



# Barrier removal and river restoration: benefitting fish, people and the economy



**Kim Birnie-Gauvin**

Freshwater Fisheries & Ecology | Technical University of Denmark

✉ [kbir@aqu.dtu.dk](mailto:kbir@aqu.dtu.dk) | @kbg\_conserv 











## ***Denmark***

- Flat country (highest point 171m)
  - Low gradient
- No natural barriers
- >90% of streams fragmented



The background of the slide is a scenic landscape featuring a large, calm lake in the upper half, with a dense line of green trees on the far shore. In the foreground, there are rolling green hills and a grassy slope. Two semi-transparent text boxes are overlaid on the left side of the image.

## Habitat = limiting factor

- Important for spawning
- Important for survival during early life stages
- Often forgotten...










A close-up photograph of several green grass blades. The blades are covered with numerous small, clear water droplets, likely from dew or rain. The background is blurred, showing more greenery and light filtering through. A semi-transparent white horizontal band is positioned across the middle of the image, containing the text.

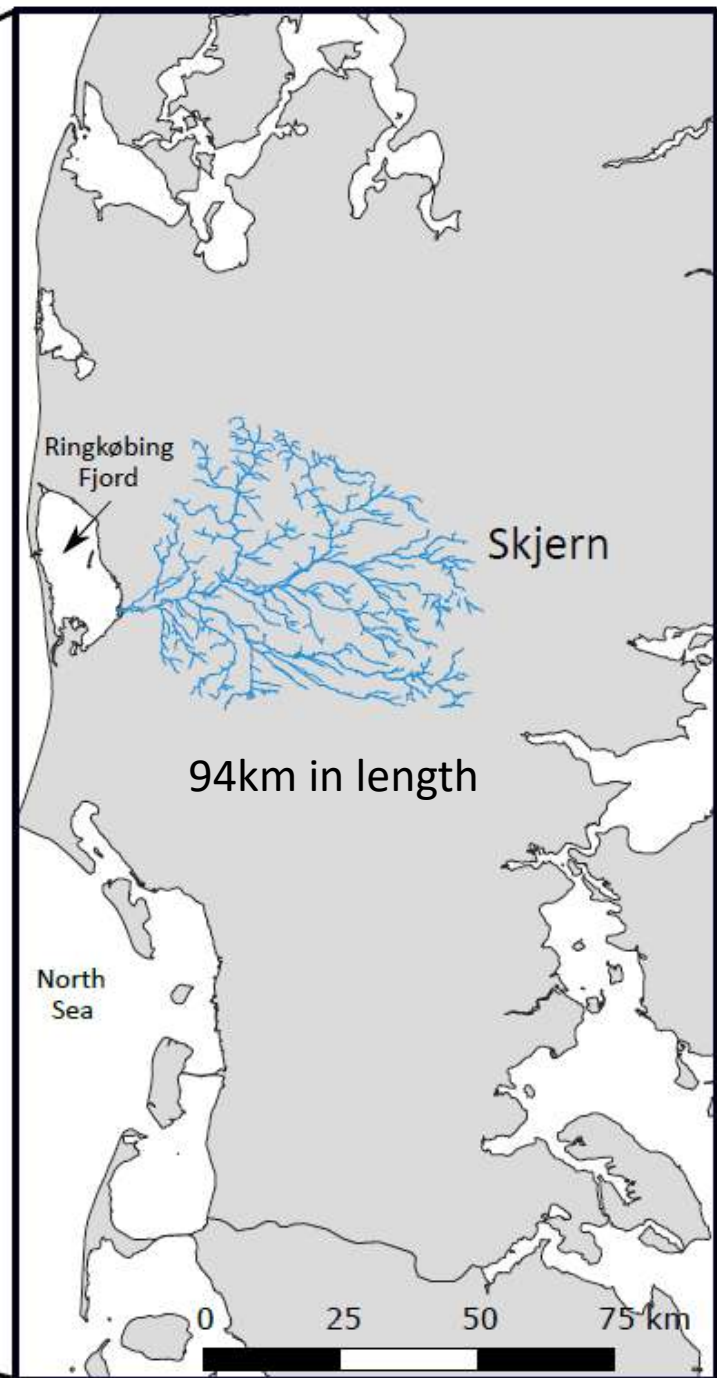
*The only way to restore habitat is through **removal***

A close-up photograph of green grass blades, likely from a reed or similar plant, with numerous small, clear water droplets resting on their surfaces. The background is blurred, showing more of the same grass and some bokeh light effects.

