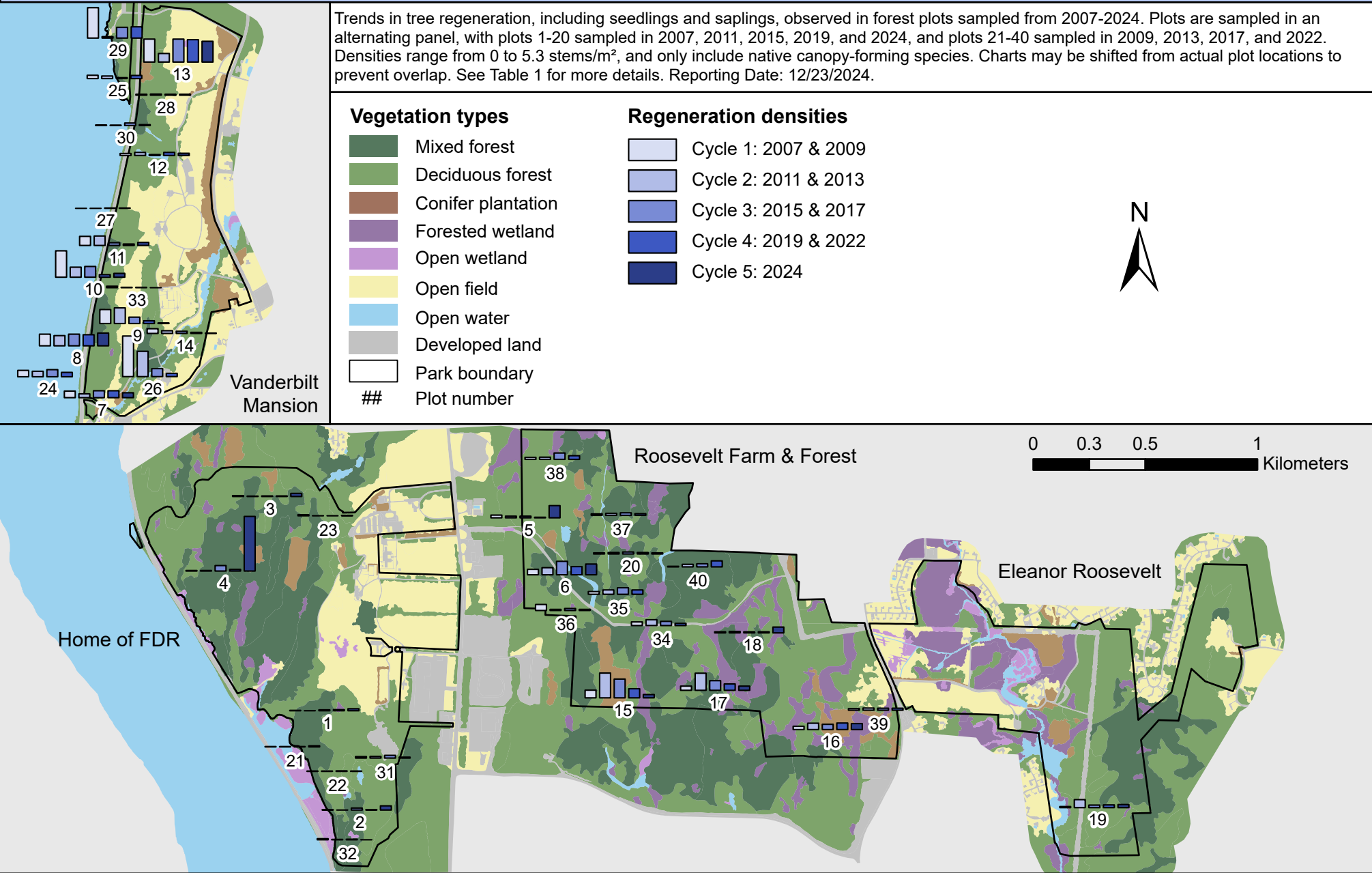


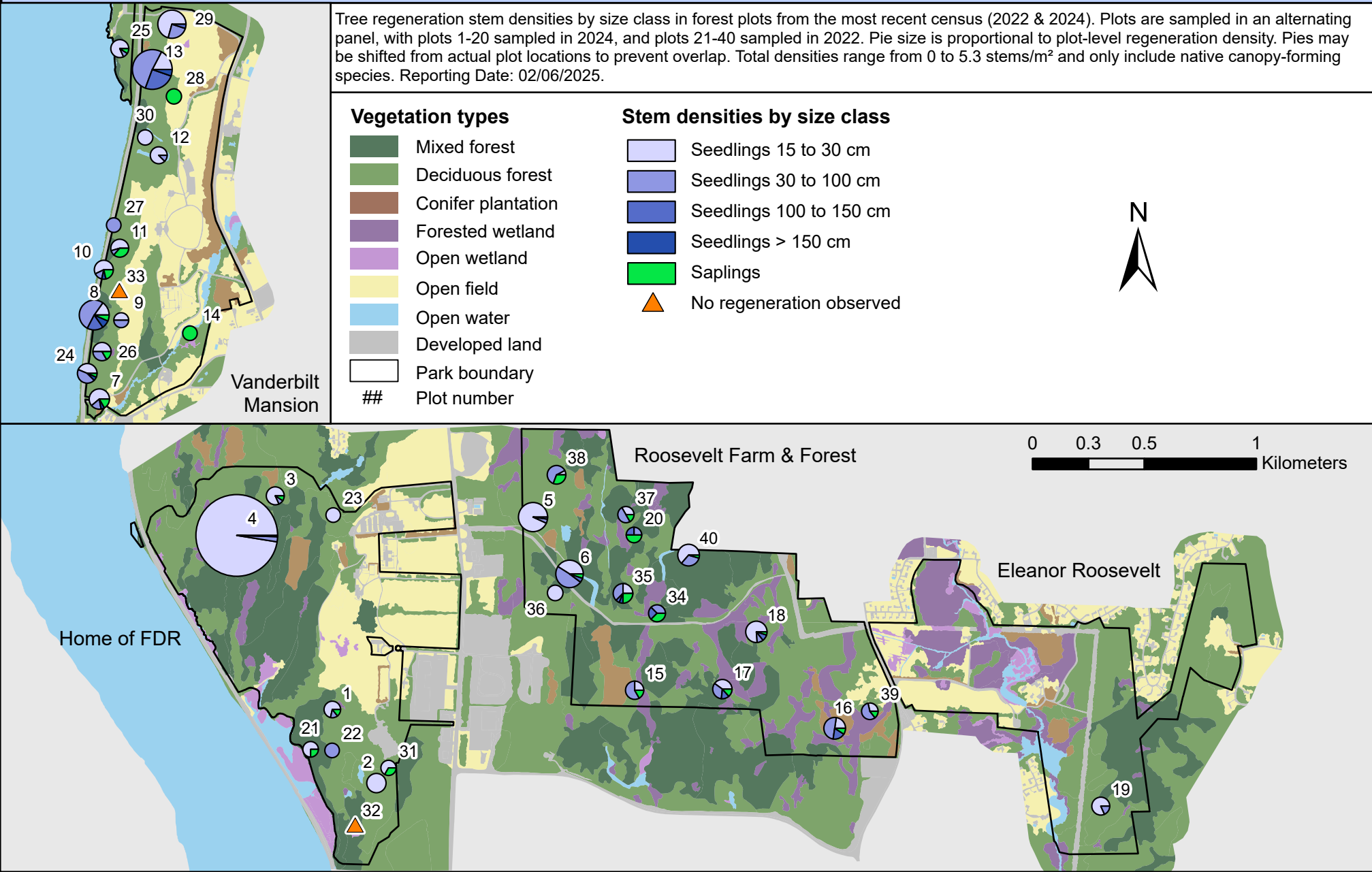


Map 1. Native Canopy-Forming Tree Regeneration by Cycle





Map 2. Native Canopy-Forming Tree Regeneration by Size Class





Map 3. Tree Regeneration Composition

Tree regeneration, including seedlings and saplings, observed in forest plots sampled in the most recent census (2022 & 2024). Plots are sampled in an alternating panel, with plots 1-20 sampled in 2024, and plots 21-40 sampled in 2022. Pie size is proportional to plot-level basal areas. Pies may be shifted from actual plot locations to prevent overlap. Total densities ranges from 0.02 to 5.4 stems/m² and includes all species. Reporting Date: 02/06/2025.

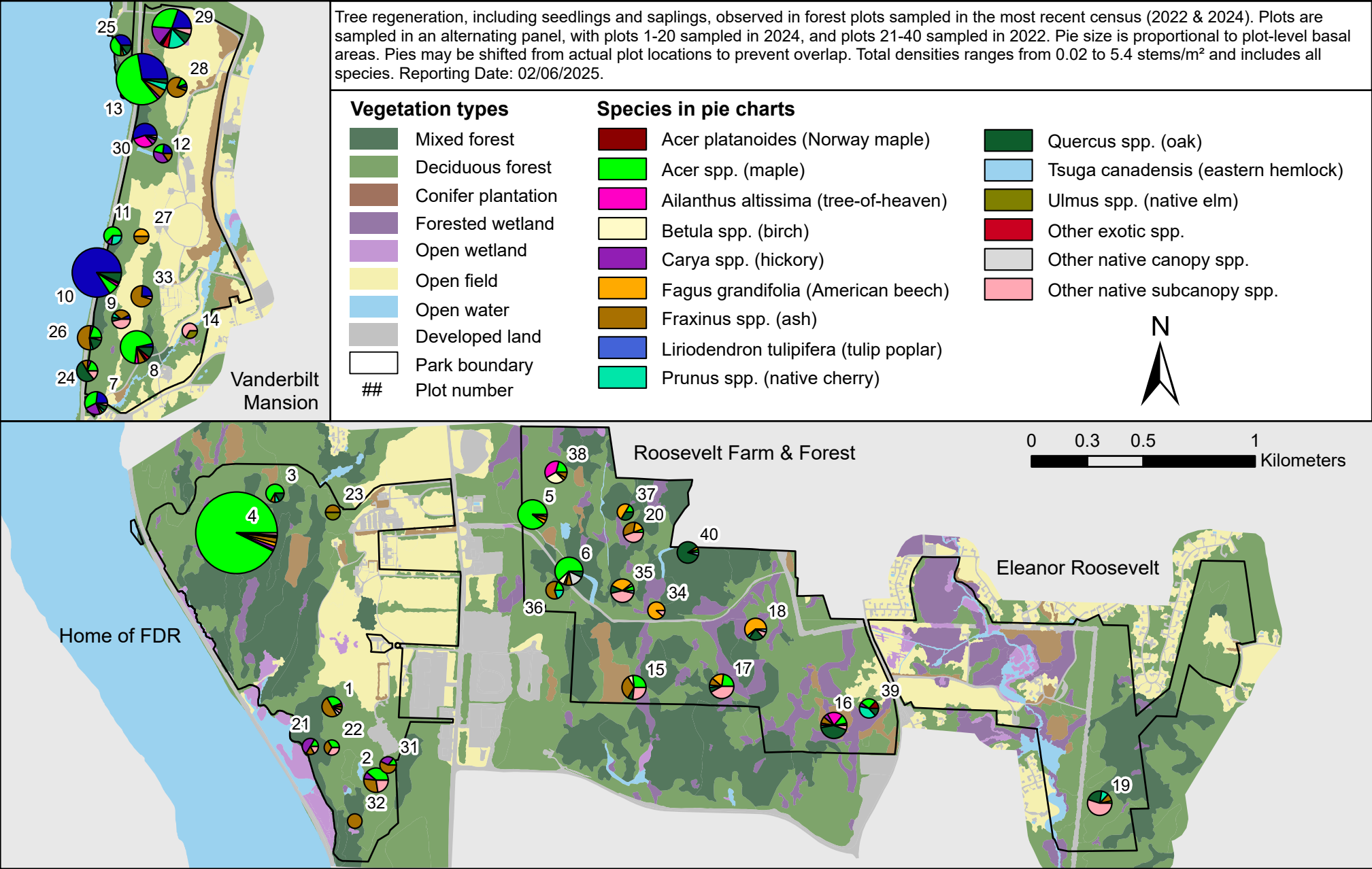
Vegetation types

- Mixed forest
- Deciduous forest
- Conifer plantation
- Forested wetland
- Open wetland
- Open field
- Open water
- Developed land
- Park boundary
- ## Plot number

Species in pie charts

- Acer platanoides (Norway maple)
- Acer spp. (maple)
- Ailanthus altissima (tree-of-heaven)
- Betula spp. (birch)
- Carya spp. (hickory)
- Fagus grandifolia (American beech)
- Fraxinus spp. (ash)
- Liriodendron tulipifera (tulip poplar)
- Prunus spp. (native cherry)
- Quercus spp. (oak)
- Tsuga canadensis (eastern hemlock)
- Ulmus spp. (native elm)
- Other exotic spp.
- Other native canopy spp.
- Other native subcanopy spp.

