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National Longitudinal Land Use Survey User Guide

Version of October 29, 2019

Contents

Introduction

The Urban Institute, with support from Fannie Mae, is providing a data source for the public on land use practices. The National Longitudinal Land Use Survey (NLLUS) was administered in 1994, 2003, and 2019. In 1994, the survey included the 25 most populous core-based statistical areas (CBSAs) in the US. In 2003 and 2019 it included the top 50 most populous CBSAs. Survey respondents are land use planning officials in local governments with land use and zoning authority, which varies from place to place (see Appendix A).

The NLLUS data can be used to describe land use practices, assess whether they have changed over time, and analyze their relationship to economic and social conditions like housing supply and affordability, racial and economic segregation, urban sprawl, and neighborhood disinvestment.

What is the NLLUS?

The National Longitudinal Land Use Survey (NLLUS) is designed to collect information from local governments about land use planning practices. Topics include:

- residential zoning density
- impact fees
- adequate public facilities ordinances (APFOs)
- accessory dwelling units (ADUs)
- growth management techniques
- affordable housing policies and programs

Tips for using the NLLUS

This survey only includes jurisdictions with land-use planning authority. Which levels of government hold land use planning authority varies from state to state, and within states in the US. For example, some states' counties regulate land in unincorporated areas while in other states, that job falls to townships, towns, or in some cases to cities. This can make analysis of this survey challenging and analysts must take care in using the data. For more information on who has zoning authority in which states and an explanation of why we surveyed the jurisdictions we did, see Appendix A.

Some issues to keep in mind:

1. The NLLUS does not include land-use practices in most small areas in the US. The survey focused on the most populous 25 (in 1994) or 50 (in 2003 and 2019) CBSAs, so it does not reflect land-use practices in smaller CBSAs.
2. The NLLUS is a hybrid between a census (all localities of at least 10,000 residents) and a sample (in some metropolitan areas, some localities of under 10,000). The jurisdictions that were not surveyed differ fundamentally based on population size and the size of their central urban economies. Similarly, jurisdictions who did not respond likely differ systematically from the average

respondent, because their practices did not square easily with standard responses or because they did not want to report their practices. NLLUS data best reflect land use practices in metropolitan areas where most land-use decision-making jurisdictions have more than 10,000 residents and where most of these jurisdictions responded. They depart most significantly from a representative picture in metropolitan areas where response rates were low and where localities under 10,000 residents account for a large proportion of regional population and land area. Land coverage for this survey design is especially low in the Buffalo, NY; Detroit, MI; Pittsburgh, PA; and Philadelphia, PA CBSAs. See Appendix B for more detail on land area response coverage by CBSA.

3. We recommend keeping comparisons and analyses restricted within jurisdictions of a similar type–i.e., incorporated places, townships or New York towns, or counties–to minimize faulty conclusions since the generic use and extent of land any zoning or land use laws apply to varies by these jurisdiction types. Lists of comparable jurisdiction types can be found in Appendix A.

4. The 2019 data can be paired with similar question data collected in 1994 and 2003 to trace the evolution of practices over the past quarter century. Some elements of the survey data collected in 1994 and 2003 align with the 2019 survey, and those have been made available in a longitudinal file. However, we recommend using only the longitudinal variables with a quality grade (explained below in the longitudinal dataset structure section) when tracing trends over time and comparing ungraded variables only with extreme caution. The comparable variables were constructed through careful review of the original survey instruments.

Recommended Citation

Data: Lydia Lo, Megan Gallagher, Rolf Pendall, Ananya Hariharan, Christopher Davis. National Longitudinal Land Use Survey: Version 1.0. The Urban Institute: Washington, DC, 2019, https://datacatalog.urban.org/.

NLLUS Datasets

The NLLUS is comprised of four datasets:

1. 1994 Land Use Survey
2. 2003 Land Use Survey
3. 2019 Land Use Survey
4. Longitudinal Land Use Survey

The 1994 and 2003 datasets were developed by Rolf Pendall over a decade ago. We are publishing them in their original structure. The Urban Institute fielded the 2019 survey, so this guide provides extensive information about its design and administration. In addition, our team has identified the ways in which the 1994 and 2003 surveys are similar to and different from the 2019 survey to develop a longitudinal dataset that includes data from 1994, 2003, and 2019.

1994 Land Use Survey

The NLLUS 1994 Land Use Dataset includes information collected by Rolf Pendall as part of his dissertation at the Institute for Urban and Regional Development at the University of California at Berkeley in 1994. The dataset includes data on land use planning empowered jurisdictions in the 25 most populous metropolitan statistical areas (MSAs) or Combined Metropolitan Statistical Areas (CMSAs) as of 1990. The survey was mailed to all planning directors in 1,530 jurisdictions with populations over 10,000 that have land use planning power, and 1,168 jurisdictions responded.

2003 Land Use Survey

The NLLUS 2003 Land Use Dataset includes information collected by Rolf Pendall, Jake Wegman, and Jonathan Martin. The 2003 survey modified some of the questions from the 1994 instrument and expanded the sample to include all jurisdictions with populations over 10,000 in the 50 most populous MSAs and CMSAs as of 2000. It also expanded to include up to 50 extra jurisdictions with fewer than 10,000 residents in metropolitan areas where jurisdictions with more than 10,000 people covered less than 60 percent of the total MSA land area. The extra sample of smaller population jurisdictions was the same regardless of the number of smaller population jurisdictions in the MSA, unless the MSA had fewer than 50 of these jurisdictions with less than 10,000 people in which case the extra sample captured all of them. The survey was mailed to 2,365 jurisdictions and 1,845 responded.

