



TO: PRRIP TECHNICAL ADVISORY COMMITTEE
FROM: PRRIP EXECUTIVE DIRECTOR'S OFFICE
SUBJECT: PHRAGMITES STUDY UPDATE AND PRELIMINARY PLANS
DATE: 01 JULY 2022

I. Context and Big Question

Beginning in the early 2000s, non-native *Phragmites australis* (common reed; hereafter *Phragmites*) spread extensively throughout the active channel of the central Platte River. *Phragmites* often forms dense, monotypic stands that stabilize banks, point bars, and islands. Transformation of channel environments has had adverse effects on wildlife habitat, most notably a reduction in roosting habitat for migratory whooping and sandhill cranes.

An extensive *Phragmites* control program along the central Platte River has been ongoing since 2008, and hundreds of river miles have been treated annually with the herbicide Imazapyr. Although the program has reduced the severity of the infestation, regular and ongoing treatment is considered necessary.

In recent years (2020-2022), prescribed environmental flow releases have been implemented during the month of June with the goal of inundating active channel surfaces (i.e., the portion of the river that is influenced by flowing water) to reduce vegetation establishment. Although some form of June flow augmentation has occurred since 2020, 2022 was the only year that flow was consistently maintained at or near the target (1500 cfs at Grand Island) for nearly 30 days.

To date, the effectiveness of herbicide or hydrologic control measures for *Phragmites* (or other vegetation) has not been quantified, and very little is known about basic survival, reproduction, expansion/contraction, and mortality dynamics of *Phragmites* along the central Platte River. The PRRIP Extension Science Plan identifies management of *Phragmites* as a key area of uncertainty needing further investigation.

Extension Big Question #2 is, *How effective is Program management of Phragmites for maintaining suitable whooping crane roosting habitat?*

Sub-questions:

- How effective have previous Program control efforts (flow, spraying, etc.) been?
- How much do growing season flows influence *Phragmites* expansion/control?

II. Note on study development

The following sections provide a brief description of one type of field data collection that is currently underway and/or planned for the 2022 season (and subsequent years). Because this project is new and evolving, the specific details are subject to change based on additional information and improved understanding. Ultimately, the *Phragmites* research project will encompass multiple approaches, including multiple types of field data/sampling schemes, GIS/remote sensing techniques, and possibly



other approaches such as greenhouse experiments and a genetics study. This document focuses on one part of the field study, which is the *Phragmites* field mapping component. Further details regarding additional proposed study approaches and methodology will be provided as the project develops.

III. Field mapping and assessment of *Phragmites*

a. Location of field sites

Field mapping (sampling) of individual *Phragmites* patches will occur at the Plum Creek, Fort Kearny, and Chapman Complexes within the Associated Habitat Reach (AHR; Figures 1 – 4). Sampling will take place within about a 0.5 square mile area within each complex.

