

Germination Suppression Evaluation of Effectiveness

PRRIP 2024 Annual Science Plan Reporting Session

Malinda Henry

Patrick Farrell

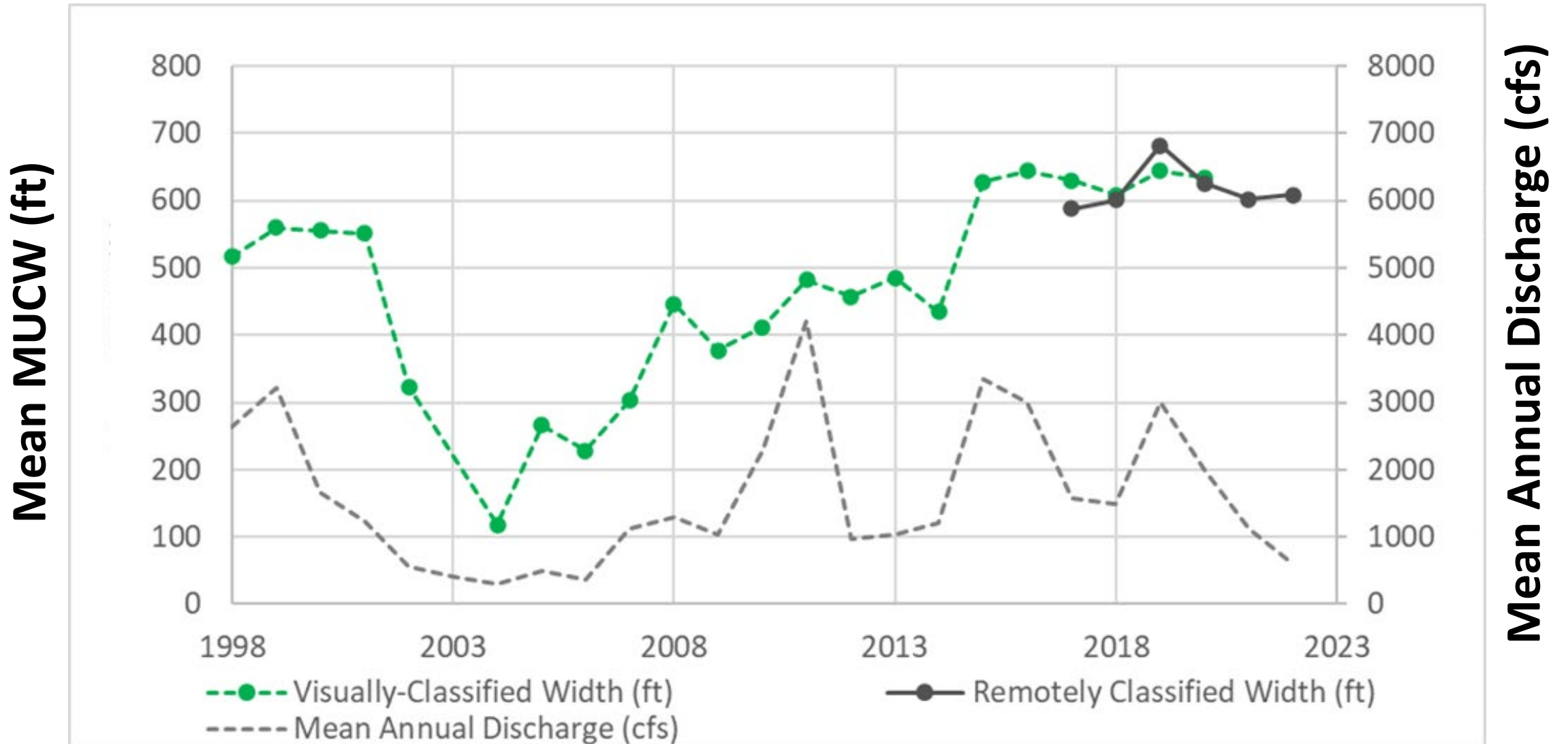
Jason Farnsworth

EBQ #1: How effective is it to use Program water to maintain suitable WC roosting habitat?

EBQ #2: How effective is Program management of Phragmites for maintaining suitable WC roosting habitat?

- 30-day flow release
- Between June 1 – July 15
- Target 1500 cfs at Grand Island
- Suppress germination (cottonwoods/willows) and slow *Phragmites* expansion into the channel
- Increase percent of AHR channel that remains ≥ 650 ft MUCW

2024 SoP Assessment 🍏👍



Evaluation Approaches

- Machine Learning Model
- Vegetation State Change
- Channel Width Maintenance



Elm Creek, Spring-Fall 2021

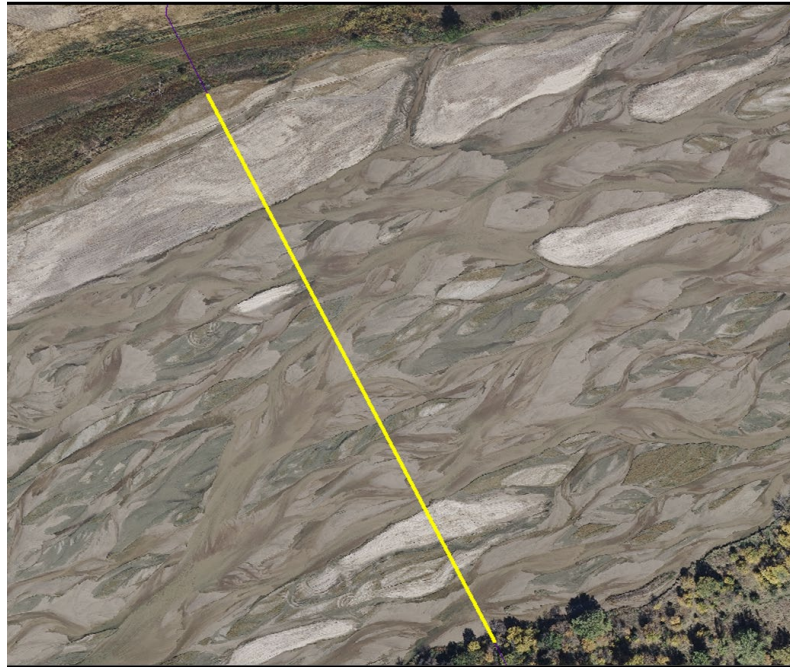
ISAC Questions

- Methods appropriate?
- Other approaches?

