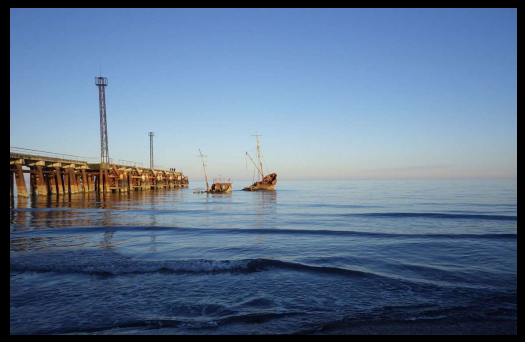
Projected 2100 Caspian Sea level drop has devastating consequences

Frank P. Wesselingh, Matteo Lattuada, Thomas Wilke, Sri Nandini-Weiss, Matthias Prange, Maxim Vinarski and the PRIDE team

PRIDE

Climate Change in the Caspian Sea Region - October 27-28, 2021

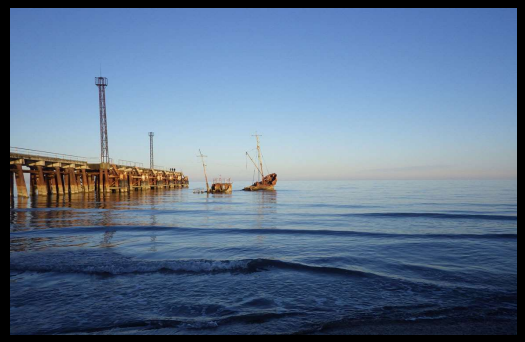
1 Caspian Sea – unique ecosystems in peril



2 Caspian ecosystems and biodiversity in 2100

3 The looming crisis – what can we do?

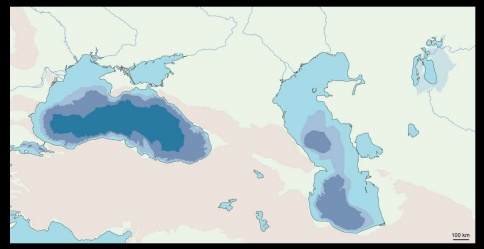
1 Caspian Sea – unique ecosystems in peril

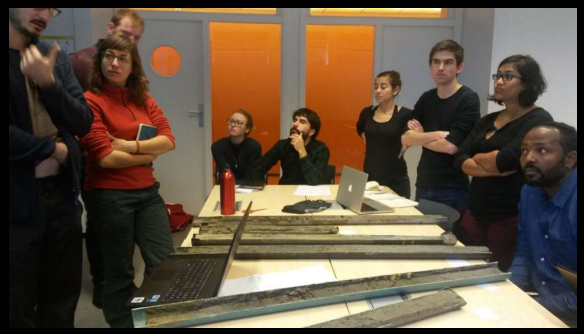


The Caspian Sea is unique
Long history - unique ecosystem - unique biota

ITN-PRIDE

By looking into the past – We aim to understand and address the current PC biodiversity crisis

