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Urban Livestock Ownership, Management, and Regulation in the United States: An Exploratory Survey and Research Agenda

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Citation Details

McClintock, Nathan; Pallana, Esperanza; and Wooten, Heather, "Urban Livestock Ownership, Management, and Regulation in the United States: An Exploratory Survey and Research Agenda" (2014). *Urban Studies and Planning Faculty Publications and Presentations*. Paper 90.

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Manuscript Submission to *Land Use Policy*: Regular paper

Urban livestock ownership, management, and regulation in the United States:
An exploratory survey and research agenda

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Highlights

- We surveyed 134 urban livestock owners in 48 US cities to determine their motivations and management practices, and the extent to which these practices conform to local ordinances
- Urban livestock ownership is more akin to pet ownership than the type of commercial activity that led to earlier restrictions, but nevertheless retain a productive function
- Regulation seems to have little impact on management practices, despite a favorable attitude towards regulation
- Planners should reevaluate setbacks and restrictions on animal limit requirements, in favor of establishing minimum space requirements that raise animal welfare standards

1. Introduction

Over the last few years, public interest in urban agriculture has spread rapidly across North America. Planning scholars and practitioners have been keeping pace with this latest surge in interest in urban agriculture, calculating urban agriculture's potential contributions to local food systems (Colasanti & Hamm, 2010; MacRae et al., 2010; McClintock, Cooper & Khandeshi, 2013), documenting best practices (Hodgson, Caton Campbell, & Bailkey, 2011; Wooten & Ackerman, 2011), and developing recommendations for policy and planning (Feldstein, 2013; Hodgson, Caton Campbell, & Bailkey, 2011; Mukherji & Morales, 2010; Raja, Born, & Russell, 2008). In many cities, planners are updating codes to reflect changing land uses and activities, including the production and sale of agricultural products and the keeping of urban livestock such as chickens, geese, ducks, goats, pigs, rabbits, and bees. While most cities already have ordinances in place that regulate animals in some manner (Bouvier, 2012), over 20 US cities (including Cleveland, San Antonio, Kansas City, and Seattle) have recently passed new ordinances that explicitly deal with urban livestock (Butler, 2012).

Historically, the presence of livestock in the city was controversial. Earlier in the 20th century, many municipalities restricted or prohibited livestock ownership, citing the public health risks of keeping farm animals in close proximity to humans. While some of the concerns over waste and nuisances were warranted, restrictions on livestock (and agricultural practices, in general) were more a reflection of a dominant paradigm to classify and separate "urban" from "rural" land uses (Bartling, 2012; Fogelson, 2005; Gaynor, 1999; McNeur, 2011; Orbach & Sjoberg, 2011). Many of the same concerns can be heard today as opponents raise concerns over smell, noise, and public health (McCaffrey, 2012; Robinson, 2012), advancing their "desire to maintain a particular vision and meaning of urban space" (Bartling, 2012, p. 8). Furthermore,

some animal welfare activists have argued against livestock ownership on moral grounds, contending that legalization will result in neglect of animals, inhumane conditions, and the development of backyard factory farms (Elwood, 2011; Kauffman, 2012). Some have opposed regulation favorable to livestock out of concern for the additional pressure urban livestock might put on already over-burdened animal control departments and animal shelters, particularly as the allure of a “hipster” fad dwindles (Aleccia, 2013).

Succumbing to what Orbach and Sjoberg (2011) colorfully refer to as “clucking”—which consists of “avoidable debates, controversies, disputes, litigation, filibusters, and other argumentative processes” (p. 3)—by opponents of urban livestock, some cities have simply left livestock out of recent efforts to update or draft new urban agriculture ordinances. San Francisco’s Urban Agriculture Ordinance (Ordinance 66-11), for example, deals only with zoning and permitting for crop production and sales; efforts in neighboring Oakland have been stymied by debates over whether or not animals should be included in a new urban agriculture ordinance (McClintock, Wooten, & Brown, 2012; Tian, 2011).

Despite the upsurge in urban agriculture in North America and the concomitant growth in relevant scholarship, research on urban livestock policy and planning in the US remains scant. Some scholarship examines conflicts related to urban livestock ownership (Orbach & Sjoberg, 2012; Salkin, 2011; Schindler, 2012), or details the various functions and benefits of urban agriculture or livestock (Blecha & Leitner, 2013; Calfee & Weissman, 2012; Voigt, 2011; Wood, Pyle, Rowden, & Irwin, 2010). Much of the recent literature reviews how livestock is regulated, detailing how municipal and county codes regulate livestock through a combination of zoning, nuisance, public health, and animal control ordinances (Butler, 2012; Hodgson et al., 2011; Salkin, 2011; Voigt, 2011). Such local controls include: outright bans; limits on types and

numbers of animals; animal-specific permits; neighbor consent; and design, size, and setback requirements for coops and shelters. In a survey of 22 recently revised municipal ordinances, Butler (2012) reported that most cities allow animals in residential areas to some extent, but that “it is rare to find a municipality that is widely permissive in all aspects of urban livestock keeping” (Butler, 2012, p. 17). Similarly, LaBadie (2008) found that chicken ordinances in 25 cities varies widely in terms of regulation of flock size, distance to property lines and dwellings, enclosures, nuisances, and slaughter. Further illustrating this trend, Bouvier (2012) found that 84 of the 100 largest cities in the US allow chicken ownership in some capacity; only three ban chickens outright, while an additional 13 restrict ownership to agricultural zones or to lots so large that most residents are excluded. Further, he found that 71 of 100 regulate chickens through animal control ordinances, while only 14 locate chicken ordinances within the zoning code.

With few exceptions (e.g. Bartling, 2012; Blecha & Leitner, 2013), however, scholars have not thoroughly examined the actual motivations and management practices of urban livestock owners, nor have they investigated whether or how existing regulations transform these practices. More than simply a gap in academic scholarship, this lack of understanding has policy implications. As Thibert (2012, p. 349) notes, planners and municipal officials rarely understand the “diversity of practices within the urban agriculture movement;” this lacuna thereby poses a challenge to the development of ordinances that can effectively regulate such practices. Indeed, as cities develop policies to facilitate (or curtail) the expansion of urban livestock ownership, it would help to first characterize what urban livestock ownership and management actually look like on the ground. What motivates most urban livestock owners to raise animals? How many animals do they raise? What kind of structures do they keep their animals in and how far are these from the property line? How often do they clean animal waste and what do they do with it?

To what extent are they raising animals for meat, eggs, milk, or other food uses? To what extent do these practices conform to or violate existing regulations?

This exploratory survey of 134 urban livestock owners from 48 different US municipalities begins to answer some of these pertinent questions, and offers preliminary insights into the scale and scope of their practices. Moreover, their responses suggest that the diversity of practices and experiences may warrant the reevaluation of current urban livestock controls. We hope that these results might pave the way for future research while helping guide planners and policy makers as they redefine the place for urban livestock in North American cities.

The paper proceeds with a presentation of our survey methodology. We then present our results, beginning with a brief overview of the municipal regulations of chickens currently in place in the respondents' cities. We then report the management practices of respondents, with special attention to if and how the practices of a subset of chicken owners adhere to municipal regulations. In the discussion and conclusion that then follow, we underscore the importance of: revisiting existing regulation to develop more appropriate setbacks and animal limits; using regulation to raise animal welfare standards; addressing sales and slaughter; and informing the public about regulation. We conclude by outlining an agenda for future research on urban livestock management and planning.

2. Methods

2.1. Survey distribution and response

In June 2011 we distributed an online questionnaire or web-based survey (Cook, Heath, & Thompson, 2000; Fleming & Bowden, 2009) via email using a chain referral or “snowball”

sampling technique (Biernacki & Waldorf, 1981). The survey, which consisted of 36 questions, was sent to known urban livestock keepers nationwide and to list-serves belonging to the Community Food Security Coalition (COMFOOD and UrbanAg), Illinois Local Food and Farms Coalition, Institute of Urban Homesteading, and Bay Area Homestead Hook Up, with the request that recipients forward the survey along to other relevant list-serves and individuals. Given this “viral” dissemination technique, it is impossible to calculate a response rate. We ultimately received 134 responses from individuals in 48 municipalities (see Figure 1), exactly half of whom (n=67) resided in the Bay Area (see Figure 2). Roughly a quarter of total responses (n=36) were from Oakland, likely because Oakland was the origin of the study. Nine responses came from adjacent Berkeley and 22 responses from 14 other Bay Area municipalities. The other metropolitan areas with the highest response rates were: Chicago (n = 13); Minneapolis (n=10); Portland (n=8); Cleveland (n=7); Seattle (n = 4); and San Antonio (n=3). There were also single responses from municipalities in the New York, Salt Lake City, Nashville, Missoula, Denver, Washington, Baltimore, Boston, New Orleans, and Lexington metropolitan regions.

[FIGURES 1 AND 2 ABOUT HERE]

2.2. Determining the regulatory context

Given the high rate of chicken ownership among respondents and low numbers for other animals, we decided to restrict our examination of the relationship between regulation and management practices to chickens. We first searched for chicken ordinances on two websites that catalog chicken ordinances from around the country: www.backyardchickens.com and www.thecitychicken.com. We followed the relevant link for each municipal ordinance to crosscheck the scope of regulation. In cases where the city was not listed on either website, we

consulted www.municode.com to access the municipal code for a particular city or searched for the code through the municipal government website. In cases where livestock ownership is regulated by the county, we searched for relevant regulations in the code for the surrounding county. In each instance, we assessed the following areas of regulation: limits on the number of chickens; if roosters are allowed; required setbacks from on-site and neighboring dwellings and property lines; the presence of requirements pertaining to shelter or sanitation requirements; and whether livestock are regulated under nuisance ordinances and/or zoning. Because we were unable to determine which of these cities allowed slaughter or sales of meat or eggs, we did not include these forms of regulation in our analysis.

Ultimately, municipal ordinances regulating chicken ownership and management were in place in 32 of the 47 municipalities represented in this survey; two more cities have added chicken ordinances since our survey was conducted (see Table 1). Out of 122 chicken owners surveyed, 105 (86%) lived in cities with ordinances that specifically regulate chickens or other livestock.

