

Aquatic and Riparian Effectiveness Monitoring Program

Invasive Species Report 2016 Field Season



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Introduction

Invasive species have been identified as a critical threat to the Nation's ecosystems by both the Forest Service and Bureau of Land Management. The broad geographic area sampled by the Aquatic and Riparian Effectiveness Monitoring Program (AREMP) provides an excellent opportunity to detect the presence or absence of "high concern" aquatic invasive plants and animals (Table 1) 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

Searches for invasive terrestrial plants and animals were performed at all sites within each watershed 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. For five minutes crew members thoroughly searched downstream in a zigzag pattern no more than five meters from bankfull. When an invasive plant or animal was encountered, the search time was paused and the crew member recorded the longitude segment, species code, bank the plant was found on (left or right), and the photo numbers of the pictures. 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.

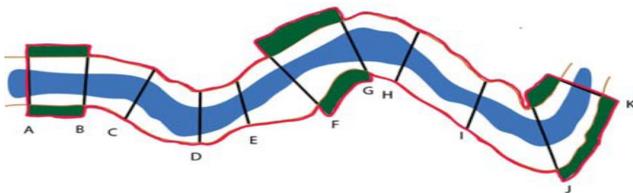


Figure 1. Schematic of search areas for Aquatic and Riparian Effectiveness Monitoring Program terrestrial invasive species surveys, letters represent transect locations. Areas in green represent the area searched by crew members.

To determine the presence of any invasive snails, mussels, or crayfish listed in Table 1, AREMP crews collected eight benthic macroinvertebrate subsamples in the first four fast-water riffles at each site using a kick net. After the field season those samples were sent to the Utah State National Aquatic Monitoring Center and processed under a microscope to ensure invasive species that may have been too small for field crews to identify were not present (results from the laboratory are still pending and any invasive species found will result in immediate notification of local managers). After the original eight subsamples were preserved, and if an invasive snail, mussel or crayfish was suspected to be present in the field, photographs were taken and the specimen was preserved in 95% ethanol. Then, more samples were opportunistically collected throughout the site. For invasive aquatic plants, AREMP crews searched the wetted portion of the channel and any off channel wetted areas during site layout. When a suspected invasive plant was encountered, the longitudinal segment was recorded, photographs were taken, and a specimen was collected and placed in a plant press to later verify identification.

Table 1. Invasive species surveyed for during the 2016 field season.

Type	Common Name	Genus Species
Aquatic animals	New Zealand mudsnail	<i>Potamopyrgus antipodarum</i>
	Zebra mussel	<i>Dreissena polymorpha</i>
	Quagga mussel	<i>Dreissena rostriformis bugensis</i>
	Rusty crayfish	<i>Orconectes rusticus</i>
	Red swamp crayfish	<i>Procambarus clarkii</i>
	Ringed crayfish	<i>Orconectes neglectus</i>
	Northern crayfish	<i>Orconectes virilis</i>
	Bullfrog	<i>Rana catesbeiana</i>
	Nutria	<i>Myocastor coypus</i>
	Asian Clam	<i>Corbicula flumina</i>
	Chinese mystery snail	<i>Cipangopaludina chinensis</i>
	Big-eared radix	<i>Radix auricularia</i>
Aquatic plants	Yellow flag iris	<i>Iris pseudacorus</i>
	Hydrilla	<i>Hydrilla verticillata</i>
	Parrot feather watermilfoil	<i>Myriophyllum aquaticum</i>
	Variable-leaf milfoil	<i>Myriophyllum heterophyllum</i>
	Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
	Giant reed	<i>Arundo donax</i>
	Brazilian elodea	<i>Egeria densa</i>
	Didymo	<i>Didymosphenia geminata</i>
	Yellow floating heart	<i>Nymphaoides peltata</i>
	Giant salvinia	<i>Salvinia molesta</i>
	Flowering rush	<i>Butomus umbellatus</i>
	Kudzu	<i>Pueraria lobata</i>
	Common reed	<i>Phragmites australis</i>
	Curly-leaf pondweed	<i>Potamogeton crispus</i>
	Purple loosestrife	<i>Lythrum salicaria</i>
Garden loosestrife	<i>Lysimachia vulgaris</i>	
Water primrose	<i>Ludwigia spp.</i>	
Terrestrial animals	Feral swine	<i>Sus scrofa</i>
Terrestrial plants	Japanese knotweed	<i>Fallopia japonica</i>
	Himalayan knotweed	<i>Polygonum polystachyum</i>
	Giant knotweed	<i>Polygonum sachalinense</i>
	Old man's beard	<i>Clematis vitalba</i>
	Garlic mustard	<i>Alliaria petiolata</i>
	Giant hogweed	<i>Heracleum mantegazzianum</i>
	Himalayan blackberry	<i>Rubus armeniacus</i>
	English ivy	<i>Hedera helix</i>
	Salt cedar	<i>Tamarix ramosissima</i>
	Orange hawkweed	<i>Hieracium aurantiacum</i>
	Yellow archangel	<i>Lamium galebdolon</i>