2019 Land Use Survey

The NLLUS 2019 Land Use Dataset includes information collected by the Urban Institute in collaboration with Rolf Pendall in 2019. The dataset includes data on land use planning empowered jurisdictions with populations over 10,000 within the top 50 Core Based Statistical Areas (CBSA) (as of 2014) and a sample of land use planning empowered jurisdictions with populations under 10,000 in the Chicago, IL; Minneapolis, MN; and Cincinnati, OH CBSAs. It also includes jurisdictions (regardless of population size) who responded to the survey in 1994 or 2003. The survey was emailed to 2,945 eligible jurisdictions in January and February of 2019 and representatives from 1,703 jurisdictions responded.

Longitudinal Land Use Survey

The NLLUS Longitudinal Land Use Dataset includes information from the 2019, 2003, and 1994 Land Use Datasets. The dataset contains 3,142 total jurisdictions' responses to the survey over the course of the three iterations. The statistical power of the longitudinal dataset varies depending on which years are being used for analysis. For analyses across 2003 and 1994, there are 742 repeat respondents. For analyses across 2003 and 2019, there are 1,034 repeat respondents. For analyses across all three years, there are 446 repeat respondents. The dataset includes both a comparable set of roughly 50 variables that have been standardized across all years as well as all the original variables from all three survey datasets. Both wide and long versions of the dataset are provided.

Dataset Conventions

Variable Types

The datasets contain two to three kinds of variables:

1. Survey variables store data obtained from respondents directly through the survey instrument.
2. Administrative variables store data obtained from sources other than the NLLUS, such as geographic identifiers (FIPS), census data (in the longitudinal file), or Urban Institute-generated identifiers.
3. [Only in the longitudinal file:] Comparable survey variables store data obtained from respondents directly through the survey instrument for which the answer categories have been standardized across iterations. These variables all have a comparability grade generated by Urban Institute that reflects the amount of manipulation required to standardize or compare responses across survey iterations.

Missing Values

Some of the respondents could not answer or chose not to answer some of the survey questions. We coded missing values to distinguish between reasons for missing values. We did not impute values for missing values, but we clarified the nature of the missing information. The survey had skip patterns, or gateway questions that were used to determine whether respondents qualified to see or fill in certain questions. We used responses to those gateway questions to code responses to subsequent questions that were not relevant or not viewed as Not Applicable with a ".n". If a respondent was asked a question but chose to skip it (either because they did not know the answer or they refused to provide an answer), we coded the responses to those questions as Skipped with a ".s". If it was not known whether a respondent was eligible to answer a question, because a gateway question was also skipped, we coded the response as Skipped with a ".s".

Open-Ended Responses

For the 2019 dataset, we reviewed all responses to open-ended (e.g., "other") questions to ensure these answers did not fall into an existing response category. For those cases where a response clearly did fall within the definition and descriptions of one of the response categories, we created a duplicate set of response variables and coded those open-ended responses to the appropriate predefined response variable. These variables have a "tc" suffix attached to their names and they are added into the dataset, not replacing the original response variables.

Personal Information for Respondents

Individual people responded to the survey as representatives of their jurisdictions. In the datasets, we have not included their personal information. Dropped fields include name, IP address, and email address of

respondent. However, the respondents' title and department remain to provide an indicator of expertise and seniority.

Weights

These datasets do not include weights, although users of the NLLUS may need to develop weights to produce unbiased estimates with the data. Bias may be introduced into the estimate for two reasons. First, the sample was designed to survey all jurisdictions over 10,000 in the top 50 CBSAs. This is a census of these jurisdictions. We sampled smaller jurisdictions in three CBSAs (Minneapolis, MN; Chicago, IL; and Cincinnati, OH). However, there are four other CBSAs where these small-population jurisdictions make up over 40 percent of the land area in that CBSA (Pittsburgh, PA; Philadelphia, PA; Buffalo, NY; and Detroit, MI) but where samples of small jurisdictions were not included. In these four places, the survey responses are less representative of land use practices within those CBSAs. See Appendix B for more information.

The second reason bias might exist stems from differential response rates for jurisdictions with differential characteristics. Response analysis has been performed for the 2019 survey and is detailed in the 2019 NLLUS Administration section below.

Census Data

Data from the 1990 and 2000 decennial censuses as well as data from the 2013-2017 ACS has been appended onto the longitudinal dataset. There are two issues of note in using these variables. First, the variables have not been adjusted for jurisdictions' annexation or relinquishing of land. The boundaries that the data encompass and describe may change from year to year, and analyses should take these boundary changes into account if they are relevant to the research. Second, these variables should be used with extreme caution as the variable values do not always equal the populations who fall under the land use authority of the encompassing jurisdiction. Namely, counties and non-New England county subdivisions (i.e. towns or townships) only regulate land in unincorporated areas, but since the census county variables include populations within county subdivisions, which in turn include populations within municipalities (e.g., cities or villages), these census variables should not be used for analysis across jurisdiction summary levels unless the populations from the planning-empowered jurisdictions within them have been subtracted out. When census data are missing, it means that the jurisdiction was not incorporated in relevant Census years (1990, 2000, 2010).

Urban Area Definitions

Due to the variation in CBSA/MSA/CMSA designations and definitions across years, we defined our own set of metropolitan areas that didn't change over time. All counties and their nested jurisdictions in our survey across all three iterations were each assigned to one of these metropolitan areas, called Metro_NLLUS areas. We have 52 such areas. For information on which counties fall within which Metro_NLLUS area, see the data file "County-NLLUS_Crosswalk."

Longitudinal Dataset Structure

This section explains the structure and format of the NLLUS longitudinal dataset.

Dataset Structure

In the wide version of the dataset, each row within the panel dataset belongs to a single jurisdiction, and each jurisdiction has only one row of data. The long version, in contrast, has three rows of data per jurisdiction– one for each year the survey ran (1994, 2003, and 2019). For example, a particular town would have three rows differentiated by year. Those years in which the jurisdiction responded contain data on their response while the rows for the jurisdiction's other years (if they did not respond or if the variable is not comparable across time) will have missing values. The panel dataset is divided into three sections of variables: comparable survey variables, original survey variables, and census variables.