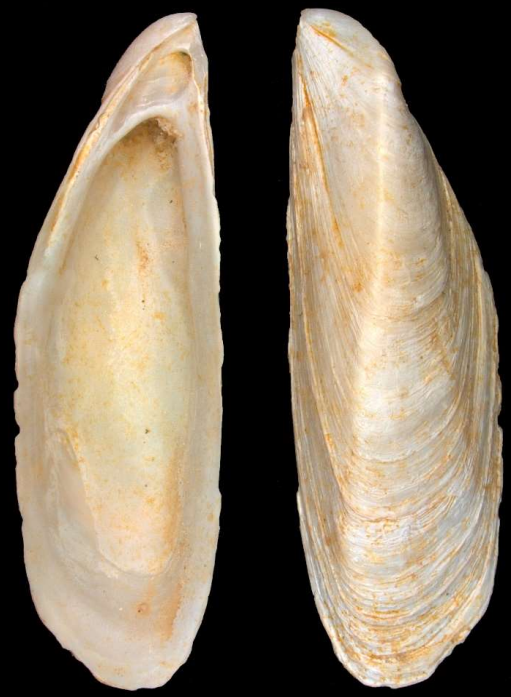




Caspian Sea ecosystems and biota already severely under stress

Species

All 6 sturgeon species **critically endangered**



Dreissena caspia; 6 Myr evolution; Abundant <1950; **Extinct** c. 1980

Caspian Sea ecosystems and biota already severely under stress

Species

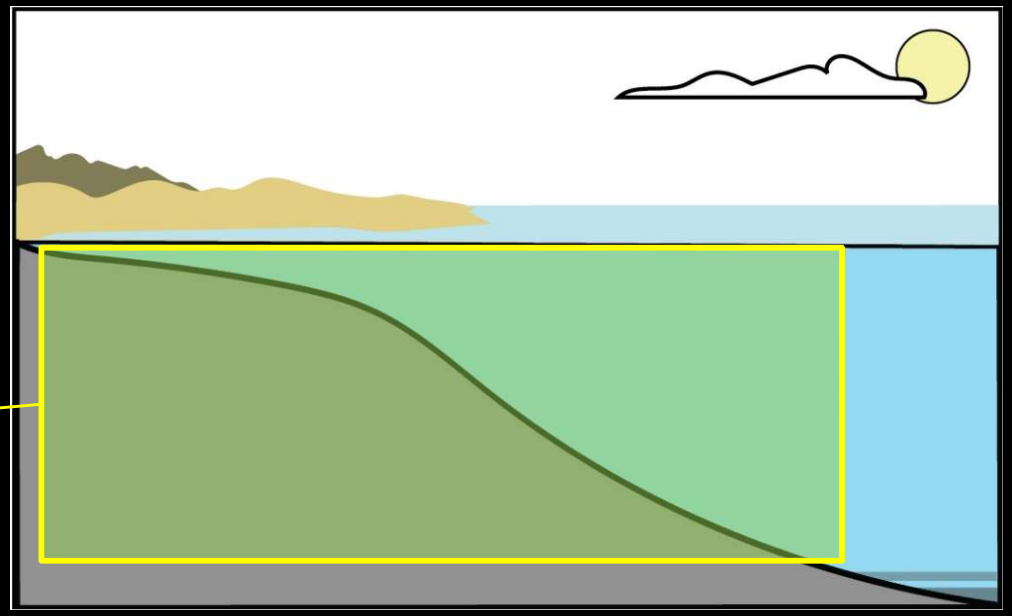
Communities

Invasives

Endemic

Before 1938

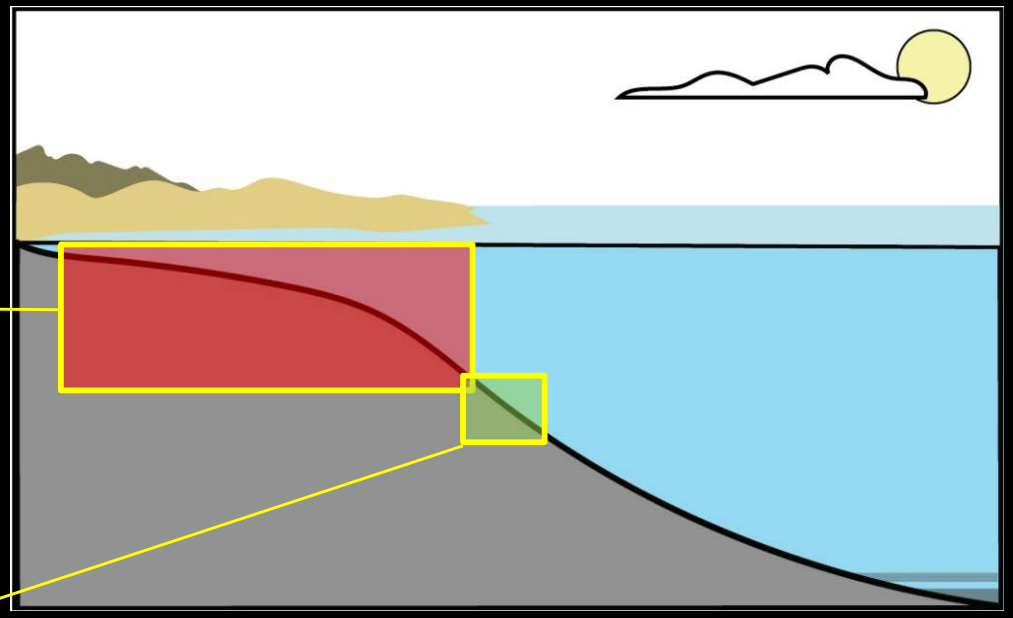
Caspian endemics