*Last barrier built in 1973  
More than 10 000 barriers removed since*



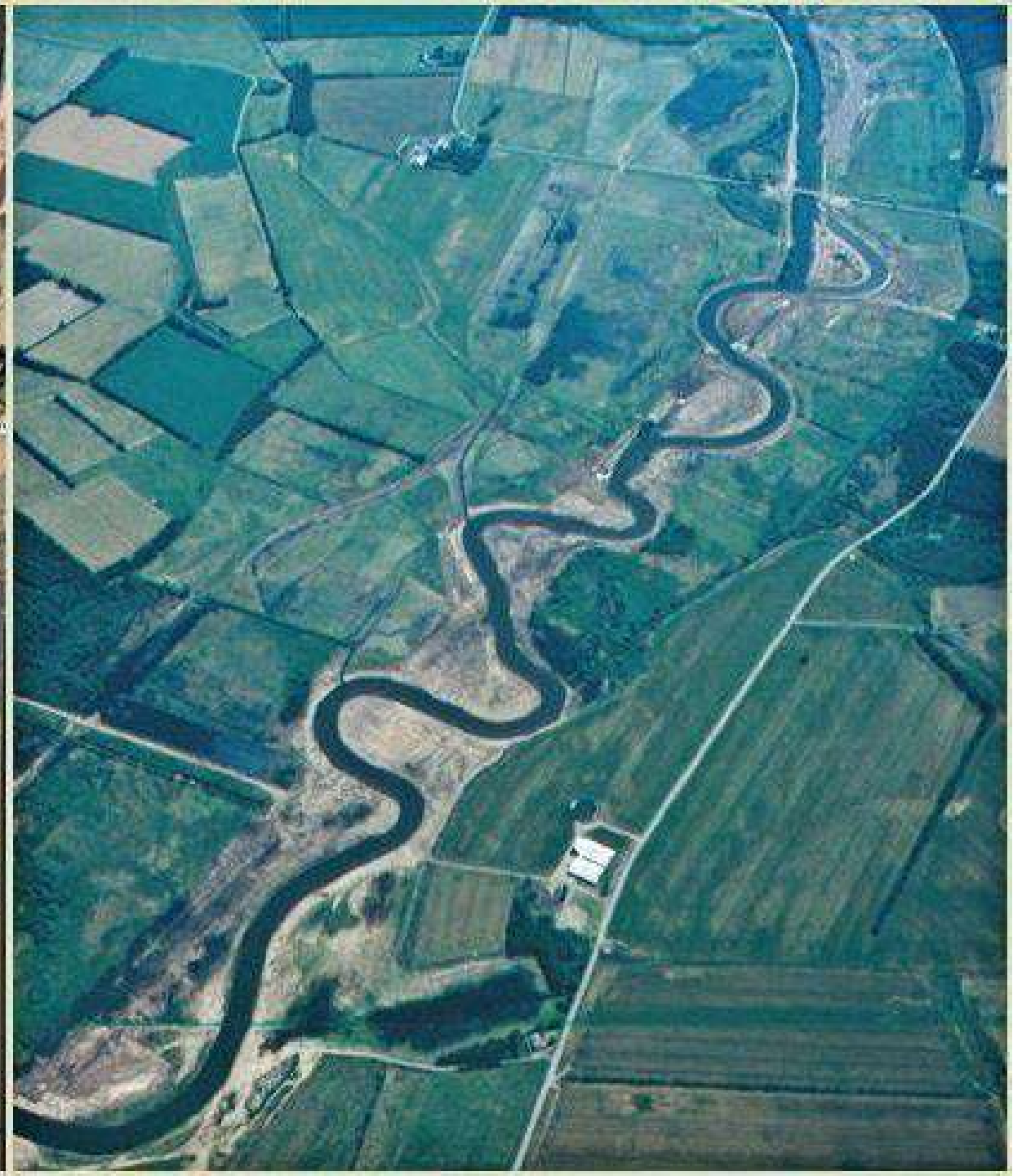
**DENMARK**















**1980s**

Realization that  
river Skjern was  
still home to a  
few wild  
salmon...



A photograph of three dead salmon lying on a pebbly beach. The fish are arranged diagonally across the frame, with their heads pointing towards the top left. The pebbles are small and dark, with some lighter-colored ones scattered around. The fish have silvery scales and some visible damage to their fins and bodies.

**mid-1980s**

Stocking began;  
was considered  
the accepted  
method then

***But stocking is  
a treatment of  
symptoms...***

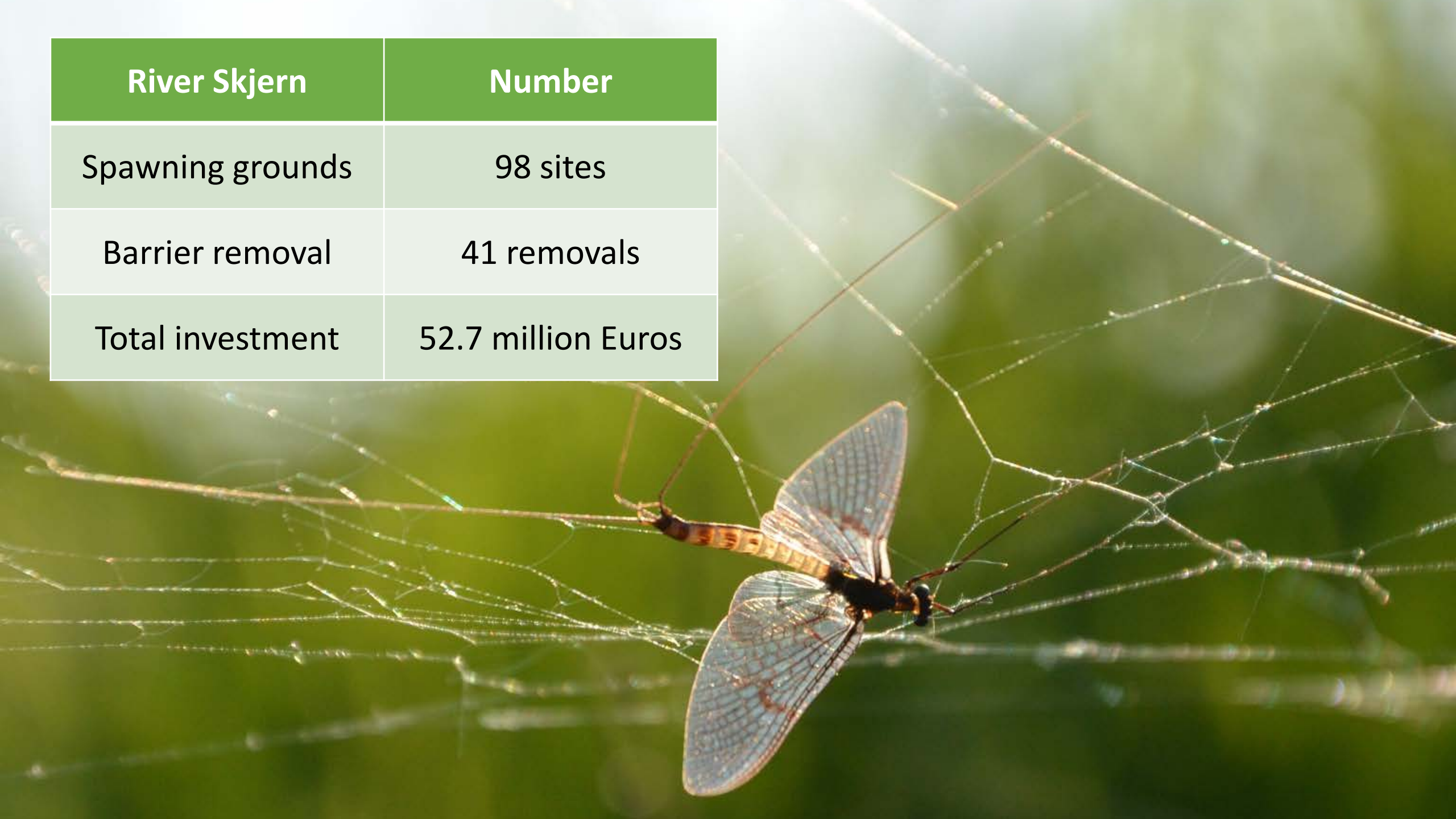


***Core issue:***  
*lack of suitable  
habitat*





River Skjern	Number
Spawning grounds	98 sites
Barrier removal	41 removals
Total investment	52.7 million Euros





