

Bur Oak Blight Presence and Susceptibility at the Arboretum

Madeline Esterl

What is BOB?

- Foliar disease caused by *Tubakia iowensis*
- Spores dispersed by wind and rain
- Affects only *Quercus macrocarpa*
- More susceptibility in certain trees
 - *Quercus macrocarpa* var. *oliviformis*
 - Upland sites
 - High precipitation



Round acorn



Olive acorn

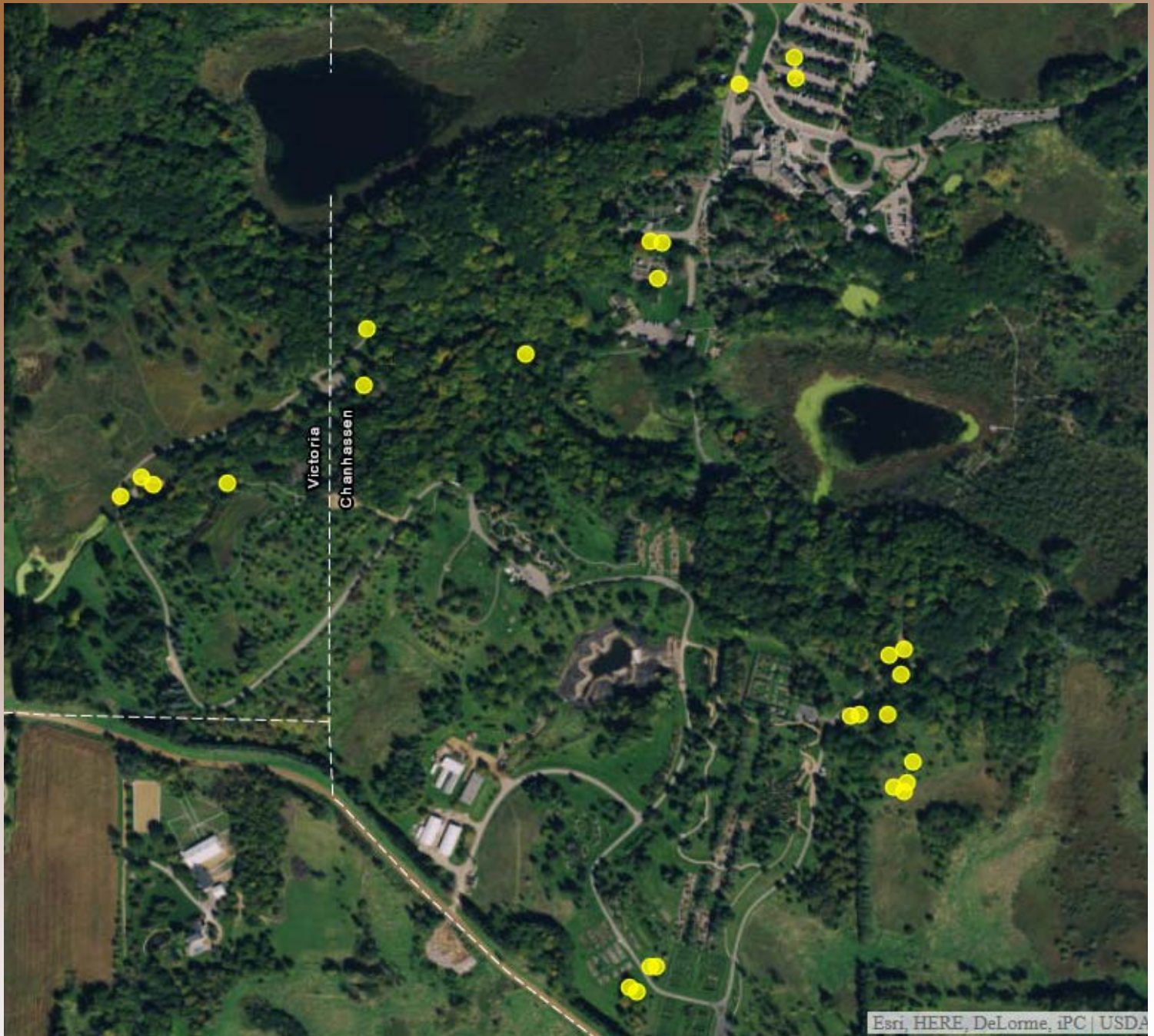
Symptoms

- Wedge-shaped wilt on leaves
- Dead leaves remain on tree during winter
- Not devastating alone, but increases tree's susceptibility to secondary pests (two-lined chestnut borer)



Objective

- Create list of characteristics of 30 Bur Oaks
 - Location (upland, lowland)
 - Community (clusters, singular)
 - Acorn type (round, olive)
 - Measurements (DBH, canopy estimate, height estimate, degree of infection)
- Seek associations between characteristics and infection
- Develop data file that can be used to monitor BOB in the future



