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Survey of Wyoming crayfishes

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SURVEY OF WYOMING CRAYFISHES

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ABSTRACT.—Collections of crayfish by Wyoming Game and Fish Department biologists and University of Wyoming staff in 1985–1987 included five species: *Pacifastacus gambelii*, the only species found in the Snake River and Bear River drainages of western Wyoming; *Orconectes neglectus neglectus*, collected from one reservoir in the South Platte River drainage in southeastern Wyoming (its first reported occurrence in the state); *O. immunis* and *O. virilis*, widespread east of the Continental Divide and in the Green River drainage of southwestern Wyoming; and *Cambarus diogenes diogenes*, collected from a tributary of the North Platte River in eastern Wyoming.

The introduction of *Orconectus rusticus* into Wisconsin and the subsequent ecological and fisheries management problems have heightened awareness of the potential adverse impacts of exotic crayfish (Lodge et al. 1985). In Wyoming, crayfish are considered valuable fish forage in most waters where they occur, but several potential problems with introduced crayfish are of concern to fisheries managers. They include possible impacts on native species (Schwartz et al. 1963, Bouchard 1976), possible forage imbalance in some trout fisheries (Hepworth and Duffield 1987), and the loss of aquatic macrophytes in aquatic systems where plants are ecologically important (Dean 1969, Lodge et al. 1985). Since no inventory of the crayfish species in Wyoming had been conducted, the Wyoming Game and Fish Department (WGFD) began one in 1985. I describe the information obtained on occurrence and distribution of crayfish species in Wyoming.

METHODS

Fishery biologists with WGFD were asked to collect and preserve crayfish found by them in 1985, 1986, and 1987. Collections were generally made during the performance of other assigned tasks on particular waters. Written instructions were provided to each biologist for preservation, labeling of specimens, and site identification. Diagrams of first-forms males were also provided, with instructions for identifying males and instructions to collect only males. Specimen jars, alcohol, and labels were provided to the biologists.

Collections were transferred to the University of Wyoming Department of Zoology and Physiology for storage and identification. Identifications follow Hobbs (1976).

RESULTS AND DISCUSSION

Occurrence

Five species of crayfish were found: *Pacifastacus gambelii*, *Orconectes neglectus neglectus*, *O. immunis*, *O. virilis*, and *Cambarus diogenes diogenes* (Table 1). This was the first record of *O. neglectus neglectus* in Wyoming (Williams 1954, Hobbs 1976).

Distributions

The only species collected in both the Snake River and the Bear River drainages was *Pacifastacus gambelii*. It is probably endemic to these drainages in Wyoming (Hobbs 1976, Johnson 1986).

Two species, *Orconectes immunis* and *O. virilis*, were collected in the Green River drainage in southeastern Wyoming. *Orconectes virilis* was reported to occur in Flaming Gorge Reservoir by Johnson (1986), but this was the first report of *O. immunis* in the watershed. Both species were in collections from Flaming Gorge Reservoir in Wyoming; however, *O. immunis* was collected only at the upstream end of the reservoir and was the only species found in the drainage upstream from the reservoir. Both species were introduced into the Colorado River drainage,

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TABLE 1. Crayfish collection sites and species of the genera *Cambarus*, *Orconectes*, and *Pacifastacus* found in Wyoming, 1985–1987.

