LASAN's Biodiversity Update & Los Angeles City Biodiversity Index

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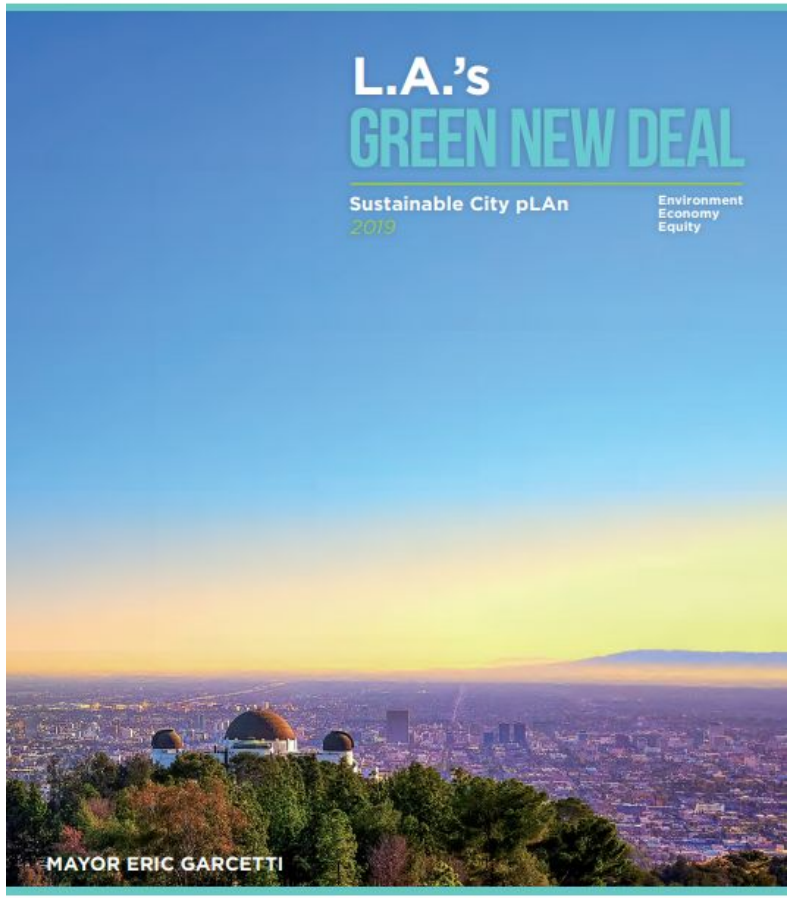
Presentation Outline

- Biodiversity Program Background (Mas)
- LA Biodiversity Index (Michelle)
- 2020 Biodiversity Report (Michelle)
- Collaborative Efforts (Mas)
  - Partnerships
  - Biodiversity Efforts/Projects in the City of Los Angeles

LASAN Biodiversity Program Background

LASAN Biodiversity Program

- **2017 Biodiversity Council Motion**
  - Protect and enhance biodiversity
  - Ultimate objective: create a biodiversity index for the City of LA that will measure progress on biodiversity goals
- **2019 Sustainability pLAn (LA's Green New Deal)**
  - Biodiversity and access to nature goals



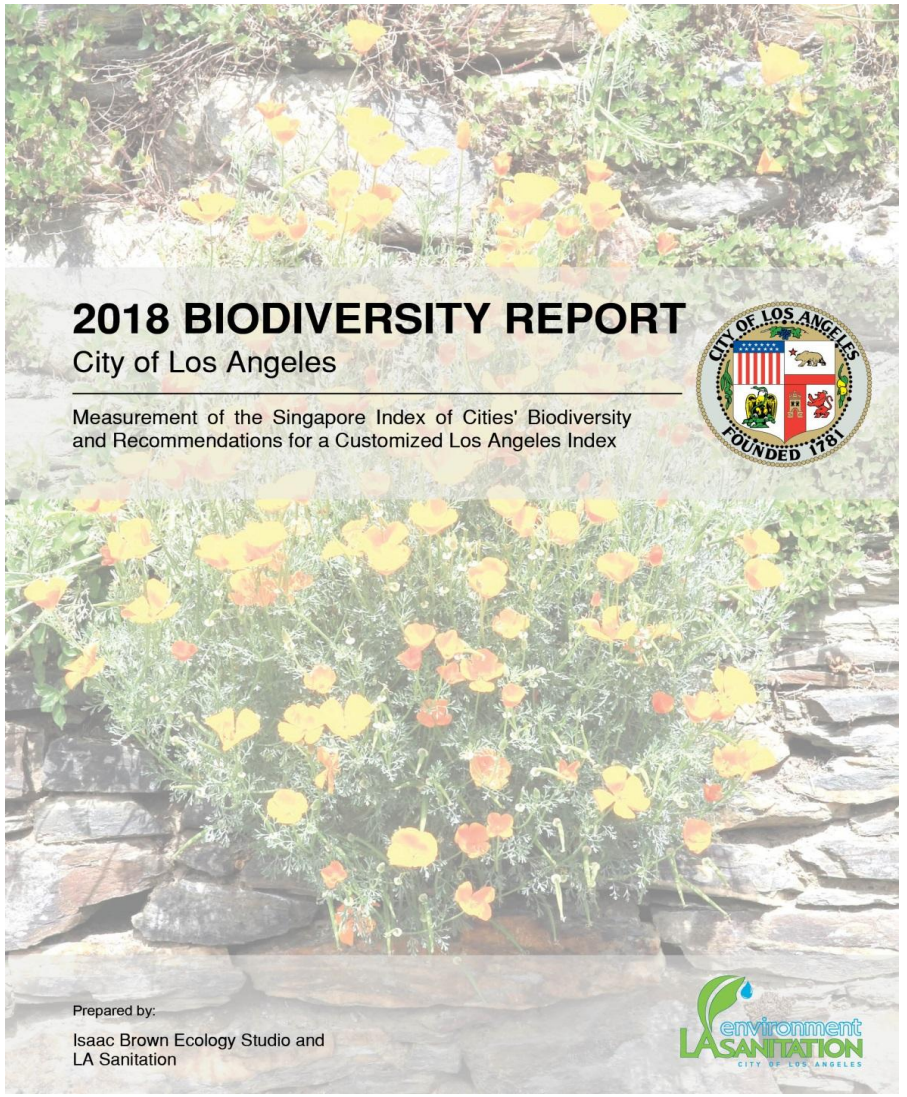
LASAN Biodiversity Program Background

Expert and stakeholder input = critical for success

- TEAMS CREATED:
  - Internal LASAN Team
  - Interdepartmental Biodiversity Team
  - Biodiversity Stakeholder Group
  - Biodiversity Expert Council

2018 Biodiversity Report

- Singapore Index (SI) on Cities' Biodiversity score
- Recommendations for customized LA biodiversity index



Find out more at lacitysan.org/biodiversity!