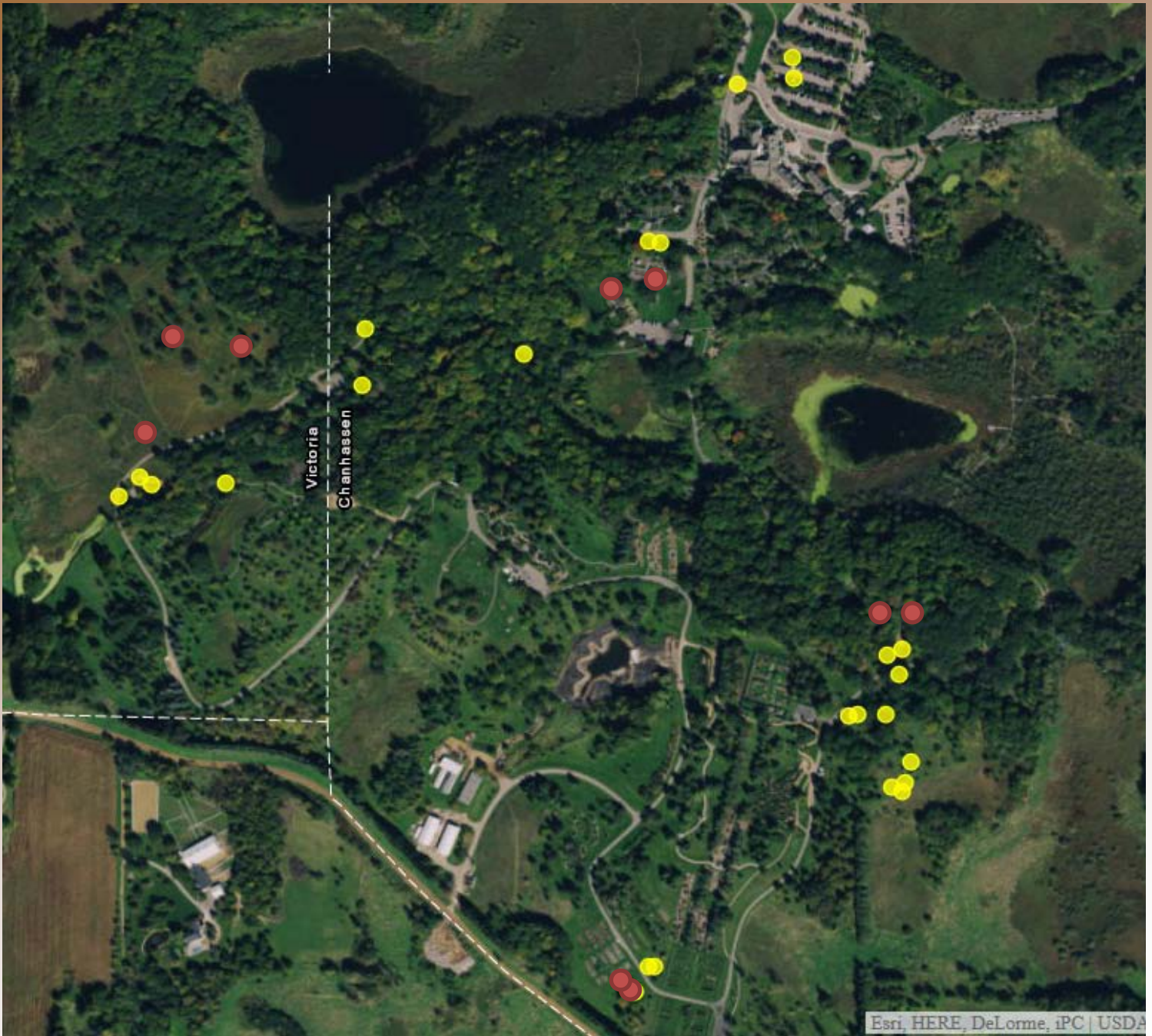
Victoria
Chanhassen

Data

Location	Up/lowland	Site conditions	Crown	Height	DBH	Cluster or solitary	Acorn shape	% infected
parking lot	upland	good, many native plants, pines, perhaps poor drainage	14	26	8.5	solitary	round	0%
parking lot	upland	good, many native plants, near walking path	19	32	11.9	solitary	round	0%
Frog Hollow	lowland	good, slope from road to Wood Duck pond	51	63	37.5	solitary	round	0%
Oak Collection across from maze, overlook	upland	good, sunny, open	3	8	2.5	solitary	absent	0%
Oak Collection across from maze, overlook	upland	good, sunny, open	2.5	5	0.5	solitary	absent	0%
Oak Collection past Q. petraea memorial	upland	good, sunny, open	10	18	5.25	solitary	absent	0%
Oak collection	upland	slope with moist soil	40	45	26.6	cluster	absent	0%
Oak collection	upland	slope with moist soil	48	45	26	cluster	absent	0%
Oak collection, just past sign, by road	lowland	roadside, moist soils, full sun	50	48	38.3	cluster	absent	0%
roadside past gravel pit	lowland	roadside, moist soils, full sun	17	26	7.7	solitary	absent	0%
roadside, huge labeled one	lowland	roadside, moist soils, full sun	57	75	33.2	cluster	round	0%
Rhododendron path	upland	good, sunny slope	38	77	27.7	cluster	absent	20% ?
Oak collection	Lowland	Roadside, moist soils, full sun	60	78	34	cluster	absent	30-40%
WRG	upland	good, sunny slope	17	35	11.2	solitary	round	0%
WRG	upland	good, sunny slope	16	24	8.6	solitary	absent	0%
WRG	upland	good, sunny slope	54	59	40.3	solitary	absent	75%