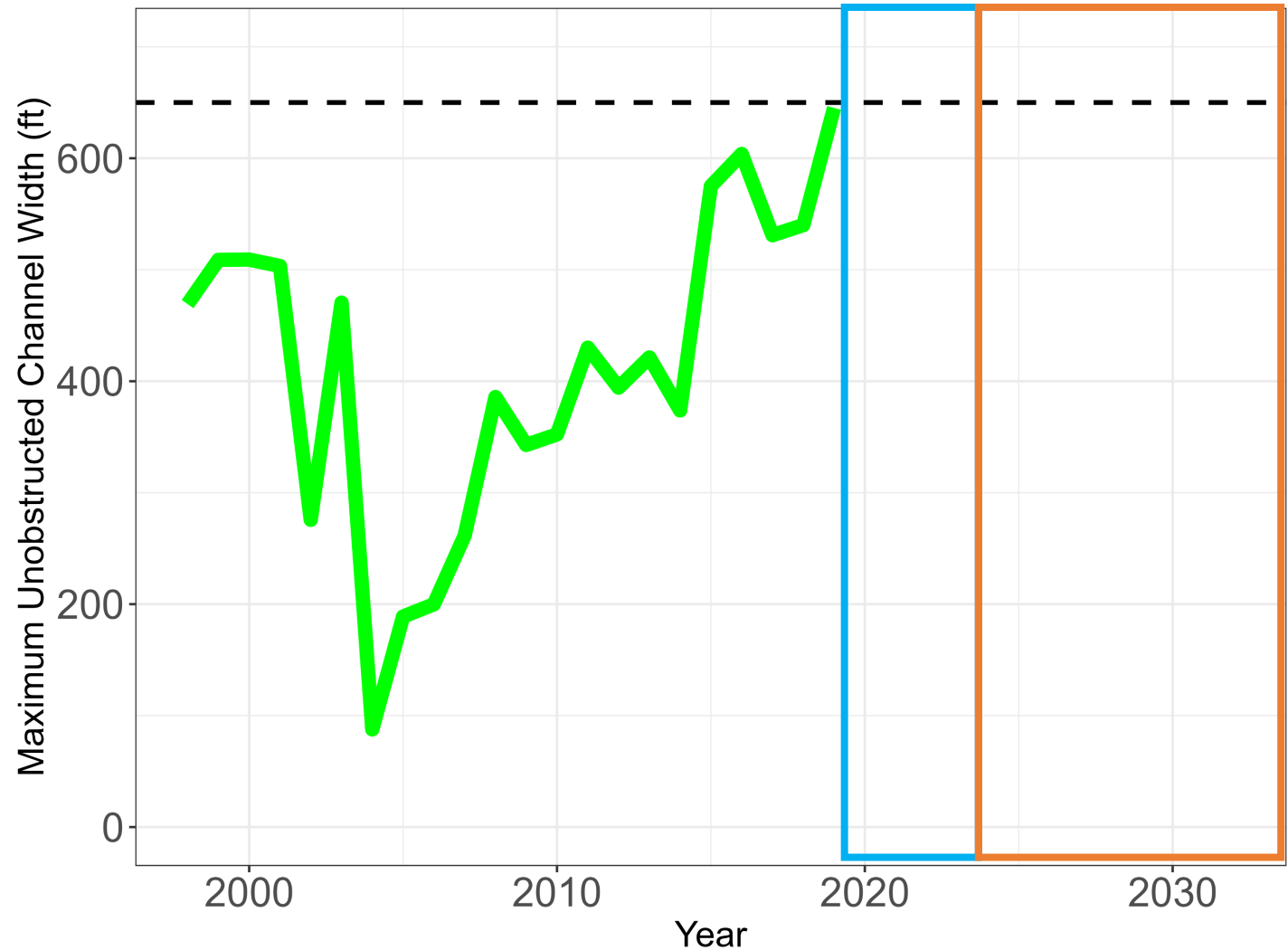


Binfield, June 2022








Machine Learning Model



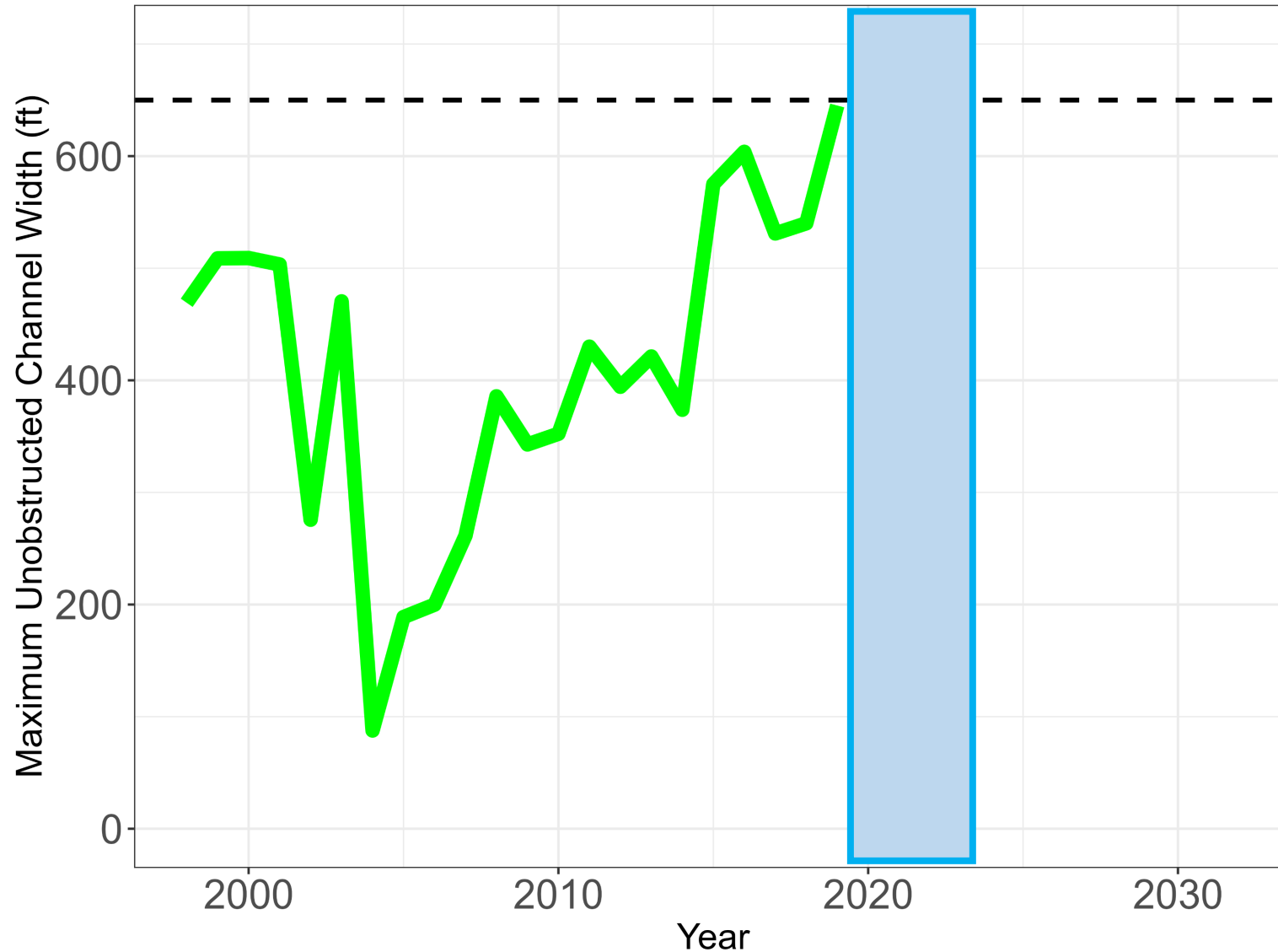
Δ Maximum Unobstructed Channel Width



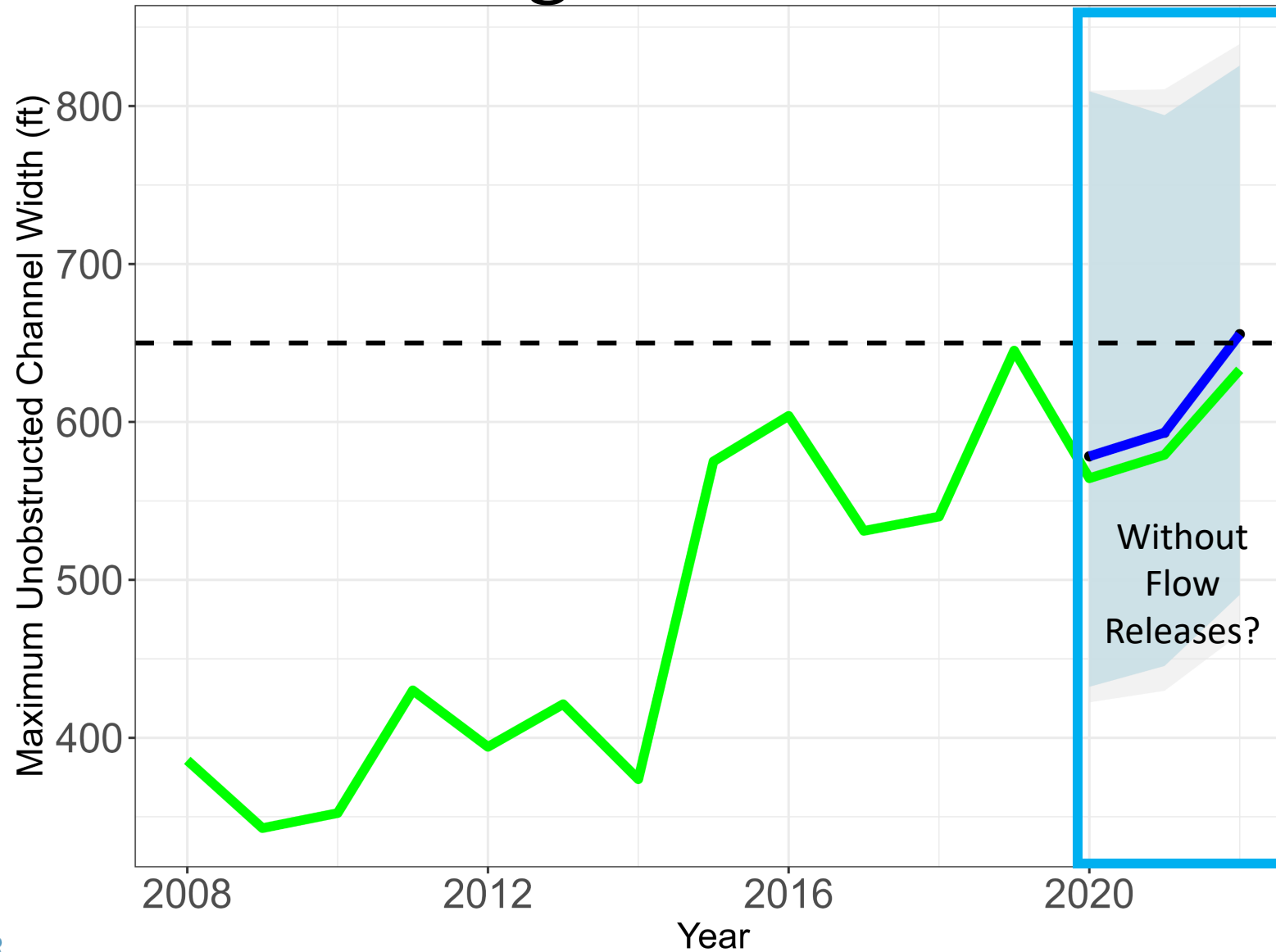
Machine Learning Model - Variables

	Response Variable	Variable Type
	Annual Change in Maximum Unobstructed Channel Width	Channel Width
	Explanatory Variables	
	Previous Year Maximum Unobstructed Channel Width	Channel Width
	Average June Flow	
	40-day mean peak discharge (Year-1)	
	40-day mean peak discharge (Year-2)	
	40-day mean peak discharge (Year-3)	Flow
	40-day mean peak discharge (Year-4)	
	Winter Flows	
	River Channel Disking	Management
	Herbicide Application	Management
	Wetted Width at Bankfull Discharge	Geomorphic
	Flow Consolidation	Geomorphic
	Geomorphic Reaches	Spatial