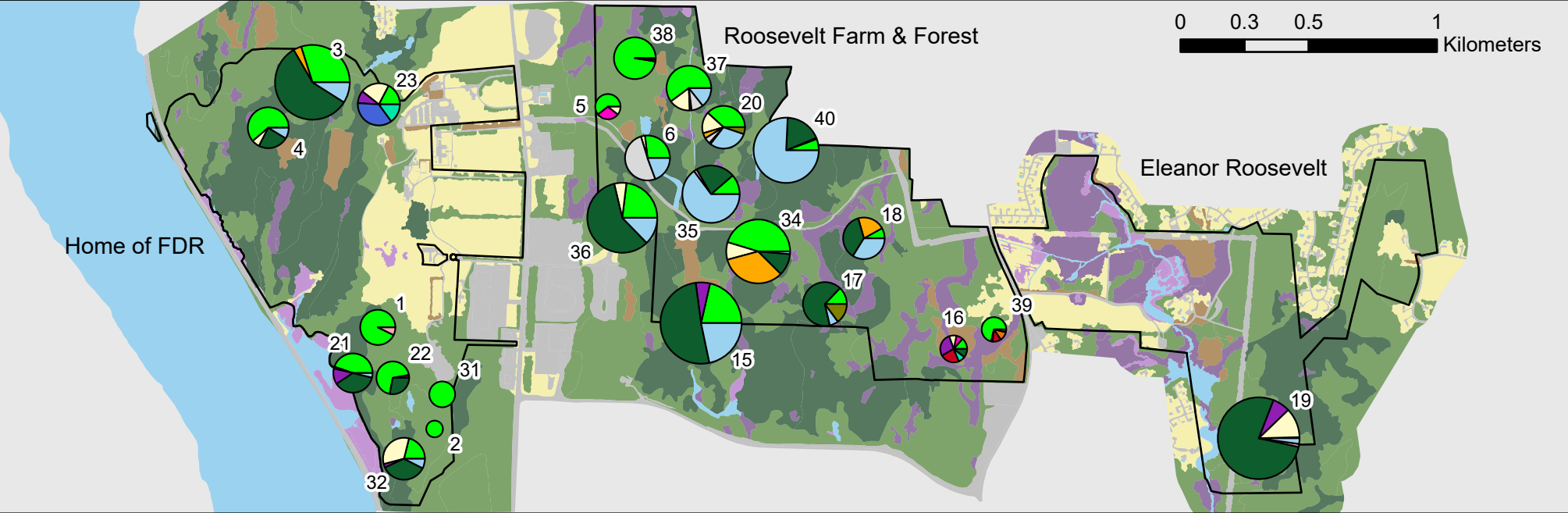
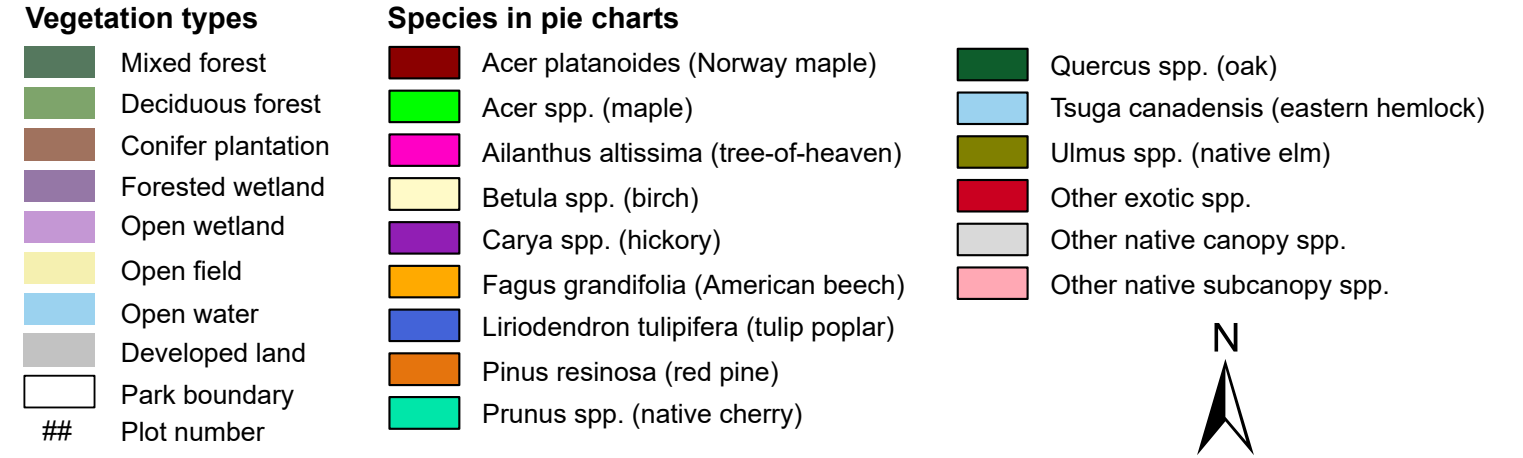
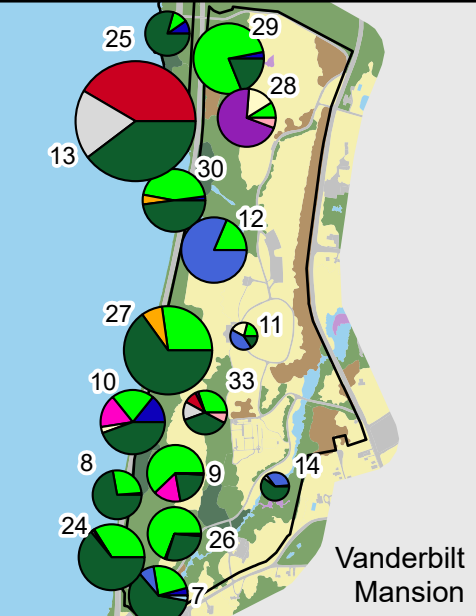
0 0.3 0.5 1 Kilometers





Map 4. Tree Canopy Composition

Tree composition, by species group, observed in forest plots sampled in the most recent census (2022 & 2024). Plots are sampled in an alternating panel, with plots 1-20 sampled in 2024, and plots 21-40 sampled in 2022. Pie size is proportional to plot-level basal areas. Pies may be shifted from actual plot locations to prevent overlap. Total basal area ranges from 10.7 to 57.5 m²/ha. Reporting Date: 02/06/2025.





Map 5. Tree Regeneration Stocking Index

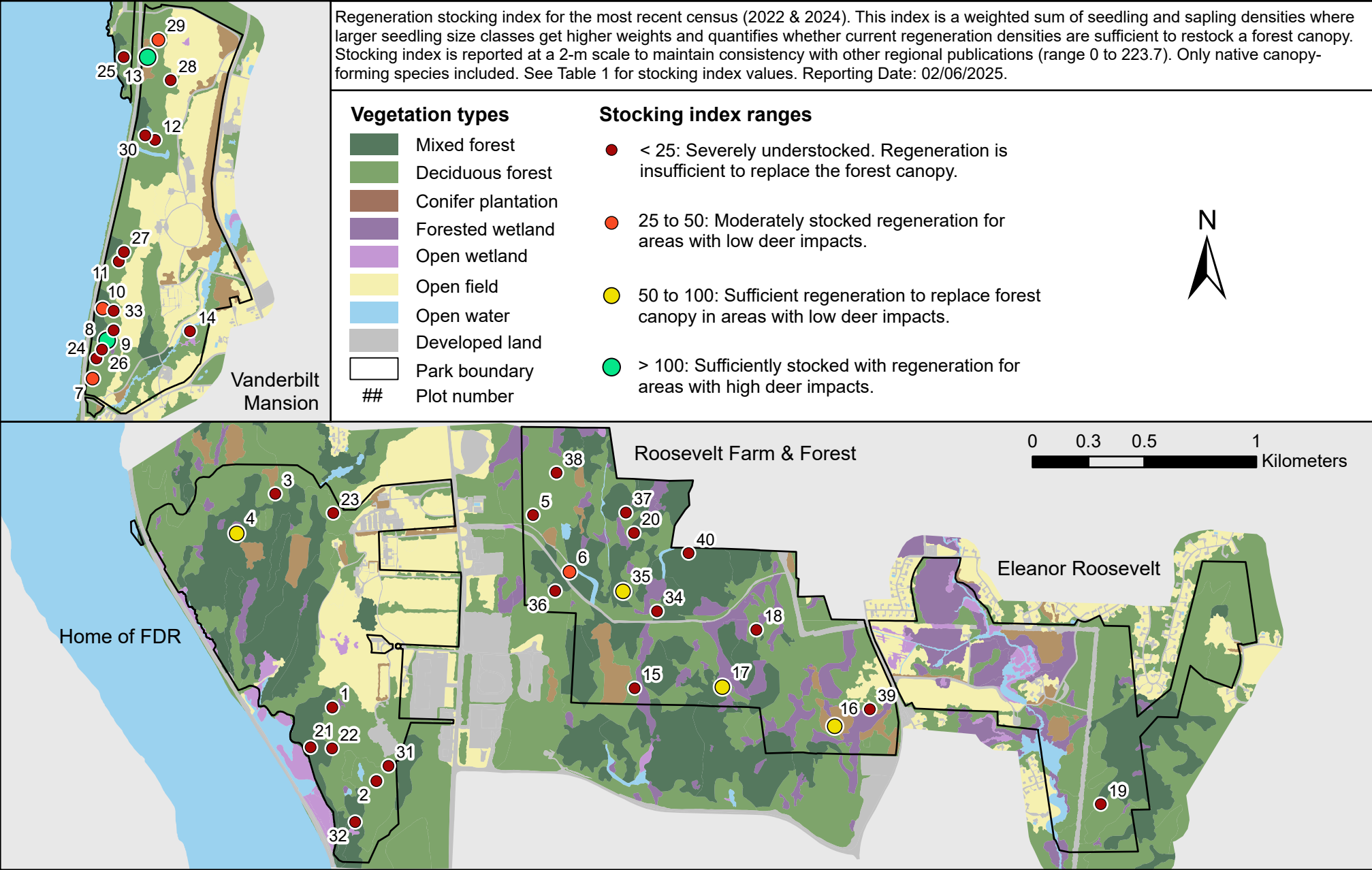
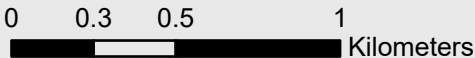
Regeneration stocking index for the most recent census (2022 & 2024). This index is a weighted sum of seedling and sapling densities where larger seedling size classes get higher weights and quantifies whether current regeneration densities are sufficient to restock a forest canopy. Stocking index is reported at a 2-m scale to maintain consistency with other regional publications (range 0 to 223.7). Only native canopy-forming species included. See Table 1 for stocking index values. Reporting Date: 02/06/2025.

Vegetation types

- Mixed forest
- Deciduous forest
- Conifer plantation
- Forested wetland
- Open wetland
- Open field
- Open water
- Developed land
- Park boundary
- ## Plot number

Stocking index ranges

- < 25: Severely understocked. Regeneration is insufficient to replace the forest canopy.
- 25 to 50: Moderately stocked regeneration for areas with low deer impacts.
- 50 to 100: Sufficient regeneration to replace forest canopy in areas with low deer impacts.
- > 100: Sufficiently stocked with regeneration for areas with high deer impacts.





Map 6. Index of Deer Browse Impacts

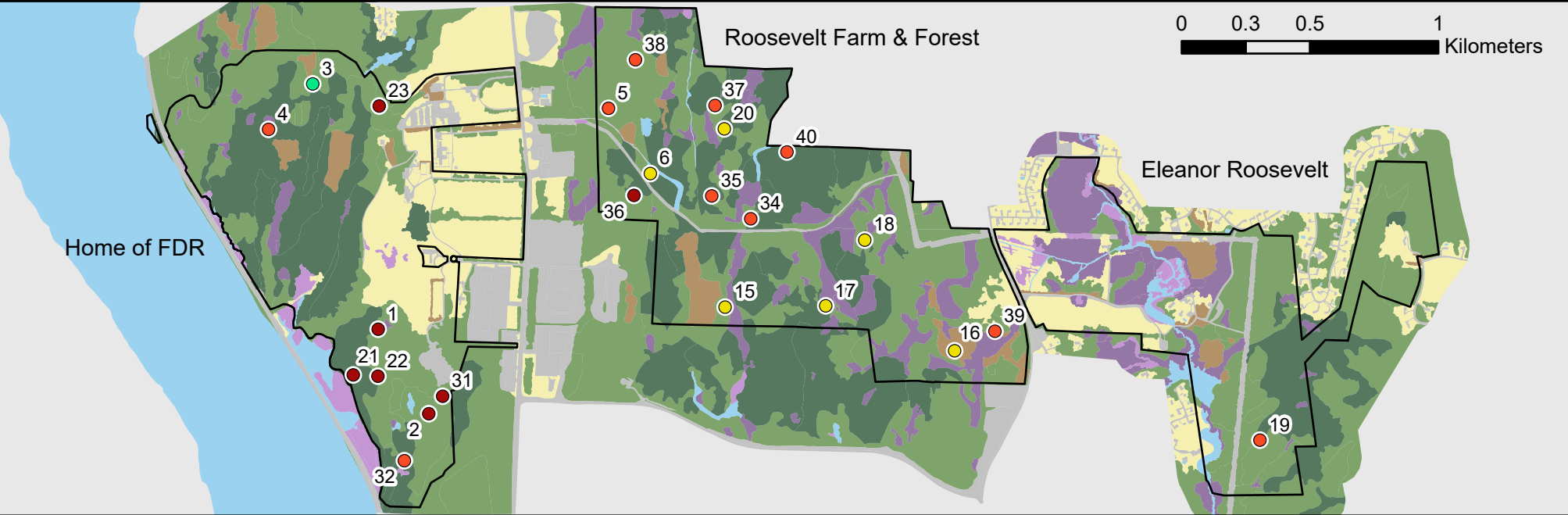
Index of deer browse impacts observed in forest plots in the most recent census (2022 & 2024). Plots are sampled in an alternating panel, with plots 1-20 sampled in 2024, and plots 21-40 sampled in 2022. Deer browse impacts are assessed on a scale of 1-5, with 1 representing no impact and 5 representing severe impacts. Reporting Date: 02/06/2025.