[TABLE 1 ABOUT HERE]

2.3. Data analysis

We calculated response frequencies using JMP 10 software (SAS Institute, Cary, NC). Not all 134 respondents answered each and every question. In such cases, we report the number (n) of respondents for the particular question. We also collected qualitative data in several open-ended questions and coded responses according to dominant organizing themes. We present direct quotes from these open-ended questions to help illustrate these dominant themes or particular trends that appeared in the survey, not only complementing the descriptive statistics

with a greater degree of narrative richness, but also give a voice to otherwise anonymous livestock owners.

As we explored the data, we grouped responses into multiple analytical categories. Given the potential bias due to geographic variance in the data (e.g., Bay Area responses vs. responses from elsewhere in the US; urban responses vs. suburban responses), it was not appropriate to test for statistical significance between groups. We did, however, statistically compare Bay Area responses (n=67) to the remaining responses (n=67) to ensure that they did not significantly; unless reported, no significant qualitative or quantitative differences appear between Bay Area responses and the rest. We also explored the data by grouping responses by geographic region (Northwest, California, Mountain West, Midwest, South, and Northeast), but observed no significant trends.

Given that we received responses from cities of various sizes, both urban and suburban, we also wanted to examine whether urban form impacted livestock ownership. Initially, we tested the effect of population size (U.S. Census Bureau, 2010), both of the municipality and of the Metropolitan Statistical Area (MSA) in which it is located, on various responses (e.g., number of animals, average lot size, average area of a shelter). Population alone does not necessarily reflect the diversity of urban form, however; a city of half a million, for example, could be a dense urban center surrounded by agricultural land or it could be a sprawling suburb adjacent to a larger city. We therefore broadly categorized the cities into one of three qualitative (and admittedly subjective) categories of urban form: urban, suburban, and town.

We based these categories on a combination of population size, density of the built environment, and spatial relationship to a larger urban core. First, we classified all cities with populations over 250,000 as urban. For municipalities under 250,000, we consulted Google

Maps satellite imagery to determine if the municipality was part of a larger metropolitan conurbation, i.e., within or adjoining a larger urban area (e.g., Figure 3a). If not, we categorized it as a “town” (e.g., Figure 3b). If so, we then distinguished between “urban” and “suburban” typologies by examining the municipality’s location in relation to the core urban area. If it lies on the periphery of the metropolitan area and adjoining agricultural land or other open space, we classified it as suburban (e.g., Figure 3c), otherwise classified it as urban.

[FIGURES 3a, 3b, and 3c ABOUT HERE]

In a few cases, the municipality is embedded within a dense urban matrix. In these cases, we zoomed in to examine the density of the built environment more closely in order to identify potential markers of suburban form (e.g., large lots, residential subdivisions, cul-de-sacs, playing fields, large parking lots, shopping centers, ranch style housing) or urban form (streets on a dense grid, apartment blocks, dense commercial districts, pre-1950s housing). Because we were able to categorize most cities by population or spatial relation to a metropolitan region, we rarely had to take such pains. Additionally, our familiarity with several of the cities often made this level of decision-making unnecessary. The classification of cities by urban form, along with municipal and metro populations, can be found in Table 1.

We qualify our methodology with an important caveat. Given the limited number of responses and the uneven geographic distribution of responses, our findings cannot be taken as representative of all livestock owners in the United States. Because of the small, geographically biased n, results are not generalizable to a larger population; rather, they reflect only the attitudes and practices of the respondents. Moreover, as with any internet survey, respondents are self-selecting; results may be therefore be more representative of a subset of internet-savvy livestock owners interested and willing enough to willing to devote time to completing the survey. As

such, we consider this research to be exploratory. Nevertheless, the practices and experiences of the respondents serve to illustrate behaviors and practices among this geographically diverse sample of livestock owners. We hope that dominant trends in the responses can serve to highlight behaviors and practices of interest in future investigations at national, regional, or municipal levels.

3. Results

3.1. Regulatory contexts

In our study, 33 of the 48 (69%) municipalities regulate chickens in some manner (see Table 2). Eight of these cities have zoning requirements that delineate where chickens are allowed (Hawthorne, Los Angeles, San Francisco, Oak Park, Minneapolis, Missoula, Nashville, and Salt Lake City). In Minneapolis, for example, chickens are not allowed in multi-family residential zones. Other cities establish minimum lot size requirements. Twenty-one of our surveyed cities established limits on the number of animals, ranging from anywhere between 1 and 25 chickens. Generally, this approach establishes the maximum number of a particular type of animal on any given residential lot. Some cities, however, do not differentiate between types of livestock. In Portland, for example, residents may keep up to three animals—any combination of chickens, ducks, doves, pigeons, pygmy goats, or rabbits—without a permit (Portland, OR City Code and Charter § 13.05.015.E).

[TABLE 2 ABOUT HERE]

While most cities in our survey simply set a limit, others do so as a function of lot size. Seattle’s code, for example, states: “up to eight domestic fowl may be kept on any lot” in addition to other small animals requiring permits (and which include potbelly pigs). Urban farms

and community gardens can exceed this maximum, however, and may be permitted to keep “one additional fowl ... for every 1,000 square feet of lot area over 10,000 square feet in community garden or urban farm use” (Seattle, WA Municipal Code § 23.42.052.D). Cleveland uses a similar approach to regulate chickens, ducks, rabbits, and similar animals: “No more than one (1) such animal shall be kept on a parcel of land for each eight hundred (800) square feet of parcel or lot area. For a standard residential lot of four thousand eight hundred (4,800) square feet, this regulation would permit no more than a total of six (6) such animals” (Cleveland, OH Codified Ordinances §347.02). Richmond, California’s ordinance is more subjective, stating: “The number of animals, including fowl, on any premises shall be of a prudent and reasonable number and is at no time to be excessive in number as to the facilities provided for them” (Richmond, CA Municipal Code § 9.24.060).

Fourteen cities in our study have an outright ban on roosters. When roosters are allowed, they may be limited to large lots: Cleveland only allows roosters on lots of one acre or larger (Cleveland, OH Codified Ordinances §347.02(b)(1)(c)). In Dallas, they must be confined, while in Denver, they are allowed with a permit. Twenty of the surveyed cities, however, do not explicitly address roosters. In such cases, roosters are likely regulated under general nuisance ordinances.

Setbacks establishing a minimum distance from a coop, pen, or other animal structure to a dwelling, property line, or street are the most common form of regulation in the surveyed cities; in our study, 21 cities (44%) defined setbacks. Fourteen of these municipalities define setbacks from neighbors’ dwellings, nine designate setbacks from the dwelling on the property, and eight designate property line setbacks.

Some requirements are intended to simultaneously mitigate potential nuisance complaints and improve animal care standards by providing sufficient shelter and space to roam. Sixteen of our survey cities established sanitation requirements. Richmond, CA's ordinance, for example, states: "the premises shall be maintained in a neat and sanitary condition so that no nuisance due to unsightliness, odor or pest breeding or harborage shall be caused by such animals or premises" (§ 9.24.060). Thirteen of the cities explicitly require shelters.

Some cities require that urban livestock keepers acquire a special permit, as Portland does for owners with more than three animals. Oversight may be provided by a range of agencies, from public health to animal control and zoning code enforcement to the police. Albany, California, for example, requires purchase of a \$165 permit from the Community Development and Environmental Resources Department. The permit verifies the code's stipulation that: "The design of the proposed housing will provide a safe and humane facility for the chickens or rabbits" (Albany, CA Municipal Code §10-6.10) and more specifically that "all premises, enclosures or structures wherein animals are kept shall be thoroughly cleaned, and all debris, refuse, manure, urine, waste food, or other removable material shall be removed therefrom every day or more often as necessary" (§10-2.1).

Local codes are frequently silent on slaughter. While Chicago bans slaughter outright (Chicago, IL Municipal Code §7,12,300), Los Angeles allows it for food and religious purpose (Los Angeles, CA Municipal Code §53.67). Cleveland is explicit about the slaughter of livestock for personal consumption: "Chickens, ducks, rabbits and similar small animals may be slaughtered on site only inside a garage or other building and only if for use by the occupants of the premises and not for sale. No other farm animal may be slaughtered on site (Cleveland, OH

Codified Ordinances §347.02). San Francisco stipulates that slaughter take place in a room separate from the coop occupied by the fowl (San Francisco, CA Health Code §37(d)(5)).

While the specific regulations differed considerably between surveyed cities, setbacks, limits on animals, shelter and sanitation requirements emerged as the primary means of regulating chickens. As we discuss in the sections that follow, livestock management practices are as diverse as the regulatory context. Nevertheless, certain patterns of ownership, motivation, management, and regulatory compliance do begin to emerge. We address these in turn.

3.2. Respondent, livestock, and property characteristics

Most respondents (88%) were white or European American. Five respondents reported their ethnicity as Hispanic or Latino, three as more than one race, two as black or African American, one as Asian, and one as Middle Eastern. Four people did not report their race or ethnicity. The vast majority of respondents (87.3%) have kept livestock for more than two years, 7% for one to two years, and 5% for less than a year. Eighty-two percent of respondents own the property where they keep their animals and 95% reside on the same property.

Almost two-thirds of respondents (62%) keep their livestock on lots under 5,000 square feet. Roughly a quarter (24%) of lots are between 5,000 square feet and 0.25 acre, with the remaining 14% on lot sizes larger than 0.25 acre. Lot sizes tend to be larger in suburban cities than in urban municipalities; in urban areas, more respondents reside on lots between 2,500 and 5,000 square feet, while in suburban areas, lot sizes average between 0.25 and 1 acre (see Figure 4).

[FIGURE 4 ABOUT HERE]

3.3. Motivations and perceptions

Respondents (n=128) reported a range of motivations for keeping urban livestock, and most reported several reasons for raising animals. The overwhelming majority of respondents keep livestock to ensure a better source of food, notably to be assured of “where our food comes from” and how it is produced. Several noted the superior quality of meat, eggs, and milk from animals that they raise themselves. Others underscored the health benefits, noting the risks of industrially produced animal products. Slightly more than a third (35%) expressed explicitly environmental or ecological reasons, ranging from broadly defined desires for “sustainability”, to wanting to “reconnect with nature”, to ecological gardening practices such as cycling nutrients from food scraps and chicken manure into the garden. More than a dozen respondents (16%) also commented on the educational benefits of urban livestock. Five people commented that owning livestock helps them save money on groceries and four specifically noted the community-building benefits of owning livestock. A handful of respondents (2%), most of whom people of color, noted that livestock ownership has a cultural significance and provides a sense of connection to traditional food ways or, in the words of an African American respondent from Nashville, “the ways of our elders.”