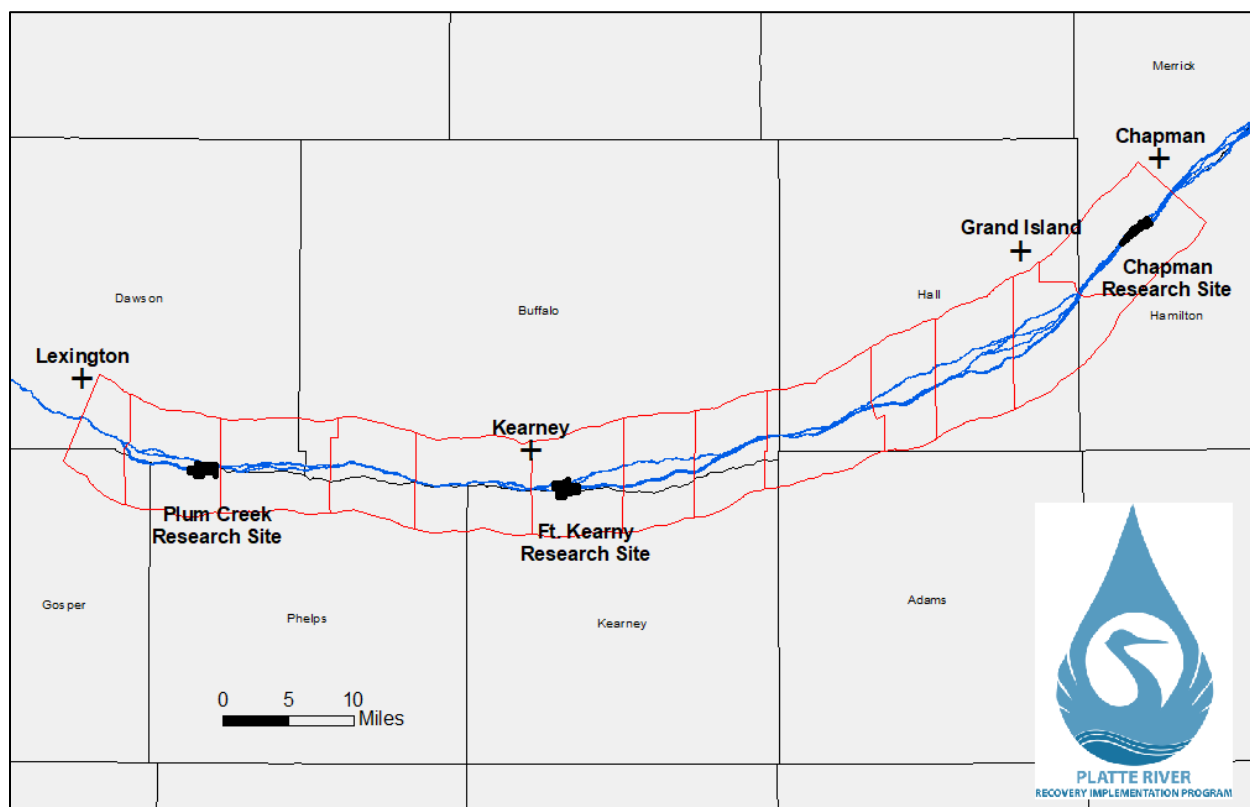


Figure 1. Overview of the three sites included in the *Phragmites* field mapping component of the study.

