

Applying Modern Technology in the Landscape: GIS Mapping

Joy Arden, GIS Specialist



Bayard Cutting Arboretum



Joy Arden

GIS Specialist

M.S. in Sustainability Management and
Environmental Policy
Concentration in GIS

Bayard Cutting Arboretum

Great River, New York



SUFFOLK COUNTY, LONG ISLAND

What is GIS?

(Geographic Informational Systems)

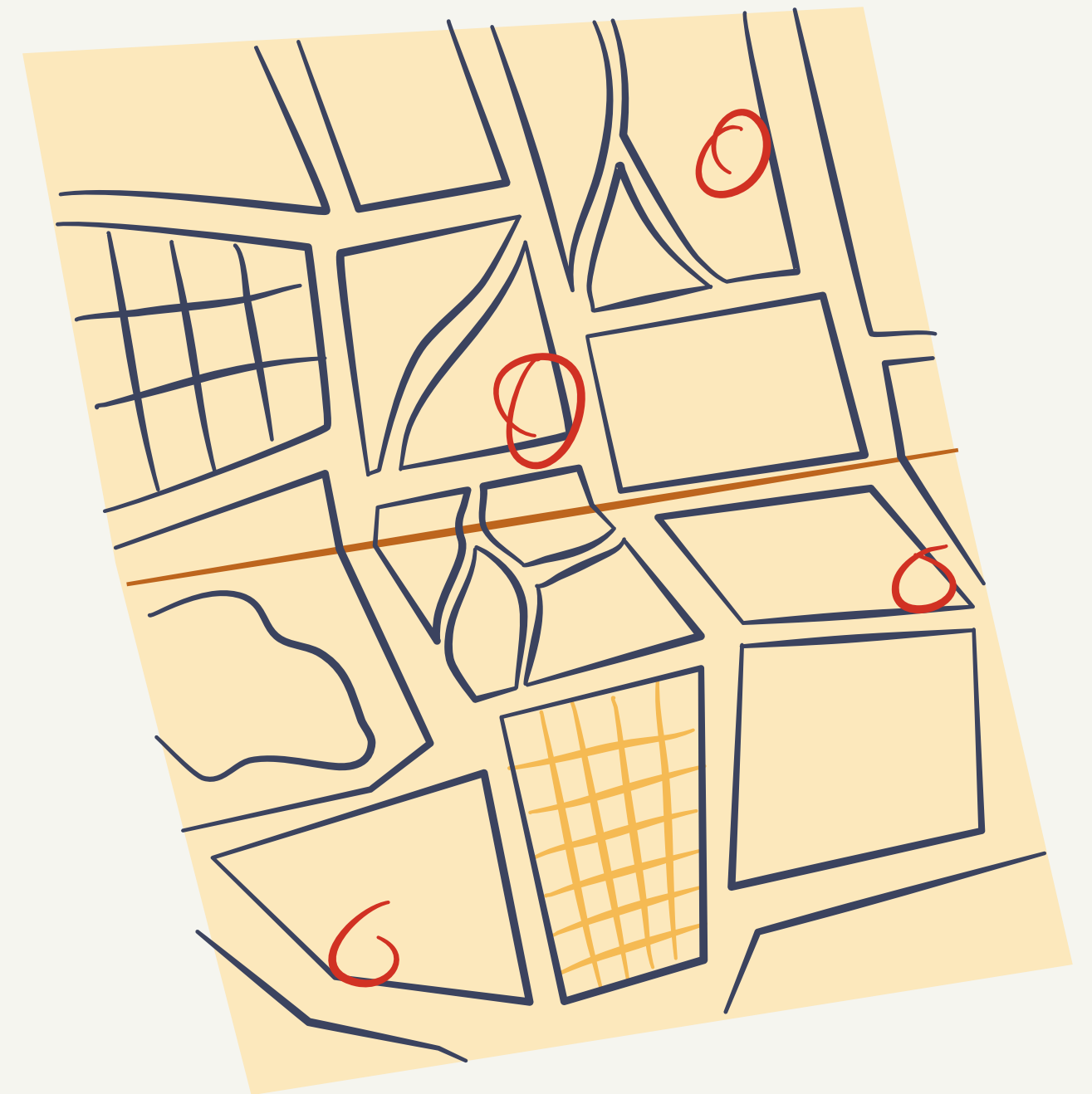


GIS

A geographic information system (GIS) is a system designed to capture, store, manipulate, analyze, manage, and present spatial or geographic data.

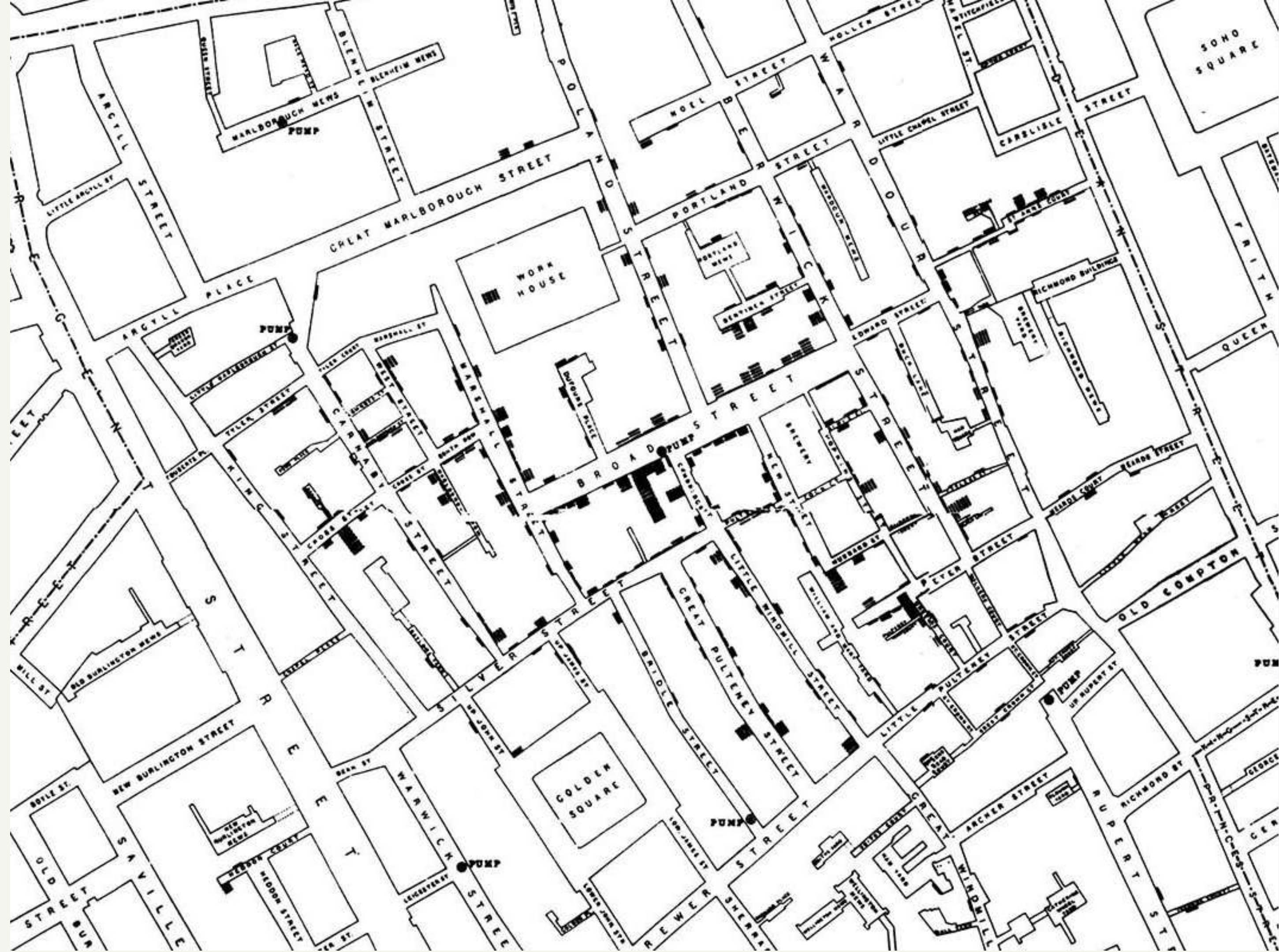
Purpose

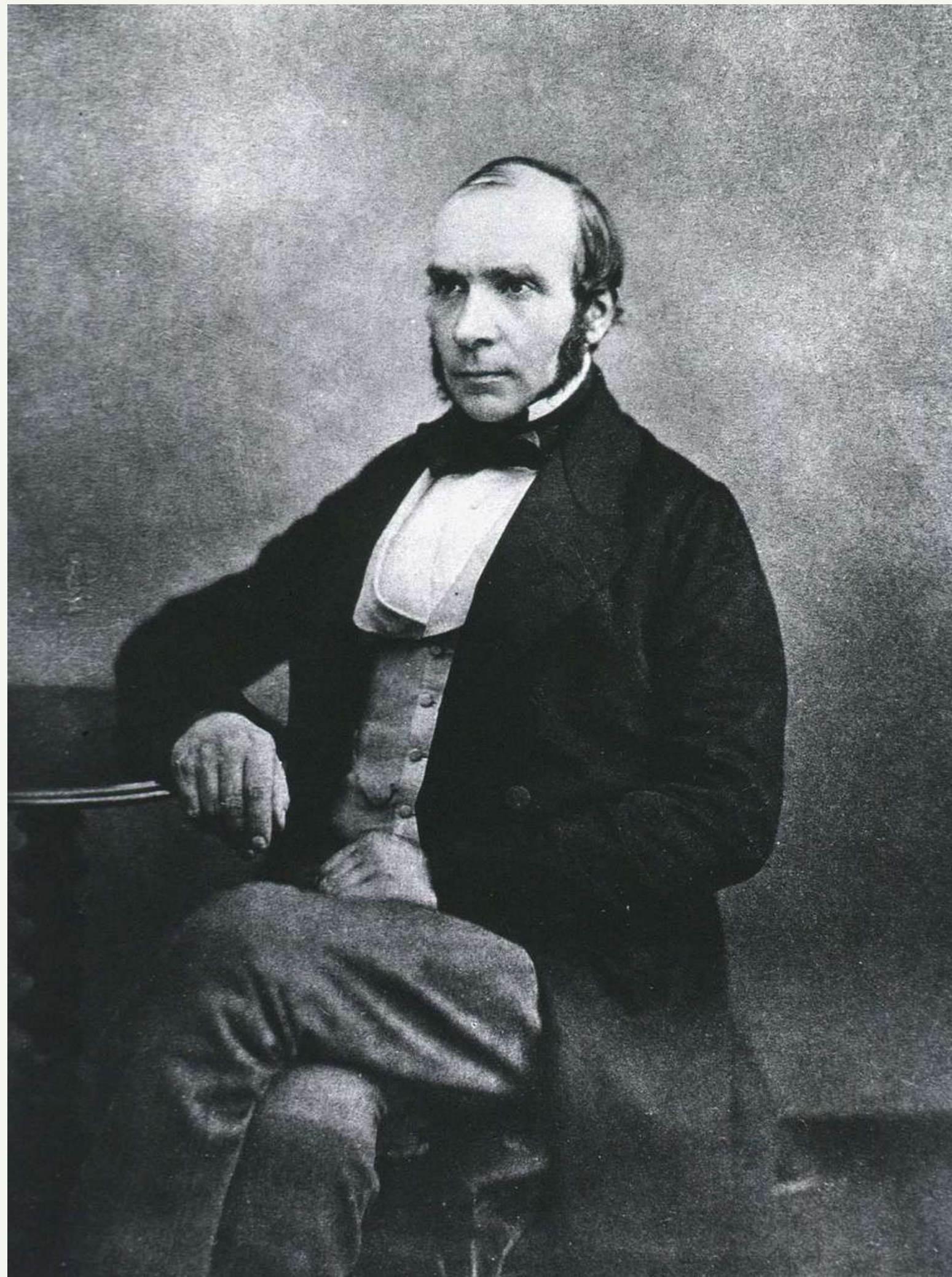
- Creating and using maps
- Compiling geographic data
- Analyze map data
- Sharing and discovering information
- Managing databases visually