When asked what, if any, impact the urban environment has on livestock, several people indicated that they consider their animals as pets. One person responded, “They are pets more than livestock, so they probably receive more attention, are more tame, live in cleaner conditions, and have more money spent on them at the vet. They are confined most of the time, but I think their coop and lot are generous” (Minneapolis). Another chicken owner noted, “Our chickens are happy, I don't see any negative impacts. If anything, they are fat and spoiled” (Chicago). A Santa Rosa, CA, resident noted, “They have a pretty great life, at least in my yard. Although they are

‘livestock’ they are definitely cared for as loved pets.” A goat owner in Oakland commented, “They become pets and are treated better than if they were in a large herd somewhere.”

Several respondents commented that animals in the city lead “a much better life” or a “better quality of life” than they would on a rural farm or in a “factory farm”. Echoing almost ten other respondents, one chicken owner from Oakland notes, “Its life is much better than it would be in a factory farm.” A chicken owner from Minneapolis exclaimed, “I’m sure they are taken better care of than chickens in a CAFO [concentrated animal feeding operation]! They are kept warm in the winter, well watered and fed and doted over.” Another respondent notes that the animals have “smaller space than some rural settings but animals may receive better lifestyles with more love per animal than a farm setting” (Napa, CA). Similarly, another Bay Area resident commented, “They don’t get a meadow to roam in, but it’s better than factory farming.” Twenty-two people (19%) responded to the question by expressing concern that insufficient space would have a negative impact on an animal. Seven noted predation by raccoons, dogs, and cats, and the same number noted that urban noise levels might have a negative impact.

[TABLE 3 ABOUT HERE]

3.4. Types and numbers of animals, shelter, and space

Respondents predominantly keep chickens (90%) and bees (37%). Fewer keep rabbits (9%) and even fewer keep goats (9%) or large fowl such as turkeys or geese (4%). Goat owners keep two to three goats on average, chicken owners keep four to eight birds, rabbit owners keep one to three rabbits, and beekeepers manage one to two hives (see Table 3). There was no significant difference in the number of chickens between municipalities with ordinances and those without (see Table 4). Overall, only slightly more than a third of respondents favor limits

on flock size (see Table 5), but only 22% of ordinance violations are the result of owners exceeding the allowed number of birds. The majority of these violations occurred in Portland, where a permit is required for more than three animals.

[TABLE 4 ABOUT HERE]

In cities with and without ordinances alike, respondents favor regulation addressing noise, hygiene, and maintenance standards (see Table 5). On average, only 13% feel that flock size, square footage, noise, hygiene, and maintenance standards should not be regulated. While only 14 municipalities represented in the survey explicitly require shelters for livestock, all respondents provide permanent coops for their chickens. Nearly all (99%) of chicken owners use wood for their structures; most also use “chicken wire” or wire “hardware cloth” (64%). Few reported using temporary materials; only two use plastic and four use tarps. Of twelve respondents keeping goats, four used wood, one used wood and metal, and two used plastic.

[TABLE 5 ABOUT HERE]

We asked respondents what they consider healthy living space for the animals they keep. Most rabbit keepers reported providing between two and five sq ft per rabbit. Of the ten respondents who keep goats, only one reported providing less than 100 sq ft per goat (see Table 6). Nearly two-thirds of respondents keeping fowl (n= 57) provide five or more sq ft per bird. A few respondents commented that chickens “should roam freely during the day” (San Antonio) on “as much room outside as possible” (Cleveland). Others gave minimum requirements, adding, “but they have much more room than that” (Chicago).

There appears to be a relationship between the number of chickens and lot size, with lots larger than 0.25 acres averaging roughly two to three times more birds than lots under 0.25 acres (see Table 7). Similarly, average shelter size increases with lot size, as does the average amount

of space per chicken. The average number of chickens is greater in the suburbs than in dense urban areas, while the average shelter area per bird is greatest in towns.

[TABLE 6 AND 7 ABOUT HERE]

Interestingly, there is a difference among chicken owners between what they consider to be a healthy amount of space per bird and how much they space they actually provide: 48% provide more space than they feel is healthy while 43% actually provide less space. The remaining respondents provide the same amount of space. Attitudes toward regulation appear to play a role in this difference. Among the 87% who favor some form of regulation, nearly two-thirds support minimum area (square footage) requirements for birds. When comparing between those who support and those who do not support square footage requirements, however, an interesting trend appears: 53% of respondents opposed to regulation of square footage provide less space than they feel is necessary, while 32% provide more space and 15% provide the same amount. Among those who favor regulation, results are almost reversed: 54% provide more space than they feel is necessary, 39% provide less, and 7% provide the same. Overall, there is no significant difference in mean shelter size and mean area per bird between municipalities with ordinances and those without (see Table 4), suggesting that the ordinances themselves do not determine how much space owners allocate for their birds.

3.5. Setbacks

Most livestock dwellers keep their livestock at a greater distance from their own dwellings than from their property lines (see Table 8). Nearly half (47%) of respondents (n=103) keep livestock at more than 20 feet, while another 26% keep their animals between ten and 20 feet from their dwellings. The remaining 28% keep their animals less than ten feet from their

homes. More than 60% of respondents keep their livestock within five feet of the property line; an additional 17% reported a setback between six and ten feet, while the remaining 19% keep animals more than 10 feet from the property line. Slightly less than two-thirds of respondents keep their livestock less than 20 feet from their neighbor's dwelling. While there is no correlation between lot size and distance to the respondent's dwelling, lot size does correlate with distance to the property line and distance to a neighbor's dwelling; on bigger lots, dwellings are usually farther from the property lines. While we did not explicitly ask respondents to explain why they located their coops where they did, it appears that they do not want coops next to their homes, and instead push them as close to the property line as possible.

[TABLE 8 ABOUT HERE]

The vast majority (88%) of regulatory non-compliance is due to setback violations. In Oakland, 26 of 32 respondents with chickens are in violation of setbacks; in Minneapolis, eight of ten; in Portland, six of eight; in Berkeley, four of seven. All three Los Angeles respondents are in violation. In Chicago, on the other hand, where setbacks are not defined, none of the 12 respondents are in violation of livestock regulations. Ironically, when asked if they feel that the required distance from property lines or buildings is reasonable, 47% of those in violation of a setback replied yes, while 44% said they do not know what the setback is. Only 8% said that they feel the distance requirements are unreasonable.

Among all respondents, ten commented that distance should be determined on a case-by-case basis, notably based on the relationship with neighbors. One livestock owner in San Antonio commented, "Rule should be based on compliance with sound practices and maintaining goodwill with neighbors, not arbitrary distances." This sentiment was echoed by another respondent in Minneapolis who stated, "I think this depends entirely upon the property and the

neighbors and shouldn't be set in stone.” A New Orleans livestock owner also responded that setbacks should be established in such a way “as long as it is agreeable with neighbor.” Three people were strictly opposed to distance limits. One noted, “If housing is clean and well-maintained, I don't think there should be a distance requirement” (Portland). Two others noted that there are no limits for dogs and there should therefore be no limit on livestock. One Berkeley respondent wrote, “People can have dogs up to the property line. Why are chickens different?” Another person from suburban Fresno said, “Dogs can roam entire yards and can defecate anywhere on property. Dogs are noisy at anytime of day. Chickens are quieter and make less waste than dogs. I only think restrictions on distance to property lines are reasonable in the case of keeping roosters, not hens.”

3.6. Hygiene and maintenance

Among the 87% who favor some form of regulation, 70% favor regulation of noise, hygiene, and maintenance standards (see Table 5). While there are no significant differences between those living in the Bay Area at large and the rest of the country, a greater percentage of Oakland respondents (22% versus 10% on average in other cities) are opposed to livestock regulation. While they are less supportive of other regulations of noise, hygiene, and maintenance standards than respondents in other parts of the Bay Area or US at large, Oakland respondents tend to be more supportive of regulation of minimum square footage requirements per animal.

As a hygiene and sanitation measure to deter rodents, most respondents keep animal feed in a lidded container: 41% use a metal container, 31% use plastic, and 19% use a container of an unknown material. Only five respondents do not keep feed in a container. Slightly more than half

of respondents keep animal feed indoors, either in their house or in an enclosed structure such as a shed, garage, or greenhouse; the remaining respondents keep the feed outdoors.

As a litter or bedding for their animals, most respondents (91%) use straw or wood chips. Most respondents (43%) clean livestock coops/shelters weekly, while 28% clean them once a month and 23% clean them daily. The vast majority (94%) either compost the used litter or apply it directly to their gardens. The remaining respondents treat the bedding as garbage. Only 18% of respondents have excess manure that they need to dispose of. Eleven respondents gave away the excess and only two disposed of the waste through municipal waste management. Of the 76 respondents who have had to deal with disposing of a dead animal, almost two-thirds (63%) buried the animal, a quarter (24%) disposed of the animal via municipal waste, and 13% took the animal to the veterinarian for disposal.

3.7. Impacts on neighbors and nuisance complaints

When asked what they consider the impacts of keeping urban livestock on their neighbors, responses were both positive and negative. Two-thirds of the respondents noted the positive community-building and educational benefits of urban livestock. One Los Angeles area respondent commented, “There are no negative impacts on my neighbors. They enjoy watching my chickens range and eating their extra eggs! They are also a teaching tool for their kids.” A Baltimore area respondent stated, “I have received many compliments on how pleasant it is to see hens pecking happily. In fact, it's strengthened my bond with my neighbors as now they will come over and chat, which is not the norm for the neighborhood.” An Oakland resident noted, “The neighbors with children are often very glad to have a little petting zoo around; other neighbors are given gifts of honey or eggs. Some neighbors see the farm as an extension of who

they are and make it part of their lifestyle. The Yemeni liquor store owner helps with the goats, for instance.” Nineteen other respondents specifically mentioned how much the neighbors’ children enjoyed their livestock.