Verified invasive species

AREMP crews surveyed 140 sites in 25 watersheds for aquatic invasive species throughout the 2016 field season (June through September). AREMP crews recorded 10 verified invasive detections. Of the 10 detections, all were of Himalayan [Armenian] blackberry (*Rubus armeniacus*). This species was detected in all states besides Washington (Figure's 2a-2c).

Oregon

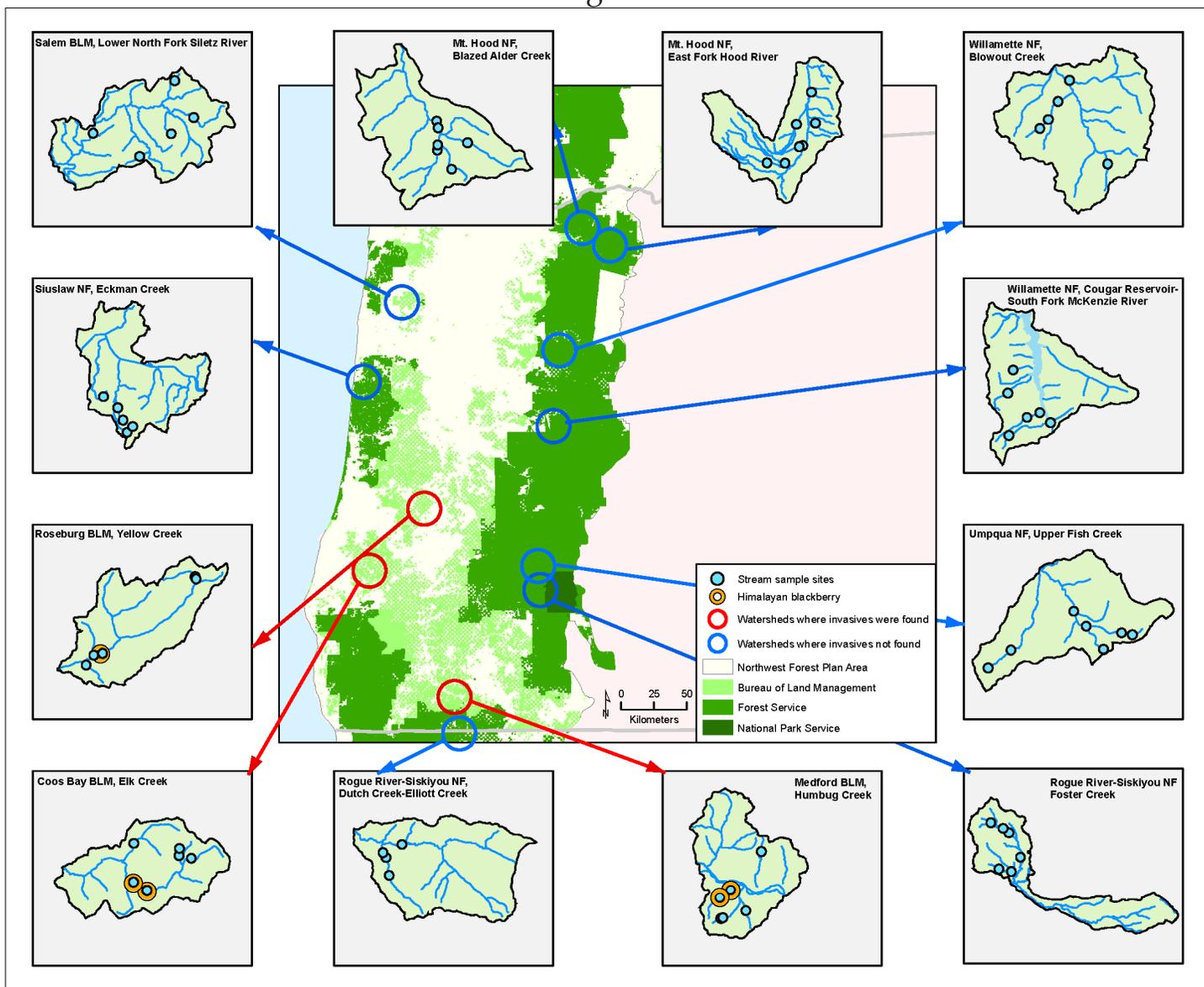


Figure 2a. Map of Oregon watersheds surveyed by Aquatic and Riparian Effectiveness Monitoring Program crews during the 2016 field season. Blue lines