River Skjern	Number	River Storaas	Number
Spawning grounds	98 sites	Spawning grounds	60 sites
Barrier removal	41 removals	Barrier removal	15 removals
Total investment	52.7 million Euros	Total investment	3.7 million Euros





River Skjern	Number
Spawning grounds	98 sites
Barrier removal	41 removals
Total investment	52.7 million Euros

River Storaas	Number
Spawning grounds	60 sites
Barrier removal	15 removals
Total investment	3.7 million Euros

River Varde	Number
Spawning grounds	191 sites
Barrier removal	17 removals
Total investment	9.2 million Euros





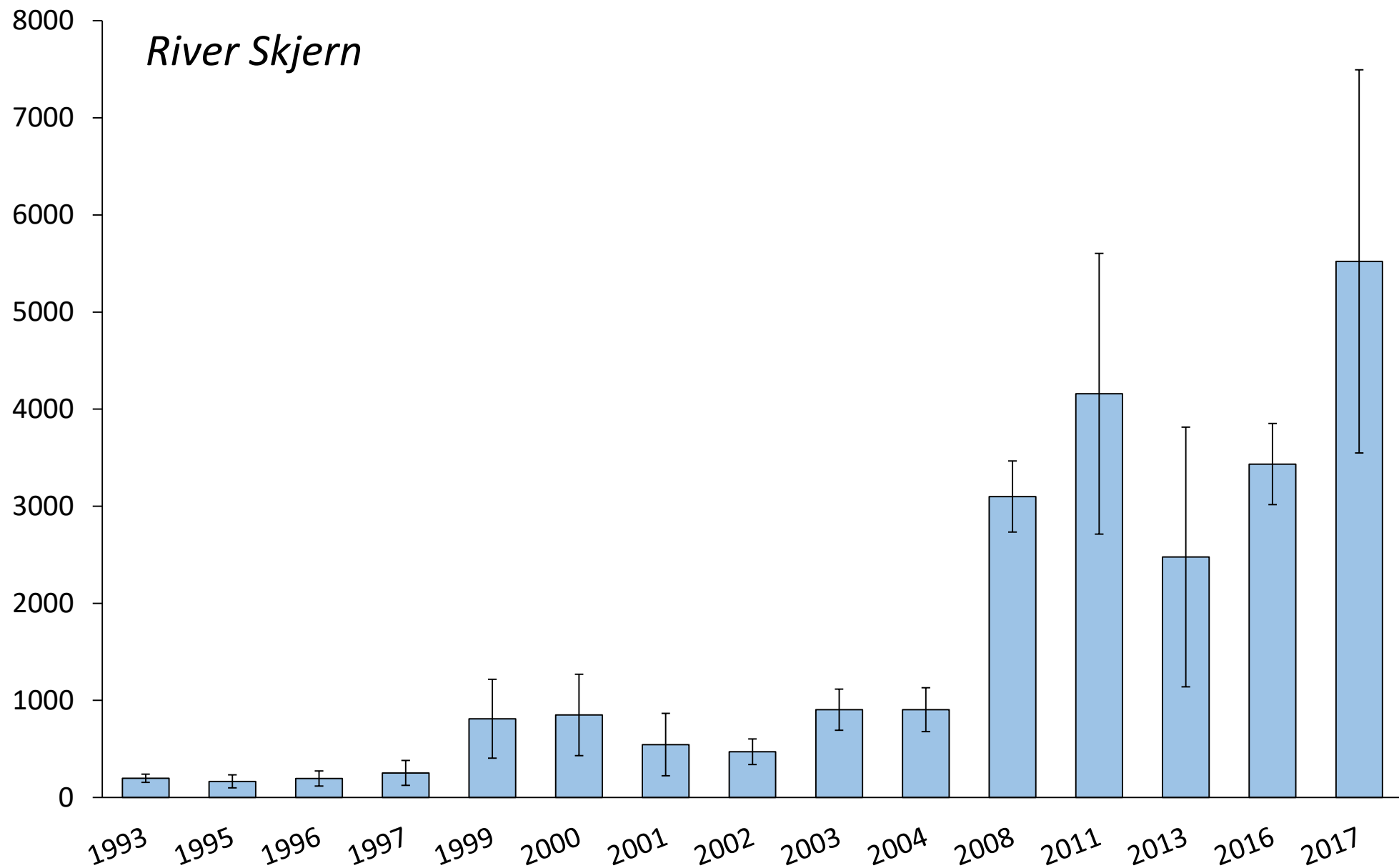
## So what's in it for the fish?

- Connectivity and free passage
- Decrease in energetic costs
- Decrease in risk of predation
- Decrease in risk of injuries
- ***Suitable habitat for spawning***
- ***Suitable habitat for rearing***



