

# ILAS: Intrinsic Landscape Assessment System for Landscape Design and Planning in the U.S. National Capital Region

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# Crowdsourcing Landscape Assessments

## Benefits

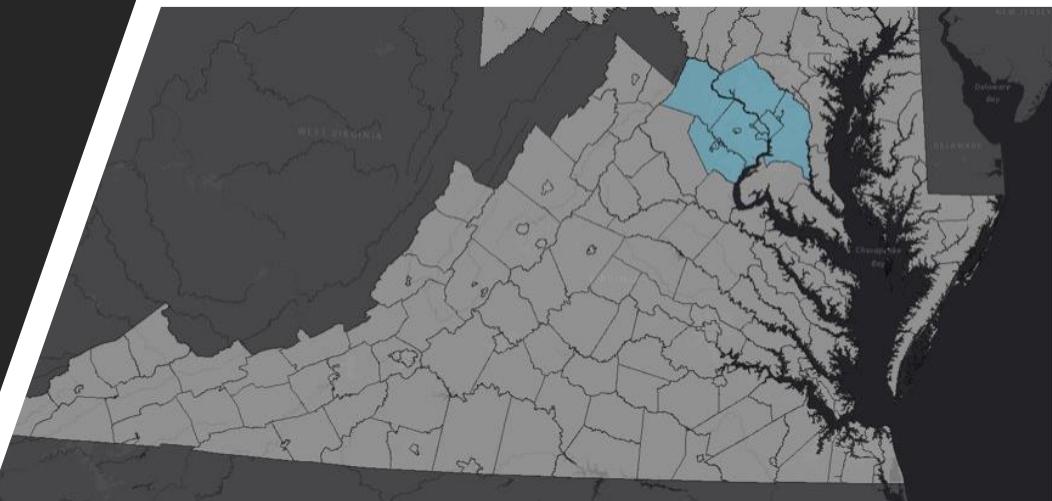
- Rapid data collection
- Large data volume
- Reduced data collection costs
- Global data

## Challenges

- Data Quality
- Representativeness
- Underdeveloped methodology

# Parks and Twitter

- “one of our great @wvstateparks to enjoy us”
- “just posted a photo @ marco island nature preserve & bird sanctuary”



