Documenting invasive *Prunus* species in Anchorage parks with digital data forms: a course at the University of Alaska Anchorage

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Introduction

Invasive tree species such as *Prunus padus* and *Prunus virginiana* pose significant challenges in populated areas of Alaska, especially in cities like Anchorage, where their impact is severe (AKEPIC Invasiveness Rank 83). Despite intermittent surveys conducted since the 2010s, *Prunus* data reported in the Alaska Exotic Plant Information Clearinghouse (AKEPIC) are substantially underrepresented in Anchorage. For example, riparian and forested areas around the University of Alaska Anchorage (UAA), as well as the majority of city parks, contain unrecorded observations of *Prunus* (Fulkerson pers. obs.; AKEPIC 2024; Figure 1). Many of these parks include naturalized forested zones or adjoin the extensive greenbelts within Anchorage, contributing to interconnected natural areas. Increased survey data will improve understanding of the extent of *Prunus* infestations and support more targeted management responses.

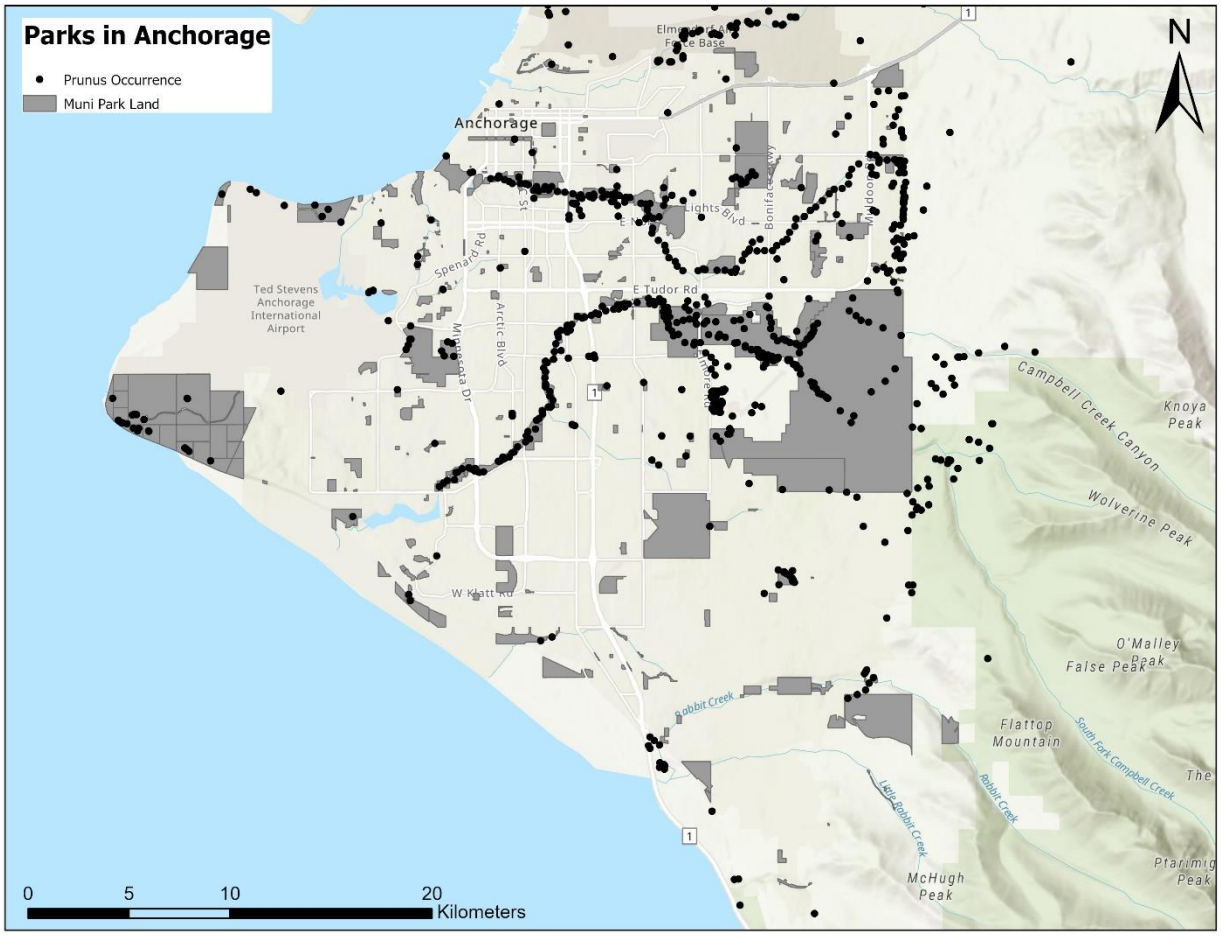

Figure 1. Parks in Anchorage with Prunus occurrence data.

