

**SAVING THE OCEAN
RIVER OF KINGS! PART 2 TRANSCRIPT**

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TEASE

Carl Safina

On this edition of SAVING THE OCEAN, we're bringing salmon back to a once-great salmon river in the Pacific Northwest.

Carl Safina (narration)

Hatchery fish are being replaced by magnificent wild king salmon.

Carl Safina

This is a wild fish.

Carl Safina (narration)

Logjams are making deep pools for young salmon.

Huge marshes are coming back.

And ancient spawning grounds are being restored.

So once again the Nisqually will be the river of kings.

Carl Safina

I'm Carl Safina. Join me now for Saving the Ocean.

FUNDER CREDITS

Announcer

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INTRO

Carl Safina

Hi, I'm Carl Safina. No matter where I travel I always return here, to walk, feel the seasons change... I've been coming here since I was a kid.

Now I'm a marine biologist and I write books about the ocean -- that magic, majestic, two thirds of the planet that starts right there in the surf.

In my travels I see pollution, overfishing, coral reefs in trouble. But I also meet inspiring people, working to solve problems.

In this series, we visit people with solutions, and places getting better. So I hope you'll join me on these journeys. It's all about Saving the Ocean.

RIVER OF KINGS Part 2

Carl Safina (narration)

Previously on River of Kings:

We flew the length of the Nisqually River, from Puget Sound to its source in the glaciers of Mount Rainier.

We saw how this still-wild river depends on a hatchery to keep its magnificent chinook or king salmon going.

We met Billy Frank, the Nisqually Indian tribal leader who fought for native fishing rights in the seventies. His vision now drives a tremendous salmon restoration project, from spawning grounds upstream to the estuary, where 750 acres of brown mud are becoming new salt marsh.

That's where we pick up our story.

The estuary's been a national wildlife refuge since the 1970s.

Jean Takekawa

In the foreground we're looking out on the restoration area that is part of the estuary restoration project, newly planted with thousands of native trees and shrubs, and some day it'll be a mature forest.

Carl Safina

I guess you can see it in your mind how it's going to look.

Jean Takekawa

It's actually growing amazingly fast.

Carl Safina

In Jean's imagination the two-year-old saplings will become like this existing part of the estuary, on the right.

It's a kind of forest called surge forest. It's laced with quiet channels, connected to the river, that are great for young fish. Right now the wetlands include 100 acres of surge forest, but the restored sections

will add another 75. That'll be good for the officially endangered chinook salmon.

Jean Takekawa

It turns out that the highest densities of juvenile chinook salmon can be found in this kind of forest because it provides food and shade, nutrients and shelter.

Carl Safina (narration)

Right next to the sprouting surge forest there's a huge area of mud. 100 years ago it was dyked off to make farmland. Then 2 years ago they took down the dykes, and now it's going back to salt marsh. It's one of the largest marsh restorations in the country.

Jean Takekawa

So now we're looking out at the biggest part of the estuary restoration and off in this distance, you can see all of Puget Sound, and how we're now connected with the tides of the sound.

Carl Safina (narration)

The tides and the salt water are now in charge.

It seems as though they've created a desolate and bare landscape. But estuaries are some of the most productive places on earth – a patchwork of channels, pools and plants, rich in wildlife.

That's what the Nisqually estuary will be again.

In the 1970s, by the way, this place was going to be a deep water seaport. A public outcry saved it, and the refuge was created.

Jean Takekawa

Some day we'll be looking out, I think, at a much more complex mosaic of estuary habitats.

Carl Safina

It's like nature is always trying, and it finds its way as soon as you give it a little break.

Jean Takekawa

You know the story here is so powerful because it has been such a lesson for all of us about how nature has the ability to heal, given a chance.

Carl Safina (narration)

They've built a half-mile of boardwalk along one edge of the restored area. It follows the course of the dyke – now-removed – that previously sealed off the farmland from Puget Sound.

Jean Takekawa took me out to the end of the boardwalk to see one of the key parts of the restoration effort.

Jean Takekawa

We are actually on the footprint of the old dyke, and everything to the right is the restoring estuary, and everything to the left is the natural salt marsh. One of the things in front of us is a slough, and so that slough on the left side is a natural slough that's been functioning for the last 100 years. But then to the right of where the dyke once was, had to be opened back up to the tides. And so you can see that connection now.

Carl Safina

So this was opened on purpose, right?

Jean Takekawa

That's right.

Carl Safina (narration)

In fact they had to open up a series of channels around the perimeter of the new marsh area. But they were lucky that inside the area the original meandering channels still existed. They just hadn't had water in them for 100 years.

Jean Takekawa

So there were eight different sloughs that we opened up and those are delivering a lot of the tidal water into the estuary.