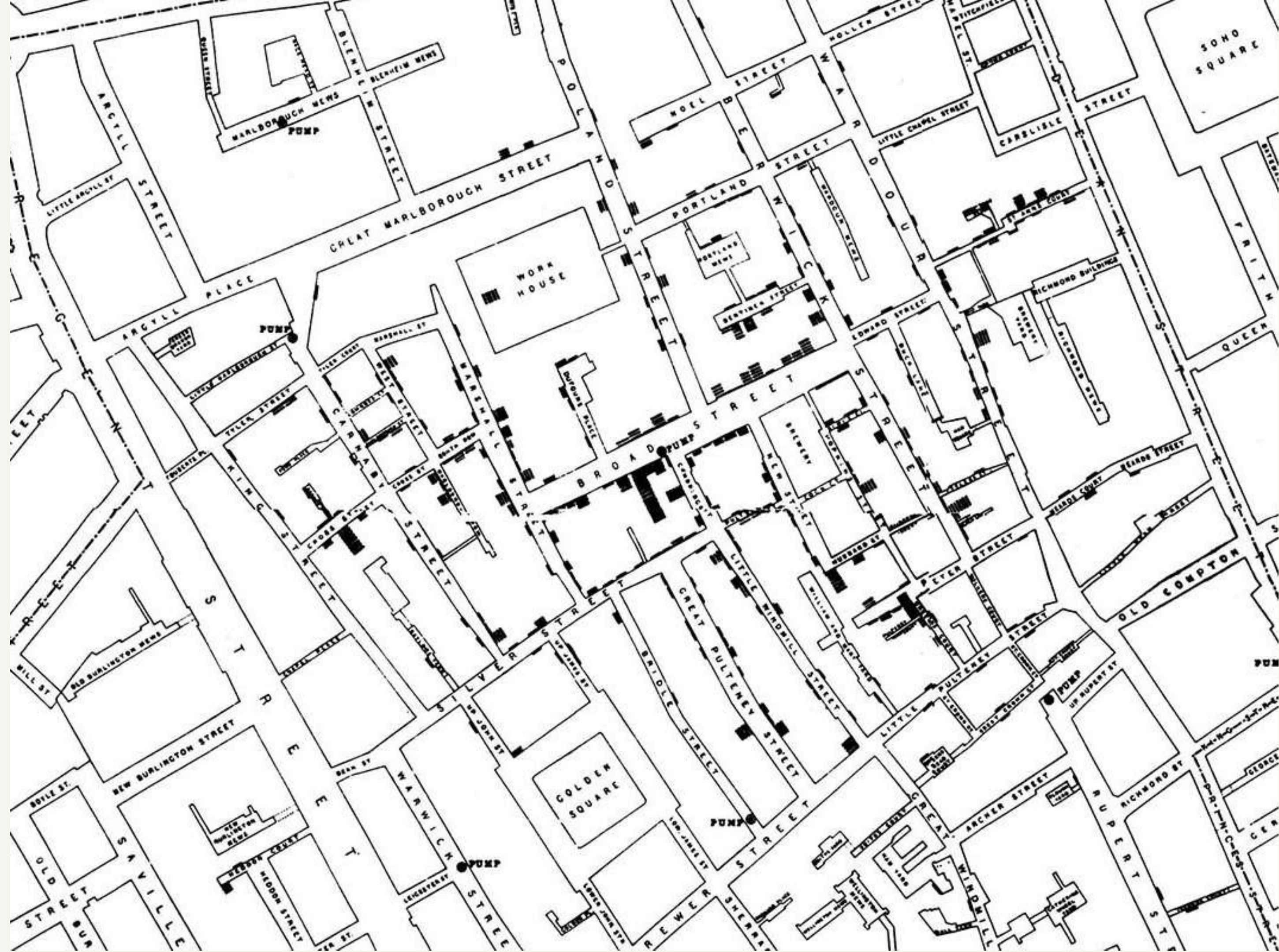


Examples

Historical to Modern Mapping

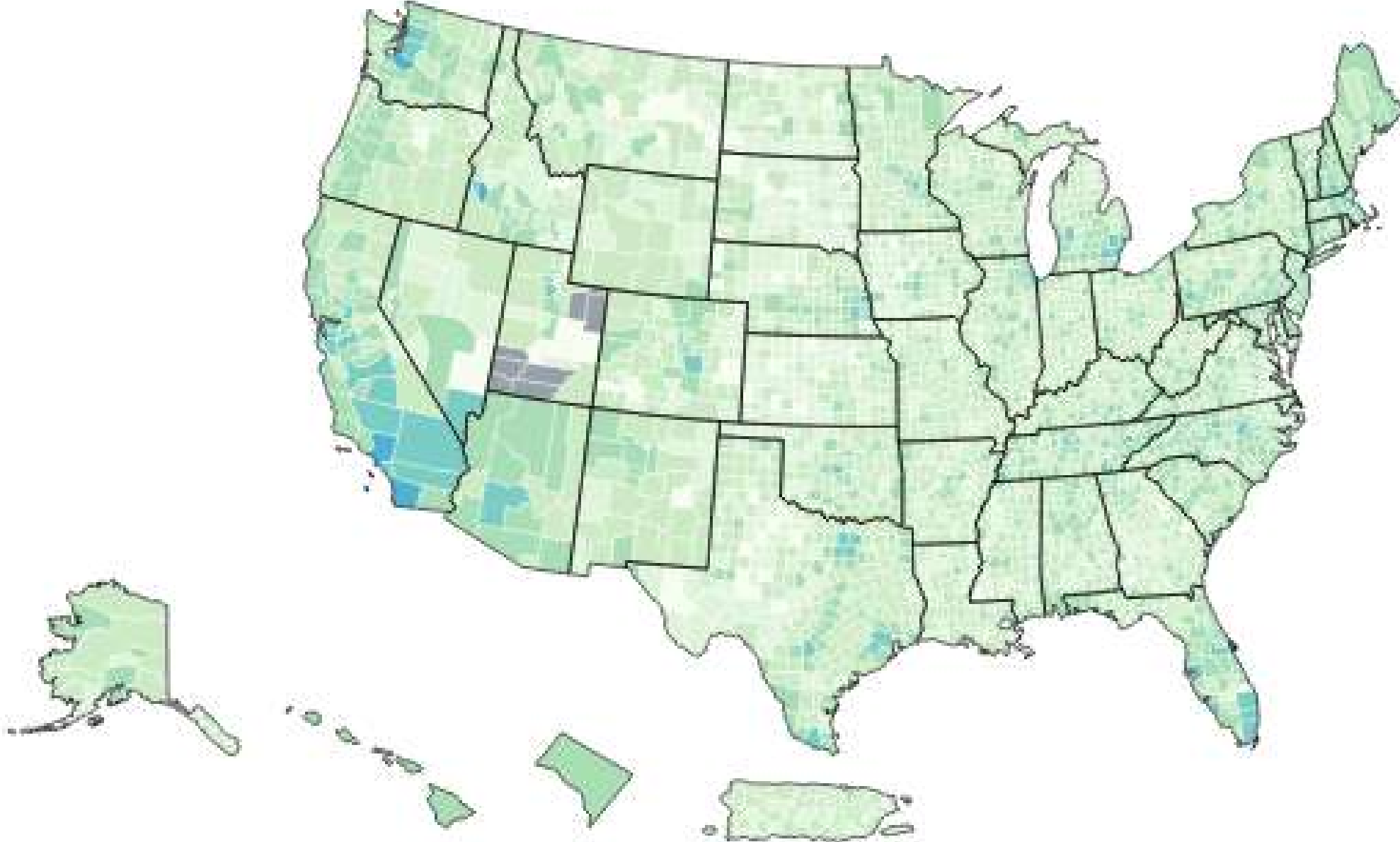








Reported cases of All Counties in US



How far have Russian troops advanced?

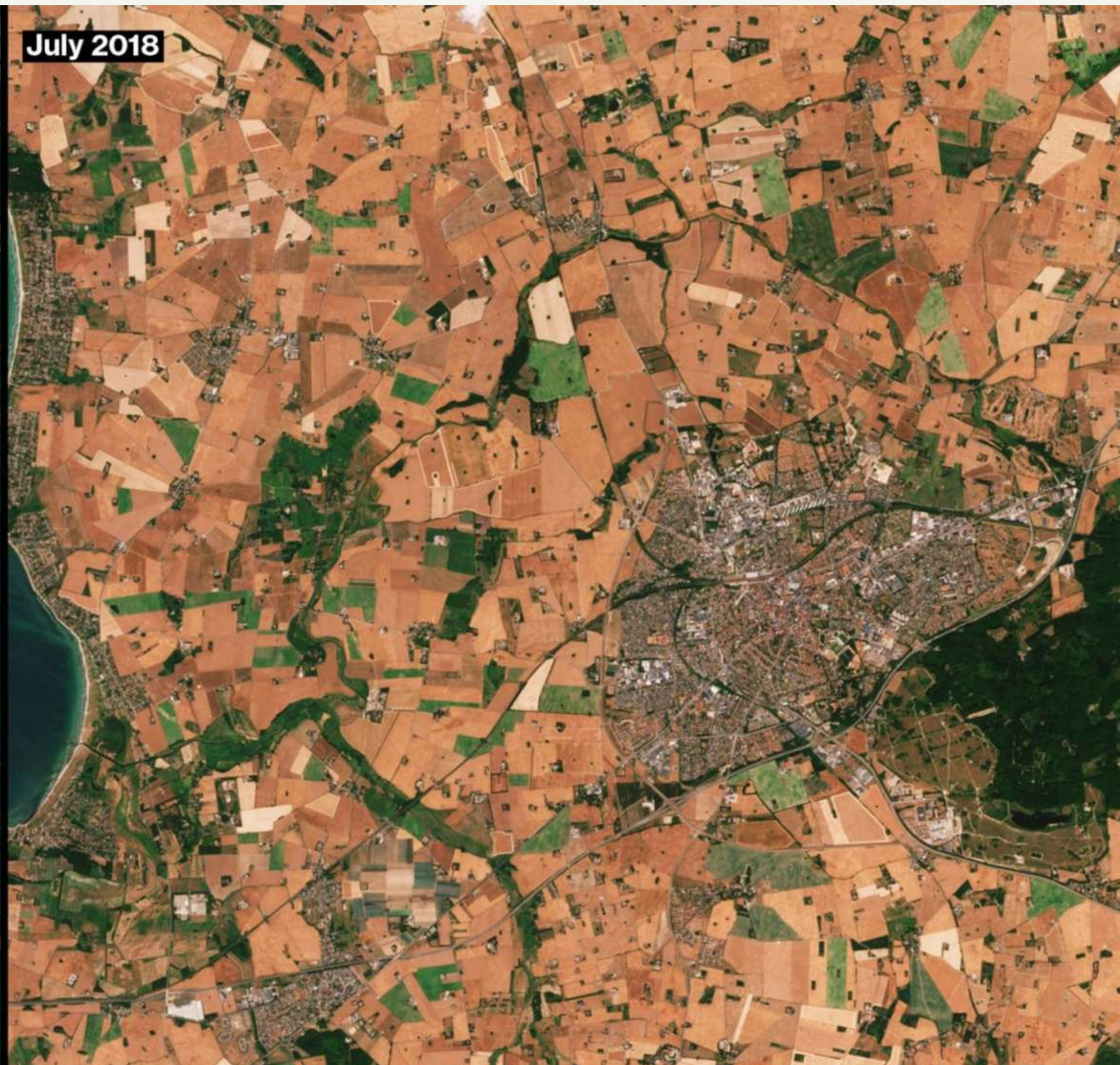


Source: Institute for the Study of War (as of 23:00 GMT, 2 March)



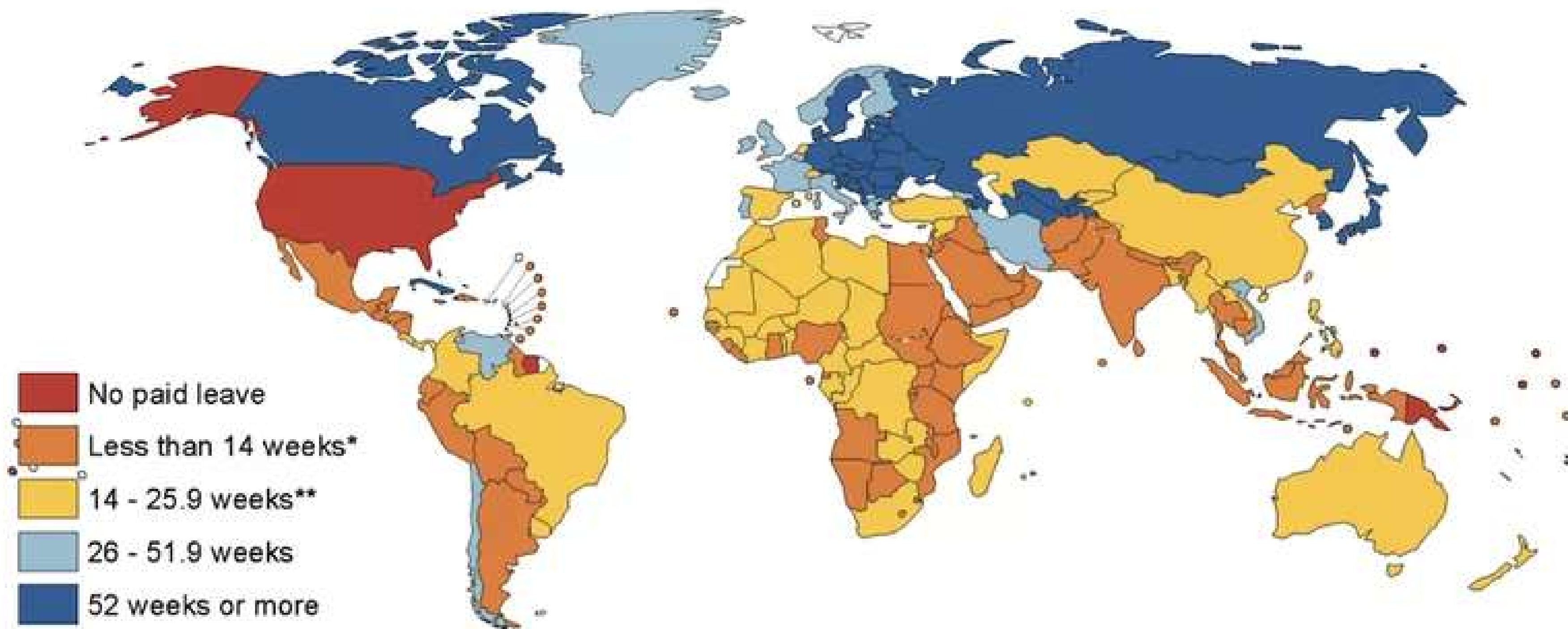


July 2017



July 2018

Is paid leave available for mothers of infants?