Digital data collection tools by Environmental Systems Research Institute, Inc. (ESRI), such as Survey123 and Field Maps, have become widely adopted in the natural resources and environmental sciences sectors. For instance, a session on data collection methods at the 2023 Alaska Invasive Species Workshop revealed that nearly all federal agencies and many non-profits have recently transitioned from paper forms to digital formats for invasive plant data collection. While these tools are increasingly used across the industry, training is largely self-

guided. General discussions at the workshop indicated that users often spend considerable time troubleshooting and refining digital forms, and many remain unaware of advanced features that support more accurate data collection and quality assurance.

To help prepare students for careers in natural sciences and integrate current industry practices, the Alaska Center for Conservation Science and the Department of Anthropology and Geography at UAA have developed a new field course focusing on digital data collection and spatial analysis. This course, GEOG A494 Mobile Field Data Collection in Community Forestry, emphasizes data collection techniques for *Prunus* species in Anchorage's data-deficient parklands. A companion course, GEOG A475 Geospatial and Cartographic Techniques for the Sciences, which is regularly offered by the Department of Anthropology and Geography, covers broader geospatial environmental data techniques, and allowed students to integrate data gathered from the field course in ongoing projects. The primary objectives of GEOG A494 include training students to create digital data forms, conduct field data collection, ensure data quality control, curate datasets, and report geospatial findings.

These new courses will enhance undergraduate training in geospatial data collection and contribute valuable data toward managing *Prunus* in Anchorage. By engaging students in real-world data collection and curation, these programs aim to equip future professionals in environmental sciences and natural resource management with practical, industry-relevant skills. Here we summarize the results of the *Prunus* survey and course objectives and outcomes.

Methods

Prunus survey

The survey area for this study focused on the Municipality of Anchorage, specifically the Anchorage Bowl. Areas outside the bowl, including Girdwood and Eagle River, were omitted, as was Joint Base Elmendorf, due to restricted access to the military base.

Occurrences of *Prunus padus* and *P. virginiana* were extracted from AKEPIC and clipped to the defined study area (AKEPIC 2024; Figure 1). A geospatial dataset of "Park Lands" from the Municipality of Anchorage was intersected with the AKEPIC *Prunus* data (Municipality of Anchorage GDIC 2024; Figure 1). Estuary lands were removed from the dataset due to safety and access limitations. Some parks in the geospatial dataset contain multiple polygons; however, only one polygon per park contained *Prunus* data (e.g., Goose Lake Park). Several parks had *Prunus* data on their boundaries, making it unclear whether the data represented an infestation within the park itself or how thoroughly the park was surveyed. These parks were retained in the study. University Lake Park, due to its proximity to UAA, was also retained, as a small section was documented with *Prunus*, though personal observations suggest a higher infestation level (Fulkerson pers. obs.). This data intersection revealed that 70% of parks (195 of 276 park parcels) contained no *Prunus* data. These parks were selected as target survey areas for GEOG 479 students. An online web app was provided to facilitate park visitation coordination and daily data sharing. Students prioritized which parks to visit.

A Survey123 data form was used to document *Prunus* observations, incorporating the minimum AKEPIC-required attributes: Observer Name, Date, Presence/Absence, and Percent Canopy

Cover. Canopy cover estimates were binned in 10% increments, with additional bins for <5% and 5% to simplify estimation. The form included open text fields for Location Notes and General Notes. Selectable options for Stem Count and Disturbance Type were restricted to AKEPIC-required attributes. Survey Area was displayed as a geoshape, enabling the observer to draw a polygon that represented the area surveyed. The polygon's acreage automatically calculated for AKEPIC reporting. Due to Survey123 limitations allowing only one polygon per survey, each Survey Area polygon was also used as the Infested Area for reporting purposes.

The survey did not differentiate between *P. padus* and *P. virginiana*, as they are difficult to distinguish in the field. Students received training on *Prunus* identification and invasive plant survey techniques. To document survey areas, students walked the park perimeters, tracing their steps to create polygons and ensuring each survey area was approximately one acre, using additional polygons to document discrete areas within a park. Within each polygon, students recorded the Presence/Absence and Percent Canopy Cover of *Prunus* (Figure 2). During the initial weeks, surveys were conducted in pairs, transitioning to individual work thereafter. Data was collected via the Survey123 app and reviewed in class for quality assurance.