Original Variables

Original variables keep their same formatting as in the individual survey year datasets. In the long formatted longitudinal dataset, these variables are missing in the responding jurisdiction for years that the original variables do not represent. For example, the jurisdiction-year rows will contain only missing values for 2003 and 1994 if the original variable comes from the 2019 dataset. Thus the dataset is both wide by survey variable and long by year to facilitate reproducibility and better understanding of comparable variables.

Census Variables

The longitudinal (long form) dataset contains census data matched as closely as possible to the three years of the survey: the 1990 decennial census for the 1994 survey, the 2000 decennial census for the 2003 survey, and the 2013-2017 American Community Survey (ACS) for the 2019 survey. Researchers may wish to update which census dataset they use for the surveys and can do so using the fips codes provided in tandem with the summary level variable that indicates which census summary level the data should be pulled from.

Census variables included in this dataset are all unmanipulated from their original format. This means that dollar amounts have not been adjusted for inflation, incorporated populations have not been subtracted from encompassing jurisdictions that only govern unincorporated areas, and all values are people-counts not percentages. Census variables within the long-formatted dataset include: number of housing units, multifamily units, vacancies, owner occupied units, and renter occupied units; aggregate housing value; median contract rent; median gross rent; median home value; total population and population by race; median household income; population below poverty line; poverty rate; land area (2000 and 2017 only).

Comparable Variables

Variables for comparison were chosen through analysis of the three different survey instruments' question wordings and response categories.

Similar, comparable, and identical questions were included in the comparable variable set with a comparability grade that indicates the degree of fidelity in question wording and response categories between survey years.

- For A grade-variables, the wording for both the question and answer categories was exactly the same across survey iterations.

- For B-grade variables, either the question wording or categories of response have some variation between years, but they are comparable as the question wording barely differs or the categories are different but can be manipulated to be comparable (e.g., recoding both “fewer than 4” and “4-7” to the same number and equating them to “less than 8”).
- For C-grade variables, the questions are topically the same but the wording or context and response options were different enough that these should be compared only qualitatively and not used for quantitative analyses.

These comparability grades were coded into the variables’ labels in the wide formatted dataset along with any notation of discrepancies between the comparability of different years. For example, if a variable is perfectly comparable between 2003 and 2019 but the wording or categories were only qualitatively comparable from the 1994 instrument, the label would contain: “A (03 19) C(94)” at the start. If a comparable variable has only two years, the question was either not asked in other years or it was not comparable to other years.

The table on the following page lists all panel variables with their comparability grade, associated question number in the instruments, and source variables from the individual year datasets.

TABLE 1

Longitudinal NLLUS Variables by Comparability Grade, Survey Question, and Source Variable

Variable Name	Grade	2019 Q#	2003 Q#	1994 Q#	Composite/Source Variables
respotitle_	C	3	0	-	titlcode_2003, respotitle_2019
compplan_	A	9	1	1	juris_masterplan_dummy_2019, plan_2003, plan_1994
cp_updateyr_	B	10	1	-	mp_update_yr_2019, planyear_2003
zonord_	A	11	2	2	zo_dummy_2019, zoneord_2003, zoneord_1994
zo_updateyr_	B	13	2	-	zo_update_yr_2019, zoneyear_2003
maxden_	B	14	3	3	dupernacre_max_2019, maxdens_2003, maxdens_1994
maxdens2_	A	14	3	-	dupernacre_max_2019, maxdens_2003
hypdensit_	A	15	6	-	hyp_densit_test_2019, hypodev_2003
mobilehome_	C	16	5	-	hudcomp_temp_dummy_2019, mobhome_2003
grwthlimit_	A	22	9	11	ugb_dummy_2019, ugb_2003, ugb_1994
morator_	B	25	11	13	moratorium_2019, morat_2003, morat_1994
moratextent_	A	27	11	13	morat_applies_2019, morat_2003, morat_1994
growthmgmnt_	B	23	10	12	growthmgmnt_dummy_2019, resdpace_2003, pacecont_1994
poprstrpct_	A	23	10	12	gm_popgrowthperyr_2019, pcntcont_2003, pctcont_1994
bldgprmlimit_	A	23	10	12	gm_bpperyr_2019, bcnumber_2003, bpcont_1994
gc_ahexmpt_	B	24, 28	12	14	gm_ahexempt_2019, mafexmp_2003, gcahexmp_1994
impactfees_	A	29	14	-	if_dummy_2019, impctfee_2003
ifmode_	A	30,31	14	-	if_casebycase_2019, if_formula_dummy_2019, impctfee_2003
if_sqft_	C	32	14	-	if_sqft_dummy_2019, ifsfrate_2003
if_sqft2_	B	32	14	-	if_dpersqft_2019, ifsfrate_2003
if_unittype_	C	32	14	-	if_unittype_dummy_2019, ifsinfam_2003, ifmfrate_2003
if_sfrate_	C	32	14	-	if_dforsf_2019, ifsinfam_2003
if_mfrate_	C	32	14	-	if_dformf_2019, ifmfrate_2003
if_school_	A	33	14	-	if_schooltc_2019, ifschool_2003
if_storm_	A	33	14	-	if_stormtc_2019, ifstorm_2003
if_transit_	A	33	14	-	if_transittc_2019, iftransp_2003
if_pubsafe_	A	33	14	-	if_pubsafetc_2019, ifpubsaf_2003
if_water_	A	33	14	-	if_watertc_2019, ifwater_2003
if_park_	A	33	14	-	if_parkstc_2019, ifparkos_2003
apfoyn_	B	34	15	16	apfo_dummy_2019, apfo_2003, apfo_1994
apfo_school_	B	35	15	16	apfo_schooltc_2019, apschool_2003
apfo_storm_	B	35	15	16	apfo_stormtc_2019, apstorm_2003
apfo_transit_	B	35	15	16	apfo_transittc_2019, aptrans_2003
apfo_pubsaf_	B	35	15	16	apfo_pubsafetc_2019, appubsaf_2003
apfo_water_	B	35	15	16	apfo_watertc_2019, apwater_2003
apfo_park_	B	35	15	16	apfo_parkstc_2019, appark_2003
apfo_other_	B	35	15	16	apfo_other_dummy_2019, apother_2003
ahreqinc_	C	37, 45	16	17	ah_noexmpttc_2019, ah_req_dummy_2019, afincntv_2003, pvtah_1994
ahlinkfee_	C	46	16	-	ah_linkfeetc_2019, aflinkfe_2003
izreq_	B	37	16	17	ah_req_dummy_2019, afinclzn_2003, pvtah_1994, inclpct_1994
izpct_	B	38	16	17	pct_ah_req_2019, izpct_2003, inclpct_1994
densbonus_	B	45	16	17	ah_bonusdens_2019, afbonus_2003, densbon_1994
ahwaiver_	B	45	16	-	ah_ifwaiver_2019, opwaiver_2003
ahfast_	B	45	16	17	ah_faskttracktc_2019, affastrk_2003, fasttrack_1994
ahinlieu_	B	41	16	17	ah_fee_2019, afhsgfee_2003, inlieu_1994
ahtf_	C	47	19	-	ah_tf_dummy_2019, afmech_2003