Vegetation types

	Mixed forest
	Deciduous forest
	Conifer plantation
	Forested wetland
	Open wetland
	Open field
	Open water
	Developed land
	Park boundary
##	Plot number

Deer browse index

	1) No impact: found only in well-maintained deer exclosures.
	2) Low impact: deer-preferred (DP) species abundant and of varying heights.
	3) Medium impact: DP species present, but mostly under 30 cm tall. DP herbs present but stunted and flowering is uncommon.
	4) High impact: DP species are rare to absent. Non-preferred and browse-resilient vegetation (e.g. beech) limited in height by deer browse. DP herbs absent or severely stunted.
	5) Very high impact: DP regeneration absent. Non-preferred species also reduced by heavy browsing. Distinct deer browse line.





Map 7. % Canopy Cover by Cycle

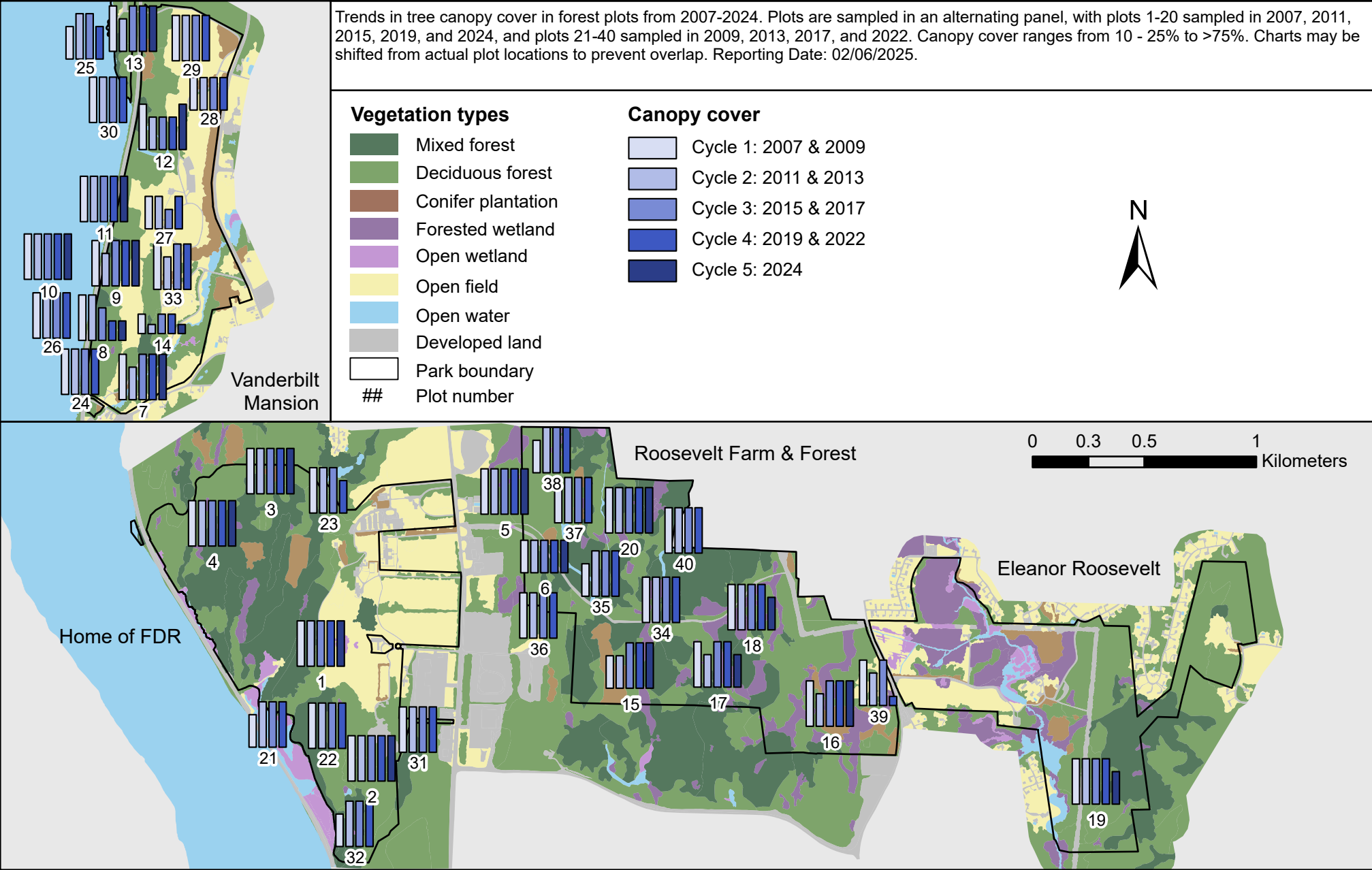
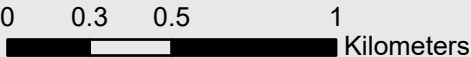
Trends in tree canopy cover in forest plots from 2007-2024. Plots are sampled in an alternating panel, with plots 1-20 sampled in 2007, 2011, 2015, 2019, and 2024, and plots 21-40 sampled in 2009, 2013, 2017, and 2022. Canopy cover ranges from 10 - 25% to >75%. Charts may be shifted from actual plot locations to prevent overlap. Reporting Date: 02/06/2025.

Vegetation types

- Mixed forest
- Deciduous forest
- Conifer plantation
- Forested wetland
- Open wetland
- Open field
- Open water
- Developed land
- Park boundary
- ## Plot number

Canopy cover

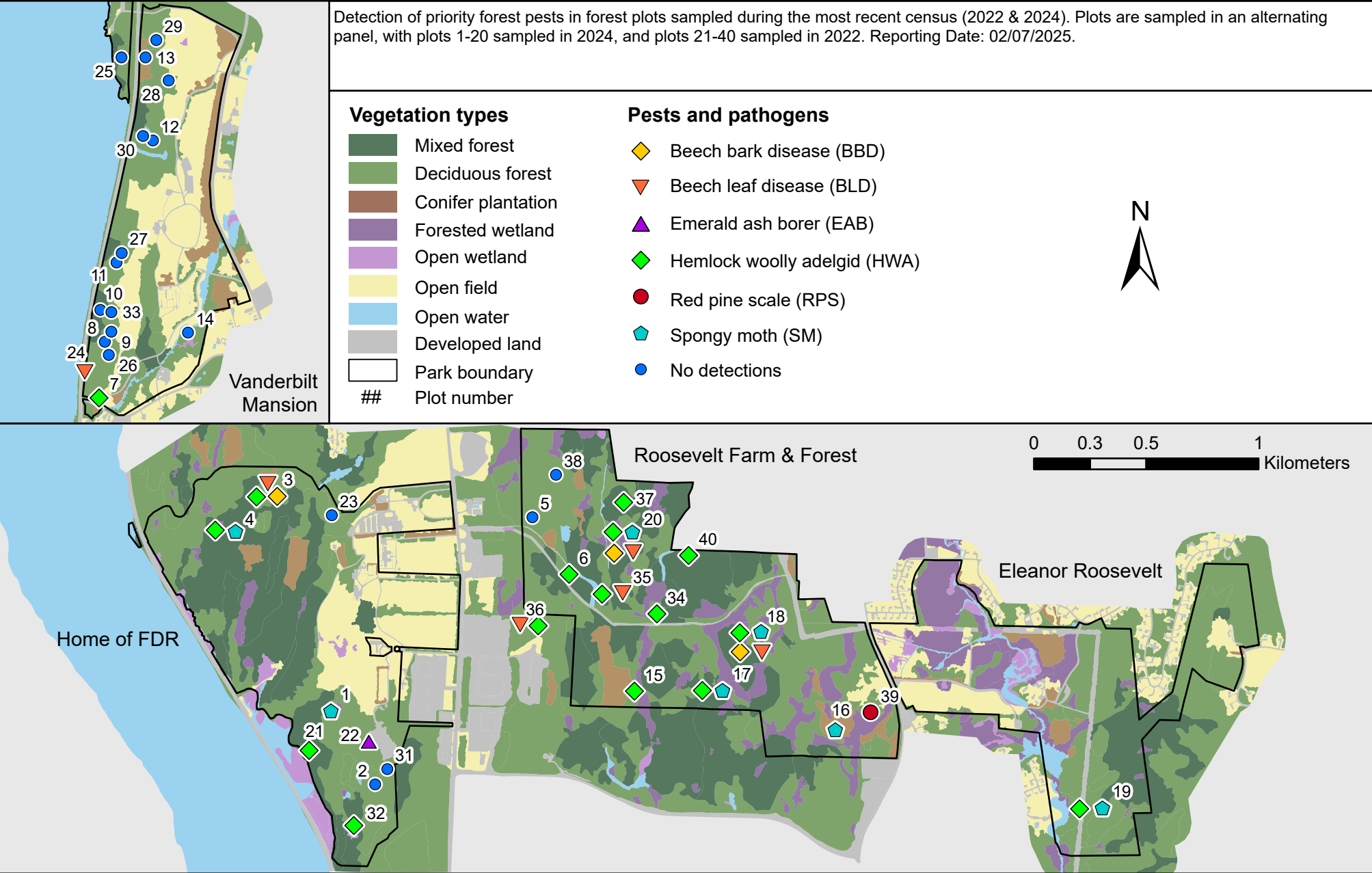
- Cycle 1: 2007 & 2009
- Cycle 2: 2011 & 2013
- Cycle 3: 2015 & 2017
- Cycle 4: 2019 & 2022
- Cycle 5: 2024





Map 8. Forest Pest and Pathogen Detections

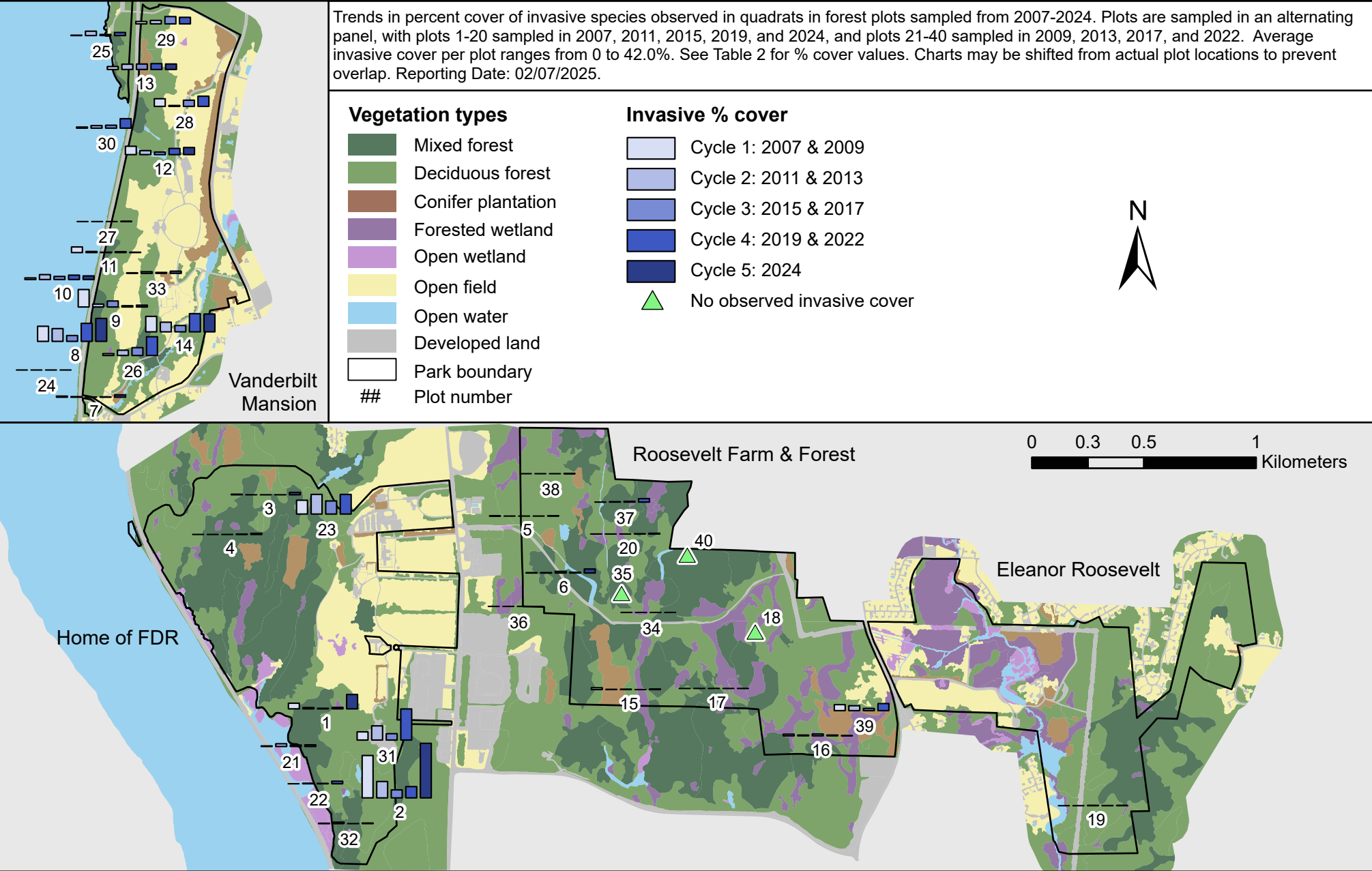
Detection of priority forest pests in forest plots sampled during the most recent census (2022 & 2024). Plots are sampled in an alternating panel, with plots 1-20 sampled in 2024, and plots 21-40 sampled in 2022. Reporting Date: 02/07/2025.





