An analysis of demographic disparities associated with the proposed U.S.-Mexico border fence in Cameron County, Texas

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ABSTRACT/SUMMARY

Introduction

The United States Department of Homeland Security (DHS) plans to install a fence along the U.S.-Mexico border by late December 2008. While much attention has been drawn to the environmental, social and political issues surrounding the fence, analysis of demographic data on the populations that will be directly affected has been limited. This paper utilizes geographic information systems (GIS) and U.S. Census Bureau data with the objective of understanding the underlying demographics in areas along the proposed Rio Grande Valley section of the border fence located in Cameron County, Texas.

Data and Methods

Demographic measures of income, education, ethnicity, citizenship status and language for Cameron County census block groups were obtained from the U.S. Census Bureau and associated with corresponding census blocks in the path of the proposed fence. GIS was utilized for mapping the sections of the proposed fence based on imagery from DHS Environmental Impact Statements. The proposed fence is not a continuous barrier: lengths of open space (gaps) exist along each section of fence. For the purposes of analysis, each individual census block was classified into one of two categories: either 'fence' or 'gap'. Census blocks designated as 'fence' are those that are fully bisected by the proposed fence, adjacent to the fence, with some portion of the fence entering the boundary of the block, or on the Mexican side of the proposed fence. Blocks designated 'gap' are approximated based on spaces between segments of the proposed fence. Two-tailed independent samples t-tests were performed on multiple demographic factors to test for statistically significant disparities in demographics between the blocks designated 'gap' and 'fence'.

Results

A total of 17 demographic factors in 242 census block areas designated either 'fence' or 'gap' were tested for disparities. Fourteen of seventeen factors were found to have statistically significant ($p < 0.05$) differences in means between gap and fence designations. All income factors were higher in gaps as compared to fence-designated block estimates. Household income in gap-designated areas was $3,141 higher than fence-designated areas in 2000 and $3,833 higher in 2007. For race and ethnicity factors, gap-designated areas were on average significantly less Hispanic (90.72% vs. 94.13%, $p < 0.01$), less Hispanic Indian (0.34% vs. 0.49%, $p < 0.01$), and less Spanish Speaking (87.92% vs. 91.40%, $p < 0.01$). Census blocks designated 'gaps' contained a lower percentage of foreign-born naturalized citizens (8.99% vs. 11.17%, $p < 0.01$) and foreign-born non-U.S. citizens (18.29% vs. 20.73%, $p < 0.01$). Households in gap areas were also smaller (3.86 persons vs. 3.96 persons, $p = 0.144$) and older (28.7 yrs. vs. 26.7 yrs, $p = 0.000$).

Discussion

These results indicate that there are marked and statistically significant disparities in the demographics between groups directly affected and not affected by the proposed U.S.-Mexico border fence in Cameron County, Texas. The authors urge caution in the wider interpretation of these results until a larger sample size can be extracted from a wider study area along the U.S.-Mexico border. However, based on these preliminary results, special consideration to demographic disparities is warranted and should be integrated into the DHS planning and decision-making process with reference to the U.S.-Mexico Border fence.

INTRODUCTION

Under the authority of the Secure Border Fence Act of 2006 and the Consolidated Appropriations Act of 2008, the United States Department of Homeland Security (DHS) intends to construct 700 miles (1155 km) of barrier along the U.S.-Mexico border (U.S. Congress 2006; 2008). DHS reports that 302 miles of fencing has been constructed as of March 2008 and that it is 'well on its way to constructing a total of 670[1] miles of fencing by the end of 2008'. (DHS, 2008a). In late May 2008, the U.S. Army Corps of Engineers issued to contractors an invitation to bid on construction of the fence in Texas. (Gamboa, 2008).

The stated purpose of the border fence is to increase border security and to prevent illegal cross-border activity near points of entry (DHS, 2007; DHS, 2008b). One of the key aspects of the fence is the fact that it is not a continuous barrier. In the Texas Rio Grande Valley Sector alone, there are 21 discreet sections of the fence ranging from 1 mile to 13 miles in length (DHS, 2007). DHS has not publically disclosed the rationale or decision-making process for its choice as to precisely where the fence will and will not be installed. A number of local landowners and local organizations have commented anecdotally on the seemingly arbitrary nature of fence and questioned the rationale behind placement of the open, or 'gap', locations along the border (del Bosque, 2008; Dulitzky and Nedderman, 2008). There may be socio-economic disparities inherent in the designation of fenced and gap areas. These disparities have yet to be systematically quantified and evaluated.