2019 NLLUS Administration

This section explains the survey design, sample design, and data collection approaches used for the NLLUS.

Sample Design

This survey's universe includes all jurisdictions with planning power and populations over 10,000 in the 50 largest CBSAs within the US as of 2014 (see Appendix C). It also includes any jurisdictions surveyed in 2003 and 1994 regardless of their population size.

We also collected data from jurisdictions with planning power whose populations were under 10,000 in three CBSAs (Minneapolis, MN; Chicago, IL; and Cincinnati, OH) yielding 148 small-population jurisdictions for the 2019 cohort. Several other small-population jurisdictions were included in the survey universe as legacies of the 2003 and 1994 survey. These jurisdictions had previously been included because they were in CBSAs where jurisdictions with populations over 10,000 represented less than 60 percent of the total CBSA area. In those jurisdictions, Rolf Pendall had included a random sample of 50 small population jurisdictions. In the end for the 2019 survey, we identified 3,106 jurisdictions for outreach.

Sample Contact Information

With the full list of sampled jurisdictions in hand, the team's research and data science members collaboratively designed an algorithm to search jurisdiction websites to identify the chief or primary contact to complete the survey for each jurisdiction.

Our research team did not know the names or contact information for the individuals most knowledgeable about land use planning in each jurisdiction, so we used a technique called web scraping to search out the name and email address for best possible contact for each jurisdiction. Researchers worked with data science experts to design an algorithm that drilled down from the jurisdiction website, to the department, and the name of the most senior planning official. The team developed and revised the algorithm to improve its capabilities during a pilot study prior to full survey administration.

The algorithm first identified the appropriate website for each jurisdiction by searching Bing with the relevant characteristics (e.g., jurisdiction type, full name, and an identifier for a government office). Then the algorithm used natural language processing paired with a prioritized set of respondent job titles to identify the best possible respondent's name, email, phone number, and office address. Job titles used include (in order of priority): Director or head, senior staff, junior staff, consultant, other. The search prioritized finding the best match within the Planning, Zoning, or Community Development departments, but beyond that, departments or offices accepted included (in order of priority): building, public works or engineering, city or county manager, clerk's office, appointed positions (e.g., to planning, zoning, or building commission or board), or elected offices.

After eliminating misidentified jurisdictions, the total number of jurisdictions in the universe was 3,100. Most (3,024) of the 3,100 jurisdictions had a web presence. The web-scraping algorithm collected titles and contact information for each viable contact candidate in a jurisdiction with email addresses not always

accurately paired with each person's name. Consequently, it was necessary for a researcher to review the results, manually choose the appropriate contact, and verify the email address using the source link the web-scraper provided. Working with the web-scraper output, the researcher was able to verify an average 1.2 contacts per minute, with difficult jurisdictions (e.g., those where emails bounced back or with poor web documentation, roughly 7 percent of the universe) taking an average of 3.5 minutes per contact. In some cases, a contact recommended that another colleague complete the survey and could forward their survey link to them.

Instrument Design

Rolf Pendall conducted a survey of land use planning in 1994 and again in 2003. The 2003 survey included some modifications from the 1994 survey, but many of the same topics were covered. In preparation for fielding the 2019 survey, we reviewed the 2003 survey for relevance and ease of use and requested input from advisors (including Fannie Mae) on new items and updates. The 2019 surveys used many of the same items from 2003.

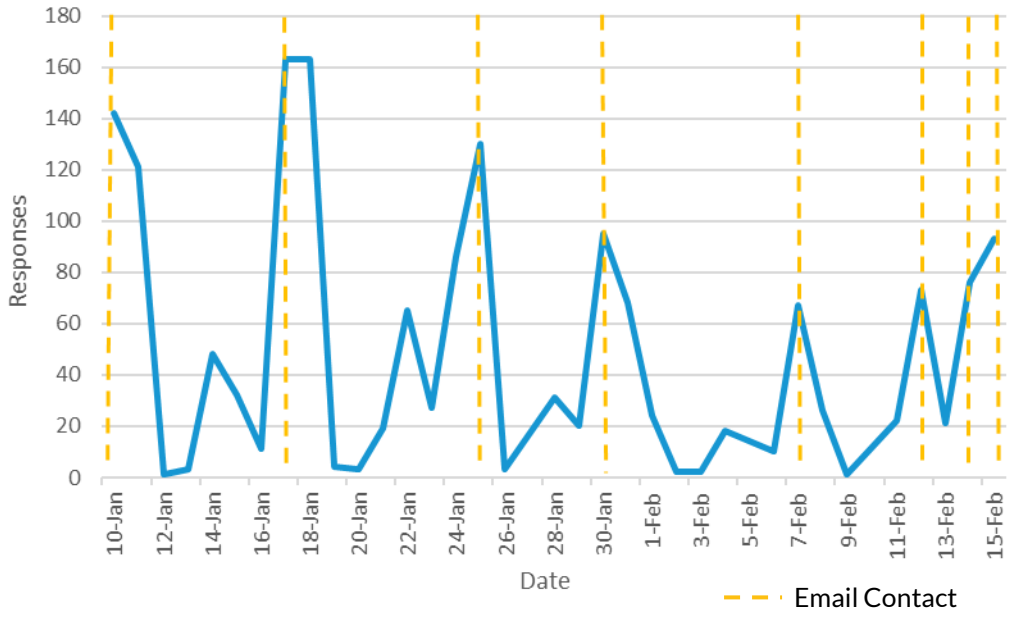
We programmed the final survey into Qualtrics and conducted several rounds of testing on the Qualtrics instrument to improve transitions, layout, and visual appeal. Survey testers were research and urban planning experts that examined the content and mechanics of the instrument and provided feedback to our team.

