



Chickasaw National Recreation Area

Exotic Plants Monitoring Summary—2022

Purpose: To briefly summarize the results of the 2022 field season of Exotic Plant-Early Detection Protocol monitoring at Chickasaw National Recreation Area.

Contacts: Please direct any questions to Vegetation Ecologist Merran Owen, at merran_owen@partner.nps.gov

Transects Surveyed: Panel 3 (3.2 kilometers)

Grid Points Surveyed: None

Number of Extra-Area Surveys Completed: None

Field Crew: M. Owen (crew lead) and C. Barry

Dates of Survey: July 11–12, 2022

Data Availability: All data are available to view and download through the Southwest Network Collaboration Exotics Dashboard, hosted on the NPS ArcGIS Portal.



Chickasaw National Recreation Area, 2022. NPS/MERRAN OWEN

Monitoring Protocol

Each year, the Southern Plains Inventory & Monitoring Network (SOPN) monitors pathways of exotic plant introduction at Chickasaw National Recreation Area (NRA) (CHIC) and other network parks. The areas sampled are typically linear transects along roads, trails, boundary lines, and stream channels that are at high risk for exotic plant invasion and infestation. The transects for each park are divided into three panels, with one panel sampled each year. In select years, exotic plant data are also collected at predetermined grid points spaced 150 meters (m) apart, at four regions within the park (West Hunting, Veterans Lake, The Point, and Cedar Blue). Grid-point surveys are done to determine the extent and distribution of exotic plants within the park interior landscape. All transect and grid-point locations at CHIC are shown in maps A-1 and A-2. Surveys of additional areas, referred to as “extra-area surveys,” may also be completed upon request from park staff.

To sample transects, surveyors walk the transect length and map exotic plant infestations that occur within 30 m of the center line. Infestations are documented as points or polygons. Points are recorded as one of three size classes: under 1-m radius, 1.1 to 5-m radius, and 5.1 to 10-m radius. Infestations larger than a 10-m radius or those that exist as long, continuous stretches are recorded as polygons. Data collected for infestations include plant species name, the size of the patch, canopy cover, number of plants present in the patch, phenology (flowering or fruiting stage), and level of site disturbance. At grid points, surveyors record the exotic plant species found within a 10-m radius of the point, as well as canopy cover and phenology for each species.

Upcoming Changes to the Protocol

Historically, SOPN Exotic Plant-Early Detection surveys have recorded all exotic plants found at transects and grid points. Beginning with the 2023 field season, we will restrict surveys at CHIC to a short list customized to each park. Our intent is to document infestations for which we recommend treatment, and to monitor species of high concern. The new monitoring list for CHIC ([Table 1](#)) was drawn from the park’s Natural Resource Condition Assessment (NRCA), completed by Struthers et al. (2016). In the NRCA, exotic plants found in 2012–2014 CHIC surveys were ranked across a series of factors, following a system designed by Hiebert and Stubbendieck (1993). Factors were based on the plant’s innate pest potential, and included reproductive abilities, germination requirements, and competitive abilities. The rankings were then used to classify plants into the following categories: highest concern, high concern, medium concern, and low concern. The 22 highest ranking plants were designated as high priority species for the park, 15 of which are included in our monitoring. For further detail, see the CHIC NRCA (Struthers et al. 2016).

Please contact the Vegetation Ecologist (see above) for further customization of the CHIC monitoring list ([Table 1](#)). Additional species will be added as requested.

Monitoring Results

In mid-July of 2022, we sampled the 3.2 kilometers (km) of transects in Panel 3 (Map A-1). This panel is in the northwest region of the park, and monitors the roadsides along Tallgrass Road, Breezy Point Road, and Primrose Lane. No grid-point or extra-area surveys were completed in 2022. Field crews observed exotic plants on each of the transects surveyed. A total of nine exotic plant species were recorded, five of which are designated as high priority for the park ([Table 2](#)). All nine species recorded in 2022 have been observed in previous surveys of Panel 3 transects, except for green bristlegrass (*Setaria viridis*).

Green bristlegrass is an annual grass that is not currently included on our park species list. We plan to confirm the identification of this species in the future through a partner herbarium. This is a common exotic grass in the western United States, and we would not consider it a priority species for treatment or eradication.

Dominant Exotic Species

The majority of exotic plant cover along our transects came from two perennial grasses—yellow bluestem (*Bothriochloa ischaemum*; Map A-3) and Johnsongrass (*Sorghum halepense*; Map A-11). These species were common along all surveyed transects, but most abundant on Tallgrass Road. Yellow bluestem is a drought-tolerant perennial grass with the capability to form monocultures in disturbed soils (Robertson et al. 2013). Johnsongrass thrives in moist, disturbed soils with full sun exposure. It is an extremely aggressive rhizomatous grass highly capable of outcompeting native prairie communities in disturbed soils (Klein and Smith 2021, Travlos et al. 2019).

Sericea lespedeza (*Lespedeza cuneata*; Map A-7) was similarly abundant along all surveyed transects and reached high levels of cover along Breezy Point and Tallgrass Roads. This species is a perennial forb from the legume family, known to invade both disturbed and undisturbed grasslands. It produces copious amounts of long-lived seeds, making it difficult to control once established (Brandon et al. 2004, Koger et al. 2002).

Treatment Recommendations

Control of Johnsongrass, yellow bluestem, and sericea lespedeza is difficult and would require multiple chemical treatments followed by revegetation. Research in western Oklahoma has demonstrated that 2–3 herbicide applications within the same growing season can significantly reduce the cover of yellow bluestem. Mowing alone does not provide control of yellow bluestem, nor does a single herbicide treatment each year (Robertson et al. 2013). Regarding Johnsongrass, repeated mowing and herbicide applications are necessary. Mowing, used as a proxy for grazing, is known to weaken Johnsongrass rhizomes and improve the efficacy of chemical treatments. Mowing is also effective at preventing seed formation and dispersal. Johnsongrass seeds are viable for up to 10 years and will form a seed bank if allowed (Klein and Smith 2021, Travlos et al. 2019). Chemical treatments of sericea lespedeza are effective but reduce the cover and biodiversity of native forbs. Mowing can prevent sericea lespedeza from shading out native plants, but resprouting is likely and may increase the overall stem density (Brandon et al. 2004, Koger et al. 2002).

The eradication of dense roadside infestations may not be a feasible priority, but to maintain control and prevent seed formation and dispersal, we recommend the park continue its current practice of mowing roadsides infested with these species.

Data Availability

Data for all exotic plant species recorded in 2022 are summarized in maps in Appendix A. Maps showing species distributions are presented in alphabetical order by scientific name. All data are available to CHIC park staff and Invasive Plant Management Teams through the Southwest Network Collaboration (SWNC) Exotics Dashboard (Figure 1), hosted on the NPS ArcGIS Portal. The dashboard is a user-friendly place to download spatial files showing exact locations and sizes of infestation points and polygons. You can also view, subset, and filter the data in the Portal interface. Exotic plant data collected by SOPN since 2009 may be accessed there. To open the dashboard, activate or sign-in to your ArcGIS Portal account, contact the SOPN Vegetation Ecologist to request your name be added to the SWNC Exotics Dashboard group, and then

open this group on the ArcGIS Portal. There are two dashboards available, one including data from 2009–2019, collected under a previous protocol, and one with data from 2020 to the present, collected under the protocol described in this report.

To further discuss the results of the 2022 Exotic Plant-Early Detection survey, please contact the SOPN Vegetation Ecologist or Invasive Plant Management Team staff.

