FACT SHEET FOR CHINA POOT SOCKEYE, AND ANOXIC CONDITIONS IN TUTKA LAGOON BASED ON OFFICIAL ADFG REPORTS

The ADFG's reports below, clarify inaccurate hearsay or silence confusing the sockeye stocking of China Poots fishery. The only hatchery facility that contributes to *hatch and rear* the production of the China poot sockeye fishery is Trail Lakes Hatchery (near Moose Pass).

Since 1976 the China Poot sockeye program has procured eggs *remotely* (*remote egg take*), from adults in freshwater rivers or lakes, without need of a facility for over 40 years. These remotely taken eggs are then transported by truck, boat, or plane to Trail lakes Hatchery for hatching and rearing for up to two years. Juvenile sockeye are again transported by truck, boat or plane, from Trail Lakes Hatchery to chosen *remote release sites*. One of these remote release sites is China Poot (Leisure Lake). Since 1976, the "Facility" of Tutka Bay Lagoon Hatchery has never been utilized.

The confusion comes from not discriminating between the geologic formation of marine waters (circled in yellow below) called "Tutka Bay Lagoon.' as compared to the state "facility" namesake (circled in orange), called Tutka Bay Lagoon Hatchery. While this *high salinity* lagoon is not optimal[1] for sockeye, the same basic procedures used for 45 years is applied in this geologic Lagoon as was used in Tustemena and Hidden lakes with no facility required. Eggs continue being transported 170 miles to the Moose Pass Hatchery (Trail Lakes) for incubation and rearing.

Please note this subtle difference to avoid confusion.

TUTKA BAY LAGOON – Large yellow circle

TUTKA BAY LAGOON HATCHERY FACILITY - small orange circle

[1] **CIAA hopes to find a more suitable freshwater site see CIAA's Dean Day Comments below**

FACT: The Tutka Bay Lagoon Hatchery (Tutka Hatchery) does not produce sockeye because of chronic sockeye pathogen, in its water supply called Infectious Hematopoietic Necrosis Virus (IHNV). Devastating to all species of salmon except pinks, the Tutka Hatchery can only produce pink salmon.[2]

ALL Annual Management Plans are signed by many ADFG's Deputy Commissioner, Regional Supervisors, research biologists and managers. Very costly to the state of Alaska.

FACT: 1998 Tutka Hatchery Annual Management Plan AMP

"Due to problems associated with securing a disease-free water, CIAA elected to discontinue the sockeye project in the Tutka Bay Lagoon Hatchery in 1998."

FACT: 2021 Tutka Lagoon Hatchery Annual Management Plan signed by ADFG Directors, superintendents, managers Matt Miller, Glenn Hollowell, Tom Vania, Bert Lewis, Ethan Ford, Lorraine Vercessi, Tom Taube, Peter Bangs and CIAA Dean Day, states:

"In 2004, CIAA suspended the Tutka Bay Lagoon pink salmon project and year-round operations at TBLH."

FACT: 2021 Trail Lakes Annual Management Plan.*Harvest Management 4.1 Cost Recovery Plan –*

Cost recovery for sockeye salmon will be done under the Trail Lakes Hatchery (TLH) program and is detailed in the Trail Lakes Hatchery

FACT: ADFG 2006 Lower Cook Inlet Finfish Fisheries Management Reports 07-42 explains:

> ***"Efforts to incubate and rear sockeye to the smolt stage were plagued by the IHN virus in the Tutka hatchery, and the experimental sockeye program was relatively short lived, suspended in 1998.***

FACT: ADFG Fish Pathologist in 2012 Tutka hatchery evaluation Report 5J12-05:

> ***"The IHNV endemic in the Tutka Bay Lagoon hatchery supply water led to the suspension of sockeye production at the hatchery in 1998. Since 2005, (after the hatchery facility closed), the Tutka Bay Lagoon has served solely as a saltwater release site for sockeye smolt reared in the Trail Lakes Hatchery. This program is administered under the Trail Lakes hatchery permit, and will be presented under that hatchery's evaluation.***

FACT: The Cook Inlet Comprehensive Salmon Plan Phase II states:

> ***Sockeye programs were tried at Tutka hatchery, were transferred… but lost to IHNV and outbreaks of Trichodina prior to release.***
> ***The current CIAA project uses Trail Lakes Hatchery for incubation and rearing for one year, the resulting pre smolt transferred to the marine waters of Tutka Lagoon [not the***

[2] Attached ADFG paper called

> ***facility] in the spring for release. The first release occurred in 2005. [After the Tutka hatchery facility had closed].***

FACT: Even the shallow warming "salt water lagoon release site", that flows into Tutka Bay is not suitable, as a remote release site nor a remote egg take site posing deadly problems for sockeye because sockeye require abundant fresh water to rear or ripen eggs.

