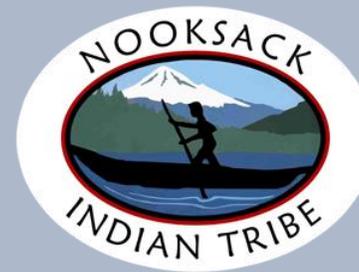
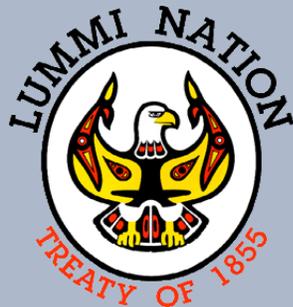


South Fork Nooksack River Chinook Mortality Event

Overview and Conclusions

Prepared by the Nooksack-Samish Fisheries Co-Managers



Unprecedented Chinook Pre-Spawn Mortality



- Pre-spawn mortalities observed starting early September
- All chinook holding in the South Fork were at high risk of mortality
- Mortality event coincided with record chinook return to the South Fork since census estimates have been annually developed
- Co-Managers estimate **2,500** chinook pre-spawn mortalities over the event

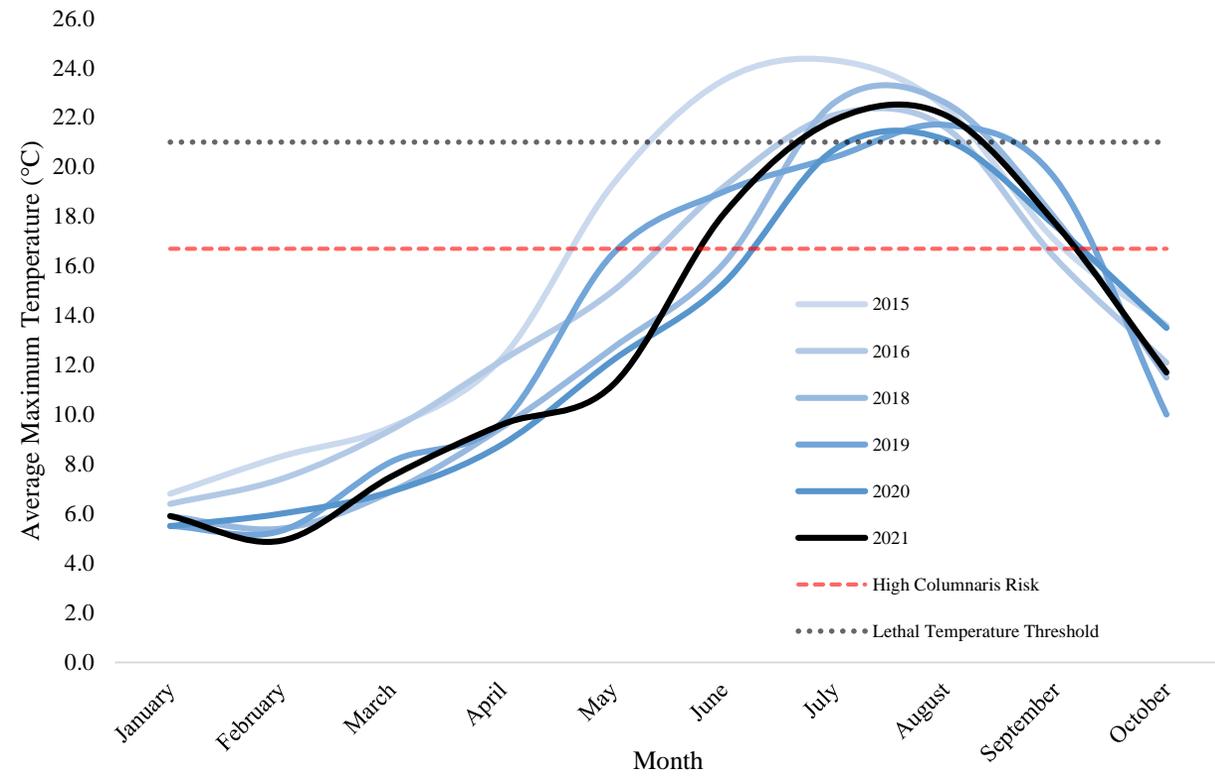
What We Know

- Confirmed presence of three pathogens:
 - *Flexibacter columnaris* (bacteria; causes disease, “Columnaris”)
 - *Ichthyophthirius multifiliis* (protozoan parasite; commonly known as “Ich”)
 - Freshwater diatoms
 - **All three pathogens alone are known to cause mortality if temperatures increase above acceptable levels**
- No evidence of heavy metal or pesticide levels outside of detectable limits
- Chinook mortalities found in all chinook-accessible reaches of the South Fork
- Pink salmon and summer steelhead mortalities were also found