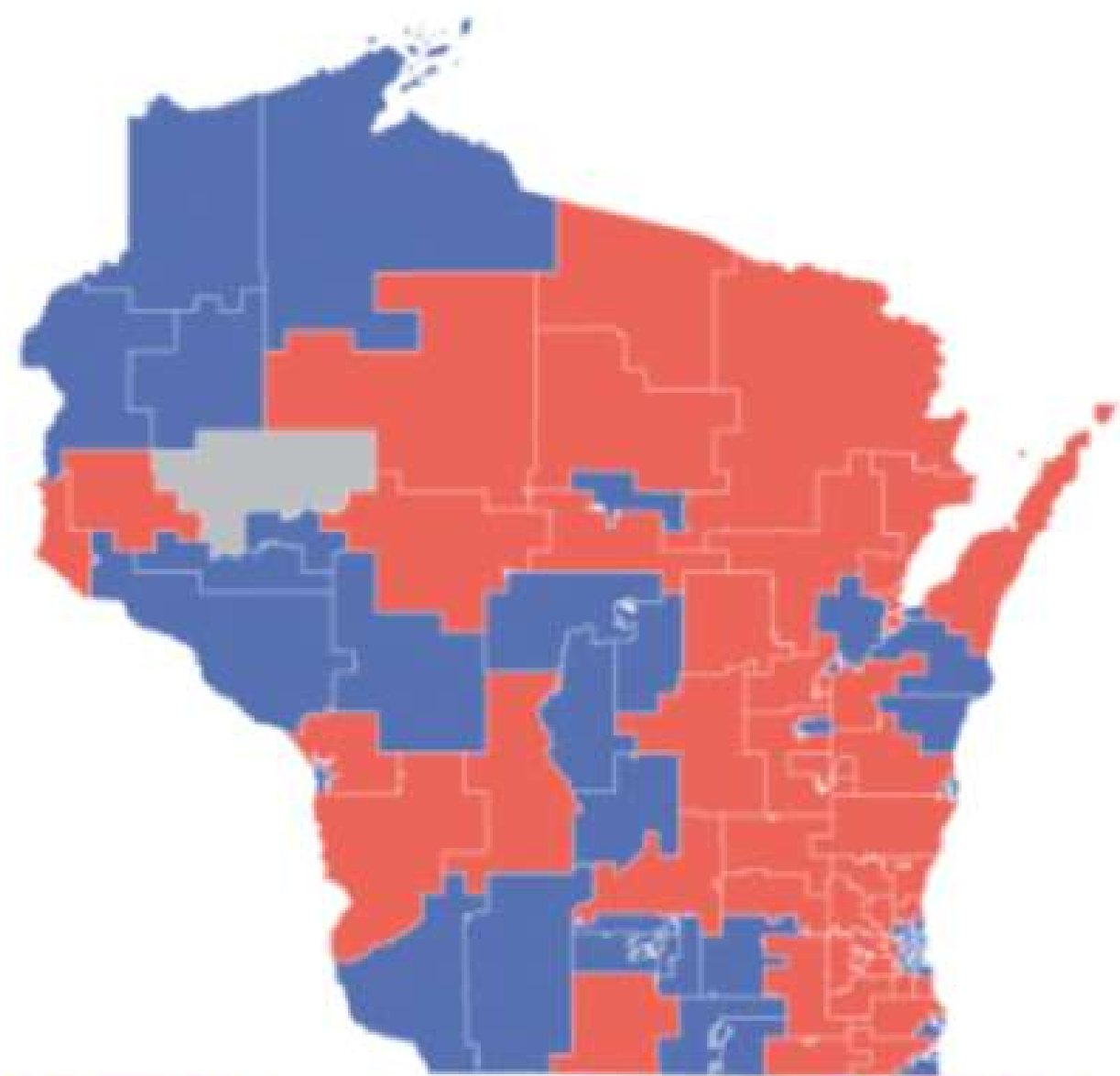


Paid leave for mothers includes both paid maternity leave, which is leave reserved for mothers of infants, and paid parental leave, which is leave available to either parent.

*The International Labor Organization's Maternity Protection Convention (No. 183) states that all countries, regardless of income, should guarantee women a minimum of 14 weeks of paid maternity leave.

**The World Health Organization recommends at least 6 months of exclusive breastfeeding, which is facilitated by paid leave.

Wisconsin District Plan 2008 Election Results

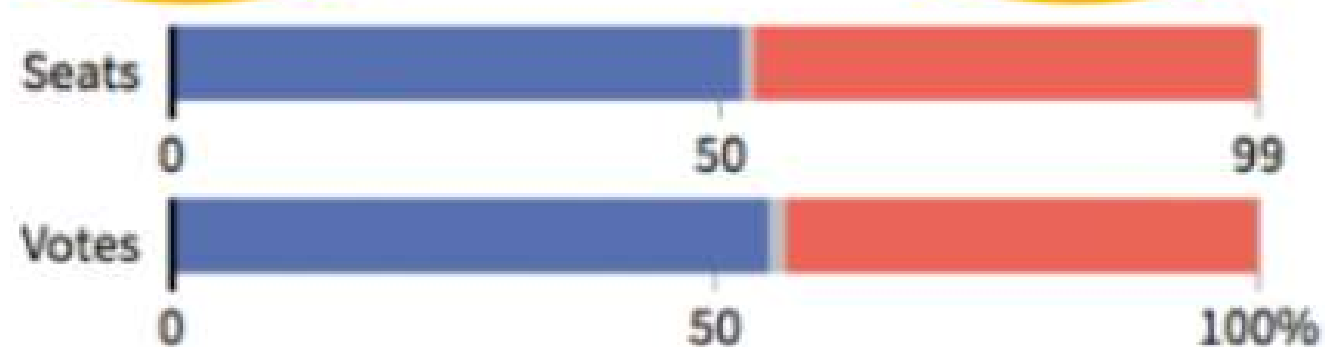


DEMOCRATS

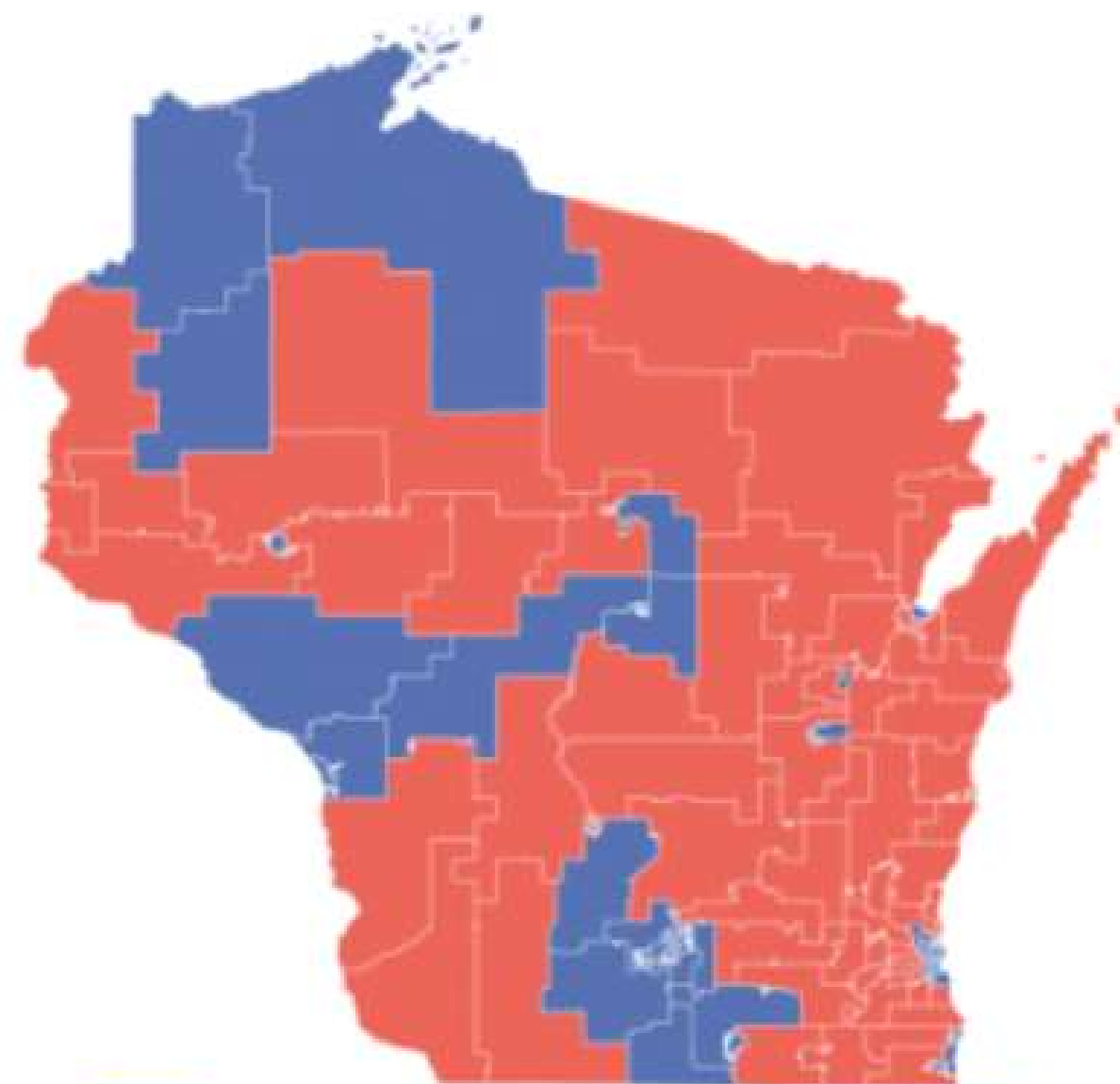
Seats: 52
Votes: 1,478,830

REPUBLICANS

Seats: 46
Votes: 1,172,877



Wisconsin District Plan 2012 Election Results

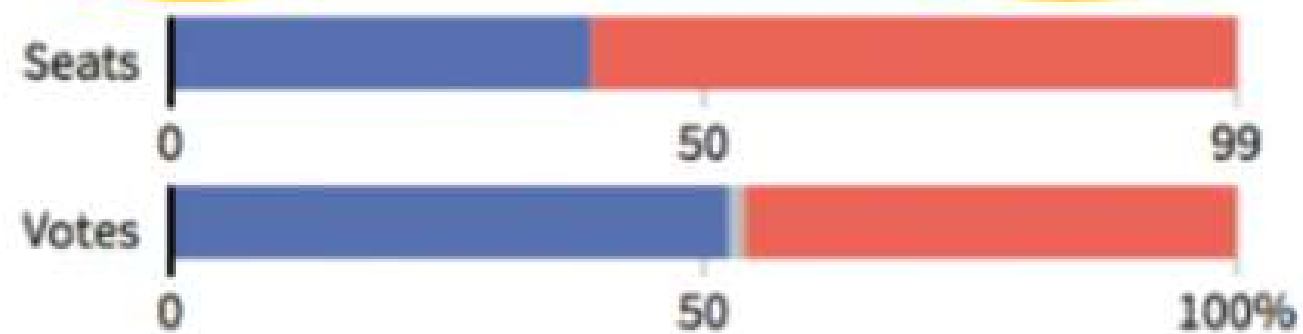


DEMOCRATS

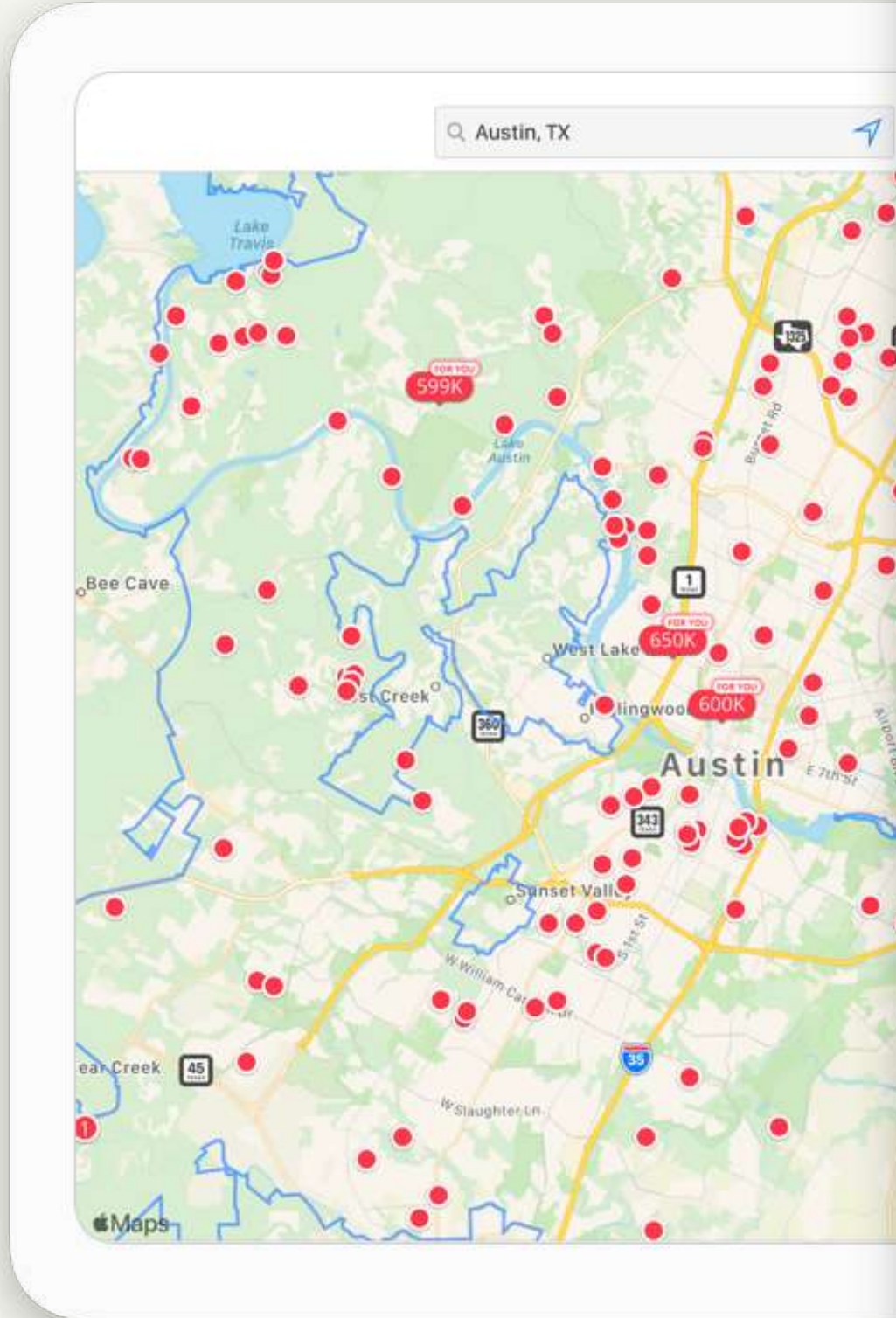
Seats: 39
Votes: 1,417,359

REPUBLICANS

Seats: 60
Votes: 1,249,562







\$429,000 3 bds | 3 ba | 1,986 sqft

1234 Main St, Austin, TX

● House for sale **Zestimate®: \$869,000**

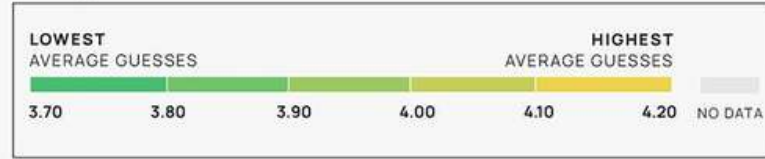
Est. Payment: \$2,437/mo **\$** Get pre-qualified