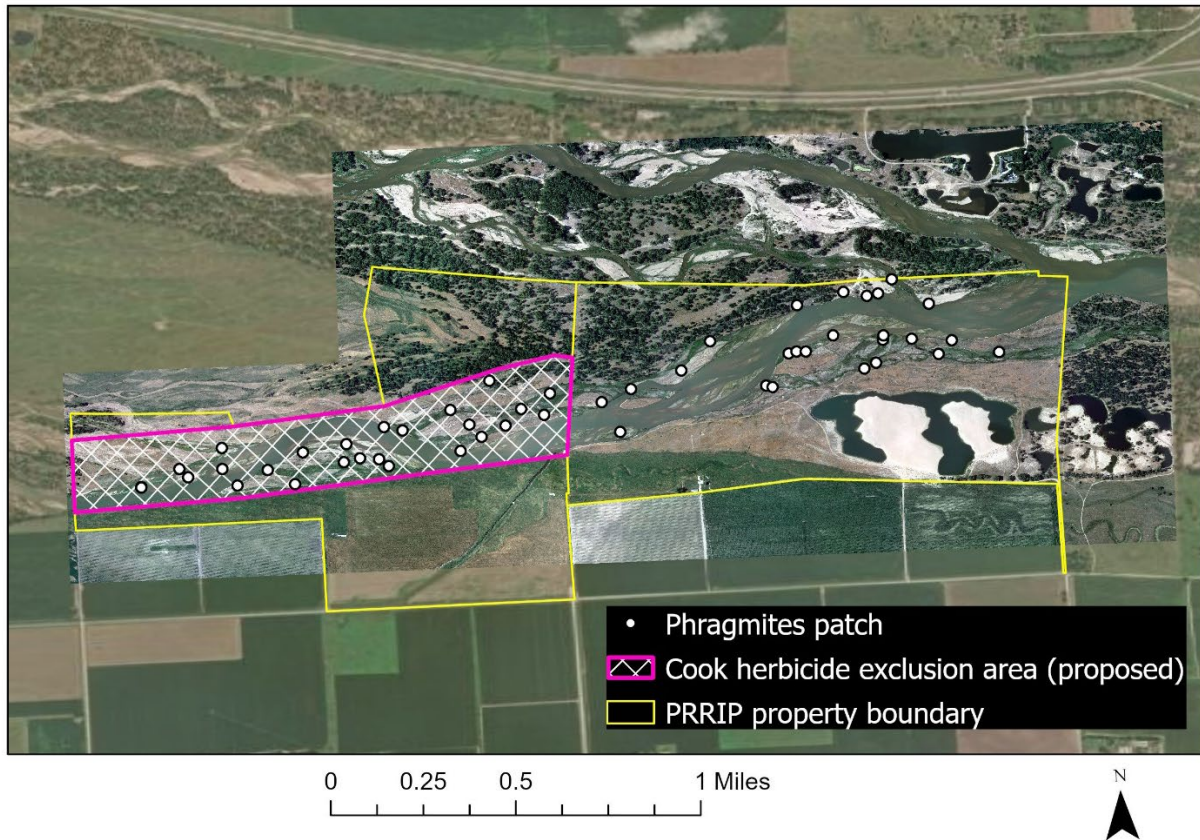


Figure 2. Plum Creek Complex site with Cook property (west) and Dyer property (east). The locations of sampled *Phragmites* patches are shown with white dots. This study site will be treated with herbicide during the fall, in accordance with ongoing protocols for the central Platte River. The hatched area outline in pink will be excluded from herbicide application.