The Lower Rio Grande Valley of Texas, though remote geographically, is at the center of the debate and controversy surrounding the proposed fence (e.g., see Blumenthal, 2008). Of special note is the area of the fence planned in Cameron County, Texas. Cameron County is the eastern-most point of the proposed fence and contains a sizable population living near or on the proposed route. Brownsville, Texas is the county seat for Cameron County and the home of the University of Texas at Brownsville/Texas Southmost College (UTB/TSC). In early 2008, DHS surveyed the UTB/TSC campus and informed university officials that a segment of fence would be constructed through campus, isolating the golf course, historical sites, and a satellite campus on the Mexican side of the fence. When University officials contested the action, DHS brought a civil suit against UTB/TSC (UTB/TSC, 2008). Although DHS and the University parties eventually reached a settlement agreement, approximately 60 cases against private landowners are currently pending in court.[2] The focus of the work presented here is exclusively on Cameron County due to the time-sensitivity and critical nature of the situation in Brownsville and the immediately surrounding area.

In this paper, we aim to: (i) understand the underlying demographics along the path of the proposed fence utilizing spatial and statistical analysis; and (ii) discuss how resulting data might inform claims that the construction of the border wall discriminates against certain, protected populations (e.g. ethnic minorities, low-income groups and under-educated groups). In the first section we outline the data and methods of analysis, followed by results of the analysis and finally, a discussion of the results, their wider implications, limitations of the study, and future work to be considered.

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[1]DHS defines a 'barrier' as consisting both of solid fencing and semi-porous 'vehicle barriers'. The proportion of the 670 miles of barrier which is made up of both fencing and vehicle barriers is unclear.

[2] The Working Group on Human Rights and the Border Wall based at the University of Texas School Of Law has compiled a list of complaints brought by the U.S. Government against private landowners. The number of open cases adjusts weekly due to settlements and new actions filed. As of June 1, 2008 the Working Group was tracking 60 cases in which the government has sought temporary access.

DATA and METHODS

Study area

The study area for this research is the U.S.-Mexico border in Cameron County, Texas. Cameron County is the southernmost county in the state of Texas, consisting of 387,000 persons that are predominantly of Hispanic ethnicity (86%) (U.S. Census Bureau, 2006). Cameron County and the adjoining county to the north, Hidalgo County, are the two poorest counties in the United States in terms of percentage of the population living below the poverty line (U.S. Census Bureau, 2006).

Border fence route data

The map of the proposed route for the border fence in Cameron County was based on maps published as part of the November 2007 DHS Environmental Impact Statement (EIS) for the Rio Grande Valley Sector. There have been several routes proposed by the DHS over the course of the last 18 months. In the latest EIS, both the initial 'Route A' and the proposed revisions – 'Route B' – are discussed. The route utilized in this study was 'Route B' – what DHS refers to as the 'preferred alternative' (DHS, 2007: ES-4). The EIS also includes an alternative that 'the proposed tactical infrastructure [fence] would not be built,' but that alternative does not currently seem to be under serious consideration given DHS's waiver of environmental regulations and its insistence on having much of the fence built by the end of 2008.

Demographic data

The demographic data utilized in this study was at the census block group level. A block group is the smallest unit of aggregation for which full demographic data are tabulated. The block group data was available through the ESRI Community Info (People) database which includes projections to 2007 on a limited number of factors. Census block boundaries were obtained from the Office of the Texas State Demographer (Texas State Demographer, 2008).

Spatial analysis and block designation

The EIS on the Rio Grande Valley Sector released by DHS in November 2007 contained detailed maps of the proposed routes of the border fence. It was made available in Adobe's Portable Document Format (PDF) on compact discs, along with the hard copy versions. PDF's containing map pages within Cameron County's geographic extent were converted into 300 dot per inch .TIFF image files to retain image quality, and then were imported into the GIS and digitized using the lat/lon grid lines as anchor points. A one-mile section of the fence was ground-proofed using a sub-meter Trimble GPS loaded with the digitized map and was found to be precise to ± 3m. For sections designated as 'gaps' in the fence, an anticipated path between the two inside end points of the fence was entered into the GIS. Environmental Systems Research Institute's (ESRI) ArcGIS 9.2 and associated extensions were utilized for all GIS analyses with the 1983 North American Datum (NAD) Universal Transverse Mercator (UTM) Zone 14N coordinate system projection for all layers.