Today

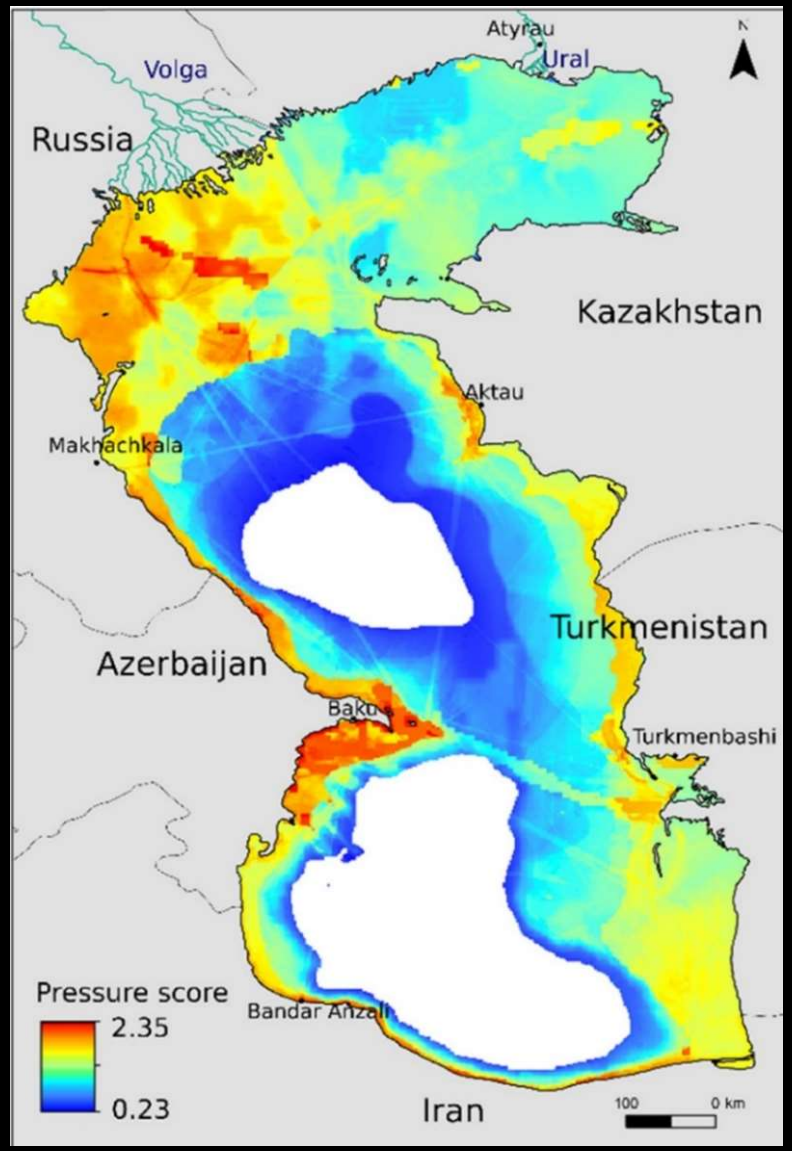
Invasive species

Caspian endemics



Caspian Sea ecosystems and biota already severely under stress

Species
Communities
Ecosystems



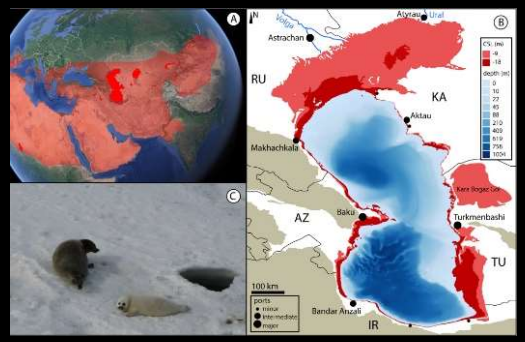
Lattuada et al., 2019

Caspian Sea – Now

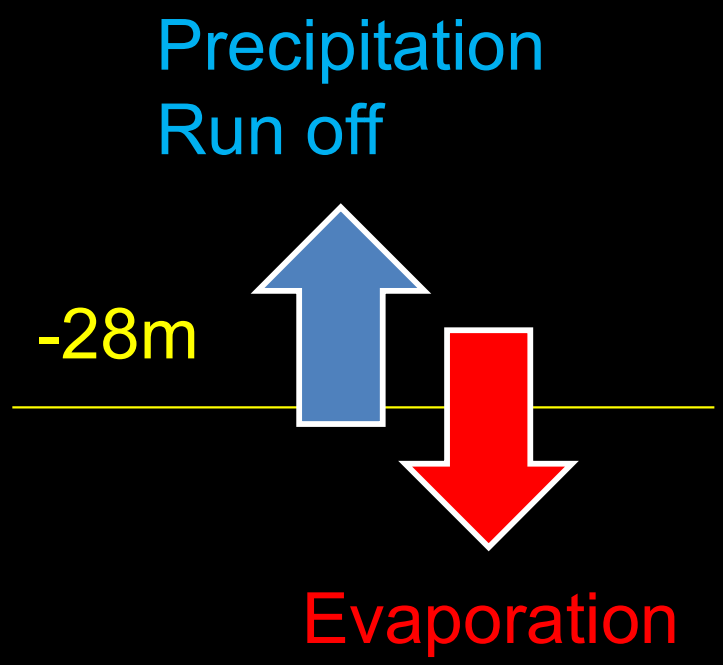
Stressed out Ecosystems

Species & communities in severe decline

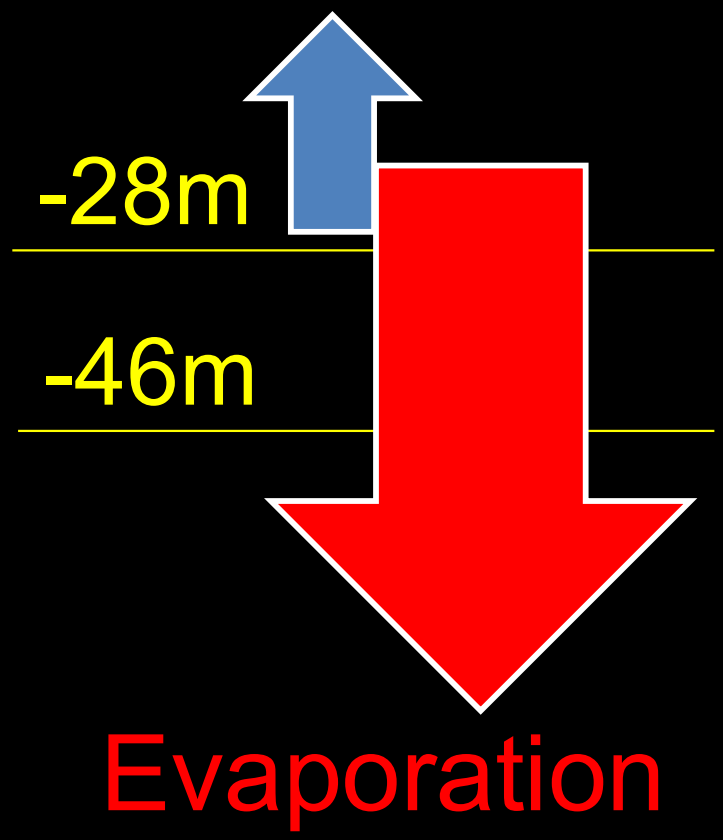
2 Caspian ecosystems and biodiversity in 2100