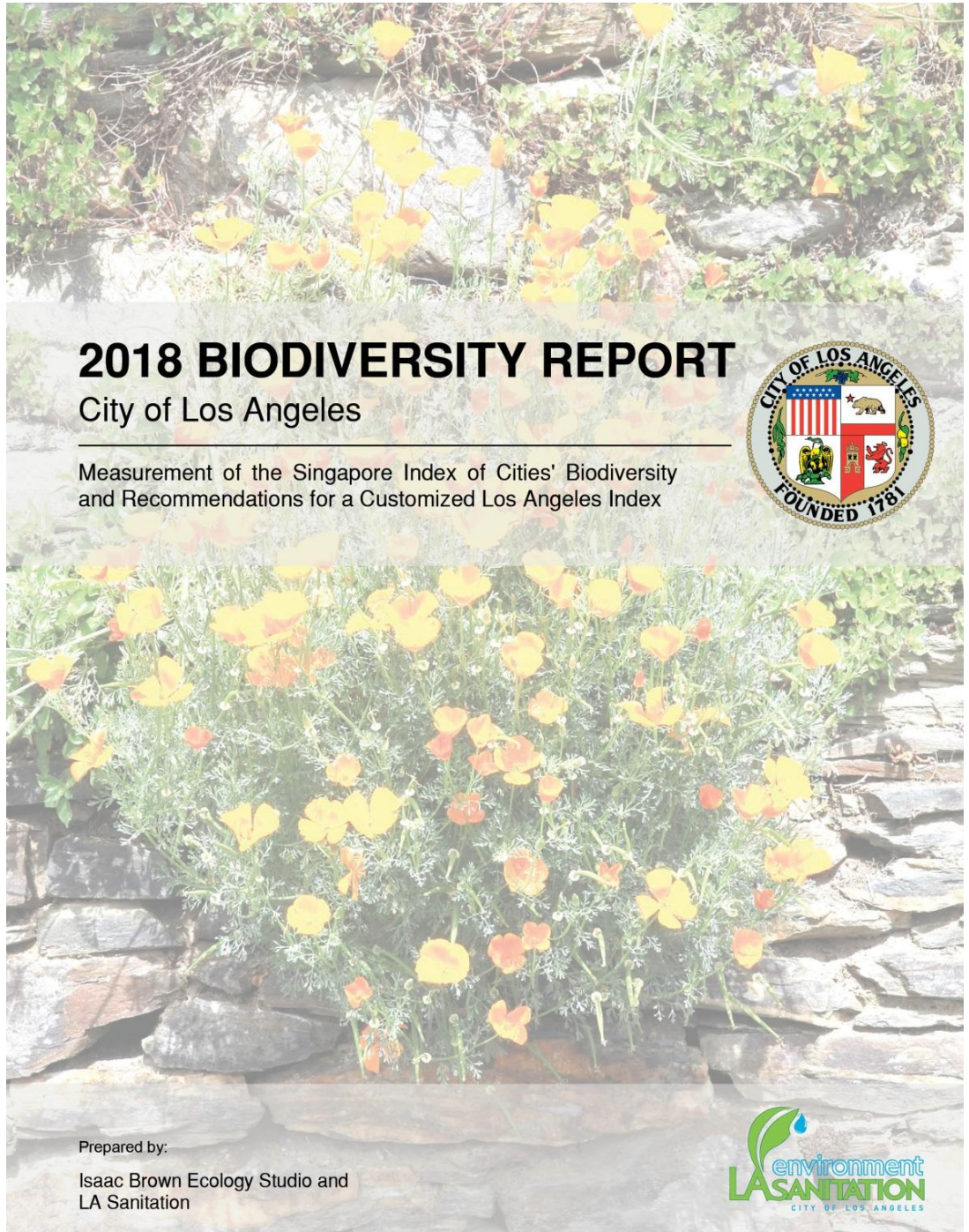


Table 1: Singapore Index of Cities' Biodiversity score summary for Los Angeles 2016

Indicator	Numeric Result	Index Score (0 weak, 4 strong)					Total
		0	1	2	3	4	
1. Natural Areas	20.5% of City (~62,000 acres)					4	**4**
2. Connectivity Measures	738 ha. effective mesh			2			**2**
3. Native Birds in Built Areas	306 native species recorded					4	**4**
4. Native Vascular Plants Change	461 native species recorded	NA in year 1					
5. Native Birds Change	325 native species recorded	NA in year 1					
6. Native Butterflies/Moths Change	218 total species* recorded	NA in year 1					
7. Native Freshwater Fish/BMI Chg.	6 fish/291 BMI native spp. recorded	NA in year 1					
8. Native Reptiles/Amphibians Chg.	69 total species* recorded	NA in year 1					
9. Protected Natural Areas	12.2% of City (~36,800 acres)				3		**3**
10. Invasive Species	~19% invasive plant species			2			**2**
11. Pervious Surfaces	~62% pervious surfaces			2			**2**
12. Urban Forest Canopy	~19% tree canopy		1				**1**
13. Access to Natural Areas	3.33 ha/1000 population					4	**4**
14. Natural Area Educational Visits	0.09 visits/student/year	0					**0**
15. Biodiversity Budget	1.2% of budget ($110M)		1				**1**
16. # Biodiversity Projects	117 projects/programs					4	**4**
17. Biodiversity Strategy/Action Plan	no Biodiversity Action Plan	0					**0**
18. # Biodiversity Related Institutions	>3 functions					4	**4**
19. Interagency Cooperation	5 agencies cooperate on bio.				3		**3**
20. Public Consultation Process	proposed as routine process			2			**2**
21. # City Biodiversity Partnerships	40+ partners					4	**4**
22. School Curricula	included					4	**4**
23. Public Outreach Events	550+ events per year					4	**4**
Total (72 potential points in year 1)		average = 2.67					**48**

* native vs. non-native species of reptiles and butterflies/moths to be determined

Process / Methods

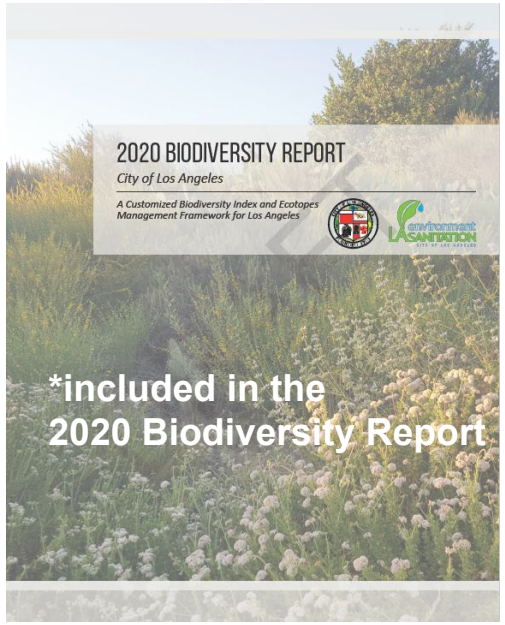
Designing the LA City Biodiversity Index

- Singapore Index = starting point
- Revised per Biodiversity Expert Council
  - Retained metrics
  - Modified metrics
  - Incorporated new metrics
- Isaac Brown's dissertation

Steve Winter: P-22 for National Geographic

LA Biodiversity Index:

- 3 themes
- 8 indicators
- 25 metrics



Theme	Indicator CODE	Indicators	Metric CODE	Metrics
1. Native Species Protection & Enhancement	1.1	Habitat Quality	1.1a	1.1a: % Natural Areas
			1.1b	Habitat Quality of Urban Landscapes & Open Space
			1.1c	Habitat Quality of Streams
			1.1d	Connectivity of Natural Areas
			1.1e	Connectivity of Urban Landscapes & Open Space
			1.1f	Connectivity of Streams and Riparian Areas
	1.2	Indicator Species	1.2a	% Open Space with Charismatic Umbrella Species
			1.2b	Native Species Presence in Urban Areas
			1.2c	Species of Conservation Conern Gained or Lost
	1.3	Threats to Native Biodiversity	1.3a	Urban Edge Effects on Natural Areas
			1.3b	Presence & Spread of Invasive Plants
			1.3c	Wildfire Frequency Departure from Natural
2. Social Equity Considerations & Biodiversity	2.1	Access to Biodiversity	2.1a	Access to Natural Areas
			2.1b	Neighborhood Landscape/Tree Canopy Footprint
	2.2	Education	2.2a	School (K-12) Biodiversity Topics
			2.2b	Off-Campus Biodiversity Educational Visits
			2.2c	Campus Nature Education Gardens/Areas
	2.3	Community Action	2.3a	Community Scientist Activities and App Utilization
			2.3b	# Certified Biodiversity-Friendly Areas
3. Governance & Management of Biodiversity	3.1	Governance	3.1a	Biodiversity Vision/Action Plan
			3.1b	% Departments with Biodiversity Programs & Policies
	3.2	Management	3.2a	% Protected Natural Areas
			3.2b	Protected Natural Areas Management and Monitoring
			3.2c	Management of Invasive Species & Pests
			3.2d	Management of Threatened, Endangered, & Species of Concern

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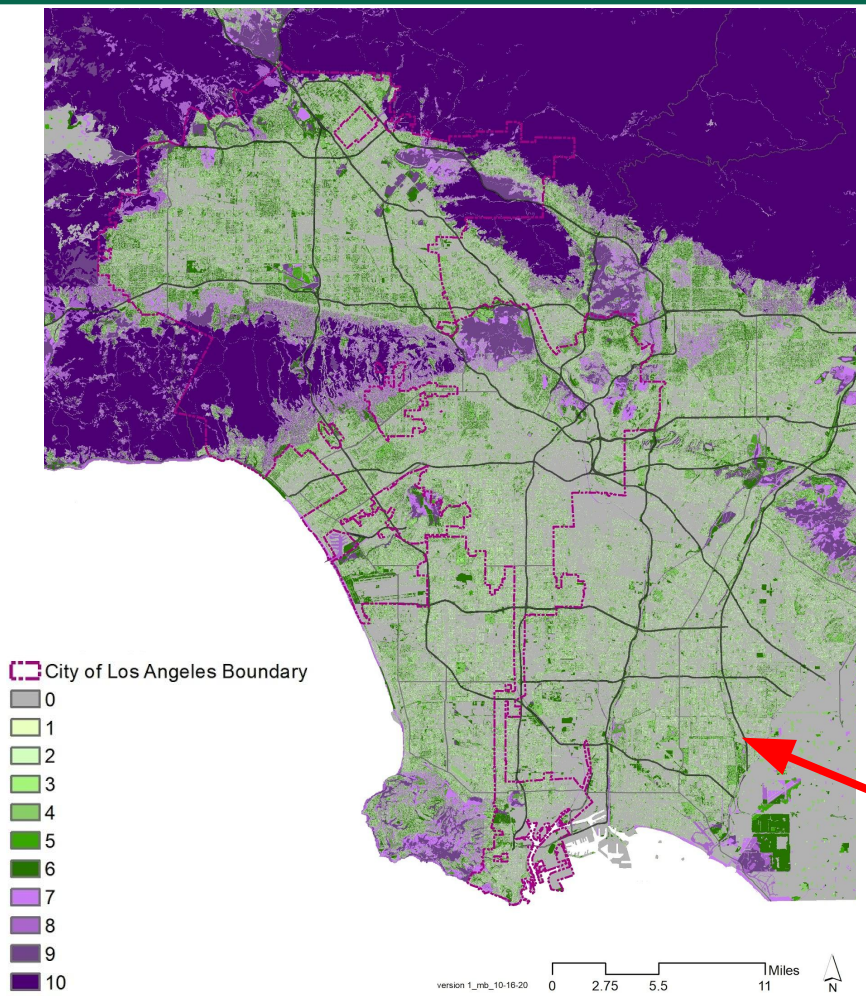
LA Biodiversity Index:
Theme 1: Native Species Protection & Enhancement