As stated in the November 2007 EIS, there are several alternative routes. Under route options 'A' and 'B' of the draft border fence paths, the total impact buffer zone would be 60 feet, or 30 feet on either side of the proposed fence (DHS, 2007). Based on this information, a buffer of 30' was created on either side of the fence in the GIS.
We used a buffer of 60' as this was a conservative measure (one fence design specification alternative discussed in the EIS called for 130' *between* two separate layers of fencing) (DHS, 2007:11). This 60-foot wide buffer was used to evaluate areas affected by the fence as this is the minimum area of land required to install the fence and patrol roads on either side of the fence. In Cameron County, census block groups were first identified by overlaying the digitized map of the fence (as described above) over the border area census blocks groups obtained from ESRI.

The process for defining which census blocks were affected and categorized as 'fence' or 'gap' was as follows. Census blocks received a 'fence' designation if they met any of the following conditions:

- if the census block was bisected entirely by the proposed fence and buffer-zone;
- if the census block was partially bisected by the proposed fence and buffer-zone;
- if the census block was between the fence and the Rio Grande river;

Gap-designated blocks were defined by first extrapolating a reasonable path between inside sections of the border fence route. Census blocks that were intersected by or isolated on the Mexican side based on this 'reasonable path' were designated as 'gaps'. A spatial join was performed in the GIS between the fence buffer and the individual census blocks, then each individual block was examined for quality control purposes.

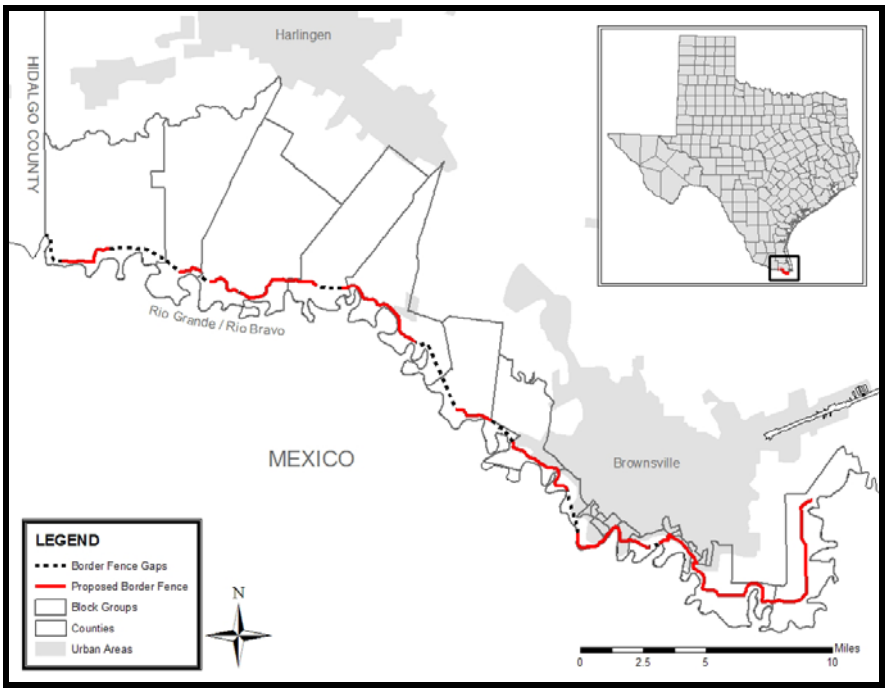

Figure 1. Study area and proposed fence sections with estimated path of gaps in Cameron County, Texas.

Demographic aggregation

Data on the range of factors of interest in this study was not available at the census block level. The U.S. Census bureau only collects information on a limited number of factors at the block level. In order to have sufficient statistical power for such a small area as one county, it was necessary to estimate block data based on census block groups. A census block group consists of approximately 50 blocks. Demographic factors for individual blocks were derived from census block groups under the assumption that block groups are demographically homogenous. Accordingly, every block in a census block group was assigned the same values and this data was used in the analysis of individual gap/fence-designated blocks.