Contact agent

THE **COUNTRIES** WHICH ARE
the Best at Solving

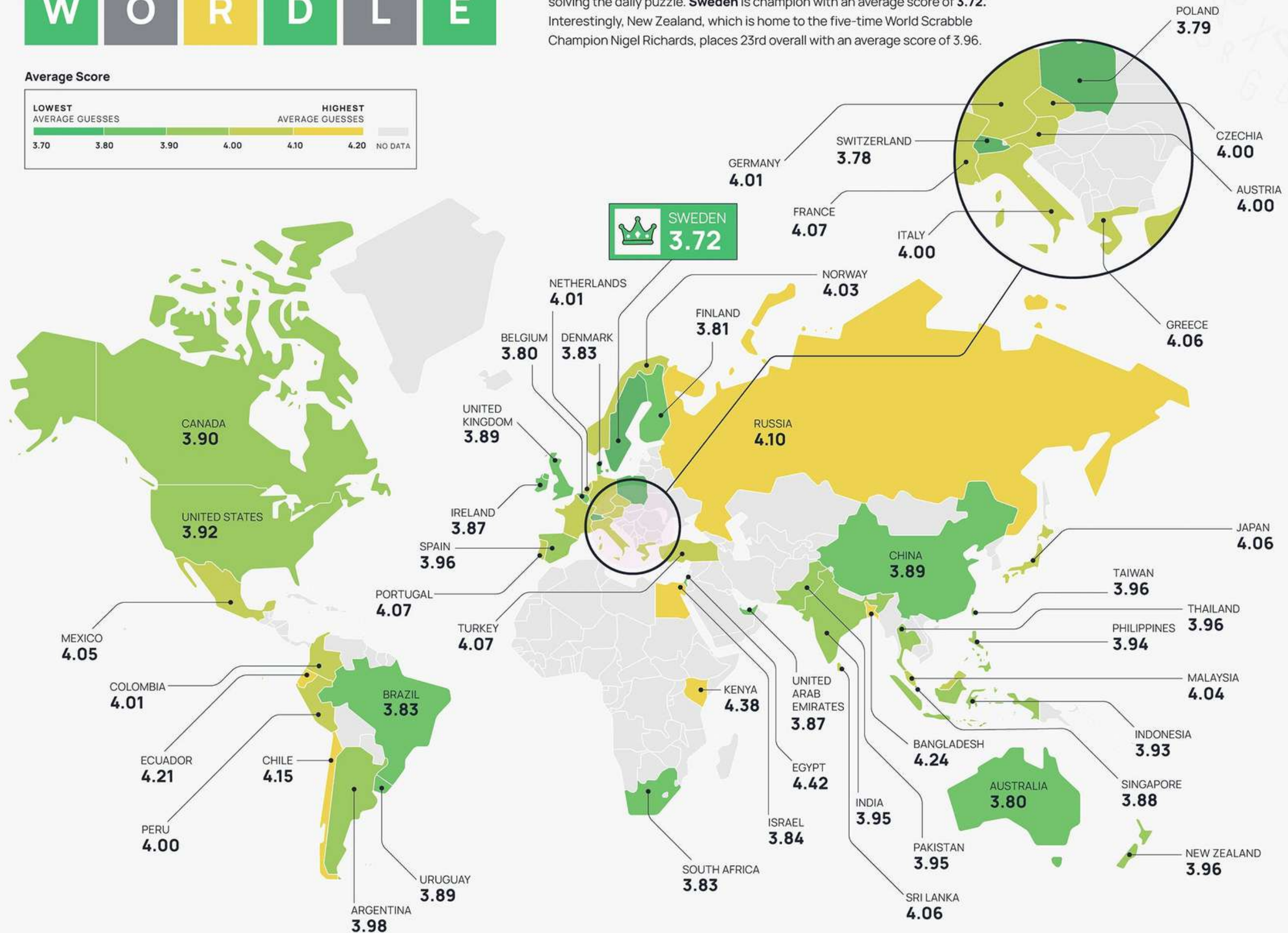


Average Score



People have taken to Twitter to express their frustration with, or humbly brag about, their Wordle scores. Wordle is an online word game that presents players with a mystery five-letter word to figure out each day. With a maximum of six guesses, the letters change color to green or yellow the closer you get to guessing the word correctly.

We analyzed thousands of geotagged tweets to find out where in the world is the best at solving the daily puzzle. **Sweden** is champion with an average score of **3.72**. Interestingly, New Zealand, which is home to the five-time World Scrabble Champion Nigel Richards, places 23rd overall with an average score of 3.96.



AMERICA'S FAVORITE GIRL SCOUT COOKIES BY STATE



Thin Mints®



Caramel deLites® / Samoas®



Peanut Butter Patties® / Tagalongs®



Do-si-dos® / Peanut Butter Sandwich



Lemonades™



Shortbread/Trefoils®



Thanks-A-Lot®



Savannah Smiles®



Trios



Toffee-tastic™

GIS:

Industry Standard

	google maps
	social media
	construction
	landscape management
	renewable energy
parks and recreation	government agencies
disaster relief	DEC, EPA, etc
retail	army, marines etc
agriculture	politics
delivery services	real estate
citizen's science	police enforcement
environmental causes	non-profits
marketing	

GIS Case Study

at Bayard Cutting Arboretum

Purpose

To map BCA's extensive and unique tree collection using modern software and methodologies to ensure a sustainable collection



Process

Historical to Modern Mapping

Historical

121

Ident. No. A 18

Bot. Name Cedrus deodora

Common Name Deodar Cedar

Origin Himalaya

Size 15" (1992) Age or Acquisition Date c 1975

Labeled: Yes No

Condition/Remarks: good - NURSERY DONATED

STATE OF CALIFORNIA
 LAND AND NATURAL RESOURCES
 DEPARTMENT OF REVENUE
 SACRAMENTO, CALIF.

RECEIPT FOR SALE OF LAND

DATE: 11/15/1992

TO: [illegible]

FROM: [illegible]

AMOUNT: [illegible]

REMARKS: [illegible]

DATE: 11/15/1992

TO: [illegible]

FROM: [illegible]

AMOUNT: [illegible]

REMARKS: [illegible]

DATE: 11/15/1992

TO: [illegible]

FROM: [illegible]

AMOUNT: [illegible]

REMARKS: [illegible]

30 October 1947

(Eye Copy)

PINETUM EXTENSION

Trees Planted: 101 - (Autumn 1946 -87)
(Spring 1947 -14)

Obtained from

ABIES (23) (43)

- 7 brachyphylla (homolepis) Kohankie
- * 6 cephaloniae Kingsville Nurseries (6 still needed)
- 3 concolor Kohankie
- 8 firma Kohankie
- 3 nordmanniana Kohankie
- * 4 nordmanniana Kingsville Nurseries
- 3 pettinata (alba) Kohankie
- * 4 pinsapo glauca Kingsville Nurseries
- 5 veitchi Kohankie

CHAMAECYPARIS (6)

- 3 pisifera plumosa Oak Park
- 3 pisifera squarrosa Oak Park

PICEA (19)

- 5 bicolor Kohankie
- 5 omorika Kohankie
- 6 orientalis Kohankie
- 3 wilsoni Farmingdale

(These will be replaced - probably)

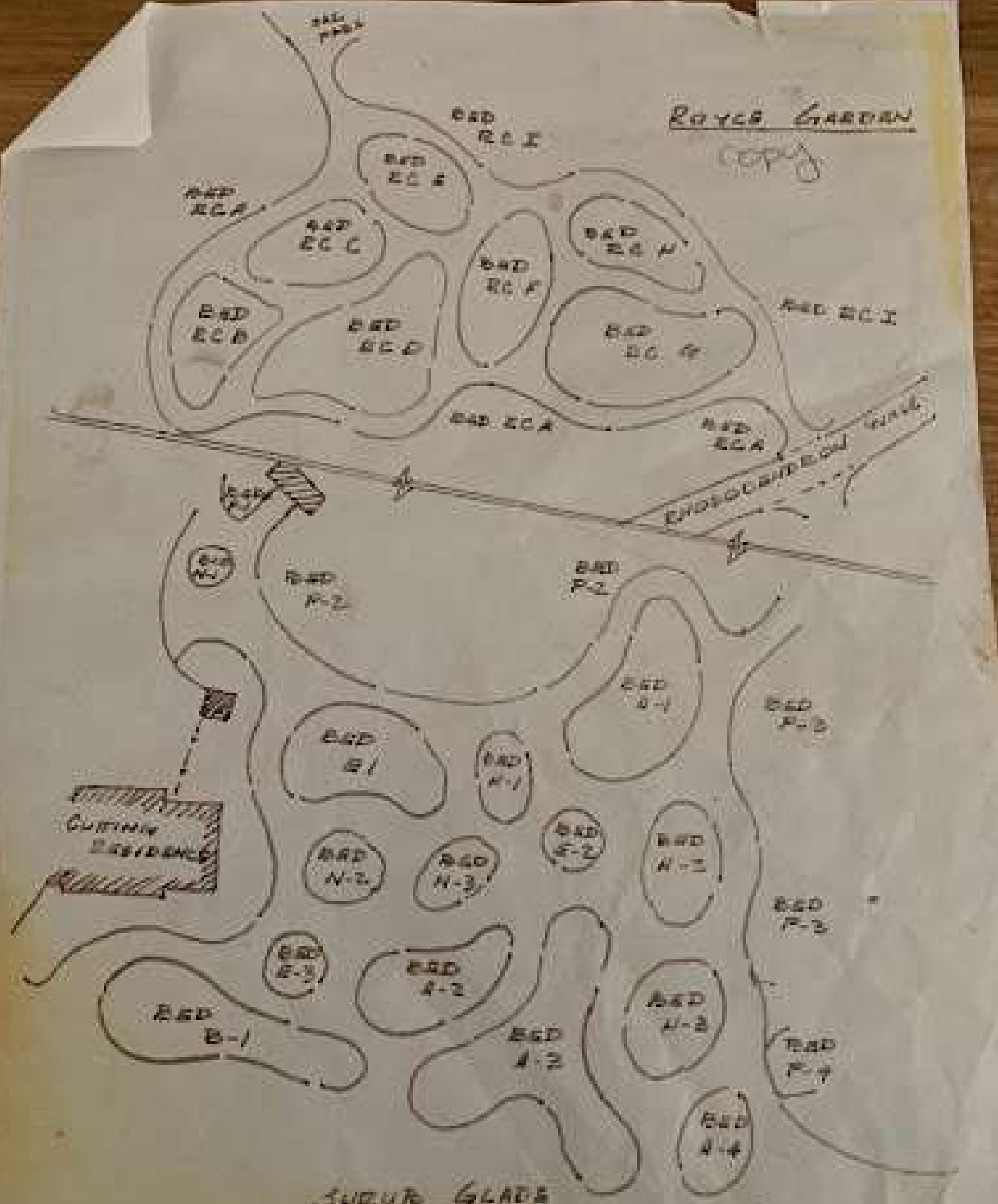
PINUS (18)

- 4 cembra Oak Park
- 6 densiflora Kohankie
- 3 koraiensis Bulk
- 5 thunbergi Oak Park

- Trees Planted Spring 1947)

ROYCE GARDEN

copy



SUGAR GLASS

BED LOCATION

5/12 (over)

By
HICKS NURSERIES
 WESTBURY, N. Y.
 DELIVERED SHIPPED
 Mrs. W. Bayard Cutting,
 Great River, L. I.
 DATE September 22nd, 1920. CANV. PLAT.

Pinetum
HICKS & SON
 HENRY HICKS
 LONG ISLAND, N. Y.

September 21st, 1920

Free	
✓ 1	Taxus cuspidata 3'
✓ 1	" " flat form 2½' wide
✓ 1	" " Hicksii 1'
✓ 1	Torreya uncinata or Tannier
✓ 2	Abies lasiocarpa sub-alpine fir 3'
✓ 1	Juniperus from China collected by Frank Meyer, Agricultural Explorer, U. S. Dept. of Agri.
✓ 1	Pinus koraiensis 1' Korean Mountain Pine
✓ 1	Tsuga diversifolia 3' Japanese Hemlock.

few evergreens we are glad to give to add
 Arboretums of evergreens growing for
 gions from which to bring plants for plant
 s from Korea and Northern China are hardy
 to get pears, plums, peaches, cereals and
 plant breeding here. For instance, the
 open may produce a good flavored pear
 European pear in the hot summers from Long

Very truly yours,

HICKS NURSERIES,

per *Henry Hicks*
J.H.S.

CANVASSES AND PLATFORMS
 RETURN PROMPTLY by Freight or Express
 at our expense.
 MARK SENT BY YOU.

November 16th, 1946

Mr. Halsey B. Knapp, Director
 State Institute of Agriculture
 and Horticulture
 Farmingdale, L.I.
 N.Y.

Dear Mr. Knapp,

My mother, Mrs. Cutting,
 and I appreciate greatly your generous
 gift to our Pinetum of the Picea
 omorika, the Picea jeccensis, and the
 three Picea wilsoni. They look
 extremely well and we shall take great
 pride and pleasure in them, and hope
 that they will thrive here.