FACT: January 2022 - Dean Day, Executive Director of Cook Inlet Aquaculture CIAA, explains at a recent park meeting the active search for a sockeye friendly "freshwater release site" away from the marine waters of Tutka Lagoon like its Hazel, Kirshner, and China Poot Lakes: ***"… the sockeye broodstock at Tutka Lagoon has been challenging for a number of reasons…as far back as 2014, we have searched for alternate locations. Port Graham was not successful for a number of reasons related to the volume of freshwater available. Kirshner has been investigated, but it's a challenge. To date, we've been unable to locate an area. we've had issues, the lensing bags at Tutka Lagoon..."***

CIAA has been using an artificial lensing bag (like a floating kiddy pool) as a fake lake in the Tutka Lagoon but this has problems, causing sockeye mortality.

FACT: 2018 ADFG's Hollowell, Otis, Ford of Homer articulate this problem in the FMR:

> ***"In many years interruption of the freshwater flow into the lensing bag, or a breach in the lensing bag has resulted in levels of mortality exceeding 30%".***

FACT: Pink salmon have a hard time surviving the Tutka hatchery
CIAA has shattered the carrying capacity of the Lagoon, putting too many salmon in too small an area causing poor saltwater circulation, low oxygen, from putrefied carcasses fish feed and feces killing fish.

FACT: 2015 LCI Fisheries Management Report Hollowell explains: ***"Sunny conditions combined with low tides resulted in anoxic conditions in the lagoon, causing the death of these fish during low tide cycles" … "very large numbers of decaying carcasses in Tutka Lagoon Creek, resulted in significant mortality."***

FACT: Hollowell 2015 FMR
However, high water temperatures and crowding in the lagoon with fish both inside and outside of the net pens, as well as very large numbers of decaying carcasses in Tutka Lagoon Creek, resulted in significant mortality… This resulted in periodic large buildups that crowded into the Tutka Lagoon and Tutka Lagoon Creek.

Nancy Hillstrand
Coal Point Seafood Company
4306 Homer Spit
Homer Alaska 99603
907-399-7777
www.welovefish.com
Please contact me if I may answer questions you may have on salmon culture as I have over 20 years' experience working with ADFG as a Fish Culturist raising sockeye as well as four other species of salmon. Each of these species have different needs. My answers will only come from cited sources as it is critical you verify accuracy. Hearsay is not acceptable. Thank-you.

Infectious Hematopoietic Necrosis Virus (IHNV)

I. Causative Agent and Disease

Infectious hematopoietic necrosis virus (IHNV) is a bullet-shaped novirhabdovirus that is enzootic to the North American Pacific Northwest but was inadvertently established in the US Snake River Valley in Idaho and in several countries of Asia and Europe. The three genetic clades of IHNV (U,M,L) can infect several salmonid species and have had severe economic impacts on intensively cultured salmon and trout. IHNV in Alaska (U clade) has been limited primarily to sockeye salmon and rarely Chinook and chum salmon when infected sockeye are present in their water supplies. Culture of sockeye salmon in Alaska by avoidance of IHNV has been successful through the rigorous use of the ADF&G sockeye salmon culture policy. The disease, infectious hematopoietic necrosis (IHN), is an acute, systemic infection causing necrosis of the kidney tissues and other visceral organs resulting in extensive mortality in hatchery reared sockeye salmon juveniles as well as in wild stocks of out-migrating sockeye salmon smolts.

II. Host Species

Fish species susceptible to infection and disease by IHNV include: sockeye, Chinook, chum, amago, yamame and Atlantic salmon; cutthroat trout and rainbow/steelhead trout. Brook and brown trout are experimentally susceptible to infection and mortality while lake trout are intermediate in susceptibility. Arctic char and grayling are resistant while coho salmon are also resistant but can carry the virus when in the presence of other susceptible virus-infected fish species. Mortality is highest in young fish and resistance to infection and disease increases with age.