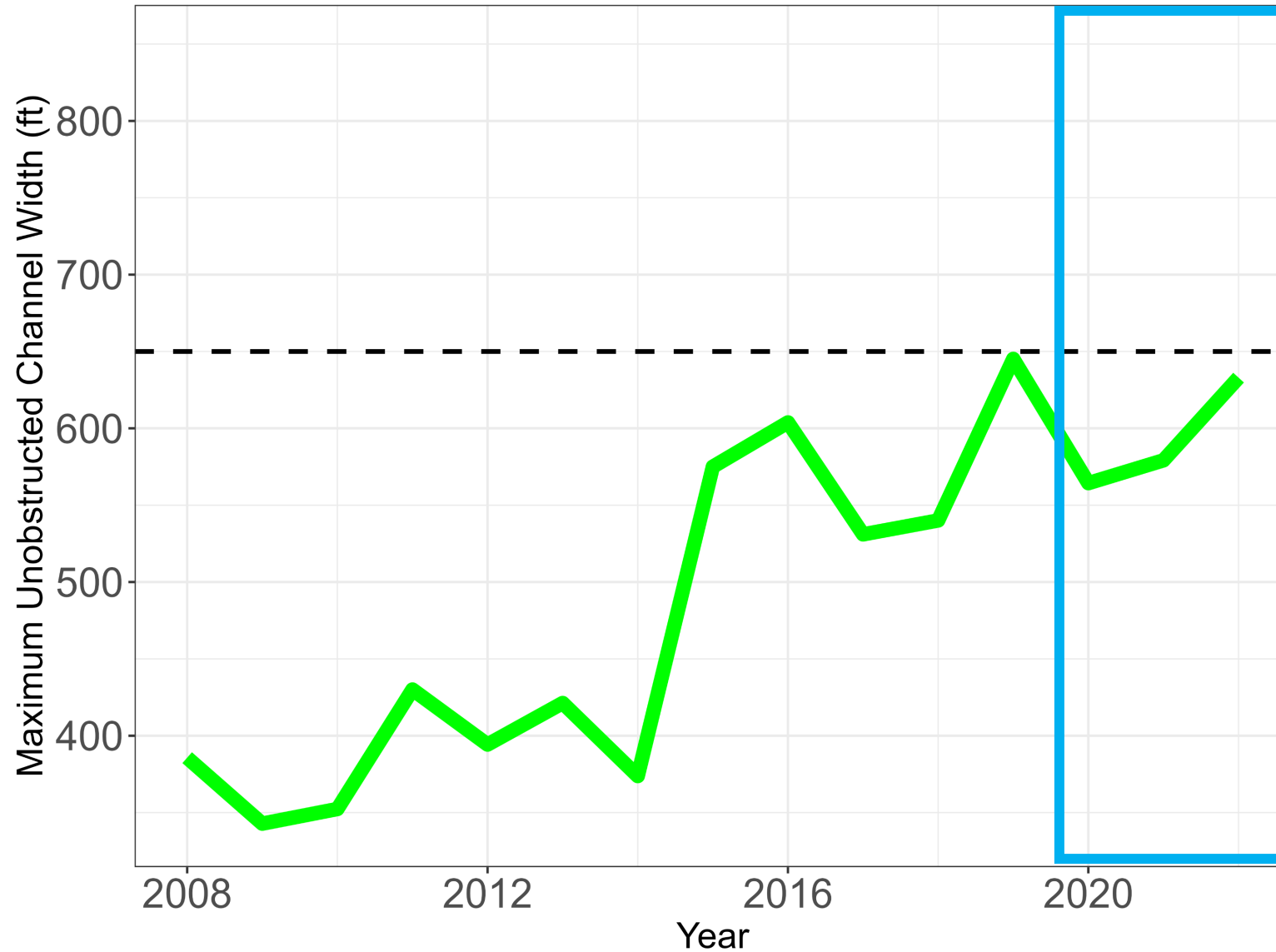
Machine Learning Model – Model Step 1



Machine Learning Model – Model Step 1



Machine Learning Model – Model Step 2



Machine Learning Model – Model Step 3

Tools

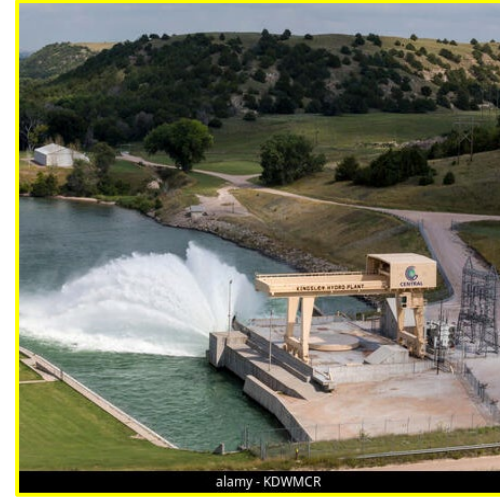
Disking



Herbicide



Flow Release



Base Flows