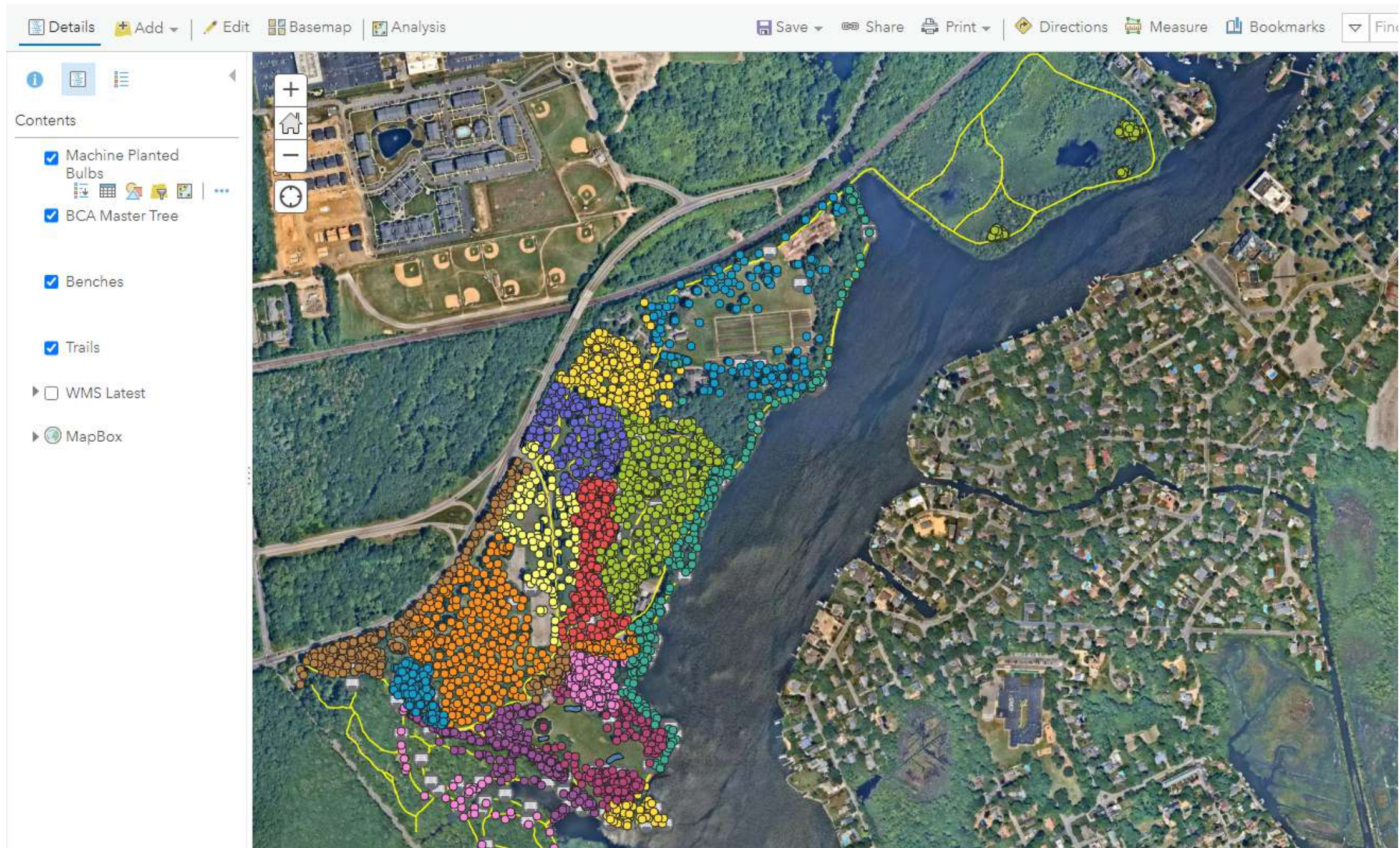
Will you also please thank
 Mr. Lewis, through whose courtesy
 Mr. Sparks obtained these plants.

Thanking you again, I am

Yours sincerely,

(Mrs. Bayard James)

Modern



ArcGIS

Utilizing Software

ESRI SUITE

SATELLITE
IMAGERY

CODING

STORAGE



ArcGIS programs

satellite access, gps,
drones

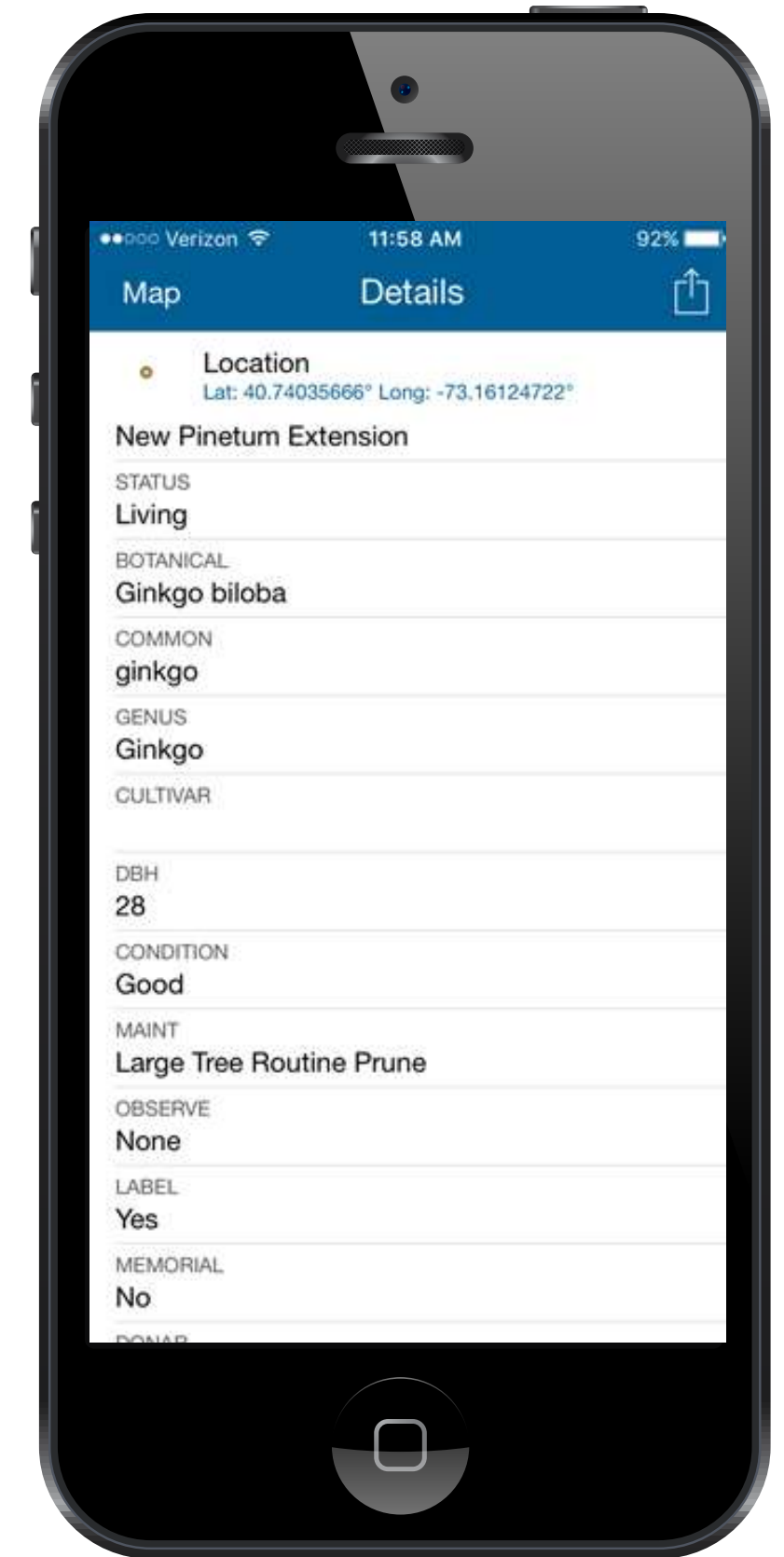
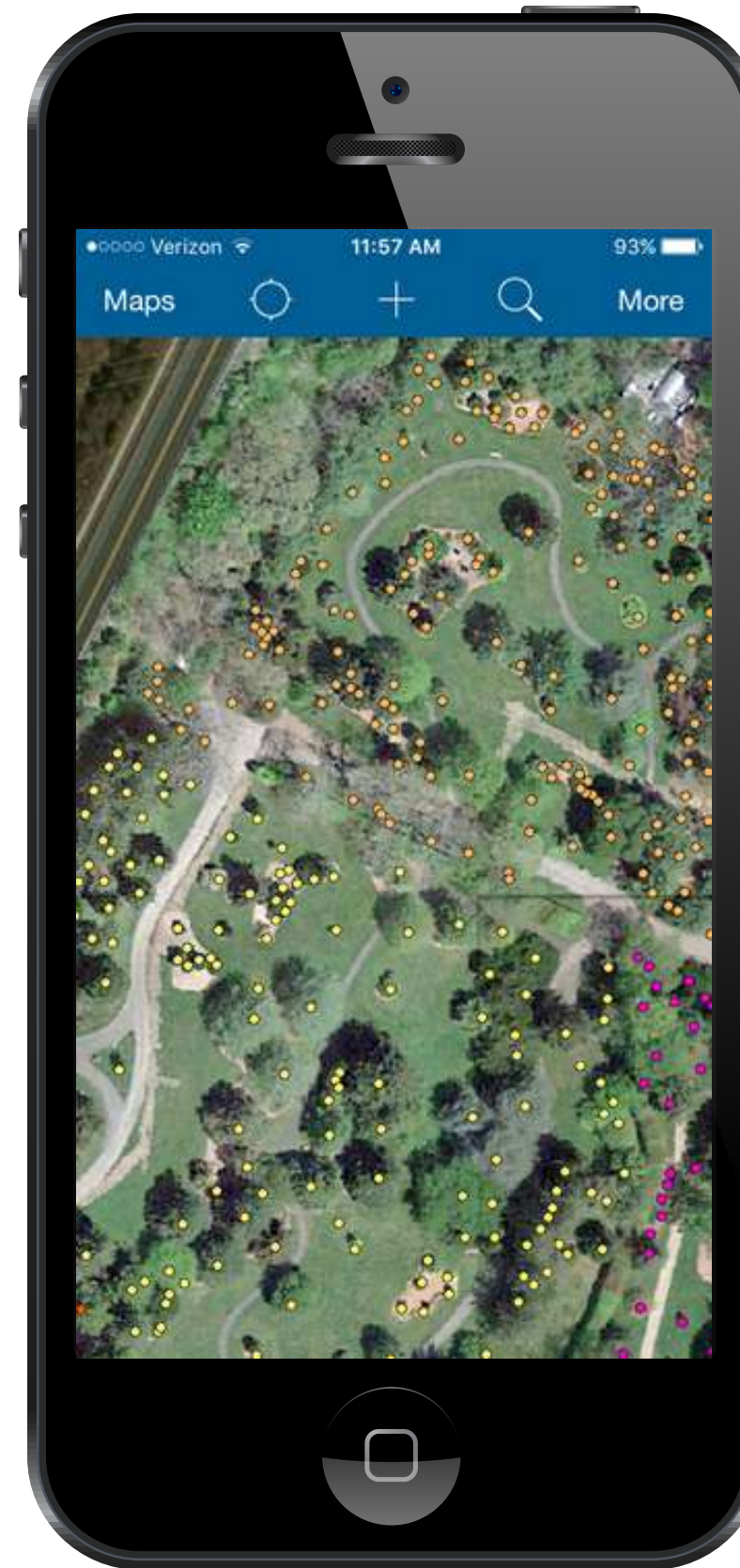
Python, SQL, Javascript,
ArcPy, R spatial, HTML, CSS

databases, servers, cloud
storage



Collecting Data

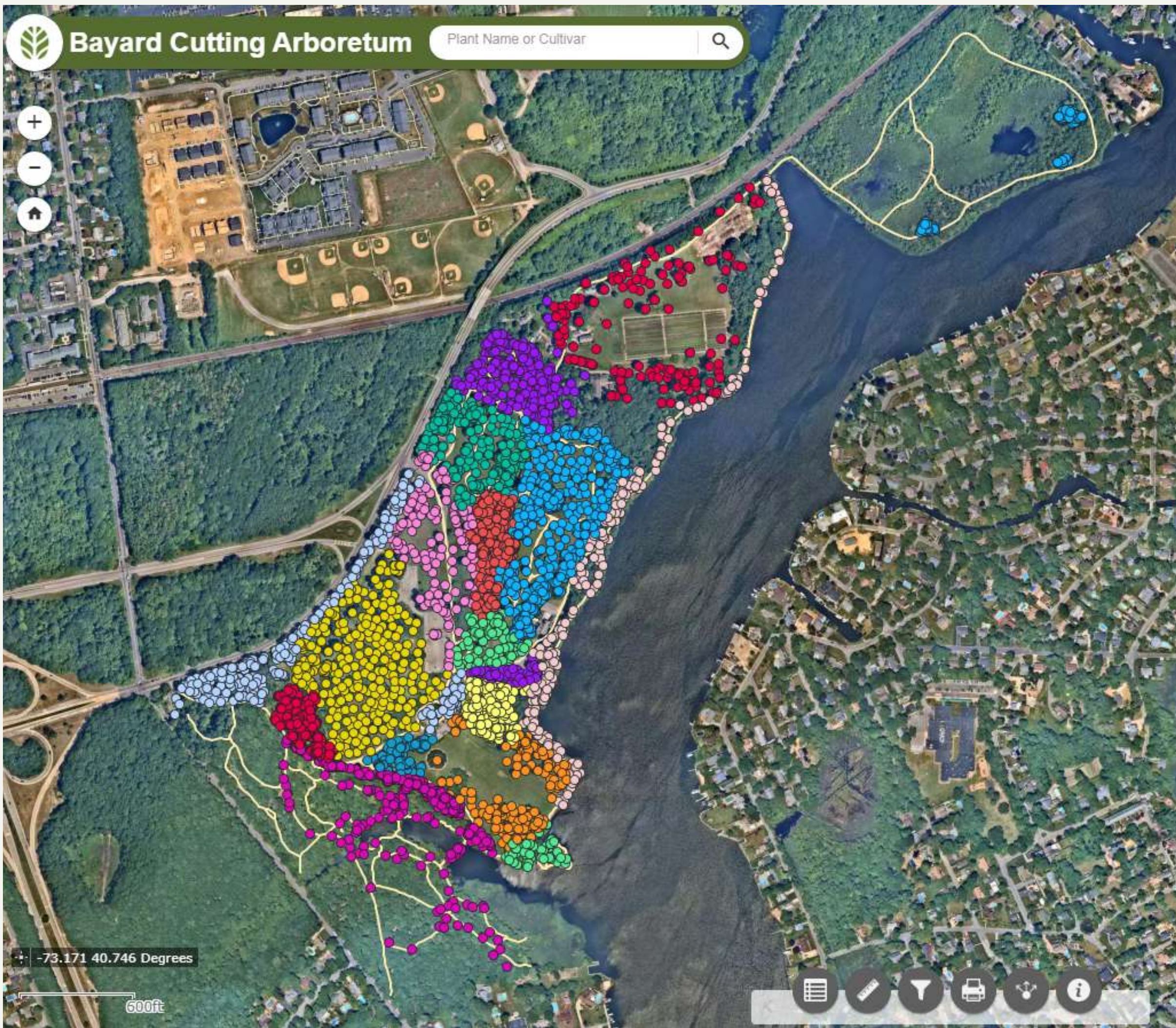
Site	Maintenance
Status	Label (Yes/No)
Accession #	Memorial (Yes/No)
Botanical Name	Donor (name)
Common Name	Donation Date
Genus	Staff Name
Cultivar	Notes
DBH	Acquisition
Condition	Photos/Files



Other Types of Mapping



How to utilize data?