# Data Processing Pipeline



Query Twitter



Filter English Tweets



Data Cleaning

Handle stopwords,  
punctuation, contractions



Geocode



Filter to study region



Data Analysis

Text analysis  
Sentiment analysis  
Hashtag analysis

# Data Filtering

All tweets

22,853,399

English tweets

19,327,380

Place tweets

217,556

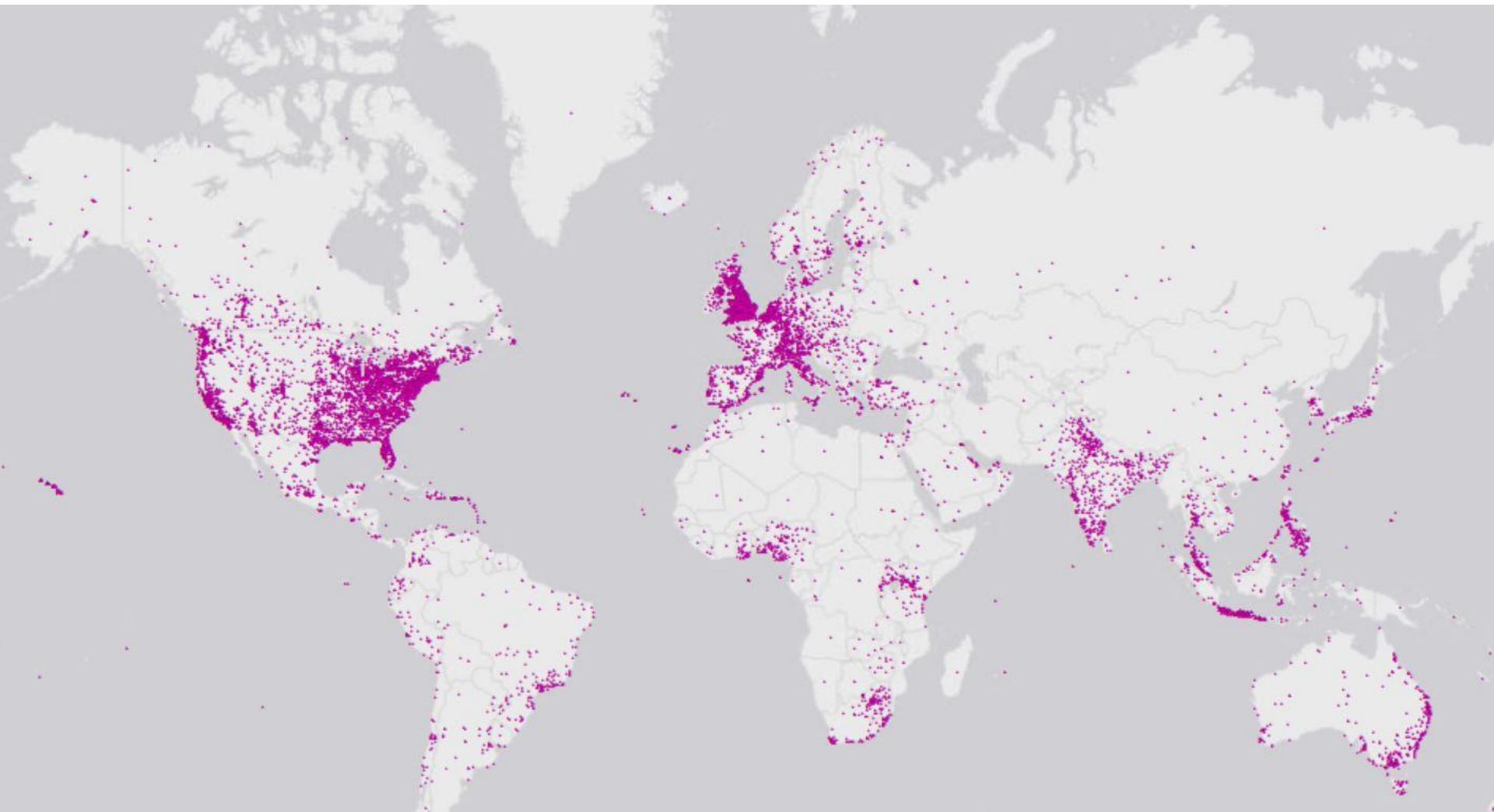
Geocoded  
tweets

215,084

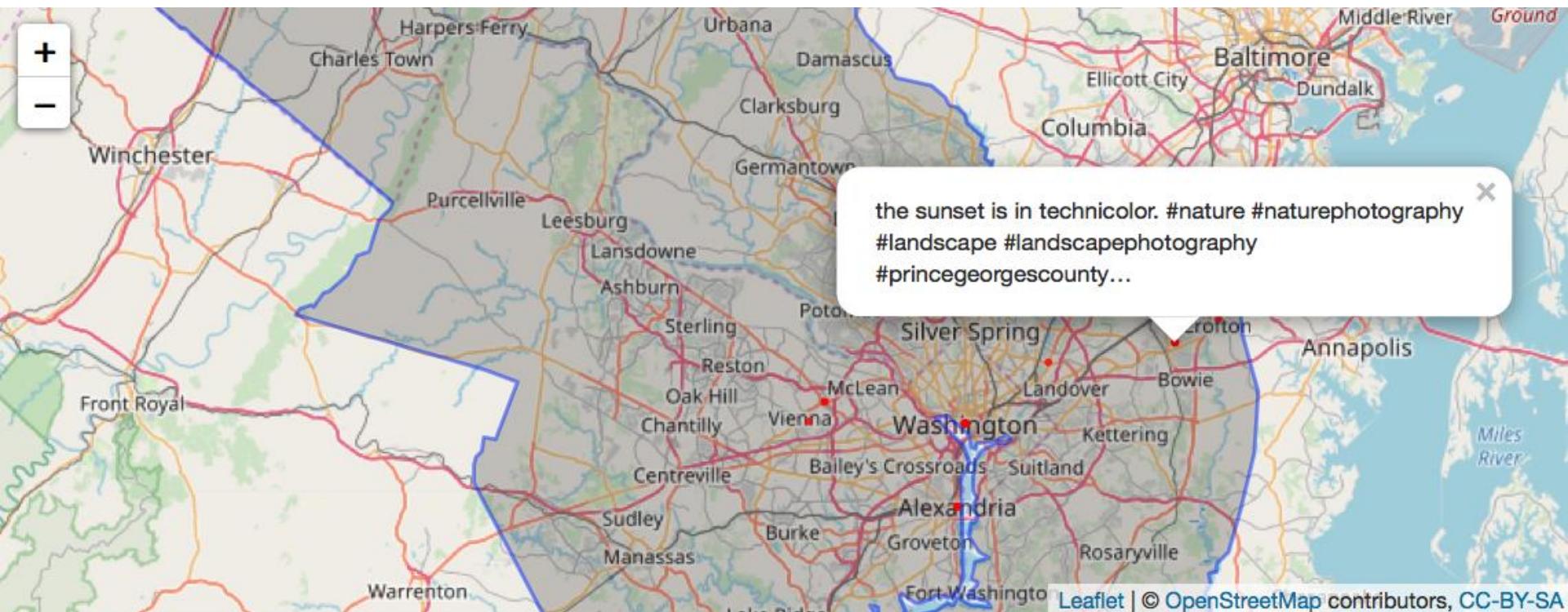
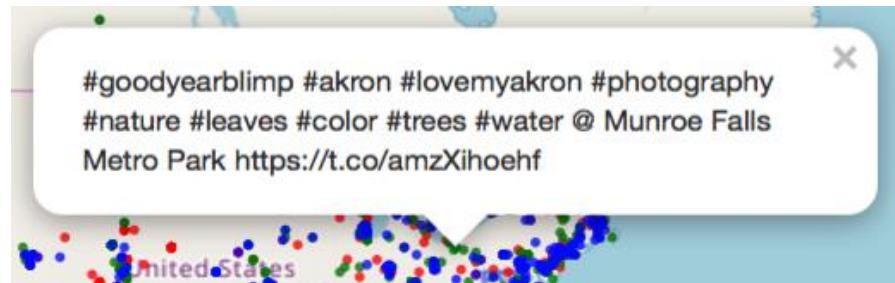
# ILT Terms Keyword Query