Statistical analysis

Data was exported from GIS to a format suitable for data preparation and analysis. For population data and for each of the demographic variables under study, descriptive statistics for the block groups were calculated, including sample size (*n*), median, mean, minimum, maximum and standard deviation. For the purposes of determining statistically significant differences between mean values for gap and fence blocks, an independent samples t-test was performed, with the grouping variable designated as 'gap' or 'fence' and respective demographic factors designated as the test variables. For data preparation and descriptive statistical analyses, Excel 2007 was utilized and SPSS v.15 was utilized for t-tests.

RESULTS

A total of 242 census blocks in 14 block groups were determined to be subject to analysis (Figure 2). Seventy (70) blocks within six block groups were designated 'gap' and 172 blocks within eight block groups were designated 'fence'. Summary statistics for demographic factors are presented in Table 1. The total population of the 14 block groups was 24,434 with an average population of 1,745 and populations within individual block groups ranging from 470 to 3,754.

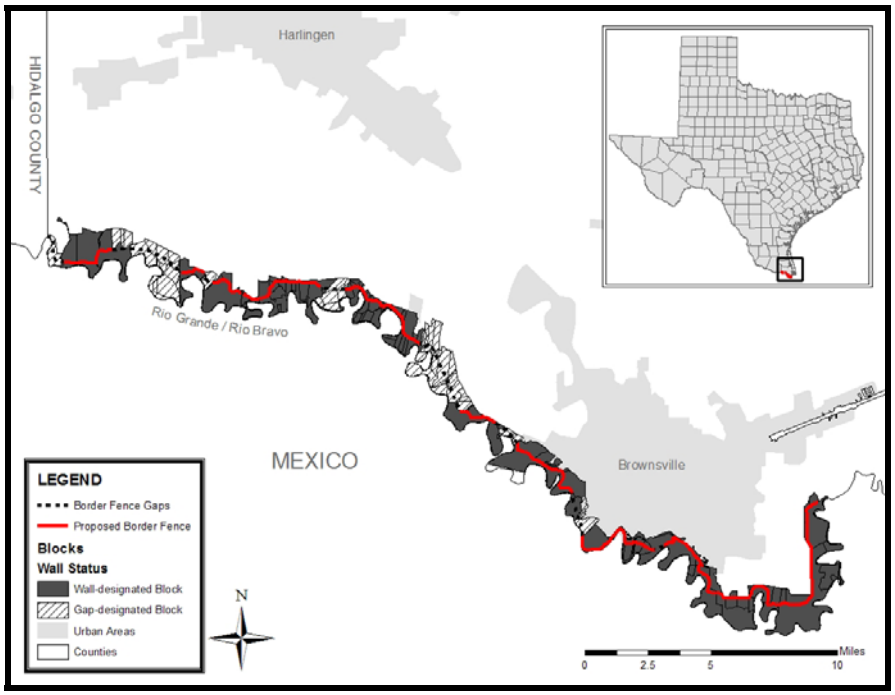

Figure 2. Census block designation (gap and fence) and location of fence and fence gaps.

Descriptive Statistics

17 demographic factors in the 14 census block groups are summarized in Table 1. Median household income increased from $23,617 in 2000 to $27,822 in 2007. The mean percent Hispanic population was 94% (Cameron County average = 86%). Less than 1% of the population in the 14 block groups identified themselves to the census as Native American Indian residents (mean = 0.76%). Sixty-four percent of the population was U.S. native-born citizens, while 21% were foreign-born non-U.S. citizens and 12% were naturalized citizens. Median household size was 4.1 persons and median age declined from 27.4 yrs in 2000 to 26.1 in 2007.

Table 1. Summary statistics for census block groups. Figures are based on census block groups.