*River Skjern*

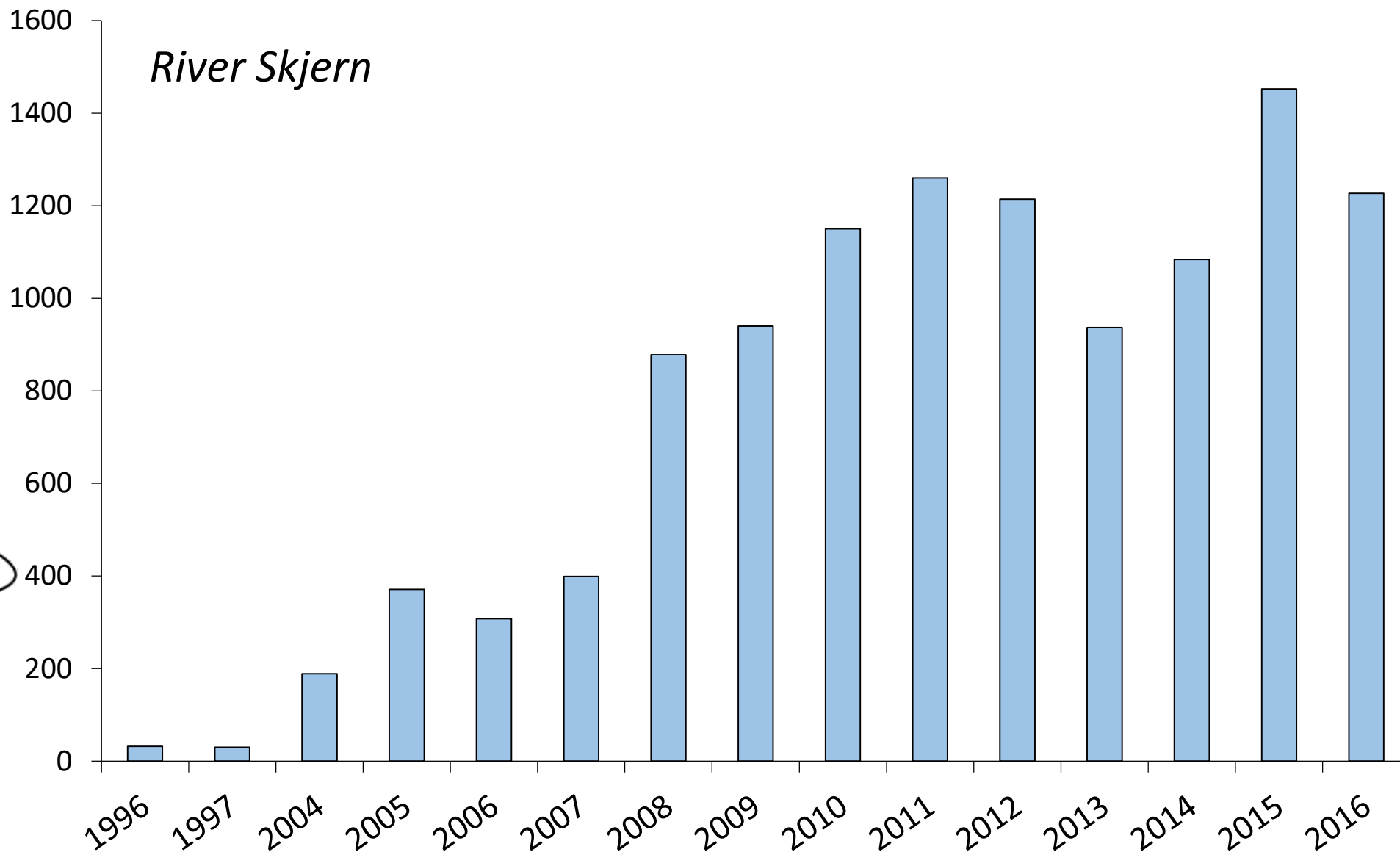
Population  
estimate





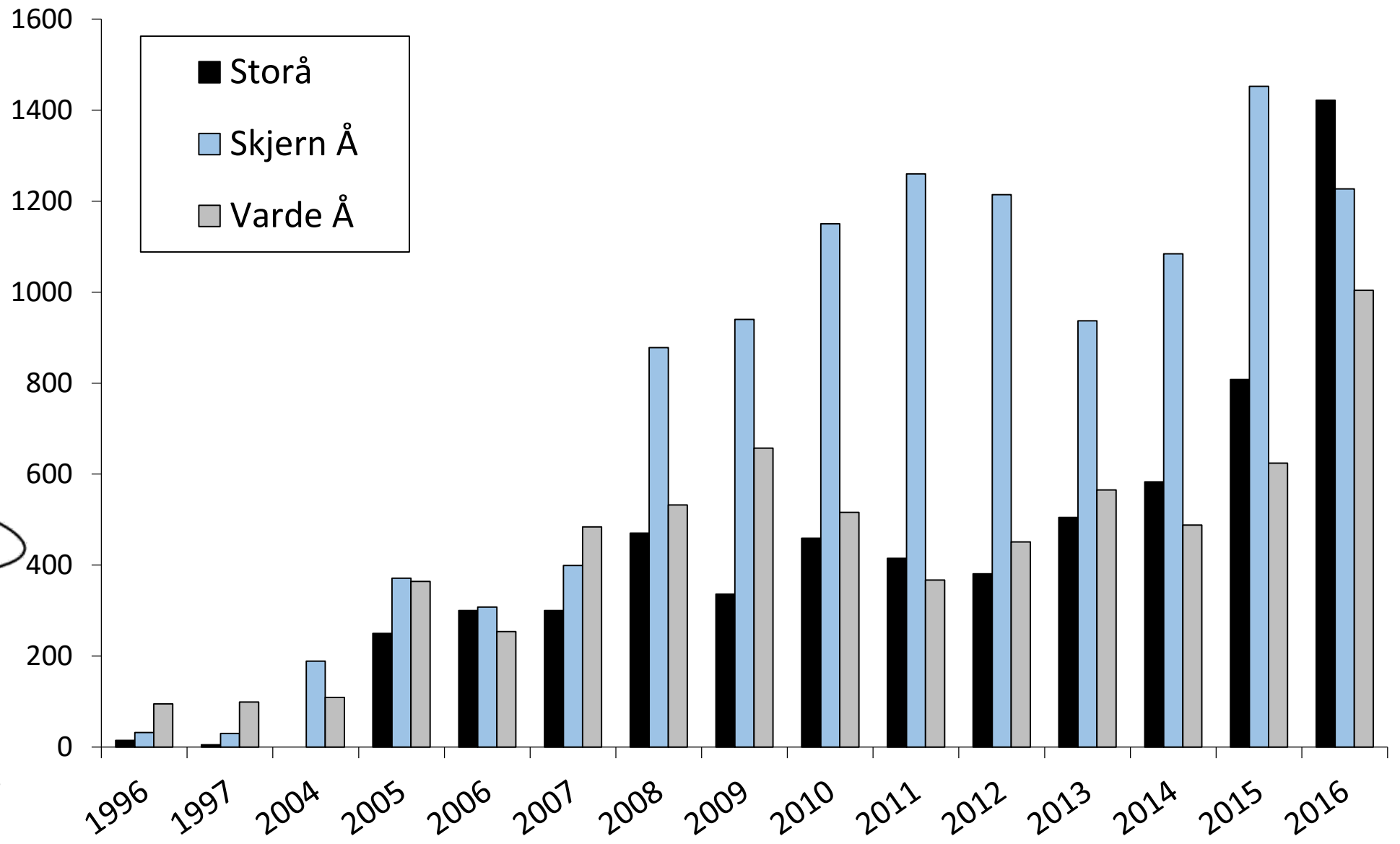
*River Skjern*

Angling  
catch





Angling  
catch

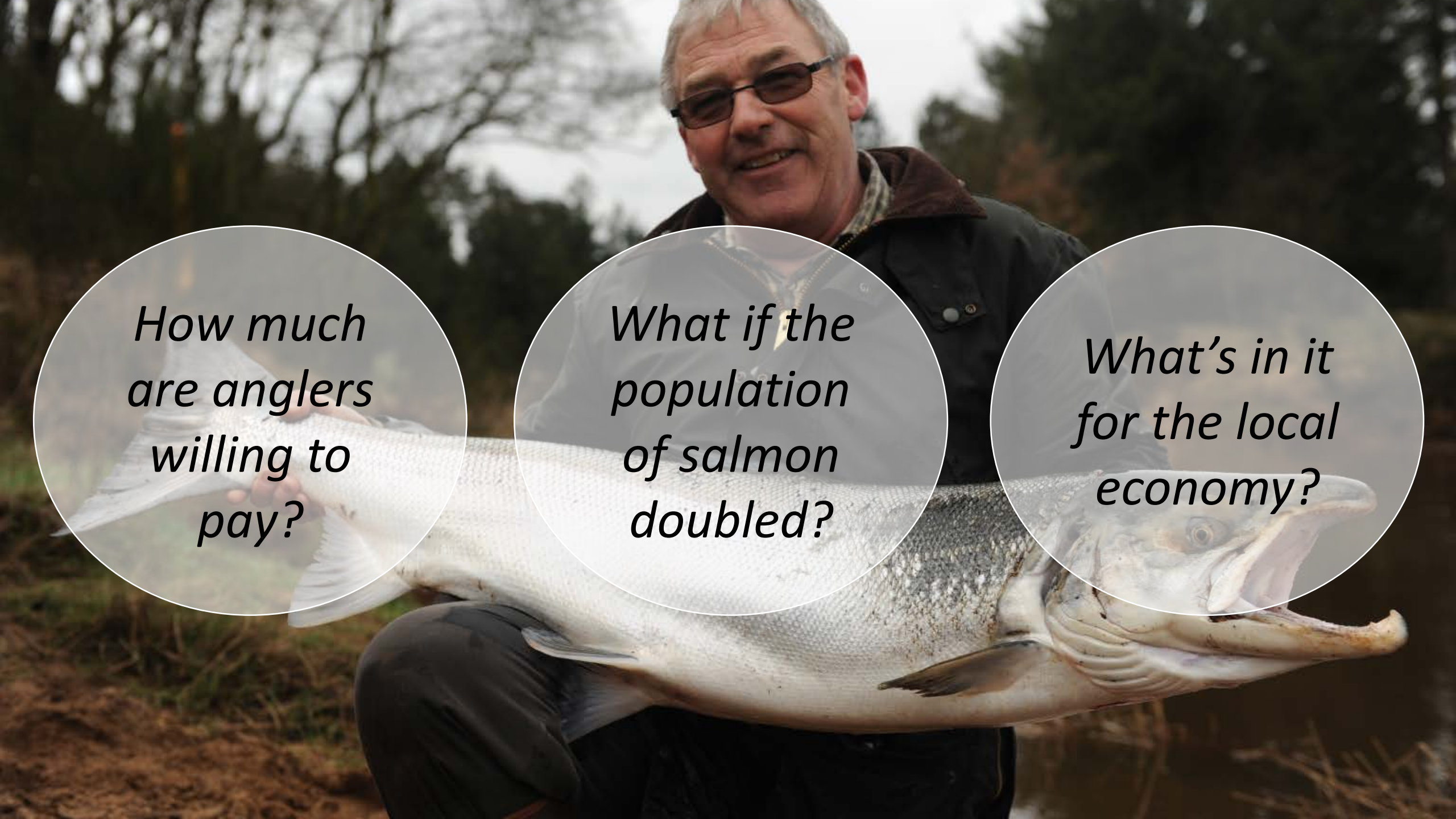




A man with a beard and a plaid hat is holding a large fish. He is wearing a dark jacket and a vest. A fishing rod is visible behind him. In the foreground, the head of a dog is visible, looking up at the fish. The background shows a body of water and some reeds.

*“Asleep we dream of things we wish;  
Dogs dream of bones and men of fish.”*



A man with grey hair and glasses, wearing a dark jacket, is smiling and holding a large, silvery salmon. The fish is held horizontally across his body. The background is a blurred outdoor setting with trees and foliage.

*How much  
are anglers  
willing to  
pay?*

*What if the  
population  
of salmon  
doubled?*

*What's in it  
for the local  
economy?*





# *How much are anglers willing to pay to fish in River Skjern?*

Type of expenditure	Cost in DKK	Cost in EUR
Equipment	4705	631
Fishing license	1508	202
Transport	3108	417
Food	2662	357
Overnight stay	799	107
<b>Total</b>	<b>12782</b>	<b>1714</b>



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<b>Local economy growth</b>	<b>7019</b>	<b>941</b>



