## SNOUT DIMORPHISM IN WHITE STURGEON, *ACIPENSER TRANSMONTANUS*, FROM THE COLUMBIA RIVER AT HANFORD, WASHINGTON

Several publications (Bajkov 1951; Semakula 1963; Vladykov and Greeley 1963; Semakula and Larkin 1968; Haynes et al. 1978; Haynes and Gray 1981) describe the behavior, natural history, and taxonomy of white sturgeon, *Acipenser transmontanus*. Although differences in snout length and shape between young and adult white sturgeon are known, morphological divergence in snout type of similar sized individuals has not been reported. We observed and documented a morphological dimorphism in the snouts of juvenile and adult white sturgeon in the Hanford reach of the Columbia River.

### Materials and Methods

Sturgeon were collected in April and June 1977 with 100 m trammel nets at White Bluffs Pool (River Mile 371) on the Columbia River. Specimens were examined in the field, and total length (TL), physical characteristics, and snout types were recorded. A subsample of 10 sturgeon (41-92 cm TL), 5 designated "long snout" and 5 "short snout," was taken to the laboratory where detailed snout and head measurements were made and sex was determined (these fish were <100 cm TL to facilitate storage). All other fish were released after examination. Morphometric and meristic measurements followed Hubbs and Lagler (1958). A discriminate analysis (Morrison 1976) was used to select separating characteristics.

### Results and Discussion

Field observations on 99 white sturgeon ranging from 35 to 205 cm TL showed two snout types based on size and shape. Although both snout types fit the basic characteristics of white sturgeon summarized in Scott and Crossman (1973), the short snout specimens captured at White Bluffs were more representative of that description: "...snout in adults short, depressed, bluntly rounded, shorter than postorbital length, in young sharper, longer than postorbital length; ...." The long snout was morphologically similar except for a long, slender, and pointed snout. The long snout characteristic was more pronounced in smaller immature fish measuring 35-120 cm TL, but was still evident in larger more mature individuals (Figs. 1, 2). Of the sampled population, 48% exhibited the long snout and 47% the short snout characteristics, and 5% could not be identified with either group.

Mean total length of white sturgeon examined in the laboratory was 65.50±20.63 cm for long snout and 70.62±18.79 cm for short snout fish (mean snout lengths were 6.77±1.65 cm and 6.58±0.91 cm, respectively). Of 21 morphometric and meristic measurements made on the subsample, 6 were deemed appropriate to demonstrate snout differences (Table 1). Although sample size was small, the data suggest a correlation between snout length and sex. Of the 10 sturgeon examined in the laboratory, all long snout specimens were males while 4 of 5 short snout specimens were females.

Snout type differences in white sturgeon have not been reported in other areas of the species range. The occurrence of this dimorphism at Hanford may reflect isolating mechanisms, such as physical barriers which block white sturgeon movements. Bajkov (1951) suggested that hydroelectric dams along the Columbia River isolate white sturgeon populations, preclude immigration and lead to divergent evolution. White Bluffs Pool is in the Hanford reach of the Columbia River which is bounded upstream by Priest Rapids Dam and downstream by McNary Dam. The adaptive significance of this dimorphism at Hanford is unknown.

TABLE 1.—Measurements used to demonstrate differences between five long snout and five five short snout white sturgeon.

| | Long snout | | | Short snout | | |
|---|---|---|---|---|---|---|
| Characteristic | Mean | SD | Range | Mean | SD | Range |
| Total length, cm | 65.50 | 20.63 | 41.90-92.00 | 70.62 | 18.79 | 49.40-91.50 |
| Head length, cm | 15.13 | 4.03 | 10.30-20.95 | 15.59 | 4.00 | 10.70-19.35 |
| Snout length, cm | 6.77 | 1.65 | 5.05- 9.50 | 6.58 | .91 | 5.50-12.50 |
| Barbles to rostrum (B-R) ratio | 4.34 | .95 | 3.20- 5.80 | 3.40 | .44 | 2.30- 3.50 |
| Head length/snout length | 2.23 | .20 | 2.04- 2.52 | 2.37 | .30 | 1.96- 2.70 |
| Snout length/total length, % | 10.34 | 1.71 | 7.62-12.18 | 9.32 | 1.46 | 8.98-12.20 |
| B-R/total length, % | 6.63 | .87 | 5.50- 7.64 | 4.81 | .95 | 3.50- 5.84 |