Caspian Sea – precarious balance



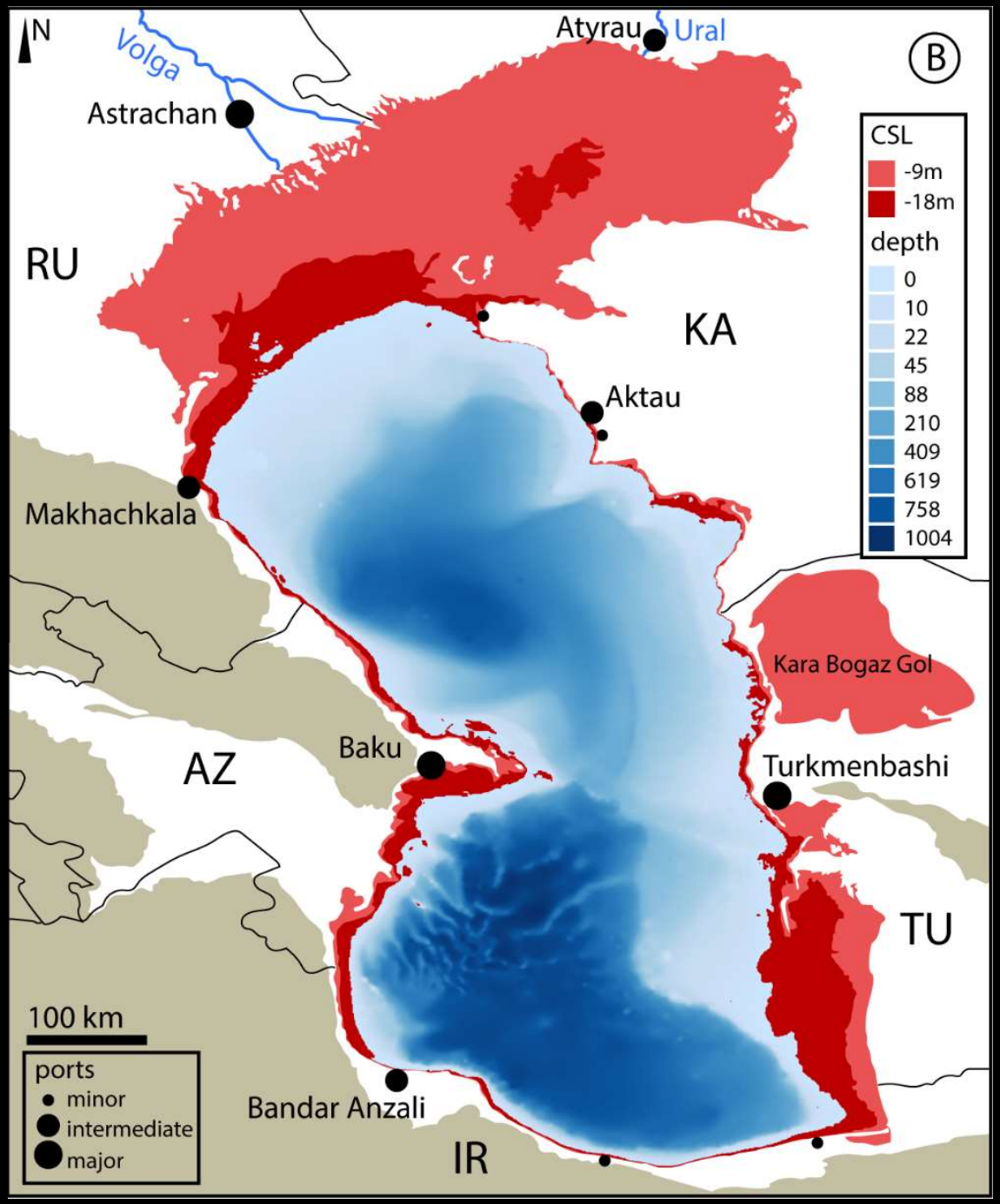
Caspian Sea – precarious balance: 2100



IPPC RCP4.5/RCP8.5

Caspian Sea 2100
9-18 m CSL drop
25-33% reduction

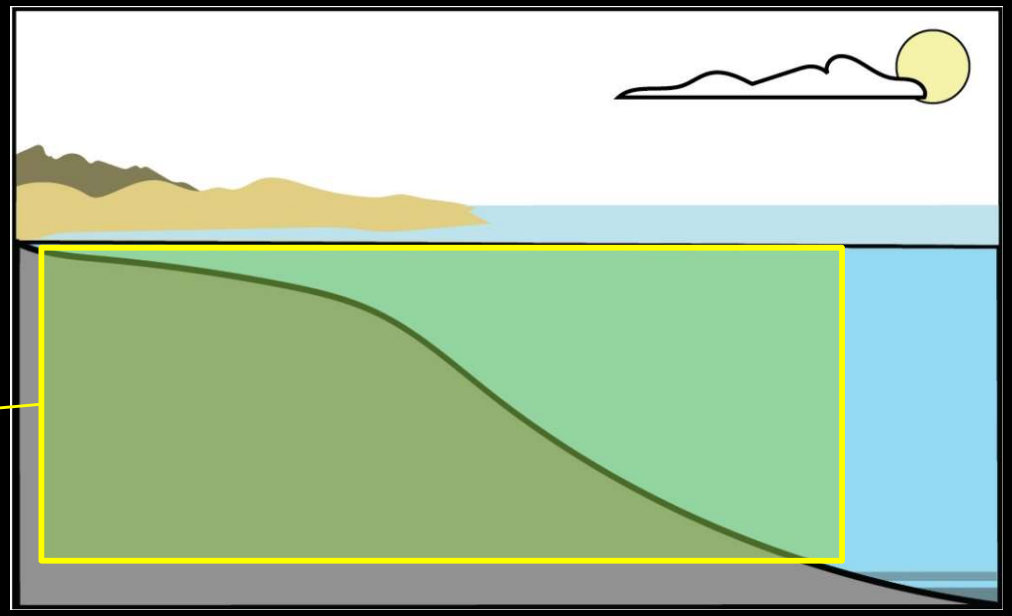
Evaporation



Caspian Sea 2100 - consequences
