Aquatic and Riparian Effectiveness Monitoring Program
Invasive Species Report
2022 Field Season

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Introduction

The Forest Service and Bureau of Land Management recognize invasive species as a critical threat to the Nation's ecosystems. The broad geographic area sampled by the Aquatic and Riparian Effectiveness Monitoring Program (AREMP) provides an excellent opportunity to detect the presence of aquatic invasive plants and animals on federal lands while surveying stream reaches in randomly-selected watersheds in the Northwest Forest Plan area (NWFP; "west of the Cascades" from Point Reyes, California north to the Canadian Border).

Methods

Each crew had Invasive ID guides on their field tablets. Guides included specific species from FS and BLM botanists. Crews were debriefed on these species prior to leaving to their watershed. Crews conduct searches in the riparian zone adjacent to the stream reach. Searches were conducted between longitudes A-B, F-G, J-K (Figure 1). AREMP field crews began searches at the bankfull indicator of the upper transect (B, G, K) with one crew member on each bank. Crew members thoroughly searched downstream in a zigzag pattern no more than five meters from bankfull for five minutes. The search time was paused when an invasive species was encountered while the crew member recorded the reach segment, species code, bank the plant was found on (left or right), and took photos. If a suspected invasive plant species was encountered but couldn't be clearly identified in the field, a specimen was collected and placed in a plant press so that it could be later identified. Most of the invasives were found incidentally.

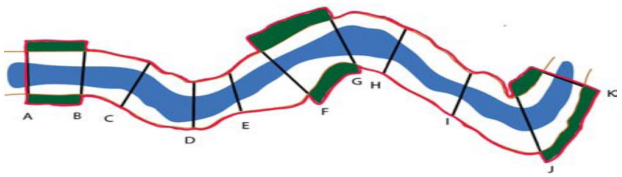

Figure 1. Schematic of search areas for Aquatic and Riparian Effectiveness Monitoring Program terrestrial invasive species surveys, letters represent transect locations. Areas in green represent the area searched by crew members.

Eight benthic macroinvertebrate subsamples were collected in the first four fast-water riffles at each site using a kick net to determine the presence of invasive macroinvertebrates such as snails, mussels, or crayfish.

Macroinvertebrate samples were sent to the Utah State National Aquatic Monitoring Center to be processed under a microscope to detect invasive species which may have been too small for field crews to identify. Laboratory results are still pending, and any invasive species found will result in immediate notification of local managers. Additional suspected invasive snails, mussels or crayfish found were photographed and preserved in 95% ethanol for verification. AREMP crews searched the wetted portion of the channel and any off channel wetted areas for invasive aquatic plants during site layout. The longitudinal segment was recorded, photographs were taken, and a specimen was collected and placed in a plant press to later verify identification when a suspected invasive plant was encountered.

Verified invasive species

AREMP crews surveyed 257 sites in 34 watersheds from June to September. AREMP crews recorded 148 verified invasive species detections. Only nineteen of those verified detections came from this year's list of high concern species (Table 1), seventeen were Himalayan blackberry (*Rubus armeniacus*) while two detections occurred of Japanese knotweed (*Fallopia japonica*). Species on our list of high concern in previous years have been included in the watershed maps. Only two species met this criteria - Herb robert (*Geranium robertianum)* and Reed Canary grass (*Phalaris arundinacea*). Our surveyors were knowledgeable in additional non-native species identification and we included those species via tables inset on the watershed maps. Invasive species were previously confirmed in six of the watersheds AREMP surveyed in 2022 (Table 2).

Table 2. Previous confirmed detections of invasive species in watersheds re-surveyed in 2022 (only includes species from the list in Table 1)

Watershed Name and State	Invasives found in previous site survey	Number of sites with invasive in previous survey
Trout Creek, OR (2014)	Himalayan blackberry	1
Indian Creek, OR (2014)	Himalayan blackberry	1
	Herb robert	1
Little Butte Creek, OR (2014)	Himalayan blackberry	3
Elk Creek, CA (2014)	Himalayan blackberry	4
Star Gulch, OR (2012)	Himalayan blackberry	2
Wolf Creek, OR (2015)	Himalayan blackberry	1

Local units have been informed of our survey locations and detections - Forest Service units are asked to upload this information into the Natural Resource Manager (NRM) Threatened Endangered and Sensitive Plants - Invasive Species (TESP-IS) database.