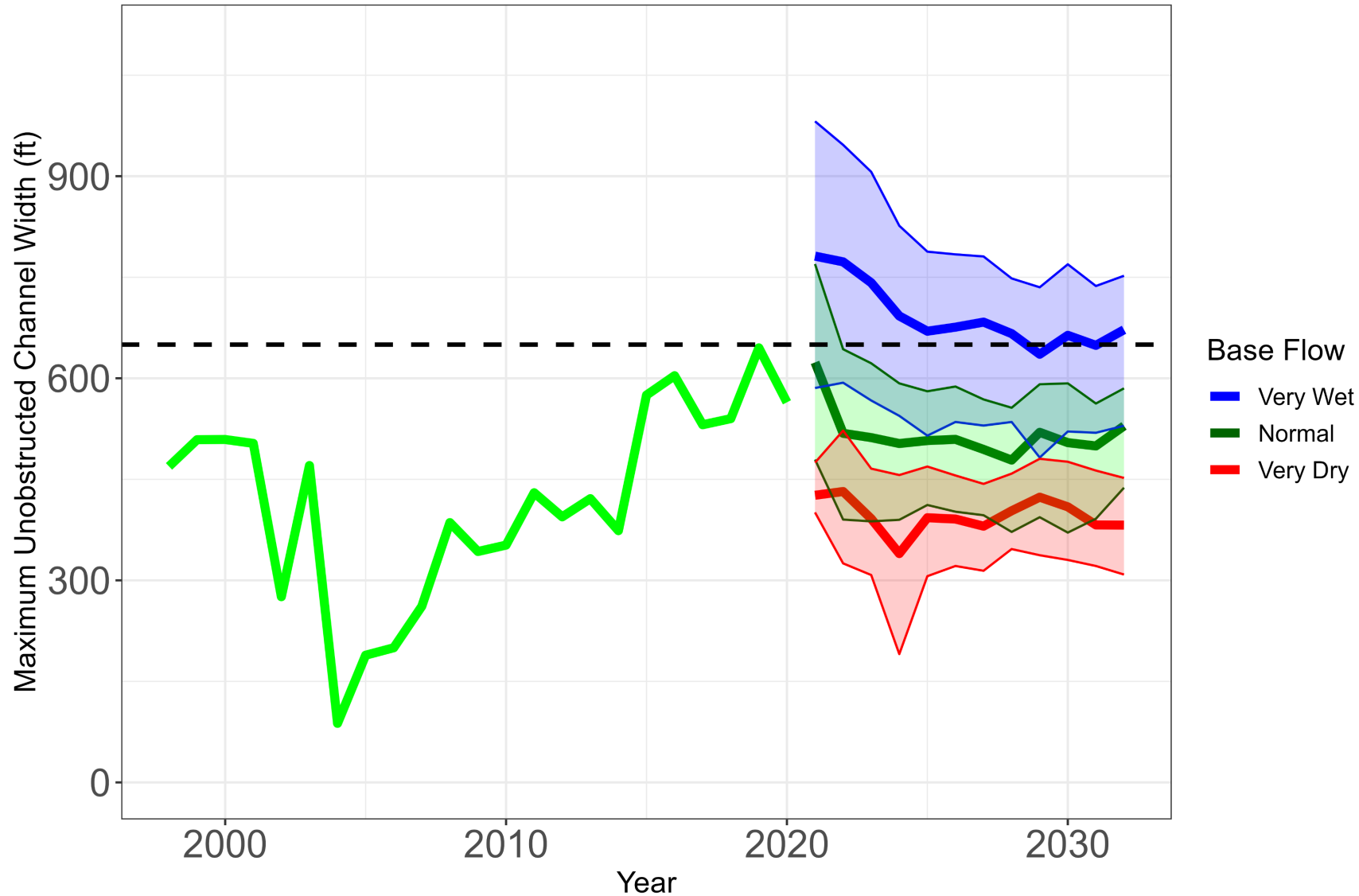
Wet Period



Dry/Normal Period



Machine Learning Model – Model Step 3



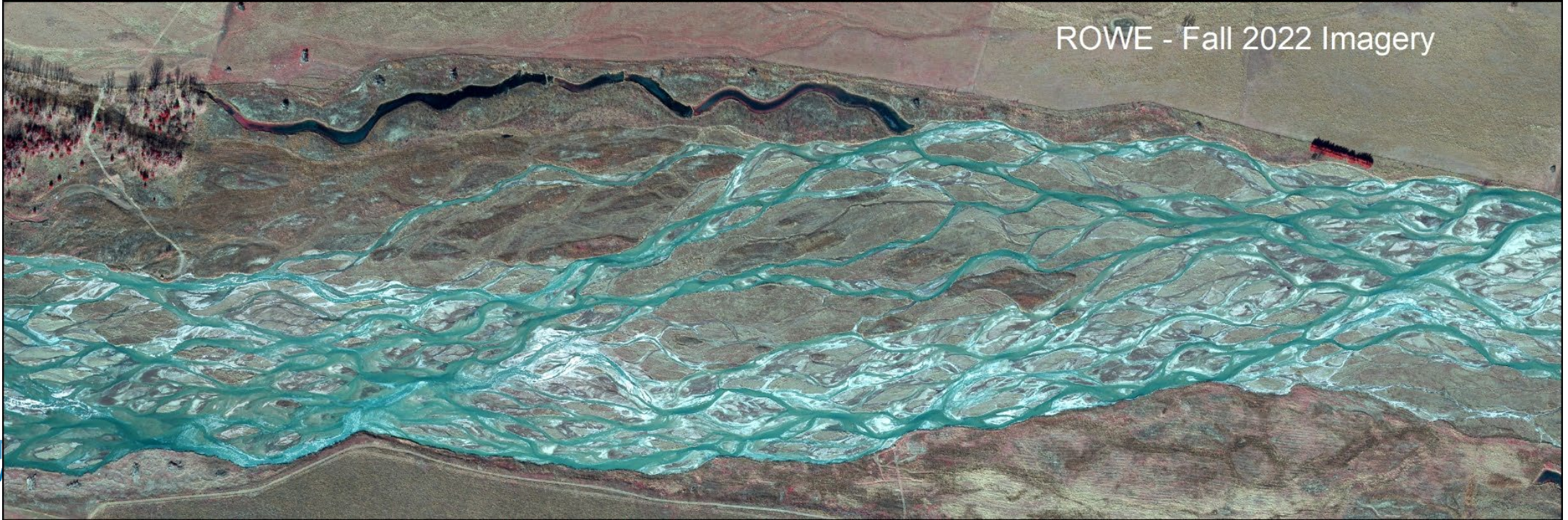
Vegetation State Change



ROWE - Fall 2019 Imagery



ROWE - Fall 2022 Imagery



US WR - Fall 2019 Imagery

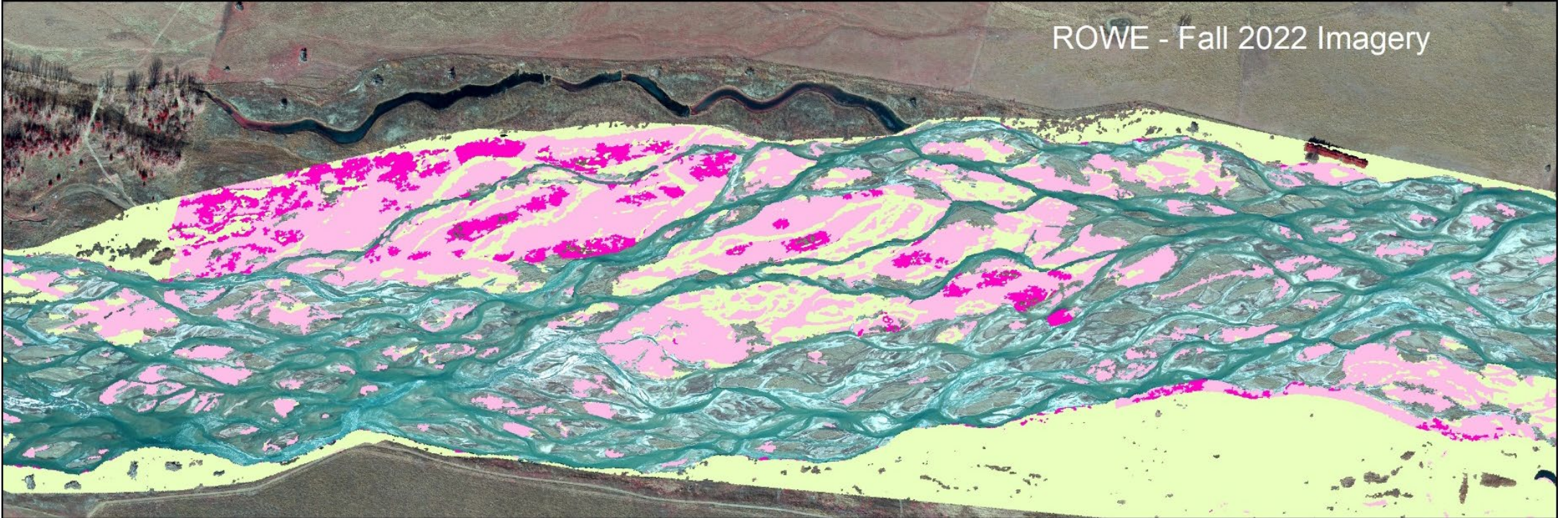


