



Prey Working Group Co-Chairs:

Ms. Penny Becker - WDFW

Steve Martin – RCO, Salmon Recovery Office

Abby Hook – Hook Environmental

August 12, 2018

Re: INNOVATIVE ACTIONS TO INCREASE PREY AVAILABILITY FOR SRKW

Dear ORCA Task Force and Prey Working Group:

We were pleased to attend the Task Force meeting in Wenatchee on 8.7.2018 and the Prey Working Group in Ellensburg on 8.9.2018. After listening to the discussion over the course of both days we are concerned that the accelerated process is eclipsing the quality and creativity of the content. For example, only in the last ten minutes of the prey working session did an honest discussion begin about what is really required to rectify the problem. We are concerned that the Task Force ultimately charged with making specific recommendations to the Governor, will fall well short of the aspirations of the Governor and his constituents who are interested in addressing the root causes of the Orca problems.

For the last seven years, [Whooshh Innovations has been studying the Prey issue](#), working with the tribes, state and federal agencies, and conservation organizations to understand the root cause of the problem (reduced numbers of salmon) and developing modern solutions to address these causes. Millions of people worldwide have seen the videos of what the media nick names the “Salmon Cannon”. Interestingly, it was by the leadership of the WDFW, that we launched the first of our commercial products a simple hand load [mobile Whooshh system](#). WDFW will use the system for the 5th consecutive year in 2018 to assist in the management and transfer of Tule Chinook hatchery salmon on the Washougal River. The technology and the solutions have advanced quickly since then. In 2016, in a study by CRIFTC at Priest Rapids Dam on the Columbia River, Whooshh demonstrated that Sockeye Salmon that used the Whooshh fish passage system swim faster and farther upstream to cooler waters than those required to use the ladder. In 2017, Whooshh working with the Bureau of Reclamation in the Yakima Basin, piloted a volitional entry system with those same Sockeye Salmon up [180’ and over the Cle Elum Dam](#) that enabled the fish to pass over the dam in less than a minute, and for the first time in 100 years.

Why have we focused on upstream passage of adult salmon? Quite simply, because **adult returning salmon are the most valuable and cost effective resource we have for substantially increasing the number of smolt downstream and the adult salmon available in the waters where the Orca forage for food**. We must reduce the stress for adult salmon migrating upstream to increase the numbers that do not succumb to pre-spawning mortality – which is the rule, not the exception today, despite the commonly espoused argument that the passage at fish ladders is 98%. Unfortunately, [this number masks the reality that the data is built on](#) estimates, rather than actual numbers, and further does not provide any indication about what the real percentage of these fish reach the spawning grounds. Because each female Chinook has the potential to lay approximately 5,000 eggs, every one of these

adult females must be given the best opportunity to complete their journey, spawn, and live long enough to protect their redd (nest) before they complete their circle of life.

We have done the math. At the end of the Working group meeting, George, a task force member, asked the question: “How many more Chinook do we need returning to feed the existing Orca population?” The answer, whether correct or not we do not opine, but was that we would need to double the average number of returning adults from two million (2,000,000) to four million (4,000,000) Chinook returning from WA to CA after an estimated take of approximately one million Chinook from commercial, tribal and predator take. This seems like a big number, but its not. It went unchallenged in the working group meeting that there are some recent years when this number has been met. We are just not doing it consistently. One big reason is climate change that contribute to warmer river waters which increase the stress on the returning adults contributing to pre-spawning mortality.

If we assume one percent (1%) Chinook return, we must increase the number of Chinook salmon returning successfully to spawn by only 120,000 to address the additional 2 million Chinook required to sustain the ORCA. [It is interesting to note that this is less than the number of Atlantic salmon that were released into the waters of the San Juan Islands last year]. If we rely on the identified priority Chinook stocks for the SKRW, it identifies and ranks 30 geographic areas that produce Chinook salmon that feed the SRKW. **If we focus on the 15 most impactful watersheds, we must increase the number of successfully returning adult Chinook by only, 8,000 Chinook per river system.** Of those 8,000, Chinook, approximately 4,000 will be female carrying 5,000 eggs, or approximately 20,000,000 more fry in each of the 15 SKRW priority Chinook stocks. Because of these realities, the Whooshh solutions focus on two areas where the ROI will be greatest and the impact immediate.

- 1) More safely, efficiently, and effectively pass salmon over barriers without stress and without costly civil construction requirements and delays.
- 2) For the first time accurately counting AND sorting in REAL TIME, all species passing upriver and through the Whooshh scanning systems.