Carl Safina (narration)

The Nisqually estuary restoration is a huge natural experiment.

Every week, this group from the US Geological Survey trudges through the strange landscape to see how things are going.

Big clumps of vegetation that grew on the farm fields have been killed by salt water, and are now rotting.

The channels are flowing again, and there's new mud. That's good – estuaries are dynamic places, and they need a constant supply of fresh silt washing down the river.

The stakes mark the group's study site.

Carl Safina

You need help with that or should I just hold the sieve?

Kelley Turner

I got it.

Carl Safina narration

The insect trap floats up and down with the tide. There are already a lot of insects, but they want more.

Kelley Turner

What we found is that in a functioning tidal marsh you will have a greater diversity of insects, and insects have different hatch times, so they provide food for the juvenile salmon throughout the entire time that juvenile salmon are using the estuary. Where in the restored sites you see more kind of spikes, where you'll get one species and...

Carl Safina

Is that because they're not fully restored yet?

Kelley Turner

That's because they're not fully restored yet.

Carl Safina (narration)

One good sign is that the areas that are slightly higher are now supporting new salt marsh plants.

As the river brings in more silt, the higher areas will expand.

Carl Safina

So this plant that's growing up high, I know it as salicornia.

Kelley Turner

But it's commonly known as pickleweed.

Carl Safina

You can eat it raw and it has a very nice little crunch. It's quite salty as you might expect. I don't know if you would like to try.

Kelley Turner

I'd love to. In all my years working with pickleweed I've never eaten it, although I've heard you can. It's kind of exactly how you would expect it to taste, a little salty and crunchy.

Carl Safina (narration)

They're not making the marsh for humans. It's about making the whole river work for endangered chinook salmon.

Take a look at this section of new channels that have been forming since the dyke came down.

I'm with biologists from the Nisqually tribe, who've been watching this area.

Healthy salmon rivers need a lot of things. Adult fish have to get upstream, into cool, clean spawning grounds. Young salmon need places to hang out, feed and get ready to head out to the ocean – this is becoming one of those areas.

Carl Safina

What about when they're coming down as juveniles and they need to change from fresh-water animals to salt-water animals? Is this an important part of that?

Chris Ellings

These are extremely important habitats because they provide a very diverse profile of salinity where we have the freshwater of the river on the surface, and then as you move deeper you get a saltier marine layer.

Carl Safina

So you're saying that the water on the surface is actually fresher than the water on the bottom?

Chris Ellings

It is, actually, we could take a measurement.

Carl Safina

What's the depth here? About 10 feet?

Chris Ellings

About 10 feet. Around bottom we have a salinity of about 11 parts per thousand then as we bring the probe up we'll see we start to see a response of...

Carl Safina

Oh wow! Look at it dropping like that. Wow that is an incredible difference!

Chris Ellings

And so up near the surface, we have a salinity of about one and a half to one parts per thousand.

Carl Safina

Wow! So if a little fish is swimming it can go from almost freshwater to about almost half the salinity of seawater in a 10-foot vertical range. And while it's adjusting, I guess, that's a very gentle way for its body to change in a changing environment.

Chris Ellings

Exactly.

Carl Safina (narration)

Eventually the young salmon emerge from the river into the salt water of Puget Sound.

Right now 4 million young salmon a year are released from the hatchery. They don't know how many make it out of the river, but about 40,000 adults come back 3 or 4 years later.

The eelgrass beds of Puget Sound is where the young salmon hide on their way to the ocean.

So the Nisqually River biologists are beginning to monitor the eelgrass near the river mouth, to track young salmon as they come out.

Salmon restoration on this scale is unprecedented, and a lot of the research results are new. We didn't know young salmon needed surge forests and estuary channels so much, or that they ate so many insects.

Out here in the Sound, they'll look at what young salmon eat, how long they hang out, and where. Many people hope eventually to clean up the Sound and restore more of its salmon rivers – the Nisqually is the guinea pig.

Here's our catch.

Biologist

Ooh, we got salmon!

Carl Safina (narration)

It's mainly sand lance and smelt, which the growing young salmon will eat.

Chris Ellings

Sand lance 104.

Biologist

Smelt 122.

Chris Ellings

It's a hatchery chinook.

Carl Safina (narration)

There's one young chinook salmon from the hatchery – they can tell because it has a clipped back fin.

Less than 1 percent of those that make it this far will come back as adults. The restoration goal is to get as many healthy young salmon out into the eelgrass as possible – but wild fish, not from the hatchery. We'll talk about that challenge a bit later.

First, we've come upstream to one of the Nisqually River's two tributaries. It's called the Mashel.

