Over the last 100 years urbanization has been a dominant driver of biodiversity change (McDonald et al. 2020). This change is, in part, due to humanity’s transition from rural to urban life. Since the start of the 20th century, the proportion of people living in cities has increased from 10% to over 50% (Citation). As a result, the amount and intensity of urban land cover has increased worldwide (Citation) and the largely negative influence urbanization has had on biodiversity has become undeniable (Citation). Cities are, after all, often located in biodiversity hotspots and the associated habitat loss that comes along with urbanization is a main driver of species extirpations or extinctions (Citation). Yet, some non-human species persist, and at times thrive, in cities. As such, the selective pressures of urban environments provide a unique opportunity to explore ecological processes across space or through time.

One underexplored process in urban environments is how species composition changes through time. Certainly, long-term comparisons of natural habitat turned urban often demonstrate a decrease in species richness and substantial community turnover as the historically present species are lost and replaced by urban-adapted species (Tingley et al. 2013, other papers). Yet, a forest turned suburban lot over 100 years likely tells a different story than a city over the same time frame. Cities have become larger and more densely populated over the last century (citation), which may heighten their selective pressures and filter out additional species (citation, probably aronson hierarchical filtering paper, Pysek et al. 2004). If this is the case, species richness should decrease, and the species present today are likely a subset of the species that were historically present. Conversely, changes in species composition through time could instead reflect large-scale changes in the distribution and abundance of the regional species pool (Ward study?, Murgui 2014). If this is the case, species turnover within a city should reflect regional trends over time. As urbanization has been a primary driver of biodiversity change, understanding how species respond to urban environments through time will likely help THOUGHTS ON THIS? To make such comparisons through time, however, historical data must be available.

To explore how species composition changes over time in a city we replicated a historical bird survey in Lincoln Park, the largest park in Chicago, IL, USA. The original surveyors, Herbert and Alice Walter, surveyed Lincoln Park from March to May between 1898 and 1903 and wrote a field guide for city bird watchers (Walter and Walter 1904). Along with accurate species descriptions, the Walter’s book summarized their field notes for future comparison. The Walter’s survey was then continued by William Dreuth – a stock clerk, amateur naturalist, and expert birder – between 1927 and 1932 (Clark and Nice 1950). Decades later, a colleague found a copy of The Walter’s book in a Chicago antique store, and subsequent investigations into the Walter’s survey led us to William Dreuth’s original field notes in the back halls of the Chicago Academy of Sciences. These discoveries inspired us to continue these Lincoln Park surveys between 2012 and 2015. Our goals were to determine 1) how this bird community changed over a century and 2) if the temporal trends observed in Lincoln Park mimic those observed throughout Illinois. The extreme levels of urbanization Chicago experienced in the last century make this survey unique. Since the Walter’s bird counts in 1898, the height of the tallest building in downtown Chicago more than quadrupled, the average human population density doubled, and automobiles replaced horses (Randall et al. 1999, Sovacool 2009). Replicating these historical surveys highlights frequency changes of the resident and migrant birds that comprise Chicago’s avian community across 100 years of urbanization in a large metropolitan city.