



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



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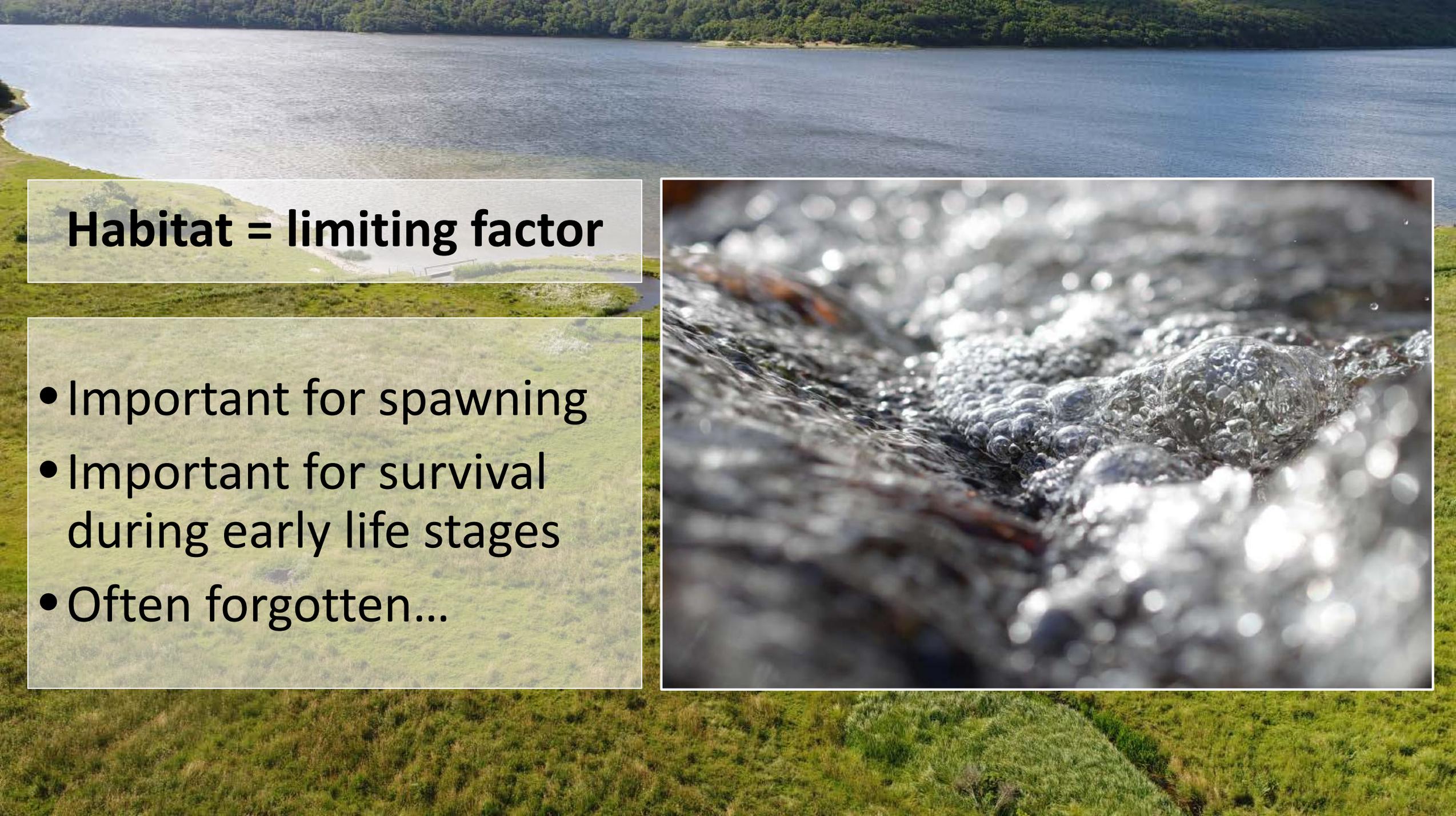




An aerial photograph of a lush green landscape. A large, calm body of water, possibly a reservoir or lake, occupies the upper half of the frame. In the foreground and middle ground, a vibrant green field is bisected by a winding, narrow stream. A herd of brown cows is gathered in a clearing near the stream. The overall scene is peaceful and rural.

## ***Denmark***

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



## Habitat = limiting factor

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





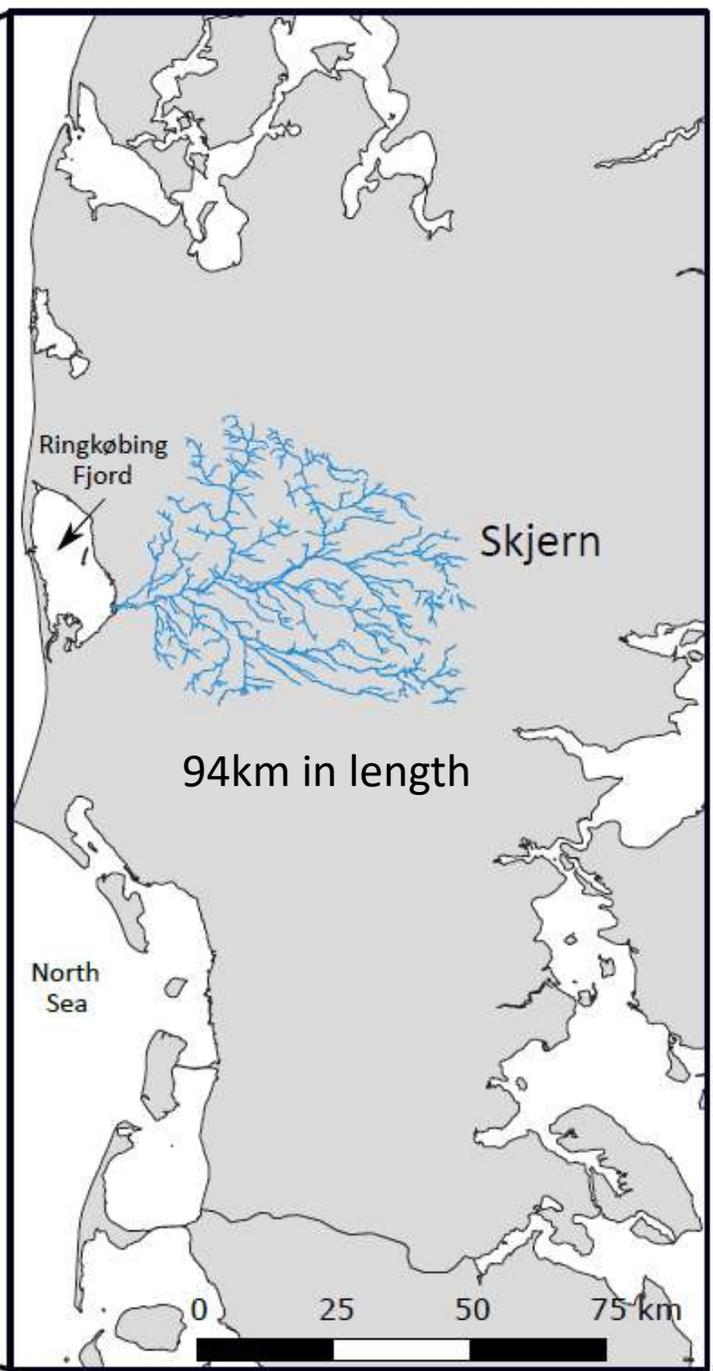
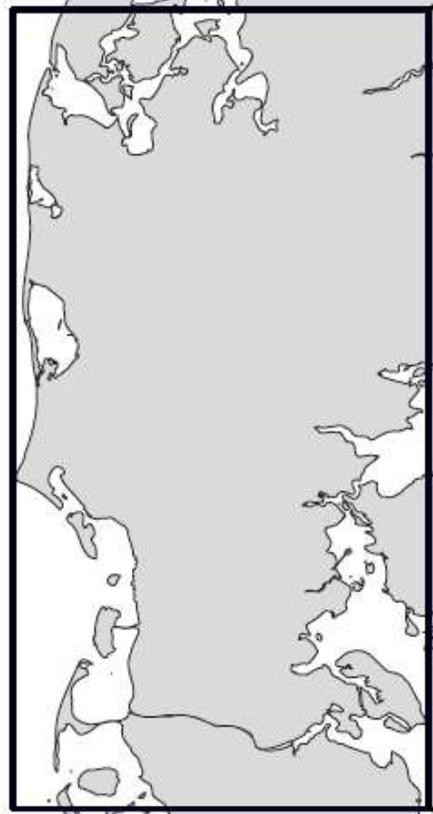
A close-up photograph of several green grass blades. The blades are covered with numerous small, clear water droplets of varying sizes. The background is softly blurred, showing more of the grass and some bokeh light spots. A white horizontal bar is overlaid across the middle of the image, containing the text.

