



State of Washington  
**DEPARTMENT OF FISH AND WILDLIFE**

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**WDFW WHITE STURGEON FISH HEALTH PLAN**

**FINAL-MAY 7<sup>TH</sup>, 2014**

- 1.) Fish health sampling and testing protocols described in this plan will be applied to all White Sturgeon culture programs at WDFW owned and operated hatcheries.
- 2.) WDFW in coordination with the appropriate Co-Managers will modify this plan, if necessary, as new information becomes available.
- 3.) WDFW will notify the appropriate external entities (e.g., PUDs, fish forum/work group memberships, etc.) in advance of annual White Sturgeon Iridovirus (WSIV) sampling and testing activities and/or proposed changes to the plan. Annual test results will be made available as soon as available.
- 4.) White Sturgeon imported into WDFW owned and operated hatcheries will be sampled and tested for WSIV.
- 5.) At this time, WDFW will not include White Sturgeon Herpesvirus (WSHV) sampling and testing as part of this fish health plan.
  - a. WSHV is an endemic pathogen to the Columbia River System.
  - b. WSHV is known to affect all life stages of White Sturgeon
  - c. WSHV has been detected less frequently than WSIV in White Sturgeon culture programs.
  - d. WSHV requires lethal sampling to accurately detect the virus through cell culture and histology.
  - e. WSHV may be detected in the same fish health samples used for WSIV testing.
  - f. There is currently no description of WSHV asymptomatic infection.
  - g. WSHV can be detected by cell culture using appropriate cell lines if clinical disease symptoms and/or overt mortality attributable to the virus are observed.
- 6.) There are three diagnostic tests used to detect WSIV in cultured White Sturgeon that include cell culture, PCR, and histology.
  - a. Cell culture has proven to be the least reliable diagnostic test to detect WSIV. The main problems with cell culture are finding a cell line (i.e., healthy fish tissues) sensitive enough to detect all strains of the virus and the prolonged incubation times.

- b. PCR testing is promising because of its high sensitivity detecting the DNA of target pathogens. However, this test is still relatively new at detecting WSIV and currently cannot detect all known strains of the virus.
    - c. Histological examination of epithelial tissues (e.g., skin, gills, fins, etc.) is the most accepted diagnostic test because changes to cell structure caused by WSIV are visually observed and counted in the laboratory.
- 7.) Based on its general acceptance and reasonable accuracy for detecting the virus, WDFW will use histology as the primary diagnostic test to detect WSIV in wild-origin White Sturgeon imported into a hatchery.
  - a. WDFW will contract with an appropriate laboratory (e.g., USFWS Idaho Fish Health Laboratory in Orofino, ID) to perform histological testing of wild-origin White Sturgeon.
  - b. Sponsors of each White Sturgeon culture program will fund WDFW fish health sampling and testing annually.
  - c. WDFW will no longer use cell culture to detect WSIV.
  - d. PCR samples may be taken concurrently during histology sampling and archived for later use (i.e., confirmation testing), if necessary. Sponsors will fund this testing.
- 8.) WDFW will collect non-lethal histology samples (pectoral fin tissue clips) from only juvenile White Sturgeon to test for WSIV.
  - a. WDFW will no longer sample or test brood stock for WSIV. WSIV can be difficult to detect in brood stock due to their large body size and the small amount of tissue used to detect the virus. There have been instances in other White Sturgeon culture programs where the brood stock tested negative for WSIV, but the virus was later detected in the progeny.
  - b. Testing juvenile White Sturgeon is the most appropriate method to detect WSIV.
- 9.) WDFW will sample and test unique lots of fish for WSIV.
  - a. Brood stock origin juvenile fish-A unique lot of fish is defined as all progeny produced from an independent spawning event. An independent spawning event constitutes a group of brood stock held in a common holding tank(s) and spawned together in one or more factorial matings within a 1-3 day time period. A WDFW fish health specialist will review brood stock collection and spawning records and at his/her discretion will determine how many unique lots of fish exist and sample accordingly.
  - b. Larval origin juvenile fish-A unique lot of fish is defined as all larvae collected from a single Columbia River pool. Multiple collection events from the same Columbia River pool do not require separate fish health sampling and testing. For example, the total number of White Sturgeon larvae collected from Lake Roosevelt and Wanapum Pool and imported into the hatchery would represent two unique lots of fish requiring fish health sampling and testing.

**10.)** WDFW will sample unique lots of fish at the 5% Assumed Pathogen Prevalence Level (APPL).

- a.** Sampling rates applied here were taken from the WDFW Fish Health Manual (2010).
- b.** Sampling at the 5% APPL equates to collecting 60 fish health samples from each unique lot of fish with  $\geq 2,000$  individuals. For unique lots of fish with  $< 2,000$  individuals, sampling rates will decrease as described in the below table.

<b>APPL = 5%</b>					
<b>Lot Size</b>	<b>Sample</b>	<b>Lot Size</b>	<b>Sample</b>	<b>Lot Size</b>	<b>Sample</b>
30	25	54	36	150	49
32	26	56	37	160	50
34	27	58	38	200	51
36	28	60	39	250	52
38	29	65	40	300	53
40	30	70	41	400	54
42	31	80	42	500	55
44	32	85	43	800	56
46	33	90	44	1,000	56
48	34	100	45	$\geq 2,000$	60
50	35	120	47		
52	35	125	48		

- c.** If a unique lot of fish is held at more than one hatchery, the total number of fish health samples required may be collected equally across all facilities.
- d.** Fish health samples will be collected equally from all rearing vessels to ensure all half-sibling families or larvae collections have an equal probability of being sampled.

**11.)** WDFW will sample and test unique lots of fish for WSIV biannually, unless more intensive sampling is warranted.

- a.** Samples for histological examination will be collected from each unique lot of fish 1-2 months post-hatch and/or importation into the hatchery.
  - i.** This amount of time allows juvenile White Sturgeon to grow large enough to collect an adequate sized tissue sample.
  - ii.** If juvenile White Sturgeon are infected with WSIV, initial rearing in the hatchery environment should cause enough stress for the virus to express itself in epithelial tissue.
- b.** Another set of histology samples will be collected from each unique lot of fish 1-1.5 months pre-release. This sampling event will most likely occur during PIT and acoustic tagging.

- i.** These samples will be used to determine if detection of WSIV has changed over the course of the culture cycle.
  - ii.** Literature suggests that as cultured White Sturgeon increase in size/age, detection of WSIV decreases significantly suggesting a potential immunological response to the virus.
  
- 12.)** Release of hatchery raised White Sturgeon infected with WSIV into waters of the State.
  - a.** WDFW authorizes the release of hatchery raised White Sturgeon infected with WSIV provided they remain asymptomatic throughout the entire culture cycle and barring any new and compelling technical information that leads WDFW to believe asymptomatic fish are no longer suitable for stocking.
  - b.** If an epizootic (WSIV or other pathogens) occurs in one or more unique lots of fish, WDFW will immediately sample and test fish for causative agents. An epizootic is defined as the occurrence of an infectious disease which results in a daily mortality of at least 0.1% of an entire group of fish held in one or more rearing vessels for five consecutive days. Concurrently, WDFW will convene and determine an appropriate path forward for these fish, which might include denying their release and/or euthanasia.
  - c.** WDFW will consult with the appropriate Co-Managers first to reach concurrence on a path forward before addressing the affected PUD fish forum/work group memberships.