III. Clinical Signs

Infected fish may exhibit: lethargy, whirling behavior, cranial swelling, abdominal swelling, exophthalmia, anemia and darkened body coloration; hemorrhaging of musculature and base of fins; fecal casts; pre-emergence in sac-fry; pale liver, spleen and kidney; stomach/intestine filled with milky or watery fluid with petechial hemorrhaging of mesenteries or visceral tissues. Gills are pale, moderately hyperplastic and blood smears often contain necrobiotic bodies.

IV. Transmission

Horizontal transmission through water via feces or sex products or carcass degradation is the most common route of infection. Virus occurs commonly in ovarian fluids and on the surface of eggs. Rarely, vertical transmission can occur within eggs (internal) and possibly with adhesion of virus particles to sperm during fertilization. Incubation and course of the disease can be strongly influenced by water temperature as reported in the Lower 48. Optimum temperature is 10-12°C but IHN losses have been reported above 15°C. Mortalities occur within 4-6 days post-exposure peaking at 8-14 days. In Alaska, the disease can cause up to 100% mortality in sockeye salmon at water temperatures as low as 1-2°C where exponential mortality may take longer to occur. No natural reservoirs of IHNV have been confirmed other than those susceptible fish species that are carriers of the virus. However, transient detections of IHNV have been reported in organic sediments, invertebrates, and some forage species of marine fish when associated with ongoing or recent IHNV epizootics in susceptible salmonid species

V. Diagnosis

Susceptible fish cell cultures are inoculated with kidney and spleen tissues (whole fry if small) or ovarian fluids from fish suspected of having IHNV. Presumptive diagnosis results from diffuse or plaqued lysis of inoculated cell monolayers (cytopathic effect). Virus is definitively identified by PCR.

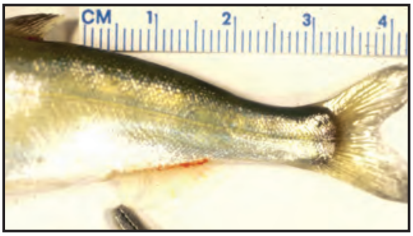
VI. Prognosis for Host

Prognosis for infected fish is poor. Survivors of epizootics and subclinical infections become lifelong carriers of the virus. There is no known therapy for fish that have been infected with IHNV. In Alaskan hatcheries, all infected lots of fish are destroyed. The occurrence of the disease is avoided through preventative measures including a virus-free water supply, rigorous disinfection, isolation of egg and fish lots and containment of diseased fish. There is an effective DNA vaccine used in Canada that is also licensed in the US but has been restricted commercially due to unlikely safety concerns regarding GMO products.

VII. Human Health Significance

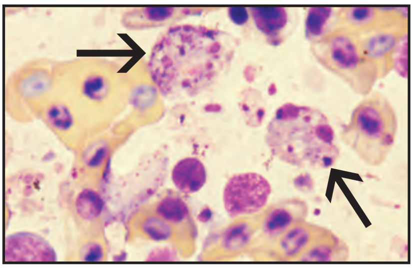
There are no human health concerns associated with IHN virus.

Exaggerated (top, middle) cephalic bumps on sockeye salmon fry commonly occur with IHN disease.

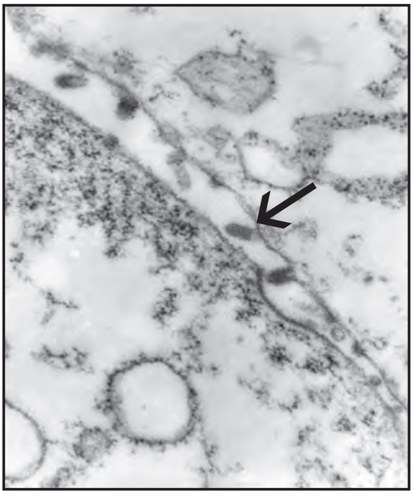


Hemorrhaging at the base of the fins is sometimes observed in IHN disease.

Scoliosis in sockeye salmon smolt surviving IHN.



Necrotic macrophages or kidney cells (necrobiotic bodies-arrows) with debris in peripheral blood, X 1000.



IHN virus particles (arrow) budding from cell membrane of an EPC cultured fish cell; TEM, X 34,000.