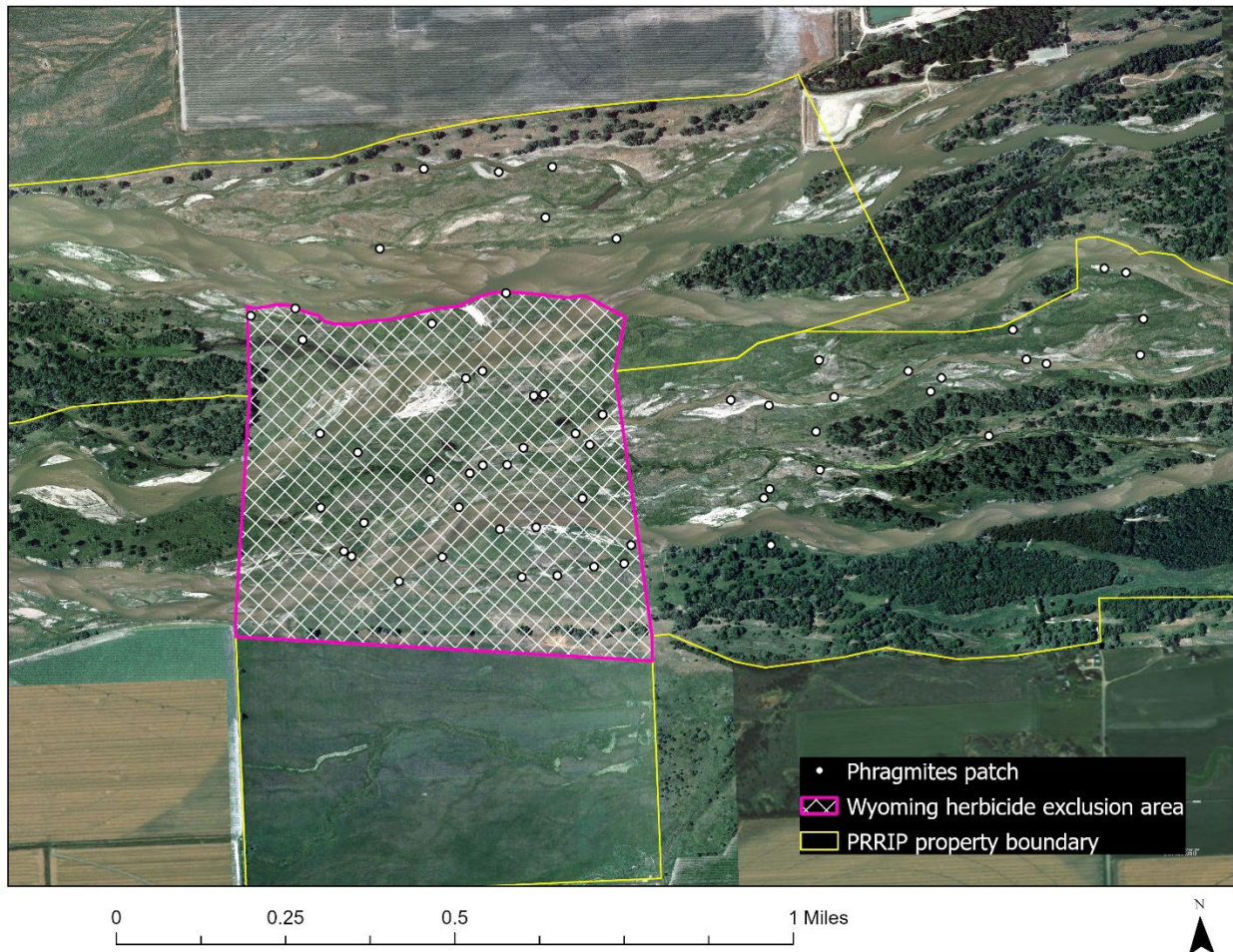


Figure 3. Fort Kearny Complex site with portions of Wyoming property (west) and Sherrerd property (east). The locations of sampled *Phragmites* patches are shown with white dots. This study site will be treated with herbicide during the spring AND fall, in accordance with ongoing protocols for the central Platte River. The hatched area outline in pink will be excluded from herbicide application.