Drainage	County	Site	Species
Snake River	Teton	Teton Valley Ranch spring	*P. gambelii*
		Polecat Creek	*P. gambelii*
Bear River	Uinta	Woodruff Reservoir	*P. gambelii*
		Bear River	*P. gambelii*
		Sulphur Creek	*P. gambelii*
Green River	Sublette	Big Sandy Reservoir	*O. immunis*
	Sweetwater	Flaming Gorge Reservoir	*O. immunis*
			O. virilis
		Green River	*O. immunis*
North Platte River	Albany	Lake Hattie	*O. immunis*
		Alsop Lake	*O. immunis*
		Lezenbee Lake	*O. immunis*
		Huck Finn Pond	*O. immunis*
		Rock Creek	*O. immunis*
	Carbon	Seminoe Reservoir	*O. immunis*
		North Platte River	*O. immunis*
	Goshen	Hawk Springs Reservoir	*O. immunis*
		Horse Creek	*O. immunis*
			O. virilis
			C. diogenes
	Natrona	Alcova Reservoir	*O. immunis*
			O. virilis
		Barbe Pond	*O. immunis*
		Kendrick Canal	*O. virilis*
	Platte	Festo Lake	*O. immunis*
		Joe Johnson Reservoir	*O. immunis*
South Platte River	Laramie	Sloans Lake	*O. immunis*
			O. virilis
		Wyoming Travel Commission Pond	*O. immunis*
		Crystal Lake Reservoir	*O. neglectus*
Belle Fourche River	Campbell	Gillette Fishing Lake	*O. immunis*
	Crook	Keyhole Reservoir	*O. immunis*
		Sundance Pond	*O. immunis*
Powder River	Johnson	Todd Reservoir	*O. virilis*
		Sandstone Draw Reservoir	*O. immunis*
		Sand Creek	*O. immunis*
		Shell Creek	*O. immunis*
Big Horn River	Freemont	Boysen Reservoir	*O. immunis*
		Maverick Pond	*O. immunis*
		Wind River	*O. immunis*
		Popo Agie River	*O. immunis*
			O. virilis
	Park	Lily Lake	*O. immunis*

where no native crayfish were known (Johnson 1976).

East of the Continental Divide in the North Platte River drainage, *O. immunis* was the most commonly collected species. *Orconectes virilis* was also collected at scattered locations. *Cambarus diogenes diogenes* was found in one stream, Horse Creek, a tributary to the North Platte River in eastern Wyoming. All three species are probably endemic to Wyoming east of the Continental Divide (Crocker and Barr 1968).

In the South Platte River drainage in southeastern Wyoming, *Orconectes neglectus neglectus* was collected from Crystal Lake Reservoir at the headwaters of the Crow

Creek drainage, Laramie County. This species has been previously reported in the South Platte River drainage in Sedgwick County, Colorado (Williams 1954). Both *O. immunis* and *O. virilis* were also collected from impoundments in the South Platte River drainage.

In the river drainages that flow to the Missouri River—Belle Fourche, Powder, and Big Horn—both *O. immunis* and *O. virilis* were collected, but *O. immunis* was the more common.

Management Considerations

Pacifastacus gambelii was the only species found in the Snake River and Bear River drainages. Because the introduction of exotic species could lead to displacement of this native crayfish, the transplanting or transporting of crayfish from other drainages into these two drainages should be discouraged.

Orconectes neglectus neglectus was found in a single coldwater reservoir at the headwater of the Crow Creek drainage, Laramie County. It has been reported in streams cold enough to support trout (Williams 1954). Only three other sites in the South Platte River drainage were sampled during this survey. Possibly *O. neglectus neglectus* is more widespread in Wyoming and is endemic to clear, rocky streams in the South Platte River drainage in Wyoming (Williams 1954).

Cambarus diogenes diogenes was collected from one stream in eastern Wyoming. It is likely to be more widespread in the state, but few samples were collected from small streams in eastern Wyoming.

Both *Orconectes immunis* and *O. virilis* were native to all drainages east of the Continental Divide and have been introduced into the Green River drainage west of the Continental Divide. Johnson (1986) described introduction of *O. virilis* into the Green River drainage with a shipment of largemouth bass (*Micropterus salmoides*) from a pond in Johnson County, Wyoming, to Flaming Gorge Reservoir.

Orconectes virilis has been known to adversely affect rainbow trout (*Salmo gairdneri*) in reservoirs (Hepworth and Duffield 1987), to displace native crayfish (Schwartz et al. 1963, Bouchard 1976), and to consume aquatic macrophytes (Dean 1969, Johnson 1976); consequently, transplanting of this species to enhance fish forage should be done with caution. Since no similar problems have been identified with *O. immunis*, it may be a more desirable forage species; however, its ecological impacts on waters where it is an introduced species are not known.

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