	n*	Median	Mean	Minimum	Maximum	SD
Population	24,434	1,615.5	1,745.3	470	3754	906.3
Education and Income						
Median Household Income (2000)		$23,617	$24,281	$18,418	$31,094	$4,348
Median Household Income (2007)		$27,822	$28,602	$22,022	$36,575	$5,149
Per Capita Income		$7,192	$7,814	$5,182	$12,202	$2,076
Percent of 25+ Pop. with High School Diploma	2,187	18.09%	18.14%	9.10%	29.60%	5.12%
Race, Ethnicity and Language						
Percent Hispanic Population	23,261	94.18%	94.33%	82.93%	100.00%	6.15%
Percent American Indian	182	0.47%	0.76%	0.31%	1.59%	0.47%
Percent Hispanic American Indian in Combination	125	0.40%	0.51%	0.00%	1.52%	0.42%
Percent Hispanic Indian Alone or in Combination	144	0.41%	0.62%	0.00%	1.59%	0.49%
Percent White in any combination	2,187	18.09%	18.14%	9.10%	29.60%	5.12%
Percent 5+ Population that Speaks Spanish	24,419	91.98%	91.67%	81.52%	99.08%	4.95%
Diversity Index[#]		44.9	47.2	24.1	72.1	13.2
Citizenship						
Percent Foreign-Born and Not a Citizen	5,382	21.44%	22.18%	10.80%	32.61%	5.32%
Percent Foreign-Born/Naturalized Citizen	2,837	11.62%	11.53%	5.09%	17.07%	3.44%
Percent Native/Born in the U.S.	15,844	64.12%	64.60%	52.95%	84.11%	7.29%
Other Factors						
Average Household Size		4.1	4.1	2.8	5.2	0.6
Median Age (2000)		27.4	27.6	23.1	35.2	3.7
Median Age (2007)		26.100	27.007	22.4	33.4	3.8

*For population and percentage values, *n* is the base population for that particular variable which is used to calculate proportions. A total of 14 U.S. Census block groups will be affected by the fence, consisting of six designated 'gap' and eight designated 'fence'. Within these 14 block groups, there were 242 blocks affected, consisting of 70 designated 'gap' and 172 designated 'fence'. Data for individual census blocks were derived from census block groups under the assumption that block groups are demographically homogenous.

[#]The 'Diversity Index' is a measure developed by ESRI that summarizes racial and ethnic diversity. The index ranges from 0 (no diversity) to 100 (complete diversity). The diversity index for the United States on average in 2000 was 54.6 (ESRI, 2006).

Fence vs. gap analysis

Of the 17 demographic factors tested, 14 showed a statistically significant ($p < 0.05$) difference in means between gap and fence-designated areas (Table 2). This level of statistical significance (0.05 or lower) is the standard acceptable level in peer-reviewed academic journal for most statistical examinations. Income factors were higher overall in the gaps areas as compared to fence-designated blocks. In 2000, the mean of the median household incomes between in gap areas was 13.4% higher than in fence areas ($26,512 vs. $23,371, $p < 0.01$). This disparity in mean of median household incomes between gap and fence designations increased in 2007 to 13.9% ($31,316 vs. $27,483, $p < 0.01$). Per capita income was also found to be higher in gap areas ($8,453 vs. $8,013, $p = 0.095$).

For race and ethnicity factors, gap-designated areas were on average significantly less Hispanic (90.72% vs. 94.13%, $p < 0.01$), less Spanish-speaking (87.92% vs. 91.40%, $p < 0.01$) and less Hispanic Indian (0.34% vs. 0.49%, $p < 0.01$). Overall, American Indian identification was lower in gap areas (0.57% vs. 0.64%) but the differences were not deemed to be statistically significant given the small sample size (n = 182).

For citizenship demographic factors, it was found that census blocks designated gaps contained a lower percentage of foreign born non-U.S. citizens (18.29% vs. 20.73%, $p < 0.01$), a lower percentage of foreign born naturalized citizens (8.99% vs. 11.17%, $p < 0.01$), and a higher percentage of native-born U.S. citizens (71.7% vs. 66.8%, $p < 0.01$).

Other factors in the analysis included households size, which was smaller in gap areas (3.86 persons vs. 3.96 persons, $p = 0.144$) and older (28.7 yrs. vs. 26.7 yrs, $p = 0.000$). Median age was higher in gap areas for both 2000 (28.7 vs. 26.7, $p < 0.01$) and 2007 (29.6 vs. 27.6, $p < 0.01$).

Table 2. Disparities in mean values, t-values and statistical significance for demographic factors in 'gap' and 'fence' designated census blocks.