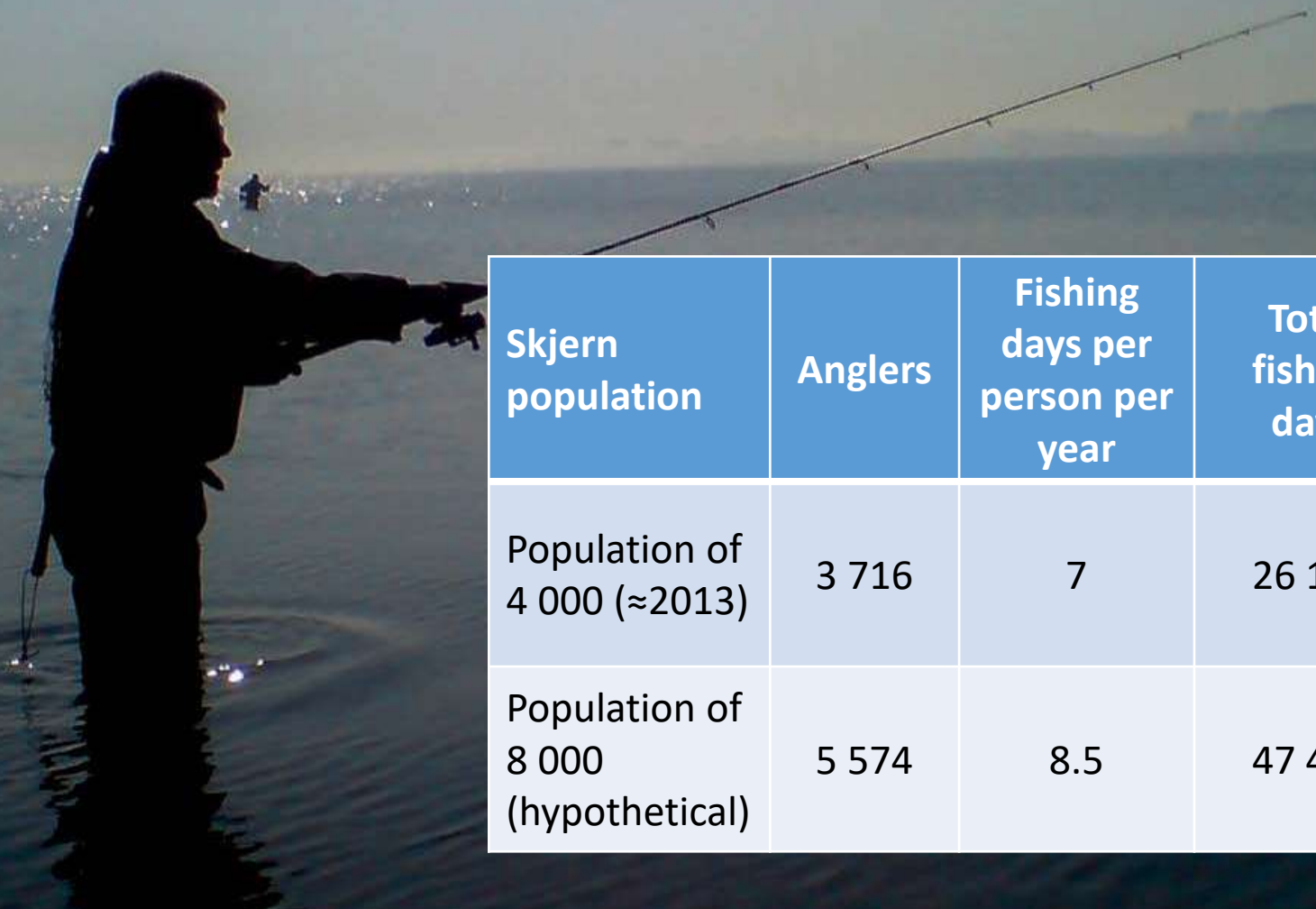


## *What's in it for the local economy?*

	Cost in DKK	Cost in EUR
Total	14 602 669	1 957 975
<b>Local economy growth</b>	<b>6 849 829</b>	<b>918 448</b>



# *What about if the population of Atlantic salmon in River Skjern **doubled**?*

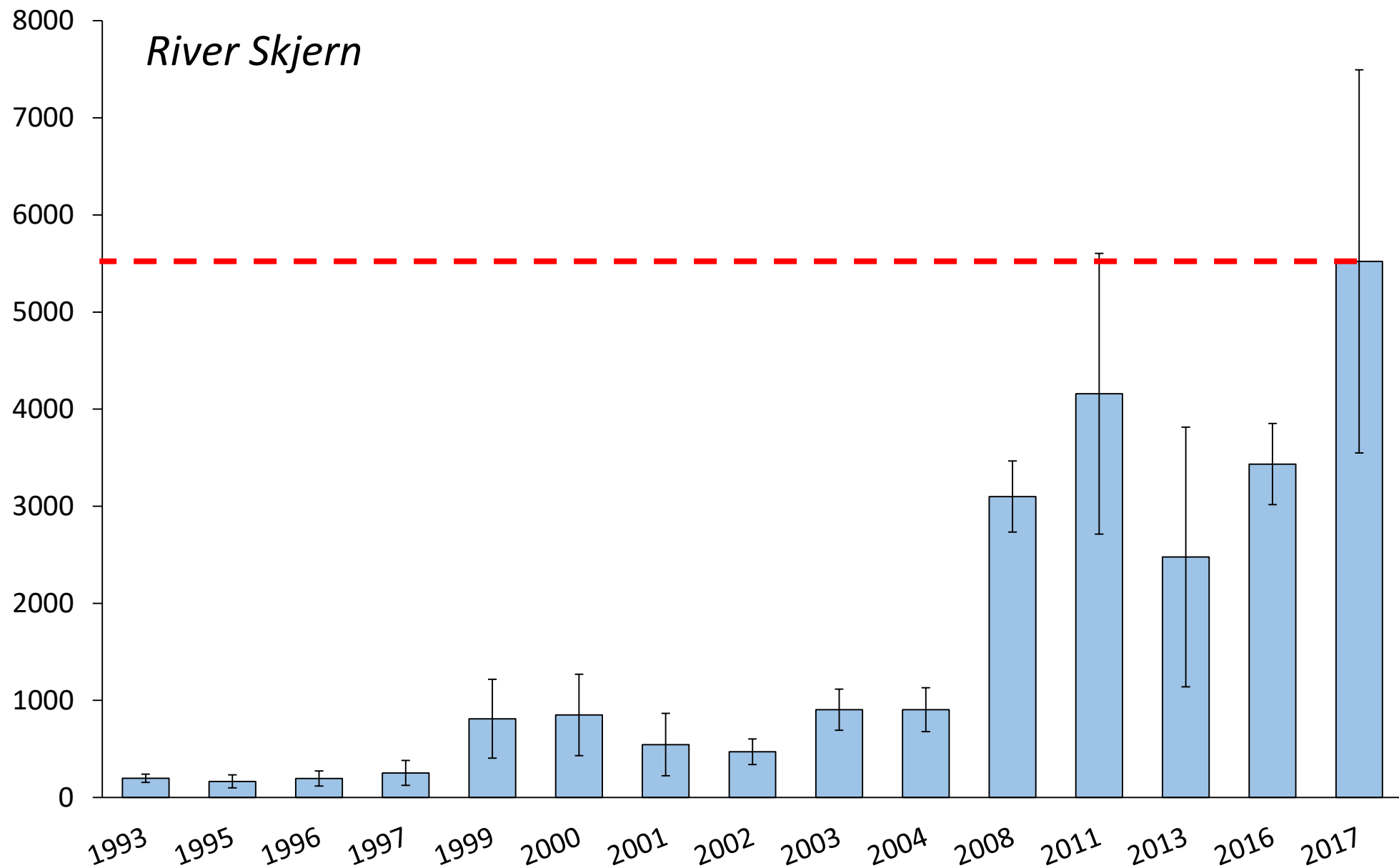


Skjern population	Anglers	Fishing days per person per year	Total fishing days	Local economy DKK	Local economy EUR
Population of 4 000 (≈2013)	3 716	7	26 100	6.8 million	<b>918 448</b>
Population of 8 000 (hypothetical)	5 574	8.5	47 400	12.4 million	<b>1.7 million</b>