represent watersheds where invasive species were not found; red lines depict watersheds where invasive species were detected. NF = National Forest. BLM = Bureau of Land Management.

Northern California

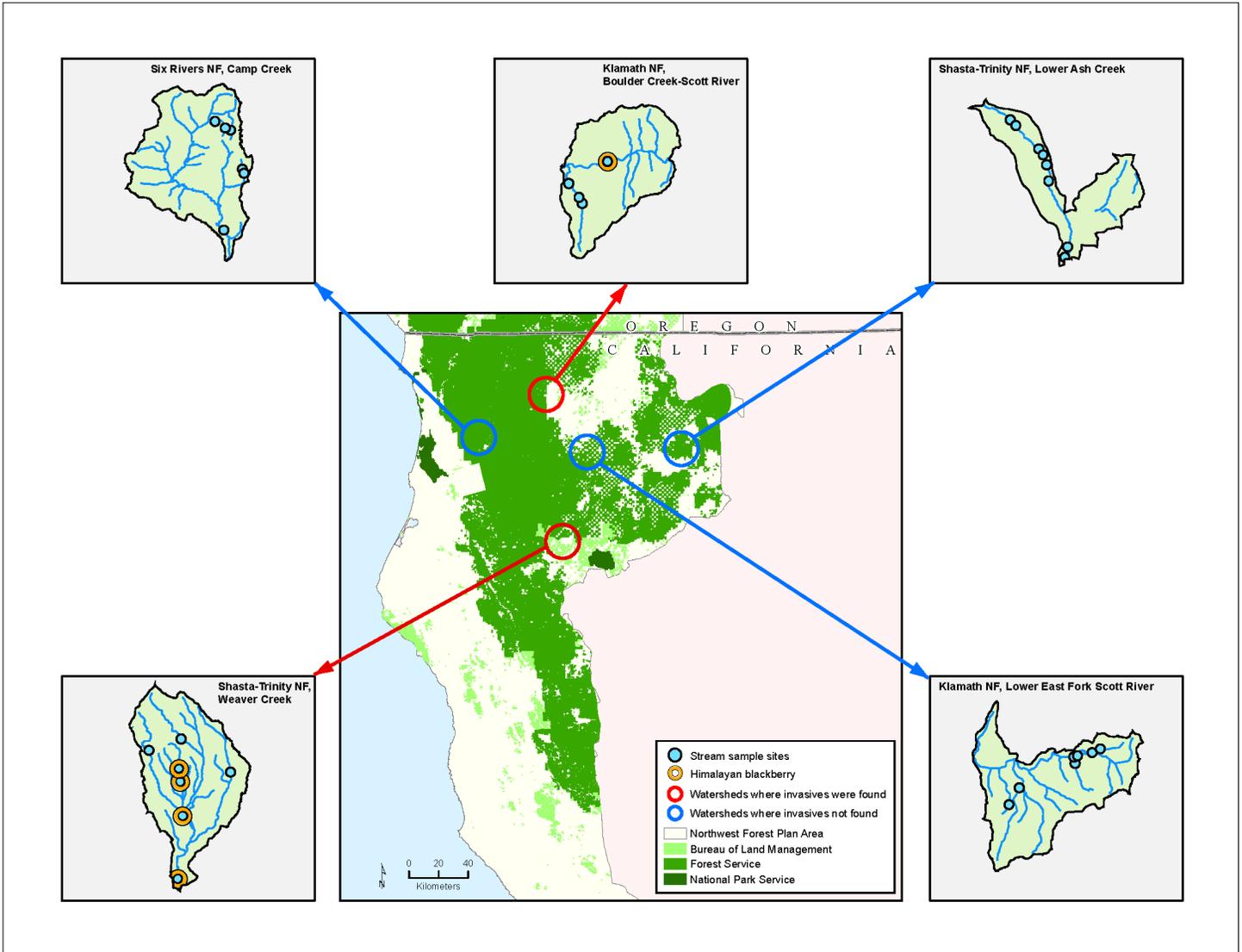


Figure 2b. Map of California watersheds surveyed by Aquatic and Riparian Effectiveness Monitoring Program crews during the 2016 field season. Blue lines represent watersheds where invasive species were not found; red lines depict watersheds where invasive species were detected. NF = National Forest. BLM = Bureau of Land Management.