Table 1. Invasives species surveyed for by Aquatic and Riparian Effectiveness Monitoring crews from 2008 to 2022. White boxes indicate species not on the list of high concern species for the respective year. Gray boxes indicate the sites where species of high concern were on our list for their respective year but were not found. Red boxes indicate the number of sites a species of high concern was found for the respective year. Yellow boxes indicate the number of sites a species of high concern from previous years was found.

Type	Common name	Year														
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Aquatic Animals	New Zealand mudsnail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Zebra mussels	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Quagga mussels	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Rusty crayfish	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red swamp crayfish	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ringed crayfish	0	2	0	1	1	1	0	0	0	0	0	0	0	0	0
	Northern crayfish	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Bullfrog					0	0	0	0	0	0	0	0	0	0	0
	Nutria					0	0	0	0	0	0	0	0	0	0	0
	Asian clam								0	0	0	0	0	0	0	0
	Chinese mystery snail								0	0	0	0	0	0	0	0
	Big-eared radix								0	0	0	0	0	0	0	0
	African Clawed Frog											0				
Aquatic plants	Yellow Flag iris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Hydrilla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Parrot feather water-milfoil	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	Eurasian watermilfoil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Giant reed	0	0	0	0	0	0	0	0	0	0	0	0			
	Brazilian elodea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Didymo	0	0	0	0	0	0	0	0	0	0	0	0		1	0
	Variable-leaf milfoil					0	0	0	0	0	0	0	0	0	0	0
	Yellow floating heart					0	0	0	0	0	0	0	0	0	0	0
	Giant salvinia					0	0	0	0	0	0	0	0			
	Flowering rush					0	0	0	0	0	0	0	0	0	0	0
	Common reed					0	0	0	0	0	0	0	0	0	0	0
	Curly-leaf pondweed					0	0	0	0	0	0	0	0	0	0	0
	Water primrose					0	0	0	0	0	0	0	0	0	0	0
	Purple loosestrife								0	0	0	0	0	0	0	0
	Garden loosestrife								0	0	0	0	0	0	0	0
	Kudzu					0	0	0	0	0	0					
	Water-Hyssop											0	0			
Terrestrial animals	Feral swine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Terrestrial plants	Japanese knotweed	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2
	Cultivated Knotweed	0	0	0	0	0	0	0	0	0		0	0	0	0	0
	Giant Knotweed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Bohemian Knotweed										0	0	0	0	0	0
	Old Man's beard	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Garlic Mustard	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Himalayan blackberry	15	14	4	14	9	2	9	17	10	25	1	7	8	12	17
	English ivy	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0
	Giant hogweed		0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Reed canary grass		2	0	2							3		1	1	8
	Yellowtuft				0											
	Salt Cedar					0	0	0	0	0	0	0	0	0	0	0
	Herb Robert							1	0				1	1		9
	Shiny geranium							0	0							
	Orange hawkweed									0	0	0	0	0		0
	Yellow archangel									0	0	0	0	0		0

