Case History – Infectious Hematopoietic Necrosis Virus (IHNV) in the Chehalis, Quinault and Queets River Basins

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• Dr. Gael Kurath and Dr. Bill Batts – USGS Seattle
• Joan Thomas - WDFW
IHNV
IHNV - Hosts

Most Susceptible
- Sockeye salmon
- Kokanee salmon
- Rainbow trout
- Steelhead trout
- Chinook salmon
- Atlantic salmon
  - Chum salmon
  - Japanese salmon
  - Cutthroat trout
  - Brown trout
  - Brook trout

Refractory
- Coho salmon
- Pink salmon
- Arctic grayling
- Lake trout
- Arctic char
Not All IHNV is Created Equal

• Today, there are 3 Clades of IHNV
  – U Clade
  – M Clade
  – L Clade
Geographic Distribution of IHNV Clades

- **U Clade**
- **M Clade**
- **L Clade**
IHNV Host Specificity

- **U Clade**
  - Sockeye / Kokanee
    - Chinook
    - Steelhead/Rainbow
IHNV Host Specificity (con’t)

- L Clade
  - Chinook
  - Steelhead
IHNV Host Specificity (con’t)

- **M Clade**
  - Rainbow trout / Steelhead
    - Chinook
Some Thoughts on IHNV MD Genogroup

- Researchers now think that it emerged from the Hagerman Valley in 1977.
- Since that time it has moved down the Columbia River.
- 2007 Break Out year with isolations from 5 hatchery facilities in the Chehalis and 1 in the Queets river basins.
Movement of IHNV M Clade in the Columbia Basin

Garver et al., 2003

Slide Courtesy G. Kurath (USGS)
Movement of IHNV MD Genotype in the Columbia Basin
Humptulips and Chehalis
IHNV Timelines

1970’s

No Viral Detections

March 2007
Bingham Ck Hatchery
- Adult Steelhead

July 2007
Bingham Ck Hatchery
- Juv Sthd
Satsop Spr RP – Juvenile Rainbow

December 2007
Humptulips Hatchery
- Coho & Steelhead Adults

September 2008
Lake Aberdeen
- Adult and juvenile salmonids
Queets River Basin
IHNV MD 1997 and 2007
Queets River Basin

Location: Queets River Basin – Quinault Indian Nation’s Salmon River Hatchery
Species: Juvenile Winter Steelhead
Isolation Dates: 1997 and 2007
Actions Taken: Fish were destroyed and replaced
## 2007-08 IHNV in the Chehalis River Basin

<table>
<thead>
<tr>
<th>Facility</th>
<th>Species</th>
<th>Life Stage</th>
<th>Disposition</th>
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<tbody>
<tr>
<td>Lake Aberdeen Hatchery</td>
<td>Chinook, Chum, Summer &amp; Winter Steelhead</td>
<td>Adults</td>
<td>na</td>
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<td></td>
<td>Steelhead</td>
<td>Juveniles</td>
<td>Chronic mortality</td>
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<td>Rainbow</td>
<td>Juveniles</td>
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<td></td>
<td></td>
<td>Adults</td>
<td>Reared and released</td>
</tr>
<tr>
<td>Satsop Springs RP (Coop Project)</td>
<td>Rainbow trout</td>
<td>2 and 3 year olds</td>
<td>Released into terminal drainages</td>
</tr>
<tr>
<td>Humptulips Hatchery</td>
<td>Winter steelhead and Rainbow Trout Coho</td>
<td>Smolts and Yearlings</td>
<td>Destroyed and potential release</td>
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<tr>
<td></td>
<td></td>
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<td>na</td>
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</tbody>
</table>
Lake Aberdeen Hatchery
Lake Aberdeen Hatchery
Clinical Symptoms of IHNV
Location: Lake Aberdeen Hatchery
Species: Adult chum, chinook, steelhead and juvenile summer and winter steelhead and rainbow trout
Isolation Dates: 2007 and 2008
Actions Taken: Mortality is chronic and fish continue to be reared
Humptulips Hatchery
Humptulips Hatchery

Location: Humptulips Hatchery
Species: Adult coho and winter steelhead, juvenile winter steelhead and rainbow trout
Isolation Dates: 2007 and 2008
Actions Taken: Rainbow trout and one raceway of winter steelhead were destroyed (2008)
Bingham Creek Hatchery
Bingham Creek Hatchery

Location: Bingham Creek and Satsop River
Species: Juvenile Winter Steelhead – 2 stocks
Isolation Dates: 2007
Actions Taken: Juvenile fish had chronic mortality with no detectable virus. They were reared and released
Lake Quinault IHNV MD
Detections 2007-08
Lake Quinault Net Pens

Location: Lake Quinault Net Pens

Species: Juvenile Winter Steelhead

Isolation Dates: 2008

Actions Taken: 3 netpens of juveniles steelhead were destroyed and some juveniles that tested positive continue to be reared. No virus is currently being detected.
Actions Taken

1. Development of Response Guidelines
2. Notifications // Communications between Co-Managers
3. Genetic Typing of IHNV (USGS - Sandpoint)
4. Increase in frequency of sampling rate in adult and juvenile fish
5. Rear susceptible species (i.e.: Steelhead) on regulated pathogen free water wherever possible
6. Continue to look for vectors of transmission