Other respondents acknowledged the possible negative impacts. Sixty-seven respondents cited noise, smell, and the potential to attract pests (such as flies or rodents) as possible nuisances. Among the 42 people who felt that noise was a possible impact, several qualified their responses, noting that the sounds of livestock are “no louder than the sounds of motorcycles, dogs, cars or other random city noises” (Chicago). One person noted, “The chickens cluck a bit, but it's MUCH quieter than the usual urban noises, such as cars, yelling, music, etc” (Oakland). One Los Angeles residents complained, “My neighbors have dogs that bark all the time. Their animals are much noisier than mine so they have a bigger impact on me than I do on them.” Others noted the positive sounds: “One neighbor says that the goats *baahing* puts him to sleep” (San Francisco). A Boston area respondent noted that the neighbors “get eggs and like the clucking.”

When asked if a neighbor had ever filed a complaint against them for keeping livestock, 87% of respondents reported that they have never had a neighbor complain about their animals. Of the 10% of respondents who reported having received neighbor complaints, half were due to crowing roosters. The quacking of one Portland resident’s ducks led to a complaint, and one Oaklander’s goats cause the neighbor’s dogs to bark. One Berkeley resident reported that, “One anonymous complaint (in 15 years) about rooster noise was filed. I ate the young noisy rooster and passed an inspection from the local animal care authority.” Three respondents reported complaints related to neighbors’ concern over flies and the spread of disease and two reported complaints related to odors. To mitigate complaints, respondents reported reaching out to

neighbors proactively. Twenty-six people reported sharing surplus eggs, milk, and honey with their neighbors, while 35 respondents actively seek feedback from them. Eighteen noted addressing potential impacts through design; several reported constructing shelters out of sight of neighbors, screening coops or property lines with vegetation, or building attractive structures. Forty-eight reported taking active steps to mitigate noise, smell, and pests through regular cleaning and conscientious efforts to deter rodents.

3.8. Slaughter and processing

More than a quarter of overall respondents (28%) butcher some of their animals for personal consumption. All 35 of them butcher chickens, six butcher large fowl, seven butcher rabbits, and one butchers goats. The vast majority of those who slaughter (31 of 35) reported that they butcher an animal less than once a month. Three respondents reported monthly processing and one respondent in Berkeley reported butchering once a week. Eighteen of them reported disposing of offal in municipal waste, 14 compost it, and five bury it.

When asked what impact butchering animals has on neighbors, roughly a third (n= 17) felt that the impacts are positive. Many commented that their neighbors participate. A Minneapolis resident noted, “Many of our neighbors want to come over and help or watch! We had quite a crowd when we killed one last fall. People are fascinated by it.” Similarly, another responded, “They come and watch and love it. The kids are fascinated. The parents are the squeamish ones” (Oakland). Two noted that neighbors draw on their own experiences. One Baltimore area respondent commented, “I did it in the most discreet way possible, and still two neighbors were aware it was happening. They actually stopped by and reminisced about how

they used to do it when they were growing up!” An Oakland resident said, “One of my neighbors helps with goat slaughter as part of his cultural heritage.”

The same number (n=17) commented that their neighbors simply do not know, due to either the infrequency of slaughter or the hidden manner in which it is conducted. One suburban Minneapolis resident notes, “I do it in a location where they wouldn't be able to witness it unless they were in my yard.” A respondent from San Francisco comments, “my neighbors are not aware that it happens. Some people can be squeamish about these things so I don't advertise it or do it very often.” For one Berkeley resident, the process is private for personal reasons: “I don't think they know. It is a quiet, sacred process.” Some respondents (n=4), however, recognized the potential drawbacks of on-site slaughter and the negative impacts on neighbors. One Oakland respondent commented, “I understand some would find this offensive, and especially not want their kids wandering in.” Another Oakland respondent commented, “I think it's one thing for neighbors to cope with the idea of live ‘farm animals’ next door. It's another thing for them to get on board with butchering.”

3.9. Barter and sales

Three-quarters of those who reported having excess eggs, milk, or meat (n=125) reported that they share this surplus. The remainder is evenly split between those who barter or those who sell their surplus. Nearly 90% (n=109) reported that they would like to be able to barter or sell surplus produce or eggs. A smaller number (n=64) responded that they would like to be able to sell, barter, or exchange raw milk, and 59 responded that they would like to be able to sell, barter or exchange excess meat.

3.10. Source of information on livestock husbandry

When asked where they seek information on how to keep livestock healthy and productive in an urban setting, respondents cited a variety of sources (see Figure 5). The internet is a dominant source of information for survey respondents, with nearly three-quarters of respondents getting information from websites or blogs, and a quarter from online discussion forums or list-serves. The most website cited most frequently by respondents is www.backyardchickens.com. Books and journals provide 40% of respondents with husbandry information. A similar number turns to other livestock owners, while about 15% get information from local urban farming associations or organizations. Slightly more than a third get information from friends and neighbors who also keep livestock. Only 12% reported getting information from government extension organizations or agencies (e.g., state or county extension, USDA, ATTRA/National Sustainable Agriculture Information Service). A few respondents noted getting information at local farm supply stores or from their veterinarian. When asked if they would attend workshops on animal care, almost half (45%) responded that they would attend such workshops, while only 11% of all respondents replied that they would not. Nearly a quarter of respondents already had taken a workshop or class. For 40% of respondents, attendance would depend on the cost.

[FIGURE 5 AROUND HERE]

4. Discussion

4.1. Limitations of the study

As noted in the introduction, we consider this survey to be exploratory for a variety of reasons. First, given the low number of respondents and the diversity of their practices, high

variance and insufficient power made it difficult to ascertain statistically significant differences. A larger pool of respondents and a more even geographic distribution of responses would be necessary to ensure statistical power and generalizability. Second, there is the possibility of self-report bias, i.e., where respondents might underreport behaviors that may be deemed inappropriate by researchers. For example, a respondent might have downplayed the complaints of a neighbor about animal noise or odor while emphasizing positive interactions with other neighbors. Interviewing or surveying neighbors of animal owners would be necessary to validate such responses. Third, given that this was an English-only internet survey circulated via email and list-serves, our survey coverage was limited to a particular population: English speakers with internet access who belong to an online network of people interested in the food system. The respondent pool was also overwhelmingly white (88%). While alternative food movements in the US have been critiqued for being dominated by white middle-class population (Alkon & McCullen, 2011; Slocum, 2007), urban agriculture is nevertheless widespread in communities of color (Alkon & Agyeman, 2011; Bradley & Galt, 2013; White, 2011a, 2011b) and among immigrants (Mazumdar & Mazumdar, 2012; Minkoff-Zern, 2012; Saldivar-Tanaka & Krasny, 2004). Their practices are likely underrepresented in this survey.

To address noncoverage, future surveys should be distributed by additional means via other networks that tap into more diverse populations, e.g., by mail or in-person interviews. At the national level, all future surveys should also be conducted in Spanish; at the local level, surveys should also be conducted in additional languages specific to local immigrant demographics (e.g., Hmong and Somali in Minneapolis; Russian and Vietnamese in Portland; Cape Verdean and Haitian in Boston). Such surveys would certainly be much more labor-intensive and costly, but would ultimately be more representative of a diversity of practices,

many of which may fall along racial, ethnic, geographic, and class lines. To further elucidate the diversity of attitudes and behaviors, additional open-ended questions should be included to gain further insight into how livestock management practices respond to regulation.

Finally, clear relationships between livestock ownership and the built environment eluded our study, likely due to the small sample size and limited statistical power. We did, however, observe relationships between lot size and both the number of animals and the distance that animals are kept from dwellings. We also noted that some management practices tend to differ between suburbs, towns, and dense urban environments (likely because lot size is a function of urban form and vice versa). Untangling these spatial relationships merits further research.

4.2. Emergent trends

Despite these limitations, our study highlights several commonalities among a diversity of practices and opinions. Moreover, responses shed light on an international phenomenon that is challenging urban land use and its controls. Several interesting trends rise to the fore. First, while responses underscore a diversity of motivations for owning livestock, there is a common emphasis on the numerous social and environmental benefits to raising livestock. Consistent with Bartling (2012) and Blecha and Leitner (2013) who found that urban livestock keepers ground their arguments in ecology, education, and health, most of our respondents view their actions as an integral part of a sustainable food system, their practices “enact[ing] imaginaries of how they think that cities and urban life, agri-food systems, and human-animal relations ought to be” (Blecha & Leitner, 2013, p. 19). The majority seek a “better food source” that they perceive to be a morally and ecological superior alternative to the animal products produced at an industrial scale. They believe that the honey, eggs, milk and meat they produce are of higher quality, safer

and come from more humane sources. These findings reflect a growing public awareness of the detrimental impacts of the industrial agri-food system on the environment and human health and animal welfare, as highlighted in bestselling books such as *The Omnivore's Dilemma* (Pollan, 2006) and *Fast Food Nation* (Schlosser, 2005) and high-profile films such as *Food, Inc.*, which have motivated many people to engage in urban agriculture. These concerns are often intertwined with growing interest in urban sustainability and food system localization (Ackerman-Leist, 2013) and well as with widespread concern over public health, notably the surge in diet-related illnesses and inequitable access to healthy food (Alkon & Agyeman, 2011; Gottlieb & Joshi, 2010). Such concern is also reflected by the surge in interest in food systems planning and planning for healthy cities (Corburn, 2009; Hodgson et al., 2011; Raja et al., 2008).

Many responses also emphasize the ways in which livestock ownership fosters community by strengthening relationships with neighbors through shared conversation, experience, and animal products (e.g., eggs, milk, honey). Respondents are generally conscientious about the impact of their animals on their neighbors, taking precautions to mitigate possible negative impacts on their neighbors. Some responses also point to the role of livestock in helping to maintain or reconnect to cultural traditions. This focus on community and culture is reflected in a large body of literature on urban agriculture that highlights urban agriculture's role in community-building, mutual aid, and reclamation of the "commons" (Domene & Saurí, 2007; Eizenberg, 2012; McClintock, 2010, 2013; Turner, 2011). A number of scholars have also detailed the importance of urban agriculture to immigrants, as a source of recreation, culturally significant foods, community, as well as a repository of agronomic and culinary knowledge (Airriess & Clawson, 1994; Baker, 2005; Mazumdar & Mazumdar, 2012; Minkoff-Zern, 2012; Saldivar-Tanaka & Krasny, 2004). For many, practicing urban agriculture is also often a political

act. White (2011b, p. 16), for example, describes how many African American women in Detroit engage in urban agriculture as activists who “consider themselves freedom fighters against capitalist and racist oppression.”