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

A close-up photograph of several green grass blades, likely from a reed or similar plant, with numerous small, clear water droplets clinging to their surfaces. The blades are arranged vertically and slightly out of focus, creating a soft, natural background. The lighting is bright, highlighting the texture of the grass and the glistening of the water.

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

# DENMARK



Ringkøbing Fjord

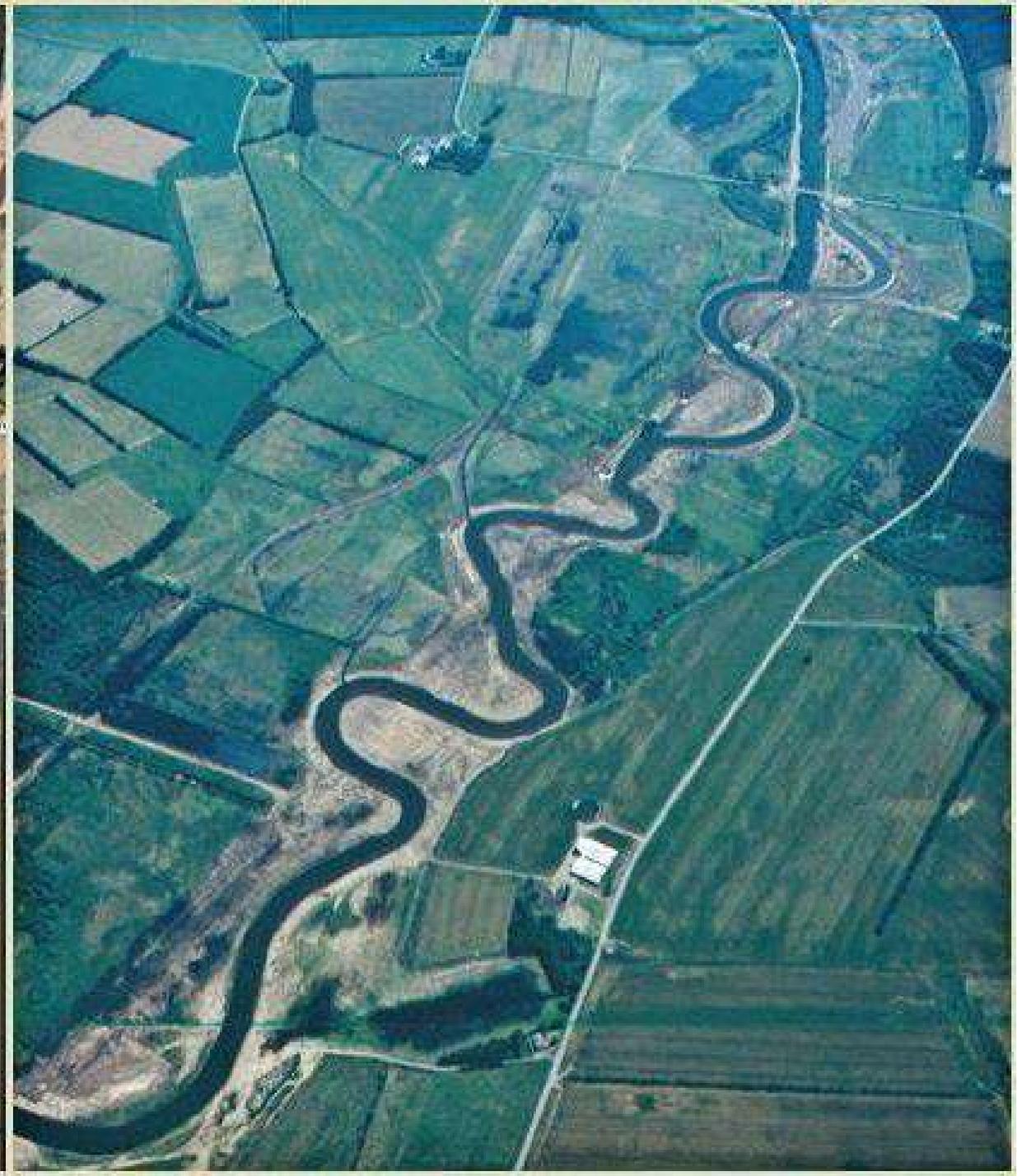
Skjern

94km in length

North Sea

0 25 50 75 km







**1980s**

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

A photograph of three salmon lying on a pebbly beach. The fish are arranged diagonally across the frame, with their heads pointing towards the top right. The pebbles are small and multi-colored, ranging from dark grey to light tan. The salmon have silvery scales and dark fins. Two circular callouts are overlaid on the image, containing text.