Map 9. Invasive % Cover by Cycle

Trends in percent cover of invasive species observed in quadrats in forest plots sampled from 2007-2024. Plots are sampled in an alternating panel, with plots 1-20 sampled in 2007, 2011, 2015, 2019, and 2024, and plots 21-40 sampled in 2009, 2013, 2017, and 2022. Average invasive cover per plot ranges from 0 to 42.0%. See Table 2 for % cover values. Charts may be shifted from actual plot locations to prevent overlap. Reporting Date: 02/07/2025.





Map 10. Invasive % Cover by Species

Percent invasive cover by species observed in quadrats in forest plots sampled in the most recent census (2022 & 2024). The top 10 species or genera are displayed individually; less common species are grouped as 'Other invasive spp.'. Plots are sampled in an alternating panel, with plots 1-20 sampled in 2024, and plots 21-40 sampled in 2022. Pie size is proportional to total invasive cover (range: 0 to 40.0%), and location may be shifted from actual plot locations to prevent overlap. See Table 3 for more information. Reporting Date: 02/07/2025.

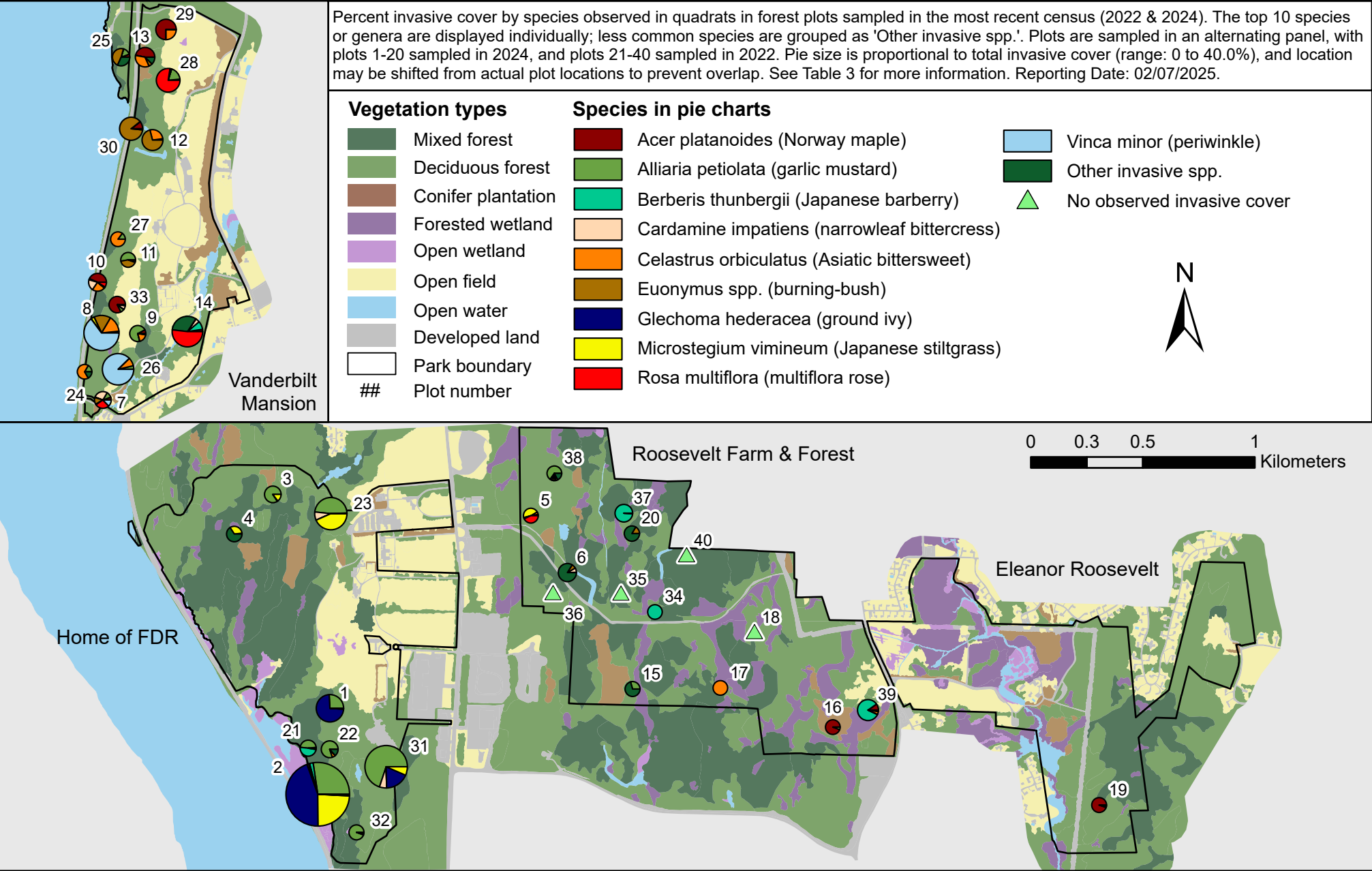
Vegetation types

- Mixed forest
- Deciduous forest
- Conifer plantation
- Forested wetland
- Open wetland
- Open field
- Open water
- Developed land
- Park boundary

Plot number

Species in pie charts

- Acer platanoides (Norway maple)
- Alliaria petiolata (garlic mustard)
- Berberis thunbergii (Japanese barberry)
- Cardamine impatiens (narrowleaf bittercress)
- Celastrus orbiculatus (Asiatic bittersweet)
- Euonymus spp. (burning-bush)
- Glechoma hederacea (ground ivy)
- Microstegium vimineum (Japanese stiltgrass)
- Rosa multiflora (multiflora rose)
- Vinca minor (periwinkle)
- Other invasive spp.
- No observed invasive cover





Map 11. Coarse Woody Debris by Cycle

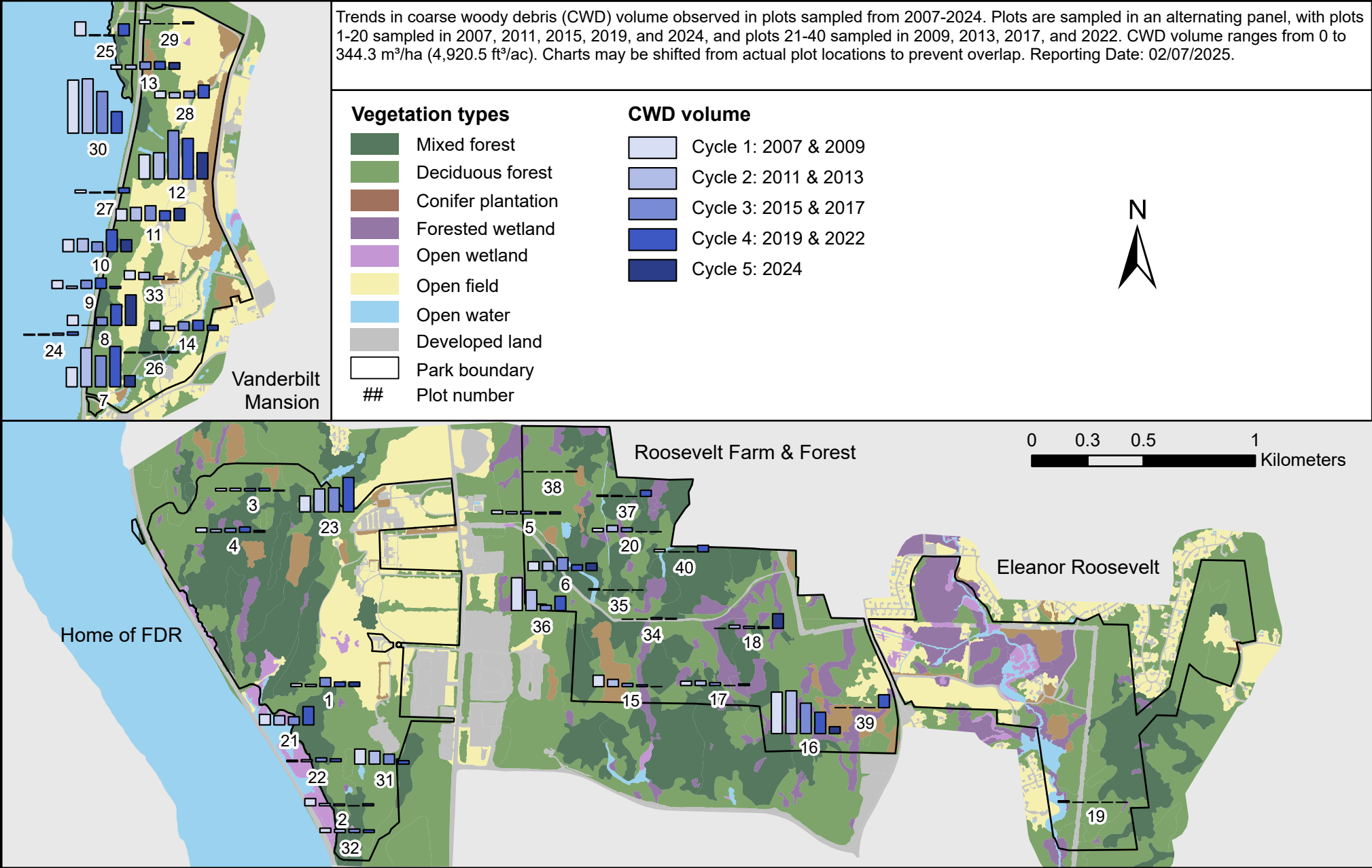
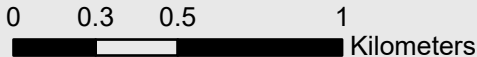
Trends in coarse woody debris (CWD) volume observed in plots sampled from 2007-2024. Plots are sampled in an alternating panel, with plots 1-20 sampled in 2007, 2011, 2015, 2019, and 2024, and plots 21-40 sampled in 2009, 2013, 2017, and 2022. CWD volume ranges from 0 to 344.3 m³/ha (4,920.5 ft³/ac). Charts may be shifted from actual plot locations to prevent overlap. Reporting Date: 02/07/2025.

Vegetation types

- Mixed forest
- Deciduous forest
- Conifer plantation
- Forested wetland
- Open wetland
- Open field
- Open water
- Developed land
- Park boundary
- ## Plot number

CWD volume

- Cycle 1: 2007 & 2009
- Cycle 2: 2011 & 2013
- Cycle 3: 2015 & 2017
- Cycle 4: 2019 & 2022
- Cycle 5: 2024





Map 12. Coarse Woody Debris Ratings

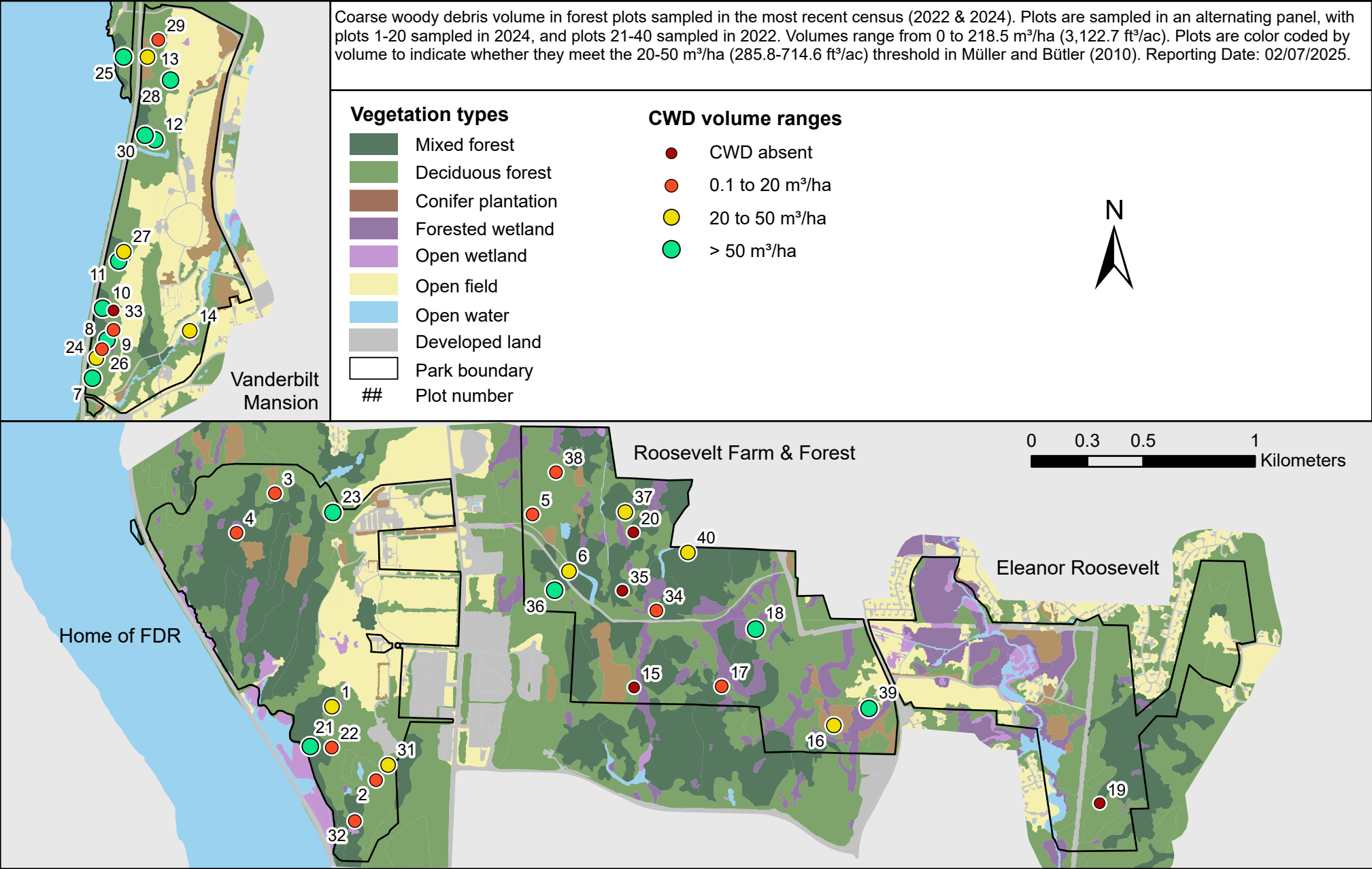
Coarse woody debris volume in forest plots sampled in the most recent census (2022 & 2024). Plots are sampled in an alternating panel, with plots 1-20 sampled in 2024, and plots 21-40 sampled in 2022. Volumes range from 0 to 218.5 m³/ha (3,122.7 ft³/ac). Plots are color coded by volume to indicate whether they meet the 20-50 m³/ha (285.8-714.6 ft³/ac) threshold in Müller and Bütler (2010). Reporting Date: 02/07/2025.