Survey data is presented as descriptive statistics and mapped in this report. The centroid of each polygon was calculated and recorded as latitude and longitude coordinates for AKEPIC data submission. Data was uploaded to AKEPIC on November 5, 2025.

Figure 2. Student collecting Prunus data on a tablet at Connors Lake Park.

GEOG A494 Class Instruction

The new field course, GEOG A494 Mobile Field Data Collection in Community Forestry, focused on field data collection methods, alongside GEOG A475 Geospatial and Cartographic Techniques for the Sciences, which covered broader geospatial data applications. Five students (three undergraduates and two graduates) enrolled in GEOG A494. Students who earned a grade of "D" or higher received a stipend to encourage enrollment and help cover vehicle transportation costs.

The one-unit course met for five hours every Friday over eight weeks, with each session including a short lecture on topics such as data collection, digital form creation, invasive species biology, and quality control measures. The course's instructional goals and student learning outcomes were as follows:

Instructional Goals

1. Develop skills in mobile data collection using industry standard tools.
2. Provide real-world experience in field data collection and analysis.

Student Learning Outcomes

1. Describe field data collection systems and GIS database management.
2. Create data collection forms and maps.
3. Use GNSS devices and GIS software in field settings.
4. Assess data accuracy, validate database entries, and map and report data.
5. Recognize the ethical considerations in the collection of field data.

Students were required to collect *Prunus* data weekly, create their own Survey123 project on a chosen subject, collect data using their Survey123 form, map their study's geospatial data, and provide a basic data summary.

Results and Discussion

A total of 44 parks were fully or partially surveyed, resulting in 147 AKEPIC records (Figure 3; Table 1). The surveyed area covered approximately 320 acres. *Prunus* was not detected in 23 out of 147 survey polygons. The surveyed polygons ranged in size from 0.06 acres to 18 acres, with an average size of 2.18 acres. Average canopy cover for *Prunus* was 10.19%, with a range from <5% to 70%. Parks surveyed were distributed across northern neighborhoods (e.g., Mountain View), Midtown, the East Side, and southward to the Rabbit Creek area (Figure 3).