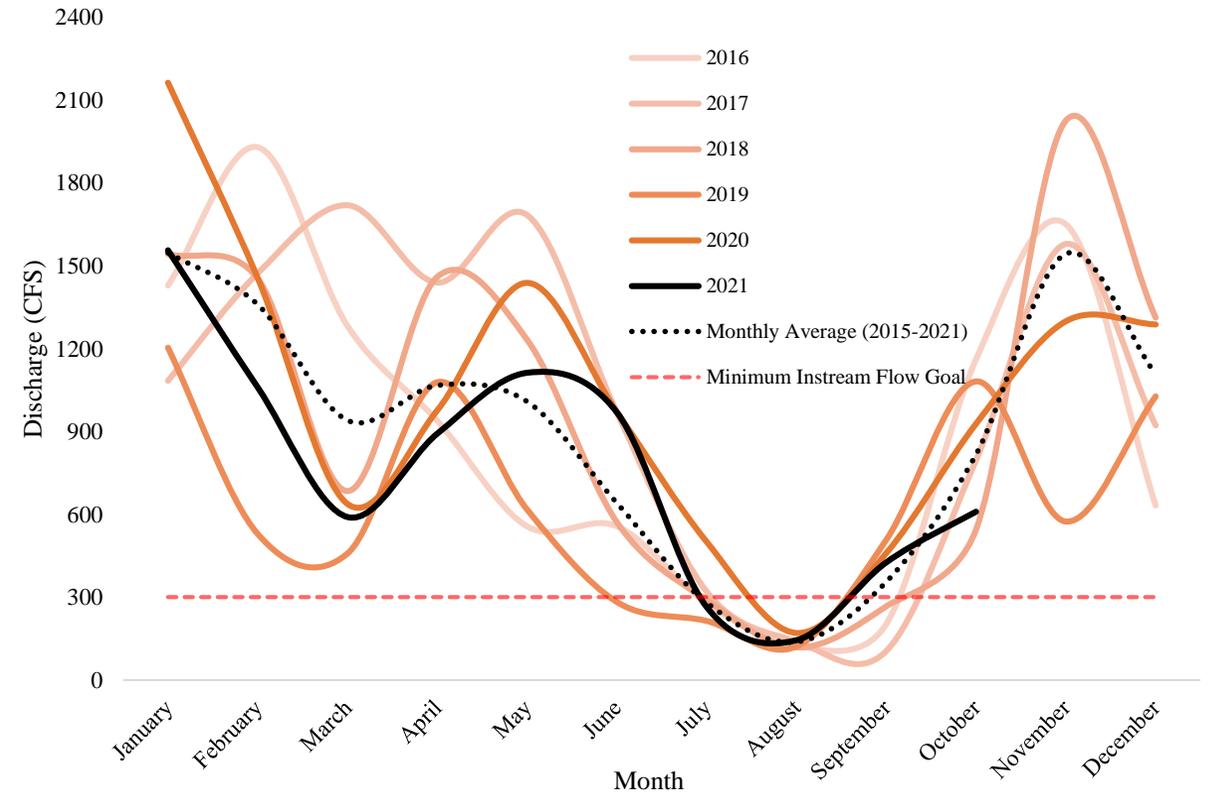
Cause of Mass Mortality

- **Habitat function is severely compromised from legacy and ongoing habitat degradation and alteration**
- Consistent lethal water temperature every year in South Fork ($\geq 21^{\circ}\text{C}$)
- Summertime flow in South Fork consistently below minimum instream goal (300cfs)
- Both factors significantly increase susceptibility to disease and proliferation of pathogens, especially columnaris (17°C)

South Fork Nooksack River Daily Maximum Temperature ($^{\circ}\text{C}$) at the Saxon Gauge
(USGS Station 12210000)



South Fork Nooksack River Average Monthly Discharge (CFS) at the Saxon Gauge
(USGS Station 12210000)