Florian Leischner

So this is the Mashel River and you can see we're standing on a logjam right now.

Carl Safina (narration)

The logjam is artificial – there are several in this stretch. There are key spawning grounds nearby, and baby salmon need places to keep cool, and hide from predators.

Carl Safina

For a long time people were taking wood out of rivers thinking that that would be better for fish.

Florian Leischner

Correct. So yeah, I mean people have been taking wood out for navigation purpose at first and then, even into the 70s, the State Fish and Wildlife took out logs and logjams thinking it would a problem for fish passage.

Carl Safina

They thought the fish would be able to get up better without the logs.

Florian Leischner

Exactly.

Carl Safina

And you're putting logs back in.

Florian Leischner

So now the same agencies are funding to get these projects done.

Carl Safina

How do we know this is right?

Florian Leischner

Well, in 50 years we might be taking them out again, I don't know.

Carl Safina (narration)

So let's take a look and see if the fish like it.

Carl Safina

I can't breathe out of my nose at the moment. I have this camera on my head so you can see what I see and I'm ready to get in this pool because I'm getting very hot.

Carl Safina (narration)

Hot above, but below it's a cold mountain stream, flowing from a glacier on Mount Rainier.

The river biologists check out the pools regularly.

The logjams create the pools, which fish clearly like. There are some wild salmon left in the Nisqually, like these young coho salmon.

Young salmon spend up to a year in the river and estuary, so the more good places there are to hang out, the more there will be to head out to the ocean, and the more salmon will eventually come back.

Carl Safina

That was pretty interesting—little baby salmon mainly. I think I saw about two dozen.

Carl Safina (narration)

One thing the biologists have discovered is that the new pools have an effect on young salmon. The darkest parts of the pools shelter darker salmon. Whether the fish are changing their color, or darker fish are choosing dark areas, we don't know. But it's a consistent pattern.

Florian Leischner

They've gotten accustomed to their hiding spot, their preferred place and so the ones that were really tucked in there were much darker.

Carl Safina (narration)

This is more than an interesting curiosity. It means the river is becoming more varied, so different fish can use it in different ways. In nature variation is strength, because not all your eggs are in one basket. That means the Nisqually's fish are becoming more resilient.

49 logjams have been built in the Mashel tributary so far, and my guess is that we won't be taking them out in 50 years.

The Mashel is right next door to the small town of Eatonville.

Towns are often bad news for rivers.

Runoff is the big problem. It's warmer than the river, and it's more polluted -- both bad for fish. The region is heavily developed, with urban runoff a big concern for the whole of Puget Sound.

If you think there's nothing to be done about that, take a look at Eatonville.

This is a parking lot for an auto parts store. The rain from the roof ran direct into the Mashel River, but from today it's going to be absorbed by what's called a rain garden.

Eatonville is a very salmon-conscious town.

David Hymel

80 per cent of the town's storm water goes into pipes that go into Ohop Creek or the Mashel River untreated. That has an impact on salmon habitat.

Carl Safina

But it's just rainwater, I mean, what's the problem?

David Hymel

It's rainwater, when it hits the impervious surface it picks up heavy metals from, say, copper from brake pads, hydrocarbons from leaking automobiles. Plus the Mashel River has low flow in the summertime which is not good for salmon. So we hope by infiltrating the majority of the town's storm water then we will increase the low summer flows.

Carl Safina

You're sort of recharging the sponge of the ground so that the water can go more slowly but more evenly into the rivers.

David Hymel

Exactly. A rain garden acts like a native forest.

Carl Safina (narration)

A critical role that forests play is to soak up rainfall. That's why when forests are cut down, floods often follow.

Not only do forests absorb rain, they hold it, they filter it and only then – maybe years later – clean water trickles out into streams and rivers.

So here in Eatonville they have a solution to runoff problems.

Sally King

I've been telling people about the rain garden ever since I found out about it and I just think we all have to care about the environment. It's not, it's really not just about us. It's about the future and the land and so it's the bigger picture of things.

Carl Safina

Do you try to encourage people to also do this?

Sally King

Oh, well yes. I really tried to recruit our neighbors to do it and the whole point is to try and keep the Nisqually rivershed clean so we can get salmon back.

Carl Safina

What're you guys all doing here? You building or maintaining?

Gardener

Well, it's an intervention.

Carl Safina

An intervention? Uh oh, you have a problem garden on your hands?

Ray Harper

Yes we do. We had a mayor who laid off the parks crew and now we need volunteers.

Carl Safina

Uh oh. And you're the mayor?

Ray Harper

I am.

Carl Safina (narration)

Eatonville has to be the rain garden capital of America – 22 of them, one for every 125 people.