US WR - Fall 2022 Imagery

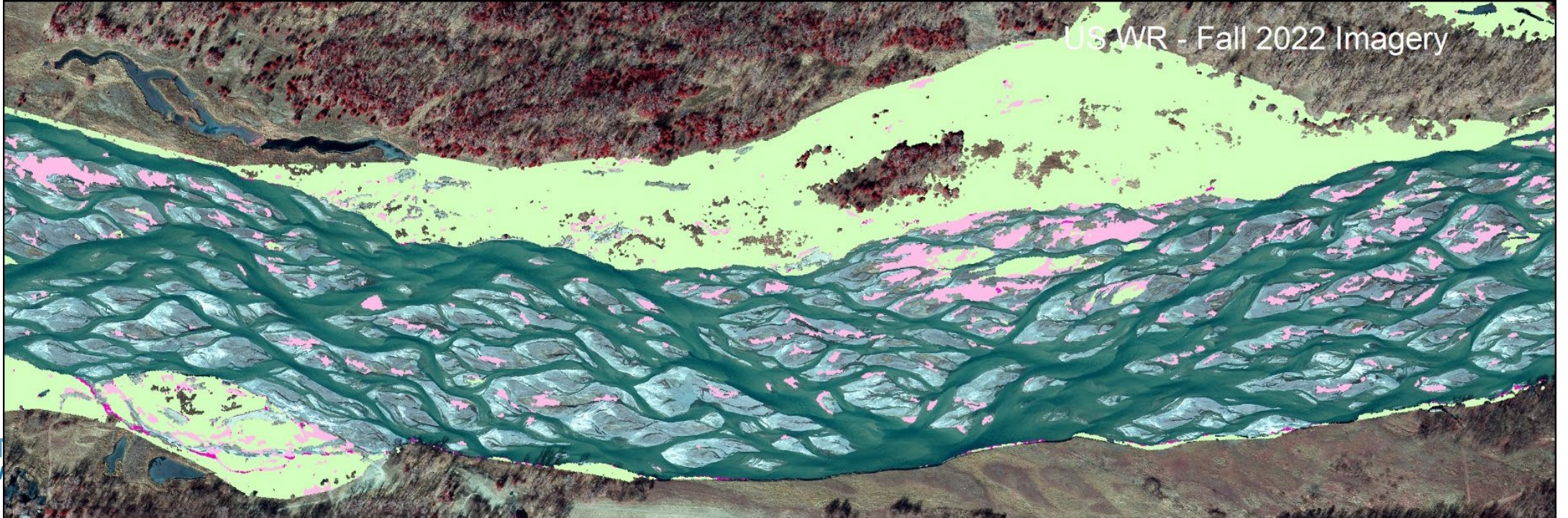


PLAT
RECOVER

ROWE - Fall 2022 Imagery

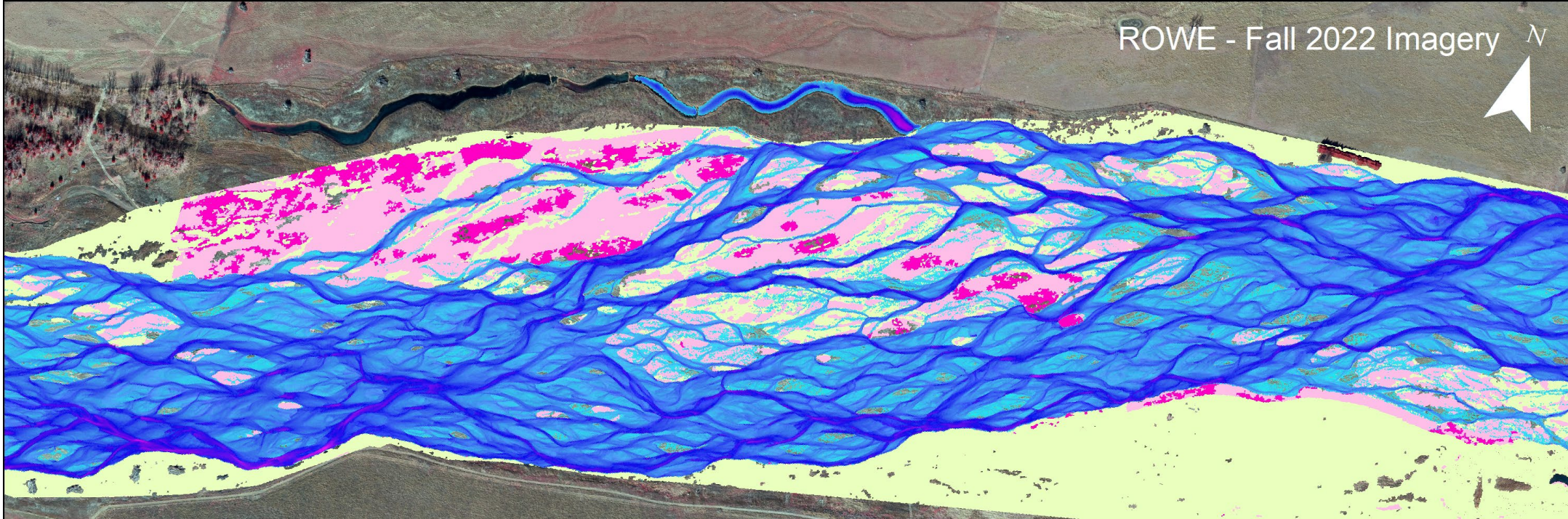


US WR - Fall 2022 Imagery



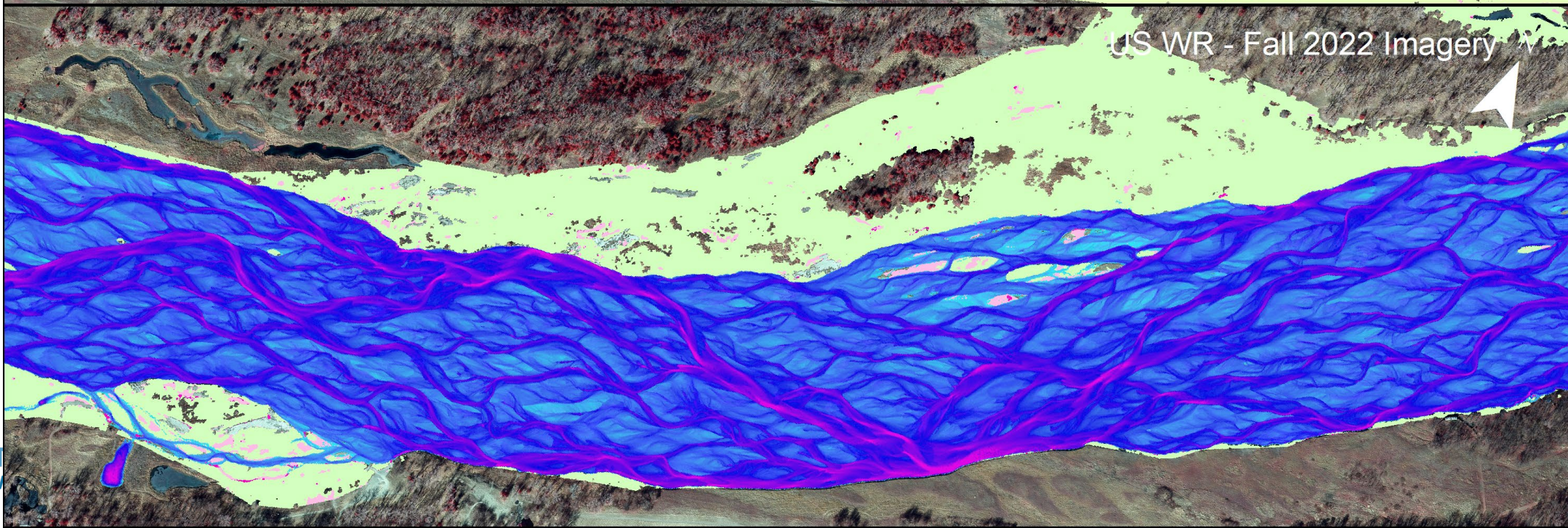
ROWE - Fall 2022 Imagery

N



US WR - Fall 2022 Imagery

N



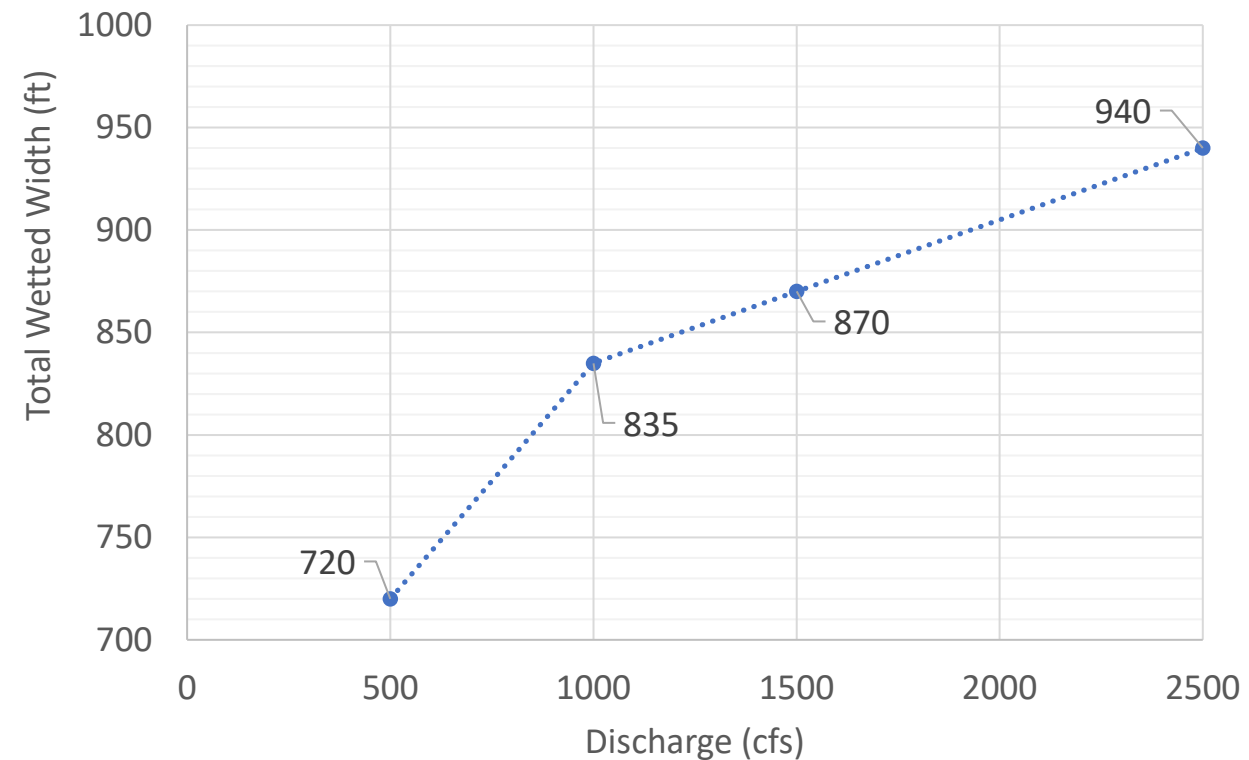
