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BASINWIDE SURVEY PROTOCOLS APPLY TO RARE FISH SPECIES IN WARMWATER SYSTEMS

Although reliable information on the distribution and abundance of rare fish species is critical to effective management, its collection must be cost-effective. Recently, basinwide protocols were developed for providing accurate and precise visual estimates of fish distribution throughout entire drainages at relatively low cost. These protocols were applied primarily in small, coldwater systems. We modified a basinwide protocol to survey about 180 river kilometers of North Fork Holston River (NFHR), a sixth-order warmwater stream in southwestern Virginia. We used the survey information to map the distribution of blotchside logperch (*Percina burtoni*), an uncommon benthic species that is patchily distributed throughout its range.

HABITAT AVAILABILITY WAS ESTIMATED VISUALLY

The NFHR was divided into five study reaches that were surveyed at random to eliminate seasonal bias. On the first of two trips down the river, one of two crew members categorized habitat units (pool, riffle, or run), and visually estimated the dominant and subdominant substratum (e.g., silt, pebble, bedrock), and width of each unit. The other crew member measured water depth with a graduated staff while canoeing or walking through each habitat unit. The length of each unit was estimated with a range finder.

Actual widths of 20% of all riffles and runs and 10% of all pools were measured at 5- to 20-m intervals with a tape. Interval size depended on length and morphology of the habitat unit (intervals between measurements increased with unit length). Calibration ratios were developed and used to correct area estimates for habitat units.

UNDERWATER OBSERVATIONS WERE MADE TO LOCATE BLOTCHSIDE LOGPERCH

During the second trip through the study reaches, habitat units selected during the survey were sampled for blotchside logperch. Two observers, using diving-masks and snorkels, started at the downstream end of each habitat unit and slowly proceeded along a line parallel to midchannel to the upstream end. To standardize sampling methods and increase the likelihood of encountering logperch, starting points in riffles and runs were at the downstream ends of primary and secondary thalwegs. Starting points in pools were midway between the middle of the stream and the stream margins. Each habitat unit was surveyed once by two observers (two transects were sampled per habitat unit). Water clarity was considered suitable for underwater observations when we could clearly see a secchi disk suspended in the water column from at least 1.5 m away. Sighting distance (distance from the observer to the secchi disk) was measured at the beginning of each day of snorkeling and when visibility apparently improved or degraded.

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BASINWIDE PROTOCOLS ARE VALUABLE TOOLS IN LARGE-SCALE INVENTORIES

The basinwide protocol provided an inventory of habitat in NFHR and enabled us to construct detailed maps of the study reaches and blotchside logperch distribution. Of the 1,026 habitat units identified, 131 were surveyed for blotchside logperch. Blotchside logperch were observed in 27 (21%) of the sampled habitat units, confirming the patchy distribution of the species in NFHR. Logperch were observed throughout NFHR, but most frequently in the fifth-order section of the river, and only in run and riffle habitats.

The survey required 378 person-hours and resulted in an extension of the known range of blotchside logperch in NFHR. This work demonstrates that basinwide protocols are applicable to large warmwater streams and to taxa other than salmonids. Moreover, they are cost-effective

and provide data that are more reliable than some traditional methods (e.g., roadside surveys) for determining distributions of rare species.

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