Interactive Tree Explorer

https://bayardcuttingarboretum.com/tree_explorer/



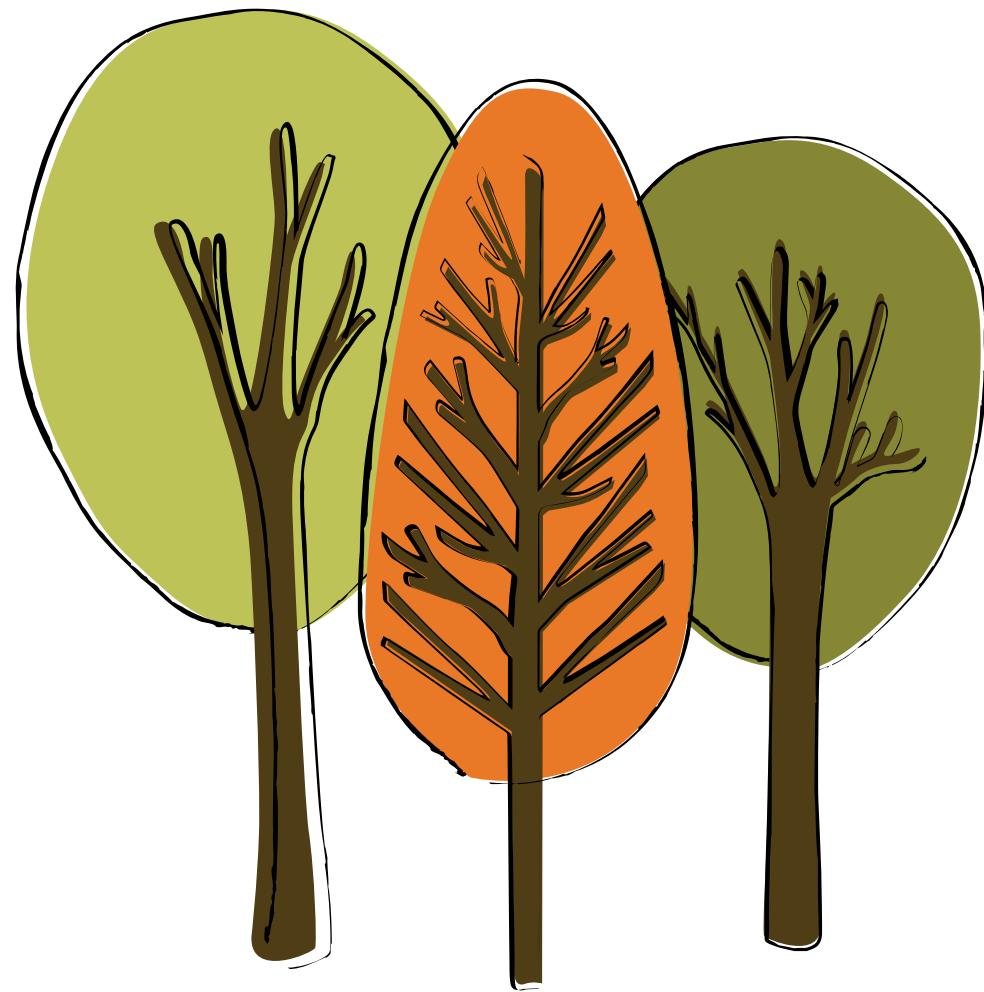
Conifer Garden: *Chamaecyparis pisifera*
'Baby Blue Ice'

ACCESSION 2016-0089
SITE Conifer Garden
BOTANICAL *Chamaecyparis pisifera*
CULTIVAR Baby Blue Ice
COMMON Japanese Falsecypress
DONOR
ACQUISITION 2016
SOURCE Foxborough Nursery

Attachments:
[2016-0089.jpeg](#)

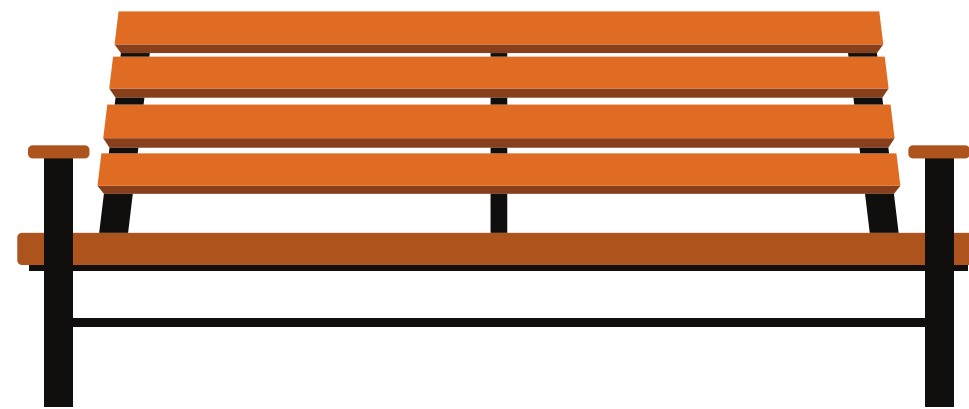
[Zoom to](#)

...