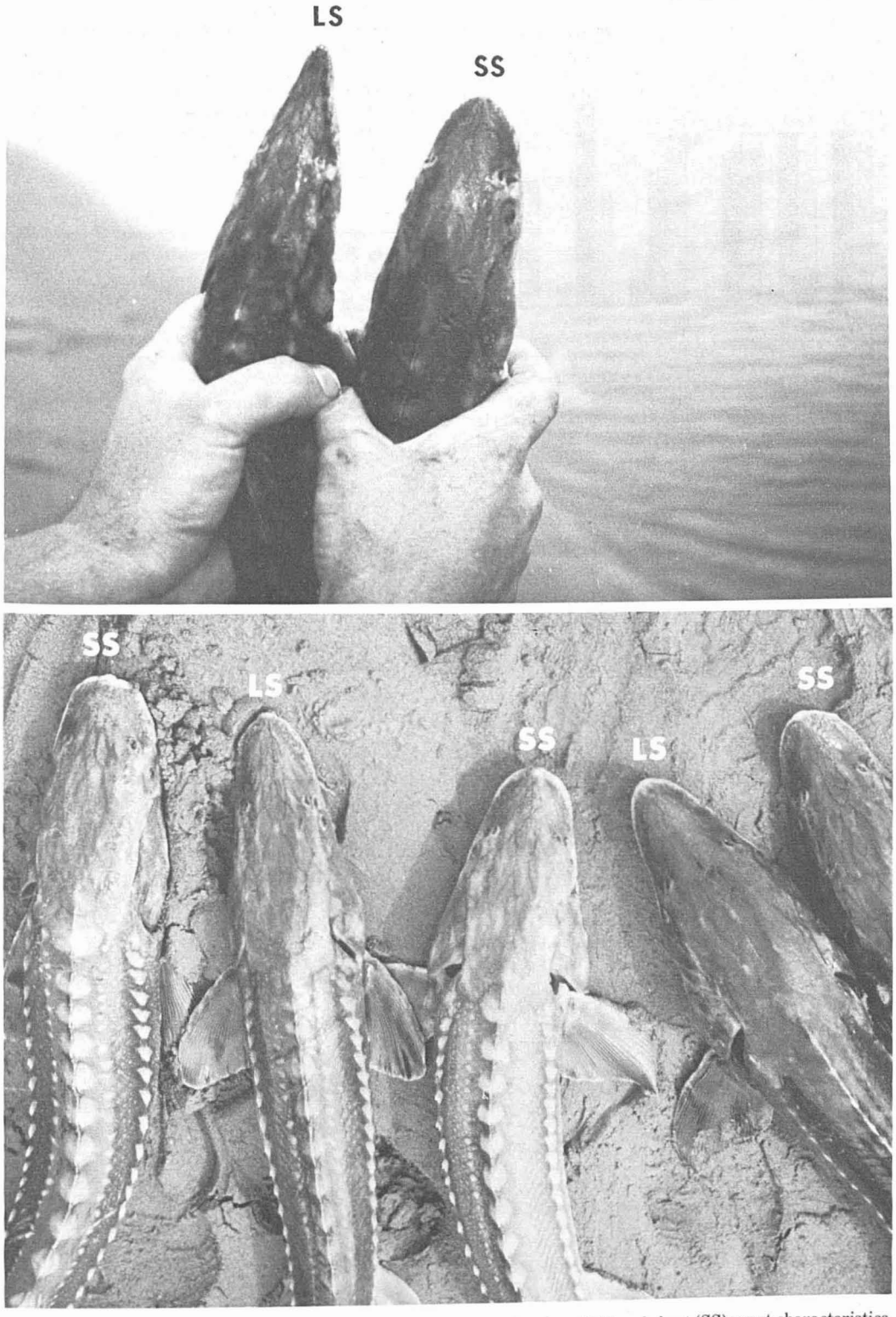


FIGURE 1.—Juvenile (above) and older (below) white sturgeon showing long (LS) and short (SS) snout characteristics.

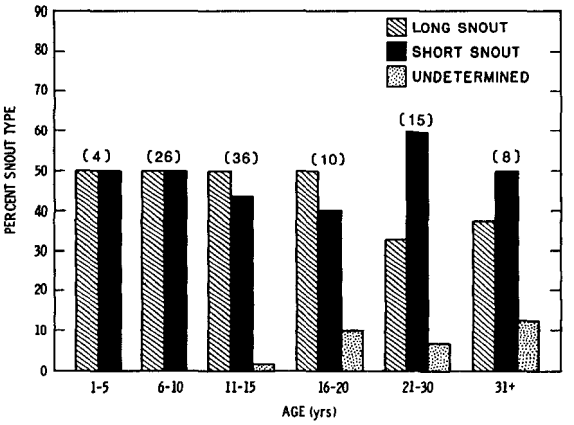


FIGURE 2.—Distribution of snout type with age for white sturgeon, *Acipenser transmontanus*, at Hanford. Age class was estimated from length based on data from Semakula (1963) for the Fraser River. Sample size in each age class in parentheses.

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