Northern California

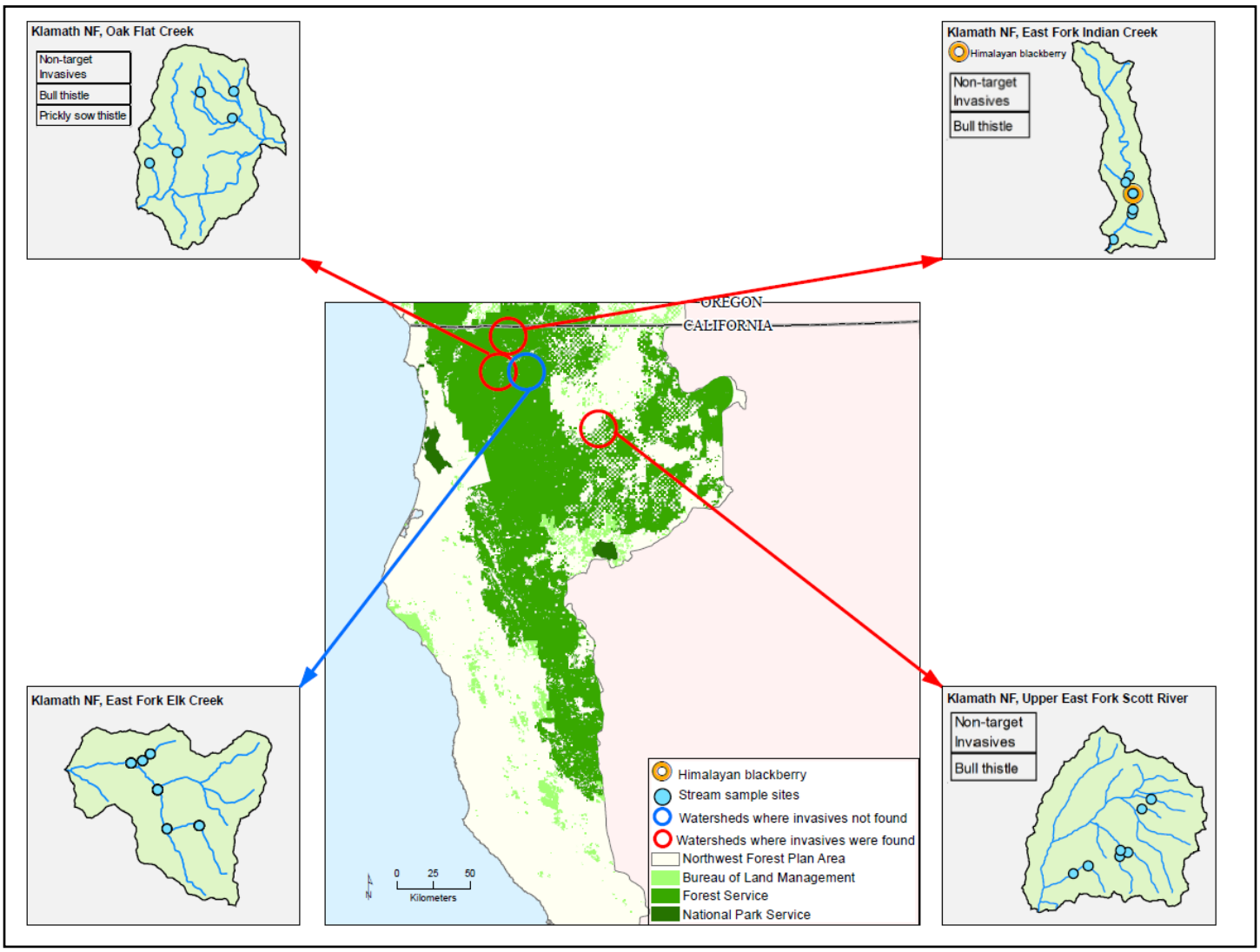

Figure 2a. Map of California watersheds surveyed by Aquatic and Riparian Effectiveness Monitoring Program crews during the 2022 field season. Blue lines represent watersheds where invasive species were not found; red lines depict watersheds where invasive species were detected. NF = National Forest.