Carl Safina

Do you think people in the town here are more aware of the patterns of runoff and water flow and the river and the fish and how it all connects?

Ray Harper

Yeah, I think they do. Because you know a lot of the old timers, they used to see salmon in the river every year. You know it was just thick, they said you could walk across. It got to where it was rare to see a salmon, so and now we're reversing that, you know, where I myself, my thoughts are try to leave it better than you found it.

Carl Safina (narration)

One of the best things about the Nisqually project is how widely it's supported.

And here on the Mashel spawning grounds close to Eatonville, you can see what it's all about.

It's late summer and the chinook, or king, salmon are back.

There's a lot of commotion as male fish face off.

The females are digging nests in the gravel to lay eggs in.

Many fish don't look healthy, but that's normal. The spawning process is exhausting. In fact all the fish will die once they've spawned.

Also there are these beautiful small salmon called pinks, or humpies - - the males get big humps in the spawning season.

Like all mating salmon, several squabbling males stick close to a female, and the female decides who she likes, and who she doesn't.

The pinks are wild fish, one of two species in good shape in the Nisqually. Three others are not doing well, and one of those – the chinook – is extinct.

Yes, these are chinook salmon, but this one's a hatchery fish – you can tell because its back fin is clipped. Close behind is a male, but this one's a kind of wild fish, with an intact back fin.

Wild and hatchery fish intermingle on the spawning grounds, but all the wild fish here are descended from hatchery fish. Every year some hatchery fish stray, and a few are able to spawn – they are becoming wild.

That's the great hope for restoring wild chinook to the river, but there's a snag.

There are hatchery strays every year, at least three times more than the "new" wild fish. The strays crowd the new wild fish out of the limited spawning areas.

So now the biologists want to get rid of all hatchery strays, and have only the new wild spawners on the spawning grounds.

That means stopping the hatchery strays before they get here.

The man mainly responsible for this strategy is David Troutt, the Nisqually Indian Tribe's lead biologist.

He took me to the spot on the river where the hatchery strays are going to be weeded out.

Carl Safina

So what's going to happen here?

David Troutt

This is the site of our weir, fish-blocking weir.

Carl Safina

A weir?

David Troutt

A weir, a floating device that'll block the entire Nisqually River and allow us to handle all the chinook that are coming upstream to spawn.

Carl Safina (narration)

A month later the fish weir was in the river.

It's an impressive device, designed to be put in the river just for the three months when the Chinook are running, then taken out.

There's a mechanical fish handling system. It all looks very elaborate to me. But the fact is there are salmon hatcheries all over our Western rivers, and if we want wild fish back while having hatchery fish to harvest, this is what we have to do.

Bill St. Jean

I see it as a prototype for systems throughout the state and throughout the west coast on salmon populations. Rivers that have large hatchery populations and their natural populations are struggling. This is a tool to manage those hatchery strays.

Carl Safina (narration)

The weir is a big sloping fence, with the top held up by giant airbags, and the bottom held down to the river bed by a massive anchor chain.

When it was first tried out there were teething troubles, with the fence riding too low in places, and fish jumping over it.

No doubt they'll straighten it out, and next year they expect to pull about 4,000 chinook out of the river. The 2 to 3 thousand hatchery strays will be harvested, while 1,000 or so newly wild chinook will be returned to the river to continue up to the spawning grounds.

Carl Safina

Do you think eventually there'll be enough fish produced here in the river that it can support the fishing as well as the fish supporting themselves, or will there always be a need for a hatchery on this river?

David Troutt

The long-term goal, if you think out a hundred years and we were in control of everything, this natural population would sustain our fishery and sustain the tribe and the fishing communities out in Puget Sound and the ocean.

Carl Safina

You do think you can do that?

David Troutt

Potentially. The challenge we have is there's two and a half million more people moving into Puget Sound in the next 15 years, and they're going to live somewhere, and they all have footprints and impacts, and having wild fish in the face of that continual growth in our region is a real challenge. Are they willing to make choices that support wild salmon? Are they willing to protect the watersheds and protect the marine shorelines in a way that supports wild fish? So I don't really, in the near term, see a place where we're not producing hatchery fish for harvest and having a wild stock as well.

Carl Safina (narration)

I have to say that the Nisqually salmon restoration project makes me elated and depressed at the same time.

Our other West Coast salmon rivers, like the Columbia, are shadows of their former selves. That's depressing.

But I'm elated that the Nisqually River, already the best that flows into Puget Sound, may one day fulfil the tribal leader Billy Frank's vision of a return to the old Nisqually – when five salmon species crowded into the river in seven different runs throughout the year.

Billy Frank's vision is now shared by many.

For Saving the Ocean, I'm Carl Safina.

FUNDER CREDITS

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