abatement • acid rain • air pollution • air quality • alternative energy • atmosphere • biodegradable • biodiversity • bioenergy • biofuels • biomass • biosphere • carbon count • carbon credit • carbon dioxide • carbon emissions • carbon footprint • carbon neutral • carbon offset • carbon tax • carpooling • cfcs • cfl bulbs • climate • climate change • compost • compostable • composting • conservation • deforestation • domestic waste • draught proofing • dumping • ecosystem • ecotourism • effluent • electric vehicle • emissions • emissions projections • end-of-life vehicle • energy efficiency • energy rating • energy star • fossil fuels • fuel poverty • global warming • green design • greenhouse effect • greenhouse gases • ground water • habitat • hazardous waste • household waste • incinerator • insulation • kyoto protocol • kyoto agreement • landfill • litter • municipal waste • noise pollution • noxious gases • oil spill • organic food • organic • ozone layer • pesticides • plastic bag tax • post-consumer waste • radiation • radioactive • recycle • reforestation • refuse • renewable energy • renewable resource • reuse • river basin • sewage • smog • smokeless fuel • solar panel • surface water • sustainable development • sustainable tourism • world heritage site • waste prevention • water vapour • wind energy • wind turbine • zero emissions • abiotic • acidification • adaptation • aichi biodiversity targets • algal bloom • alien invasive species • alien species • anthropogenic impacts • ballast • baseline • baseline study • best environmental practice • best management practice • biodiversity action plan • biodiversity metric • biodiversity offsets • biofuel • biogeographic classification • biogeographic realm • biome • bioremediation • biosecurity • biotechnology • biotope • capacity development • carbon • carbon pool • carbon sequestration • carbon sink • carrying capacity • cartagena protocol • cbd • ccas • cites • climate adaptation • connectivity • convention on biological diversity • critical habitat • critically endangered • cultural services • data deficient • degazettement • desertification • diversity • ecosystem based adaptation • ecological character • ecology • ecoregion • ecosystem approach • ecosystem asset • ecosystem based management • ecosystem engineer • ecosystem function • ecosystem integrity • ecosystem process • ecosystem services • ecosystem structure • endangered • endangered species • endemic species • endemism • environment • environmental descriptors • environmental externalities • eutrophication • ex-situ conservation • extinct • extinct in the wild • extinction • rio earth summit • feral • flagship species • flyway • forest • fragmentation • freshwater • functional group • gene pool • genetically modified organism • genetic diversity • genetic resources • geoengineering • gmo • green economy • green infrastructure • habitat banking • habitat conversion • habitat degradation • habitat destruction • habitat fragmentation • ifc ps6 • indicator species • indigenous species • in-situ conservation • intensive farming • intrinsic value • invasive alien species • invasive species • ipcc • intergovernmental panel on climate change • itpgrfa • red list • keystone species • landscape • landscape approach • landscape connectivity • migration • migratory species • minimization • mitigation • multiple use areas • nagoya protocol • native species • natural capital • natural habitats • natural heritage • naturalness • natural resources • nbsap • non-renewable natural resources • ocean acidification • oprc • ouv • overexploitation • phenology • overpopulation • population trend • protected area • provisioning services • redd+ • regulating services • rehabilitation • resilience • restoration • rio +20 • rio convention • sdgs • shifting baselines • soil erosion • soil salinization • species diversity • species richness • subsistence • supporting services • sustainability • sustainable use • synthetic biology • tek • threatened species • traditional ecological knowledge • umbrella species • unccd • unclos • uncsd • undafs • unfccc • vulnerable • wilderness • wildlife trade • wssd • environmentalism • zero waste • wildlife • solar energy • poaching • nature • anthropocene • bycatch • illegal fishing • overfishing • pollution • soil degradation • water scarcity • wildlife trade • infrastructure • oil and gas development • coral reefs • sedimentation • erosion • green building • greenwash • global warming • sbstta • co2

# 2 weeks of ILTerms data



# Example Tweets



RANK	WORD	N
1	<b>Nature</b>	16,815
2	Climate	16,223
3	Forest	11,210
4	Change	11,064
5	Environment	9,170
6	People	7,286
7	Refuse	7,272
8	Time	4,884
9	Diversity	4,475
10	Love	4,447

RANK	BIGRAM	N
1	Climate change	9,010
2	Global warming	2,060
3	Air quality	1,784
4	Mother nature	1,295
5	Nature conservancy	907
6	Cancer protecting	658
7	Brother nature	630
8	Hiring careerarc	529
9	Fast paced	522
10	Forest fires	466

# Words paired with landscape terms

Word 1	Word 2	Word 1	Word 2
Social	<b>Environment</b>	Healthcare	<b>Landscape</b>
Collaborative	<b>Environment</b>	<b>Landscape</b>	Landscape photography
Hostile	<b>Environment</b>	Beautiful	<b>Landscape</b>
Diverse	<b>Environment</b>	<b>Landscape</b>	Photography
Learning	<b>Environment</b>	Nature	<b>Landscape</b>
Forest	<b>Park</b>	Air	<b>Quality</b>
National	<b>Park</b>	<b>Quality</b>	Index
<b>Park</b>	Forest	<b>Quality</b>	Health
Wildlife	<b>Park</b>	Unique	<b>Quality</b>
WY	<b>Park</b>	<b>Quality</b>	Drinks