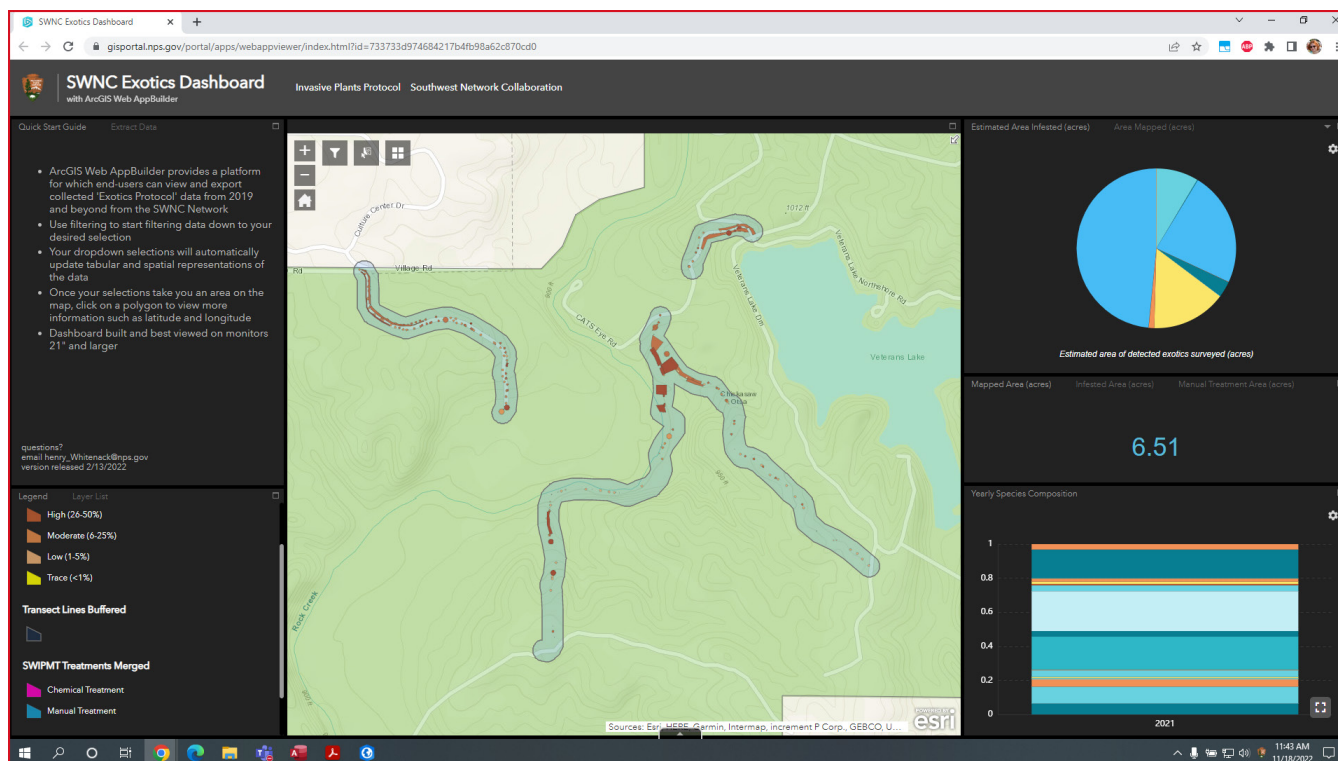


Figure 1. Screen shot of the Southwest Network Collaboration (SWNC) Exotics Dashboard, hosted on the NPS ArcGIS Portal, which can be used to view and download spatial files showing locations and sizes of exotic plant infestations.

Table 1. Exotic plant species to be included in future CHIC Exotic Plant-Early Detection surveys. Species determined as high priority in the Natural Resource Condition Assessment are marked with an asterisk. Rankings are based on the innate pest potential of the exotic plant, and categories include highest concern, high concern, medium concern, and low concern (Struthers et al. 2016).

Scientific Name	Common Name	Ranking
<i>Bothriochloa ischaemum</i> *	Yellow bluestem	Highest concern
<i>Bromus inermis</i> *	Smooth brome	Highest concern
<i>Bromus japonicus</i> *	Japanese brome	High concern
<i>Bromus tectorum</i> *	Cheatgrass	Highest concern
<i>Carduus nutans</i> *	Musk thistle	High concern
<i>Convolvulus arvensis</i> *	Bindweed	Highest concern
<i>Conium maculatum</i> *	Poison hemlock	Highest concern
<i>Coronilla varia</i> *	Crown vetch	Highest concern
<i>Cynodon dactylon</i> *	Bermudagrass	High concern
<i>Echinochloa colona</i> *	Jungle ricegrass	High concern
<i>Lespedeza cuneata</i> *	Sericea lespedeza	Highest concern
<i>Lonicera japonica</i> *	Japanese honeysuckle	Highest concern
<i>Onopordum acanthium</i> *	Scotch thistle	High concern
<i>Poa annua</i> *	Annual bluegrass	Highest concern
<i>Sorghum halepense</i> *	Johnsongrass	Highest concern

Table 2. Exotic plant species observed in the 2022 CHIC Exotic Plant-Early Detection survey. Species determined as high priority in the Natural Resource Condition Assessment are marked with an asterisk. Infestation size is calculated as the total area mapped with the given species present; point acreage is estimated by taking the midpoint of each size class.

Scientific Name	Common Name	Life Form	Duration	Infestation Size (Est. Acreage)
<i>Bothriochloa ischaemum</i> *	Yellow bluestem	Grass	Perennial	6.03
<i>Lespedeza cuneata</i> *	Sericea lespedeza	Forb/Herb ¹	Perennial	5.61
<i>Sorghum halepense</i> *	Johnsongrass	Grass	Perennial	4.48
<i>Cynodon dactylon</i> *	Bermudagrass	Grass	Perennial	2.71
<i>Kummerowia stipulacea</i>	Korean lespedeza	Forb/Herb	Annual ²	1.86
<i>Bromus japonicus</i> *	Japanese brome	Grass	Annual	0.04
<i>Setaria viridis</i>	Green bristlegrass	Grass	Annual	0.04
<i>Melilotus</i> sp. ³	Sweetclover	Forb/Herb	Biennial ⁴	0.02
<i>Paspalum dilatatum</i>	Dallisgrass	Grass	Perennial	0.02

¹ A forb is an herbaceous (non-woody) flowering plant that is not a grass. The colloquial term is “wildflower.”

² Annual plants germinate, flower, produce seed, and die in the space of one growing season, while perennials flower and produce seed for many years.

³ In the SOPN Exotic Plant-Early Detection surveys, species of *Melilotus* are identified to genus only.