Vegetation types

- Mixed forest
- Deciduous forest
- Conifer plantation
- Forested wetland
- Open wetland
- Open field
- Open water
- Developed land
- Park boundary
- ## Plot number

CWD volume ranges

- CWD absent
- 0.1 to 20 m³/ha
- 20 to 50 m³/ha
- > 50 m³/ha





Map 13. Ash Tree Density by Cycle

Trends in live ash tree density in forest plots sampled from 2007-2024. Plots are sampled in an alternating panel, with plots 1-20 sampled in 2007, 2011, 2015, 2019, and 2024, and plots 21-40 sampled in 2009, 2013, 2017, and 2022. Densities range from 0 to 5 stems/plot (400m²) and only include individuals > 10 cm DBH. Charts may be shifted from actual plot locations to prevent overlap. Reporting Date: 02/07/2025.

Vegetation types

Mixed forest

Deciduous forest

Conifer plantation

Forested wetland

Open wetland

Open field

Open water

Developed land

Park boundary

##

 Plot number

Ash tree densities

Cycle 1: 2007 & 2009

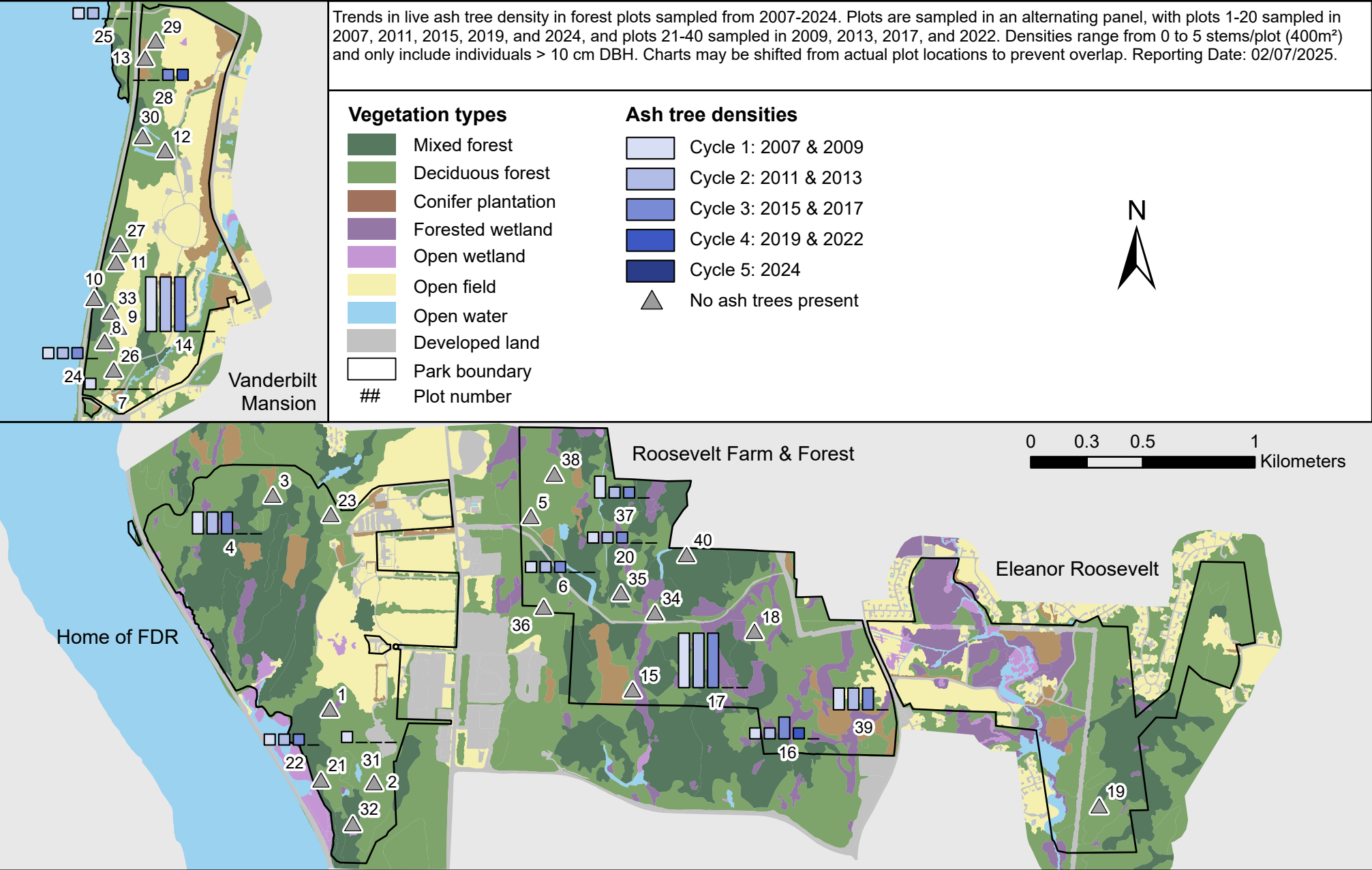
Cycle 2: 2011 & 2013

Cycle 3: 2015 & 2017

Cycle 4: 2019 & 2022

Cycle 5: 2024

No ash trees present



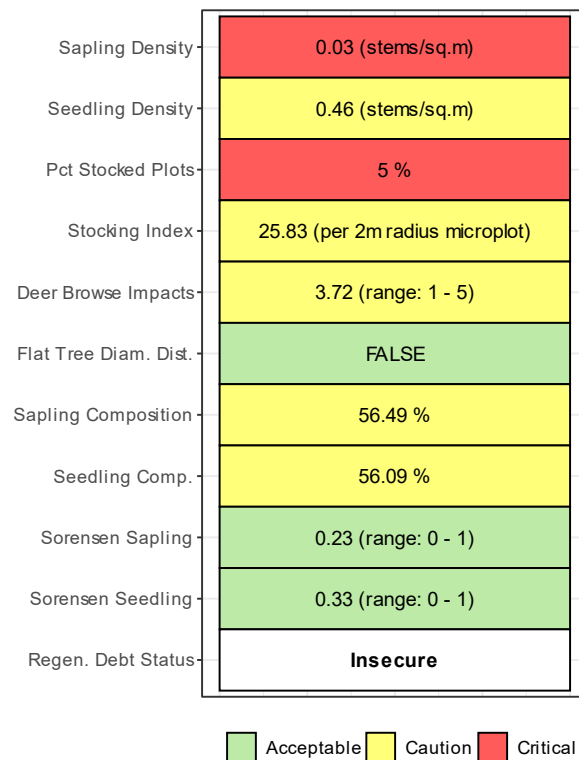


Figure 1. Regeneration Debt metrics and status for the most recent 4-year census (2022 and 2024) in Roosevelt-Vanderbilt National Historic Sites. Flat Tree Diam. Dist. stands for Flat Tree Diameter Distribution. If TRUE, the density of small trees is lower than expected due to chronic regeneration failure. Sapling/Seedling Composition is the % of total stems composed of native canopy-forming species. Sorensen is a measure of how closely the regen. layer matches canopy composition. For more details on metric calculations, thresholds and assessment of status, see Miller et al. 2023.

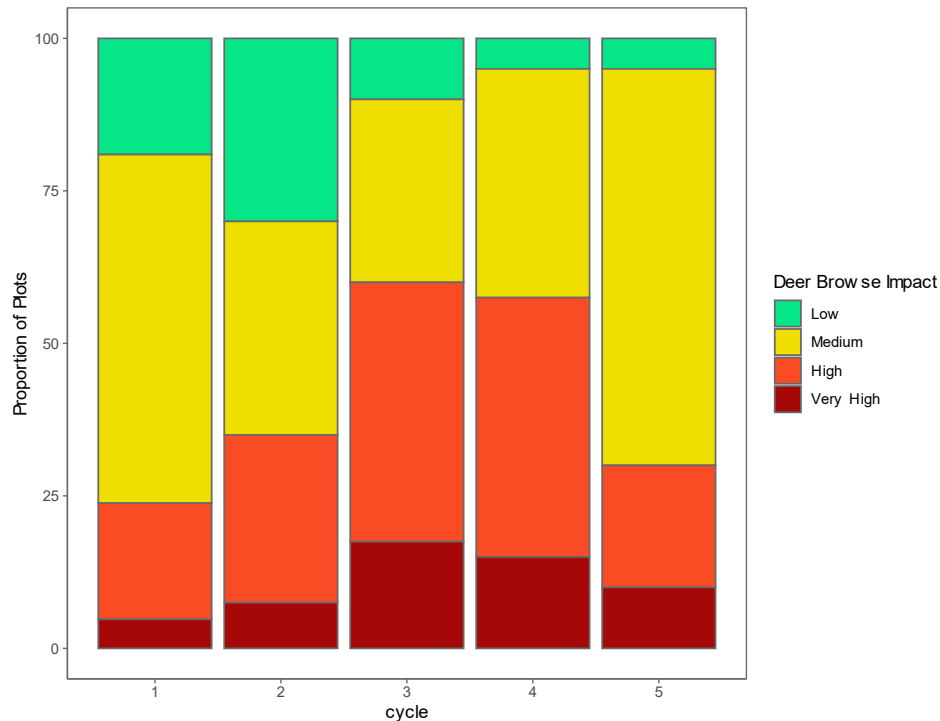


Figure 2. Deer browse impacts by cycle Roosevelt-Vanderbilt National Historic Sites. Cycle 1: 2006 – 2009; Cycle 2: 2010 – 2013; Cycle 3: 2014 – 2017; Cycle 4: 2018 – 2022; Cycle 5: 2024. Note that Cycle 5 is only partially complete.

