

# White Sturgeon Lower Fraser River Population

*Acipenser transmontanus* pop. 4

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*Disclaimer: The following document was compiled based on a review of information currently available for this species as of November 25, 2005. This document can be used to assist with the identification of this species and to support the development of management recommendations as they relate to forestry activities. For more information on this species, please refer to the reference section or consult with a Species at Risk specialist.*

## Description

Reaching 6 m in length, 635 kg in weight and over 100 years in age, the white sturgeon is the largest freshwater fish in Canada. The torpedo-shaped white sturgeon has no scales. Its protective bony plates, or scutes, are arranged in five rows – one along the back, one along the middle of each side, and one along each side of the belly. The plates of young sturgeon have very sharp points that become blunted with age. Its tail has a shark-like upper lobe that is longer and more pointed than the lower lobe, a shape referred to as heterocercal<sup>1</sup>.

The white sturgeon has a broad, flattened head and small eyes. Its wide toothless mouth, located on the underside of the head well back from the snout, is protrusible, an adaptation for sucking up food from the lake or river bottom. Its four whiskers or barbels, located between the mouth and snout, aid in finding food in the murky or darker waters where sturgeons prefer to inhabit<sup>1</sup>.

The back and upper sides of the “White” Sturgeon vary in colour from dark to medium grey, often with obvious white markings. The lower sides and belly are pale grey to white<sup>1</sup>.



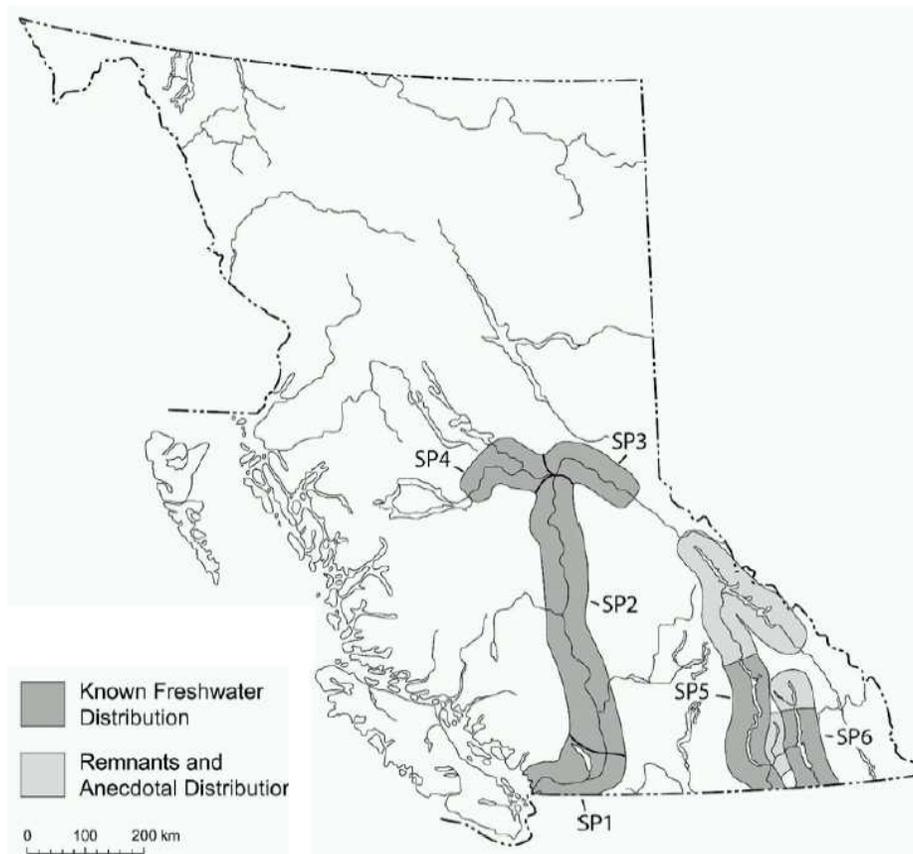
*Photo courtesy of the Fraser River Sturgeon Conservation Society*



Photo courtesy of the Fraser River Sturgeon Conservation Society

## Distribution

In British Columbia, the most widespread population occurs in the Fraser River mainstem inland to upstream of Prince George, high into the Nechako. They are also present in the lower reaches of other large tributaries like the Stuart, McGregor, Bowron, Harrison and Pitt rivers. White sturgeon also occur in the British Columbia portion of the Columbia River drainage. There have also been reports of the white sturgeon in several lakes in those drainages including Fraser, Takla, Trembleur, Stuart and Williams Lakes in the Fraser system, and Kootenay, Arrow, Slokan and Duncan Lakes in the Columbia watershed<sup>1</sup>.