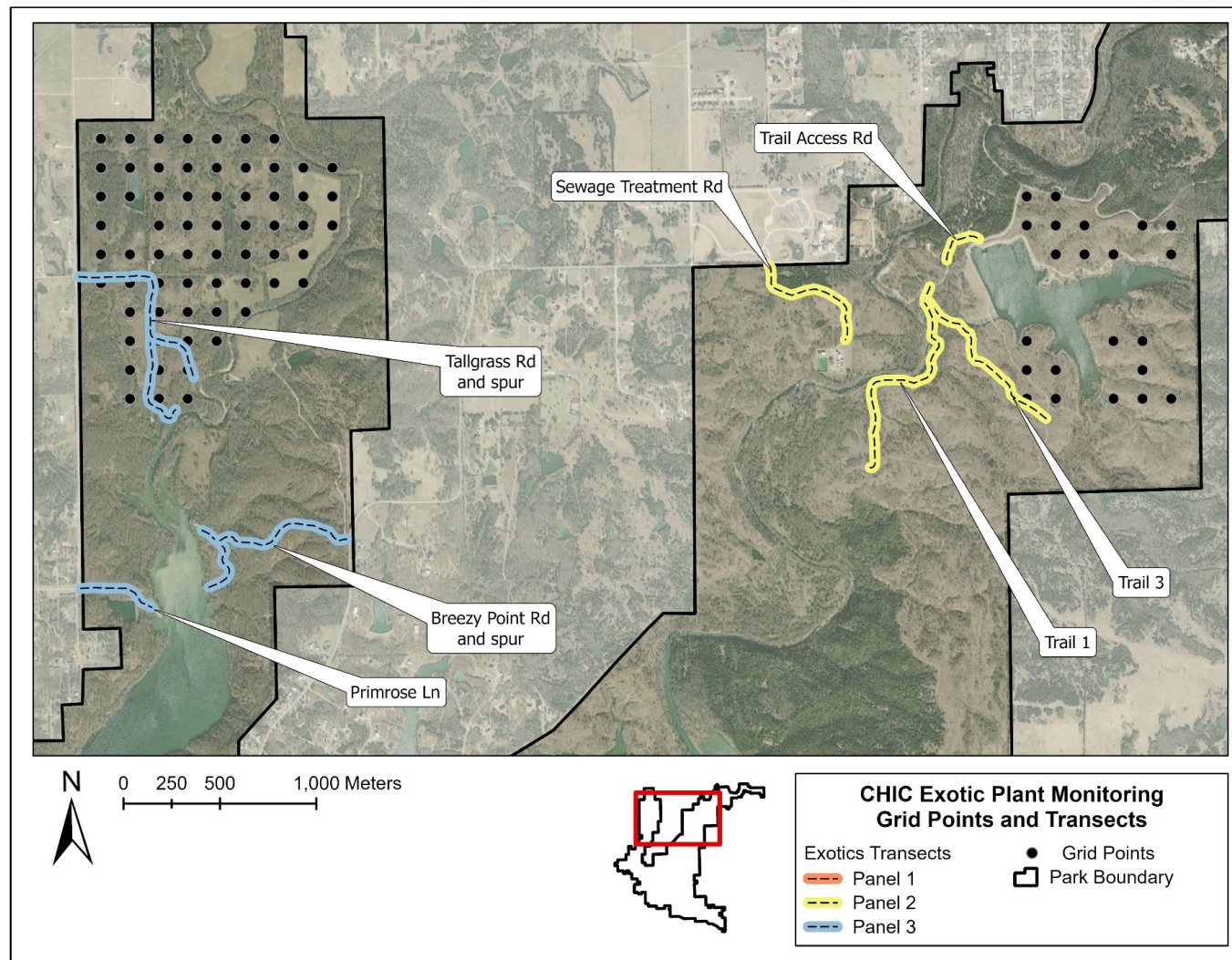
⁴ Biennials complete their life cycle in two years and generally do not flower in their first year.

Literature Cited

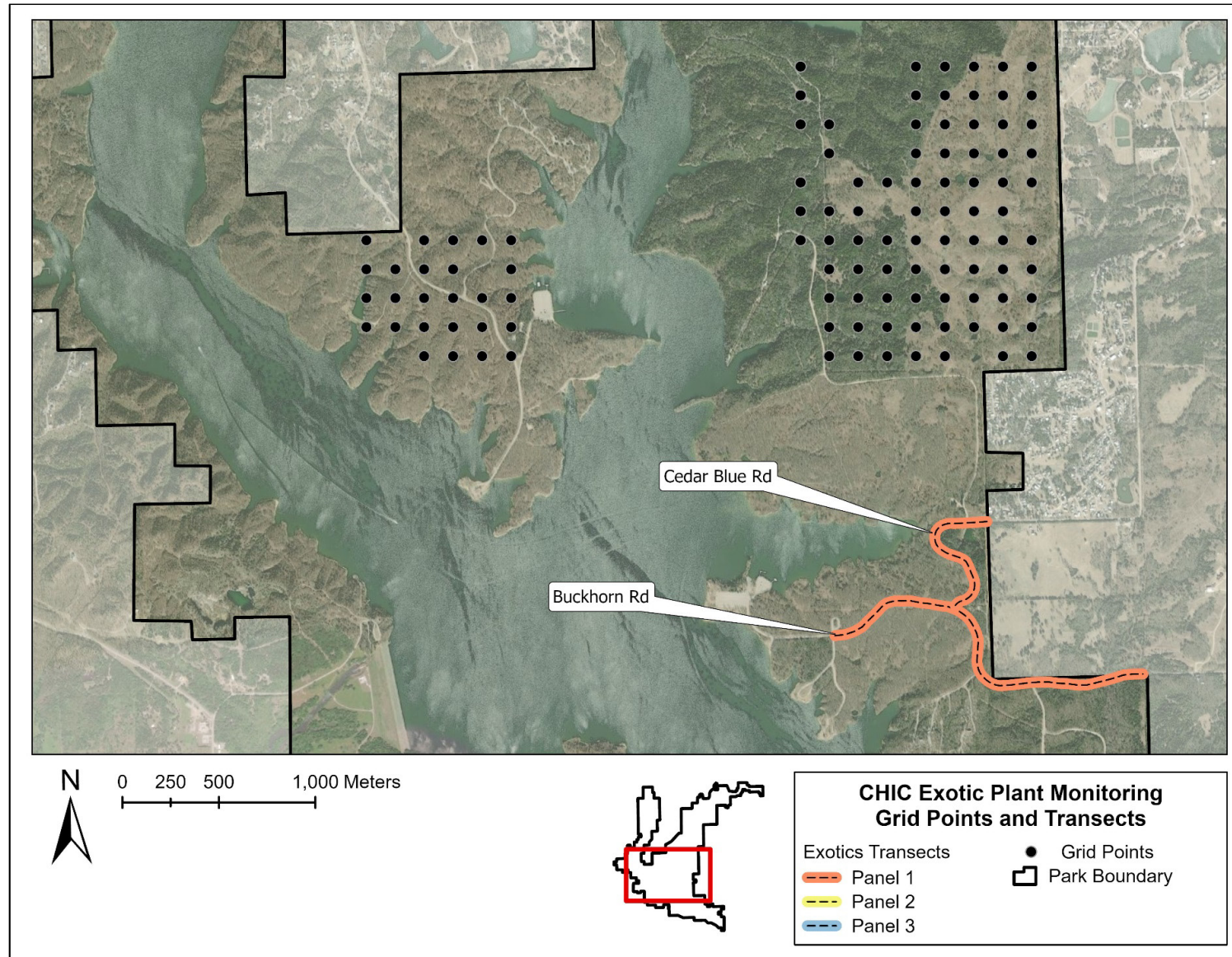
- Brandon, A. L., D. J. Gibson, and B. A. Middleton. 2004. Mechanisms for dominance in an early successional old field by the invasive non-native *Lespedeza cuneata* (Dum. Cours.) G. Don. *Biological Invasions* 6(4):483–493.
- Hiebert, R. D., and J. Stubbendieck. 1993. Handbook for ranking exotic plants for management and control. Natural Resources Report NPS/NRMWRO/NRR/93/08. National Park Service, Midwest Regional Office, Omaha, Nebraska, and University of Nebraska, Department of Agronomy, Lincoln, Nebraska.
- Klein, P., and C. M. Smith. 2021. Invasive Johnsongrass, a threat to native grasslands and agriculture. *Biologia* 76(2):413–420.
- Koger, C., J. Stritzke, and D. Cummings. 2002. Control of sericea lespedeza (*Lespedeza cuneata*) with Triclopyr, Fluroxypyr, and Metsulfuron. *Weed Technology* 16(4):893–900.
- Robertson, S., H. R. Hickman, K. R. Harms, and D. M. Leslie, Jr. 2013. Combining glyphosate with burning or mowing improves control of yellow bluestem (*Bothriochloa ischaemum*). *Rangeland Ecology and Management* 66(3):376–381.
- Struthers, K., N. Chambers, P. Valentine-Darby, A. Mathis, D. Shorrock, N. Osborn, R. E. Bennetts, T. Folts-Zettner, and H. Sosinski. 2016. Chickasaw National Recreation Area: Natural resource condition assessment. Natural Resource Report NPS/SOPN/NRR— 2016/1137. National Park Service, Fort Collins, Colorado.
- Travlos, I. S., J. M. Montull, G. Kukorelli, G. Malidza, M. N. Dogan, N. Cheimona, N. Antonopoulos, P. J. Kanatas, S. Zannopoulos, and G. Peteinatos. 2019. Key aspects on the biology, ecology and impacts of Johnsongrass [*Sorghum halepense* (L.) Pers] and the role of glyphosate and non-chemical alternative practices for the management of this weed in Europe. *Agronomy* 9(11):717.