**mid-1980s**

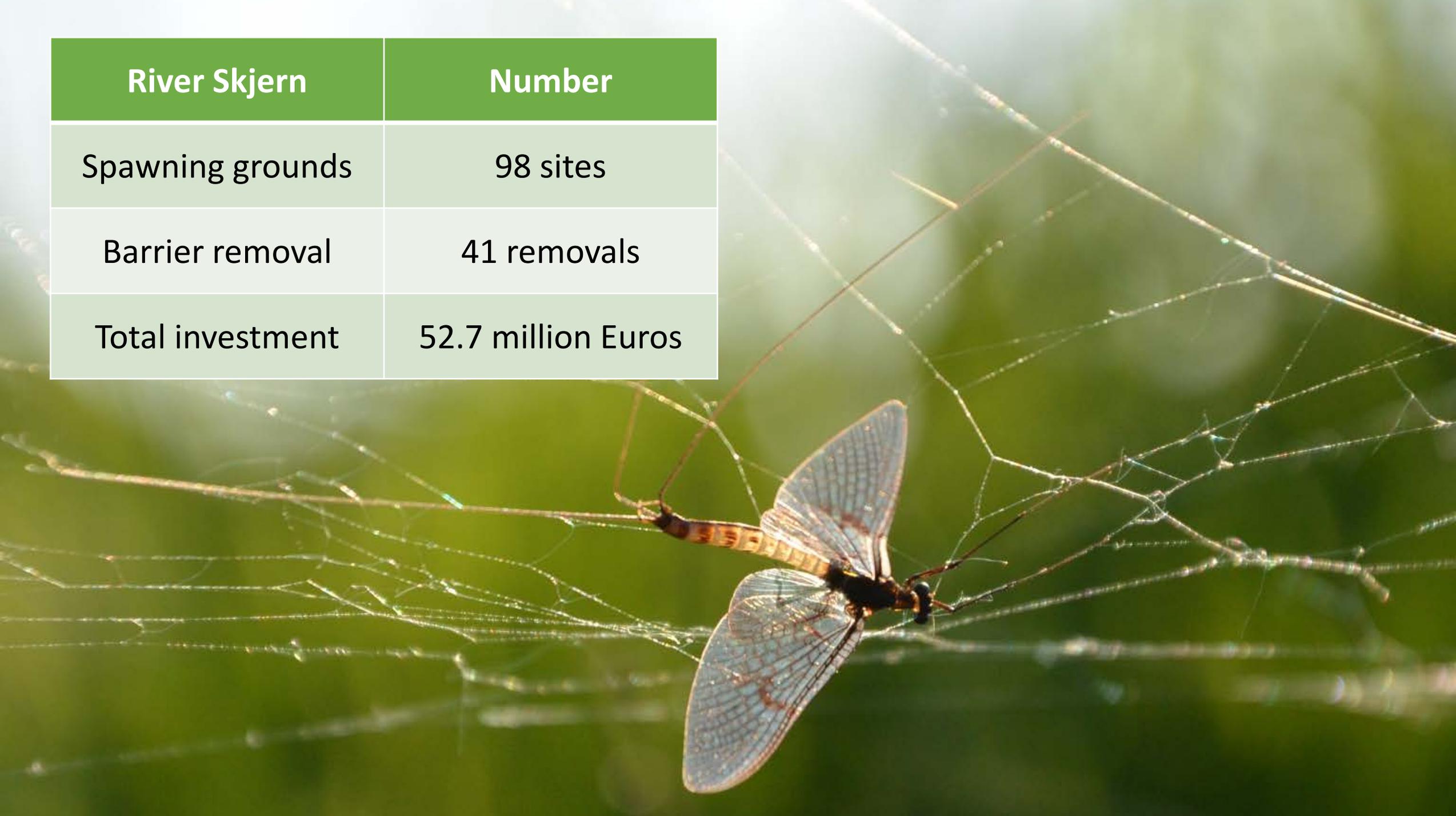
Stocking began;  
was considered  
the accepted  
method then

***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



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<b>River Storaå</b>	<b>Number</b>
Spawning grounds	60 sites
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<b>River Varde</b>	<b>Number</b>
Spawning grounds	191 sites
Barrier removal	17 removals
Total investment	9.2 million Euros