We used Qualtrics survey software for communication with sample members, data collection, and tracking. Qualtrics software can send personalized email communications (e.g., survey introductions and reminders) to sample members and provides detailed tracking on response status for each recipient. Using the individualized links in those emails, respondents could access their survey to see whether they completed it or not and pick up where they left off. For data collection, Qualtrics offers custom layout, formatting, and features like pop-up definitions for terms and sophisticated skip and display logic. This survey utilized all these features to create a customized look, personal feel, and to-the-minute analysis for both respondents and researchers.

On January 8, 2019, we sent each of the 2,951 jurisdictions (the 3,024 jurisdictions in the survey minus the 73 who had already completed the survey during the pilot phase) an introductory email without any links through Outlook to notify them of the upcoming survey and request the sender's email address be added to their list of safe contacts. Then, we sent the survey invitation email with links out two days later, on January 10, 2019 at 3pm using Qualtrics' email distribution feature. Each jurisdiction received an introductory email with a survey link unique to their jurisdiction that they could forward to another individual or click again to return to the survey on a later date. Jurisdictions received weekly reminder emails to complete the survey with days and times varying (Thursday, Wednesday, Tuesday; morning, noon, late afternoon) to maximize potential for recipients to respond. Responses tended to only come in on days where a reminder email had been sent (see Figure 1). The survey closed on February 15, 2019 at midnight. Figure 1 presents respondent activity and Figure 2 presents response types over the survey administration period.

FIGURE 1

2019 NLLUS Response Timeline



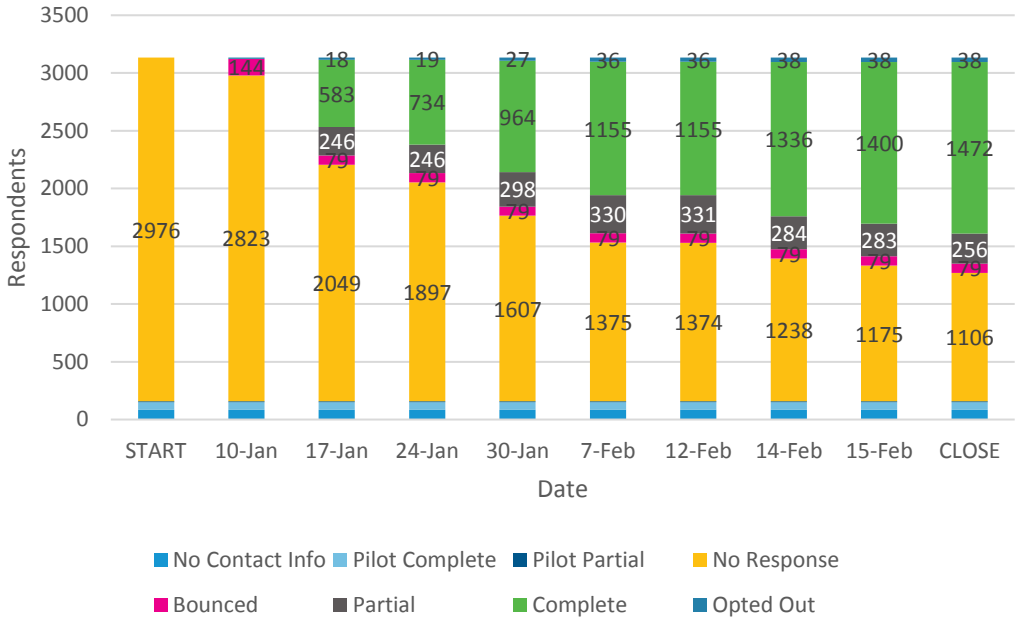
From the sample of 2,951 who were included in the full survey (3100 minus the 76 without web presences and the 73 who participated in the pilot), 144 contacts' emails bounced back and prompted a fresh search for improved email addresses. Of those updated emails, 65 did not bounce back again and became the primary contact address for that jurisdiction in future communications. The 79 non-recoverable bounce-back emails brought the total jurisdictions who received the survey down to 2,872. Over the course of the survey, 38 jurisdictions opted out.

Of the 2,834 that did not opt out of the survey, 1,728 (61 percent) participated in the survey and of those, 1472 (51 percent of the total, 85 percent of participants) completed it. While 1,472 respondents reached the end of the survey and submitted it, another 256 participated in the survey and completed some portion of it. Of those 256, we included those with responses to at least 5 percent of the survey items, resulting in a total of 158 useable partial responses and 98 non-counted partial responses. These adjustments in addition to those 66 full and 7 useable partial responses from the pilot survey result in an analysis file with 1703 responses (see able 3).[1]

[1] Our initial response count was 1,721, but quality checks revealed we had 1) mistakenly identified emails for what turned out to be seven jurisdictions outside of our Metro_NLLUS CBSAs, 2) received duplicate responses from seven jurisdictions, and 3) had taken in four responses for New York City boroughs who are under the center city planning authority. Thus, the final response total is 1703.