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			1.3c	Wildfire Frequency Departure from Natural

INDICATORS:

- Habitat Quality
- Indicator Species
- Threats to Native Biodiversity

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LA Biodiversity Index:
Theme 2: Social Equity Considerations & Biodiversity

INDICATORS:

- Access to Biodiversity
- Education
- Community Action

2. Social Equity Considerations & Biodiversity	2.1	Access to Biodiversity	2.1a	Access to Natural Areas
			2.1b	Neighborhood Landscape/Tree Canopy Footprint
	2.2	Education	2.2a	School (K-12) Biodiversity Topics
			2.2b	Off-Campus Biodiversity Educational Visits
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	2.3	Community Action	2.3a	Community Scientist Activities and App Utilization
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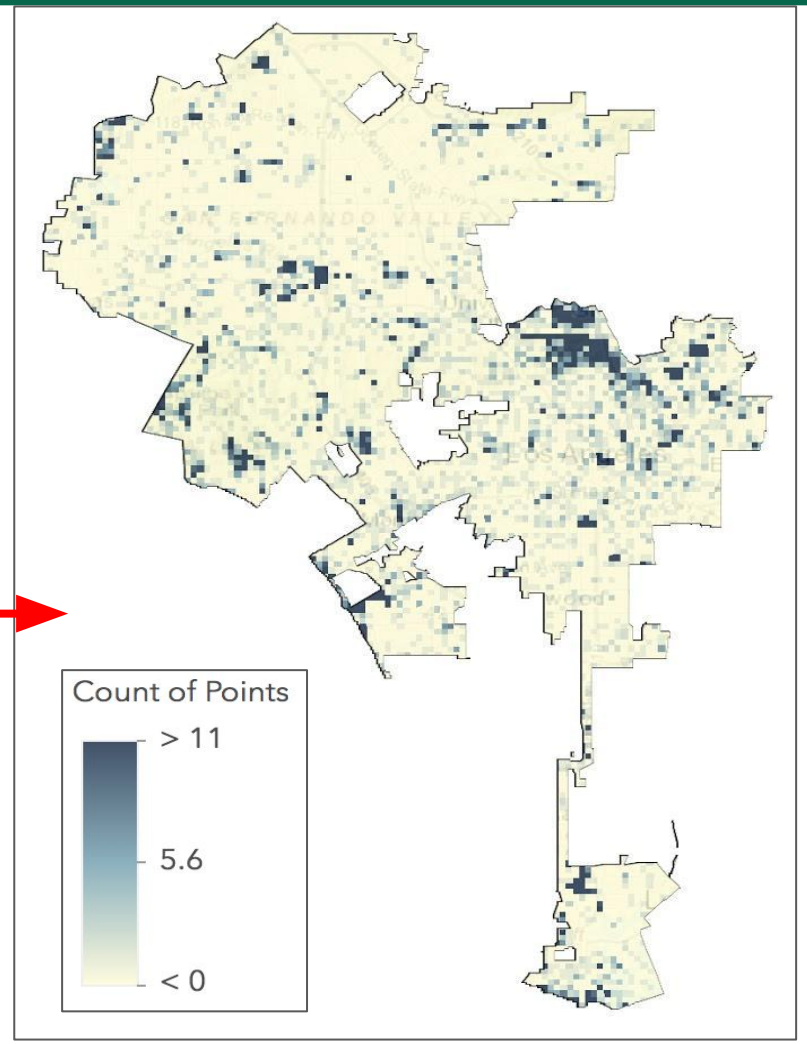


Example Graphic for Metric 2.3a: Community Science Activities & App Utilization (Preliminary Results)

LA Biodiversity Index:
Theme 3: Governance & Management of Biodiversity

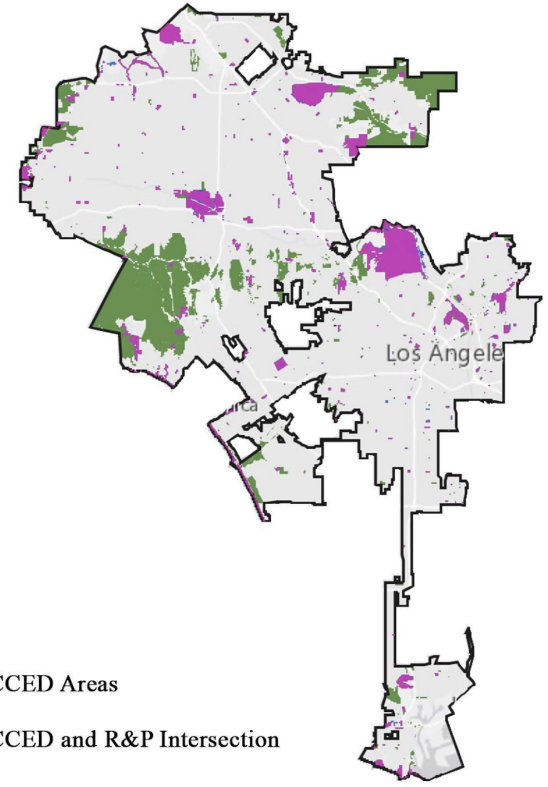
3. Governance & Management of Biodiversity	3.1	Governance	3.1a	Biodiversity Vision/Action Plan
			3.1b	% Departments with Biodiversity Programs & Policies
	3.2	Management	3.2a	% Protected Natural Areas
			3.2b	Protected Natural Areas Management and Monitoring
			3.2c	Management of Invasive Species & Pests
			3.2d	Management of Threatened, Endangered, & Species of Concern

INDICATORS:

- Governance
- Management

<u>3.2b Protected Natural Areas Management and Monitoring</u>

- Uses protected areas -
  - CA Conservation Easement Database (CCED),
  - CA Protected Areas Database (CPAD)
  - Santa Monica Mountains Conservancy Easements and Holdings

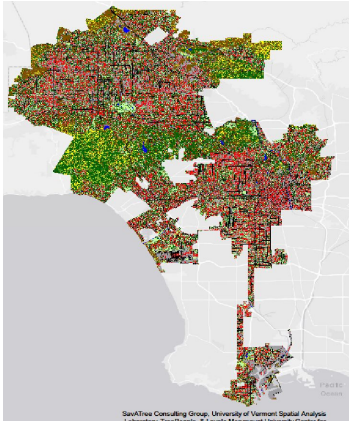


Preliminary Methodology (From Report Table 1-1)

Example: 2.1b Neighborhood Landscape/Tree Canopy Footprint

Description	Relationship to Singapore Index
Urban biodiversity is also present in other landscapes and parks, in addition to natural areas. This indicator will determine levels of landscape and open space present in neighborhoods at a 1/8-mile grid resolution. This data can support urban design, planning, and other project efforts to maintain adequate levels of landscape and tree canopy in neighborhoods.	Modified from Singapore Index Indicator 12. The proposed metric re-orients Singapore Index Indicator 12 to consider tree canopy and landscape as an indicator of access to native and non-native biodiversity in built-up urban areas, instead of tree canopy alone as an indicator of urban cooling/carbon benefits. Indicators of regulating ecosystem services have been removed from the LA Biodiversity Index because they are not central to the species conservation and access concerns contained in the Biodiversity Motion.

Preliminary Methods	Preliminary Benchmark Score (every 10 years)	Preliminary Monitoring Score (every 3 years)
Measure average landscape/canopy % cover per 1/8 mile pixel using 2016 LA County Tree Canopy/Landcover dataset based on LARIAC. Measure weighted average score for pixels within area of interest (e.g., City, Ecotope, Neighborhood, or other area of interest)	0 points: landscape/canopy footprint < 5%	-2 points (significantly negative): More than 1% reduction in landscape/tree canopy
	1 point: landscape/canopy footprint 5-10%	-1 point (negative): >0-1% reduction in landscape/tree canopy
	2 points: landscape/canopy footprint 10-20%	0 points (neutral): no change
	3 points: landscape/canopy footprint 20%-30%	1 point (positive): >0-1% increase in landscape/tree canopy
	4 points: landscape/canopy footprint 30%-40%	2 points (significantly positive): More than 1% increase in landscape/tree canopy
	5 points: landscape/canopy footprint >40%	



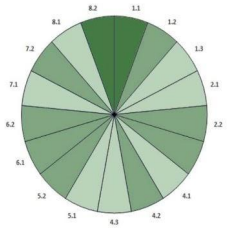
LiDAR Data - land cover

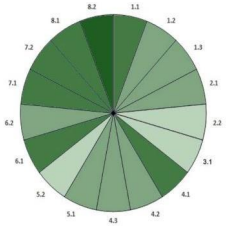
SavATree Consulting Group, University of Vermont Spatial Analysis Laboratory, TreePeople, & Loyola Marymount University Center for Urban Resilience. *Los Angeles County Tree Canopy Assessment,* 2016.