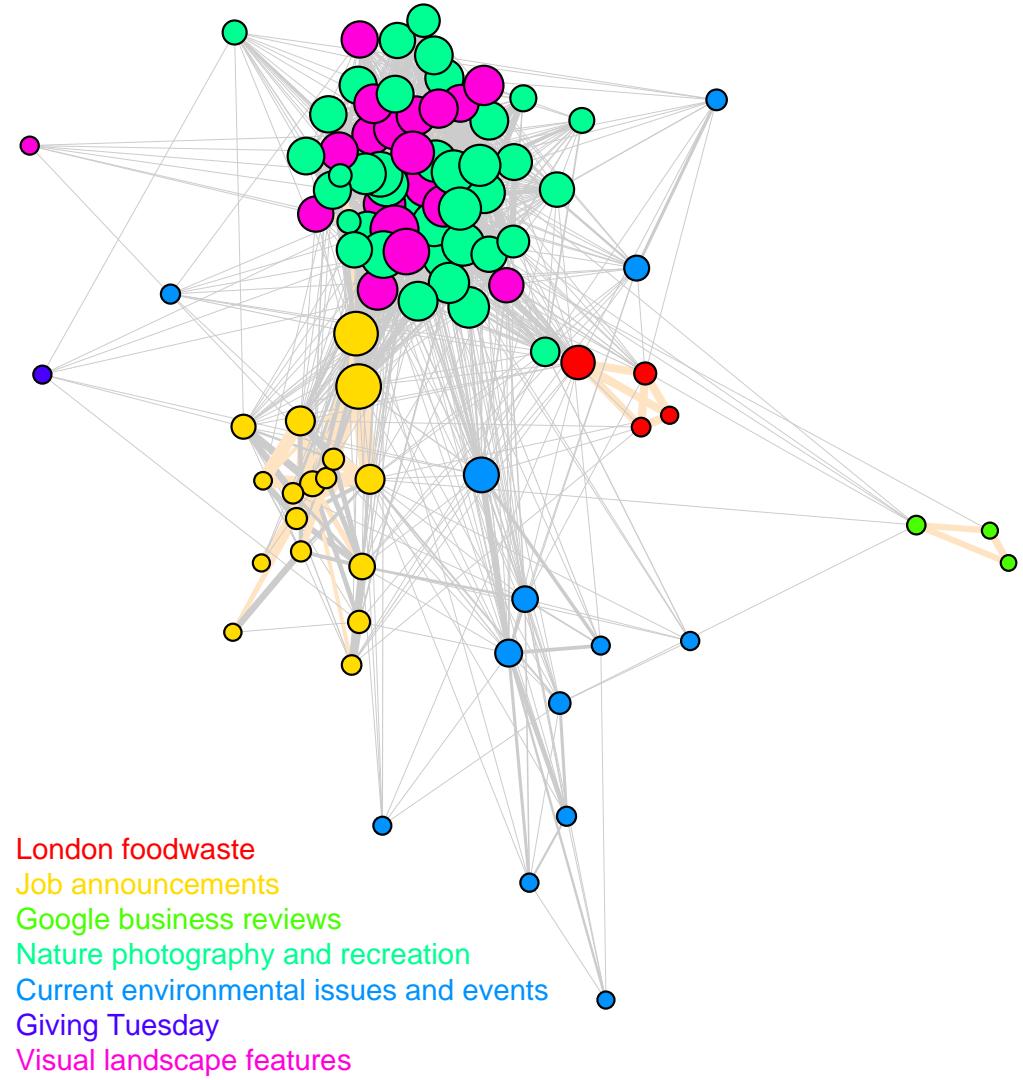
Rank	Hashtag	N
1	Nature	3439
2	Job	2424
3	Hiring	1045
4	Landscape	938
5	Photography	907
6	Hiring!	891
7	Careerarc	833
8	Climatechange	752
9	Sustainability	655
10	Green	628
11	Travel	628
12	Diversity	521
13	Autumn	479
14	Sunset	465
15	Naturephotography	464