FIGURE 2

2019 NLLUS Response Types, by Contact Date



Duration: The median time taken on the survey was 19 minutes, with the minimum (those who did more than click the link and immediately close the window) being 5 minutes and the maximum (those who left the survey open for several days or returned to it after several weeks) being 669 hrs.

Response rate: American Association for Public Opinion Research (AAPOR) provides options for calculating response rates. Using their most conservative standard, which only includes completed surveys, the response rate is (1538/3100), or 49.6 percent. The alternative, which includes partial completes, is (1703/3100), or 54.9 percent.

If we exclude the 155 ineligible jurisdictions from the denominator, the completed-only response rate is 52 percent (1538/2945) and the partials-included response rate is 58 percent (1703/2945).

TABLE 2

Eliminating Ineligible Jurisdictions for 2019 NLLUS

		Sample
Initial list of eligible jurisdictions		3100
Reasons for elimination		
No web presence	76	3024
No valid email address	79	2945
Revised list of eligible jurisdictions		**2945**

TABLE 3

Results of 2019 NLLUS Survey Administration to Eligible Jurisdictions

	Pilot n=150	Full Survey n=2872	Full Analysis Sample
Non-Participants			
Did not open email	--*	1106	1106
Opted Out	--*	38	38
Participants			
Opened email and completed 0-5% of survey	--*	98	98
Opened email and completed 5-99% of survey	7	158	165
Full submissions	66	1472	1538
Usable Responses (>5%) Subtotal	73	1630	1703
Total			**2945**

**We offered all non-respondents, incomplete respondents, and participants who opted out during the pilot a chance to complete the survey during the full survey period.*

Nonresponse analysis: Below we describe ways in which the characteristics of respondents and non-respondents vary. There are signs of nonresponse bias that we will look at more closely during the analysis stage.

- **Survey cohort:** Nonrespondents were less likely to be from the overlapping '03 and '19 survey cohorts and more likely to be from the 2003-only cohort.
- **Jurisdiction type:** Nonrespondents were more likely to be from boroughs and villages and likely to be from cities.
- **Land area:** There were no significant differences between respondents and non-respondents in terms of jurisdiction land area.
- **Population:** There were no significant differences between respondents and non-respondents in terms of population size.
- **Region**: Nonrespondents were more likely to be from Northeast jurisdictions and less likely be from Western jurisdictions.
- **State:** Nonrespondents were less likely to be from four states (Connecticut, Minnesota, Rhode Island, and Texas), and more likely to be from six states (Alabama, Louisiana, Massachusetts, Michigan, New Jersey, and New York). These results are listed in Appendix D.

TABLE 4

T-Tests for Differences between 2019 NLLUS Respondents and Non-Respondents

	Respondents n=1,703	Non-Respondents n=1,242	Statistical Significance
2014 population (mean)	89,748	73,716	--

Land Area (sq. miles) (mean)	111.4	93.2	--
Sample (pop<10,000)	4%	5%	--
Pilot participation	6%	4%	**
Cohort			
2019 only	39%	43%	--
2003 only	16%	20%	**
03 and '19	45%	37%	***
Region			
North	27%	32%	**
South	22%	19%	--
Midwest	34%	35%	--
West	17%	14%	*
Jurisdiction Type			
County	11%	10%	--
Borough	2%	6%	***
City	51%	43%	***
Town or Township	28%	31%	--
Village	8%	11%	**

* p<0.05 ** p<0.01 ***p<0.005

Note: See Appendix D for non-response analysis by state.

Appendix A: Who Holds Zoning Authority?

Who holds the authority to zone land varies widely across states and even within states.

In the most common arrangement, incorporated municipalities (which we think of as cities, boroughs, villages, or sometimes towns) zone within their boundaries and sometimes a few miles beyond city limits. Beyond that, counties take over zoning in the leftover unincorporated areas.

By the second most common arrangement, incorporated municipalities zone within their boundaries and county subdivisions govern the unincorporated areas. Variations on this arrangement include:

- New York's zoning-authorized county subdivisions (towns) have villages nested within them, and these villages zone their own land.
- In New England, county subdivisions (which in are the only unit of government and include towns and municipalities) are responsible for zoning all land in the state. The same is true in New Jersey, Pennsylvania, and Michigan, where county subdivisions are known as townships.

Within Illinois, Kansas, Minnesota, Missouri, Ohio, and Wisconsin, county subdivisions (called townships) have the option to take over for counties in zoning the unincorporated areas outside of cities or villages.

There are a few states with one-off arrangements. Maryland counties have the option to take over zoning for incorporated places. Virginia's cities have the same functional powers as counties, while towns within counties are subject to that county's land use laws. In Texas and Alabama, cities are the lead zoning body because counties cannot legally regulate land use. Similarly, Oklahoma counties have the option to zone but not the requirement. Table A1 on the next page lays out these zoning authority arrangements state by state.

All these different arrangements have implications for comparability between jurisdiction types since the kind of land a jurisdiction zones varies depending on what other kinds of jurisdictions with zoning authority exist within that same state. For example, whether a jurisdiction only zones for a relatively dense urban center alone or whether they also zone for sprawling or agricultural land depends on their state's arrangement.

To lay out these comparable types:

- All incorporated places (cities, villages, and towns outside of New York) with zoning power can reasonably be compared to each other.
- Counties and parishes cover similar areas and are comparable.
- Townships within Illinois, Kansas, Minnesota, Missouri, Ohio, and Wisconsin along with towns in New York are comparable.
- New England states, Pennsylvania, Michigan, and New Jersey sub-counties along with Virginia cities are roughly comparable in terms of their zoning authority level (no nested jurisdictions and no external jurisdictions governing unincorporated land) and the kinds of land they govern.

Within these groupings however, comparability may vary by population size and region.