Data

Location	Up/lowl and	Site conditions	Crown	Height	DBH	Cluster or solitary	Acorn shape	% infected
WRG	upland	good, sunny slope	18	28	13	solitary	olive	0-5%
Upright Tree Collection	upland	good, sunny slope	21	45	16.6	cluster	absent	0%
Upright Tree Collection	upland	good, sunny slope	23	44	18	cluster	absent	0%
Upright Tree Collection	upland	good, sunny slope	20	37	17.5	cluster	absent	0%
Upright Tree Collection	upland	good, sunny slope	27	43	15.3	cluster	absent	5-10%
Upright Tree Collection	upland	good, sunny slope	12	40	10.7	cluster	round	5-10%
Learning Center	upland	good, sunny slope	60	76	54.4	cluster	absent	0-5%
HRC	upland	good, sunny slope	24	36	13	cluster	absent	0-5%
HRC	upland	good, sunny slope	65	80	48.7	solitary	absent	30-40%
HRC	upland	good, sunny slope	39	48	31.3	solitary	round	0-5%
Lake Tamarack	upland	good, sunny slope	51	85	56.2	solitary	absent	0%
HRC	upland	good, sunny slope	48	52	38.1	cluster	absent	50-75%
Prairie Garden	upland	good, sunny slope	25	33	14.5	solitary	absent	0%
Prairie	lowland	good, sunny slope	10	22	4.4	solitary	absent	10-25%
Prairie	upland	good, sunny slope	35	50	35.3	solitary	absent	0-5%
Prairie	upland	good, sunny slope	36	53	32.3	solitary	absent	80-90%



Infection Index

% infected	Index	Quantity
0%	0	18
1-5%	1	5
6-25%	2	4
26-50%	3	2
51-75%	4	1
>75%	5	2

Results

- **Index 0 (0%)**
 - Nearly all upland
 - DBH: 0.5 – 56.2 inches
 - 60% solitary
 - Five trees with round acorns; rest absent
- **Index 1 (1-5%)**
 - All five upland
 - DBH: 13 – 54.4 inches
 - 60% solitary
 - One olive, one round, the rest absent

Results

- **Index 2 (6-25%)**
 - Mostly upland
 - DBH: 4.4 – 27.7 inches
 - 25% solitary
 - one round, three absent
- **Index 3 (26-50%)**
 - Lowland and upland
 - DBH: 34 and 46.7 inches
 - Cluster and solitary
 - Acorns absent for both

Results

- **Index 4 (51-75%)**
 - Upland
 - DBH: 38.1 inches
 - Cluster
 - Acorns absent
- **Index 5 (>75%)**
 - Both upland
 - DBH: 40.3 - 32.3 inches
 - Both solitary
 - Acorns absent

Results Summary

- Most trees measured were upland, so inconclusive
- Lack of acorns means lack of conclusions
- Variance in solitary/cluster for all indices
- Trees with medium to large DBH seem to show the worst symptoms



Current Practices

- Depends on tolerance
- Root flare injection (Alamo, propiconazole) every two years as soon as new leaves emerge
- Effectiveness is questionable
 - See bur oak near Wilson Rose Garden
- Root zone treated with Arborkelp to stimulate root growth and increase stress tolerance

Conclusions

- Overall, the Arboretum is minimally affected
- Continue monitoring bur oaks on Arboretum grounds, including Lake Tamarack
 - Visit same trees in following years to track progress of infection
- Treat low-tolerance trees with injections if deemed necessary
- Promote general tree health

Special Thanks!

- **Jan Malyzsa**, mapping the oaks
- **Drew Zagala**, assisting in locating and measuring trees
- **Dan Miller**, providing a wealth of knowledge on this and many other topics

Resources

- Harrington, Thomas C., McNew, Doug, & Young Yun, Hye (2012). Bur oak blight, a new disease on *Quercus macrocarpa* caused by *Tubakia iowensis* sp. nov. Iowa State University.
- Pokorny, J. D., & Harrington, T. C. (2011). Bur oak blight. Newton Square, PA: USDA Forest Service, Northeastern Area, State and Private Forestry.