said on the permit as pertinent information related to this building and owner?

Surrounding/ Infrastructure Conditions:

_____Trash; ______Fallen Tree; ______ Abandoned Car; ______Street Damages;

______Sidewalk Damages; ______Street Lights Damages

Emergency Facilities:

_____Fire hydrants; _____Electrical sub-stations; _____Manholes; ______Gas or water main shut-off location;
_____ Unknown

If there are such facilities nearby the house, please identify their location(by address):

____

Their current condition:____

Emergency Facilities needing apparent repair:

_____ Fire hydrants; _____ Electrical substations; _____ Missing/broken Manholes; _____ Broken sewer drains;
_____ Unknown..

Commercial Buildings:

Name:________________________

Is the commercial property abandoned? _____Yes; _____No

What type of business is it? ___________________________

Is there any contact number? __________________________

Notes:

Appendix G:
Year-to-Year Resident Status by Home Construction Type

These are graphs showing year-to-year resident status by home construction type from the Broadmoor PlanReady data set.