While most of the discussion above is focused on the first point, the importance of the second cannot be underestimated. When you can scan and sort real time, you not only have accurate counts, but you can remove invasive species, and divert hatchery fish, thereby **effectively increasing the available habitat and nutrients available in the waters for the native species AND reducing the amount of predation by such invasive species** as well. This will, over time, increase the number of fry --> smolt that survive and make it out to the sea. Therefore, these solutions simultaneously address upstream and downstream passage, predation and some of the habitat availability issues.

The seven Prey Working Group Matrix Action Item Questions and our answers to them are as follows:

1. Should the task force provide recommendations to implement in specific places (i.e. specific dams removed) or should the task force provide a guiding set of principles? *Both are necessary. Specific action items for shorter term actions to sustain; guiding principles to help direct long term policy and leadership for recovery.*
2. How much of the action would need to be implemented to have an effect on SRKW? (how much restoration? How many smolt?) *The 10 specific action items below if fully implemented alone will be impactful and should result in 300 million or more smolt. The action can be started in*

2019 (or before) and several completed within months, and all completed within a few years if properly funded.

3. How would this productively be implemented? Who has the authority to implement? What laws or policies would need to be adjusted? What are the links to existing programs, communities, groups or mechanisms? *The biggest impediments to implementation are competing funding, current DFW regulations and NMFS approval for non-traditional fish passage of ESA species. NMFS and WDFW are the two leading agencies who have the authority to support the implementation of the actions items below.*
4. How can the action be evaluated, monitored and responsive to adaptive management? On what time scale? *Deploy Whooshh automated scanning, sorting, counting systems at dams and barriers at each of the key Chinook river systems. This can begin within 90 days of a purchase order.*
5. Does the action take climate change into account and if so how? *Yes. Climate change is warming the river waters which stress the fish and contributes to delay at ladders and pre-spawning mortality in rivers. The Whooshh fish passage system reduces stress, and preserves fish energy to migrate faster between dams to reach cooler waters and spawning grounds.*
6. Geographic specificity – general information covered above – social/cultural, economic, community, and environmental costs and benefits of action (local and statewide) and potential ways to ameliorate any negative impacts. The equity of impacts to be considered. *The cost of the Whooshh fish passage systems is approximately 20% of the cost of traditional fish ladders. It also saves time. It can be deployed in months rather than years, and is highly flexible (it can be used in a variety of river/geographic conditions without significant customization). Many tribes are already supportive of the solution, including the Colville and Yakama nations who have acquired systems for use in their hatchery operations.*
7. Comments on current and potential funding sources and estimated gaps. *The state of Washington does not currently have funds allocated to acquire and deploy Whooshh fish passage systems. The language for conduit repair and construction does not currently contemplate or allow deployment of the Whooshh solution to speed up repairs and save the state costs. The bill for the Yakima Basin Integrated Water Management Resource Plan, has not been authorized by the Federal government, however, there are funds authorized in the current budget for USBR, but not yet appropriated for a Whooshh fish passage system at Cle Elum dam. Additional funding will be needed for dams above Cle Elum dam and any other West coast dams.*

There are a variety of specific action items (applications) that can and should be taken to increase the number of available Chinook salmon. **We have summarized our thoughts in writing, and categorized them pursuant to the Working Group matrix to facilitate inclusion in the recommendations** and help the Task Force effect a more immediate and dare we say bolder impact in the prey category to increase the quantity of Chinook available to the Orca, both in the short term and the long term.

1. **Install emergency fish passage:** Decrease pre-spawning mortality and improve fecundity of returning adult salmon in 2019 by installing the Whooshh fish passage system at high impact barriers, dams, and conduits where traditional civil works will take years to plan and deploy (including locations where dams may be removed in the future).
[Working Group Matrix: Hydro E]
2. **Reduce deadly delay below ladders:** Replace and/or supplement ladder systems with Whooshh fish passage to provide more passage routes for the adult fish to improve fish passage efficiency, reduce milling and help them to avoid or escape pinniped predation.
[Working Group Matrix: Hydro E]
3. **Add automated sorting:** Automate sorting by deploying the Whooshh scanning sorting system component at all upstream fish passage locations to remove invasive species, pass wild salmon, and re-direct hatchery fish – all autonomously and all real time, effectively and instantly creating more habitat and less competition for wild salmon upstream.
[Working Group Matrix: Hydro C]
4. **Pinniped injury assessment/validation:** Autonomously collect and analyze images from migrating salmon at strategic barrier locations to identify pinniped injury on salmon and use this data to validate the effectiveness of actions taken with pinnipeds in the impacted location.
[Working Group Matrix: Hydro E, Predation B]
5. **Make better decisions with real time and real accurate data collection:** While labor intensive processes and systems are in place to estimate fish counts, the distribution of such data is slow and then only an estimate, often leading to decisions that need to be later reversed. More robust data collected and delivered in real time allows for superior fishery management.
[Working Group Matrix: Hatchery B]
6. **Return hatchery surplus salmon to the sea:** Use the mobile Whooshh fish transport system now to safely, rapidly, and efficiently transfer surplus hatchery salmon from the hatchery into transport vehicles without injury/stress and return them to areas of the sea where Orcas forage for salmon.
[Working Group Matrix: Hydro E]
7. **Self-financing fish passage:** Install Whooshh fish passage systems at non-powered dams and install small hydro (less than 10MW to avoid FERC delays) on those dams to finance the much more affordable Whooshh fish passage system and provide access to new habitat for salmon.
[Working Group Matrix: Hydro E]
8. **For Commercial Fisherman enable selective catch and replace indiscriminate fishing methods:** The Whooshh scanning sorting component is a real time identification system. Used in conjunction with the recently evaluated [Wild Fish Conservancy tested pound net/fish trap](#) in the Columbia River, a commercial fisherman could select only hatchery fish for harvest and safely