Northern Oregon

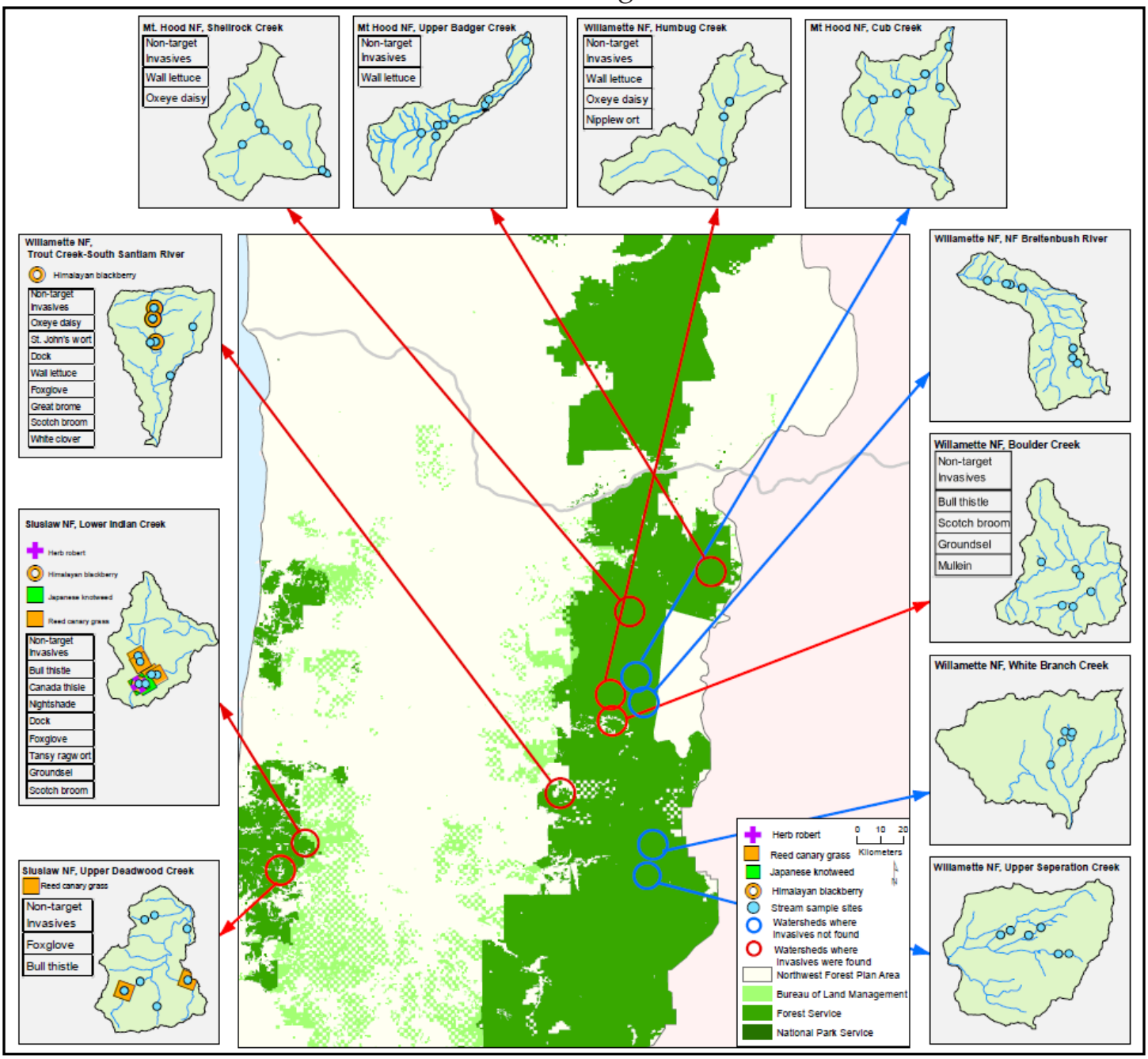

Figure 2b. Map of Northern Oregon watersheds surveyed by Aquatic and Riparian Effectiveness Monitoring Program crews during the 2022 field season. Blue lines represent watersheds where invasive species were not found; red lines depict watersheds where invasive species were detected. NF = National Forest. BLM = Bureau of Land Management.

