

## **Whooshh Innovations Passage Portal™**

It all started with the social media sensation - the Whoosh innovations Salmon Cannon™.

Videos, GIFs, and memes of the Salmon Cannon have been viewed hundreds of millions of times around the globe.

Now fish passage has been forever transformed by the Whoosh Passage Portal™ - the modular and fully automated successor.

The Passage Portal is a volitional, selective, fish passage system that can work with obstacles of every height and most species of fish.

It's more affordable to implement than traditional fish ladders - safer and more effective for native fish too.

Check this out - Fish swim in on their own and right into our FishL Recognition™ scanner.

18 high-definition images are taken of the fish in less than a second.

Size... Species... Hatchery or Wild... Injured... Invasive... Or the one that got away...

The Whoosh Passage Portal can tell.

From there it's all slide and glide.

Fish that are selected to be transported slide into the tubes - and Whooshh. Off they go!

Gently migrating is a matter of seconds, fish are safely deposited above the obstruction.

Dams, natural disasters, you name it, the Whoosh Passage Portal enables fish to navigate past the barrier.

SAVE the fish

FEED the planet

GROW clean energy!

For more information: [www.whooshh.com](http://www.whooshh.com)

## VIDEO TRANSCRIPT

### Video Transcript

Vince Bryan III:

At Whoosh Innovations we recognized a need for new sustainable technologies designed for the fish so they can feed the planet and the people on it. So we can be more efficient with our resources and so clean, renewable energy can grow faster.

Speaker 2:

Because a cannon that fires fish through a tube and over a dam is absolutely incredible.

Vince Bryan III:

We've come a long way from the viral videos of the salmon cannon and years of regulatory testing. We're now ready to scale and grow the business.

Vince Bryan III:

Our company has solutions for fish passage, invasive species, agriculture, and fish processing, each a huge and growing market. Our goal is to restore native fish species to their historic levels and we can begin to do that today.

Vince Bryan III:

It's called the Whoosh Passage Portal. It's a modular system that can be deployed anywhere. Fish swim in on their own, a fish recognition scanner takes 18 high definition images of the fish at a fraction of a second to determine, among other criteria, size, and species, including invasive species so they can be separated and removed.

Kenny Down:

The scanning capabilities of systems like the Whoosh Innovation System are absolutely mandatory. I think that we implement these as fast as we can in our river systems.

Vince Bryan III:

It's like the hyperloop for fish. Incredibly, it can whoosh up to 40 fish a minute. That's more than 57,000 fish a day.

Vince Bryan III:

You're not losing any water down fish ladders either. This means that hydro facilities can potentially increase their clean power production without adding any civil infrastructure and that means we can add up to 10% more clean energy production at dams worldwide, that's real revenue.

Vince Bryan III:

There are more than a million dams worldwide. More than 84,000 alone in the United States. And most dams have no fish passage, and those that do, they're ineffective.

Vince Bryan III:

The problems we're trying to help solve are enormous, but so is our business opportunity. Our ultimate vision is to deploy our fish passes systems on dams all over the planet, driving four key revenue channels.

Vince Bryan III:

First, a recurring revenue model we call Passage As a Service on our fully automated passage portals. Second, sales. Our non-automated systems. The simple ones like the salmon cannon itself. Third, Services. As the recognized leader of new and innovative fish passage technologies, we offer worldwide consulting and advising on how best to move the fish. Fourth, Subscription. Data and image capture from our official recognition system is invaluable and highly sought after in today's world.

Vince Bryan III:

Our key markets are fish passage and invasive species removal, agriculture, and fish processing. So think of it this way. Save feed, grow, save the fish, feed the planet, grow clean energy. We're not just helping fish over barriers but also moving fish and agriculture and fish processing.

Vince Bryan III:

Aquaculture is the fastest-growing food resource today. You can tap into this growing market and become the standard-bearer for a future where farmed and wild fish thrive. 20 independent laboratory studies over the past six years have shown us that traditional solutions such as ladders and lifts are ineffective.