Distribution of white sturgeon (*Acipenser transmontanus*) in British Columbia<sup>2</sup>.

**Forest Districts<sup>3</sup>**

- Central Cariboo Forest District (DCC)
- Chilliwack Forest District (DCK)
- **Cascades Forest District (DCS)**
- **Kamloops Forest District (DKA)**
- **100 Mile House Forest District (DMH)**
- Prince George Forest District (DPG)
- Quesnel Forest District (DQU)

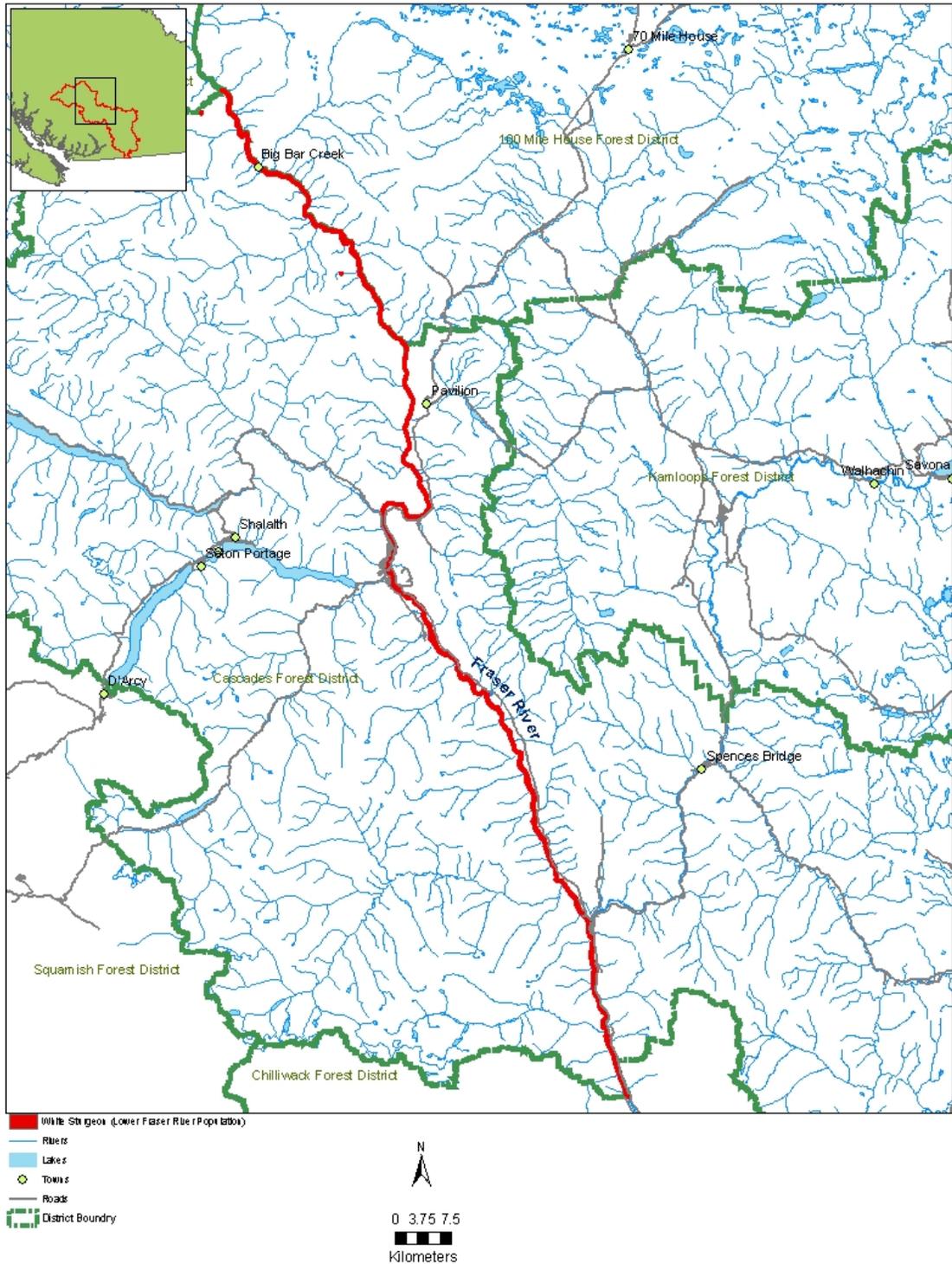
**Biogeoclimatic Units<sup>3</sup>**

- BGxw - Bunchgrass - Very Dry Warm
- CDF - Coastal Douglas Fir
- CWH - Coastal Western Hemlock
- IDF - Interior Douglas-fir
- PP - Ponderosa Pine
- SBS - Sub-Boreal Spruce

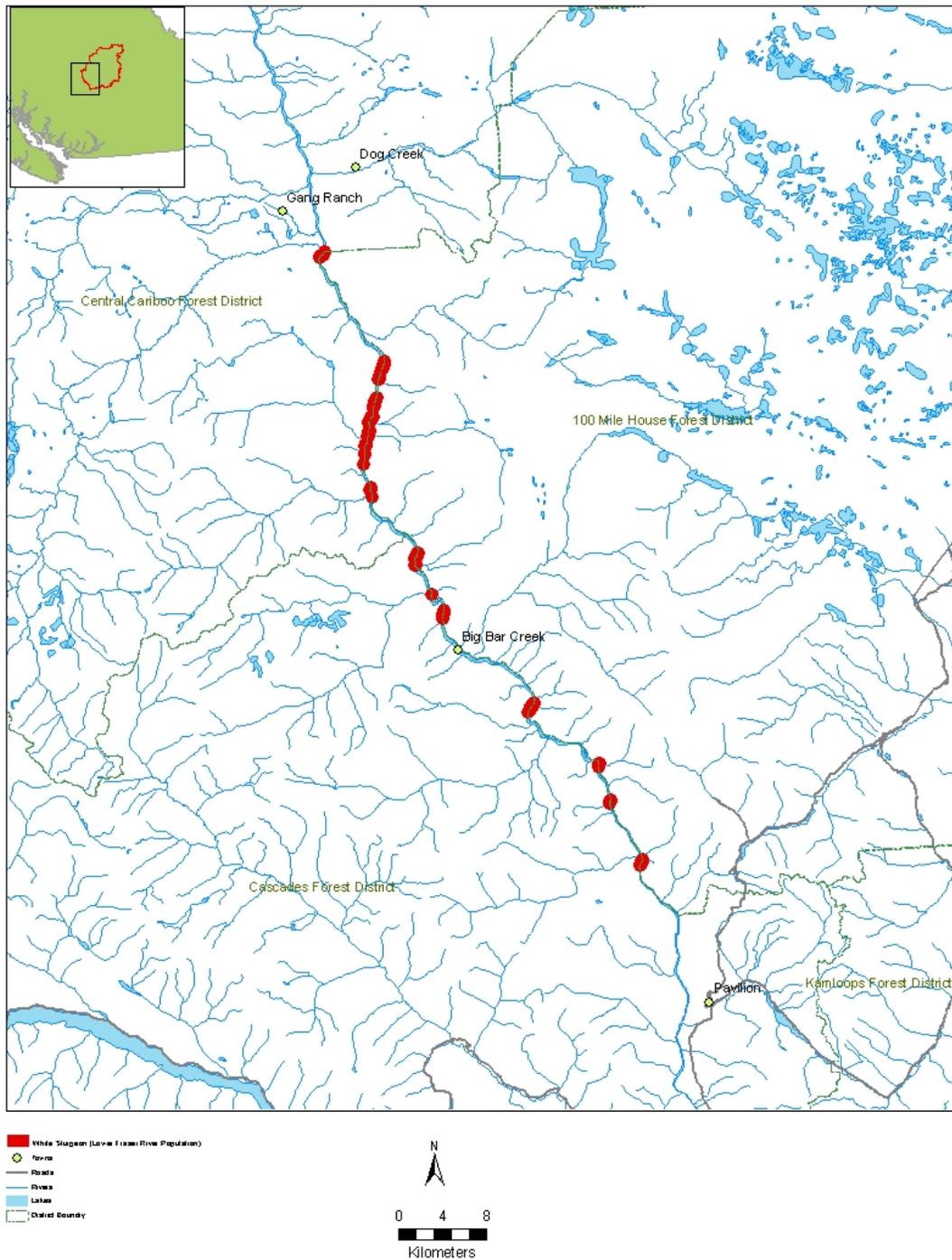
**Elevation**

Not available.