Economic arguments are less prevalent among our respondents. Historically, urban agriculture has flourished in times of economic crisis, when land values are depressed and purchasing power precarious (Lawson, 2005; McClintock, 2010, 2013). With the latest economic crisis, many have turned to urban gardening and animal raising as an alternative food source in response to the “perceived perilousness of economic opportunities during a prolonged period of stagnant wages and increasing prices for many essential commodities” (Bartling, 2012, p. 9). In addition to the handful of people who raise animals to save on grocery costs, however, only one Bay Area respondent explicitly raises animals “to be ready for societal disruption from peak oil, climate change and economic troubles.”

A second significant insight emerging from this study is that urban livestock ownership has a different face than it did when zoning regulations pushed animals out of cities during the first half of the last century (Bartling, 2012; Gaynor, 1999; McNeur, 2011; Philo, 1995). At that time, livestock were more utilitarian, a source of sustenance more than companionship or personal enrichment. Our survey results point, rather, to the *multiple* and overlapping use values of urban livestock. On the one hand, today’s urban livestock owners often consider their animals more as pets than livestock in the traditional agricultural sense. Few operate at a commercial or farm scale. They provide humane conditions for their animals, including structurally sound shelters and ample space, and tend to keep small flocks or herds. Indeed, a concern for animal welfare motivates many respondents to raise these animals in the first place, a finding supported

by Blecha and Leitner (2013, p. 9) who found that “commitment to ethical treatment” was a primary concern among chicken owners in Portland, Seattle, and Minneapolis.

On the other hand, these animals clearly *are not* simply pets. They play functional roles that traditional pets do not. They are productive in the agricultural sense, providing sustenance for their owners (mostly in the form of eggs, and to a lesser extent, milk and meat). Slaughter, in particular, marks a real distinction from traditional pet ownership. Indeed, these multiple use values, as Bartling (2012, p. 9) has noted, result in urban livestock eluding classification. He argues that urban chickens do not conform to the dominant typology used in urban zoning where “animals are either pets (accepted and regulated), wild (managed), or livestock (prohibited).” This “existential ambiguity” sows debate and disagreement between advocates and those less sanguine about the presence of “farm animals” in the city, further complicating regulation.

A third theme emerging from our study is the apparent complexity of the relationship between urban livestock owners and regulation. The chicken owners we surveyed are largely in favor of some form of regulation (87%), but their support varies depending on what is being regulated. Most are opposed to limits on the number of animals but supportive of setbacks and regulation of noise, management, and minimum space requirements. This makes sense, given their emphasis on maintaining good relations with neighbors and humane conditions for their livestock. But there is, in some cases, a gap between their expressed opinions on regulation and their actual practices. When it comes to setbacks, for example, a large number of respondents appear to violate ordinances out of ignorance of specific requirements, while a slightly larger number knowingly flaunt them.

Given the flagrant violations of code, one might ask if the regulatory context actually has a bearing on management practices. Many respondents seem to be managing their chickens

without reference to the regulations. For example, most people keep far fewer birds than are allowed and provide more space than is required, and many—knowingly or unknowingly—violate setbacks. At the same time, however, respondents overwhelmingly expressed their support for such regulations, mostly as a means of establishing humane standards. Because most livestock owners consider their animals as pets—albeit productive ones—and many are conscientious and concerned with maintaining good relationships with their neighbors, they often *already* act within the law, and may even manage their animals in a way that exceeds the minimum standards established by the law. At the same time, if they deem a particular regulation too restrictive, as in the case of setbacks, then they may choose to violate it. In effect, regulations appear not to matter unless a neighbor files a complaint. Because a certain code of conduct (that emphasizes animal welfare and good neighborliness) seems to guide management practices, however, regulations are nevertheless viewed as important.

That said, we must acknowledge that livestock owners are not a homogenous group. Divergence in opinion may arise in a particular city or region. In regions of the country where libertarian ideals have more traction and in right-leaning suburban areas, for example, regulations may be less popular than they are in left-leaning urban centers such as the Bay Area, Portland, Seattle, or Minneapolis, where the role of government is often viewed more favorably. Differences may also be attributed to events taking place in a specific city. The difference between Oakland responses and others (see Table 7), for example, might be attributed to a rancorous debate over whether or not livestock should be included in the city's (now stalled) efforts to create a new urban agriculture ordinance. Supporters of urban livestock ownership in Oakland are pushing for the inclusion of animals in the ordinance, while animal welfare activists

have lobbied planners to curtail livestock ownership and outlaw backyard slaughter (Kauffman, 2012; McClintock et al., 2012; Tian, 2011).

Indeed, such debates over whether and how to regulate livestock continue to rage across the country, making it difficult to draw any general conclusions about regulation's impact on municipalities, livestock, or their owners. In one study, officials from 20 municipalities reported that chicken ordinance infractions and complaints were rare and that ordinances had not imposed additional burdens on city services (Bartling, 2010). While some media sources report "many concerns, few actual complaints" (McLoughlin, 2013), others draw attention to the large number of chickens abandoned by dilettante urban farmers (Aleccia, 2013). It is possible, however, that the scale of these debates is "unrelated to the significance of the issue at stake, the size of the population, or the innovation in the proposed change" (Orbach & Sjoberg, 2011, p. 5) and have emerged simply because some parties "cluck to promote and preserve some perceived interest, triggering other parties to counter-cluck or to decline to cluck altogether" (ibid, p. 6).

4.3. Implications for land use policy and planning

The dominant trends *and* diversity of practices expressed in our survey point to several issues that may be of interest to planners and policy makers as they consider how to appropriately regulate urban livestock. Our results highlight the multiple use values of urban livestock; they are simultaneously pets and as productive animals. Urban livestock ownership and should therefore not be simply restricted as if it were a commercial-scale agricultural activity of the sort commonly found in rural areas. Planners should take heed of the diversity of livestock ownership motivations and practices, lot sizes, and urban form within an individual city when developing urban livestock codes. More specifically, they might consider the following: 1)

determining more appropriate setbacks and animal limits; 2) promoting high standards for animal welfare; 3) addressing sales and slaughter; and 4) making regulations more visible to the public.

4.3.1. Determining more appropriate setbacks and animal limits

In addition to taking the local context into consideration with regards to typical lot sizes, our survey suggests that planners in cities with more restrictive setbacks and animal limits might consider eliminating “one size fits all” setbacks, to instead establish scaled systems of animal limits where the animal limit increases with the setback. This might ultimately allow more people living on small lots to *legally* keep their animals. For example, a setback under 10 feet might restrict the flock size to two chickens, while a setback greater than 10 feet, might correspond with a limit of six chickens, and so on. Alternately, establishing minimum area requirements (e.g., 10 sq ft of roaming area required for each chicken) in conjunction with (or instead of) setbacks might make limits on animals unnecessary.

Such an approach would tailor the number of animals to fit the available space, while incorporating high animal welfare standards (addressed in the next section). This approach should also be animal-specific; as Wood et al. (2010) argue, aggregate limits are arbitrary, given that different animals require different amounts of space. Additionally, given the "existential ambiguity" (Bartling, 2012, p. 9) of chickens and other animals relative to existing codes (i.e., their multiple use values as pets and as livestock), planners determining appropriate setbacks and animal limits might also consider standards of care for traditional pets (such as dogs and cats) alongside evidence-based rationale addressing public health concerns over human proximity to farm animals. Pollock et al (2012, p. 741), for example, conclude that risk of pathogen transmission by urban livestock is limited and “does not present a greater threat to the public’s

health compared with keeping other animals allowed by similar bylaws such as dogs and cats.” The attention that our respondents give to sanitation supports these conclusions.

4.3.2. Promoting high standards for animal welfare

Updating municipal codes to include urban livestock creates an opportunity to establish standards that promote humane animal care and that exceed (the often minimal) standards established under state animal cruelty laws (Ibrahim, 2006). Higher standards would not only prevent deplorable treatment of animals, but would also reflect the sentiments and practices reported by survey respondents. Indeed, our survey shows that an important motivation for keeping urban livestock is to provide animals with more humane conditions than are typical on large-scale, industrial farms (see also Blecha & Leitner, 2013). Cities clearly must set certain standards to prevent inhumane treatment of animals by a small minority. The majority of our respondents advocate for regulations that limit space requirements and set standards for management practices that exceed industry standards for livestock.

Establishing minimum space requirements for animals (based on type rather than aggregate) is one way to promote humane care, and may be an alternative to setting specific limits on animal numbers. This approach provides a concrete metric against which an animal control officer could measure in the case of any complaints. Such requirements may also prevent nuisance complaints regarding odor or noise by preventing overcrowding. While the survey respondents generally indicated that they provided adequate space for their urban livestock, there was high variability in the extent to which practices conformed to these dimensions; some provided far more space while others (particularly those not in favor of regulation) provided far less. Furthermore, many municipalities do not establish such dimensions. Clearly defined and

publicized space requirements might help to reduce some of this variation and further raise the bar of humane living conditions.

4.3.3. Addressing sales and slaughter

Reflecting a broader interest in urban agriculture and small-scale, entrepreneurial food enterprises, respondents to our survey indicated they were interested in sharing, bartering, and selling surplus food produced by their urban livestock (e.g., honey and eggs). In addition, some keepers of urban livestock would like to be able to slaughter their animals for meat. The small number who already do already slaughter their animals tend to do so in a way that attracts little attention, under conditions they deem far more humane than those of industrial processing facilities.

However, both sales and slaughter pose potential challenges to planners drafting local ordinances. Some of the challenges are political; community residents may oppose sales and slaughter on grounds ranging from decreased property values to moral objections. Cities wishing to allow slaughter—while balancing neighbor concerns over unwanted sites, smells, and sounds—might consider adopting an approach similar to that of Cleveland, described earlier (see Section 3.1). Processing of animal products destined for exchange (rather than for household consumption) run into significant regulatory challenges. The sale, slaughter, and transport of animals, as well as the processing and sale of animal products, are generally regulated at the federal level. State environmental quality and environmental health regulations may also apply; county environmental and public health agencies, often responsible for enforcing state laws, may impose additional regulations (Bush & Rilla, 2008).