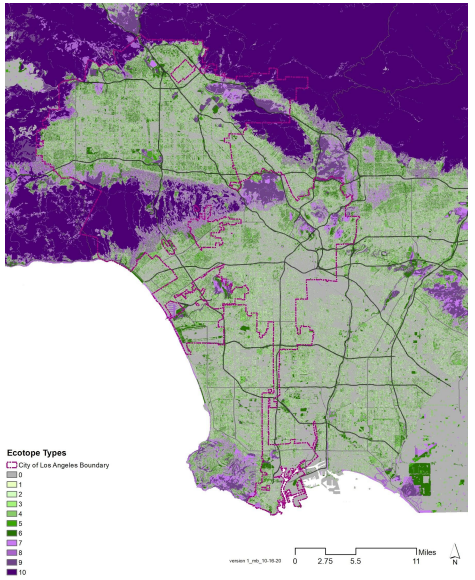
Measuring the Index

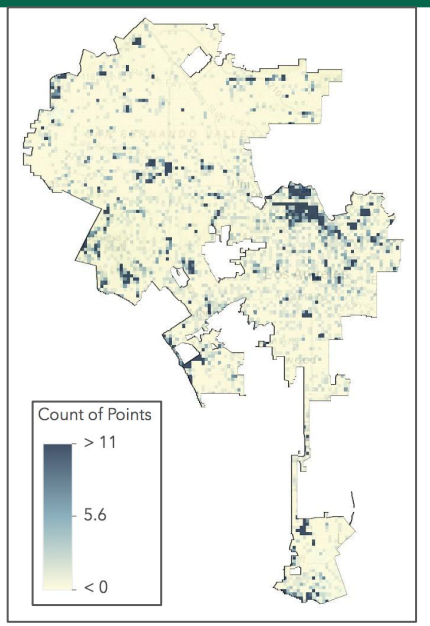
Metric Performance

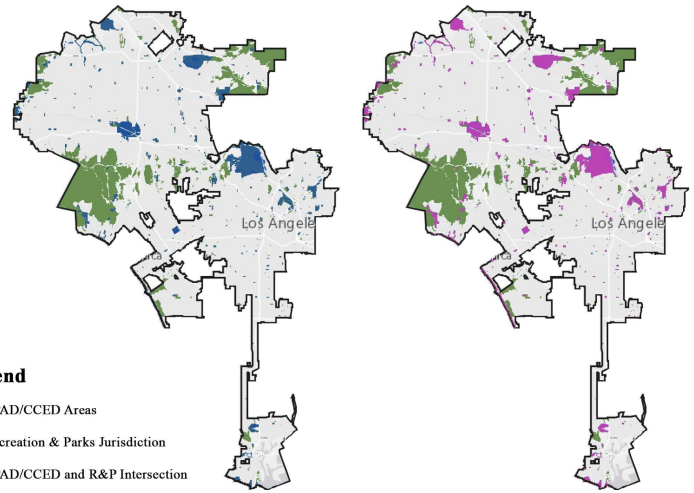
- Each metric will be distilled to an easily interpretable:
  - score
  - single graphic/map/table
- Performance of the entire index tracked over time via color-coded pie charts
  - Shading/color= performance









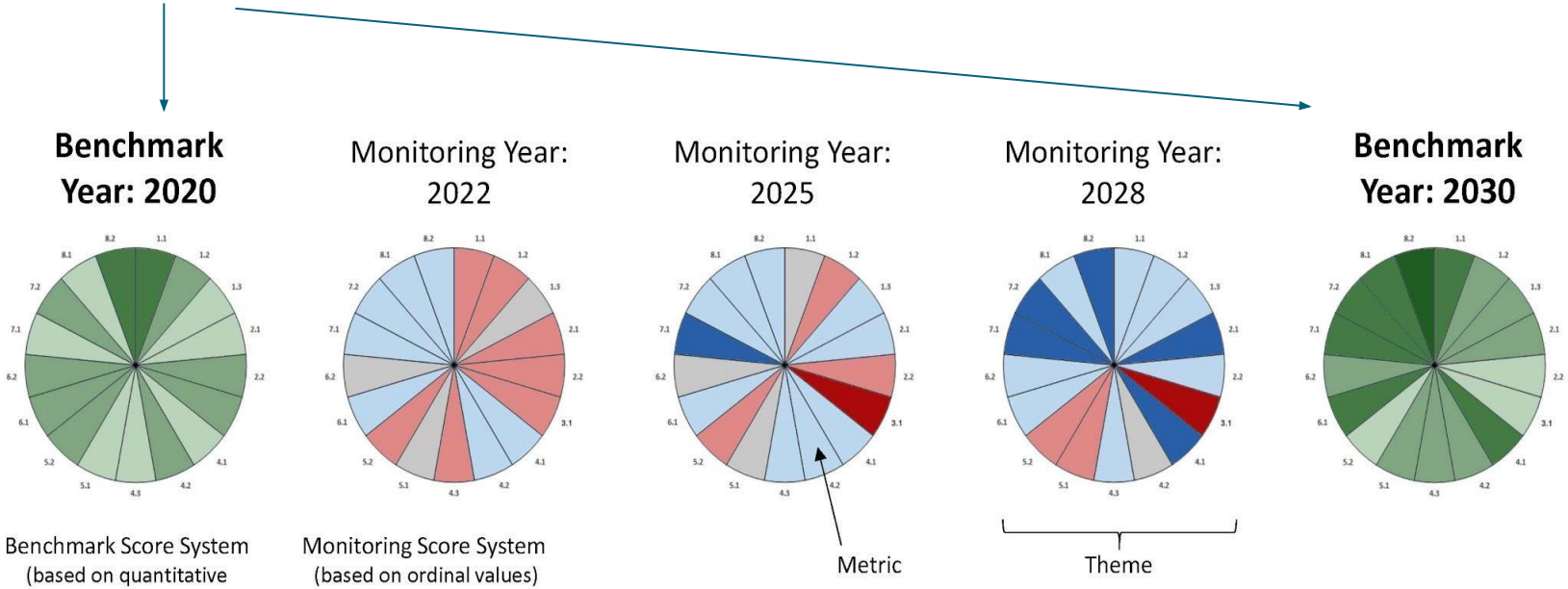


Measuring the Index

Measurement Timeline

Benchmark scores
(every 10 yrs)

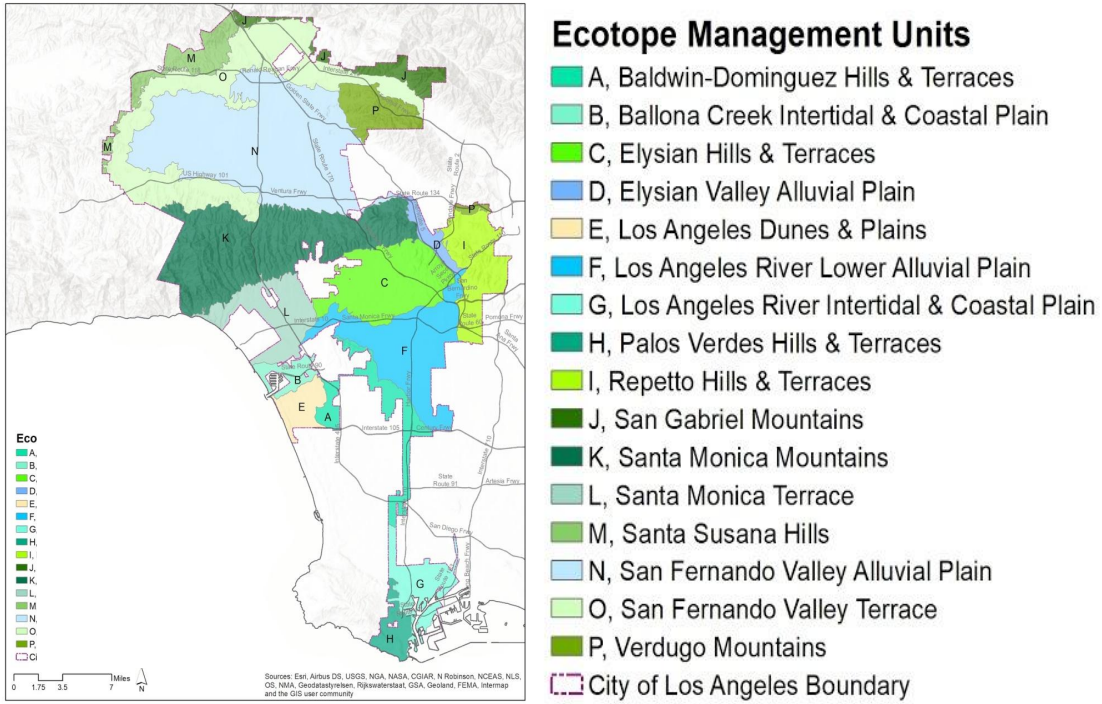
Monitoring scores
(every 3 yrs)