Demographic factors†	**Gap***	**Fence****	***t******	***p*‡**
Education and Income				
Median Household Income (2000)	$26,512	$23,371	4.501	**0.000**
Median Household Income (2007)	$31,316	$27,483	4.358	**0.000**
Per Capita Income	$8,453	$8,013	1.676	0.095
Percent of 25+ Population with High School Diploma	21.44%	17.29%	6.039	**0.000**
Race, Ethnicity and Language				
Percent Hispanic Population	90.72%	94.13%	-4.612	**0.000**
Percent American Indian	0.57%	0.64%	-1.358	0.176
Percent Hispanic American Indian and Other	0.28%	0.39%	-2.354	**0.019**
Percent Hispanic Indian	0.34%	0.49%	-2.723	**0.007**
Percent White and Other	0.73%	0.77%	-2.815	**0.005**
Percent 5+ Population that Speaks Spanish	87.92%	91.40%	-5.693	**0.000**
Diversity Index#	55.3	46.6	4.219	**0.000**
Citizenship and origin				
Percent Foreign-Born and Not a U.S. Citizen	18.29%	20.73%	-3.512	**0.001**
Percent Foreign-Born/Naturalized U.S. Citizen	8.99%	11.17%	-6.039	**0.000**
Percent Native/Born in the U.S.	71.69%	66.82%	4.948	**0.000**
Other Factors				
Average Household Size	3.86	3.96	-1.465	0.144
Median Age (2000)	28.68	26.74	3.652	**0.000**
Median Age (2007)	29.60	27.57	3.721	**0.000**

†All values are for 2000 Census unless otherwise indicated;

* there were 70 blocks designated 'gap'

** there were 172 blocks designated 'fence'

*** degrees of freedom = 240 for all tests

‡Bolded figures indicate a statistically significant difference in means to the 0.05 level.

#The 'Diversity Index' is a measure developed by ESRI that summarizes racial and ethnic diversity. The index ranges from 0 (no diversity) to 100 (complete diversity). The diversity index for the United States on average in 2000 was 54.6 (ESRI, 2006).

DISCUSSION

The results presented in this paper indicate that the construction of a border barrier and the necessary taking of property associated with it would have substantial disproportional impacts based on ethnicity, income and citizenship status in Cameron County, Texas. Our comparison of the areas planned to be fenced along the border with those areas where 'gaps' in the fence are planned suggests disproportionate impact on individuals with lower income and education, Hispanic ethnicity and non-U.S. citizenship status in Cameron County, Texas. A primary implication of this work is that the impact of the fence and its current placement should be examined more carefully to mitigate the effects on marginalized groups. In this final section we discuss the implications of our findings, opportunities for improvement in the study, and further work.

There exists no evidence to date that DHS has made an attempt to mitigate the impact on these marginalized and underrepresented groups. While DHS appears not to have studied the disparities between fence and gap areas, it has acknowledged that the general placement of the fence along the Mexican border ensures that poor Hispanic immigrant families are those who would most likely to be affected by its construction. This concern was included in the EIS prepared for the area discussed here, but has not been further addressed by the U.S. government. We discuss the EIS below both because it highlights the government's awareness of disparities and because the government's own data supports some of our independently reached conclusions. In addition to the disparities in demographics that were not addressed sufficiently, there is also little evidence that the DHS did not address additional environmental factors not included in the EIS (see Taylor and Eriksson, 2008), land rights issues (Dulirzky and Nedderman, 20008) and indigenous rights (Hurwitz and Guzman, 2008).

Part three of the DHS November 2007 methodology for evaluating potential environmental justice impacts states that DHS shall 'assess whether there are potential significant adverse effects on minority and low-income populations that would be disproportionately high and adverse' (DHS, 2007: 3-66). In an attempt to conduct this assessment, factors of interest were aggregated at the *county* and *census tract* level by DHS for the Rio Grande Valley sector of the fence. Census tracts are a larger unit of aggregation that census blocks or census block groups, roughly four times the size of the census block groups utilized in this paper for demographic data. For comparison purposes between those affected and not affected by the fence, EIS designates areas as either 'included in the project area' or 'areas not included'. Income disparities were not reported in the EIS below the county level of aggregation, but race/ethnicity factors taken into account by the EIS are displayed in Table 3.

Table 3. Environmental justice factors at the census tract level reported in the Department of Homeland Security Environmental Impact Statement (DHS, 2007).