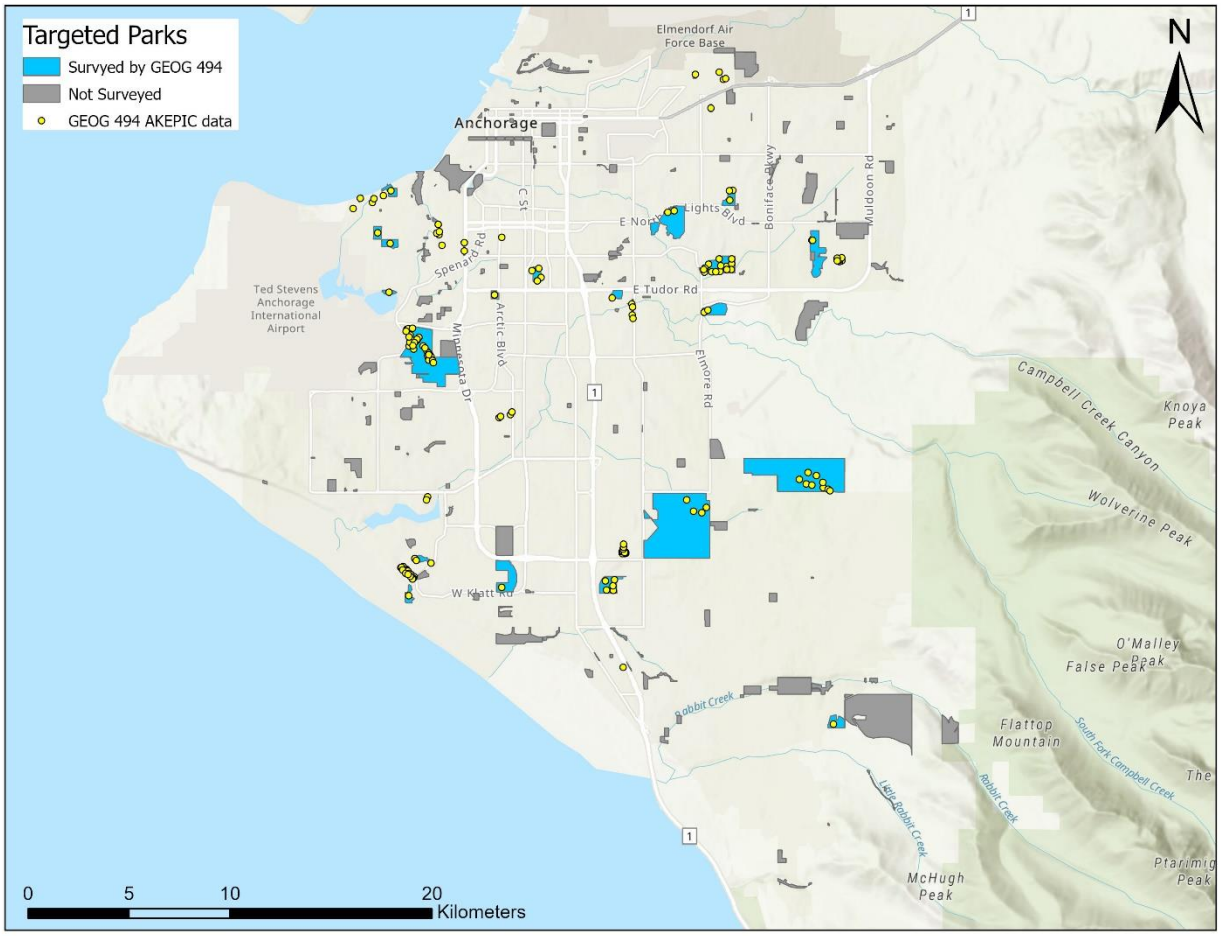

Figure 3. Targeted parks for survey that had no previous Prunus occurrence data. Blue parks were surveyed by GEOG 494 students.

Table 1. List of parks surveyed by GEOG 494 students.

Park Name	
Arctic/Benson Park	Louie G. Mizelle Park
Balto Seppala Park	Lyn Ary Park
Baxter Bog Park	Marston Drive Park
Bayshore Park North	Minnesota Park
Bayshore Park South	Muriel Park
Campbell Creek Greenbelt - Part E	Old Hermit Park
Carr-Gottstein Park	Papago Park
Chuck Albrecht Softball Complex	Pete's Park
Clay Park	Pop Carr Park
Connors Lake Park	Ray E. Storck Homestead Park
Duldida Park	Russian Jack School Park
Goose Lake Park	Ruth Arcand Park
Hamilton Park	Scenic Park

Park Name	
Heatherstone Park	South Anchorage Sports Park
Hillside Park	Spenard Beach Park
Iliamna Park	St. Mary's Park
Independence Park	Tanglewood Park
Kanchee Park	Telequana Park
LaHonda Park	The Cuddy Family Mid-Town Park
Lake Otis Buffer Park North	University Lake Park
Little Park	W. B. Lyons Park and Mountain View Recreation Center
Lloyd Steele Park	Wolverine Park

Some parks were thoroughly surveyed (e.g., Lyn Ary Park), while others were only partially covered (e.g., Connors Lake Park; Figure 4). These data significantly enhance understanding of *Prunus* distribution and infestation severity in Anchorage's parks and natural lands. We suggest these parks be revisited in the future to document the entire park boundary.

Prunus was not detected in Hillside Park and W. B. Lyons Park. However, AKEPIC data from 2023 indicate a small *Prunus* tree was observed near (but not within) a surveyed area in Hillside Park. This suggests that students did not survey the precise location of the prior observation, and that *Prunus* spread in this area may be slow. While no clear patterns emerged in infestation severity (percent canopy cover) across the study area, students noted that canopy cover and presence/absence of *Prunus* varied by habitat type (Figure 4). In particular, areas with very low or absent canopy cover were often associated with wetland or bog habitats.

During class data reviews, it was observed that some polygons corresponded to entire park boundaries. These polygons included non-target type habitat of playground or baseball fields. These review sessions highlighted the importance of defining smaller, distinct infestation areas to capture data that is both meaningful and representative. Nevertheless, even larger survey and infestation areas documented new occurrences, contributing valuable insights into the spread of *Prunus* in Anchorage.