TABLE A1

Zoning Authority, by Jurisdiction Type and State

State	County	Sub-County	Incorporated Place
AL	●		●
AK	●		⊗
AZ	●		●
AR	●		●
CA	●		●
CO	●		●
CT*		●	
DE	●		●
FL	●		●
GA	●		●
HA	●		
ID	●		●
IL	●	●	●
IN	●		●
IA	●		●
KS	●	●	●
KY	●		●
LA	●		●
ME*		●	
MD	●		⊗
MA*		●	
MI*	○	●	●
MN	●	●	●
MS	●		●
MO	●	●	●
MT	●		●
NE	●		●
NV	●		●
NH*		●	
NJ*	○	●	
NM	●		●
NY	○	●	●
NC	●		●
ND	●		●
OH	●	●	●
OK	●		●
OR	●		●
PA*	○	●	
RI*		●	
SC	●		●
SD	●		●
TN	●		●
TX	●		●
UT	●		●
VT*		●	
VA**	●		●
WA	●		●
WI	●	●	●
WV	●		●
WY	●		●

● Exist and hold zoning power

● Exist but zoning power is optional/conditional

⊗ Exist but must be given zoning power

● Exist but legally banned from zoning

○ Exist but only advise on zoning

* The census records all jurisdictions in New England, Pennsylvania, and New Jersey at the sub-county level (060)

** Many Virginia cities function like counties insofar as they govern zoning in unincorporated areas. Counties outside of cities manage zoning in unincorporated land and towns zone their own land.

Appendix B: Response Land Area Coverage by CBSA

Appendix B provides NLLUS users with information about how much land the survey was designed to represent, and how much land the data represent, given who responded.

First, we calculate how much land area jurisdictions with populations above 10,000 represents of a CBSA's total land area. Land area is in square miles. The percent of land area in the 2019 NLLUS design was less than 60 percent of the CBSA's total land area in four cases: Buffalo, NY; Detroit, MI; Pittsburgh, PA; and Philadelphia, PA. These CBSA's have many smaller population jurisdictions that were not included in the design. In Ohio, where it is difficult to determine how much unincorporated land is zoned by counties versus townships, the land area represented by the survey design may exceed 100 percent.

Second, response rates varied across CBSAs, affecting how much land area within a CBSA the 2019 NLLUS data represent. Because counties' zoned land area is so large, they have an outsized effect on the survey's total representation once their responses are factored in. Relatedly, where counties do not have zoning authority (Texas and Alabama), the ratio of respondent vs total zoning-empowered land only uses incorporated land area as the denominator. Several CBSAs are not well represented by the 2019 NLLUS data. These include: Detroit, Las Vegas, Los Angeles, Memphis, New Orleans, Pittsburgh, Raleigh, Salt Lake City, San Francisco, San Jose. Whether low representation is due to lack of large county participation or overall poor response rates should be taken into consideration. Conversely, several CBSAs are well represented by the 2019 NLLUS data. These CBSAs include: Austin, Baltimore, Cleveland, Dallas, Milwaukee, Portland, Providence, Riverside/San Bernadino, San Antonio, San Diego, and Washington DC.

TABLE B1

Estimated Land Area and Number of Jurisdictions Represented in the NLLUS by CBSA

	Land Area (in Square Miles)				Number of Jurisdictions		
CBSA (2013) Core City Name	Whole CBSA	With Zoning Authority	Represented by Sample Design	Represented by Respondents	With Zoning Authority in CBSA	Represented by Sample Design	Represented by Respondents
Atlanta, GA	8686	8686	8301	5363	174	78	50
Austin, TX	4220	660	561	445	49	12	8
Baltimore, MD	2601	2601	1813	1810	29	13	11
Birmingham, AL	5280	5280	4797	1856	98	29	9
Boston, MA	3487	3487	2181	1673	204	133	89
Buffalo, NY	1565	1565	647	466	69	48	20
Charlotte, NC	5067	5067	4854	1906	161	31	17
Chicago, IL	7197	7197	6619	3889	578*	256	135
Cincinnati, OH	4169	4169	4445	2803	248*	122	61
Cleveland, OH	1997	1997	1965	1503	173*	66	35
Columbus, OH	4796	4796	5020	2471	277*	80	39
Dallas, TX	9278	2884	2348	1873	208	65	48
Denver, CO	8346	8346	8310	3981	57	33	22
Detroit, MI	3888	3888	1941	969	215	105	46
Hartford, CT	1515	1515	1012	1045	65	47	38
Houston, TX	8258	1623	7885	1049	123	34	23
Indianapolis, IN	4306	4306	3819	2029	220*	29	17
Jacksonville, FL	3201	3201	3167	1231	23	10	4
Kansas City, MO/KS	7256	7256	6946	2960	331*	51	24
Las Vegas, NV	7891	7891	7891	108	6	6	1
Los Angeles, CA	4848	4848	4796	1274	124	113	63
Louisville, KY	3578	3578	3197	2213	196	23	14
Memphis, TN	4984	4984	4780	901	72	16	8
Miami, FL	5077	5077	5007	4621	107	66	37