Appendix A. Chickasaw National Recreation Area Exotic Plant-Early Detection Survey Maps, 2022

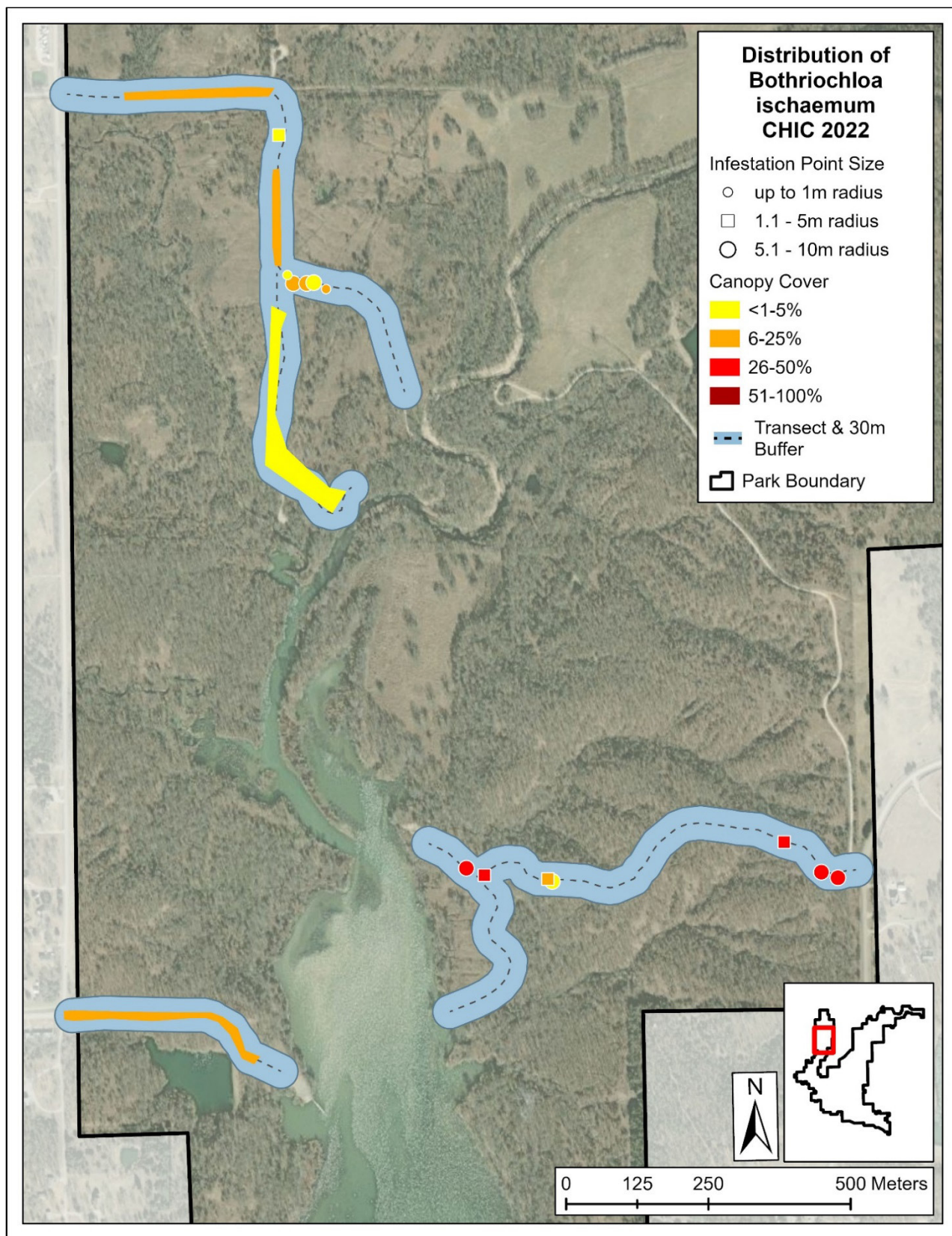
Map A-1. Map showing all exotic plant transect and grid-point locations for the northern portion of Chickasaw NRA. Transects are broken into three panels, with one panel surveyed each year. Panel 3 was surveyed in 2022. Grid points are 150 m apart, and areas with >30% slope are excluded.



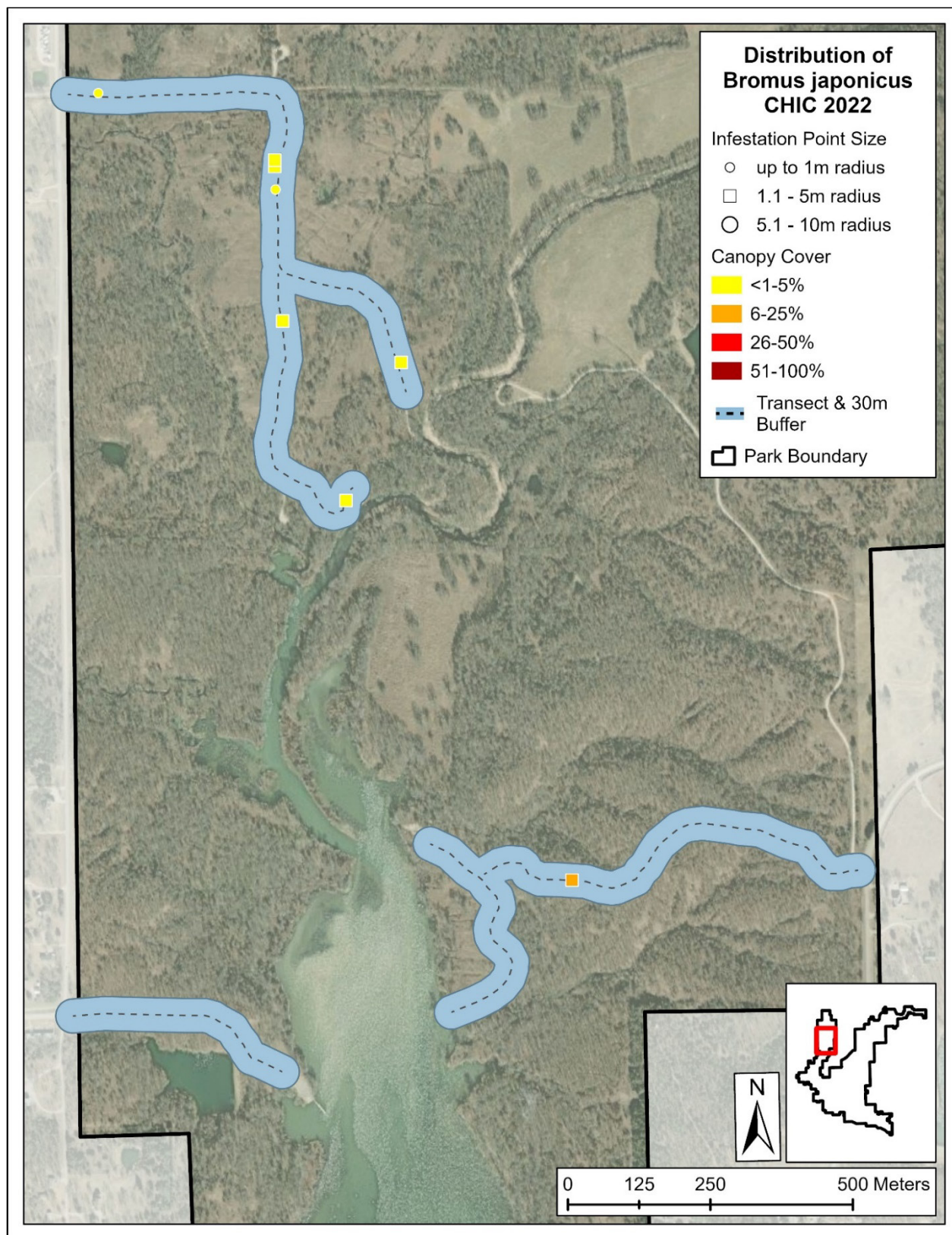
Map A-2. Map showing all transect and grid-point locations for the southern portion of Chickasaw NRA. Transects are broken into three panels, with one panel surveyed each year. Panel 3 was surveyed in 2022. Grid points are 150 m apart, and areas with >30% slope are excluded.