Preliminary Results

Metric Performance

- Metrics may be measured within smaller management units called **ecotopes**

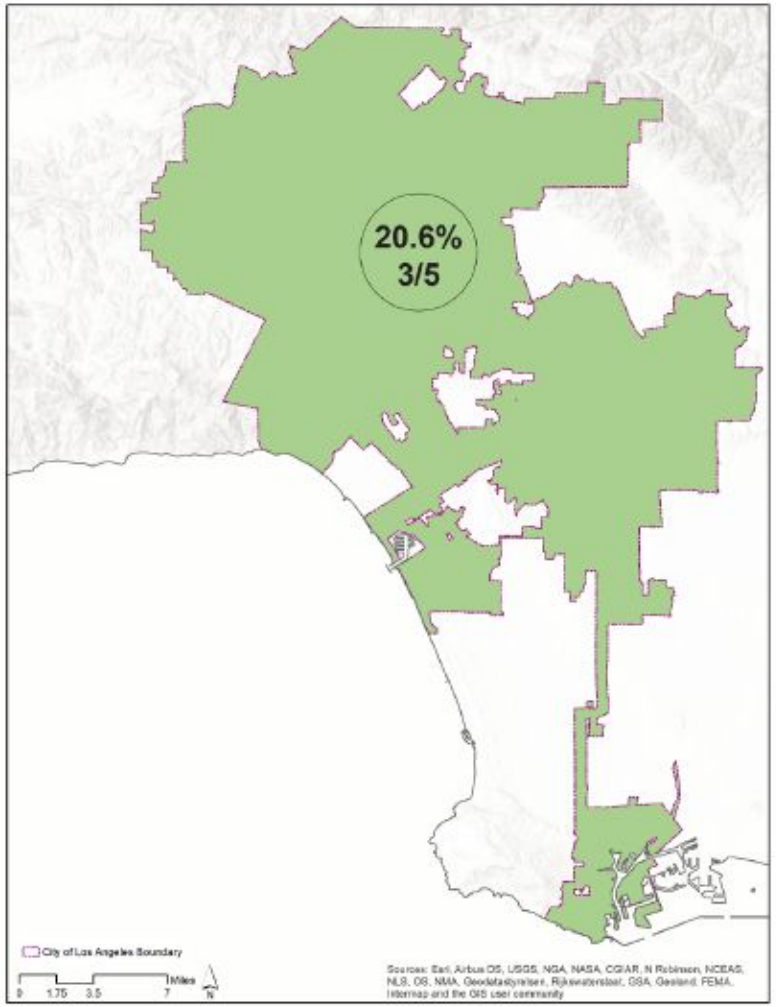


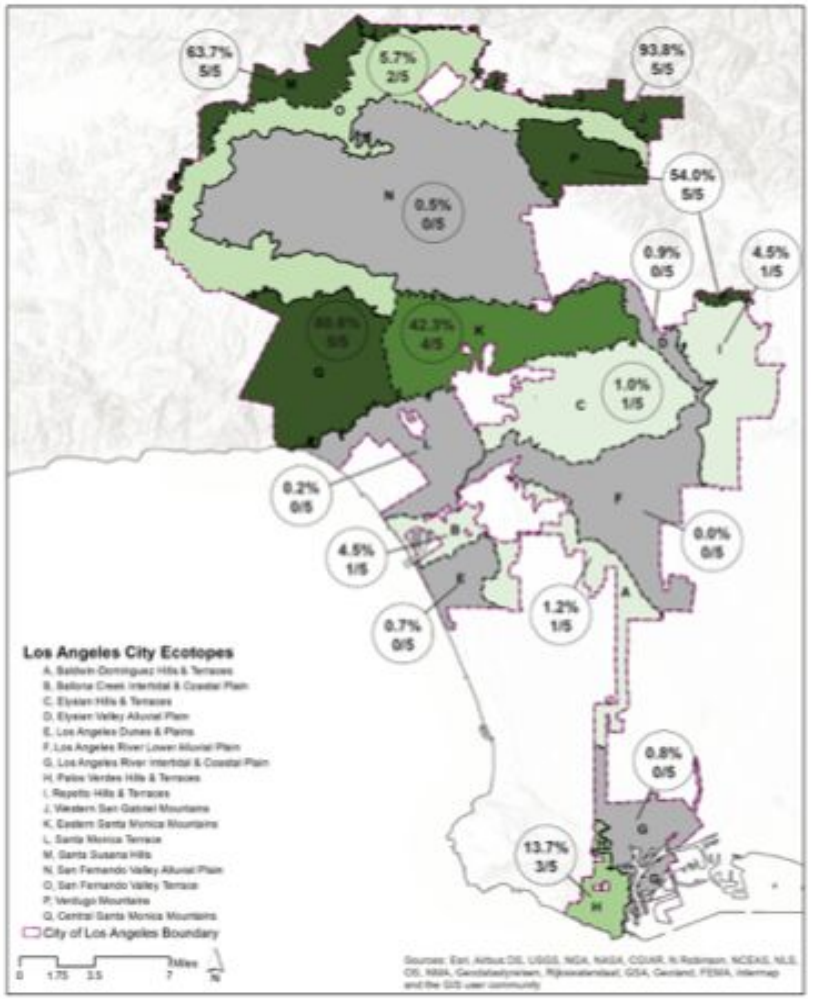
Isaac Brown will present on this concept in more detail!

Preliminary Results

% Natural Areas:

Indicator 1 (Singapore Index) vs. Indicator 1.1a LA City Index

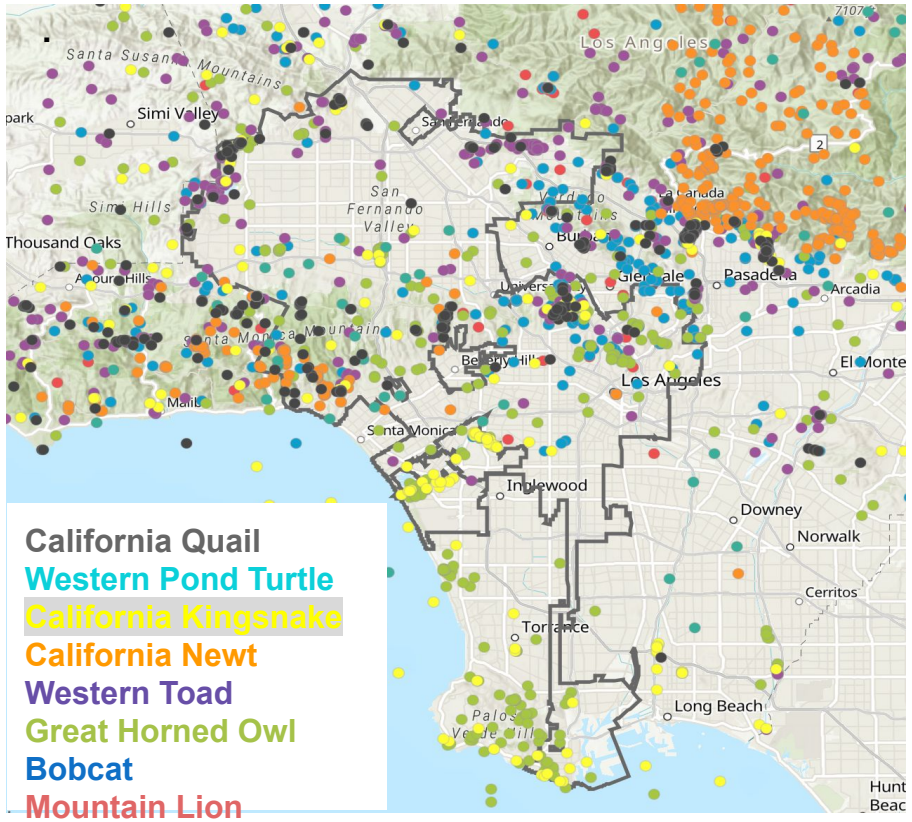




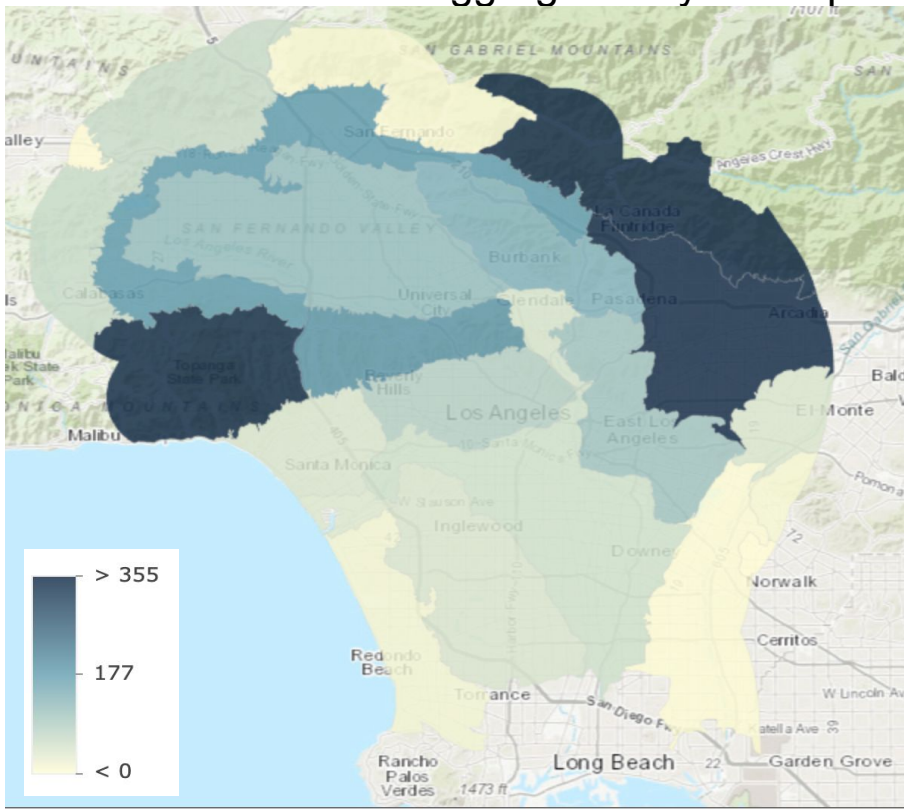
Data Aggregation by Ecotope

1.2a % Open Space with Charismatic Umbrella Species

A DRAFT list of charismatic umbrella species was created by a summer intern.



Species observations were downloaded from iNaturalist/eBird were aggregated by ectotope.



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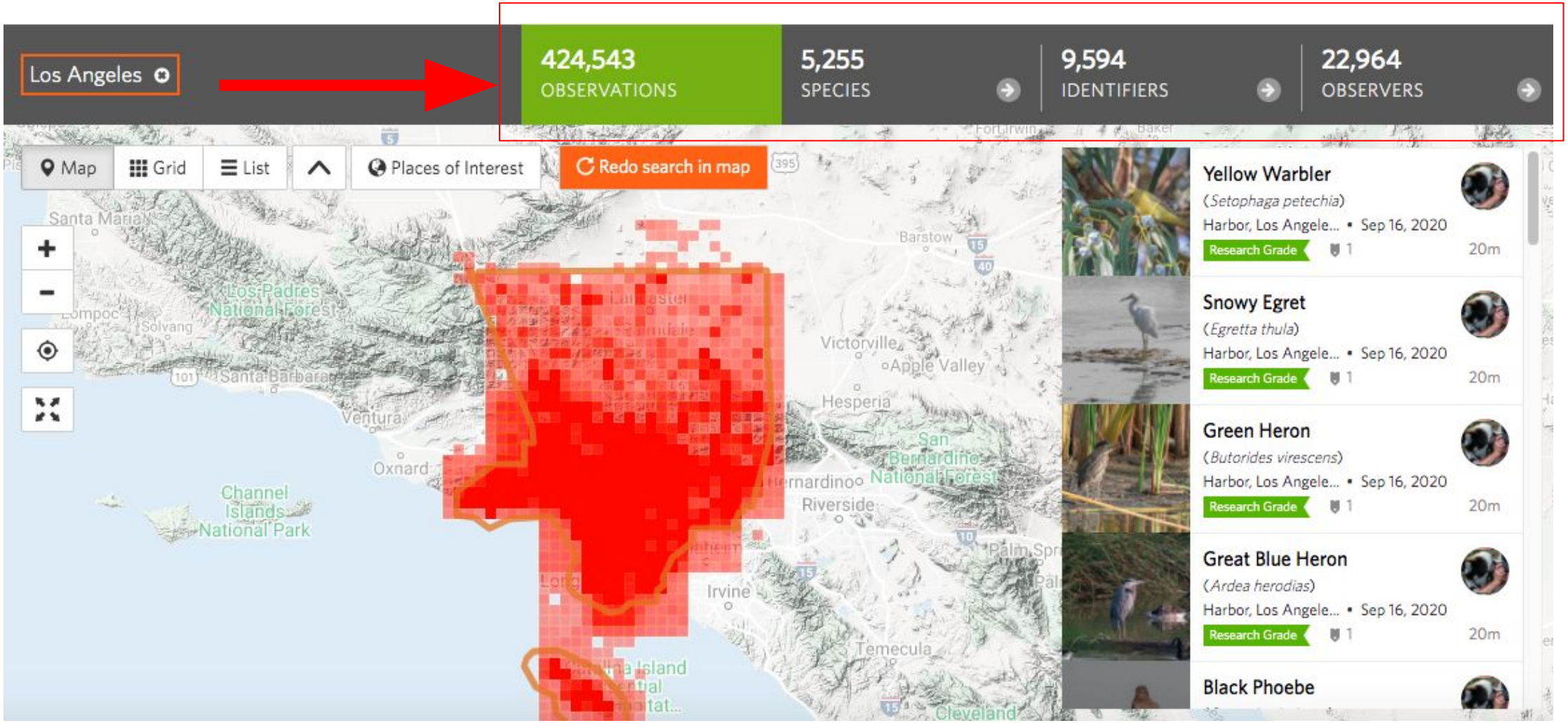
iNaturalist - Treasure Trove of Data!

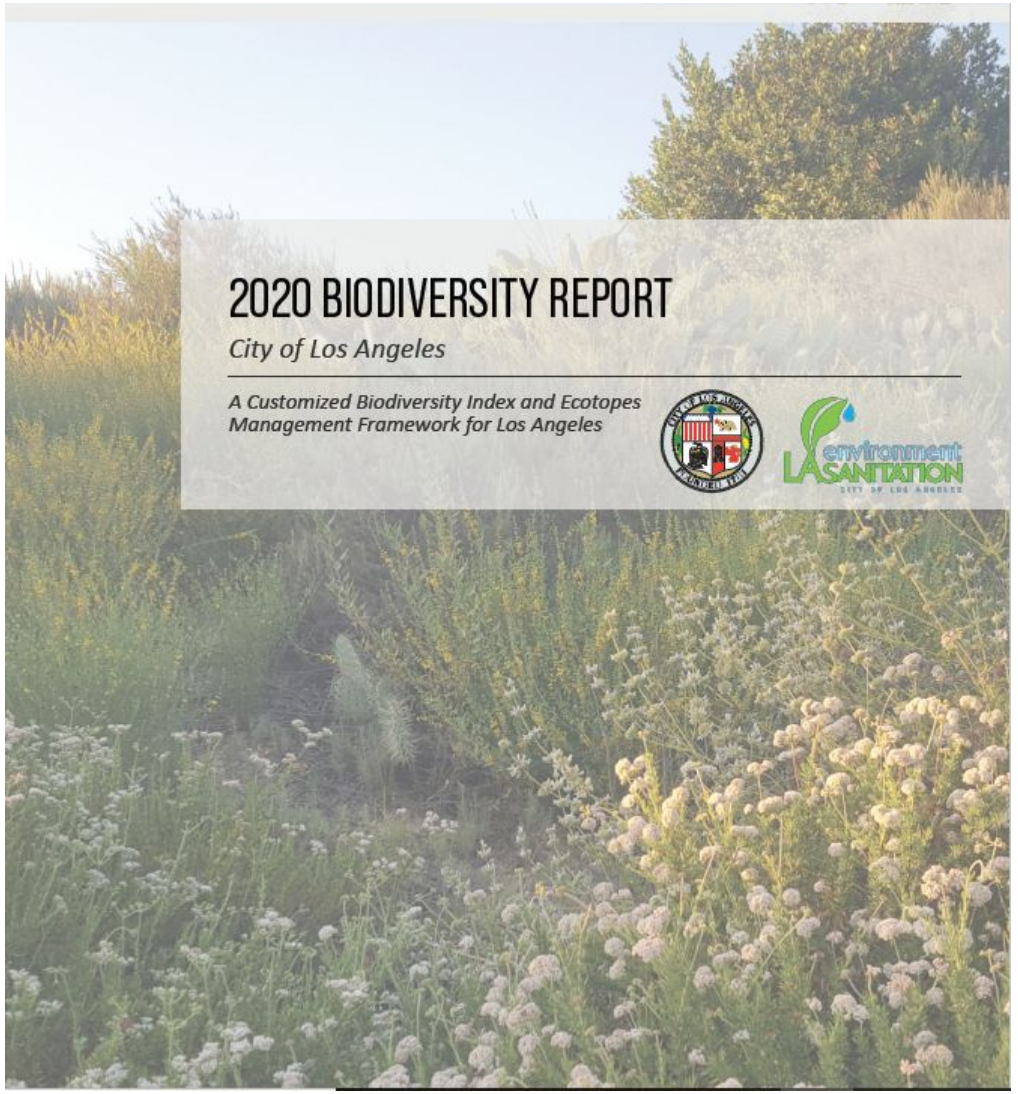


Sign up for an account today to start contributing observations!