### Map of Known Locations



Known locations for white sturgeon (*Acipenser transmontanus* pop. 4), in the Cascades Forest District as of September 2005 (data source: Conservation Data Centre).



Known locations for white sturgeon (*Acipenser transmontanus* pop. 4), in the 100 Mile House Forest District as of September 2005 (data source: Conservation Data Centre).

Note: Occurrence data could not be obtained for the Kamloops Forest District. Sightings in the North Thompson River were most likely isolated events.

## Biology

### **Reproduction**

The white sturgeon is a long-lived species. In the Fraser River, the age where individuals reach sexual maturity increases from the lower river to the upper river. Below Hell's Gate some females may spawn as young as 18 years of age and males at 14 years<sup>4</sup>. The preliminary age estimate for first spawning in females in the mid-river population is in their late 20s; males could be younger than 20 years of age. In the Nechako River system, females may not reach maturity until their late 40s, or older, and males may not spawn until their early 30s<sup>2</sup>.

Once mature, the females spawn only every 4 to 10 years. Sturgeon make up for this pattern of delayed maturity and infrequent spawning by producing an exceptional numbers of eggs –from about 700,000 in medium sized females to 3 or 4 million in the largest<sup>1</sup>.

Sexually mature adults gather in aggregations to broadcast spawn during spring and early summer. The fertilized small brown, sticky eggs fall to the bottom and adhere quickly to the substrate. The length of time before the eggs hatch is temperature dependent and can last for 5 to 25 days. Yolk-sac larvae go through a dispersal period where they move vertically and swim or drift with the current. At 15°C the yolk sac is absorbed around 12 to 14 days of age and the larvae begin to actively feed during daylight<sup>1,5</sup>. About 20 to 30 days after hatching, larvae transform into fry (young-of-the-year). At around 55 days, they orient to the current and swim freely<sup>2</sup>.

### **Foraging**

White sturgeon eat a variety of organisms from benthic (bottom-dwelling) invertebrates including crayfish, shrimp and clams to fish such as lamprey, salmon, eulachon and smelt. Smaller sturgeon tend to eat smaller invertebrates, while larger sturgeon consume mainly fish. White sturgeon will readily take live prey as well as carrion<sup>6</sup>.

## Habitat

Habitat use varies with life-history stage and season, and may involve migrations to spawning and feeding areas, making critical habitat difficult to define<sup>2</sup>.

### **Spawning**

White sturgeon spawning habitat is difficult to study as it is used during the time of the year when flood events occur and because the habitat exists only in large rivers. In the meandering reaches of the lower Fraser River, there is evidence that spawning occurs only in side channels with substrates comprised of gravel, cobble and sand. Boulder and cobble predominated one study site, which was located in a confined area of the main channel. Flows at apparent spawning sites are mainly non-turbulent with near-bed velocities averaging 1.7 m/s. The lower Fraser River generally has high levels of suspended sediment<sup>7</sup>. In regulated systems sturgeon utilize fast, turbulent water over clean, large rocky substrate<sup>8</sup>.

### **Juvenile habitat**

The lower reaches of tributaries, large backwaters, side channels and sloughs (a depression or hollow) are used by juvenile (>1m) sturgeons. Some important factors in determining high suitability rearing habitat are a depth > 5 m, low velocities and variable current direction, high turbidity and relatively warm water. There is a distinct movement from sloughs and backwaters to mainstem areas as summer progresses<sup>6</sup>.

### **Adult habitat**

Although they will briefly move into shallower areas to feed during spring and summer, in the Fraser River, adults are typically found in deep near-shore areas, adjacent to heavy flows, defined by deposits of sand and fine gravels with backwater and eddy flow characteristics<sup>9</sup>.



*Photo courtesy of Murray Ward*

## **Conservation and Management**

### **Status<sup>3</sup>**

Provincial Rank: S2 (Provincially Imperiled)  
BC List: Red (Endangered)  
COSEWIC Status: E (Nov 2003) (Endangered)  
SARA Schedule: 3 (Special Concern)

### **Threats**

Over the past century, most white sturgeon habitat in British Columbia has declined in quality and quantity, but quantitative measures are not available. River regulation and diversion has likely had the most severe influence on sturgeon habitat<sup>8,9,10,11</sup>. While dams have had a major effect, habitat loss and degradation from other human activities has occurred in all drainages.