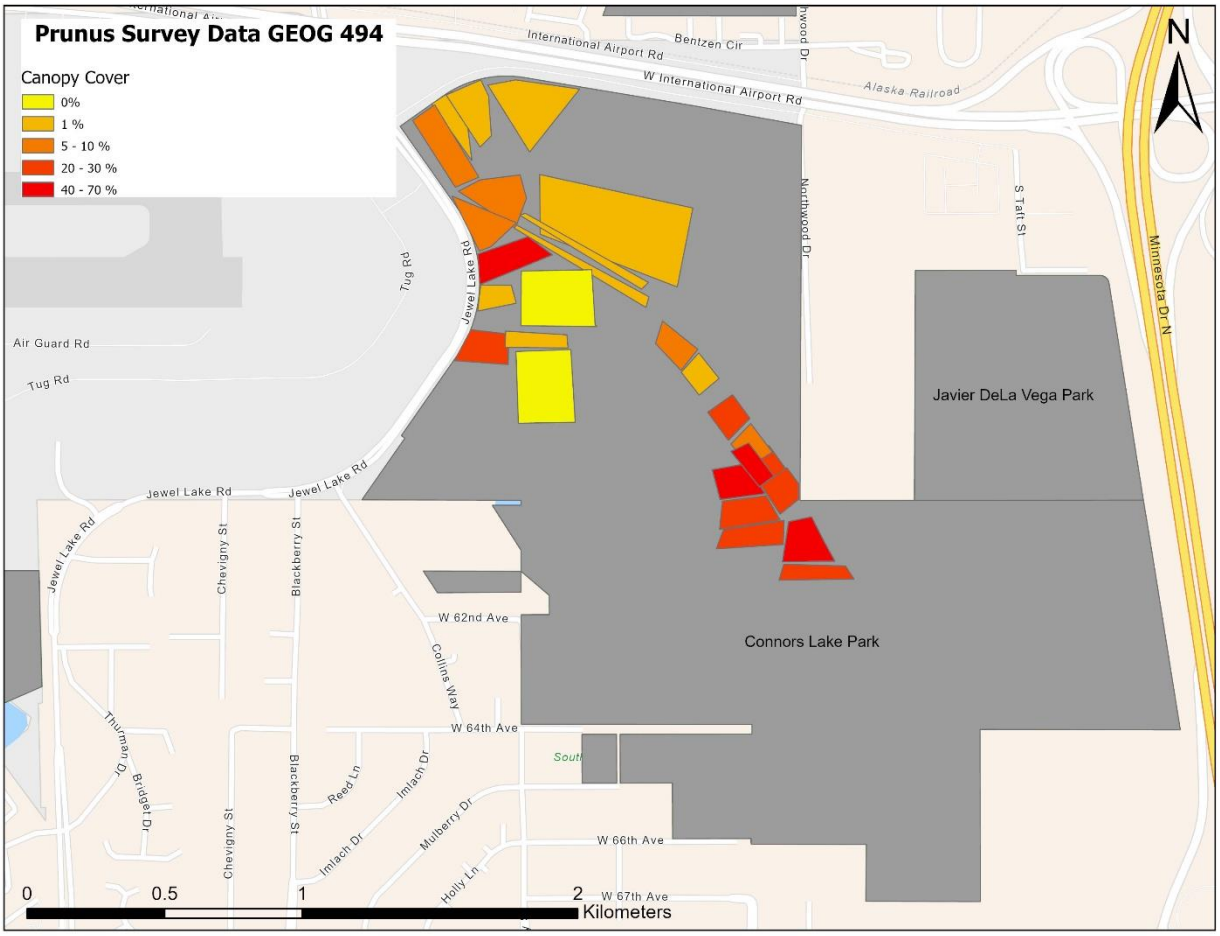

Figure 4. Survey area of Connors Lake Park and associated canopy cover of Prunus.

Student chosen projects that utilized Survey123 varied in subject matter but all included simple and advanced data attributes within the digital form. Projects included mapping culturally modified trees for their graduate thesis, survey of stores that sell Xtratuf boots, locations of Little Libraries, bicycle racks in the University Medical neighborhood, and pothole location and severity in the Anchorage Bowl. All of the students met the learning objectives of creating original Survey123 forms, testing data collection and revising forms, performing data quality assurance, and spatial analyses of data. In many cases, data collected in these projects will also be used in ongoing projects in GEOG A475, the companion course.

In summary, the diverse range of student-selected projects utilizing Survey123 not only reinforced practical skills in digital data collection and spatial analysis but also highlighted the flexibility of Survey123 for various research applications. By independently designing and refining forms, students developed critical thinking in data structuring and quality assurance, skills that are highly applicable across disciplines.

Overall, the course successfully met its learning objectives, equipping students with robust tools and methodologies that will strengthen their thesis work and future research initiatives. In particular, the graduate students provided feedback that the course will enhance their data

collection and database management for their theses in the natural sciences. Undergraduates were given the opportunity to learn how to use a valuable data collection tool that many will encounter in professional settings. All students were actively engaged in collecting real and valuable data for a community partner, while also learning how to use data collection tools to capture their own, usable data. Students were further asked to consider problems related to collecting accurate and consistent data and how to display and present data in a professional setting and through publicly available applications.

Literature Cited

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