Caspian Seal – 99% loss of pupping grounds

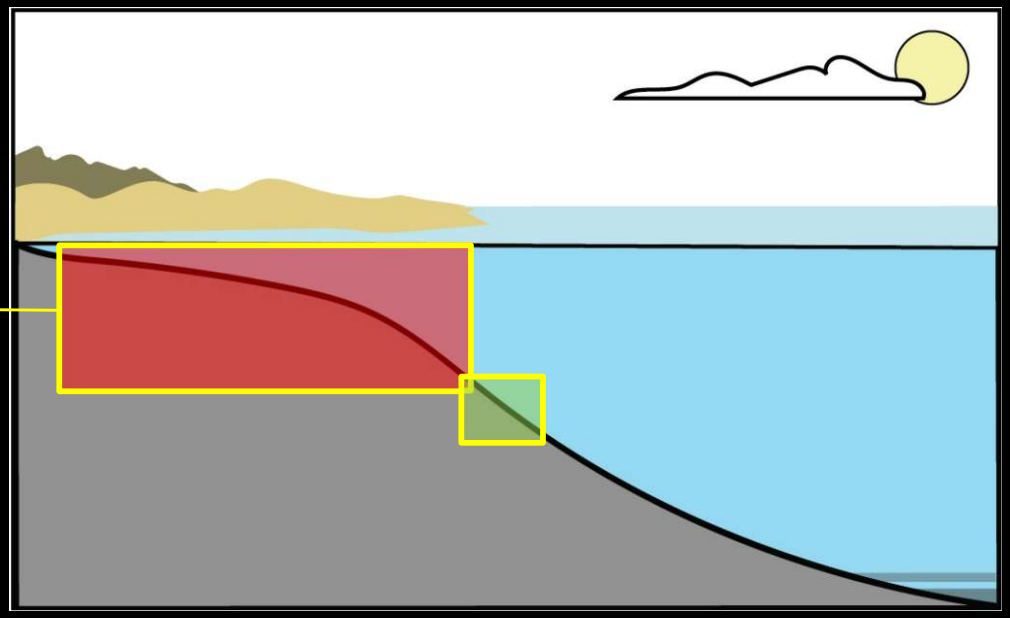
Past

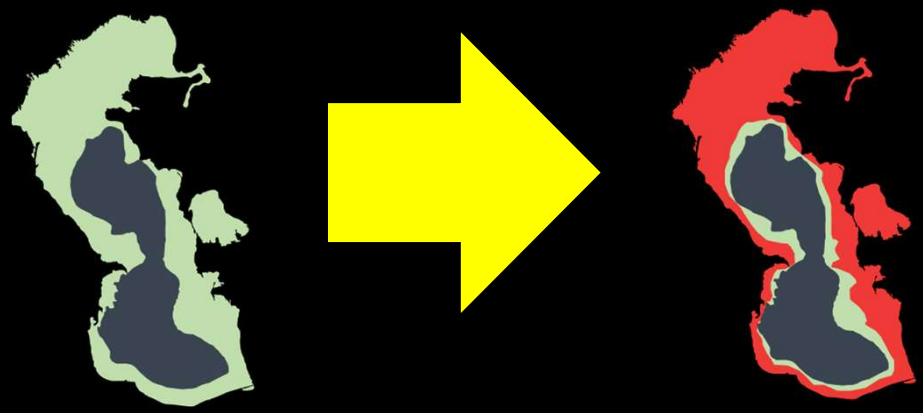
Caspian endemics



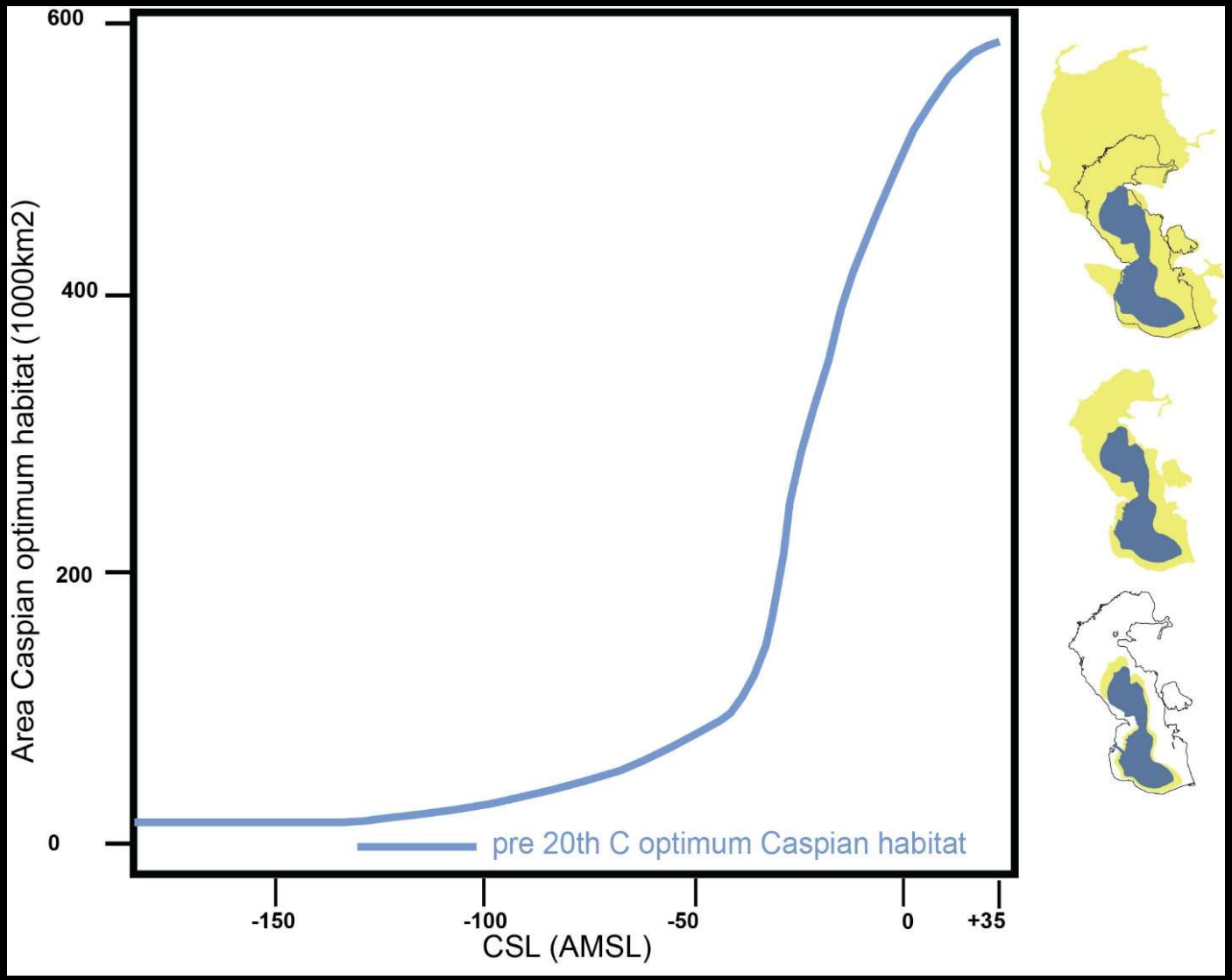
Present

Invasive species





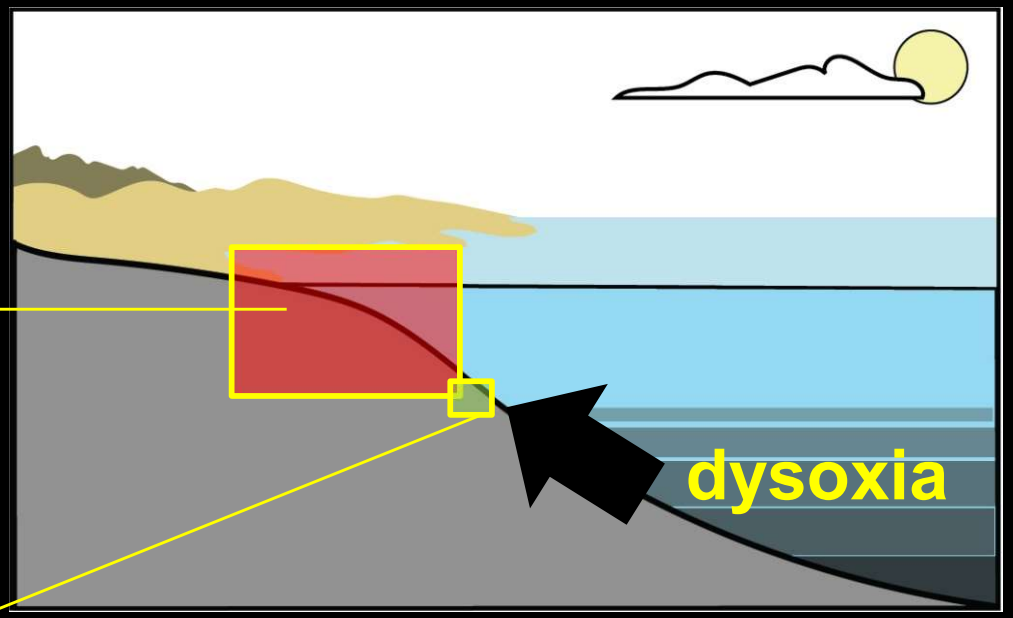
Habitat size dynamics in Caspian



Future?