Speaker 4:

Well, most of the barriers we've developed, ladders and lifts. Fish don't have legs, but we've developed ladders and lifts for their solutions because they work for us.

Vince Bryan III:

In 2018, Whoosh finished testing our passage portal on the Columbia River. By 2020 we were saving tens of thousands of threatened salmon after a landslide blocked the Frazier Rivers, legendary salmon run.

Jacques White:

And I've seen it in operation and it's really impressive. I think it has a lot of potential for fixed systems where you can capture the fish and move them upstream safely and efficiently.

Vince Bryan III:

In five years we have the expectation that Whoosh Systems will be deployed on dams of the Columbia and Snake Rivers. Be removing Asian carp throughout the Midwest and Southeast. Be providing fish passage for salmon, eel, and shad in the Eastern US, and helping Sweden and Norway lead the Europeans in implementing the ambitious EU Water Framework Directive. All of these are in the works. We need fish to sustain us. So does the planet. We also need dams to protect us from floods, to provide irrigation and drinking water and to help reduce our carbon footprint.

Vince Bryan III:

Join us if you believe that the fish and the planet are running out of time. Let's give them a chance to recover and help us run as fast as we can to get our Whoosh systems deployed on the planet's 1 million dams.

## **Whooshh Webinar Open – Call to Action – Why Now**

I'm going to take a few minutes to address the question of why. This is going to help provide you the background of why we're excited about this and hopefully that you can get excited about it too. You know, two centuries ago we had no real understanding of our actions in the rivers and waterways and even the federal government planted what we now consider invasive species, usually carp in many of the waterways throughout the country to help feed the railway workers as they were putting in the railways coming across the country.

And then last century the dams were put in either with no fish passage at all or with fish ladders which let all the species pass the dam or none at all. Oftentimes they weren't working, or they didn't allow for passage.

So you know the result has been this devastation to the native species, our fisheries and fishing opportunities for the sportsmen. So more recently the efforts that have been made to try to help the fish, but often at such tremendous expense for the dam owner and operator and diverting large amounts of water from its intended use for power generation or irrigation or flood control.

As a result the conservationists and the dam operators have often been on opposite sides and the regulations and lawsuits have further delayed real action. And as a result we are jeopardizing our own future.

The world's principal source of protein with fish, wasting our clean water reserves and jeopardizing the clean renewable hydropower with which we increasingly rely upon for our everyday activities. We believe we have a product here which can address many of those issues simultaneously.

So with 1 million dams worldwide and 85,000 dams in the US we have a lot of work, or it may well be too late. Because throughout the world we need to deploy what we're calling the dam smart fish passage and we've got to do it everywhere and we need to do it faster than what we have been addressing these problems in the past.

So Whooshh is taking this problem that has created over centuries and trying to bring all the parties together and solve this at one time. We can't afford to perpetuate the mistakes of the past any longer, so we've got to get started.

## **FISH PASSAGE | SAVE THE WATER | FEED THE PLANET**

Save The Salmon

Feed The Planet

Safely moving delicate objects quickly and over distance has always been challenging. This challenge has now been met by an innovative system based on soft, flexible tubes and localized pressure differential.

It was first applied to fresh fruit. It worked and it led to the question, could we move a fish through this tube? The concept that we had of moving fish over dams but not in water actually seemed quite natural to us when you thought about what a fish actually does when they encounter a barrier, like a tree that's fallen in the water every day.

So, yes, they would jump over the tree if it was blocking their way in the river and they're leaving the water and they seem to not be stressed about that at all. And once we convinced ourselves that logically from a biological standpoint and a physiological standpoint that this shouldn't be injuring the fish, well, we've got to try this. It should work.

The tube transport system for fish was developed in Seattle by a company called Whooshh Innovations. The transport tubes move fish gently and safely from the water below a dam to the spawning grounds above.