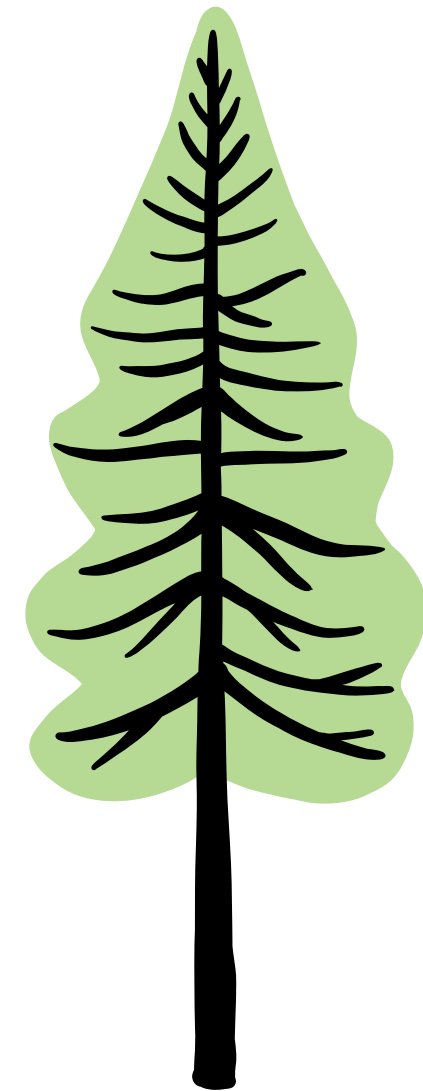
5,732

Total Mapped
Specimens



102

Memorial Benches

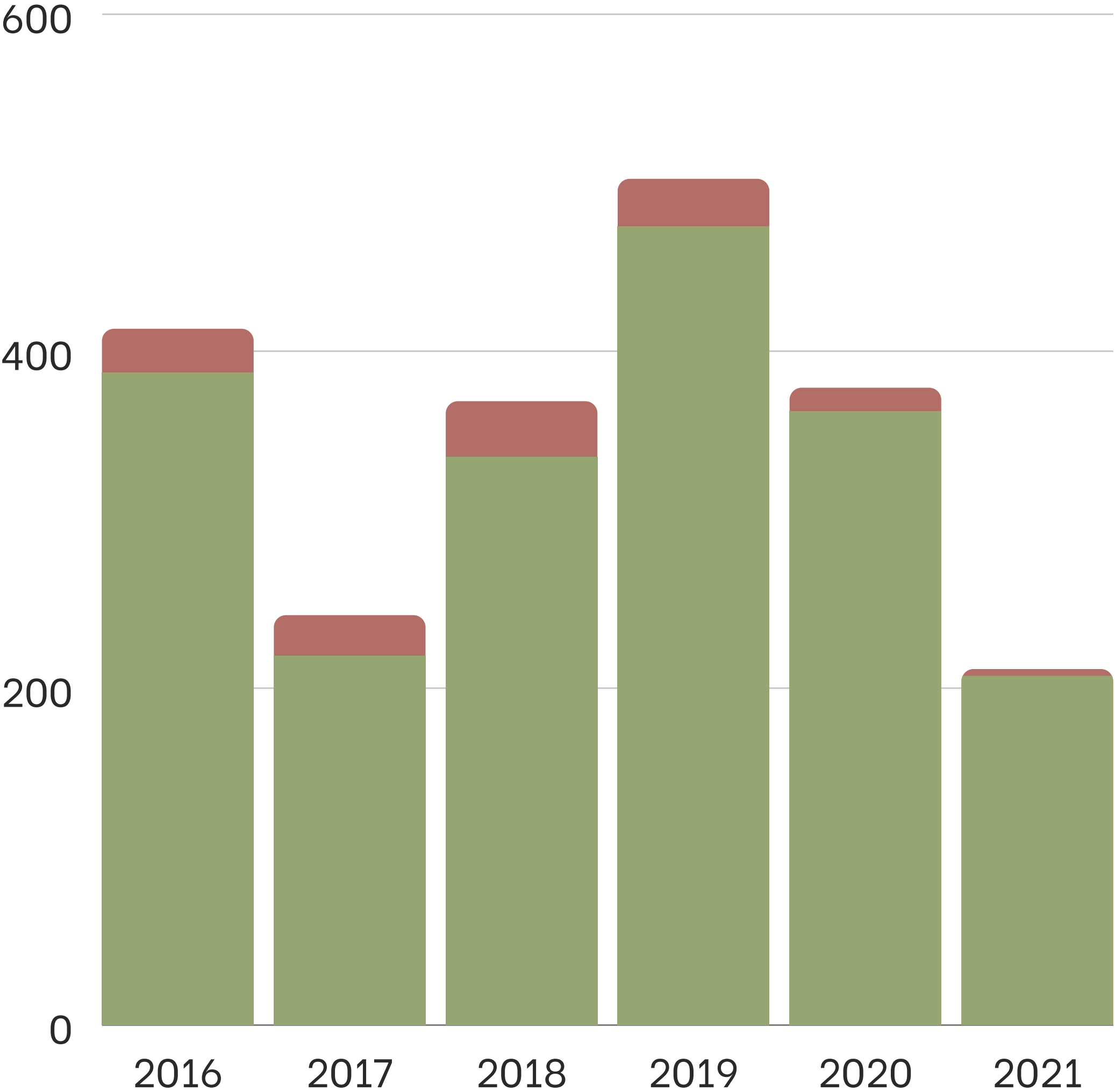


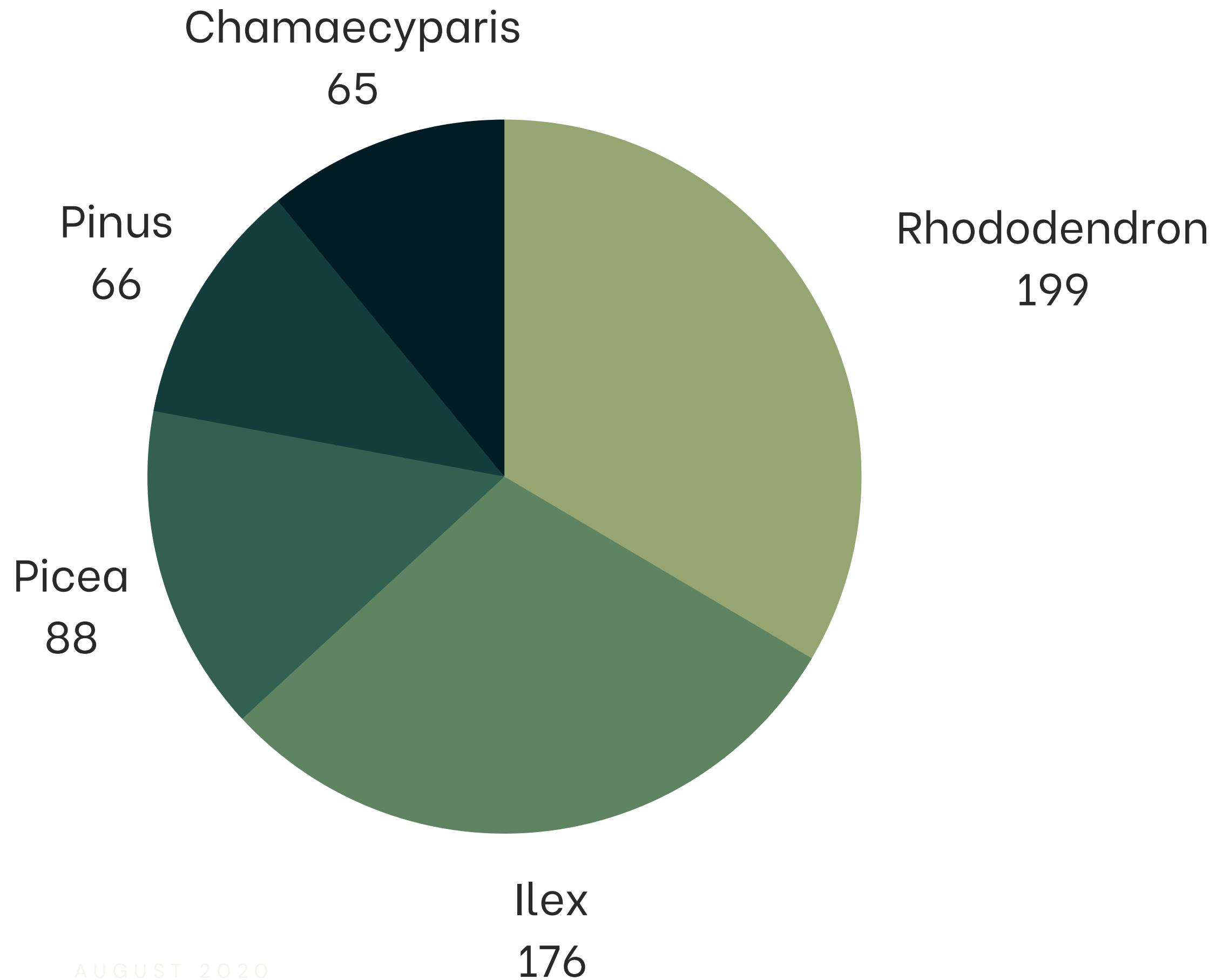
122

Memorial Trees

Additions by Year

Over 2000 additions
with a 6% loss in the
last 6 years





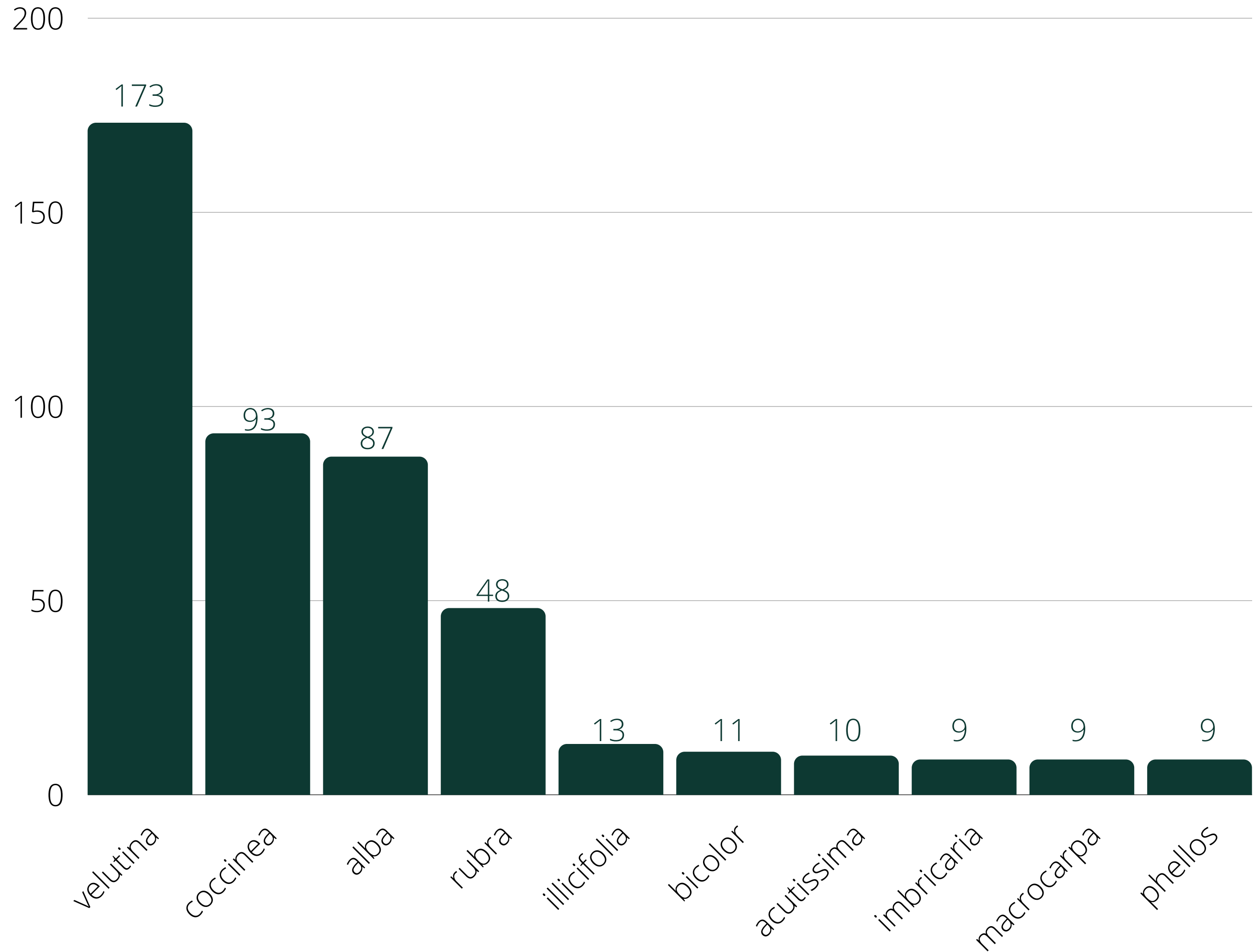
138 Genera

Top 5 largest
collections by
diversity:

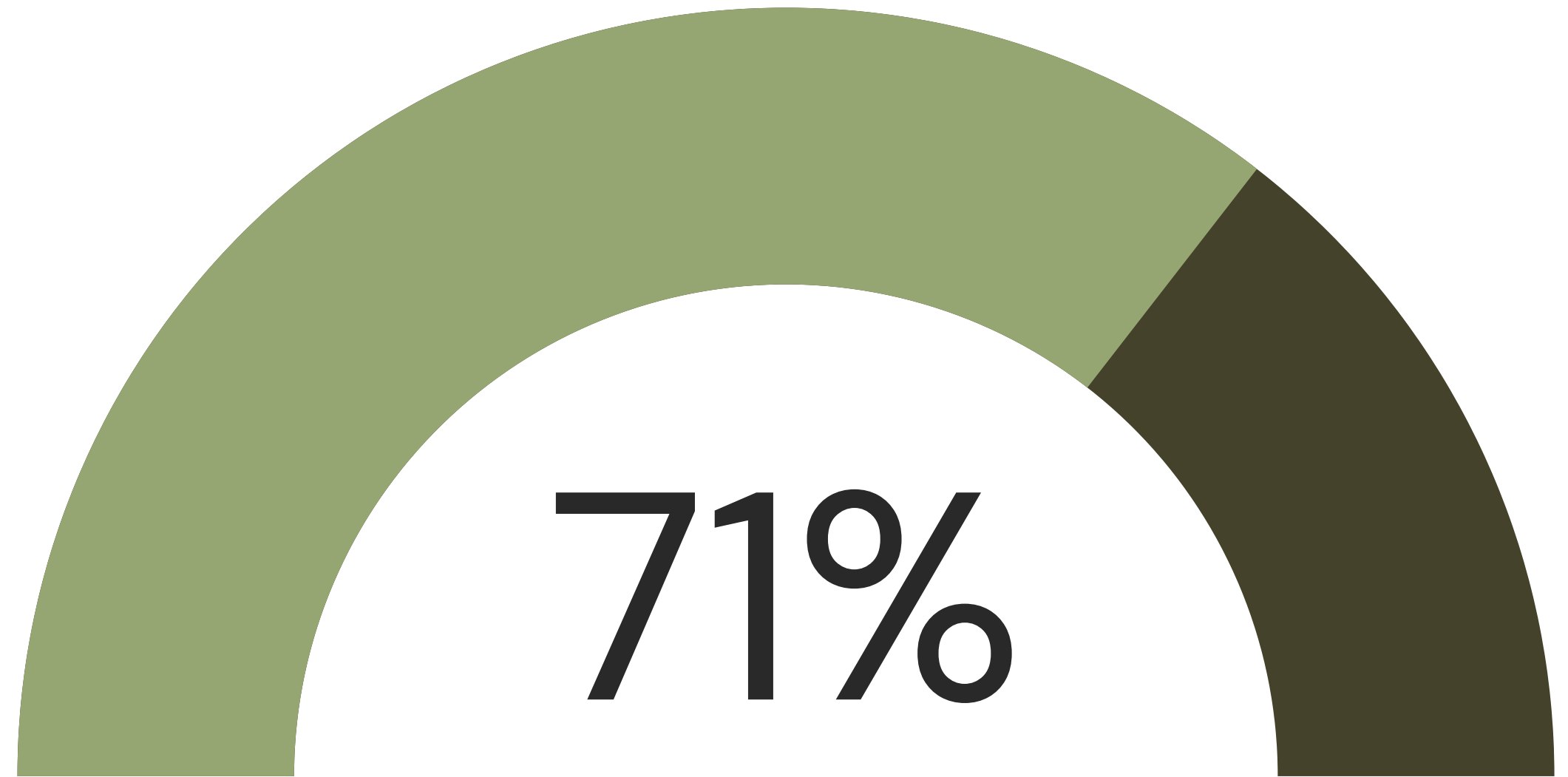
Rhododendron, Ilex,
Picea, Pinus,
Chamaecyparis

Quercus

521 oaks on property
47 unique oaks
39 species



Conifer Garden Labels



specimens are labeled

2016-0065

ILEX

VERTICILLATA

'RED SPRITE'

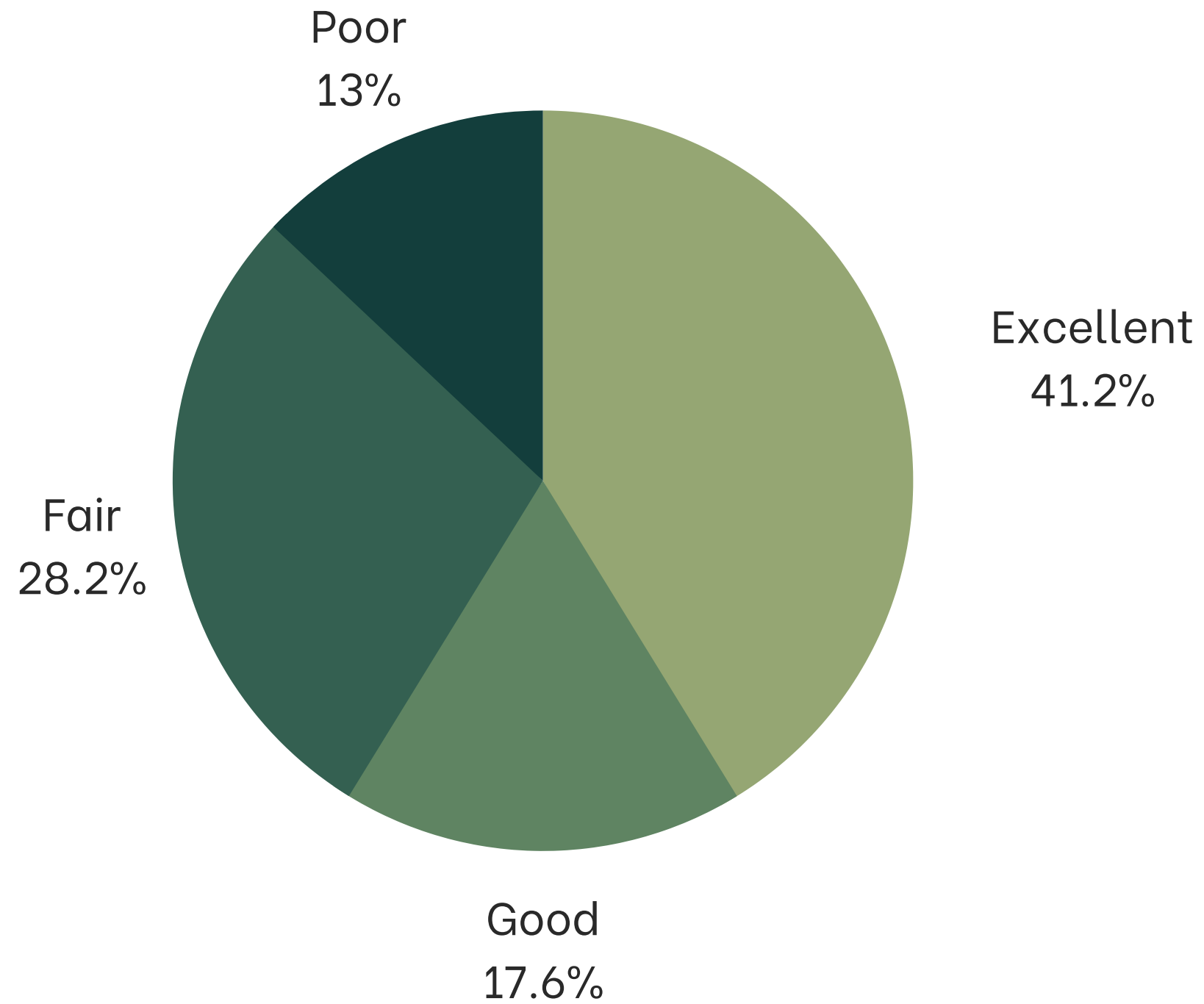
English Oak

Quercus robur

'General Pulaski'