Invasive species

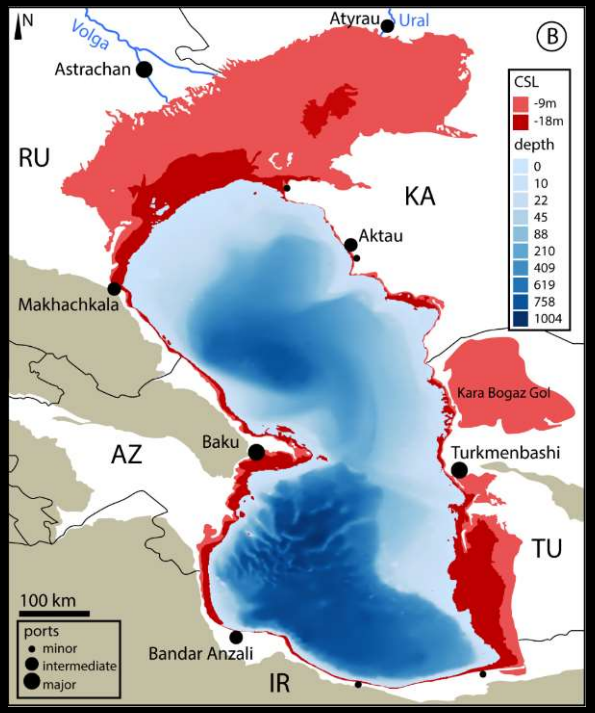
Caspian endemics



2100: biodiversity hotspots squeezed between invasive territory and dead zones?

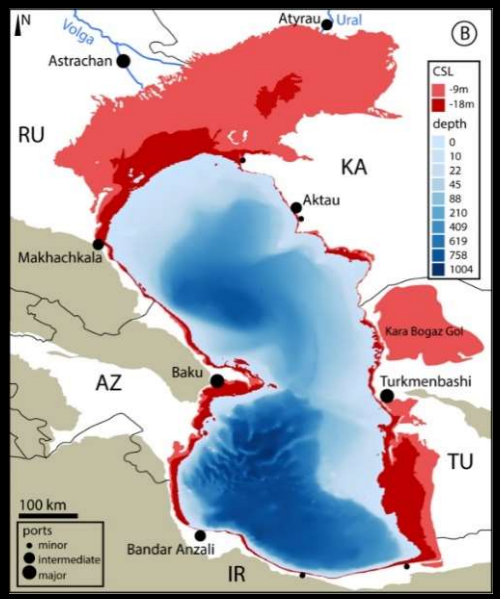
Caspian 2100 - Trouble ahead

Loss of prime coastal wetlands



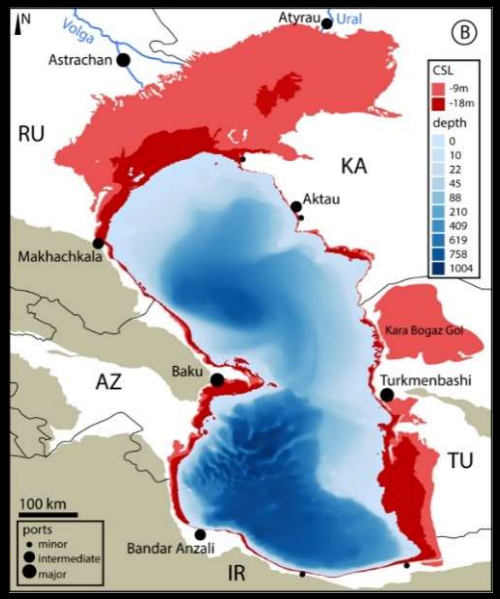
Caspian 2100 - Trouble ahead

Coastal societies and economies impacted



Caspian 2100 - Trouble ahead

Caspian lowlands impacted



Prange et al., 2020

COMMUNICATIONS
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COMMENT

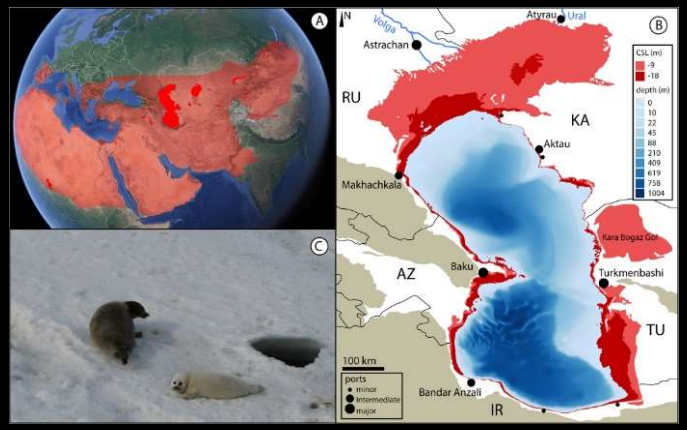
https://doi.org/10.1038/s43247-020-00075-6 OPEN

Check for updates

The other side of sea level change

Matthias Prange[1✉], Thomas Wilke[2] & Frank P. Wesselingh[3,4]

Water levels in inland seas and lakes globally will drop, often dramatically, over the 21st century in response to climate change. Based on the case of the Caspian Sea, we argue for a concerted campaign to raise awareness of threats to people, biodiversity and geopolitical stability.