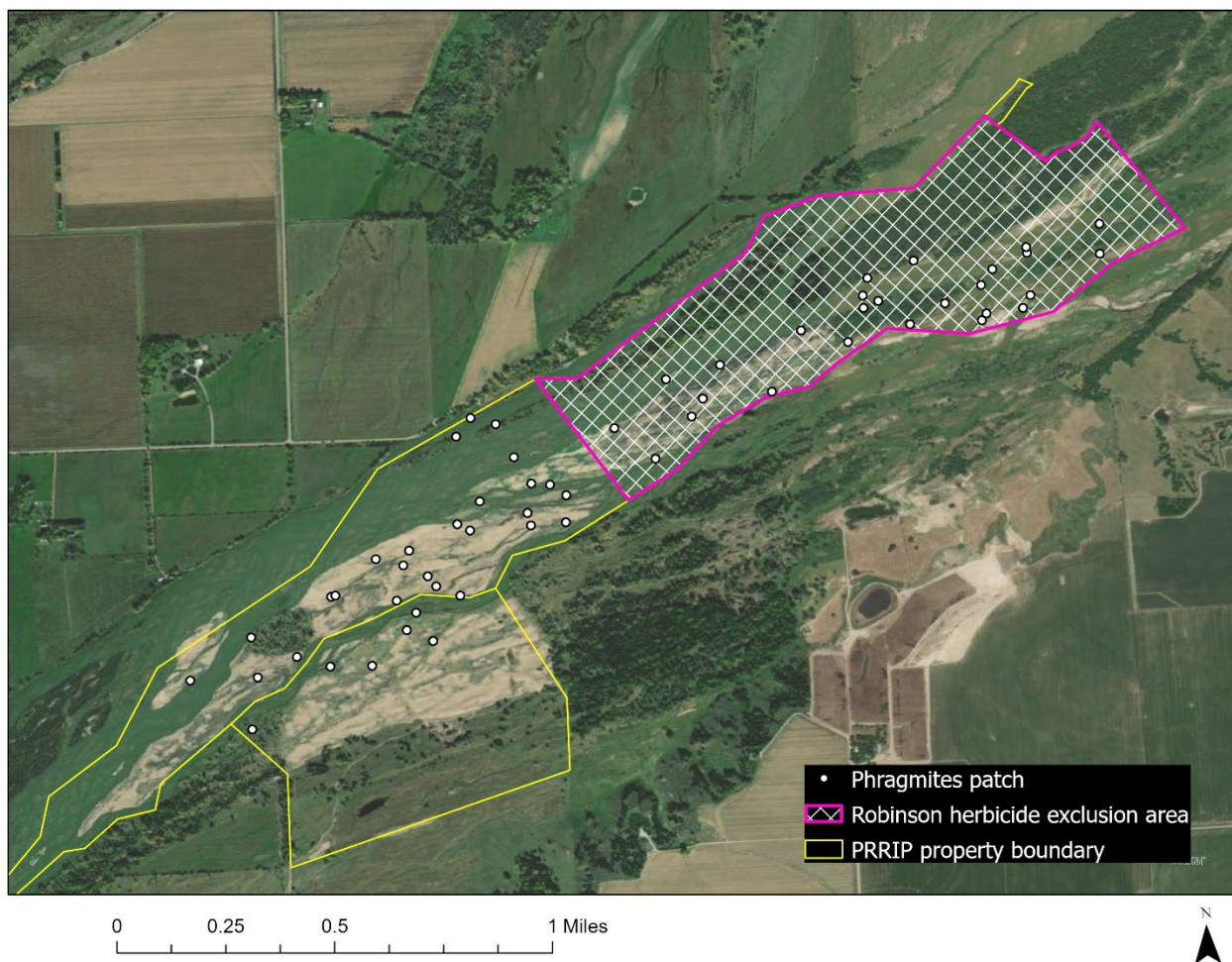


Figure 4. Chapman Complex site with Robinson property (north) and Bergren property (south). The locations of sampled *Phragmites* patches are shown with white dots. This site was cleared of vegetation and disked in fall 2021. It will be treated with herbicide during the spring AND fall, in accordance with ongoing protocols for the central Platte River. The hatched area outline in pink will be excluded from herbicide application.

b. Treatments

Each study site will be equally divided into an herbicide zone and an herbicide exclusion zone (Figures 2 – 4). The herbicide zone will be treated according to the existing/ongoing spray protocols across the AHR. The herbicide exclusion zone will not receive herbicide of any kind for the duration of this study (initial evaluation planned for 2024). Approximately 25 patches will be mapped in the herbicide zone and 25 patches will be mapped in the herbicide exclusion zone at each site.

In addition to herbicide, each site represents a unique combination of treatments related to the seasonal timing of annual herbicide application (spring + fall versus fall only) and whether tree clearing and disking has recently occurred on site (Table 1). Note that river hydrology (e.g., June flow



augmentation) is an independent *variable* (not a treatment) for the field mapping component of this study, as there is no control available for this metric in the natural system.

Table 1. Phragmites field mapping sites and treatment combinations.

Site name	Spring herbicide treatment	Fall herbicide treatment	Cleared/disked fall 2021
Plum Creek	No	Yes	No
Fort Kearny	Yes	Yes	No
Chapman	Yes	Yes	Yes

c. Field mapping and assessment methods

Approximately 50 *Phragmites* patches will be delineated and assessed at each site for a total of ~150 patches across the three sites. Patches for repeated sampling through time will be initially selected at random within each site and treatment block based on points generated by the “Create Random Points” tool in ArcGIS Pro, with 30 m minimum spacing between points. The *Phragmites* patch located nearest to each point will be sampled.

Patch boundaries will be delineated by collecting a series of points with a Real-Time Kinematic (RTK) GPS receiver. Each point will record latitude, longitude, and elevation above sea level with a high level of accuracy. The RTK unit will also be used to collect water surface elevations associated with each patch. Water surface elevation measurements will be used to calculate the vertical distance to groundwater/surface water for each patch, as well as matched to the nearest stream gage data for that date and time.

Additional metrics recorded for each patch will include:

- Maximum *Phragmites* height (feet)
- *Phragmites* stem density (low/medium/high)
- Other plant cover (low/medium/high), and dominant species recorded
- Presence of previous year’s stems (yes/no)
- Condition (greenness ranking low/medium/high)
- Life stage (elongation/reproduction/seed maturation/post-reproduction)
- Stolon presence/absence and length (feet)

d. Sampling frequency

Phragmites patches will be repeat sampled by the same methods at multiple times during the growing season:

1. Pre-spring herbicide treatment – COMPLETED June 2022
2. Post-spring herbicide treatment / Pre-fall herbicide treatment – PLANNED July and August 2022
3. Post-fall herbicide treatment – PLANNED September and October 2022 (assuming there is no hard frost within 2-4 weeks of the fall herbicide application).

It is anticipated that the same patches will be re-sampled in 2023 (and for multiple future years) according to the methods described above.