Geographic Area by Census Tract	Percentage of Total Population						
	White and not Hispanic or Latino (A)	Asian and not Hispanic or Latino (B)	Black or African American and not Hispanic or Latino (C)	Other Races, Two or More Races, and not Hispanic or Latino (D)	Hispanic or Latino Ethnicity (E)	Total Racial and Ethnic Minorities (B +C+D+E)	Difference in Percent Minority Population Above/Below Texas Avg.
Texas	52.4%	2.6%	11.3%	1.7%	32.0%	47.6%	---
Cameron County	14.5%	0.4%	0.3%	0.3%	84.5%	85.5%	37.9%
Census Tracts Included in Project[3]	7.6%	0.0%	0.0%	0.1%	92.2%	92.3%	44.8%
Census Tracts Not Included in Project[3]	15.3%	0.5%	0.4%	0.3%	83.5%	84.7	37.1%

It should be noted that there are limitations to our study. The census data utilized presents both temporal and spatial challenges. In temporal terms, census data here was based on the last full census which was undertaken in 2000. There have been shifts in underlying population demographics over the past eight years, but a comparison between 2000 figures and estimates from 2007 points to the fact disparities are relatively consistent and perhaps understated. Between 2000 and 2007 the difference in median household income between gap-designated areas and affected areas (fence) increased from $3,141 to $3,833 (see Table 2). This suggests that disparities between 2000 and 2007 may have increased for other factors as well. From a spatial perspective, there is an issue with the aggregation of census block groups into census blocks. Openshaw defined this issue as the modifiable area unit problem (MAUP) which, in brief, deals with the variation which can occur when data from one scale of areal units is aggregated into more or less areal units, as is the case here (Openshaw, 1984). As the data for the range of relevant demographic factors for this study are not available from the U.S. Census Bureau, we assumed homogenous distribution throughout census block groups and aggregated into census blocks. By dividing the 14 block groups into blocks we obtained 242 individual blocks in the path of the fence which could then be coded 'gap' or 'fence'. This effectively parceled up percentages of each block group into designations that could then be analyzed. Although the level of demographic variation within census block groups is unclear due to lack of data at the block level, the EIS issued by DHS in November 2007 states that:

> '[the selected] census tracts have demographic characteristics similar to those of the persons living at or near the proposed construction activities. In some cases, the population in the census tract closest to the project area would seem to be lower in income than the population in the same census tract farther away from the river' (DHS, 2007).

Thus, DHS's own census track analysis reinforces both that the assumption of homogeneity is reasonable and that DHS is aware that lower income individuals are generally most likely to be affected by the fence.

[3] The DHS methodology for determining how census tract areas are coded as 'included in the project area' and 'not included' was not specified in the EIS. It is therefore difficult to judge whether the areas designated by the EIS as 'Census Tracts Not Included in the Project Area' are referring to 'gaps' in the fence as designated in this paper or if they refer to entire areas outside the fence and gaps in the fence. Based on the fact that all 14 block groups in our analysis contained at least some portion of proposed fence, the EIS is most likely referring to census tracts outside the area of the fence or away from the actual path of the fence in Cameron County

The results presented in this paper suggest several opportunities for future work. First, the study area should be increased to include all Texas sections of the proposed and existing fence along the U.S.-Mexico border and the aggregation level should be reduced to the block level for demographic measures that are available (race and ethnicity only). This would address the concern over aggregation of certain factors from the block group to the census block level. Another point of future analysis might include community-level surveys of how the fence is impacting socio-cultural factors in urban and rural areas affected by the fence. A 2004 study by the General Accounting Office noted that while illegal migrant apprehensions in urban areas such as San Diego and El Paso *decreased* by a combined 64% since 1993, apprehensions on land managed by the Department of the Interior (DOI) in rural areas *increased* dramatically (GAO, 2004). A more thorough analysis of environmental impacts of the proposed fence would also be valuable, especially given Secretary Chertoff's waiver of federal environmental laws over certain portions of the proposed fence (DHS, 2008b). As noted above, there have been several revisions to the route of the proposed fence. It would be informative to analyze how these shifts in the location of the proposed fence have altered not only the environmental impacts but also the populations affected by those impacts. Finally, under circumstances that a barrier actually *is constructed* along the proposed path, it would be beneficial and necessary to track the impacts on populations and the environment over time.

In conclusion, the results presented here, while made under certain necessary assumptions, support the premise that there is a substantial and statistically significant disparity in socio-economic demographic factors between those living in the path of the proposed fence and those living in the gaps. This disparity merits further and immediate examination.

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