# Hashtag Analysis

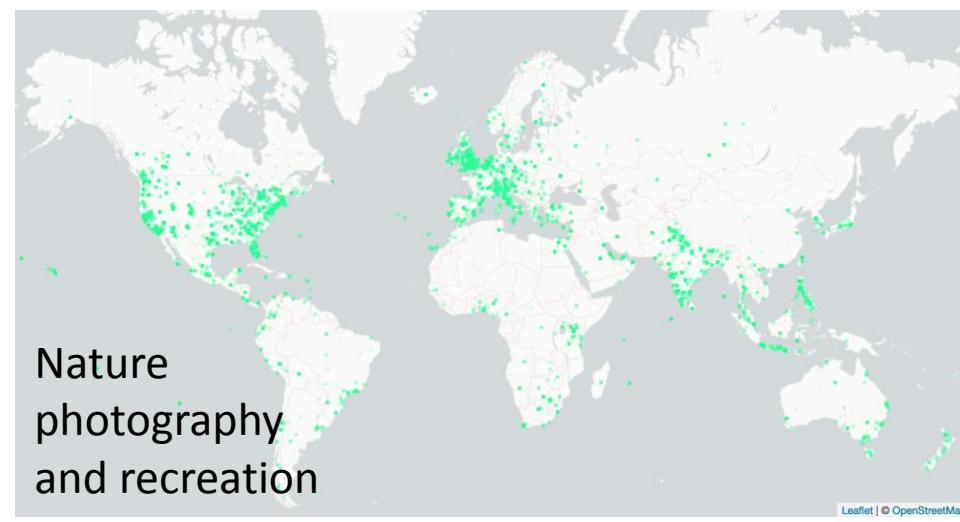
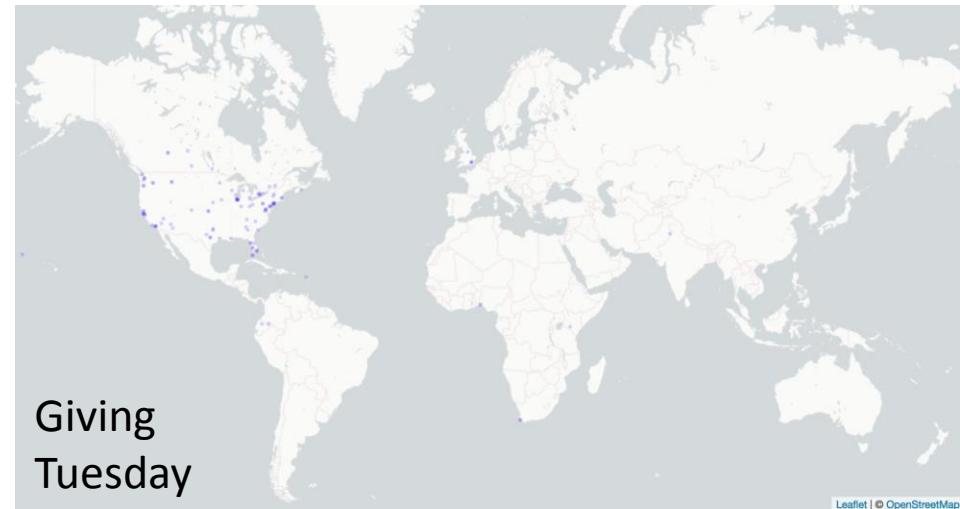
“taking it all in  
#nofilter  
#nofiltersneeded  
#sunset #sky #clouds  
#beautiful #nature  
#lake #lakeview @  
south lake ta[hoe]”