Planners must therefore think carefully about how to craft code that is sensitive to these multiple jurisdictions. For example, they should investigate their state’s retail food code when determining whether to allow onsite sales of eggs and honey produced by urban livestock. Most states have adopted a version of the federal model food code, which exempts sales of whole, uncut, fresh produce, unprocessed honey, and farm fresh eggs, from retail food operation license requirements. Seattle’s urban agriculture ordinance allows onsite sales of products grown onsite, and their Client Assistance Memo on urban agriculture specifically informs residents that under state law, “Egg producers who sell eggs from their own flock at the place of production directly to consumers for their own personal use are not required to be licensed or buy egg seals” (City of Seattle, 2010, p. 4). However, even if urban livestock owners do not need to obtain a state permit to sell eggs and honey, they may still face obstacles if local business or “home occupation” permits do not expressly allow urban agriculture sales. In 2011, the City of Oakland amended its home occupation permit to allow residents who grow food on their property to sell produce from their home, although they failed to include eggs and honey in the amendment (Oakland, CA Municipal Code § 17.112.020, amended August 29, 2011).

4.3.4. Making regulations more visible to the public

Finally, our findings suggest the need for these and other regulations to be made more available to the public. Our respondents reported relying heavily on internet resources (websites and list-serves), which suggests a potential low-cost avenue for disseminating up-to-date information about regulations, such as the “ABCs of Urban Agriculture” published by the City of Somerville (2012), the City of Portland’s “Raising backyard animals and bees in Portland” FAQs

website (City of Portland, 2013), or the regulatory clearinghouse website www.UrbanAgLaw.org.

5. Conclusion: Toward a research agenda

Given the growing popularity of urban agriculture and the resulting efforts by municipalities to address this trend, understanding how and why people keep farm animals in cities can help inform policy and planning in ways that take into consideration multiple factors impacting the surrounding communities, livestock owners, and their animals. Our study demonstrates the need for—and lays the groundwork for—a comprehensive and interdisciplinary research agenda with far-reaching implications for food systems policy and planning.

Our survey is merely a first pass at understanding the relationship between regulation, compliance, and management practices associated with urban livestock. Further research is needed to determine whether livestock management practices emerge as a result of—or independent of—regulation. Moreover, research should examine the diversity and variability of attitudes toward regulation and compliance both within and between cities. Importantly, how these attitudes vary along geographic, demographic, and socioeconomic lines should be fundamental to such a study. Finally, focusing more closely on the “existential ambiguity” of urban livestock (Bartling, 2012, p. 9) and on their multiple uses—as pets *and* as productive animals, among others—might help to clarify the incongruity between urban livestock ownership and existing regulations in many cities.

Clearly, these questions only begin to scratch the surface of what could prove to be an exciting area of study with real policy implications. Both *extensive* and *intensive* research is needed. Those engaged in extensive research to enumerate the extent or distribution of a

phenomenon in a generalizable manner must make concerted efforts to reach a widest possible population of livestock owners, to better represent the attitudes and behaviors of those who are not connected to the internet, those who are not English speakers, and those who may not belong to local associations of urban livestock owners. Such quantitative, generalizable work should be complemented with more intensive, qualitative research approaches, linking individual attitudes and behaviors to the context-specific social processes and structures that produced them (Sayer, 1992, p. 237), e.g., the politics driving a particular form of regulation; suspicion of and resistance to regulation among a particular demographic in a particular region; or the impact of gentrification on regulation compliance and enforcement in a particular area. In particular, intensive research on how immigrants groups practice livestock husbandry in US cities, and whether these practices run up against regulatory constraints, will shed further light on the diversity of management practices, while also demonstrating that urban livestock are not solely the domain of “locavores” and hipsters.

Given the diversity of such practices *and* regulatory contexts, *city-specific* research is vital. While news media is rife with accounts over the politics surrounding such processes (Amundson, 2013; McLoughlin, 2013; Tian, 2011), only a handful of scholars have tackled the subject (Orbach & Sjoberg, 2012; Sheridan, 2013). Again, it is important that we not privilege quantitative over qualitative approaches to gathering relevant data. Ethnographic methods such as interviews, participant observation, and thick description (Geertz, 1973) can generate rich empirical data that can be interpreted using grounded theory derived from emergent themes (Glaser & Strauss, 2012) or in conversation with critical theory emphasizing linkages to larger scale political economic processes (Brenner, 2009; Burawoy, 1998). Such site-specific

qualitative studies are also needed to characterize the diverse motivations and subjectivities of livestock owners and how these articulate with local policies.

While limited in scope and scale, this exploratory study sheds light on what urban livestock management looks like for more than 130 livestock owners in nearly 50 cities across the US. More than simply contributing to the awareness of management practices for these individuals, these findings point to the social change underway in American cities, change not only reflected in the attitudes and behaviors of urban dwellers *vis a vis* the food system, but also in shifting landscapes of municipal land use policy.

Acknowledgements

The authors acknowledge Danielle Nahal for helping to compile and code the data. We are also grateful for the incisive comments of two anonymous reviewers.

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Table 1. Surveyed municipalities with population, urban form, and existence of chicken regulation

City	State	Urban form	Population		Chickens regulated
			Municipality	MSA	
Alameda	CA ⁺⁺	U	73,812	4,335,391	×
Albany	CA ⁺⁺	U	18,539	4,335,391	×
Berkeley	CA ⁺⁺	U	112,580	4,335,391	×
Contra Costa	CA ⁺⁺	S	unincorporated	4,335,391	
East Palo Alto	CA ⁺⁺	U	28,155	4,335,391	
Easton	CA	T	2,083	930,450	
El Cerrito	CA ⁺⁺	U	23,549	4,335,391	**
El Sobrante	CA ⁺⁺	S	12,669	4,335,391	×
Hawthorne	CA	U	84,293	12,828,837	×
Los Angeles	CA	U	3,792,621	12,828,837	×
Napa	CA ⁺⁺	T	76,915	136,484	×
Oakland	CA ⁺⁺	U	390,724	4,335,391	×
Pittsburg	CA ⁺⁺	S	63,264	4,335,391	×
Richmond	CA ⁺⁺	U	103,701	4,335,391	×
San Francisco	CA ⁺⁺	U	805,235	4,335,391	×
San Jose	CA ⁺⁺	U	945,942	1,836,911	×
San Pablo	CA ⁺⁺	S	29,139	4,335,391	
Santa Rosa	CA ⁺⁺	T	167,815	483,878	**
Vallejo	CA ⁺⁺	T	115,942	413,344	×
Denver	CO	U	600,158	2,543,482	×
Washington	DC	U	601,723	5,582,170	×
Brookfield	IL	S	19,085	9,461,105	
Chicago	IL	U	2,695,598	9,461,105	×
DuPage	IL	S	unincorporated	9,461,105	
Oak Park	IL	S	2,695,598	9,461,105	×
Lexington	KY	U	295,803	472,099	×
New Orleans	LA	U	343,829	1,167,764	×
Salem	MA	T	41,340	4,552,402	×
Severn	MD	S	35,076	2,710,489	×
Minneapolis	MN	U	382,578	3,317,308	×
Roseville	MN	S	33,660	3,317,308	
Saint Paul	MN	U	285,068	3,317,308	×
Sunfish Lake	MN	T	521	3,317,308	×
Missoula	MT	T	66,788	109,299	×
New York	NY	U	8,175,133	18,897,109	×
Brunswick	OH	S	34,255	2,077,240	

Cleveland	OH	U	396,815	2,077,240	×
Mayfield Village	OH	S	3,460	2,077,240	
Oberlin	OH	T	8,286	2,077,240	
Portland	OR	U	583,776	2,226,009	×
Nashville	TN	U	601,222	1,589,934	×
Dallas	TX	U	1,197,896	6,371,773	×
San Antonio	TX	U	1,327,407	2,142,508	×
Salt Lake City	UT	U	186,440	1,124,197	×
Bellevue	WA	S	122,363	3,439,809	×
Olympia	WA	T	46,478	252,264	×
Seattle	WA	U	608,660	3,439,809	×

Sources: www.backyardchickens.com; www.thecitychicken.com; www.municode.com; US Census Bureau 2010

⁺⁺ indicates San Francisco Bay Area municipality

** indicates that chicken ordinance passed after survey was conducted

Table 2. Type of regulation in surveyed municipalities with chicken ordinances

City	State	Permit required	Animal limit	Roosters allowed	Dwelling	Setback		Shelter	Sanitation	Nuisance	Zoning
						Neighbor's dwelling	Property line				
Alameda	CA		6			20'		×	×	×	
Albany	CA	×	6	No							
Berkeley	CA					25'		×	×	×	
El Sobrante	CA		12				25'				
Hawthorne	CA		10	No	35'	35'			×	×	×
Los Angeles	CA		×	No	25'	35'			×	×	×
Napa	CA		6	No							
Oakland	CA			No	20'	20'		×			
Pittsburg	CA			No							
Richmond	CA		×		20'	20'			×	×	
San Francisco	CA		4		20'	20'		×	×	×	×
San Jose	CA		6,10,20	No		20', 40', 50'					
Vallejo	CA		25	Yes	15'						
Denver	CO	×		Permit							
Washington	DC	×		No	50'		250' or 100' w/ permit	×	×		
Chicago	IL								×	×	
Oak Park	IL		2						×	×	×
Lexington	KY							×		×	
New Orleans	LA								×		
Salem	MA						100'			×	
Severn	MD	×									
Minneapolis	MN	×				20'					×
Saint Paul	MN	× (>3)	3	No					×	×	
Sunfish Lake	MN		32/40K sf				50'	×			

Missoula	MT	×	6	No		20'		×	×	×	×
New York	NY			No				×	×		
Cleveland	OH		6 (1 per 800 sf)	On lots > 1 ac				×			
Portland	OR	× (>3)	3	No	50'	50'					
Nashville	TN		Varies w/ size	No	25'	25'	10'				×
Dallas	TX			Confined			20'	×	×	×	
San Antonio	TX		3					×	×		
Salt Lake City	UT		15			25'		×	×		×
Bellevue	WA		6				15'				
Olympia	WA		3	No							
Seattle	WA										

Sources: www.backyardchickens.com; www.thecitychicken.com; www.municode.com

Table 3. Type of livestock and number of animals owned by respondents

Type of Livestock	Number of respondents	% of total respondents (n=134)	Number of animals	Frequency of responses*	% of responses
Goats	12	9	2-3	7	58
			4-6	4	33
			7-10	0	0
			10-15	1	8
Large fowl	5	4	1	1	20
			2	2	40
			3	2	40
Chickens	121	90	1-3	19	17
			4-8	64	57
			9-15	13	12
			16-20	8	7
			> 20	8	7
Rabbits	12	9	1-3	7	64
			4-8	2	18
			9-15	0	0
			16-20	1	9
			> 20	1	9
Bees	50	37	1 hive	22	43
			2 hives	15	29
			3 hives	9	18
			4 hives	1	2
			5+ hives	4	8

* Frequency of responses may not sum to number of respondents. Nine chicken owners did not report the number of birds they own and one rabbit owner did not report the number of rabbits s/he owned.