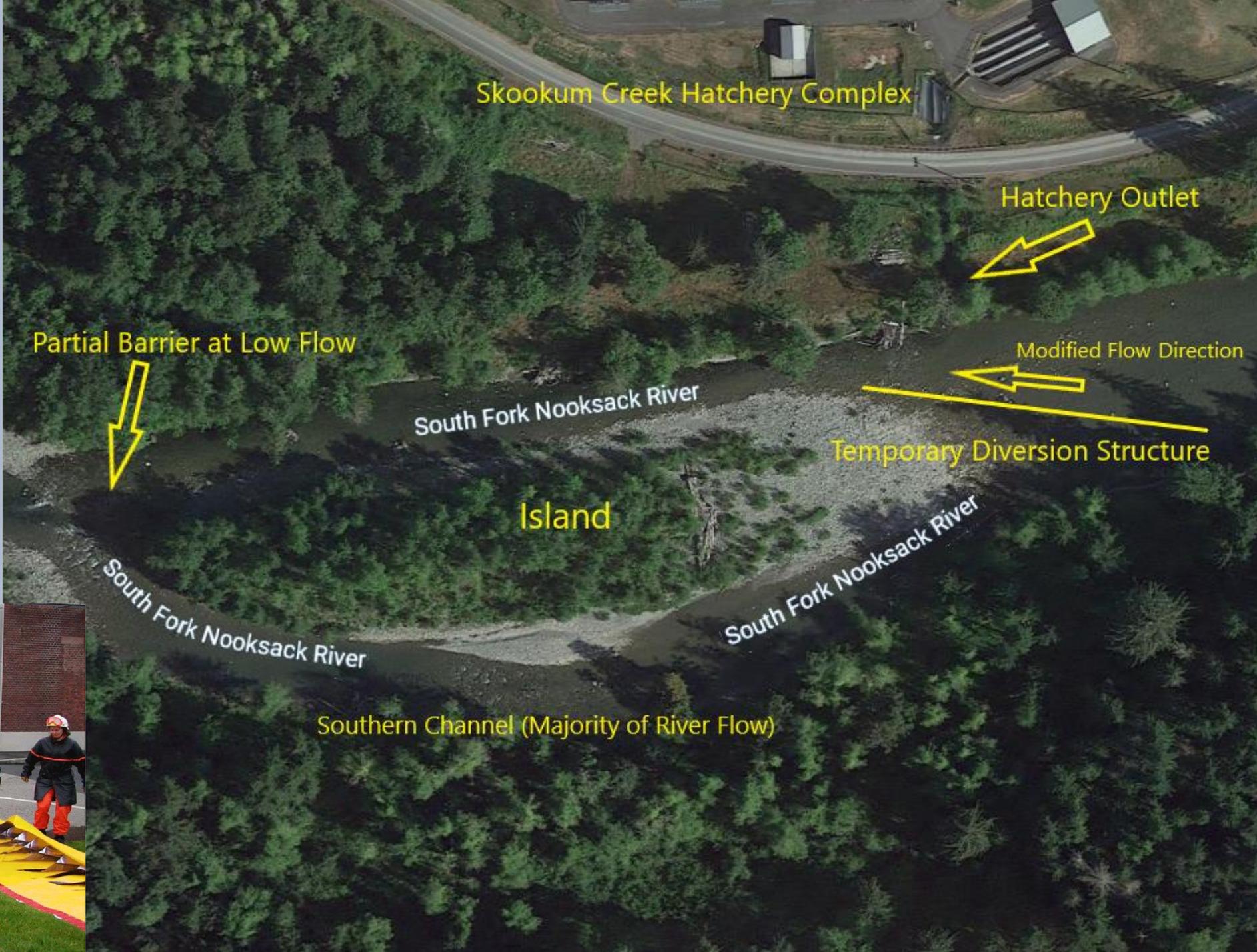
Action is Needed – Phased Approach

This is policy-directed and policy-driven approach

- 1. Immediate:** Install temporary water diversion/deflection at low flows (2022-2023)
- 2. Near Term:** Construct permanent in-stream habitat structures (2023-2024)
- 3. Long Term:** Increase basin-wide efforts to address and resolve summertime low flows and reduce river temperature

Phase 1: Immediate Action (2022-2023)

- Essential to recruit chinook to the hatchery earlier
- Temporary water deflection gates at low flow
- Will not block fish passage or have other effects on fish
- Need regulatory agency support for permits



Phase 2: Near Term Action (2023-2024)

Construction of permanent ELJ complex – Requires an aggressive approach



Phase 3: Long Term and Ongoing Actions

Increase basin-wide efforts to address summertime low flows and reduce river temperature

- Immediate funding for South Fork acquisition and restoration projects
- Sustained funding to support SF acquisition and habitat restoration projects – i.e. annual and biennial dollars are not enough
- Implement restoration permit streamlining options
 - Habitat Recovery Pilot Program RCW 77.55.480
 - Meet with FEMA to discuss Rescindment of Policy on Fish Enhancement Structures in the Floodway
- Enforceable mechanisms for non-point source pollution that would allow for meaningful improvements in stream temperature
 - South Fork TMDL recommends several actions, but relies largely on volunteer measures to implement
- Completion of a general stream adjudication



Key Takeaways

- Unless habitat conditions are immediately addressed, future mass mortality events jeopardize the South Fork chinook population, constrain local fishery opportunity, and chinook recovery
- 15 years of the South Fork Chinook Hatchery Preservation Program's success is jeopardized – Hatchery program is critical for preservation and recovery
- South Fork chinook recovery objective and ESA de-listing target: Up to 13,000 natural-origin spawners
- Adequate funding to address poor habitat function will be a challenge to secure, but is essential and will require strong support and action

Actions and Support

- Lummi Indian Business Council declared mortality event a disaster in Resolution #2021-159
 - Reso directs policy & technical staff to develop and implement a plan
- Establish a multi-agency Crisis Team (local, state, tribes, federal)
- Support with funding requests and permitting:
 - Streamline and expedite permitting process for phases 1 & 2
 - Up to \$1M projected for instream structures outlined in Near Term phase
 - Multi-agency effort to secure an additional \$24.5M for large scale restoration efforts



Questions & Policy Discussion

