Understanding the consequences of recreational angling stress on the biology and movement of white sturgeon in the Fraser River, British Columbia

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Figure 1. The crew poses with a 3.23 m FL white sturgeon caught with rod and reel during the May 2014 field season. This fish was tagged with a Vemco V13 acoustic tag equipped with an accelerometer sensor.

Background

White sturgeon *Acipenser transmontanus* (Figure 1) are the largest freshwater fish in North America and are found along the Pacific coast from California to Alaska, with spawning populations distributed throughout three main watersheds: the Sacramento, Columbia, and Fraser Rivers. The Lower Fraser River (LFR) white sturgeon are the target of a lucrative catch-and-release (C&R) fishery (Figure 2) where individual recaptures is common. Despite the cultural and economic importance of white sturgeon little is known about the potential post-release mortality and/or sub-lethal alterations in physiology and behaviour after C&R.

Figure 2. White sturgeon in the LFR were captured using regulation rods and reels supplied by the angling guides at B.C. Sportfishing Group.

White Sturgeon Project

Using acoustic telemetry and physiological sampling, we will examine the effects of recreational angling on the biology and movement of white sturgeon. In May 2014, glucose and lactate levels were measured from whole blood sampled from 64 white sturgeon ranging from 59 to 323 cm FL and varying in total fight time (36 s to 85 min). Although there was no correlation between glucose levels and fight time, lactate levels significantly increased with fight time (Figure 3). Plasma from these fish will also be analyzed for the stress hormone cortisol, as well as for sex hormones (testosterone, estradiol).

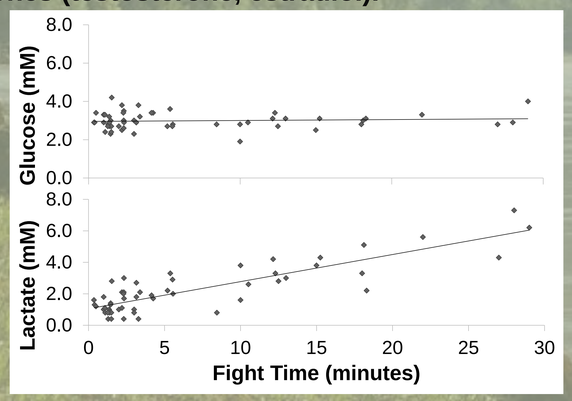

Figure 3. Glucose and lactate were measured from whole blood taken from 64 LFR white sturgeon after varying fight times on rod and reel.

Our Project Within OTN

In April 2014, 16 VR2Ws were deployed in the LFR to provide additional coverage in areas not already monitored by OTN or the province of B.C. (Figure 4). These data will contribute to a number of existing projects, including ongoing Pacific salmon work led by OTN researchers.

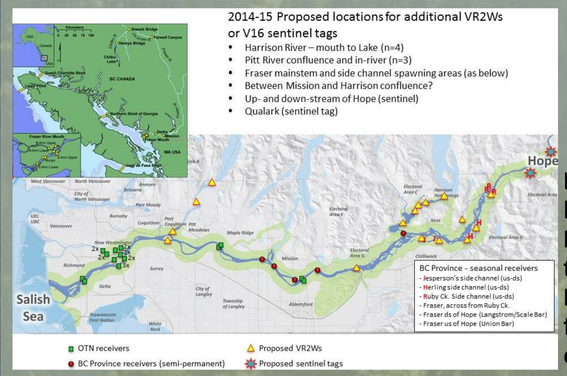

Figure 4. Collaboration between existing OTN Pacific arena projects and the B.C. Ministry of Environment has allowed for extensive receiver coverage of the LFR.

Additionally, the use of white sturgeon as an acoustic tracking platform will also benefit existing OTN projects in the Fraser River as sturgeon equipped with Vemco Mobile Transceivers (VMTs) will be able to monitor areas otherwise inaccessible to other active or passive monitoring devices (Figure 5).

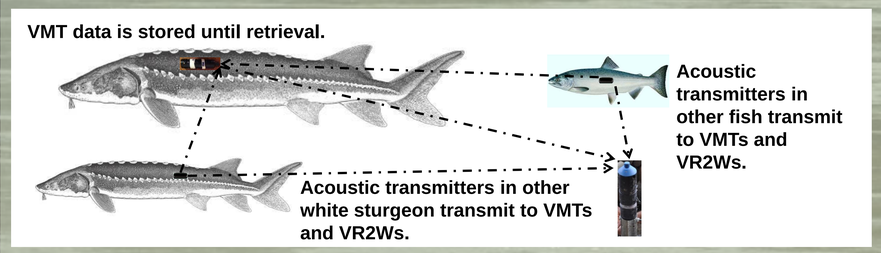

Figure 5. Thirty VMTs will be externally attached to white sturgeon in the LFR to examine intra- and inter-specific interactions, for example sturgeon interactions with tagged Pacific salmon.

Implications for Policy and Management

Preliminary results indicate that angling stress causes an acute stress response in white sturgeon. Recovery from angling stress is necessary to restore homeostasis, but during recovery fish may not exhibit normal behaviours. Movement patterns examined through acoustic telemetry will, therefore, help shed light on the recovery process and potential post-release locomotory impairments.

The LFR white sturgeon population is the only population of white sturgeon not listed under the Species At Risk Act because of its high economic value. This has resulted in little mandatory protection at the federal and provincial levels. A suite of best practices for white sturgeon C&R angling were developed by the province of B.C. and have been embraced by conservation and angling groups. However, little science has been done to validate those best practices. Our aim is to fill this knowledge gap and contribute to the sustainability of sturgeon populations in the LFR by evaluating the short- to long-term impacts of C&R angling.

Acknowledgements

This work wouldn't be possible without the help of B.C. Sportfishing Group guides, Tony Nootebos and Yves Bisson. Special thanks to Petra Szekeres, Eric Lotto, Andy Taylor, and Tom Gregoire for field assistance. Also thanks to the Fraser River Sturgeon Conservation Society for providing in-kind support for this project.