Table 4. Mean number of chickens and shelter space in municipalities with and without a chicken ordinance

City w/ Ordinance	Number of chickens			Shelter area (sq ft)			Shelter area / chicken (sq ft)		
	n	Mean	S.E.	n	Mean	S.E.	n	Mean	S.E.
No	13	8.8	1.9	11	111.1	32.7	10	24.9	13.1
Yes	99	8.7	1.0	65	112.1	24.1	58	17.9	3.6

Table 5. Types of regulation favored by respondents

	N	Limits on animal numbers		Minimum area requirements		Other (noise, hygiene, maintenance standards)		No regulation	
		No %	Yes	No %	Yes	No %	Yes	No %	Yes
All	123	62.6	37.4	37.4	62.6	30.1	69.9	87.0	13.0
Cities w/out ordinance	14	57.1	42.9	35.7	64.3	28.6	71.4	92.9	7.1
Cities w/ ordinance	108	63.0	37.0	37.0	63.0	30.6	69.4	86.1	13.9
Oakland	32	65.6	34.4	46.9	53.1	43.8	56.3	78.1	21.9
Other	91	61.5	38.5	34.1	65.9	25.3	74.7	90.1	9.9

Table 6. Perceived necessary space to keep animals healthy

Type of livestock	Area	Responses	
		(n)	%
Goats	< 100 sq ft	1	10
	150-100 sq ft	6	60
	200 sq ft	1	10
	0.125 acre	1	10
	1 acre	1	10
Fowl	2-4 sq ft	36	39
	5-8 sq ft	22	24
	10 sq ft	25	27
	16-20 sq ft	10	11
Rabbits	2-3 sq ft	4	40
	4-5 sq ft	2	20
	6-7 sq ft	3	30
	8-9 sq ft	1	10
	>10 sq ft	2	20

Table 7. Mean number of chickens and shelter space by urban form and lot size

	Number of chickens			Shelter (ft ²)			Area/chicken (ft ²)		
	n	mean	S.E.	n	mean	S.E.	n	mean	S.E.
Urban form									
Suburban	12	11.7	1.9	9	59.2	11.5	9	7.3	1.4
Town	11	10.6	2.9	7	115.9	51.1	7	31.8	18.4
Urban	88	7.3	0.7	59	120.7	26.4	51	19.6	4.0
Lot size									
< 2,500 sf	9	5.7	1.8	5	54.2	26.7	5	13.8	5.7
2,500 - 5, 000 sf	60	5.8	0.4	38	84.8	15.6	33	19.2	5.3
0.25 to 1 ac	38	11.7	1.6	29	155.5	49.5	26	17.3	4.7
> 1 ac	4	14.3	4.2	3	153.3	123.5	3	45.8	43.8

Table 8. Distance of animal shelter to dwelling (n=133) and property line (n=128)

Distance (feet)	From dwelling		From neighbor's dwelling		From property line	
	n	% of responses	n	% of responses	n	% of responses
< 1	11	8	0	0	25	20
1-5	14	11	26	20	55	43
6-10	12	9	30	23	22	17
11-15	16	12	14	11	9	7
16-20	18	14	13	11	7	5
> 20	62	47	48	37	10	8

Figure Captions

Figure 1. Metropolitan areas represented in survey responses. Responses were received from 134 livestock owners living in 48 municipalities in 21 metro areas across the US. Numbers inside circles indicate the number of respondents from a particular metro area. No number implies a single respondent.

Figure 2. Bay Area municipalities represented in survey responses. In total, half of the survey respondents (n=67) were from 16 Bay Area municipalities. The highest number of responses came from Oakland (n=36), Berkeley (n=9), Richmond (n=3), and San Francisco (n=3). There were 2 responses each from Alameda, Albany, and San Pablo livestock owners, while remaining cities were represented by one response each.

Figure 3. Examples of urban form typologies: a) Urban. Hawthorne, California (2010 pop. 84,293) is nested within the dense built environment of the Los Angeles metropolitan conurbation; b) Town. Missoula, Montana (pop. 66,788) is surrounded by mountains and agricultural land. Suburban sprawl is limited. c) Suburban. Mayfield, Ohio (pop. 3,460), is a suburb at the periphery of metropolitan Cleveland. Note its location at the transition between the urban fabric and agricultural land. Also notable are the cul-de-sacs and large lots, indicative of post-war suburbanization.

Figure 4. Lot size of respondents by urban form.

Figure 5. Source of animal husbandry information

Figure 1
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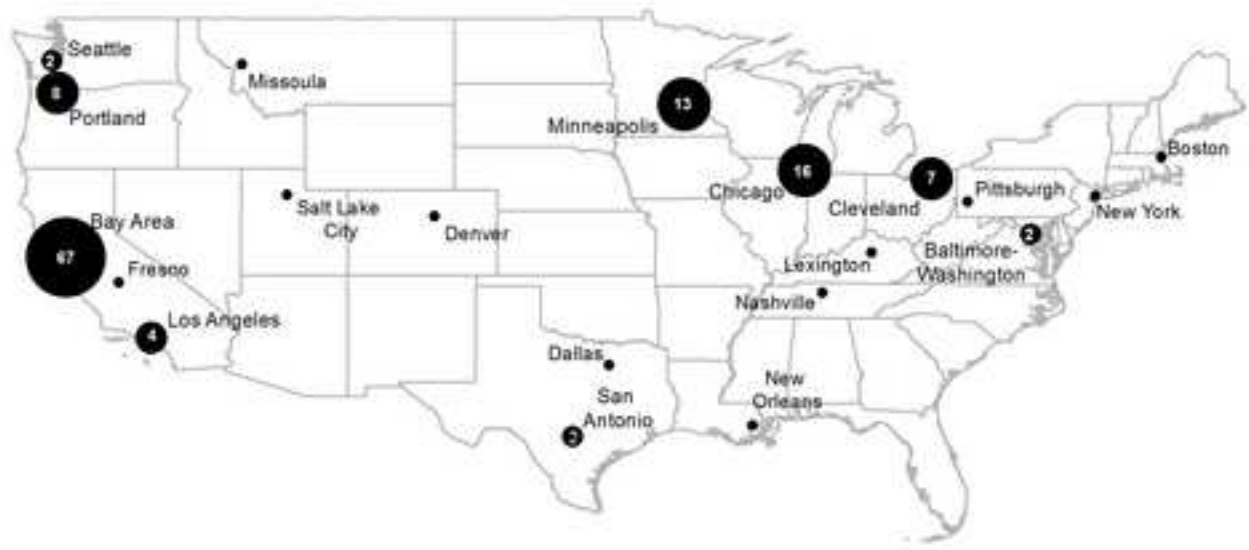


Figure 2
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Figure 3a
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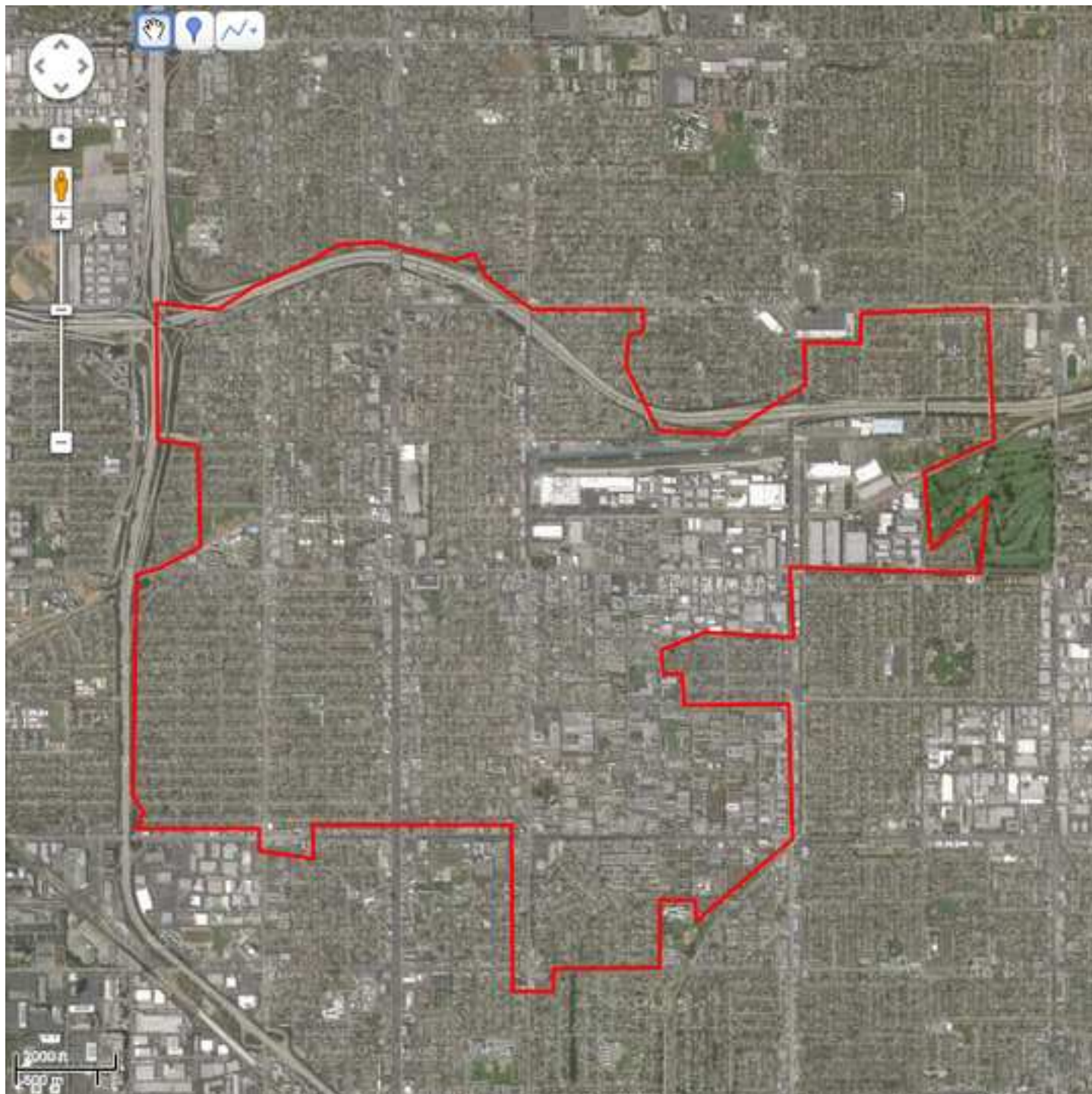