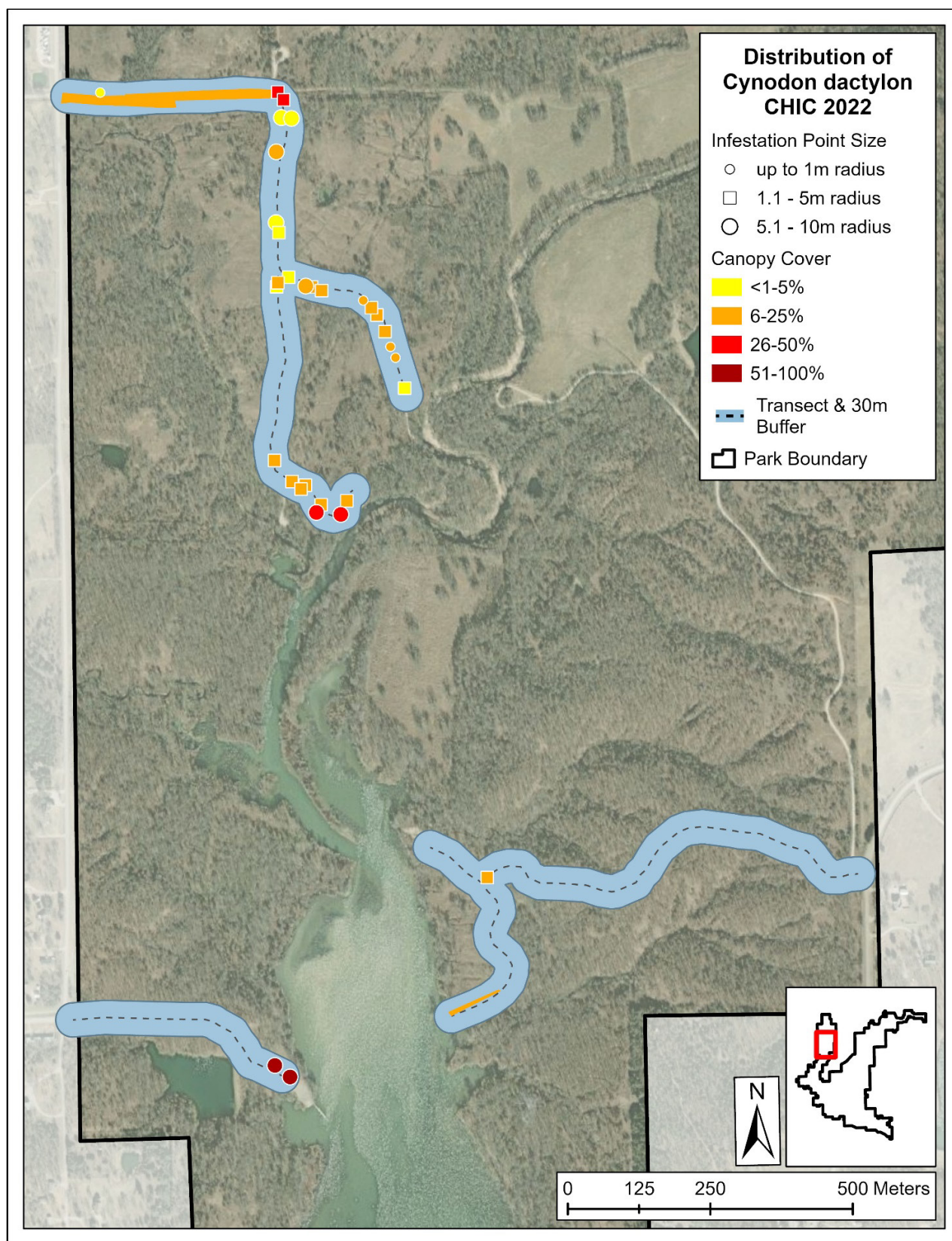
Map A-3. Yellow bluestem (*Bothriochloa ischaemum*) distribution, infestation size, and canopy cover recorded in July 2022 surveys.



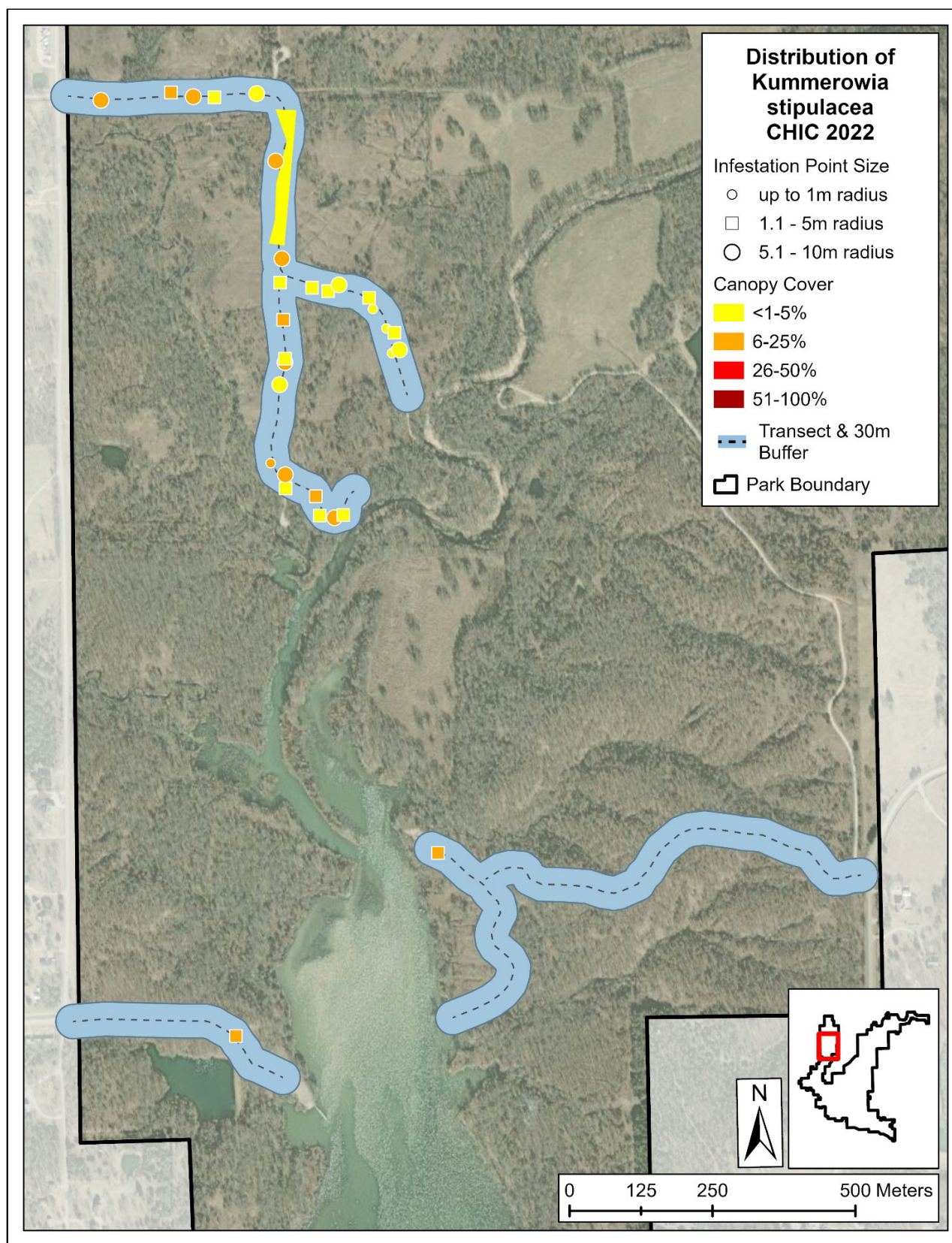
Map A-4. Japanese brome (*Bromus japonicus*) distribution, infestation size, and canopy cover recorded in July 2022 surveys.