inaturalist.org

2020 Biodiversity Report

- **2020 Biodiversity Report**
  - LA Biodiversity Index
  - Ecotopes framework
  - Preliminary Connectivity Work
  - Case Studies
- Will be published soon
  - @ lacitysan.org/biodiversity
- Integration with LA County
- Other municipalities can use it as a model



LA Index Implications/Next Steps

- <u>Baseline Measurement:</u>
  - The LASAN Biodiversity Team is working to perform measurements on all 25 metrics.
    - Some metrics complete
      - (e.g., 1.1b Habitat Quality of Urban Landscapes & Open Space)
    - Some have preliminary scores
    - Brand new metrics require additional research and refinement

Photo: Robert Hollingsworth

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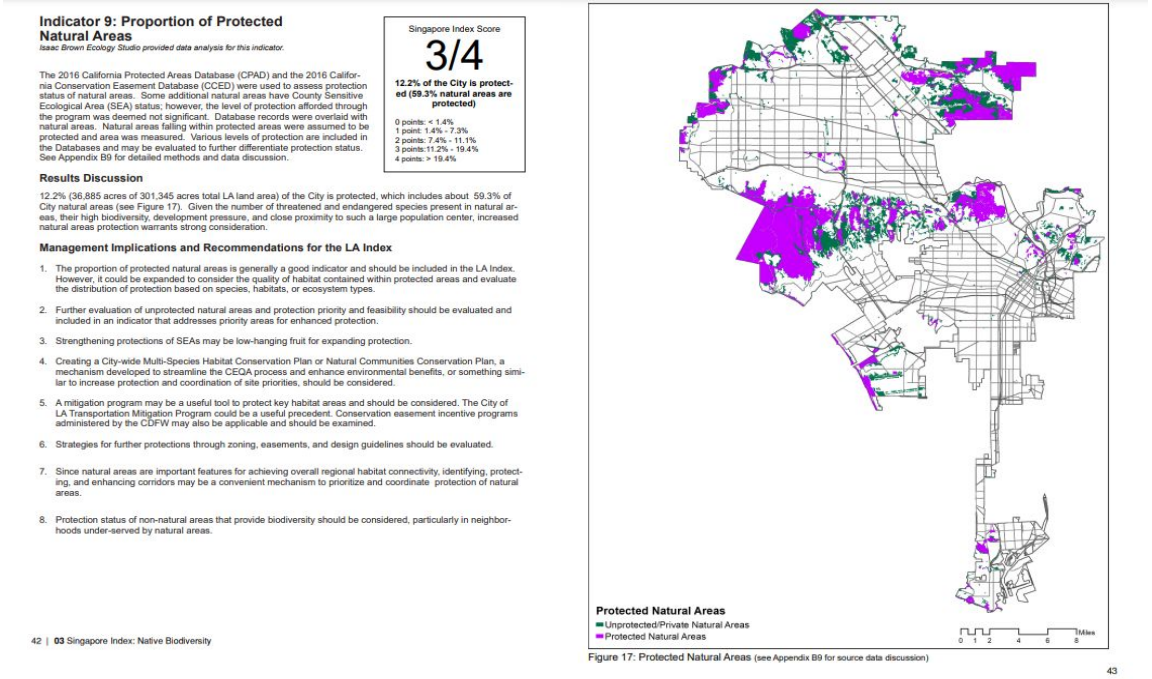
LA Index Implications/Next Steps

- <u>Index Results:</u>
  - Report format envisioned as similar to the 2018 Biodiversity Report
    - Overall index score for the City
    - Individual metric scores
    - Detailed methodology
    - Maps, graphics
    - Management implications/recommendations for all 25 metrics.



Indicator 9: Proportion of Protected Natural Areas

Isaac Brown Ecology Studio provided data analysis for this indicator.

Singapore Index Score

3/4

12.2% of the City is protected (59.3% natural areas are protected)

0 points: < 1.4%
1 point: 1.4% - 7.3%
2 points: 7.4% - 11.1%
3 points:11.2% - 19.4%
4 points: > 19.4%

The 2016 California Protected Areas Database (CPAD) and the 2016 California Conservation Easement Database (CCED) were used to assess protection status of natural areas. Some additional natural areas have County Sensitive Ecological Area (SEA) status; however, the level of protection afforded through the program was deemed not significant. Database records were overlaid with natural areas. Natural areas falling within protected areas were assumed to be protected and area was measured. Various levels of protection are included in the Databases and may be evaluated to further differentiate protection status. See Appendix B9 for detailed methods and data discussion.

Results Discussion

12.2% (36,885 acres of 301,345 acres total LA land area) of the City is protected, which includes about 59.3% of City natural areas (see Figure 17). Given the number of threatened and endangered species present in natural areas, their high biodiversity, development pressure, and close proximity to such a large population center, increased natural areas protection warrants strong consideration.

Management Implications and Recommendations for the LA Index

1. The proportion of protected natural areas is generally a good indicator and should be included in the LA Index. However, it could be expanded to consider the quality of habitat contained within protected areas and evaluate the distribution of protection based on species, habitats, or ecosystem types.
2. Further evaluation of unprotected natural areas and protection priority and feasibility should be evaluated and included in an indicator that addresses priority areas for enhanced protection.
3. Strengthening protections of SEAs may be low-hanging fruit for expanding protection.
4. Creating a City-wide Multi-Species Habitat Conservation Plan or Natural Communities Conservation Plan, a mechanism developed to streamline the CEQA process and enhance environmental benefits, or something similar to increase protection and coordination of site priorities, should be considered.
5. A mitigation program may be a useful tool to protect key habitat areas and should be considered. The City of LA Transportation Mitigation Program could be a useful precedent. Conservation easement incentive programs administered by the CDFW may also be applicable and should be examined.
6. Strategies for further protections through zoning, easements, and design guidelines should be evaluated.
7. Since natural areas are important features for achieving overall regional habitat connectivity, identifying, protecting, and enhancing corridors may be a convenient mechanism to prioritize and coordinate protection of natural areas.
8. Protection status of non-natural areas that provide biodiversity should be considered, particularly in neighborhoods under-served by natural areas.

42 | **03** Singapore Index: Native Biodiversity

Figure 17: Protected Natural Areas (see Appendix B9 for source data discussion)

43

Example metric summary, score, and graphic from 2018 Biodiversity Report

Collaborations

- California Department of Fish & Wildlife
  - Important partner for management of threatened & endangered species
  - Education
- Community Forestry Advisory Committee
  - Community group focused on urban forestry issues
- Pollinator Pockets - CSUN/NBF
  - Using underutilized pockets to create gardens/green space
- WestEd and UCLA
  - NSF Grant proposal
  - Pilot studies for NGSS @ LAUSD schools

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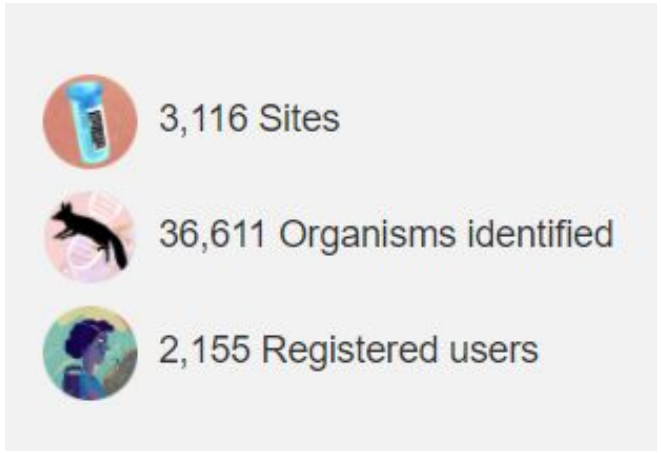
Collaborations

- CALeDNA
  - Statewide initiative (led by UC) to establish a database of environmental DNA
  - Plants & animals slough off cells into environment
  - Samples are collected & analyzed
  - DNA results compared to DNA library
  - Taxonomic identification using DNA much faster than traditional methods
  - eDNA is the future of biodiversity data



Volunteer as a community scientist.
https://ucedna.com/

Explore our field data and eDNA results.