Southern Oregon

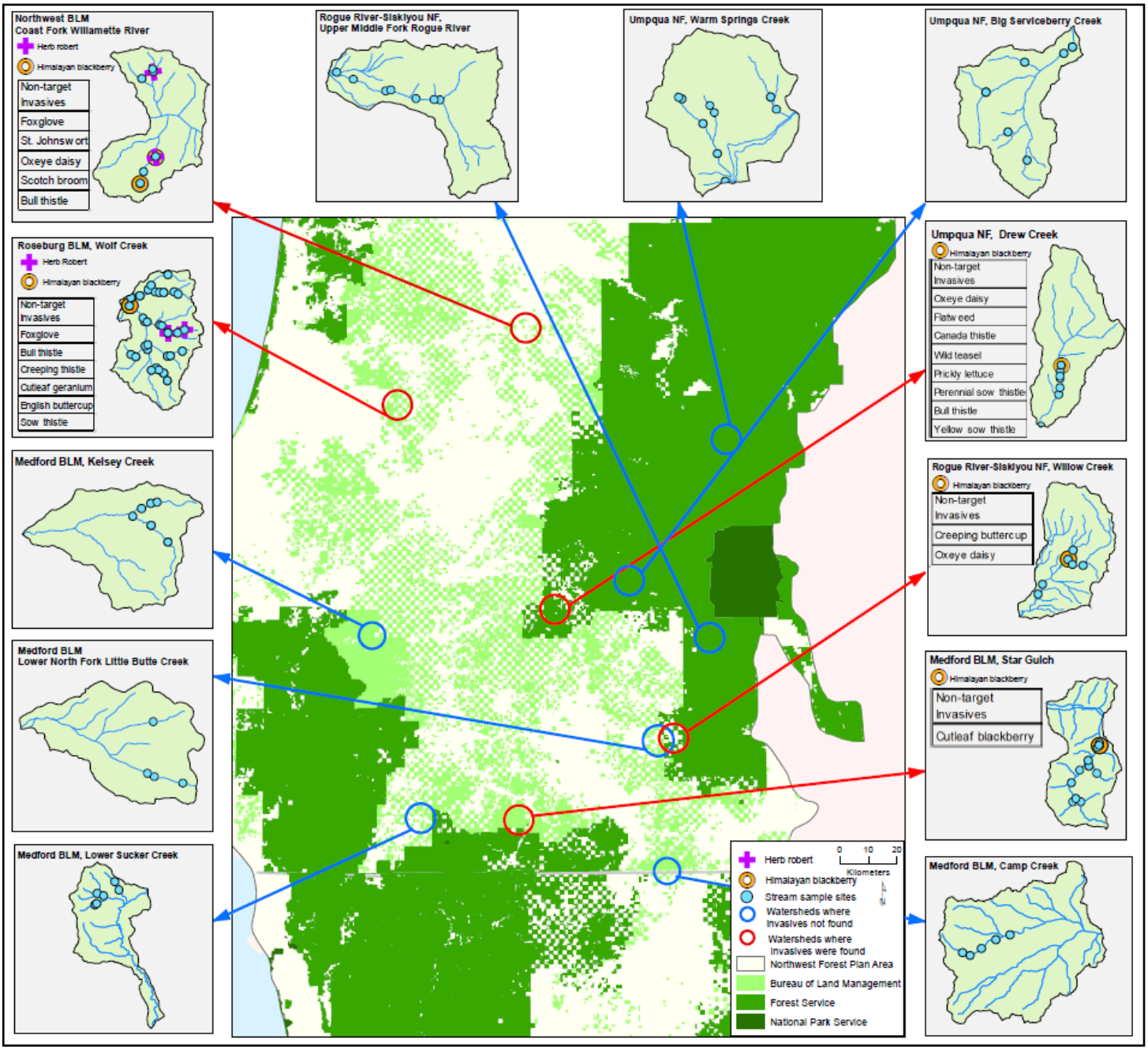

Figure 2c. Map of Southern Oregon watersheds surveyed by Aquatic and Riparian Effectiveness Monitoring Program crews during the 2022 field season. Blue lines represent watersheds where invasive species were not found; red lines depict watersheds where invasive species were detected. NF = National Forest. BLM = Bureau of Land Management.