*River Skjern*

Population  
estimate





# A little perspective...

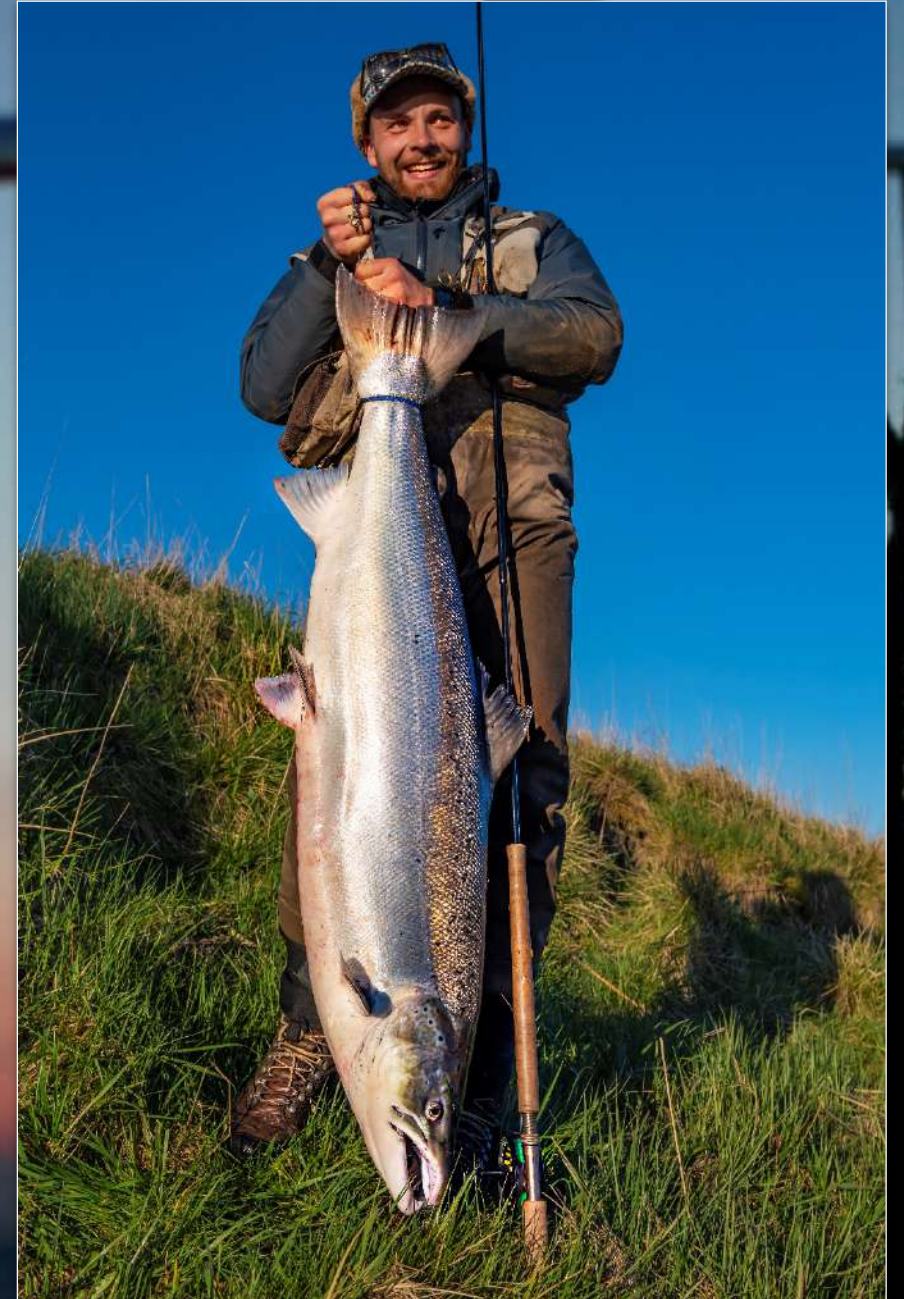
- We've been screwing up rivers for more than 1000 years without much thought for the consequences...





# A little perspective...

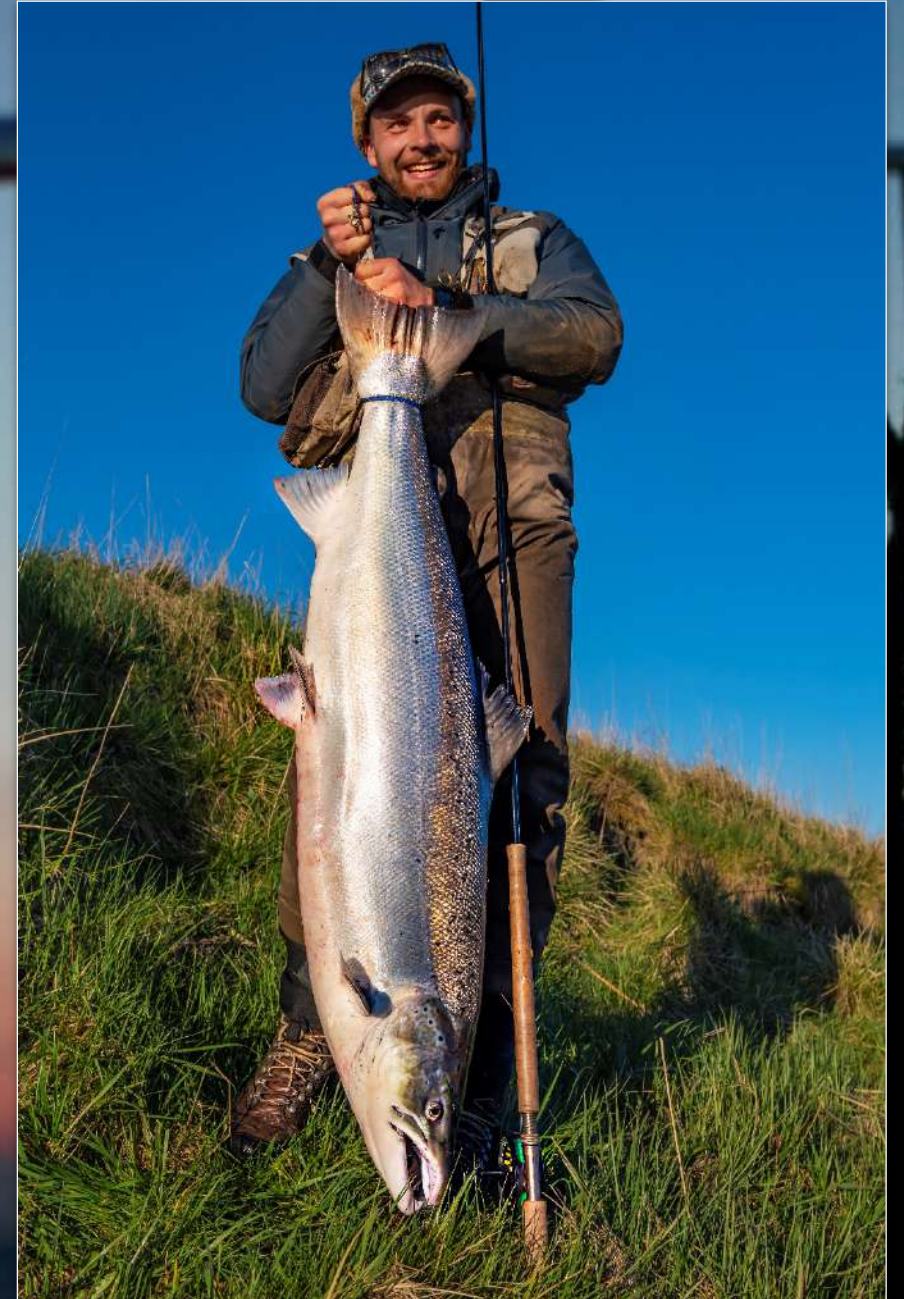
- Shifting baseline – do we even know what the situation was historically?
- We have no historical record of salmon this size in Denmark – yet, here they are!