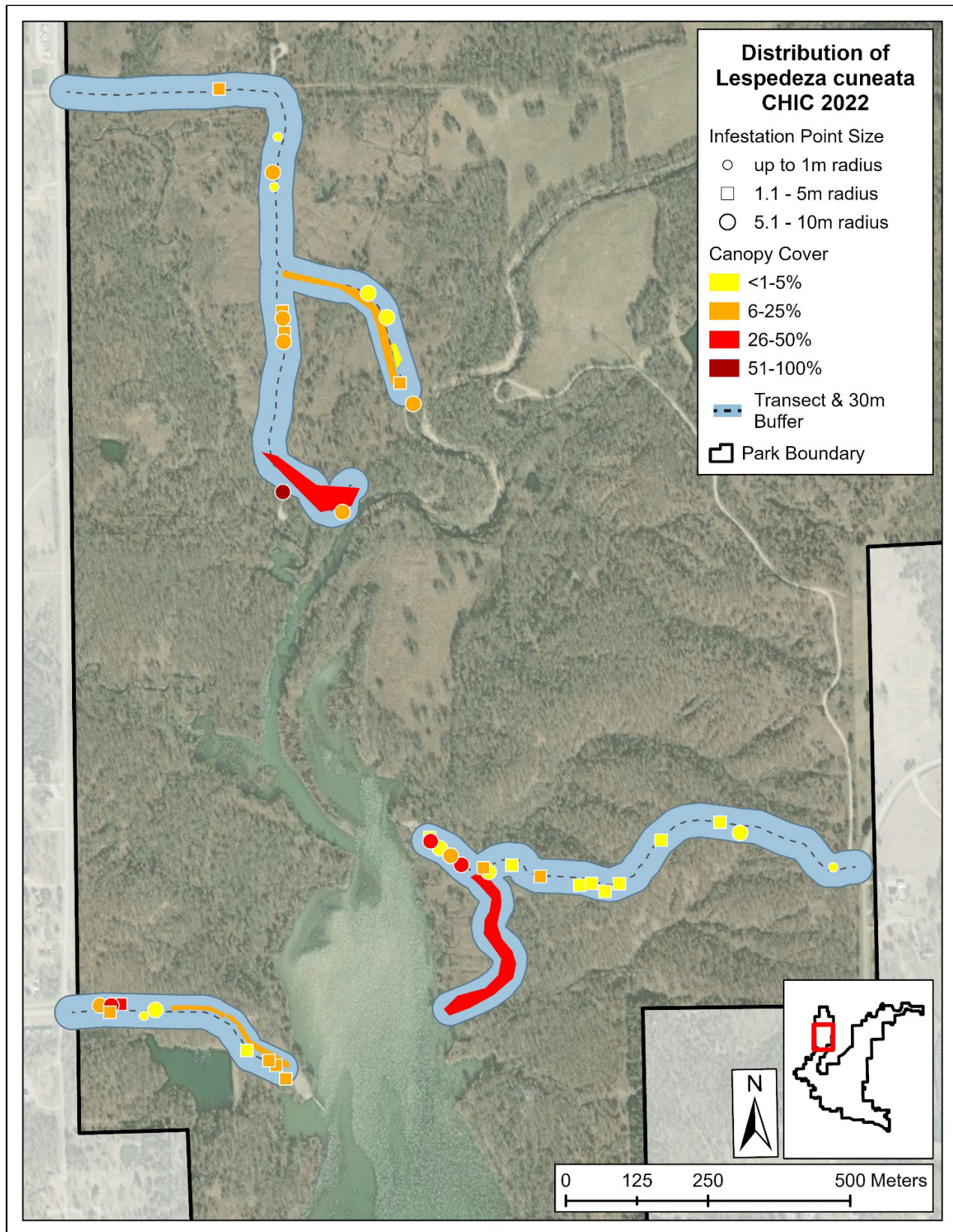
Map A-5. Bermudagrass (*Cynodon dactylon*) distribution, infestation size, and canopy cover recorded in July 2022 surveys.