This represents a huge step forward in salmon recovery at a significantly lower cost than with fish ladders. Going up a ladder is exhausting for the fish. Going up the Whooshh system is like taking the first step of a ladder and after that taking the elevator the rest of the way.

In this country, there's 85,000 dams or so in this country. Only a fraction of those have fish passage, many of which need fish passage. To take down 85,000 dams, if you took down one a day, it's going to take over 230 years and we're not going to have any fish by that point.

Or we can put in 11 Whooshh systems a day. In 20 years, we will have fish passage on every dam in the country. Because the fish are singulated in our tube as they're coming through and we have an opportunity to scan and sort those fish, we can take out an invasive species which then the salmon or the other the natives fish doesn't have to compete with them.

And it's a little surprising that somebody hasn't come up with a device like this a little bit sooner that really kind of takes the mystery out of how to get fish from one location to another without damaging them.

The real question is what happens to the fish between dams where they spend extended time in abnormally warm water before reaching the spawning grounds where they can safely reproduce.

The numbers indicate that there is a substantial loss of fish between dams, and pre-spawning mortality can be very high. The general public gets it. If you get fish up to the spawning ground they're gonna be successful. We need not worry so much about getting the fish back down initially, because if there's just more fish up that successfully spawn, there's going to be more fish coming down.

We could open up salmon runs to waterways where it's now very difficult or very costly. It requires rethinking the problem. It requires rethinking where you are putting the dollars. It's important to have good habitat for them to spawn, but if the fish is not in good shape when they're reaching that habitat, it doesn't do us any good.

And so that's the challenge. On the grand scale of things, when there's so many issues in the world, you know, where do you focus? This seemed like an awfully good one, good place to do it. Save water, save power, save money, and save the fish.

Save the salmon. Feed the planet.

## Faster Migration with Whooshh

WHOOSHH Innovations

Whooshh v. Ladder

A Whooshh Tube

A ladder step

In a direct migration comparison, what happened after Sockeye salmon went up over a dam via ladder on the Columbia River compared to those that went over a dam via Whooshh?

Whooshh tube over dam

Ladder over dam

The results were remarkable and the implication for both dam operators and fish recovery truly astounding

110 Sockeye salmon climbed a ladder more than 100 vertical feet. The last 15 vertical feet, half the fish went over the dam via Whooshh and the balance climbed the rest of the way via the ladder.

Salmon swimming into the Whooshh system and automatically being sorted

A migrating salmon is like a battery, they only store so much energy. A ladder requires burst swimming, its like repeatedly using ludicrous mode in a Tesla which wears down the battery faster.

A fish in a Whooshh tube glides up and over on cool moist cushion of air, reserving energy in the process.

This temporary system used for the study was put up in the morning and taken down in the evening. A typical ladder would take years to design and install

When the Whooshh fish reach the top of a dam, they are not stressed, and have the energy to quickly continue on their migration

The ladder fish in comparison were much slower over the next week and fell way behind on their migration. See the Whooshh fish in green and the ladder fish in purple

54 Whooshh over the dam fish

56 Ladder swim fish

July 22

OLAFT Whooshh fish Priest Rapids Passage time = 2.55 minutes mean & median (PIT tag scan to Whooshh exit into forebay)

OLAFT Ladder fish Priest Rapids Passage time = 2.88 hours median and 23.04 hours mean (PIT tag scan to last Priest Rapids PIT detection antenna)

July 22



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July 23

July 24

July 25

July 26

July 27

July 28

July 29

July 30

Over 100km separated many of the Whooshh fish from the ladder fish ... and this difference was achieved by saving the fish from climbing just the last 15 vertical feet of the ladder!