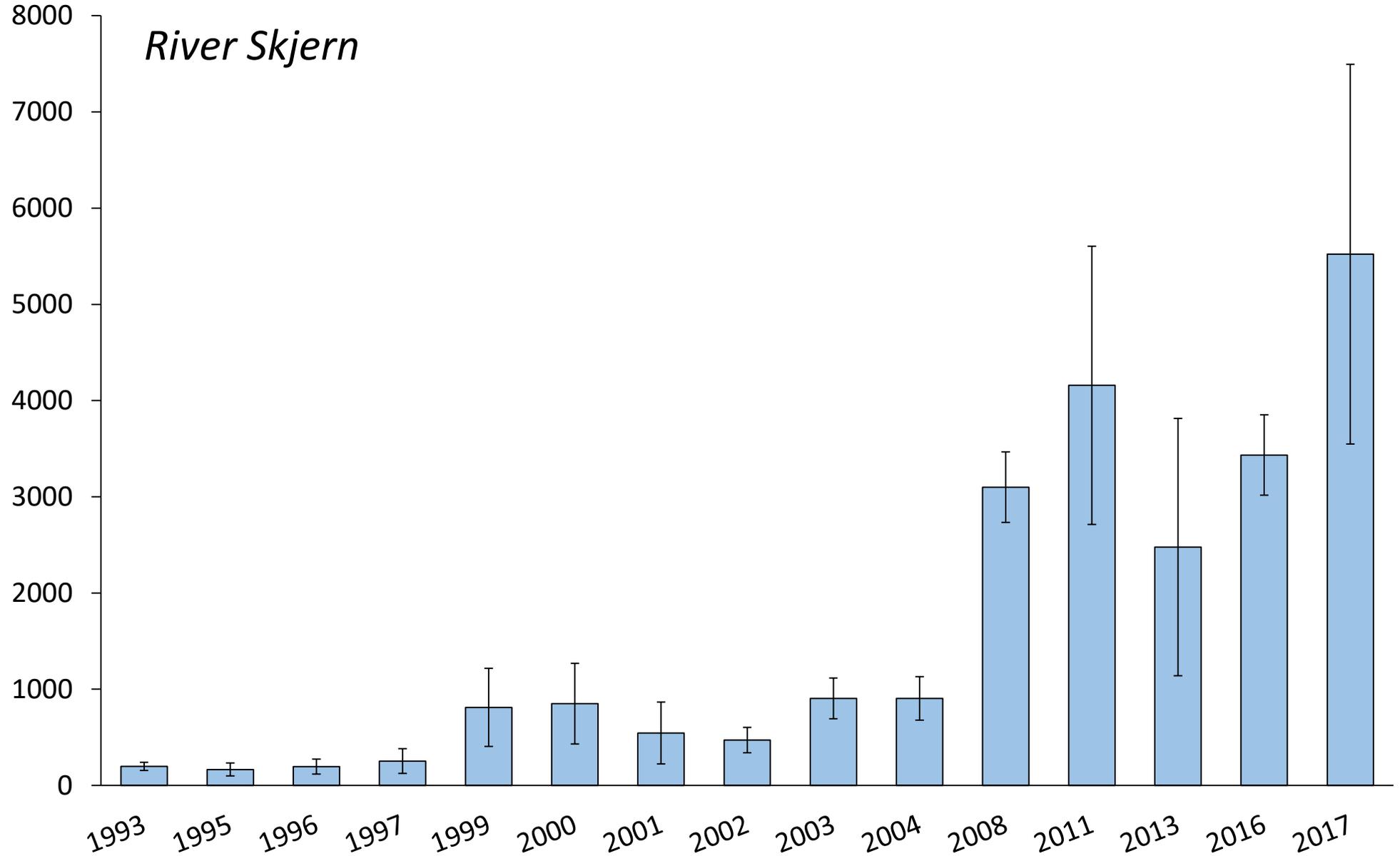


## So what's in it for the fish?

- 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***

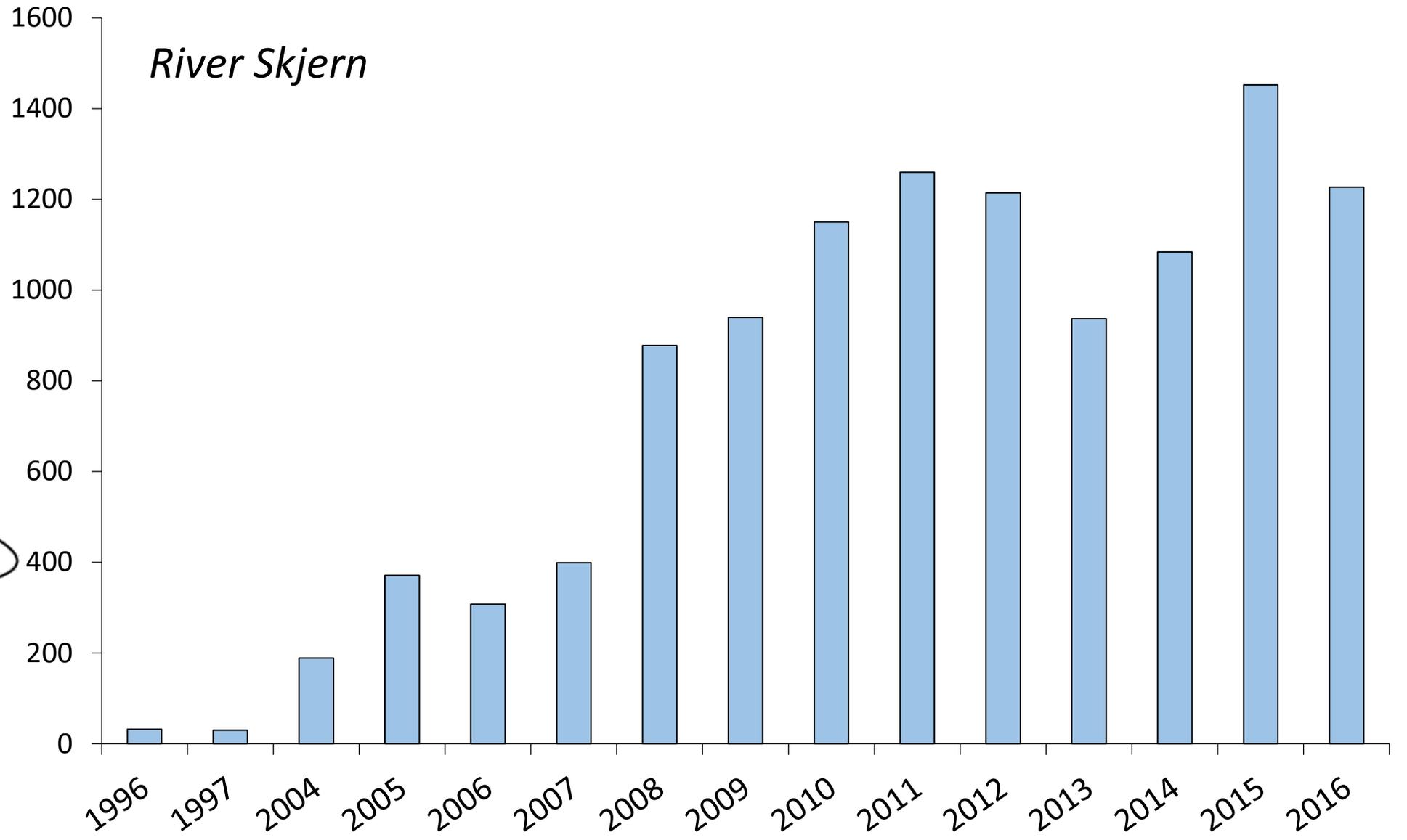
*River Skjern*

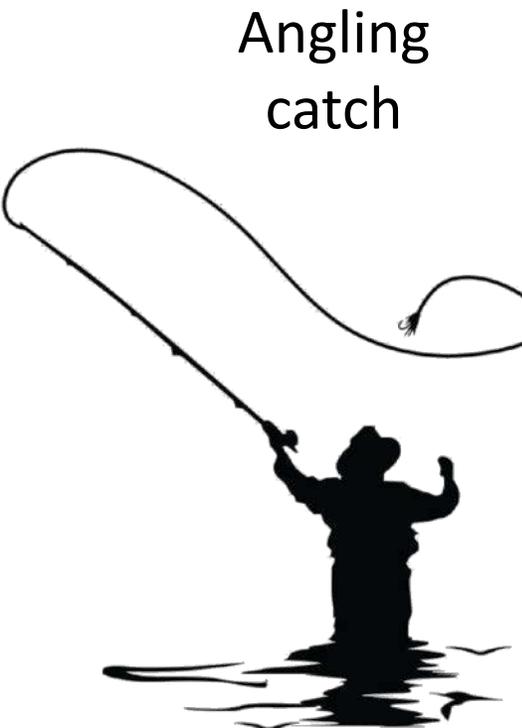
Population  
estimate



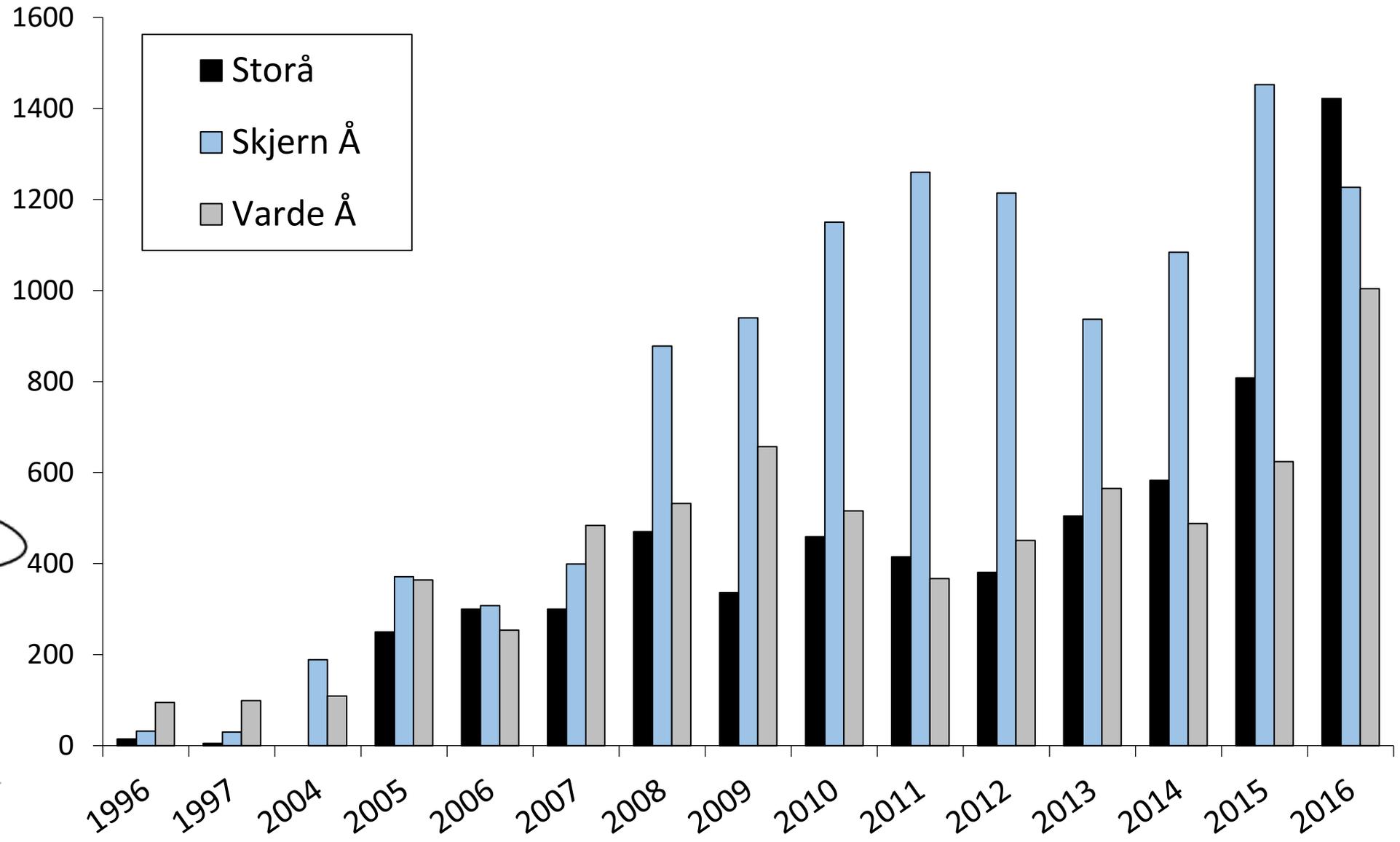
*River Skjern*

Angling  
catch



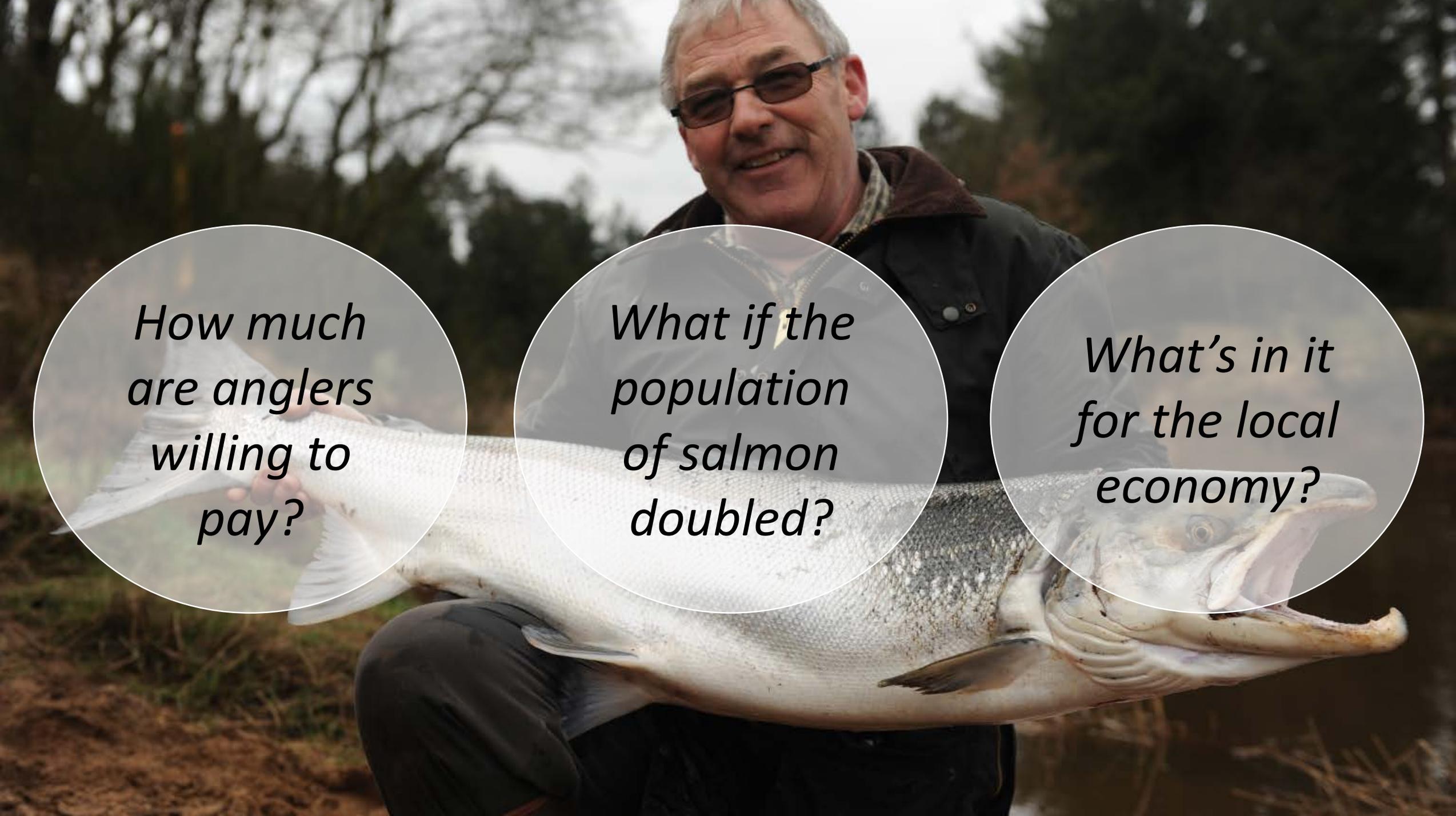


Angling  
catch



A fisherman with a beard and a blue and white checkered cap is holding a large, silvery salmon. He is wearing a blue jacket and a fishing vest. A fishing rod with a colorful reel is resting on his shoulder. In the foreground, a dog's head is visible, looking up at the fish. The background shows a body of water and a clear blue sky.

*“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, silver salmon. The fish is held horizontally across his body. Three semi-transparent circular text bubbles are overlaid on the image. The background shows a blurred outdoor setting with trees and a body of water.