# A little perspective...

- Booming salmon populations in Denmark, while most of Europe's populations are crashing...
- **Salmon and trout worth the same as silver!!**
- **Why?**

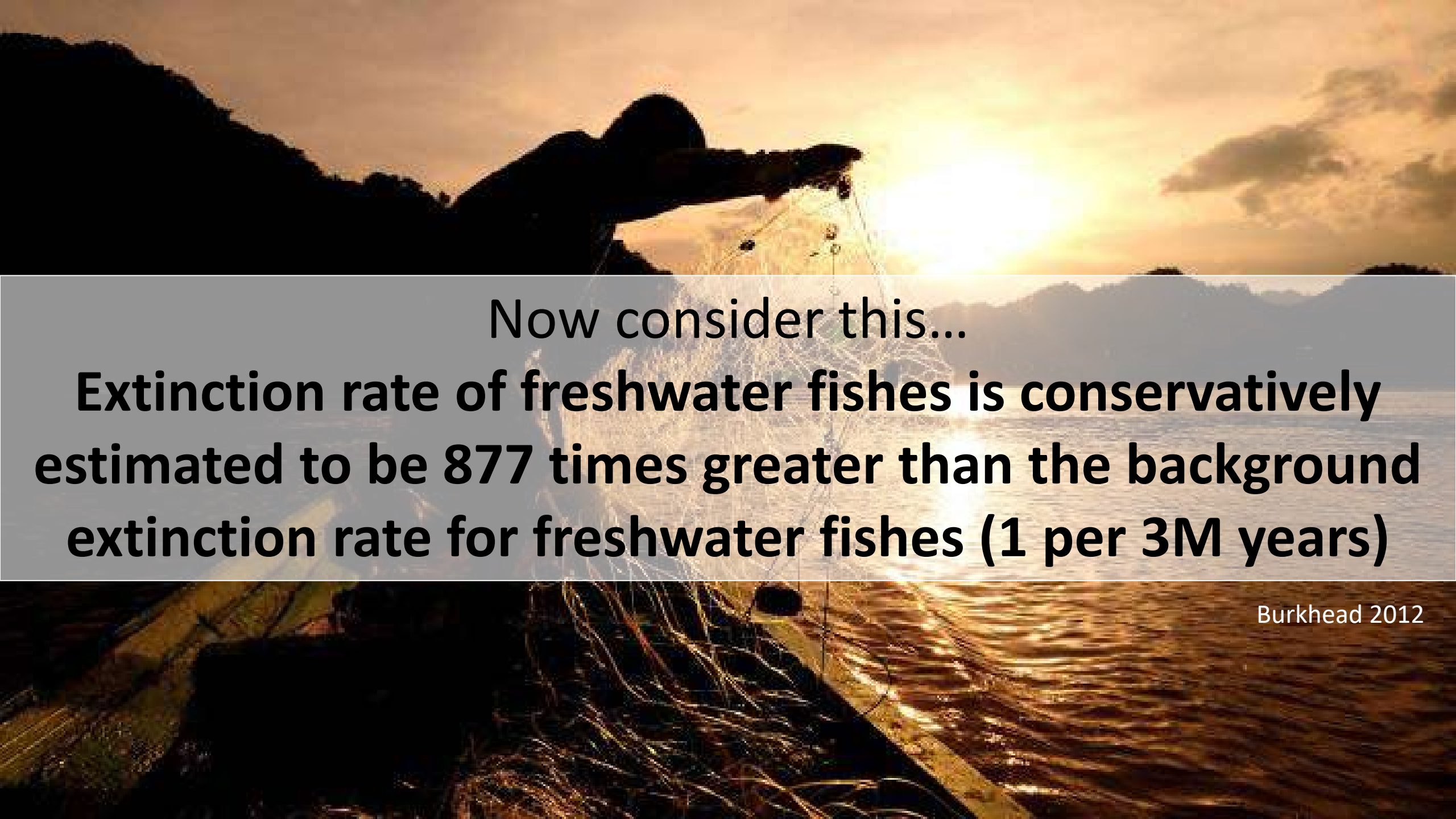






We gave them back what they had in the first place:  
**a healthy river habitat**




A dramatic sunset scene over a body of water. In the foreground, the dark silhouette of a person is visible on a boat, looking out towards the horizon. The sun is low on the horizon, creating a bright, glowing light that reflects on the water's surface. The sky is filled with soft, orange and yellow clouds. The overall mood is contemplative and serene.

Now consider this...

**Extinction rate of freshwater fishes is conservatively estimated to be 877 times greater than the background extinction rate for freshwater fishes (1 per 3M years)**

Burkhead 2012



A dramatic sunset scene over a body of water. In the foreground, the dark silhouette of a person is visible on a boat, looking out towards the horizon. The sun is low on the horizon, creating a bright, golden glow that reflects on the water's surface. The sky is filled with soft, orange and yellow clouds. The overall mood is contemplative and serene.

Now consider this...

**Freshwater ecosystems are the MOST threatened ecosystems worldwide**



Thank you for listening!  
Merci de votre attention!



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✉ [kbir@aqu.dtu.dk](mailto:kbir@aqu.dtu.dk) | @kbg\_conserv 