3 The looming crisis – what can we do?

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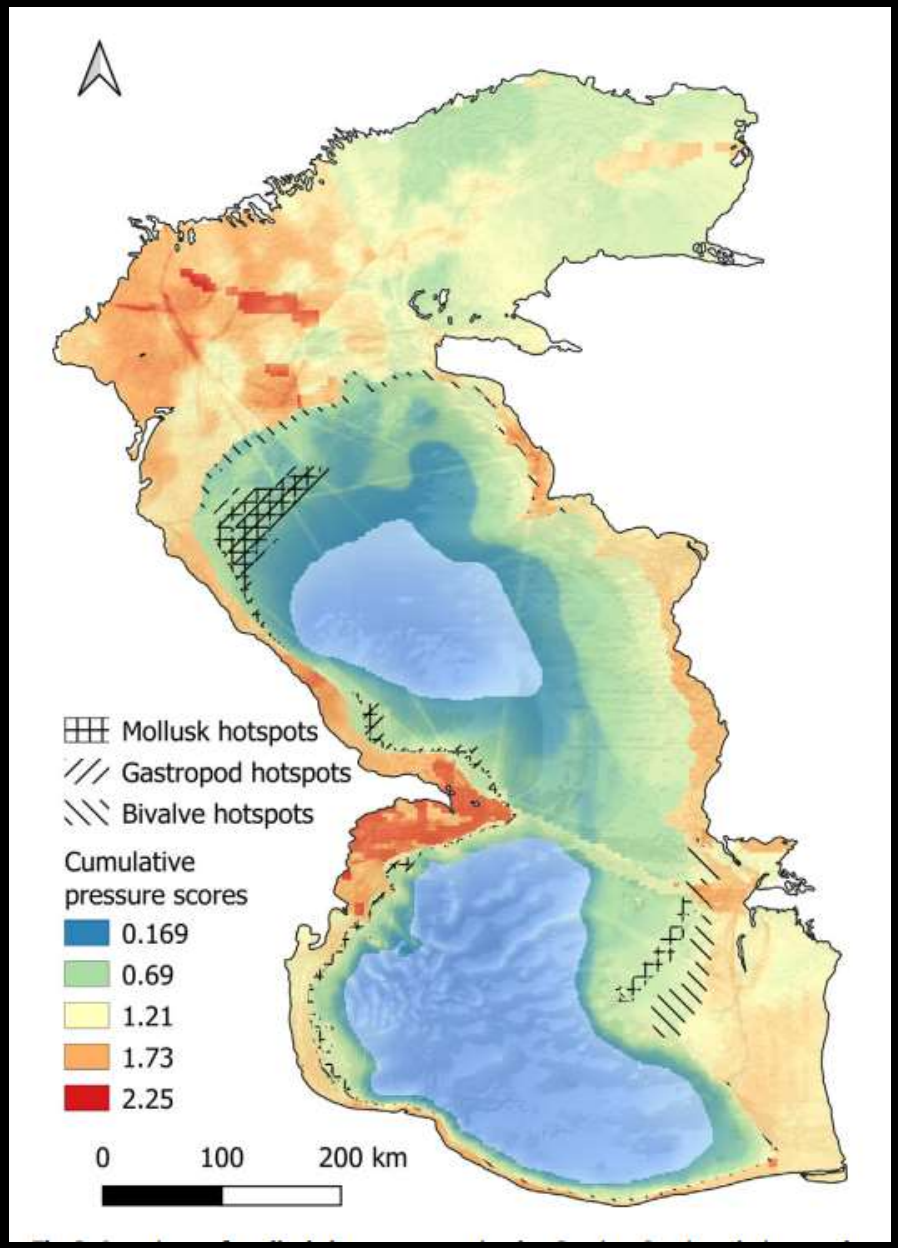
To understand

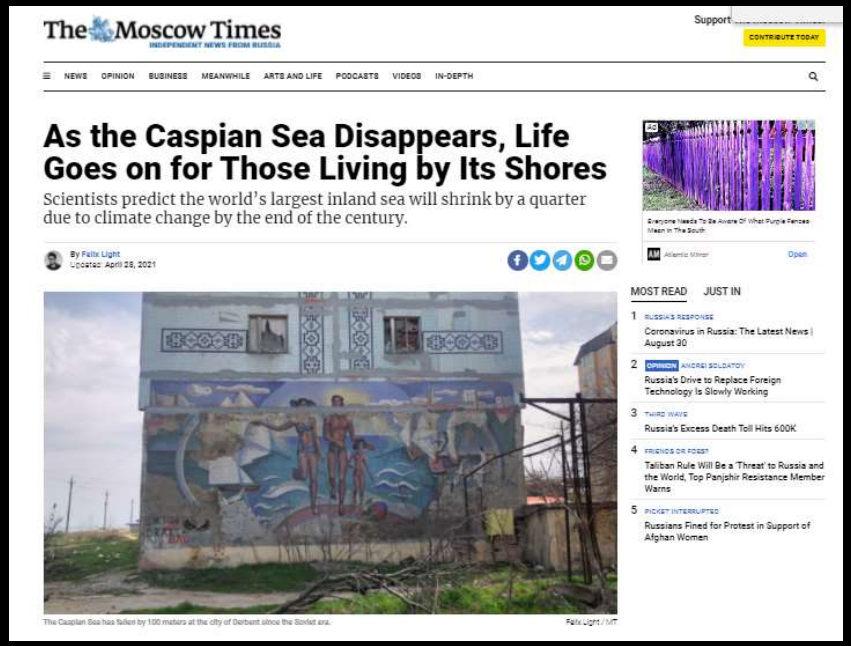


Lattuada et al., 2020

3 The looming crisis – what can we do?

To understand

To reach out



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As the Caspian Sea Disappears, Life Goes on for Those Living by Its Shores

Scientists predict the world's largest inland sea will shrink by a quarter due to climate change by the end of the century.

By Felix Light
Updated: April 28, 2021

The Caspian Sea has fallen by 100 meters at the city of Derbent since the Soviet era. Felix Light / MT

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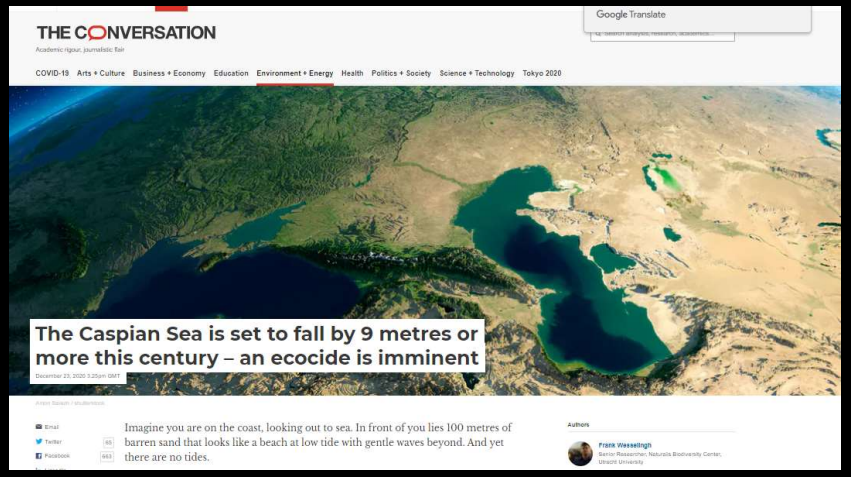

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The Caspian Sea is set to fall by 9 metres or more this century – an ecocide is imminent

December 23, 2020 5.25pm GMT

Imagine you are on the coast, looking out to sea. In front of you lies 100 metres of barren sand that looks like a beach at low tide with gentle waves beyond. And yet there are no tides.