*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>

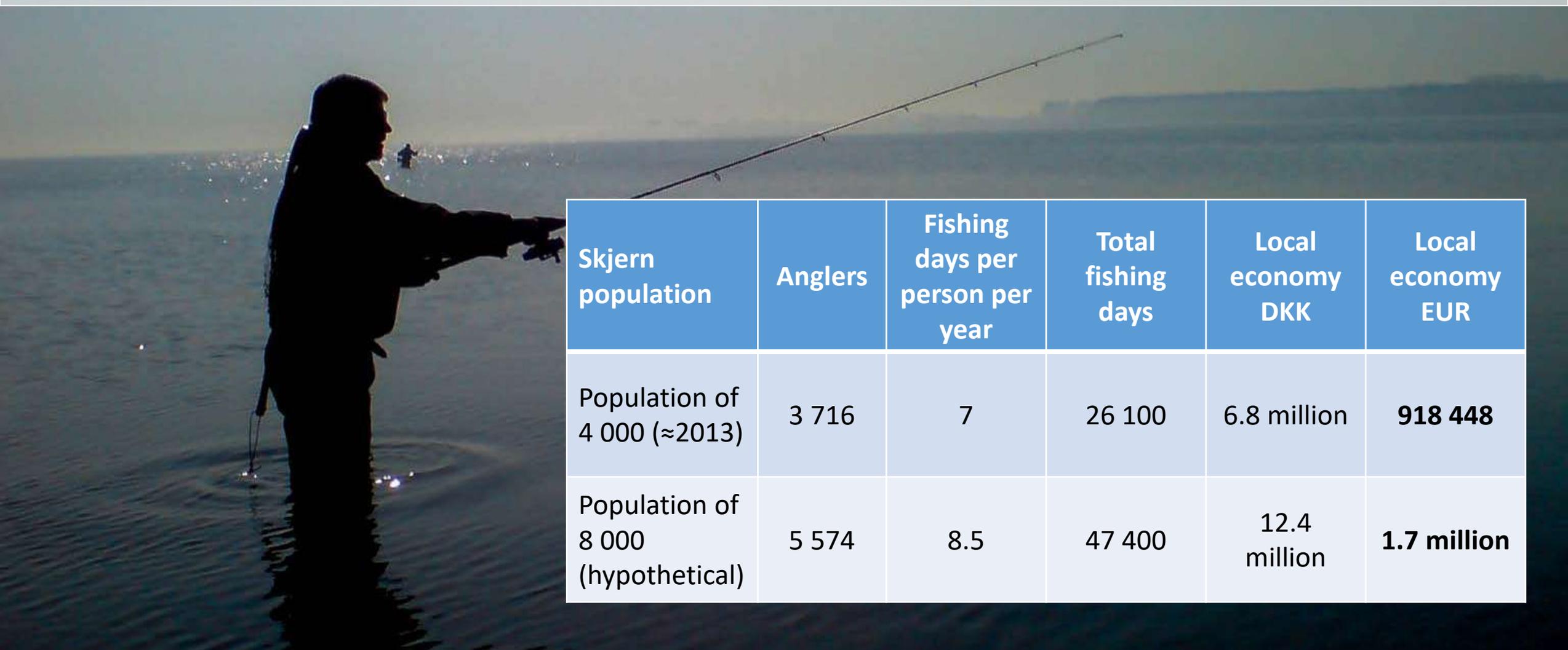
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<b>Local economy growth</b>	<b>7019</b>	<b>941</b>

# *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>

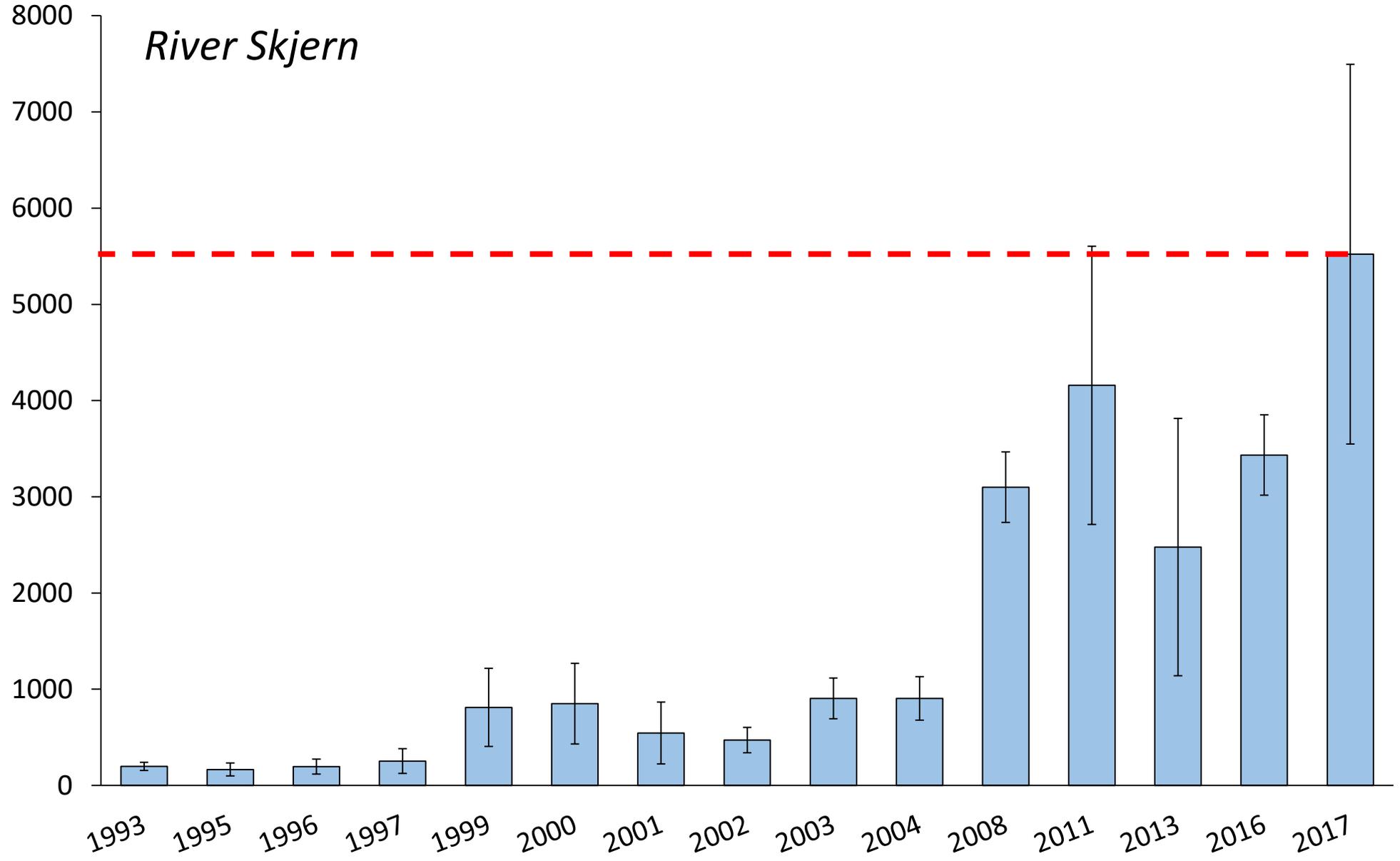
# *What about if the population of Atlantic salmon in River Skjern doubled?*