Milwaukee, WI	1455	1455	1389	1024	94	57	38
Minneapolis, MN	7637	7637	7542	2545	417*	149	97
Nashville, TN	6302	6302	5935	3013	70	31	13
New Orleans, LA	3202	3202	2664	412	26	13	3
New York, NY	8294	8294	5456	2196	672	295	110
Oklahoma City, OK	5512	5512	5023	2204	88	22	13
Orlando, FL	3478	3478	3390	1741	40	25	14
Philadelphia, PA	4602	4602	2596	1756	388	151	69
Phoenix, AZ	14566	14566	14423	8260	38	25	12
Pittsburgh, PA	5281	5281	1209	904	465	82	45
Portland, OR	6684	6684	6625	5926	67	33	25
Providence, RI	1587	1587	1142	1142	65	46	33
Raleigh, NC	2118	2118	2070	291	80	14	9
Richmond, VA	4576	4576	4576	2593	29	17	12
Riverside, San Bernadino, CA	27263	27263	27197	20099	52	49	27
Sacramento, CA	5094	5094	5082	1311	23	20	15
St. Louis, MO	7863	7863	7387	5075	528*	84	50
Salt Lake City, UT	7684	7684	7593	697	25	16	12
San Antonio, TX	7313	766	7152	519	52	10	5
San Diego, CA	4207	4207	4205	4017	19	18	10
San Francisco, CA	2471	2471	2426	451	69	58	31
San Jose, CA	2679	2679	2668	319	19	16	12
Seattle, WA	5872	5872	5780	3573	81	43	27
Tampa, FL	2513	2513	2480	779	39	19	12
Virginia Beach, VA	2691	2691	2429	1298	38	15	10
Washington DC	6244	6244	6024	4632	121	40	29
Legacy Jurisdictions Outside 2019 Top 50 CBSAs						286	151
Total						**3100**	**1703**

Appendix C: 2019 CBSA List

2019:

1. Atlanta-Sandy Springs-Roswell, GA
2. Austin-Round Rock, TX
3. Baltimore-Columbia-Towson, MD
4. Birmingham-Hoover, AL
5. Boston-Cambridge-Newton, MA-NH
6. Buffalo-Cheektowaga-Niagara Falls, NY
7. Charlotte-Concord-Gastonia, NC-SC
8. Chicago-Naperville-Elgin, IL-IN-WI
9. Cincinnati, OH-KY-IN
10. Cleveland-Elyria, OH
11. Columbus, OH
12. Dallas-Fort Worth-Arlington, TX
13. Denver-Aurora-Lakewood, CO
14. Detroit-Warren-Dearborn, MI
15. Hartford-West Hartford-East Hartford, CT
16. Houston-The Woodlands-Sugar Land, TX
17. Indianapolis-Carmel-Anderson, IN
18. Jacksonville, FL
19. Kansas City, MO-KS
20. Las Vegas-Henderson-Paradise, NV
21. Los Angeles-Long Beach-Anaheim, CA
22. Louisville/Jefferson County, KY-IN
23. Memphis, TN-MS-AR
24. Miami-Fort Lauderdale-West Palm Beach, FL
25. Milwaukee-Waukesha-West Allis, WI
26. Minneapolis-St. Paul-Bloomington, MN
27. Nashville-Davidson--Murfreesboro—Franklin, TN
28. New Orleans-Metairie, LA
29. New York-Newark-Jersey City, NY-NJ-PA
30. Oklahoma City, OK
31. Orlando-Kissimmee-Sanford, FL
32. Philadelphia-Camden-Wilmington, PA-NJ-DE-MD
33. Phoenix-Mesa-Scottsdale, AZ
34. Pittsburgh, PA
35. Portland-Vancouver-Hillsboro, OR-WA
36. Providence-Warwick, RI-MA
37. Raleigh, NC
38. Richmond, VA
39. Riverside-San Bernardino-Ontario, CA
40. Sacramento--Roseville--Arden-Arcade, CA
41. Salt Lake City, UT
42. San Antonio-New Braunfels, TX
43. San Diego-Carlsbad, CA
44. San Francisco-Oakland-Hayward, CA
45. San Jose-Sunnyvale-Santa Clara, CA
46. Seattle-Tacoma-Bellevue, WA
47. St. Louis, MO-IL
48. Tampa-St. Petersburg-Clearwater, FL
49. Virginia Beach-Norfolk-Newport News, VA
50. Washington-Arlington-Alexandria, DC-VA-MD-WV

2003:

1. Atlanta, GA
2. Austin-San Marcos, TX
3. Boston-Worcester-Lawrence-Lowell-Brockton, MA-NH
4. Buffalo -Niagara Falls, NY
5. Charlotte-Gastonia-Rock Hill, NC-SC
6. Chicago-Gary-Kenosha, IL-IN-WI
7. Cincinnati-Hamilton, OH-KY-IN
8. Cleveland-Akron, OH
9. Columbus, OH
10. Dallas-Fort Worth, TX
11. Denver-Boulder-Greeley, CO
12. Detroit-Ann Arbor-Flint, MI
13. Grand Rapids-Muskegon-Holland, MI
14. Greensboro-Winston-Salem-High Point, NC
15. Hartford, CT
16. Houston-Galveston-Brazoria, TX
17. Indianapolis, IN
18. Jacksonville, FL
19. Kansas City, MO-KS
20. Las Vegas, NV
21. Los Angeles-Riverside-Orange County, CA
22. Louisville, KY
23. Memphis, TN-MS-AR
24. Miami-Fort Lauderdale, FL
25. Milwaukee-Racine, WI
26. Minneapolis-St. Paul, MN
27. Nashville, TN
28. New Haven-Bridgeport-Stamford-Waterbury-Danbury, CT
29. New Orleans, LA
30. New York-Northern New Jersey-Long Island, NY-NJ-PA
31. Norfolk-Virginia Beach-Newport News, VA-NC
32. Orlando, FL
33. Oklahoma City, OK
34. Philadelphia-Atlantic City-Wilmington, PA-NJ-DE-MD
35. Phoenix-Mesa, AZ
36. Pittsburgh, PA
37. Portland-Salem, OR-WA
38. Raleigh-Durham-Chapel Hill, NC
39. Richmond-Petersburg, VA
40. Rochester, NY
41. Sacramento-Yolo, CA
42. Salt Lake City-Ogden, UT
43. San Antonio, TX
44. San Diego, CA
45. San Francisco-Oakland-San Jose, CA
46. Seattle-Tacoma-Bellevue, WA
47. St. Louis, MO-IL
48. Tampa-St. Petersburg-Clearwater, FL
49. Washington-Baltimore, DC-MD-VA-WV
50. West Palm Beach-Boca Raton,