Figure 3b
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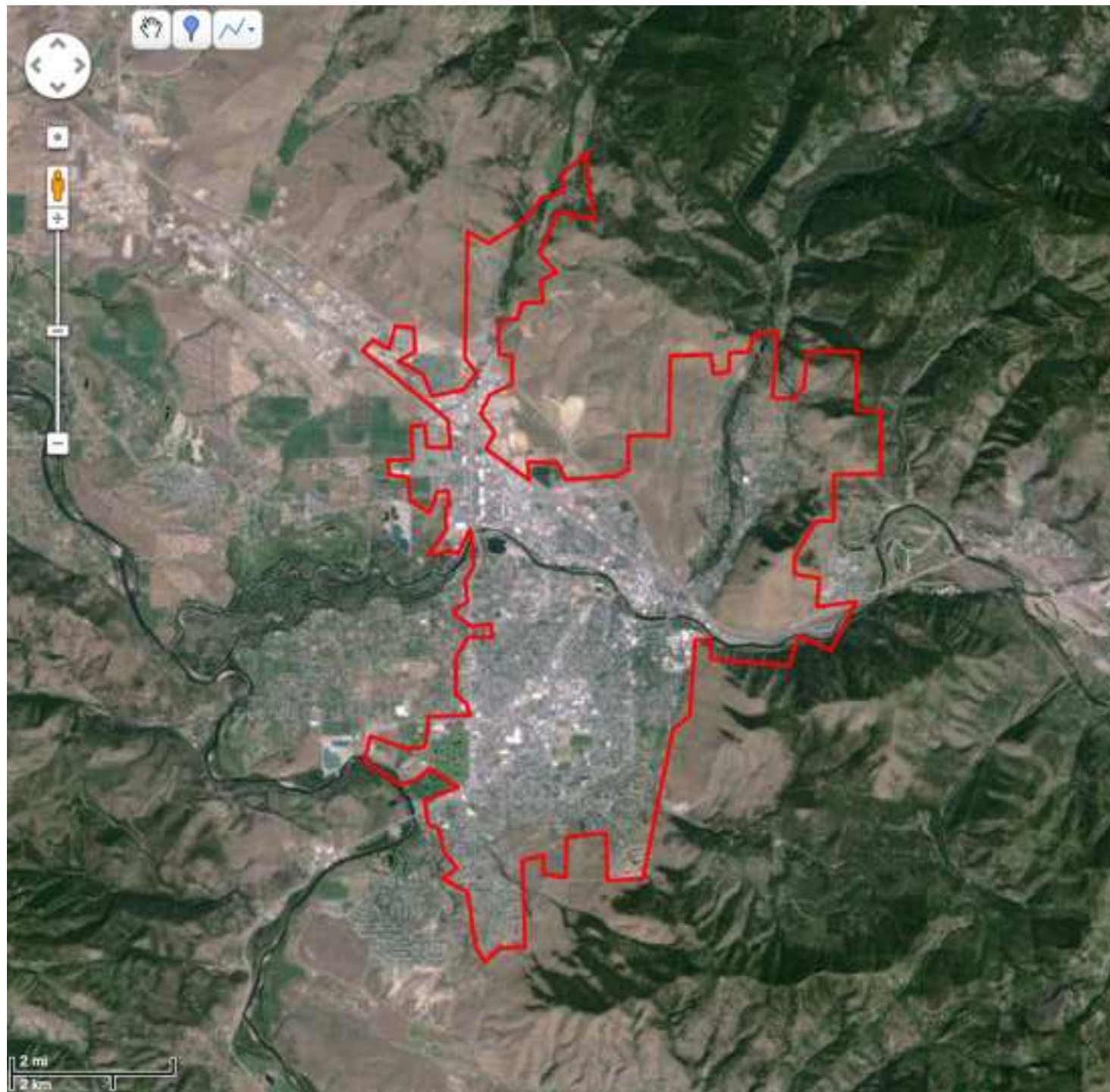


Figure 3c
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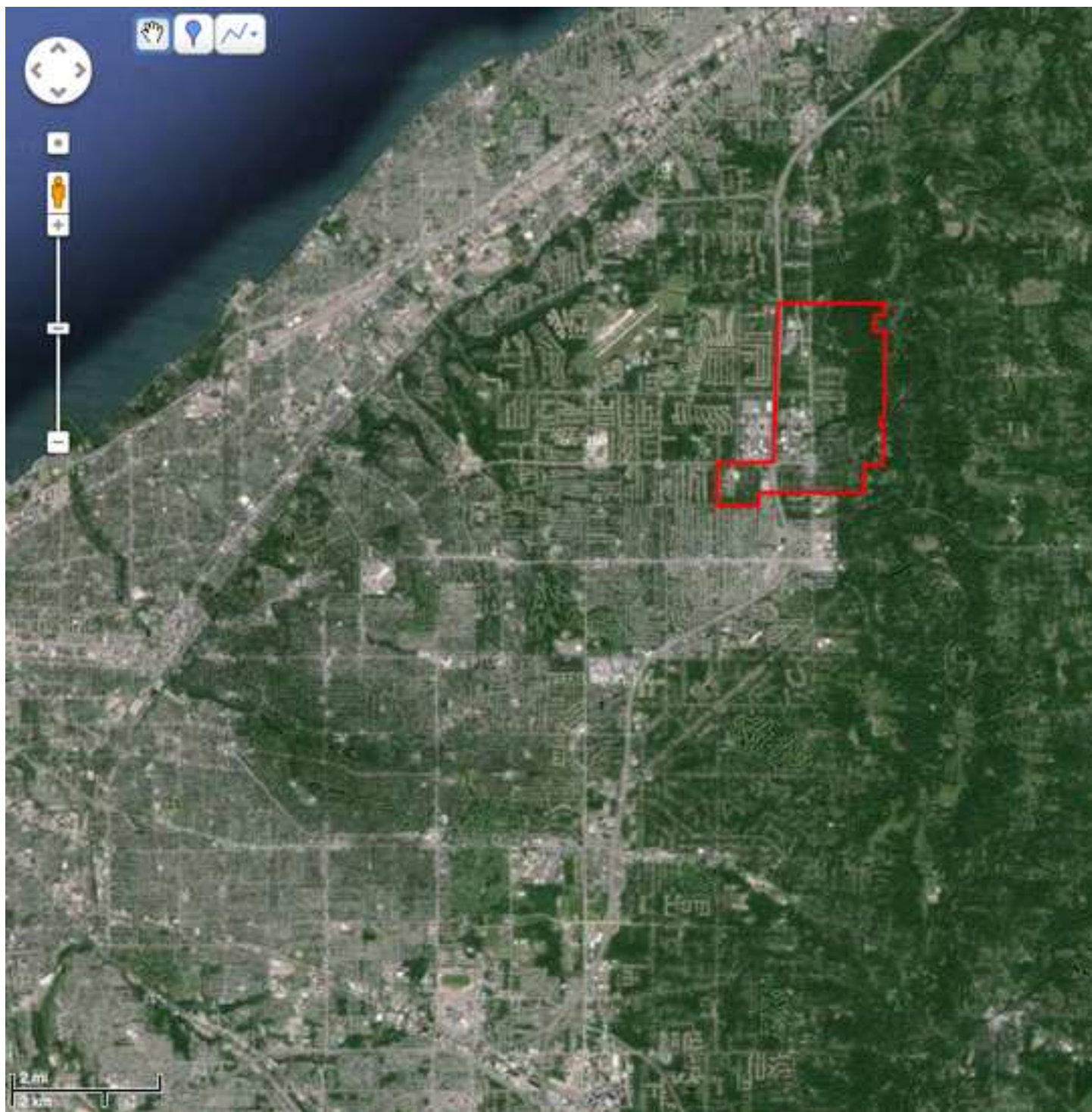


Figure 4

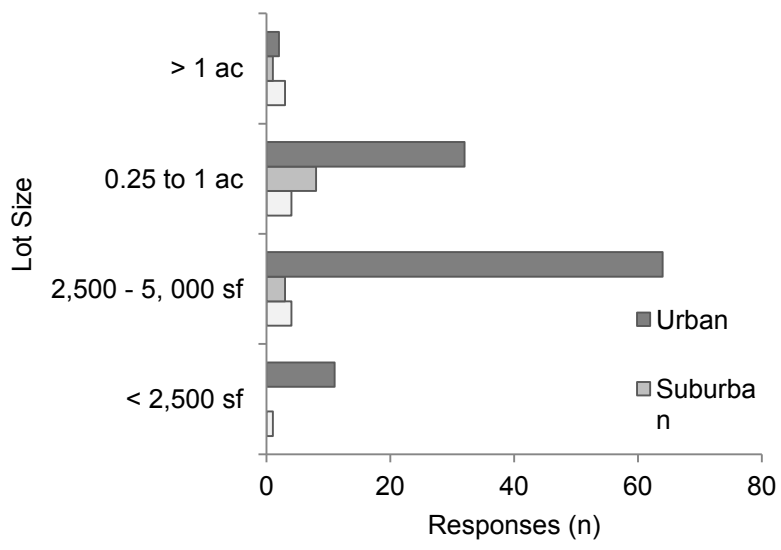


Figure 5