# Hashtag Community Detection

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# Cluster Distributions

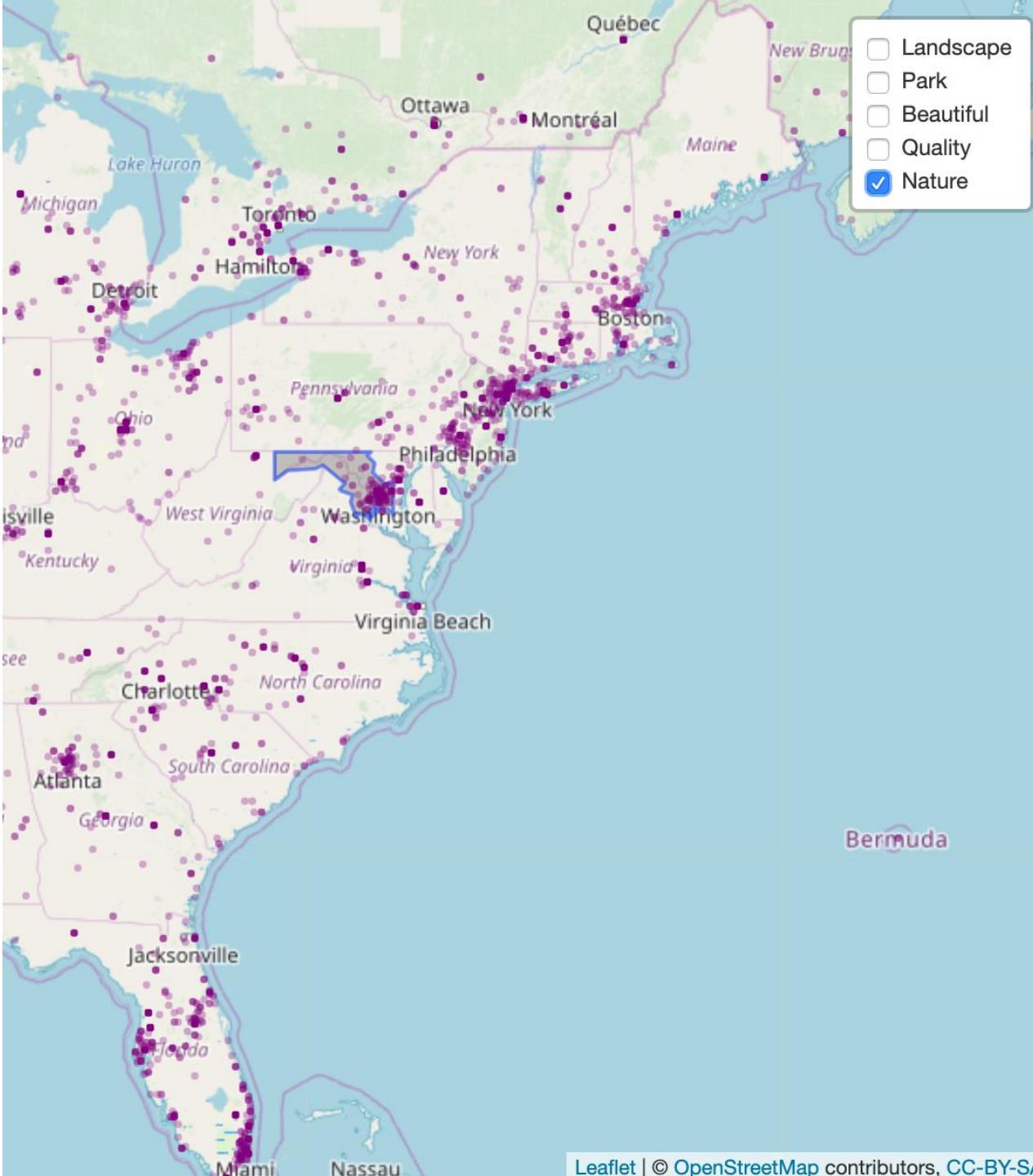


# Conclusions

- Twitter data have potential to inform landscape assessment and planning
- Methodology requires further development
- Areas for future exploration:
  - Sentiment analysis
  - Time sensitivity
  - Query content
  - Linking activity, aesthetics, and place

# Outlook

- Upcoming results from 6-month data collection
- Interactive maps and data-driven dashboards



# Thank you!

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