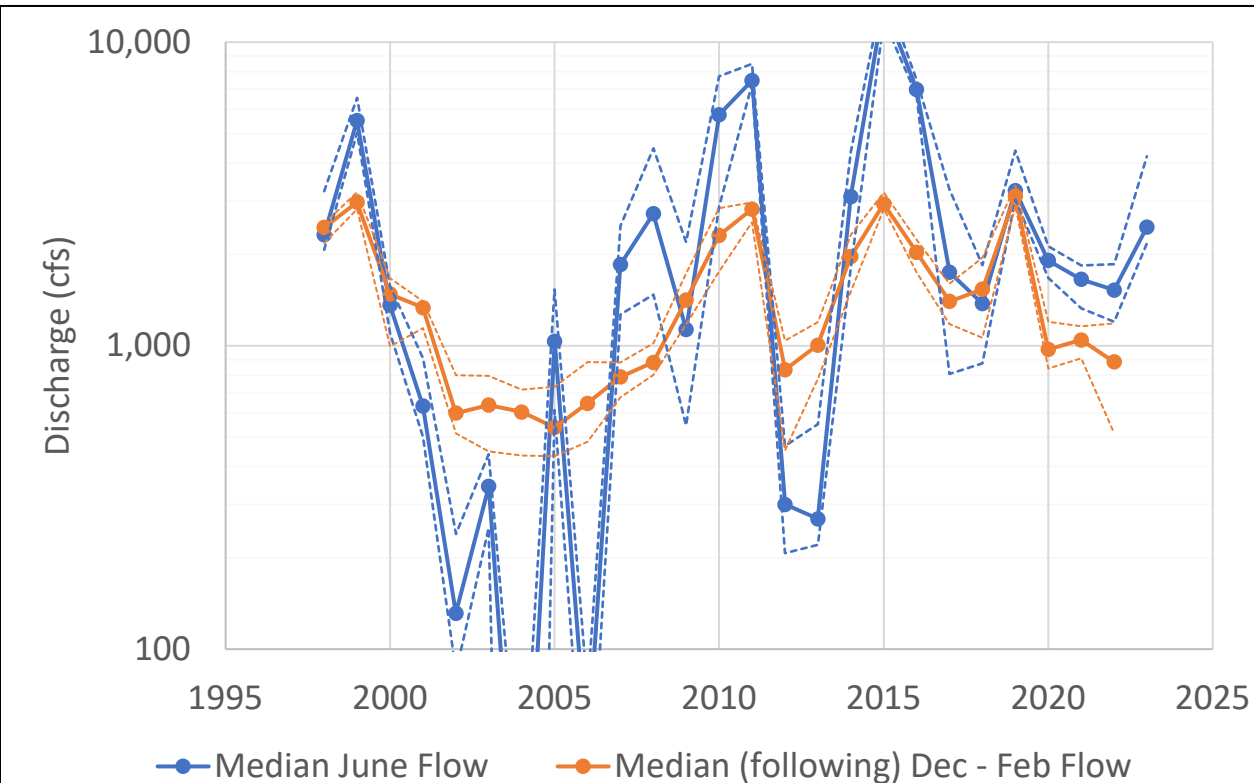
PLAT
RECOVER

Vegetation Class Change (Unvegetated in 2019)	Percent of Total Area	Percent of Area Inundated @ 1,500 cfs	Percent of Area Dry @ 1,500 cfs
Remained Unvegetated	76%	95%	5%
Unveg to Veg < 2ft	21%	46%	54%
Unveg to Veg > 2ft	3%	15%	85%