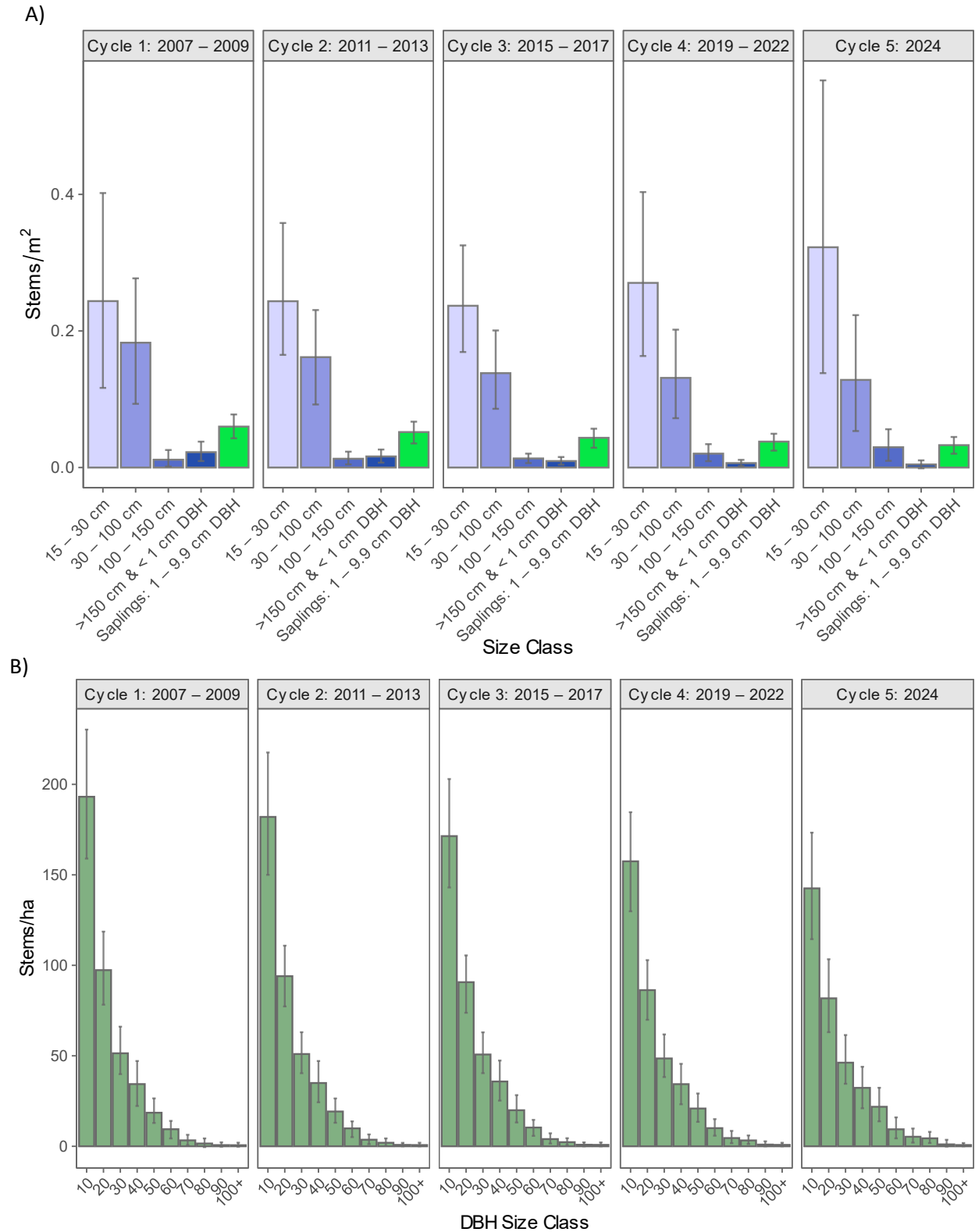


Figure 3. Stem density distributions in 10 cm by cycle in Roosevelt-Vanderbilt National Historic Sites. Cycle 1: 2006 – 2009; Cycle 2: 2010 – 2013; Cycle 3: 2014 – 2017; Cycle 4: 2018 – 2022; Cycle 5: 2024. Note that Cycle 5 is only partially complete. Figure A shows regeneration densities by size class. Figure B shows tree density by diameter at breast height (DBH) increments. Error bars are 95% bootstrapped confidence intervals. An asterisk denotes a linear DBH distribution that is indicative of long-term recruitment failure.

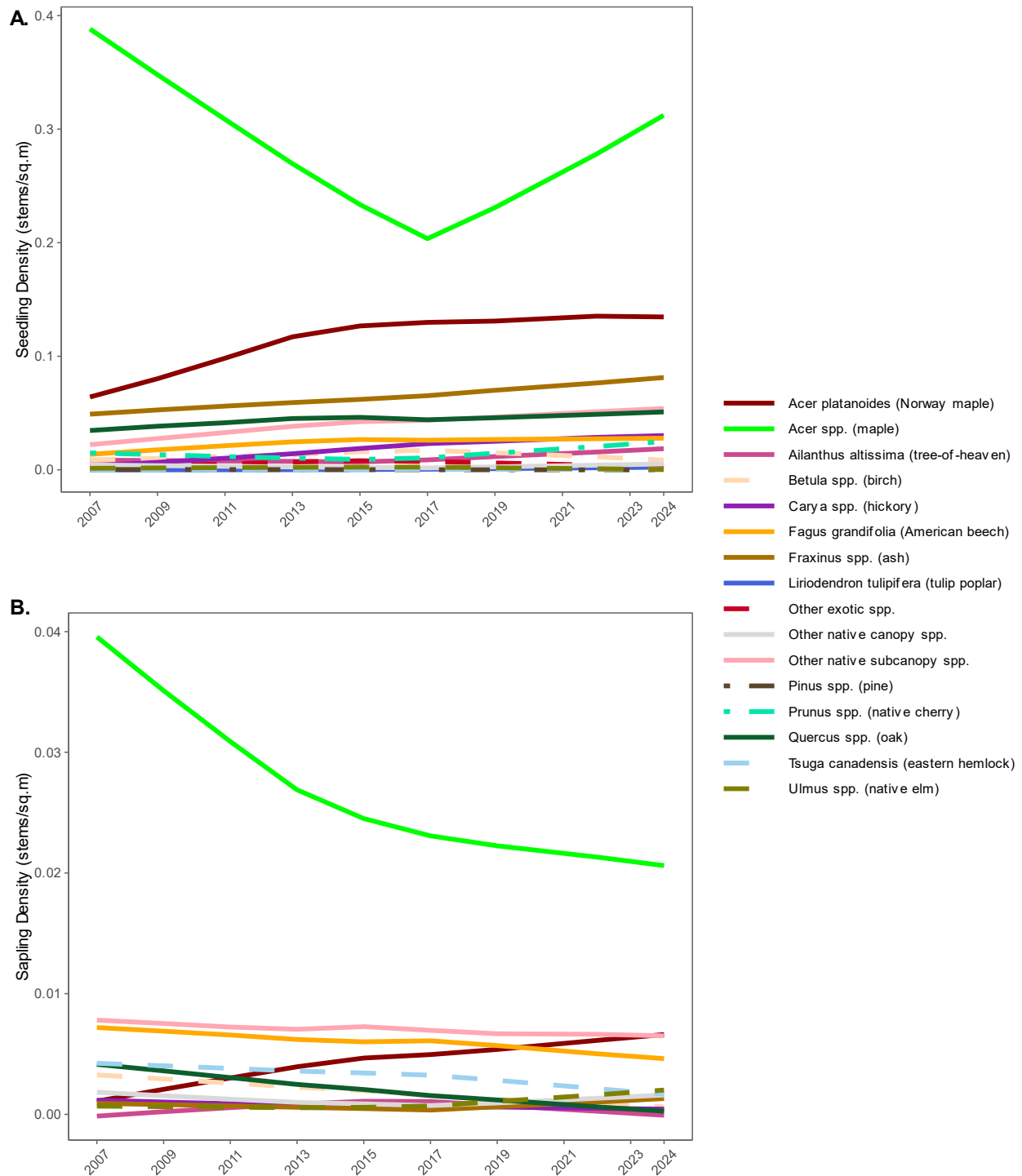


Figure 4. Loess smoothed changes in stem density for seedlings (A) and saplings (B) by species group and sample year in Roosevelt-Vanderbilt National Historic Sites. Specified loess span approximated a linear trend between consecutive sample events per panel.

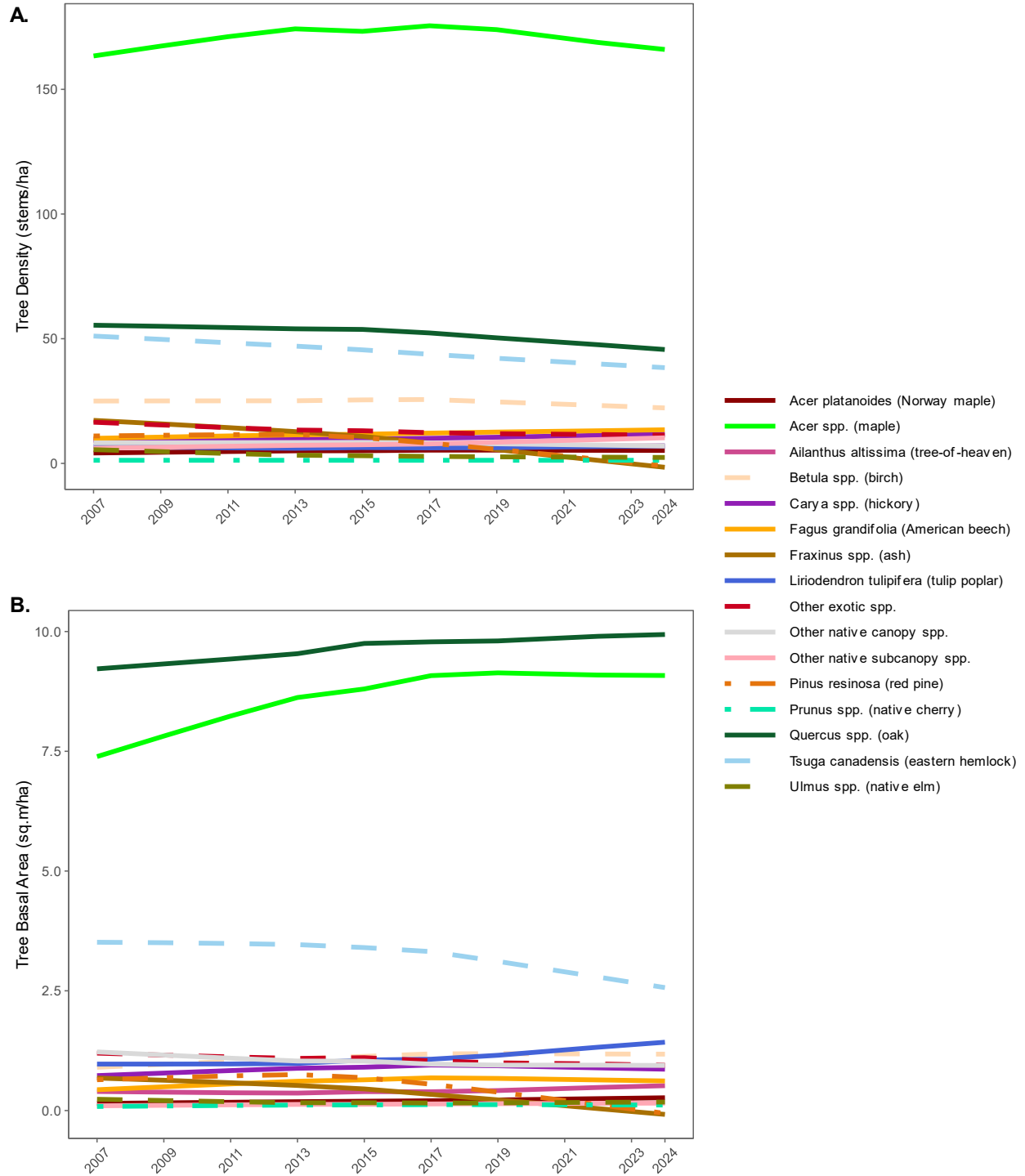


Figure 5. Loess smoothed changes in tree stem density (A) and basal area (B) by species group and sample year in Roosevelt-Vanderbilt National Historic Sites. Specified loess span approximated a linear trend between consecutive sample events per panel.

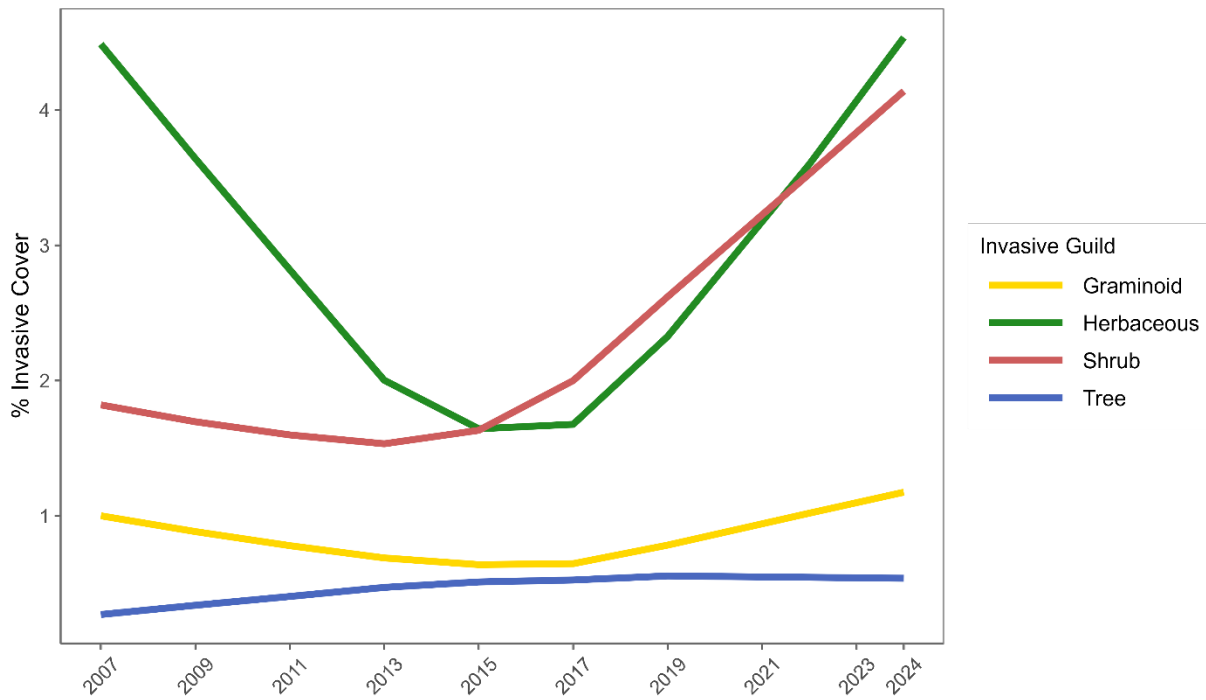


Figure 6. Loess smoothed changes in invasive plant percent cover by guild and sample year in Roosevelt-Vanderbilt National Historic Sites. Specified loess span approximated a linear trend between consecutive sample events per panel.