Washington

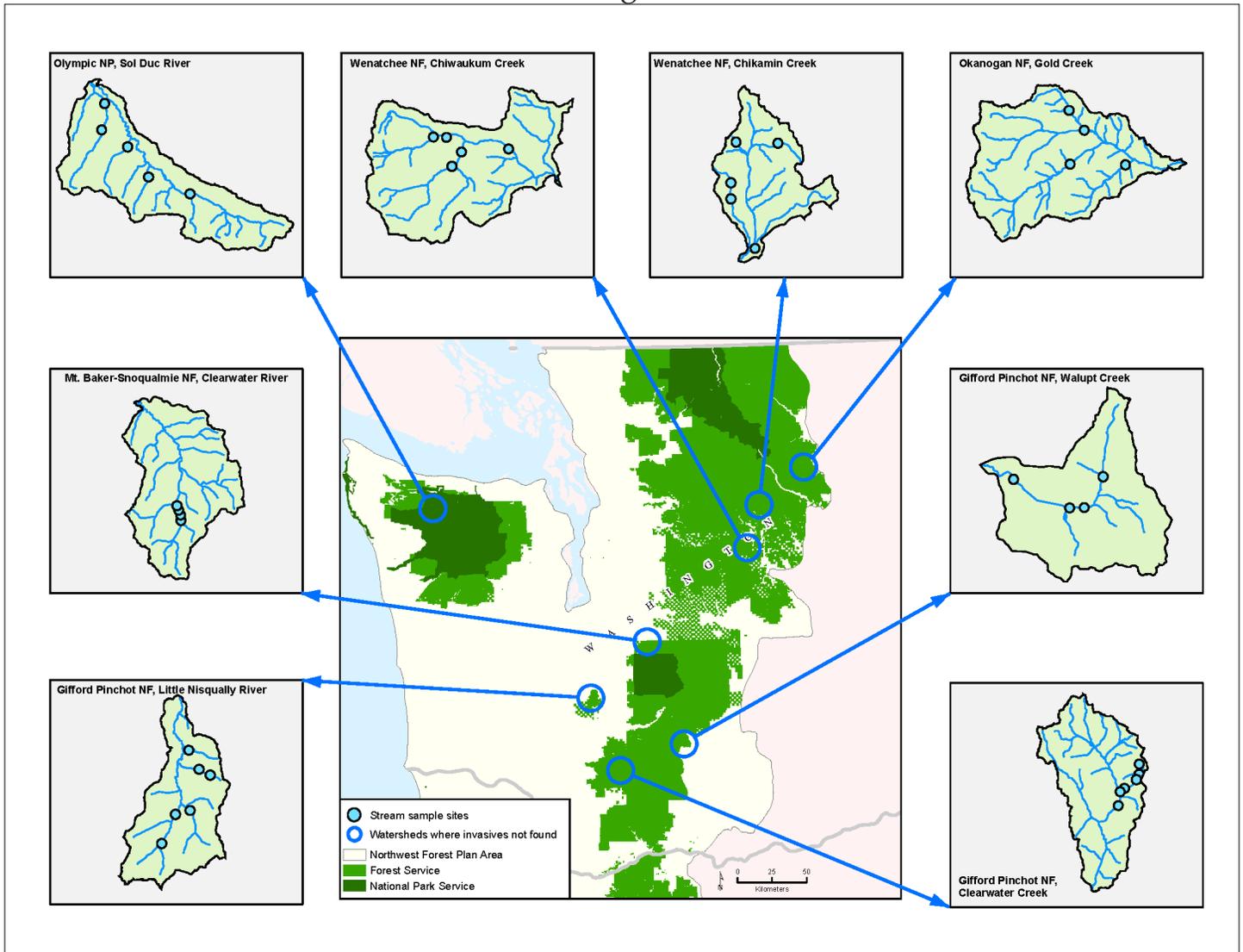


Figure 2c. Map of Washington watersheds surveyed by Aquatic and Riparian Effectiveness Monitoring Program crews during the 2016 field season. Blue lines represent watersheds where invasive species were not found. NF = National Forest. BLM = Bureau of Land Management.

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