bypass the wild salmon without handling, containment or delay, increasing the number of adult Chinook that return to the spawning grounds. This is in stark contrast to the by-catch mortality for tangle nets, seining, gill netting, etc. licensed today to commercial fisherman.

[[Working Group Matrix: Harvest C](#)]

9. **For Sport Fisherman, put the sport back into sport salmon fishing:** Two technologies used together have dramatically increased the effectiveness of sport fisherman success in catching Chinook salmon, fish finders and downriggers. Down riggers allow the sport fisherman to place their bait exactly at the depth they prescribe. Fish finders allow you to see where the fish are located as well as the depth of the water. While further limiting fishing seasons may not be politically viable, prohibiting the use of downriggers will reduce the fishing pressure on the Chinook salmon. It is also relatively easily self-enforced because when a downrigger is being used by a fisherman, it is visible to all other fisherman and enforcement agents. Many conservation oriented fisherman will likely be supportive.

[[Working Group Matrix: Harvest C](#)]

10. **The prescribed means of passing fish past dams and the means of measuring passage success often leads to faulty data and assumptions:** [Numerous studies over the last ten years have debunked](#) our elementary school field trip teachings about the efficacy of ladders and salmon successfully spawning in the rivers. The most valuable fish for recovery is the returning wild adult because of the number of viable eggs they carry. There is a causal relationship with stress and injury and pre-spawning mortality, especially with higher water temperatures. The Task Force can [answer the questions raised in this paper](#) with the best available science and technology.

As noted above, a 180' high Whooshh fish passage system was installed at the 165' Cle Elum Dam last year as a pilot project. Cle Elum Dam is the first of six dams requiring fish passage as part of the Yakima Basin Integrated Water Resource Management Plan. Here is a [link to a video](#) showing the pilot system in action and how it works. Federal and state funding to install fish passage at these dams will open up hundreds of miles of new habitat for salmon, including Chinook. Many independent studies of the Whooshh solutions have been completed by the major independent research organizations: PNNL, CRITFC, USGS, Alden Labs, etc. You can see all the results and studies summarized [here](#).

We are happy to meet with the task force and/or working group and answer your specific questions in person at any time. We also have a one hour webinar that covers the following four topics that we would be happy to make available to any and all working group or task force members if that would enhance your understanding of our suggestions/ solutions. The topics are:

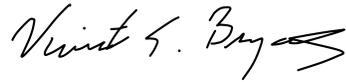
- a. Modernizing Upstream Fish Passage
- b. The Biology supporting Whooshh
- c. The Engineering behind Whooshh
- d. The Economics and ROI

We are here to help. As a private company we developed solutions to help solve a public problem. We established solutions to help increase the numbers of salmon for the ORCA, for the tribes, for the

commercial fisherman, for the sport fisherman, and for all of our health and welfare. We raised millions of dollars from private investors to do the research and development on the belief that this day of action would come. The Whooshh approach is based in science, and is a modern cost effective solution that should be embraced by all agencies if we are serious about the problem at hand and realistic about the limited time we have to act.

We look forward to working with the task force, the working group, and the agencies more closely in the future, [both here and in Canada](#). We believe the public, the Governor, the salmon, and the ORCA will all benefit from it.

Sincerely,

A handwritten signature in black ink that reads "Vincent E. Bryan III". The signature is fluid and cursive, with a long, sweeping tail on the final letter.

Vincent E Bryan III
Founder and CEO
Whooshh Innovations, Inc.