Imagine if Whooshh were installed at every dam, and the fish took Whooshh over the full height of the dam

More native fish (and no invasive species) would reach their spawning grounds far faster and with more energy in their reserves to successfully spawn

fish recovery would be possible ... and none of the headwaters would be spilled down the ladders

and that's a sustainable double bottom line win

DO YOU WANT TO TAKE THE STAIRS?

ARE YOU KIDDING? LET'S TAKE THE ELEVATOR

DO YOU WANT TO TAKE THE LADDER?

REALLY?!

LET'S WHOOSH!!

## **Whooshh Innovations SE Campaign Ending**

At Big Bar, it was more than just a rockslide. It was a slice of the cliff. And then all at once the fish quit coming and God blocked the river. It'd be very sad to say if there was no more salmon, I don't know what our people would eat.

Two years in a row we get zero salmon fish. There's something wrong. There is really something wrong. This slide affects so many different communities and not just the people, but the wildlife. That's two years in a row of virtually zero salmon getting by on populations that in some years would have been up in the millions.

There's 22 million fish supposed to be coming up. If we can't harvest salmon, I don't know where we'll be. A few of us from DFO and engineers flew out to sight and seen. We realized it was a significant issue.

Big Bar, it was a disaster. Still a disaster. This is a massive natural landslide that is threatening to wipe out an entire river's population if they don't get it right. It's the opportunity to help.

And we don't have to talk about it anymore. How are we going to do this? Let's just do it. Because a cannon that fires fish through a tube and over a dam is absolutely incredible. And this is about as important as it gets.

There's a lot of people watching. There's a lot of anticipation. And so the first fish that actually went up the tube was just this incredible sense of relief.

## **Whooshh Seminar for Dam Operators, Labs, and Federal Agencies**

In October, Whooshh traveled 3,000 miles from our office in Seattle, to the East Coast, and then back.

On our journey we saw first-hand many of America's great rivers - the Columbia, Missouri, and Mississippi.

We were reminded of the great journey many species undertake to reach their spawning grounds.

After six days of travel, we reached our first destination in Holden, Massachusetts, home of Alden Laboratories.

Alden Labs is a world leader in solving water-related engineering and environmental challenges.

After seeing our technology in action, Alden Labs asked Whooshh to give a seminar and demonstration for dam operators, other laboratories, and federal agencies across the Northeast.

We then traveled to Washington, DC, where Whooshh was hosted by the U.S. Department of Energy and the Office of Energy Efficiency and Renewable Energy.

While in DC, we held a public demonstration on the Mall and had public and private briefings with Congressional staff and the Federal Energy Regulatory Commission.

And like salmon, Whooshh traveled 3,000 miles back to home to the West Coast after completing our East Coast tour.

In Prosser, Washington, at the Yakima Nation Fisheries, we met with the US Bureau of Reclamation, U.S. Army Corps of Engineers, National Marine Fisheries Service, United States Geological Survey where we displayed the newest scanning and sorting capabilities of the Whooshh system.

(Denil, False Weir, Scan and Sort, Accelerator, Whooshh Tube)

Whooshh offers a better way to address fish passage challenges and support for the Whooshh eco-technology continues to build within the scientific and regulatory communities and conservation groups.

So... just Whooshh!

Thank you [to]: Alden Laboratories, U.S. Department of Energy, Office of Energy and Renewable Energy, Yakima Nation Fisheries, US Bureau of Reclamation

Music: Josh Woodard "Show Me" – Instrumental Version

Produced & Edited: Sam Heim  
Samheimphoto.com

Do you care about water availability and a reliable, affordable, clean energy grid?

How about salmon, orca, fishing, or ocean acidification?

What about invasive species? Irrigation water? Flood control? or affordable food?

We don't like the choices so we debate, litigate, and risk it all.

Hoping for a better option – as if we have all the time in the world.

Whooshh Innovations fish migration solutions are a faster, more affordable and sustainable option that can be deployed today.

Make your choice known to your peers and representatives.

Better fish migration solutions.

Better Choices.