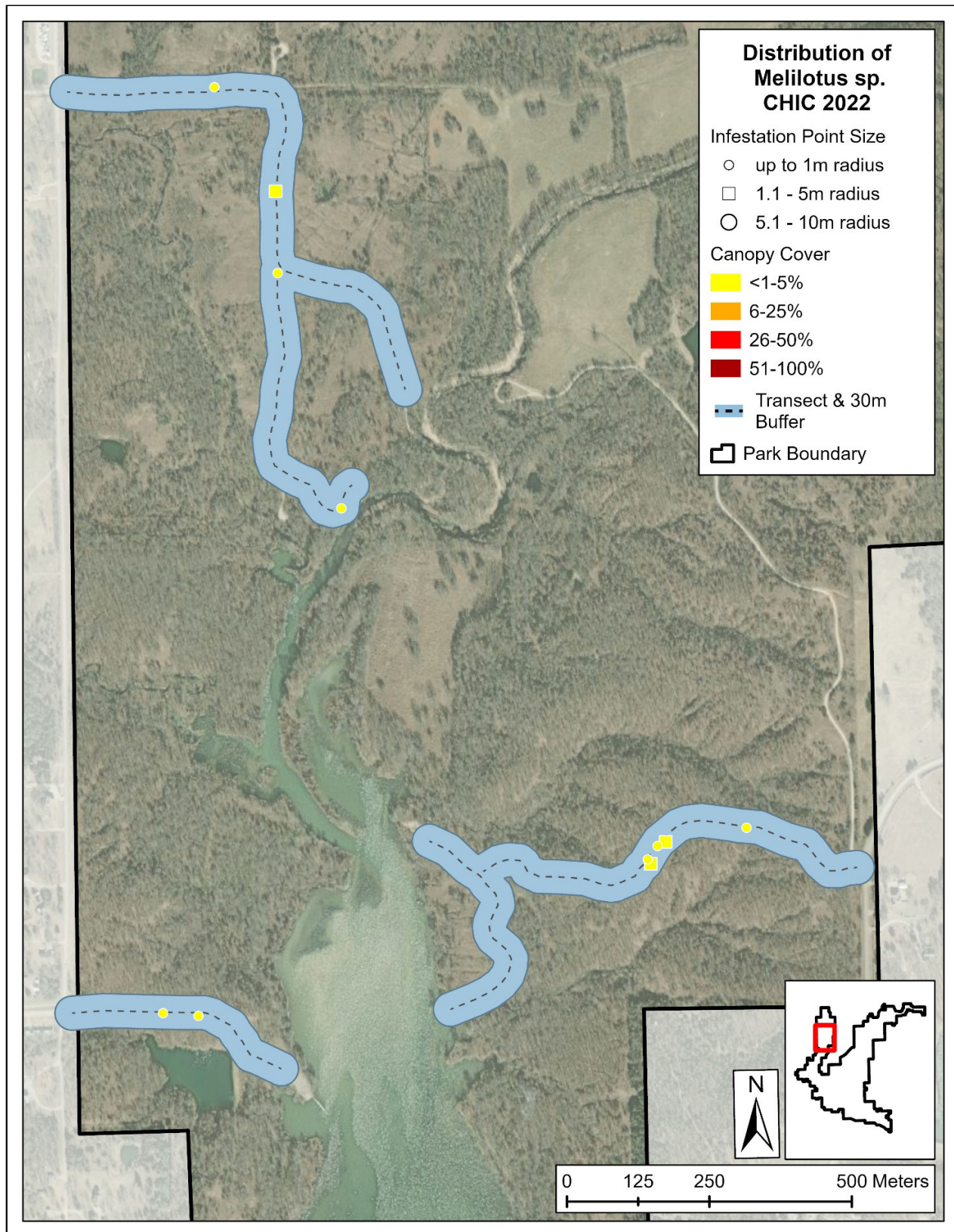
Map A-6. Korean lespedeza (*Kummerowia stipulacea*) distribution, infestation size, and canopy cover recorded in July 2022 surveys.



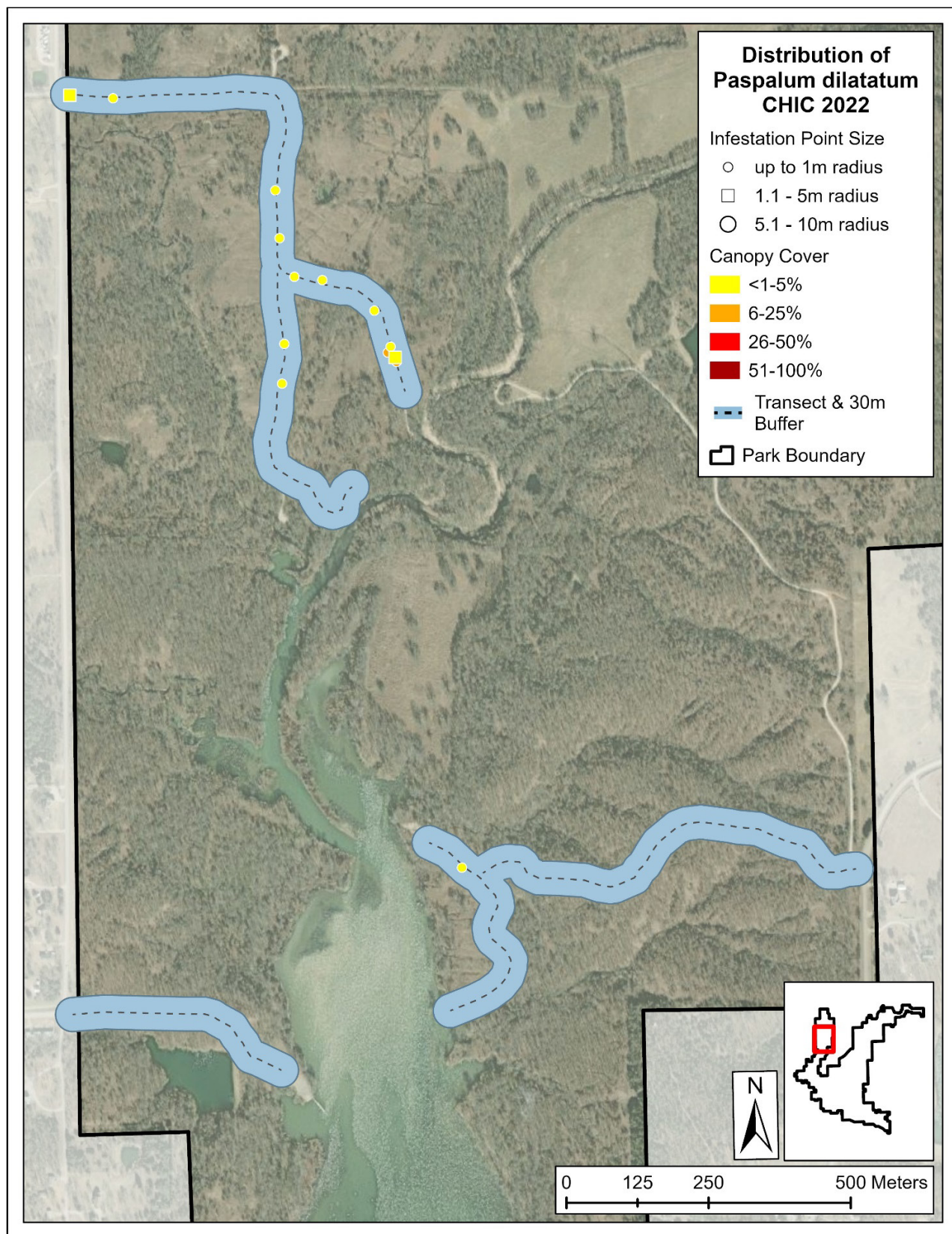
Map A-7. *Sericea lespedeza* (*Lespedeza cuneata*) distribution, infestation size, and canopy cover recorded in July 2022 surveys.