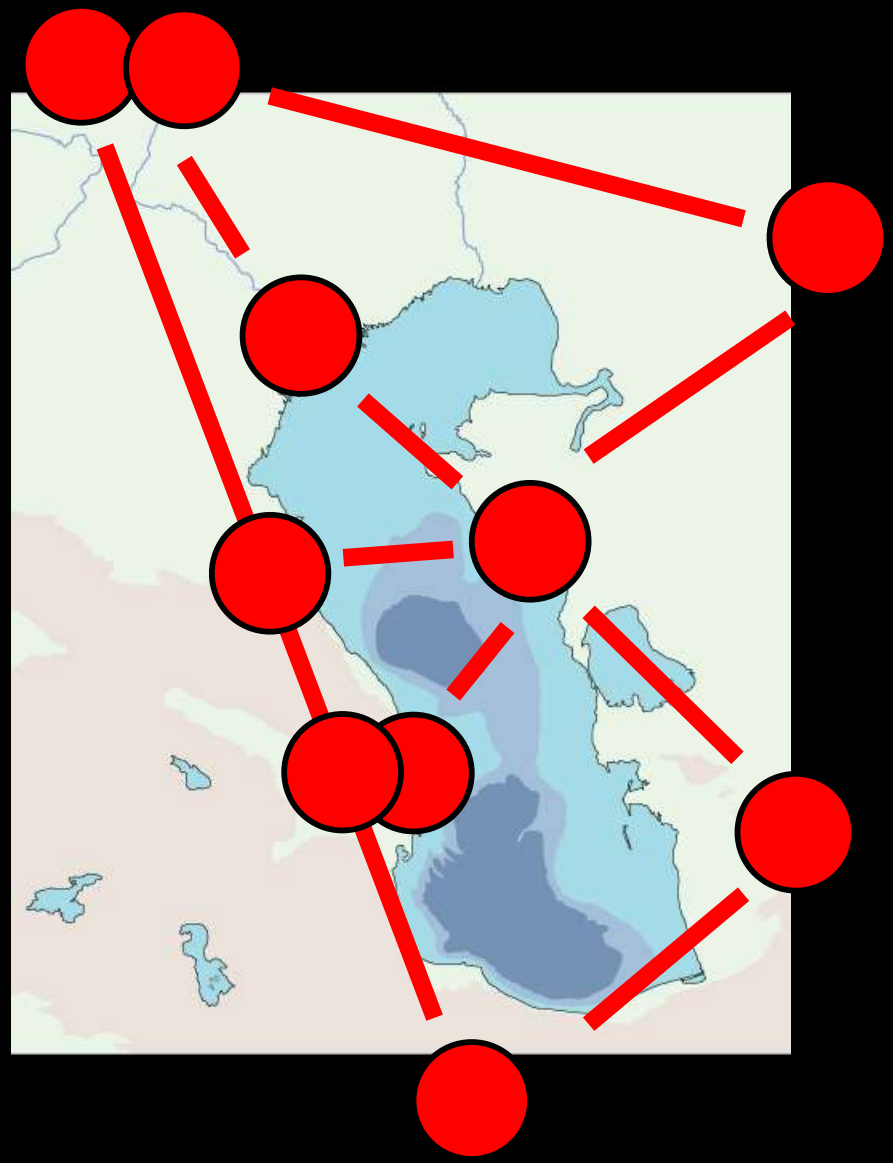
Authors
Frank Wesselingh
Senior Researcher, Naturalis Biodiversity Center, Utrecht University

3 The looming crisis – what can we do?

To understand

To reach out

Regional actors



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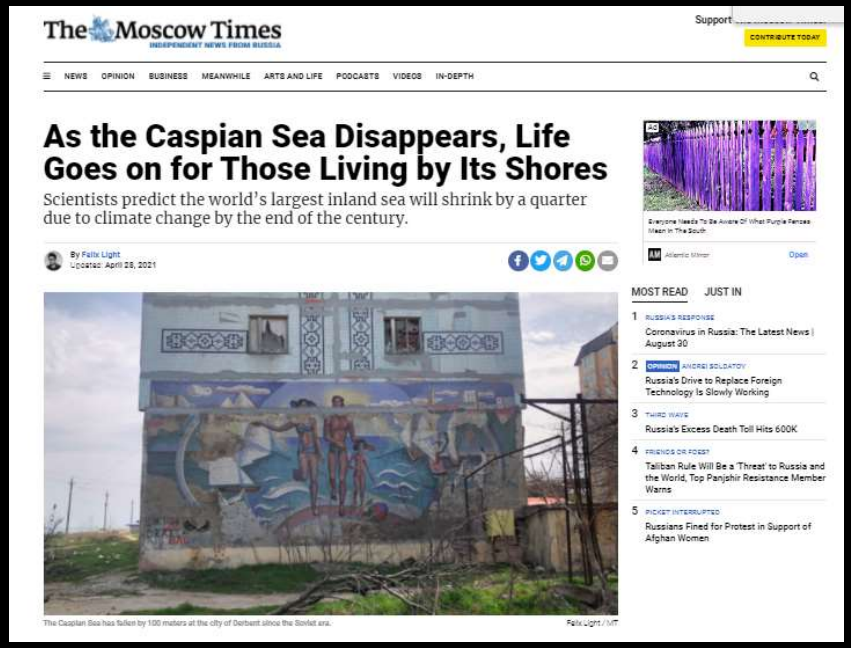
Action



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Safeguarding the unique Caspian Sea

The unique Caspian Sea and its inhabitants are worth the effort

Fotalia/Thomas Hasenberger

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