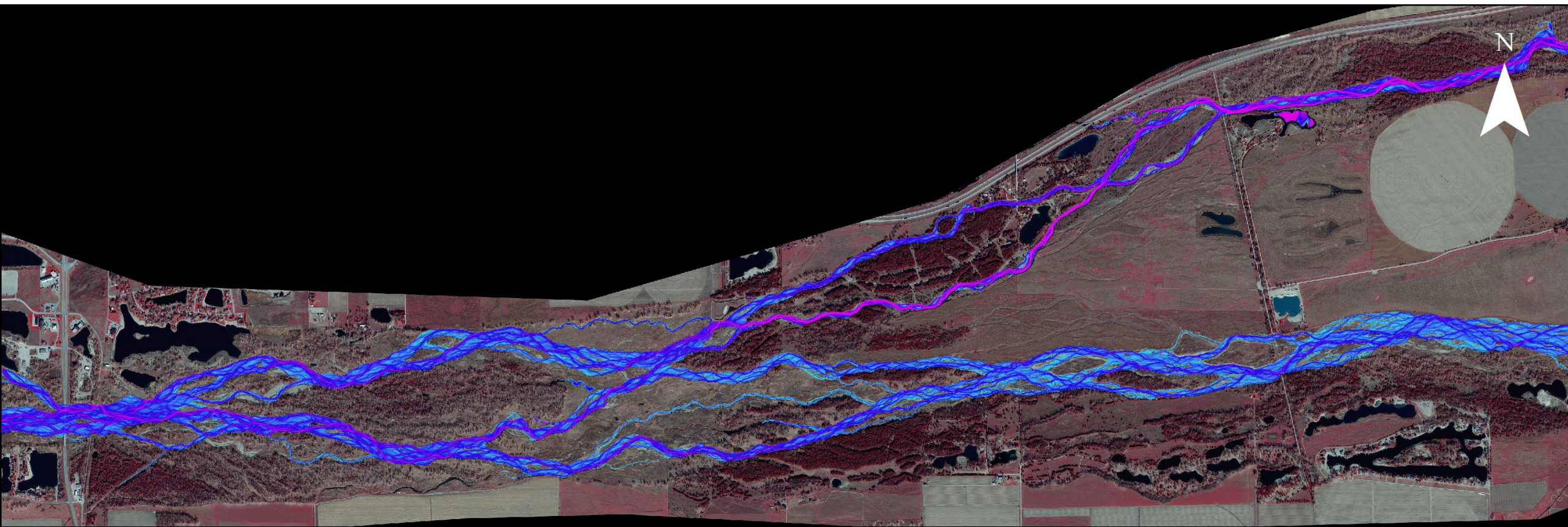


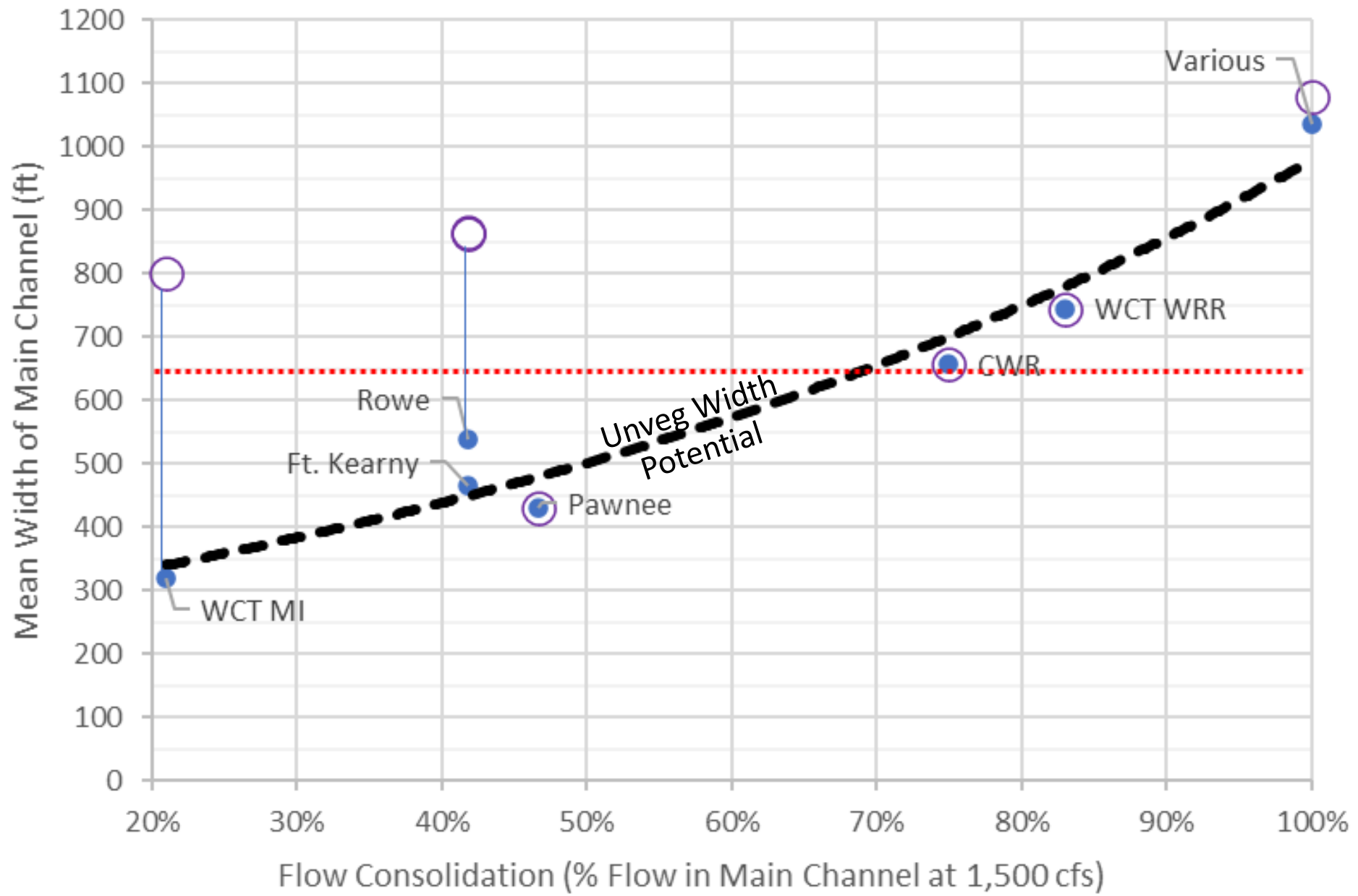
Challenges

- Amount of data: ~1 million points per river mile
- Uncertainty (empirical & deterministic), (horizontal & vertical)
- Everything is correlated
- Other actions (confounding factors)



Unvegetated Width Maintenance





● TUCW (Total Unvegetated Channel Width)

○ TCW (Total Channel Width)