Fagaceae

Bench Condition and Maintenance



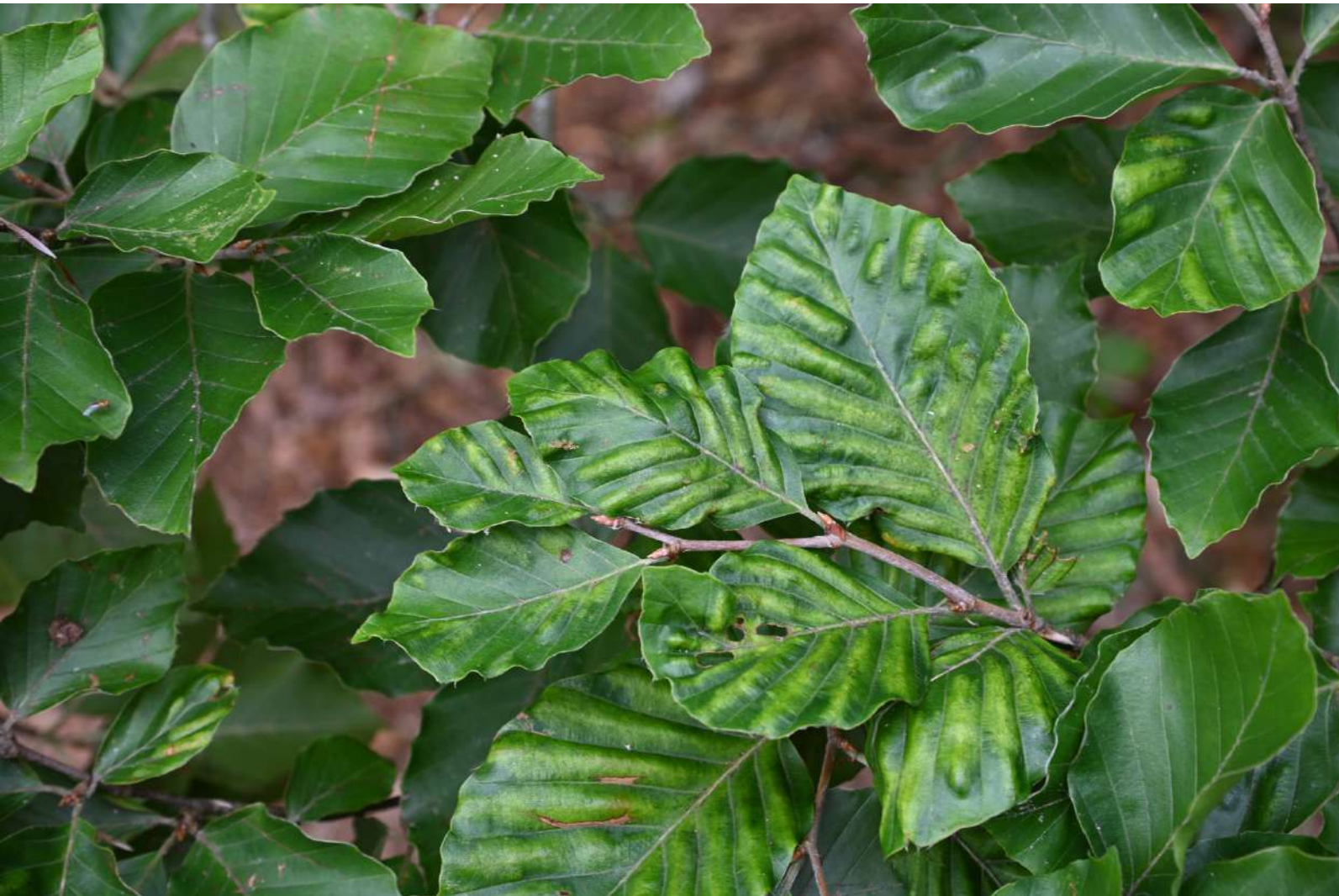
Old Pinetum



1. *Pinus pumila* 'Jeddoloh'
2. *Pinus banksiana* 'Manomet'
3. *Pinus virginiana* 'Wate's Golden'
4. *Hamamelis* 'Jelena'
5. *Picea abies* 'Wartburg'
6. *Hamamelis* 'Amethyst'
7. *Chamaecyparis noot.* 'Green Arrow'
8. *Acer saccharum* 'Monumentale'
9. *Fagus sylvatica* 'Aurea pendula'
10. *Fagus sylvatica* 'Fastigiata'
11. *Cedrus atlantica* 'Aurea Robusta'
12. *Pinus flexilis* 'Pendula'
13. *Cotinus* 'Grace'
14. *Hamamelis* 'Brigit'
15. *Hamamelis* 'February Gold'
16. *Hamamelis* 'Barmstedt Gold'
17. *Hamamelis* 'Sunburst'

Tree Care

Integrated Pest Management



Beech Leaf Disease



Hemlock Woolly Adelgid

Great Lawn: Proposed Daffodil Plots



In Lawn Bulbs



Cornell Extension BioChar Trial

The Red List of Oaks 2020

Christina Carrero, Diana Jerome, Emily Beckman, Amy Byrne, Allen J. Coombes, Min Deng, Antonio González Rodríguez, Hoang Van Sam, Eyen Khoo, Ngoc Nguyen, Iyan Robiansyah, Hernando Rodríguez Correa, Julia Sang, Yi-Gang Song, Joeri Strijk, John Sugau, Weibang Sun, Susana Valencia-Avalos and Murphy Westwood



**AMERICAN
CONIFER SOCIETY**



**BOTANIC
GARDENS
CONSERVATION
INTERNATIONAL**



**American
Public Gardens
Association**

PublicGardens.org



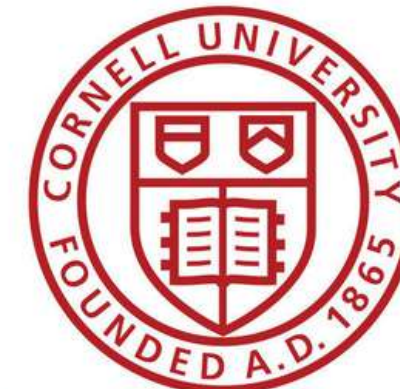
Holly Society of America

• ESTABLISHED 1947 •



**NEW YORK
STATE OF
OPPORTUNITY.**

**Parks, Recreation
and Historic
Preservation**



**Cornell University
Cooperative Extension**

Bayard Cutting Arboretum: Paradise Island



DEC GRANT:
Southern Pine
Beetle
Restoration



American Conifer Society Grant & Reference Garden



Key Stats

December 2021

2144

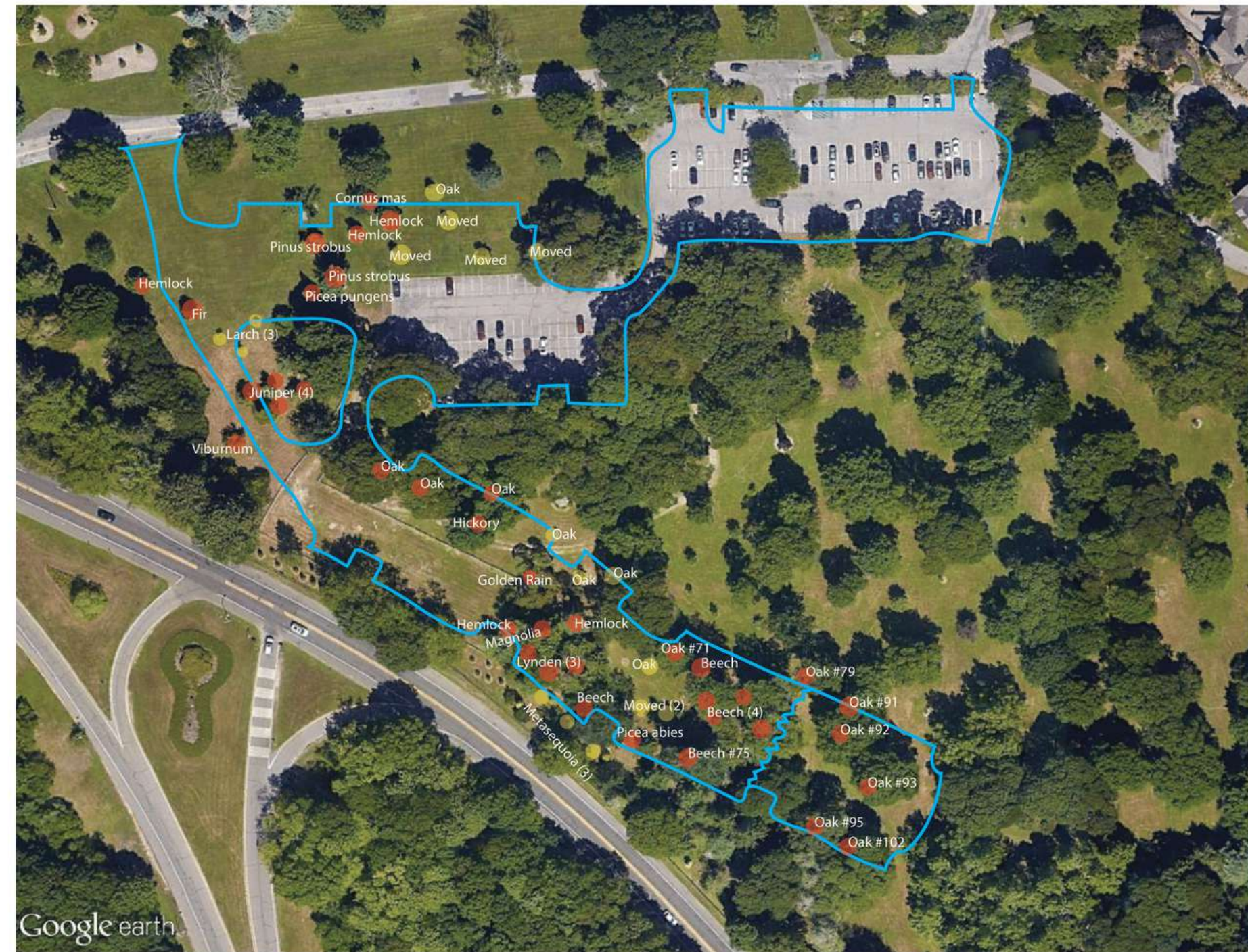
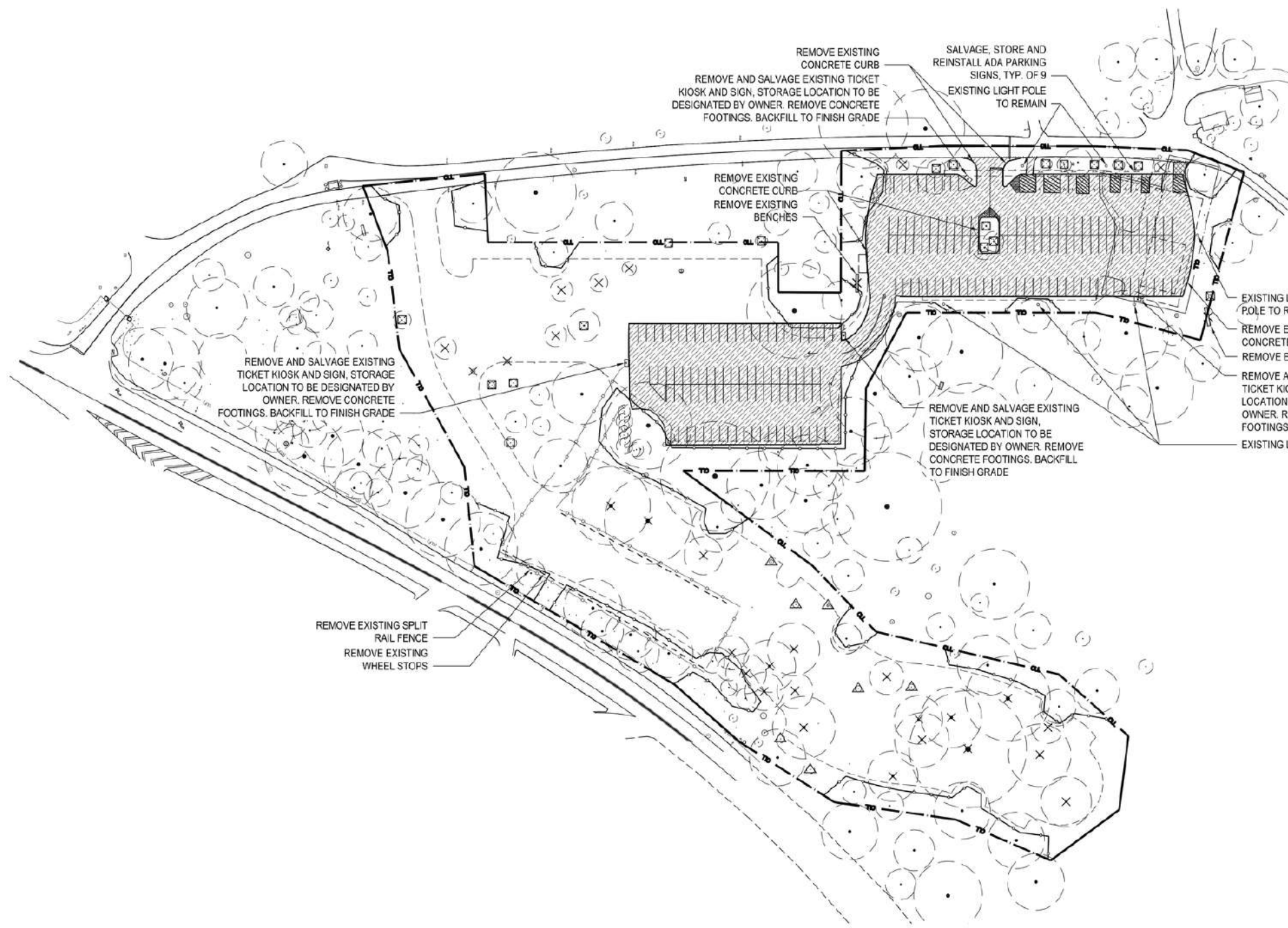
arboreta worldwide in
the Morton Register

496

arboreta accredited
globally

35 countries
with accredited
arboreta

Level I – 270 arboreta
Level II – 151 arboreta
Level III – 39 arboreta
Level IV – 36 arboreta



Capital Projects



Exciting Upcoming Projects



Collaboration





Thank You

joy.arden@parks.ny.gov