The threats to the white sturgeon from timber harvesting include: increased siltation, changes in hydrology (water flow and quality), water temperature changes, alteration of key life history habitats (e.g. spawning and rearing habitats) and a reduction of key prey

abundance due to habitat changes<sup>12</sup>. These threats come from timber harvesting directly affecting the Fraser River, but also, and perhaps more importantly, from any streams that run into the Fraser.

## Management Recommendations

Consult with a Registered Professional Biologist prior to implementing the following management recommendations because certain situations may require custom solutions based on specific site characteristics.

- Identify and protect locations where this species is known to occur: obtain occurrence data from the Conservation Data Centre (<http://srmwww.gov.bc.ca/cdc/>) and if necessary conduct surveys to confirm presence or absence of this species.

Where this species is known to occur:

- Conduct silvicultural activities in a manner that prevents or minimizes sediment delivery to aquatic habitats where this species may occur. Increased silting of substrate reduces habitat quality for this species including the loss of deep near-shore pools used by adult sturgeon.
- Maintain riparian habitat features (i.e. crown closure) especially within the Fraser Watershed to minimize impacts to unnatural fluctuations in water levels, temperature and flow to maintain white sturgeon habitat. Reduced water flow affects the availability of physical habitat and increases water temperatures during the warm summer months.
- Follow the Riparian Management Guidelines for S1 streams.
- Do not use pesticides near aquatic habitats where this species may occur.

## References

- <sup>1</sup> Blood, D.A. 1997. White Sturgeon. B.C. Minist. Environ., Lands and Parks, Wildl. Branch. 6pp.
- <sup>2</sup> COSEWIC. 2003e. COSEWIC assessment and update status report on the white sturgeon *Acipenser transmontanus* in Canada. Comm. on the Status of Endangered Wildl. in Can. Ottawa. vii+51pp.
- <sup>3</sup> BC Conservation Data Center. Website: <http://srmapps.gov.bc.ca/apps/eswp>.
- <sup>4</sup> Semakula, S.N., and P.A. Larkin. 1968. Age, growth, food, and yield of the white sturgeon (*Acipenser transmontanus*) of the Fraser River, British Columbia. Fisheries Research Board of Canada 25 (12): 2589-2602.
- <sup>5</sup> Conte, F.S., I. Doroshov, P. Lutes, and E.M. Strange 1988. Hatchery manual for the white sturgeon *Acipenser transmontanus* Richardson with application to other North American Acipenseridae. Publication 3322 Cooperative Extension University of California Division of Agriculture and Natural Resources. 104 p.
- <sup>6</sup> Lane, E.D. and M.L. Rosenau. 1995. The conservation of sturgeon stocks in the lower Fraser River watershed. A baseline investigation of habitat, distribution, age and population of juvenile white sturgeon (*Acipenser transmontanus*) in the lower Fraser River, downstream of Hope, B.C. Habitat Conservation Fund Project – Final Report. 153p.
- <sup>7</sup> Perrin, C.J., L.L. Rempel, and M.L. Rosenau. 2003. White sturgeon spawning habitat in an unregulated river: Fraser River, Canada. Transactions of the American Fisheries Society 132: 154-165.
- <sup>8</sup> UCRRP. 2002. Draft upper Columbia River white sturgeon recovery and management plan. Recovery Plan prepared by the Upper Columbia River Recovery Team, January, 2002. 88 p.
- <sup>9</sup> RL&L Environmental Services Ltd. 2000. Fraser River white sturgeon monitoring program comprehensive report (1995 to 1999). Prepared for BC Fisheries. Victoria, B.C. 94 p.
- <sup>10</sup> Korman, J., and C. Walters 2001. Nechako River white sturgeon recovery planning: summary of stock assessment and October 2-3, 2000 workshop. Report prepared for B.C. Fisheries, March 30.
- <sup>11</sup> Anders, P.J., D.L. Richards, and M.S. Powell. 2001. The first endangered white sturgeon population: repercussions in an altered large river-floodplain ecosystem.
- <sup>12</sup> Troy Nelson. Personal Communication. Sept. 23, 2005.