Washington

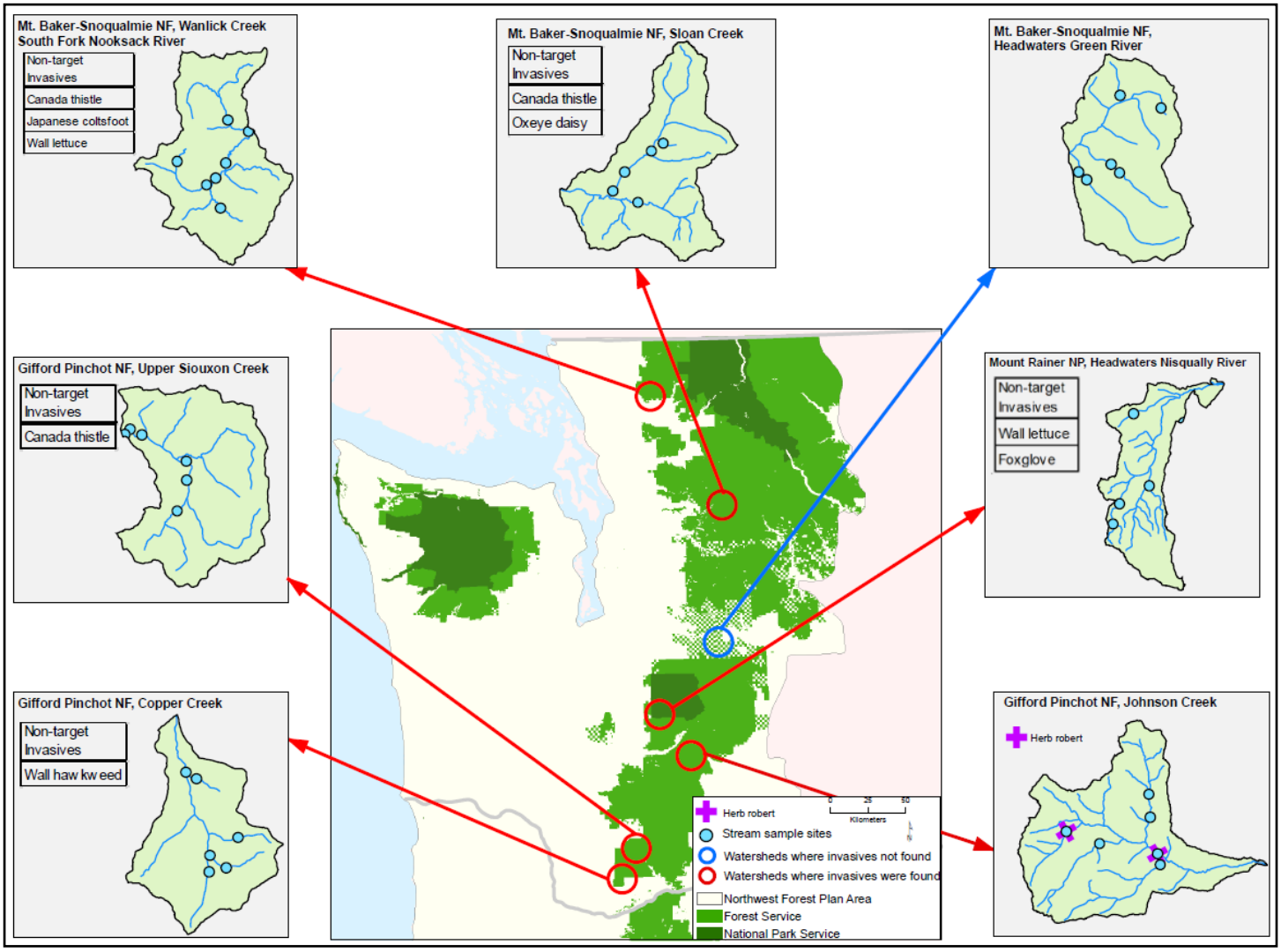

Figure 2d. Map of Washington watersheds surveyed by Aquatic and Riparian Effectiveness Monitoring Program crews during the 2022 field season. Blue lines represent watersheds where invasive species were not found; red lines depict watersheds where invasive species were detected. NF = National Forest.

Acknowledgements

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