University Relations

- UCLA - Institute of the Environment and Sustainability
  - IoES Senior Practicum
    - 7 Students on LASAN Biodiversity Index Practicum Team
    - Students will be working with a post-doc (Dr. Levi Simons) to help identify indicator species for the City to focus on
    - Mutually beneficial:
      - Students will gain great skill sets and practical work experience
        - Machine learning, R, GIS, modeling, etc.
        - City will receive models, maps, data
- Occidental College
  - 8 Summer Interns
    - 3 interns: decision support tool & wildlife connectivity
    - 5 interns: refined metrics and helped measure metrics

National Wildlife Federation (NWF)

- NWF's Community Wildlife Habitat program
  - LA = largest registered entity in the US
  - Need **1000 certification** points across the City
    - Help us reach this goal!
    - Homeowners, businesses, community centers, schools, etc. can register their gardens as wildlife habitats
    - Greater Wilshire Neighborhood Council

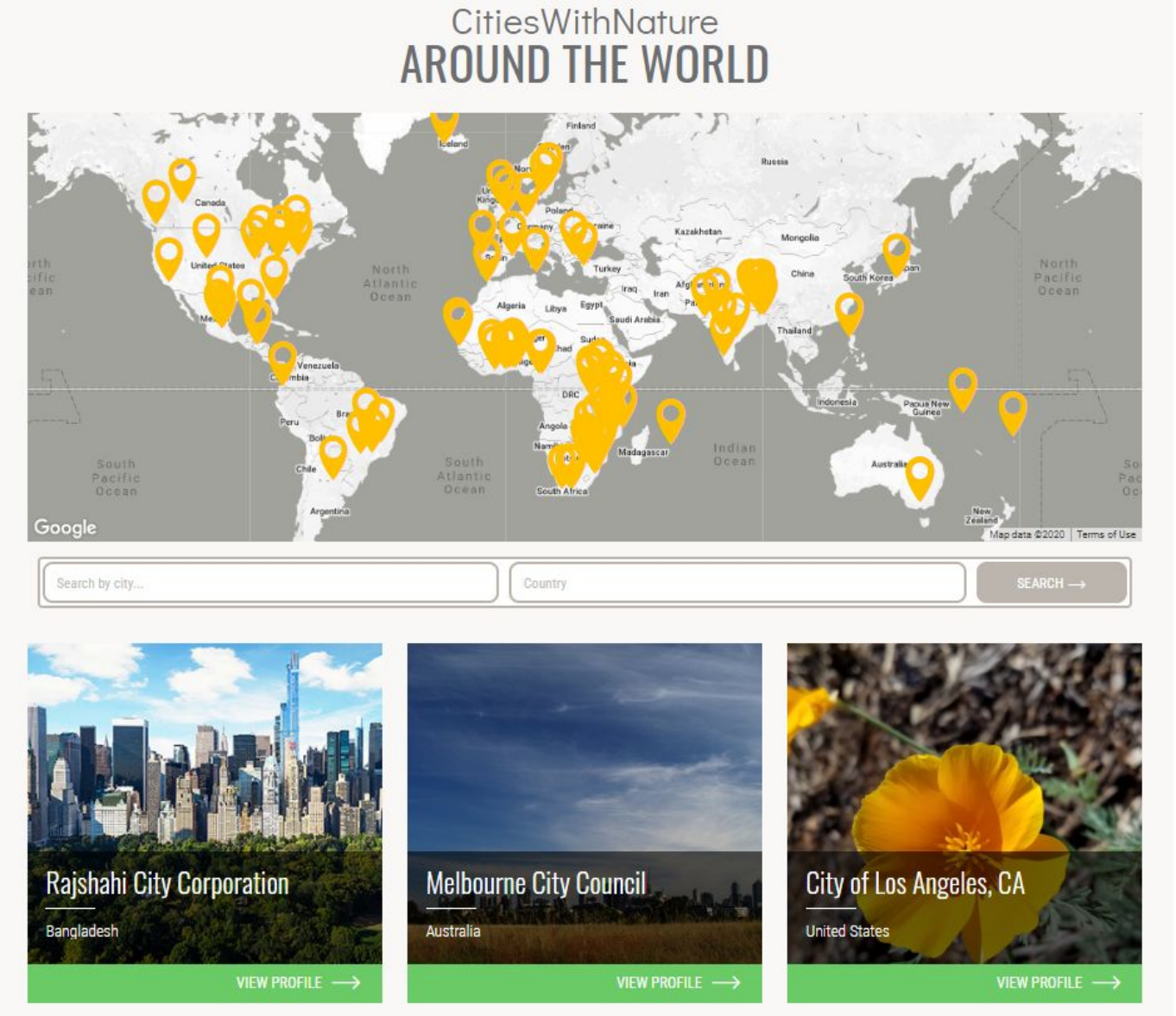
Certification Requirements

Certified Wildlife Habitat® applicants are asked to confirm they've provided the required number of elements for each of the following:

- **Food**
- **Water**
- **Cover**
- **Places to Raise Young**
- **Sustainable Practices**

https://www.nwf.org/Garden-for-Wildlife/Certify

International Efforts: CitiesWithNature



- Environmental “facebook”
- Resource sharing hub
- LA = Pioneer City
  - One of the first 100 cities to register

Healthy Soils - Advisory Panel

- LA Sanitation & Environment is working to achieve healthy soil goals
  - LA's Green New Deal (2019 Sustainability pLAn; pg 112).
    - Piloting two healthy soil projects by 2021.
    - Exploring incentives for regenerative agricultural practices, including water conservation.
    - Developing a healthy soil strategy for the City to support urban agriculture, address carbon sequestration, and increase water capture.
    - Amplifying community education campaigns on the benefits of healthy soils, biodiversity, and regenerative agriculture.
- ADVISORY PANEL: LASAN has convened experts to assist with the goals + better integrate soils management into City practices.

6th Street (Photo credit: Jose Lozano)

Photo: Robert Hollingsworth

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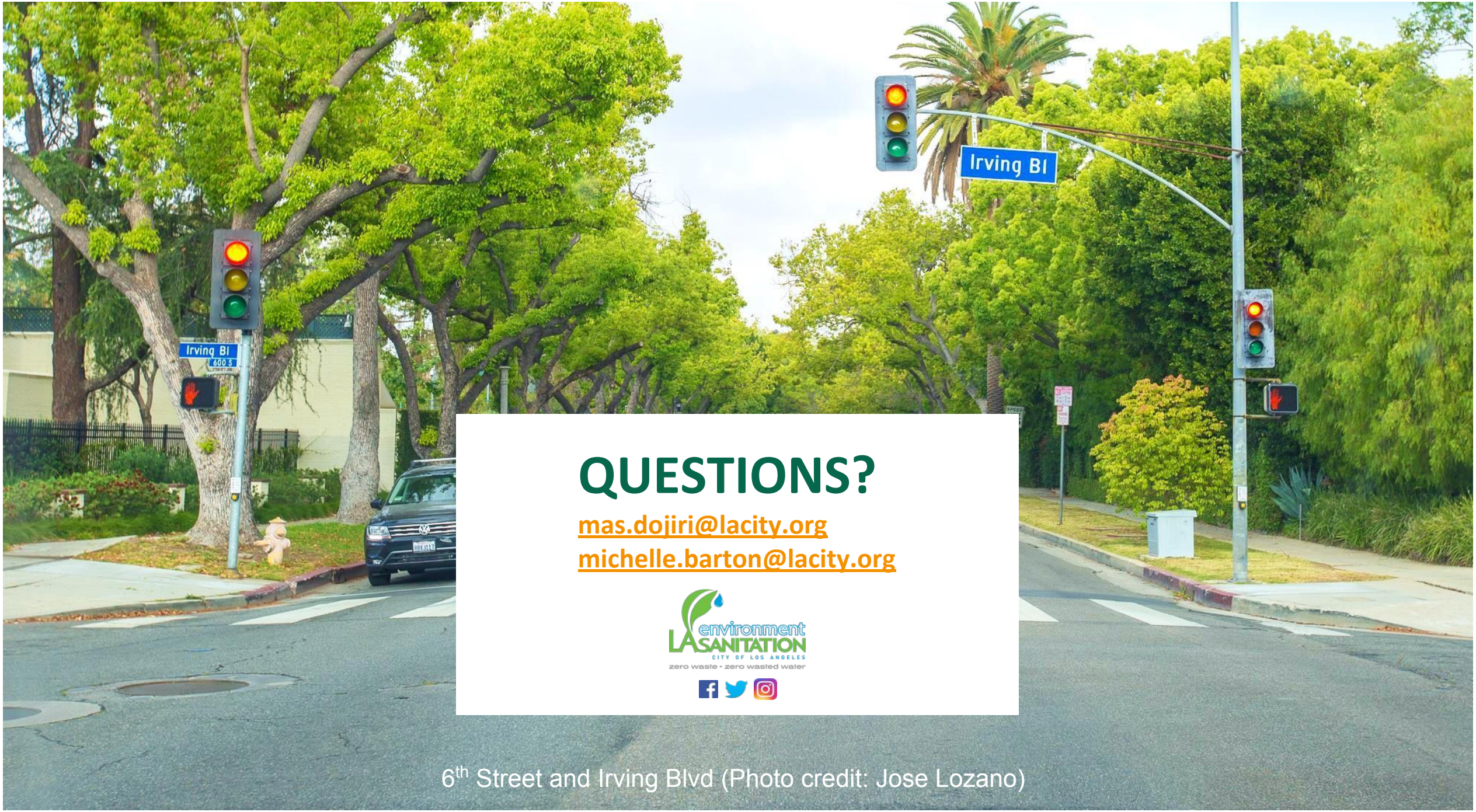
How to Take Action

- Individual actions and projects are important to protect and enhance biodiversity
  - How to take action?
    - Certify your garden via NWF
    - Upload observations to iNaturalist
    - Identify iNaturalist observations
    - Plant natives
    - Use integrated pest management practices
  - All of the above will either help improve scores of individual metrics or provide important data
- Collectively, we can achieve the no-net loss of biodiversity goal



QUESTIONS?

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6th Street and Irving Blvd (Photo credit: Jose Lozano)