Table 1. Average plot-level seedling and sapling stem densities (stems per m²) and stocking index by cycle (at the 2m radius scale). Only native, canopy-forming species are included. Note that Fraxinus spp. (ash species) are no longer considered canopy-forming species. Cycle 1: 2006 – 2009; Cycle 2: 2010 – 2013; Cycle 3: 2014 – 2017; Cycle 4: 2018 – 2022; Cycle 5: 2024. Plots are sampled in an alternating panel, with Panel 1 sampled first, and Panel 2 sampled two years later. The stocking index quantifies whether current regeneration densities are sufficient to restock a forest canopy. The index is a weighted sum of seedling and sapling densities where larger seedling size classes get higher weights. Cells highlighted in green are plots that meet the minimum management target of 0.25 seedlings/m² (~1,000 seedlings/acre) and 0.14 saplings/m² (~550 saplings/acre) or have a stocking index >100. These are the same thresholds used in Figure 2 and are described in Miller et al. 2023. Note that Cycle 5 is only partially complete.

Plot	Panel	Seedlings per m ²					Saplings per m ²					Stocking Index				
		Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5
1	1	0.00	0.00	0.08	0.11	0.16	0.03	0.00	0.00	0.00	0.03	0.00	0.00	1.00	1.33	2.33
2	1	0.03	0.00	0.19	0.03	0.40	0.00	0.00	0.00	0.00	0.00	0.33	0.00	2.33	0.33	5.00
3	1	0.05	0.00	0.03	0.03	0.27	0.03	0.03	0.03	0.03	0.03	17.33	16.67	0.33	0.33	3.67
4	1	0.03	0.05	0.53	0.16	5.23	0.03	0.00	0.00	0.00	0.03	0.67	0.67	6.67	2.33	83.67
5	1	0.21	0.13	0.13	0.03	1.17	0.05	0.03	0.03	0.03	0.00	3.00	1.67	2.33	0.67	21.67
6	1	0.48	0.64	1.22	0.74	0.98	0.05	0.05	0.08	0.05	0.05	47.33	44.00	65.67	30.33	48.00
7	1	0.48	0.32	0.56	0.56	0.40	0.16	0.05	0.11	0.11	0.08	98.33	72.33	91.00	58.33	39.00
8	1	1.06	0.95	1.06	1.03	1.14	0.05	0.03	0.05	0.03	0.08	45.33	41.33	28.00	53.33	171.67
9	1	1.30	1.49	0.61	0.27	0.05	0.05	0.03	0.00	0.00	0.00	25.00	25.67	8.33	3.33	1.00
10	1	2.39	0.80	0.93	0.11	0.29	0.16	0.16	0.11	0.13	0.08	319.67	211.00	163.67	91.00	37.33
11	1	0.64	0.66	0.08	0.00	0.19	0.24	0.24	0.19	0.13	0.11	111.67	110.33	67.67	33.33	19.33
12	1	0.13	0.27	0.08	0.29	0.21	0.05	0.03	0.00	0.00	0.00	18.00	3.33	1.00	5.00	3.00
13	1	2.18	0.82	2.20	2.15	1.99	0.03	0.00	0.00	0.00	0.00	378.00	16.00	37.33	42.67	223.67
14	1	0.27	0.13	0.13	0.11	0.00	0.19	0.13	0.08	0.00	0.03	37.33	35.67	2.33	8.00	16.67
15	1	0.69	2.33	1.75	0.82	0.27	0.05	0.05	0.05	0.05	0.05	44.67	68.00	87.67	38.33	22.33
16	1	0.16	0.50	0.37	0.56	0.53	0.16	0.11	0.13	0.08	0.05	85.67	65.00	57.00	27.67	52.33
17	1	0.24	1.57	0.82	0.50	0.34	0.16	0.08	0.11	0.11	0.05	103.67	116.00	91.33	69.33	52.00
18	1	0.00	0.03	0.03	0.05	0.53	0.11	0.11	0.08	0.05	0.03	16.67	17.00	23.33	0.67	20.00
19	1	0.11	0.77	0.24	0.27	0.29	0.00	0.00	0.00	0.00	0.00	1.67	10.00	3.00	3.33	4.33
20	1	0.05	0.11	0.13	0.08	0.05	0.05	0.03	0.05	0.05	0.05	17.67	18.33	19.33	18.33	24.00
21	2	0.00	0.00	0.00	0.08	---	0.03	0.03	0.03	0.03	---	0.00	0.00	0.00	1.00	---
22	2	0.00	0.00	0.05	0.03	---	0.03	0.03	0.00	0.00	---	0.00	0.00	0.67	0.67	---
23	2	0.11	0.00	0.00	0.03	---	0.00	0.00	0.00	0.00	---	1.33	0.00	0.00	0.33	---
24	2	0.56	0.53	0.64	0.40	---	0.05	0.00	0.05	0.03	---	25.33	29.67	30.00	23.67	---
25	2	0.27	0.19	0.08	0.27	---	0.05	0.05	0.00	0.03	---	4.00	3.33	1.00	3.67	---
26	2	3.79	2.33	0.72	0.27	---	0.11	0.11	0.05	0.05	---	97.33	74.00	10.33	4.67	---
27	2	0.00	0.00	0.03	0.03	---	0.00	0.00	0.00	0.00	---	0.00	0.00	0.33	0.67	---
28	2	0.03	0.03	0.00	0.00	---	0.05	0.08	0.08	0.08	---	0.33	0.33	0.00	0.00	---
29	2	2.84	0.13	1.03	1.09	---	0.08	0.00	0.00	0.00	---	49.67	1.67	18.00	29.67	---
30	2	0.00	0.00	0.21	0.08	---	0.05	0.03	0.03	0.00	---	0.00	0.00	2.67	1.00	---
31	2	0.05	0.16	0.19	0.05	---	0.08	0.00	0.08	0.03	---	0.67	2.00	2.33	0.67	---
32	2	0.11	0.03	0.05	0.00	---	0.00	0.00	0.00	0.00	---	1.33	0.33	0.67	0.00	---
33	2	0.13	0.03	0.03	0.00	---	0.00	0.00	0.00	0.00	---	2.00	0.33	0.33	0.00	---
34	2	0.21	0.37	0.32	0.13	---	0.13	0.19	0.08	0.08	---	27.00	64.67	37.00	15.33	---
35	2	0.24	0.40	0.58	0.32	---	0.03	0.03	0.05	0.11	---	4.00	56.67	71.33	78.67	---
36	2	0.58	0.11	0.19	0.11	---	0.00	0.00	0.00	0.00	---	7.33	1.67	2.67	1.33	---
37	2	0.08	0.13	0.19	0.13	---	0.05	0.05	0.05	0.03	---	18.00	19.33	19.67	2.67	---
38	2	0.08	0.11	0.50	0.24	---	0.11	0.11	0.11	0.11	---	51.00	2.33	8.00	5.67	---
39	2	0.13	0.19	0.16	0.16	---	0.03	0.03	0.03	0.03	---	1.67	3.00	2.67	3.33	---
40	2	0.03	0.21	0.27	0.56	---	0.03	0.03	0.03	0.03	---	0.33	3.00	3.33	9.33	---

Table 2. Average % cover and number of invasive species detected in each plot by cycle. Cycle 1: 2006 – 2009; Cycle 2: 2010 – 2013; Cycle 3: 2014 – 2017; Cycle 4: 2018 – 2022; Cycle 5: 2024. Plots are sampled in an alternating panel, with Panel 1 sampled first, and Panel 2 sampled two years later. Plots with at least 10% average cover or 4 or more invasive species present are highlighted in yellow. Note that Cycle 5 is only partially completed.

Plot	Panel	Average % Cover					Number of Species per Plot				
		Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5
1	1	7.83	1.89	0.69	2.05	19.89	7	7	8	5	10
2	1	58.91	22.74	11.03	15.74	75.90	7	6	9	7	9
3	1	0.85	0.08	0.01	0.06	3.16	3	3	3	6	6
4	1	0.01	0.01	0.01	0.46	1.43	1	4	4	5	7
5	1	0.30	0.01	0.01	0.05	0.41	6	4	6	6	7
6	1	0.46	0.45	2.24	1.14	5.60	4	3	5	6	6
7	1	1.61	0.71	0.28	0.55	3.41	4	5	7	7	9
8	1	20.95	17.70	8.06	25.03	31.79	3	6	8	14	12
9	1	24.34	4.09	8.40	1.81	2.40	3	9	7	10	9
10	1	2.26	6.65	4.28	6.19	5.05	7	8	10	11	10
11	1	7.81	1.59	0.49	1.39	0.45	4	7	8	8	8
12	1	11.58	5.43	3.51	8.49	9.80	3	4	6	7	7
13	1	3.95	7.35	7.60	8.11	7.61	2	7	9	7	8
14	1	21.40	13.35	8.80	25.41	24.75	7	10	14	15	15
15	1	2.63	0.21	0.49	0.03	0.64	2	6	6	6	5
16	1	2.19	1.13	2.64	0.96	0.23	5	4	6	5	8
17	1	0.00	0.00	0.00	0.00	0.01	2	2	2	3	2
18	1	0.00	0.00	0.00	0.00	0.00	0	0	0	1	1
19	1	0.00	0.01	0.44	0.19	0.45	1	2	2	2	3
20	1	0.00	0.00	0.01	0.19	1.14	1	1	2	2	5
21	2	0.84	3.78	2.05	2.29	---	6	6	8	9	---
22	2	0.03	0.64	0.45	3.49	---	3	4	6	9	---
23	2	19.30	27.29	18.20	27.43	---	6	6	7	9	---
24	2	0.04	0.04	0.04	0.08	---	5	9	5	5	---
25	2	0.60	6.04	1.46	4.34	---	4	6	5	7	---
26	2	2.21	7.29	10.88	26.01	---	3	6	7	6	---
27	2	0.05	0.06	0.09	0.25	---	2	3	5	4	---
28	2	10.64	1.16	8.58	14.03	---	6	8	8	9	---
29	2	3.39	4.88	10.08	9.08	---	5	6	6	7	---
30	2	1.63	3.63	3.99	13.16	---	5	4	6	5	---
31	2	11.29	19.70	8.83	43.18	---	3	7	8	8	---
32	2	0.43	2.10	0.05	0.69	---	6	8	6	5	---
33	2	0.75	2.36	1.28	2.86	---	7	6	6	6	---
34	2	0.01	0.01	0.01	0.01	---	3	2	1	3	---
35	2	0.00	0.00	0.00	0.00	---	0	0	0	1	---
36	2	0.00	0.01	0.00	0.00	---	3	3	3	7	---
37	2	0.05	0.44	0.94	4.73	---	4	1	1	4	---
38	2	0.00	0.03	0.03	0.26	---	2	5	4	8	---
39	2	8.44	6.90	3.05	9.81	---	8	6	7	9	---
40	2	0.00	0.00	0.00	0.00	---	0	0	1	1	---

Table 3. Number of plots out of 40 where exotic species were detected by cycle. Cycle 1: 2006 – 2009; Cycle 2: 2010 – 2013; Cycle 3: 2014 – 2017; Cycle 4: 2018 – 2022; Cycle 5: 2024. Priority invasive species that capable of dominating Northeastern US forest habitats are highlighted in yellow. Note that Cycle 5 is only partially completed.

Latin Name	Common Name	Priority Invasive	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5
<i>Acer palmatum</i>	Japanese maple	No	0	1	0	0	0
<i>Acer platanoides</i>	Norway maple	Yes	13	17	22	26	14
<i>Aesculus hippocastanum</i>	horse chestnut	No	1	1	2	1	0
<i>Ailanthus altissima</i>	tree-of-heaven	Yes	18	14	13	15	10
<i>Alliaria petiolata</i>	garlic mustard	Yes	28	29	29	30	13
<i>Allium vineale</i>	wild garlic	No	6	10	15	10	6
<i>Anthriscus sylvestris</i>	wild chervil	No	2	9	6	10	7
<i>Artemisia vulgaris</i>	common wormwood	No	0	0	0	1	1
<i>Berberis thunbergii</i>	Japanese barberry	Yes	14	19	31	27	14
<i>Cardamine impatiens</i>	narrowleaf bittercress	Yes	2	4	9	11	9
<i>Celastrus orbiculatus</i>	Asiatic bittersweet	Yes	19	24	24	28	17
<i>Chelidonium majus</i>	celandine	No	3	5	4	5	4
<i>Conium maculatum</i>	poison parsley	No	5	0	0	0	0
<i>Dactylis glomerata</i>	orchardgrass	No	0	3	1	2	1
<i>Duchesnea indica</i>	mock strawberry	No	2	1	0	0	0
<i>Epipactis helleborine</i>	broadleaf helleborine	No	3	5	6	5	3
<i>Euonymus</i>	burning-bush	Yes	0	0	2	1	0
<i>Euonymus alatus</i>	burning-bush	Yes	8	12	19	27	14
<i>Fagus sylvatica</i>	European beech	No	0	0	0	0	1
<i>Festuca trachyphylla</i>	hard fescue	No	0	0	1	0	0
<i>Forsythia suspensa</i>	weeping forsythia	No	0	1	1	1	1
<i>Glechoma hederacea</i>	ground ivy	Yes	5	9	9	7	3
<i>Gleditsia triacanthos</i>	honey locust	No	0	0	0	2	0
<i>Hemerocallis</i>	daylily	No	0	0	2	0	0
<i>Hemerocallis fulva</i>	tawny daylily	No	2	2	0	2	2
<i>Hesperis matronalis</i>	dames rocket	Yes	3	3	3	2	1
<i>Hosta</i>	plantain lily	No	0	0	1	1	0
<i>Hosta lancifolia</i>	narrowleaf plantain lily	No	0	0	0	0	1
<i>Hosta ventricosa</i>	blue plantain lily	No	0	1	0	0	0
<i>Hylotelephium telephium</i>	witch's moneybags	No	0	0	1	0	1
<i>Lapsana communis</i>	nipplewort	No	0	0	1	2	1
<i>Ligustrum</i>	privet	Yes	0	2	2	3	2
<i>Ligustrum obtusifolium</i>	border privet	Yes	0	2	3	3	2
<i>Lonicera - Exotic</i>	honeysuckle - exotic	Yes	4	5	6	7	3
<i>Lonicera japonica</i>	Japanese honeysuckle	Yes	1	0	1	0	0
<i>Lonicera morrowii</i>	Morrow's honeysuckle	Yes	4	8	5	2	3
<i>Lysimachia nummularia</i>	creeping jenny	Yes	3	2	2	2	2
<i>Lythrum salicaria</i>	purple loosestrife	Yes	0	0	0	1	1
<i>Malus</i>	apple	No	0	1	1	1	1
<i>Microstegium vimineum</i>	Japanese stiltgrass	Yes	7	8	8	12	11
<i>Myosotis scorpioides</i>	true forget-me-not	No	1	0	0	1	0
<i>Narcissus</i>	daffodil	No	0	0	1	1	0
<i>Ornithogalum nutans</i>	drooping Star-of-Bethlehem	No	0	0	1	0	0
<i>Ornithogalum umbellatum</i>	Star-of-Bethlehem	No	0	0	0	1	1
<i>Persicaria longiseta</i>	Asiatic lady's thumb	Yes	3	3	3	4	2
<i>Phalaris arundinacea</i>	reed canary grass	Yes	0	0	0	0	1
<i>Phragmites australis</i>	common reed	Yes	1	1	1	1	1
<i>Picea abies</i>	Norway spruce	No	3	4	4	4	2
<i>Plantago major</i>	common plantain	No	1	0	0	1	0