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



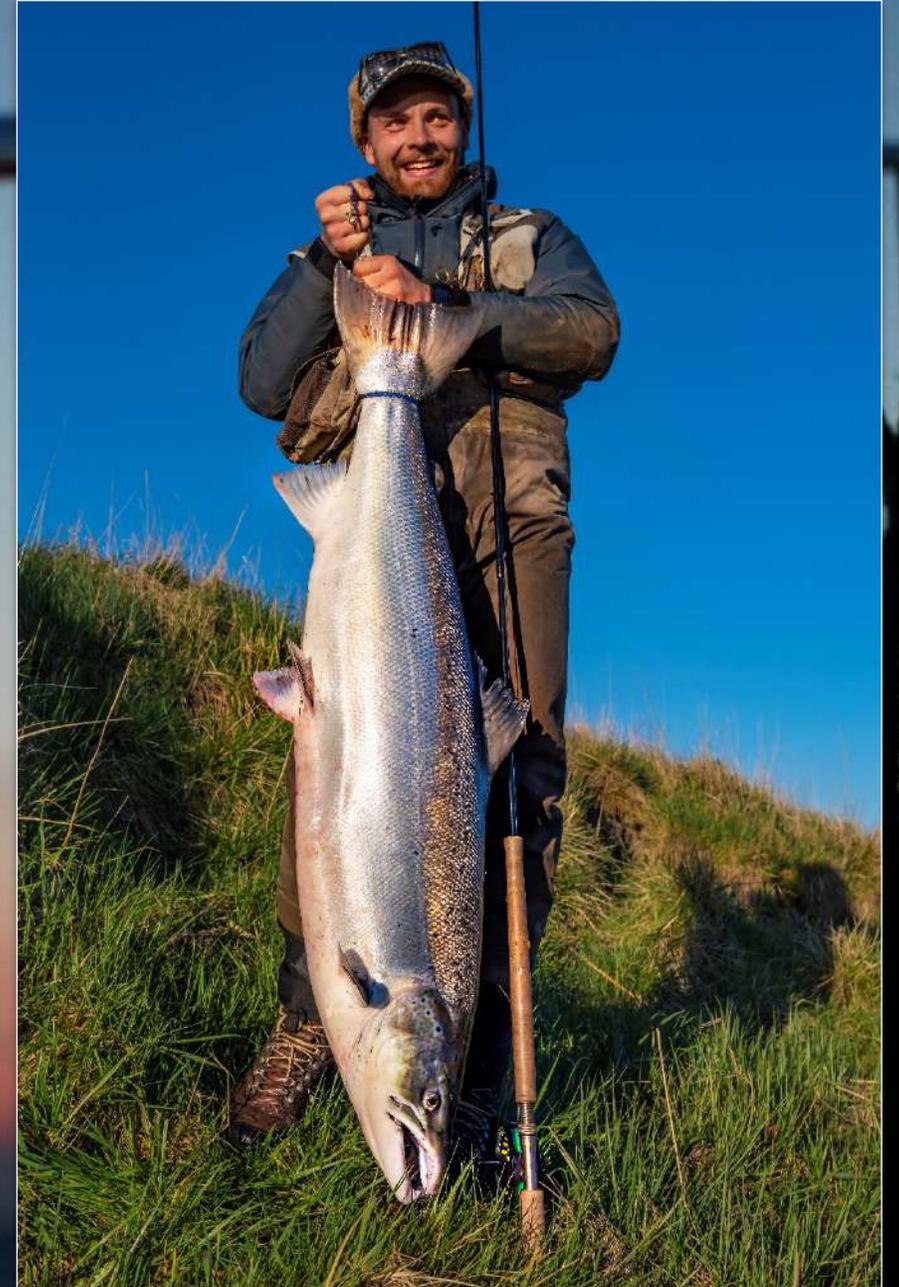
# A little perspective...

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



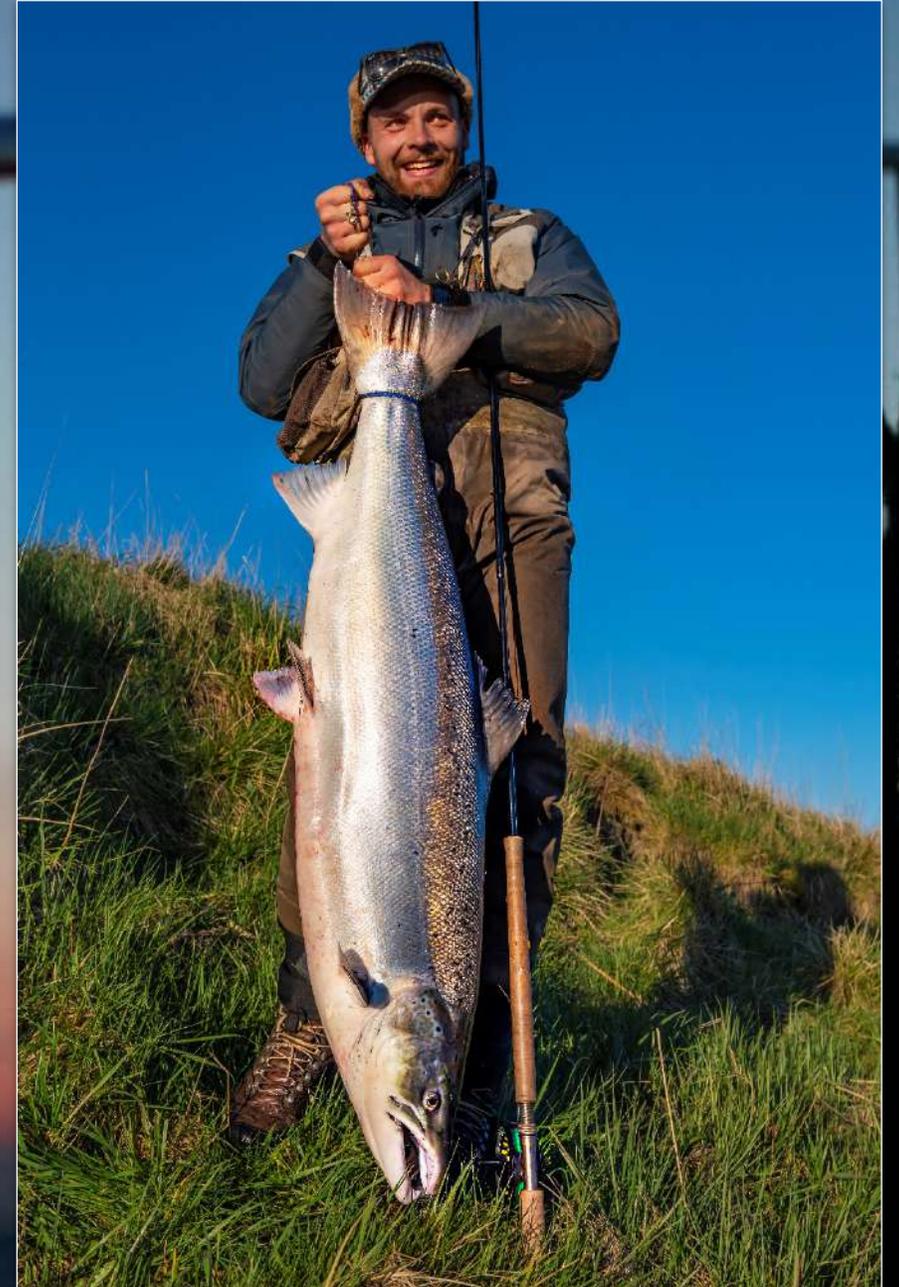
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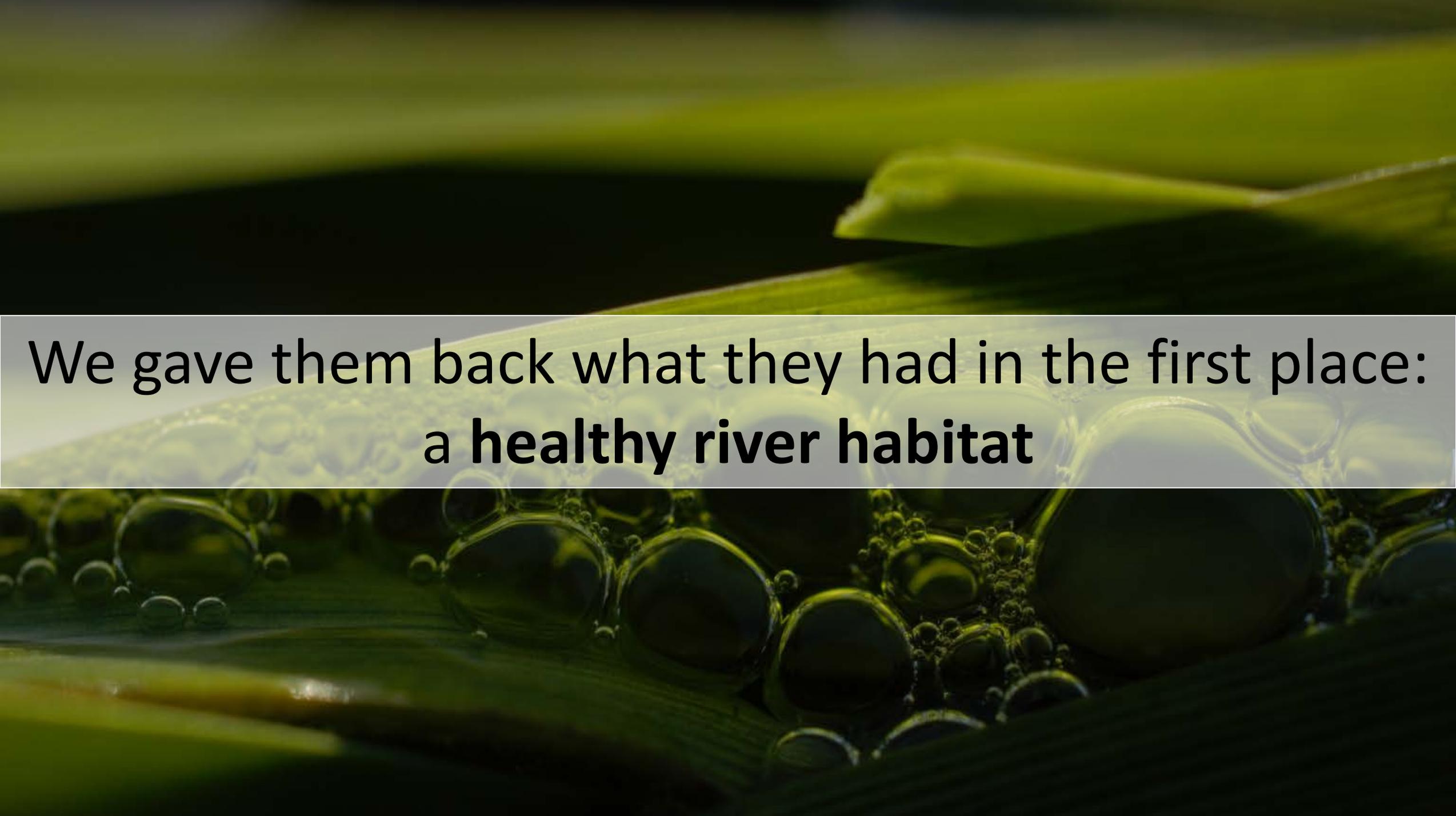
- Shifting baseline – do we even know what the situation was historically?
- We have no historical record of salmon this size in Denmark – yet, here they are!