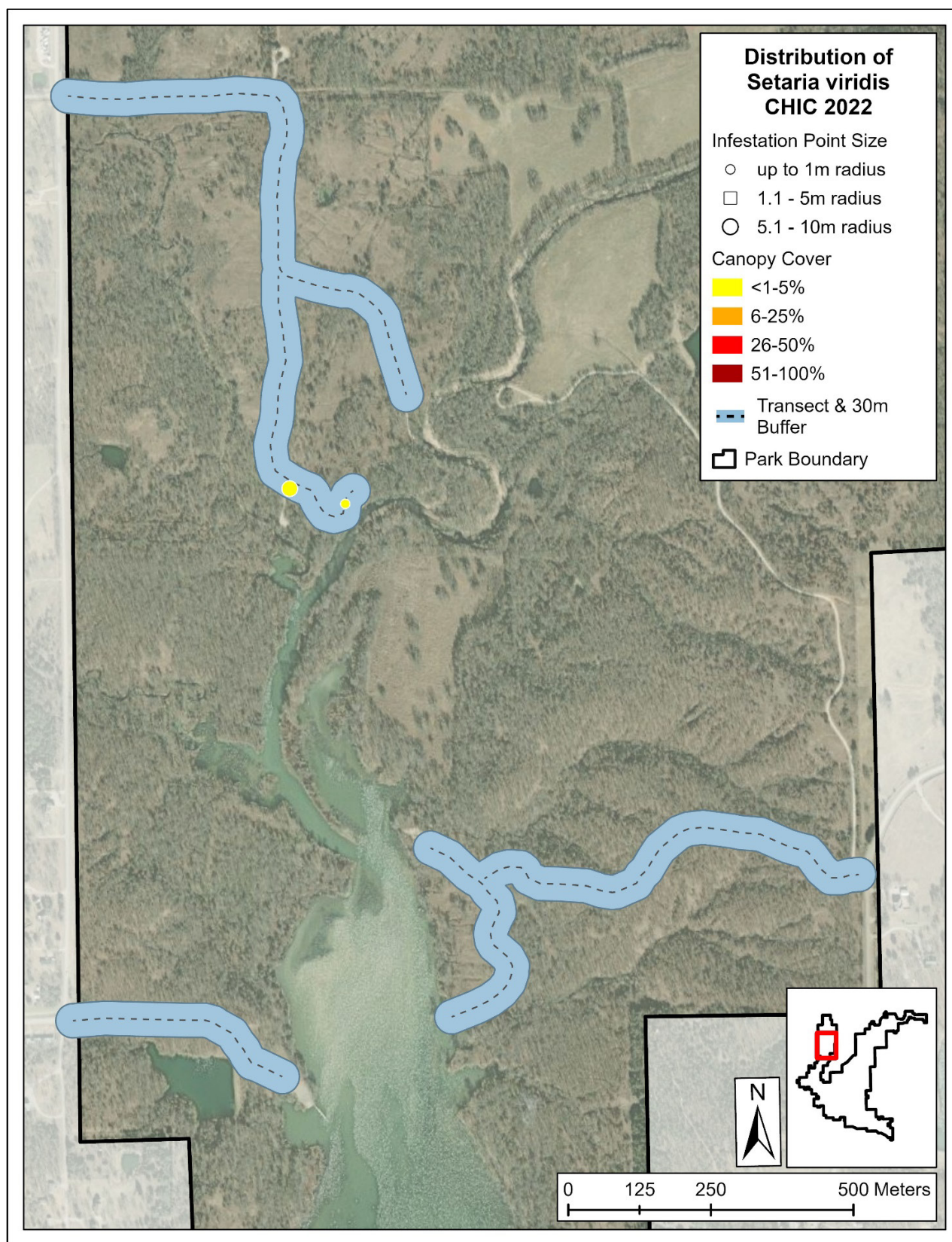
Map A-8. Sweetclover (*Melilotus* sp.) distribution, infestation size, and canopy cover recorded in July 2022 surveys.



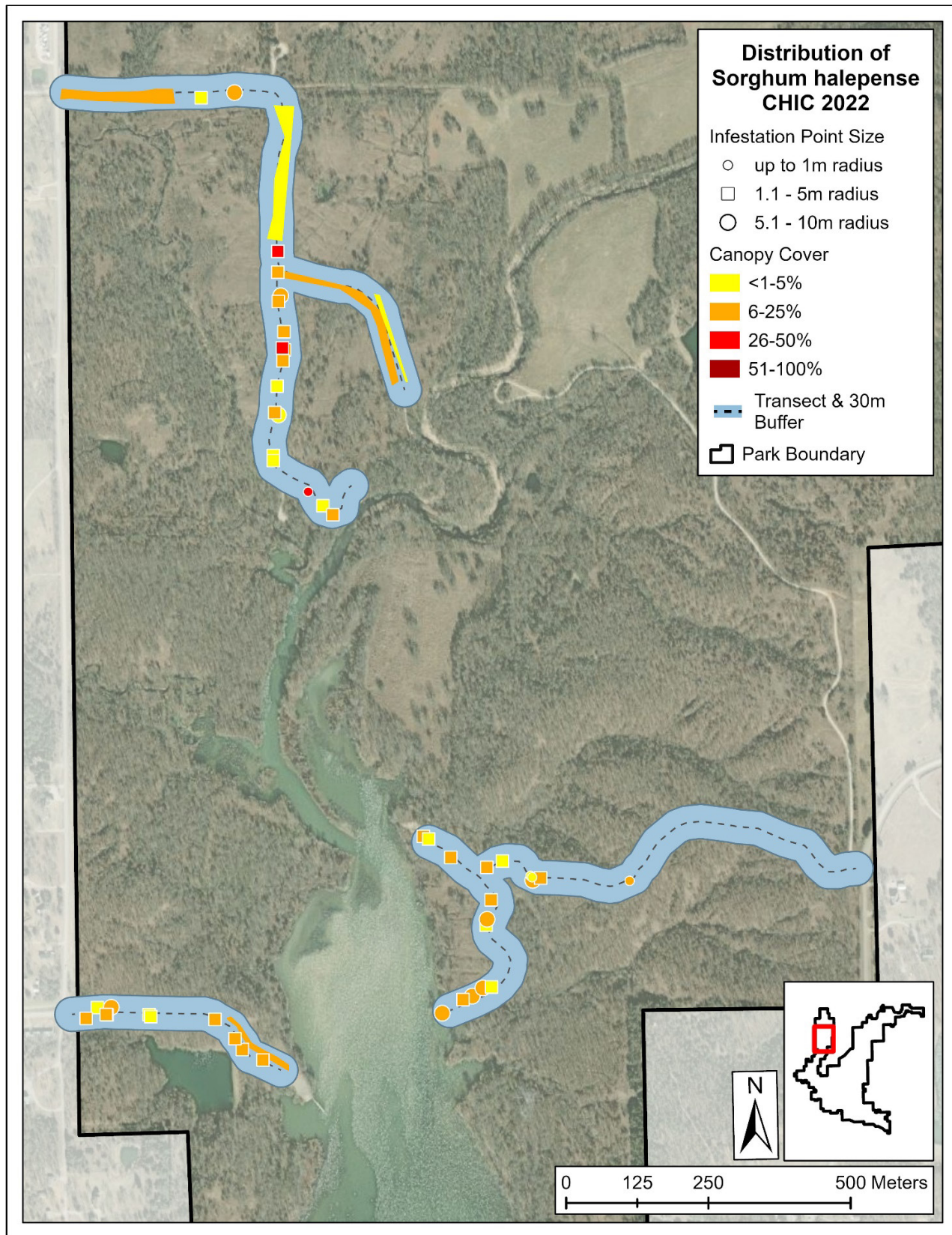
Map A-9. Dallisgrass (*Paspalum dilatatum*) distribution, infestation size, and canopy cover recorded in July 2022 surveys.



Map A-10. Green bristlegrass (*Setaria viridis*) distribution, infestation size, and canopy cover recorded in July 2022 surveys.



Map A-11. Johnsongrass (*Sorghum halepense*) distribution, infestation size, and canopy cover recorded in July 2022 surveys.



Report Disclaimer

This report received peer review by subject-matter experts who were not directly involved in the collection, analysis, or reporting of the data, and whose background and expertise put them on par technically and scientifically with the authors of the information. Peer review helps to ensure that the information is scientifically credible, technically accurate, appropriate to its intended audience, and effectively presented. Data in this report were collected and analyzed using methods based on established, peer-reviewed protocols and were summarized and interpreted within the guidelines of the protocols. Views, statements, findings, conclusions, recommendations, and data in this report do not necessarily reflect views and policies of the National Park Service, U.S. Department of the Interior. Mention of trade names or commercial products does not constitute endorsement or recommendation for use by the U.S. Government.

Report Citation

Owen M., A. Pingatore, C. Barry, and P. Valentine-Darby. 2023. Chickasaw National Recreation Area exotic plants monitoring summary—2022. National Park Service, Southern Plains Inventory and Monitoring Network, Pecos, New Mexico.