<i>Poa annua</i>	annual bluegrass	No	0	1	0	0	0
<i>Poa nemoralis</i>	wood bluegrass	No	2	4	4	5	3
<i>Poa pratensis</i>	Kentucky bluegrass	No	0	0	1	1	0
<i>Poa trivialis</i>	rough bluegrass	No	0	2	1	1	3
<i>Prunus avium</i>	sweet cherry	No	2	5	7	4	4
<i>Ranunculus acris</i>	tall buttercup	No	1	0	0	0	0
<i>Rhamnus cathartica</i>	common buckthorn	Yes	2	4	4	6	1
<i>Ribes rubrum</i>	cultivated currant	No	0	1	1	1	1
<i>Robinia pseudoacacia</i>	black locust	Yes	3	6	4	6	2
<i>Rorippa sylvestris</i>	creeping yellowcress	No	1	0	0	0	0
<i>Rosa multiflora</i>	multiflora rose	Yes	10	14	17	24	14
<i>Rubus phoenicolasius</i>	wine raspberry	Yes	1	2	1	2	3
<i>Sagina japonica</i>	Japanese pearlwort	No	0	0	0	0	1
<i>Solanum dulcamara</i>	climbing nightshade	No	1	0	1	1	0
<i>Stellaria media</i>	common chickweed	No	2	3	1	1	1
<i>Taraxacum officinale</i>	common dandelion	No	1	0	1	2	2
<i>Taxus</i>	exotic yew	No	0	0	0	1	0
<i>Veronica officinalis</i>	common speedwell	No	1	3	1	3	2
<i>Viburnum plicatum</i>	Japanese snowball	Yes	0	0	0	0	1
<i>Vinca minor</i>	periwinkle	Yes	3	3	3	4	3
<i>Vincetoxicum</i>	swallow-wort	Yes	0	1	0	0	0
<i>Vincetoxicum nigrum</i>	black swallow-wort	Yes	0	0	0	2	0
<i>Viola odorata</i>	sweet violet	No	0	0	0	1	0
<i>Wisteria</i>	wisteria	Yes	0	0	0	2	0
<i>Wisteria floribunda</i>	Japanese wisteria	Yes	0	2	1	0	0

Table 4. Invasive plant and pest/pathogen early detections in Roosevelt-Vanderbilt National Historic Sites observed in the most recent census of each plot. Coordinates are in UTM NAD83 Zone 18N.

Plot	Year	X	Y	Latin Name	Common Name	Type
ROVA-012	2024	587848	4628101	<i>Rhamnus cathartica</i>	common buckthorn	shrub
ROVA-022	2022	588357	4623772	<i>Rhamnus cathartica</i>	common buckthorn	shrub
ROVA-025	2022	587708	4628471	<i>Rhamnus cathartica</i>	common buckthorn	shrub
ROVA-028	2022	587918	4628368	<i>Rhamnus cathartica</i>	common buckthorn	shrub
ROVA-014	2024	588004	4627246	<i>Phragmites australis</i>	common reed	graminoid
ROVA-002	2024	588555	4623626	<i>Rubus phoenicolasius</i>	wine raspberry	shrub
ROVA-004	2024	587931	4624733	<i>Rubus phoenicolasius</i>	wine raspberry	shrub
ROVA-008	2024	587634	4627205	<i>Rubus phoenicolasius</i>	wine raspberry	shrub
ROVA-021	2022	588261	4623777	<i>Rubus phoenicolasius</i>	wine raspberry	shrub
ROVA-024	2022	587586	4627124	<i>Wisteria</i>	wisteria	shrub
ROVA-026	2022	587611	4627164	<i>Wisteria</i>	wisteria	shrub
ROVA-003	2024	588103	4624910	<i>Adelges tsugae</i>	hemlock woolly adelgid	pest
ROVA-004	2024	587931	4624733	<i>Adelges tsugae</i>	hemlock woolly adelgid	pest
ROVA-006	2024	589418	4624561	<i>Adelges tsugae</i>	hemlock woolly adelgid	pest
ROVA-007	2024	587569	4627034	<i>Adelges tsugae</i>	hemlock woolly adelgid	pest
ROVA-015	2024	589709	4624041	<i>Adelges tsugae</i>	hemlock woolly adelgid	pest
ROVA-017	2024	590101	4624046	<i>Adelges tsugae</i>	hemlock woolly adelgid	pest
ROVA-018	2024	590253	4624302	<i>Adelges tsugae</i>	hemlock woolly adelgid	pest
ROVA-019	2024	591792	4623523	<i>Adelges tsugae</i>	hemlock woolly adelgid	pest
ROVA-020	2024	589706	4624735	<i>Adelges tsugae</i>	hemlock woolly adelgid	pest
ROVA-021	2022	588261	4623777	<i>Adelges tsugae</i>	hemlock woolly adelgid	pest
ROVA-032	2022	588460	4623443	<i>Adelges tsugae</i>	hemlock woolly adelgid	pest
ROVA-034	2022	589809	4624385	<i>Adelges tsugae</i>	hemlock woolly adelgid	pest
ROVA-035	2022	589657	4624474	<i>Adelges tsugae</i>	hemlock woolly adelgid	pest
ROVA-036	2022	589354	4624476	<i>Adelges tsugae</i>	hemlock woolly adelgid	pest
ROVA-037	2022	589670	4624826	<i>Adelges tsugae</i>	hemlock woolly adelgid	pest
ROVA-040	2022	589950	4624645	<i>Adelges tsugae</i>	hemlock woolly adelgid	pest
ROVA-022	2022	588357	4623772	<i>Agrilus planipennis</i>	emerald ash borer	pest
ROVA-003	2024	588103	4624910	<i>Fiorinia externa</i>	elongate hemlock scale	pest
ROVA-004	2024	587931	4624733	<i>Fiorinia externa</i>	elongate hemlock scale	pest
ROVA-017	2024	590101	4624046	<i>Fiorinia externa</i>	elongate hemlock scale	pest
ROVA-018	2024	590253	4624302	<i>Fiorinia externa</i>	elongate hemlock scale	pest
ROVA-019	2024	591792	4623523	<i>Fiorinia externa</i>	elongate hemlock scale	pest
ROVA-020	2024	589706	4624735	<i>Fiorinia externa</i>	elongate hemlock scale	pest
ROVA-021	2022	588261	4623777	<i>Fiorinia externa</i>	elongate hemlock scale	pest
ROVA-032	2022	588460	4623443	<i>Fiorinia externa</i>	elongate hemlock scale	pest
ROVA-034	2022	589809	4624385	<i>Fiorinia externa</i>	elongate hemlock scale	pest
ROVA-035	2022	589657	4624474	<i>Fiorinia externa</i>	elongate hemlock scale	pest
ROVA-036	2022	589354	4624476	<i>Fiorinia externa</i>	elongate hemlock scale	pest
ROVA-037	2022	589670	4624826	<i>Fiorinia externa</i>	elongate hemlock scale	pest
ROVA-040	2022	589950	4624645	<i>Fiorinia externa</i>	elongate hemlock scale	pest
ROVA-003	2024	588103	4624910	<i>Litylenchus crenatae</i> ssp. <i>Mcannii</i> complex	beech leaf disease	pest
ROVA-018	2024	590253	4624302	<i>Litylenchus crenatae</i> ssp. <i>Mcannii</i> complex	beech leaf disease	pest
ROVA-020	2024	589706	4624735	<i>Litylenchus crenatae</i> ssp. <i>Mcannii</i> complex	beech leaf disease	pest
ROVA-024	2022	587586	4627124	<i>Litylenchus crenatae</i> ssp. <i>Mcannii</i> complex	beech leaf disease	pest
ROVA-035	2022	589657	4624474	<i>Litylenchus crenatae</i> ssp. <i>Mcannii</i> complex	beech leaf disease	pest
ROVA-036	2022	589354	4624476	<i>Litylenchus crenatae</i> ssp. <i>Mcannii</i> complex	beech leaf disease	pest
ROVA-039	2022	590760	4623947	<i>Matsucoccus resinosae</i>	red pine scale	pest

Table 5. List of tree species included in Maps 3 and 4 and how each was displayed.

Latin Name	Group: Map 3. Regeneration	Group: Map 4. Tree Canopy
<i>Acer platanoides</i>	Acer platanoides (Norway maple)	Acer platanoides (Norway maple)
<i>Acer rubrum</i>	Acer spp. (maple)	Acer spp. (maple)
<i>Acer saccharum</i>	Acer spp. (maple)	Acer spp. (maple)
<i>Aesculus hippocastanum</i>	---	Other exotic spp.
<i>Ailanthus altissima</i>	Ailanthus altissima (tree-of-heaven)	Ailanthus altissima (tree-of-heaven)
<i>Amelanchier</i>	Other native subcanopy spp.	---
<i>Betula alleghaniensis</i>	Betula spp. (birch)	---
<i>Betula lenta</i>	Betula spp. (birch)	Betula spp. (birch)
<i>Carpinus caroliniana</i>	Other native subcanopy spp.	---
<i>Carya</i>	Carya spp. (hickory)	---
<i>Carya cordiformis</i>	Carya spp. (hickory)	Carya spp. (hickory)
<i>Carya glabra</i>	---	Carya spp. (hickory)
<i>Carya tomentosa</i>	---	Carya spp. (hickory)
<i>Celtis occidentalis</i>	Other native canopy spp.	---
<i>Fagus grandifolia</i>	Fagus grandifolia (American beech)	Fagus grandifolia (American beech)
<i>Fraxinus</i>	Fraxinus spp. (ash)	---
<i>Fraxinus americana</i>	Fraxinus spp. (ash)	Other native subcanopy spp.
<i>Fraxinus pennsylvanica</i>	Fraxinus spp. (ash)	---
<i>Liriodendron tulipifera</i>	Liriodendron tulipifera (tulip poplar)	Liriodendron tulipifera (tulip poplar)
<i>Nyssa sylvatica</i>	Other native canopy spp.	Other native canopy spp.
<i>Ostrya virginiana</i>	Other native subcanopy spp.	Other native subcanopy spp.
<i>Picea abies</i>	Other exotic spp.	Other exotic spp.
<i>Pinus resinosa</i>	---	Pinus resinosa (red pine)
<i>Platanus occidentalis</i>	---	Other native canopy spp.
<i>Prunus</i>	Prunus spp. (native cherry)	---
<i>Prunus avium</i>	Other exotic spp.	---
<i>Prunus serotina</i>	Prunus spp. (native cherry)	Prunus spp. (native cherry)
<i>Quercus (Red group)</i>	Quercus spp. (oak)	---
<i>Quercus alba</i>	Quercus spp. (oak)	Quercus spp. (oak)
<i>Quercus montana</i>	Quercus spp. (oak)	Quercus spp. (oak)
<i>Quercus rubra</i>	Quercus spp. (oak)	Quercus spp. (oak)
<i>Quercus velutina</i>	Quercus spp. (oak)	Quercus spp. (oak)
<i>Robinia pseudoacacia</i>	Other exotic spp.	---
<i>Sassafras albidum</i>	Other native subcanopy spp.	Other native subcanopy spp.
<i>Tilia americana</i>	Other native canopy spp.	Other native canopy spp.
<i>Tsuga canadensis</i>	Tsuga canadensis (eastern hemlock)	Tsuga canadensis (eastern hemlock)
<i>Ulmus americana</i>	Ulmus spp. (native elm)	Ulmus spp. (native elm)