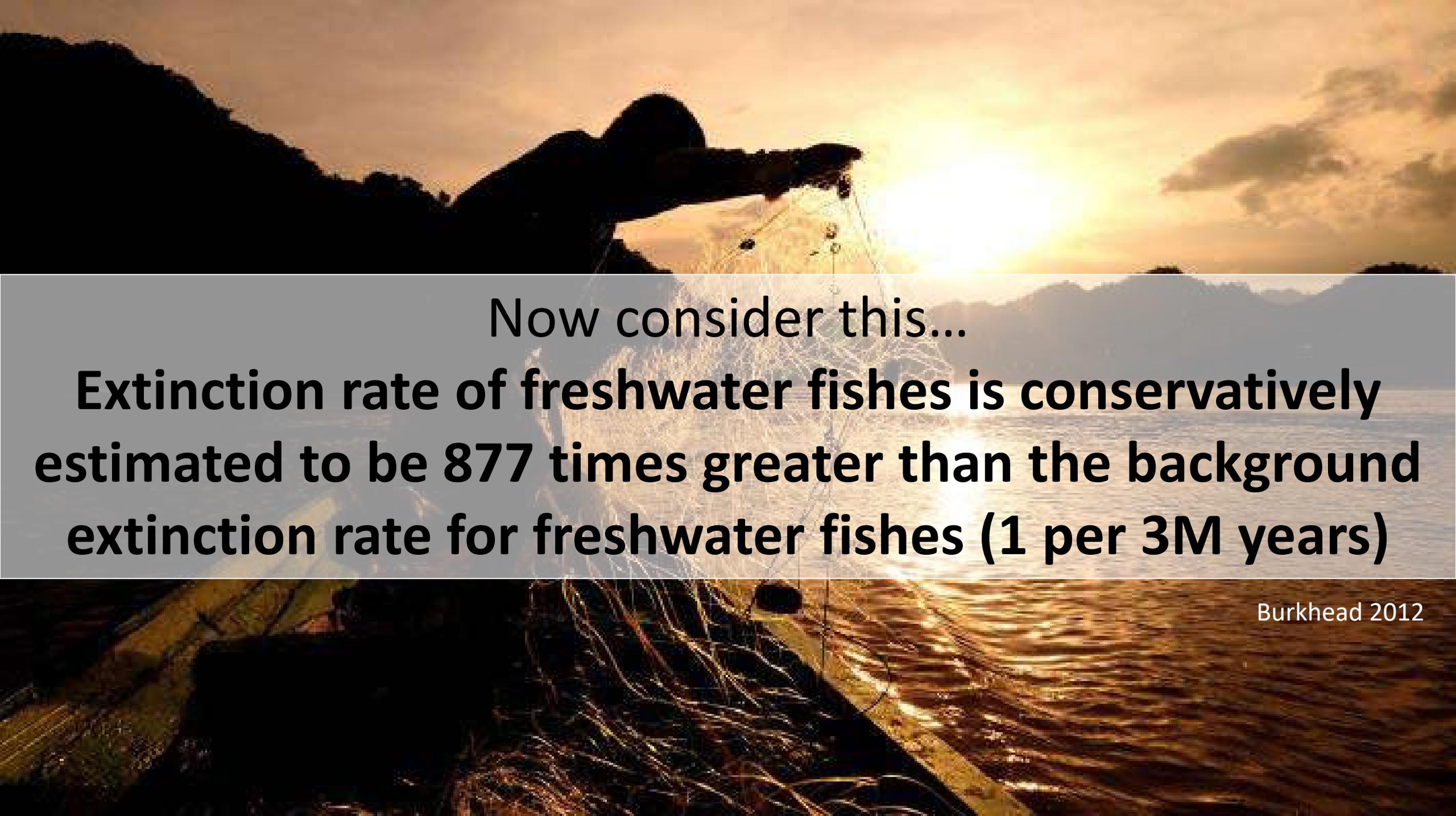
# A little perspective...

- 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 person in silhouette is pulling a fishing net from a boat on a lake at sunset. The sun is low on the horizon, creating a bright glow and reflecting on the water. The background shows distant hills or mountains.

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



Now consider this...

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

Thank you for listening!  
Merci de votre attention!



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