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SDG 6: Ensure availability and sustainable management of water and sanitation for all

SDG Goal 6

① 6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all

② 6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations

③ 6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally

④ 6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity

SDG Goal 6

⑤ 6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate

⑥ 6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes

- 6.a By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies
- 6.b Support and strengthen the participation of local communities in improving water and sanitation management

Percentage of receiving water bodies with ambient water quality not presenting risk to the environment or human health

Percentage of total available water resources used, taking environmental water requirements into account (Level of Water Stress)

Percentage of change in wetlands extent over time

You can’t manage what you can’t measure

http://cbsnews1.cbsistatic.com/

World's water questions addressed

① Where are truly permanent water-bodies found?

② When and where does seasonal inundation occur?

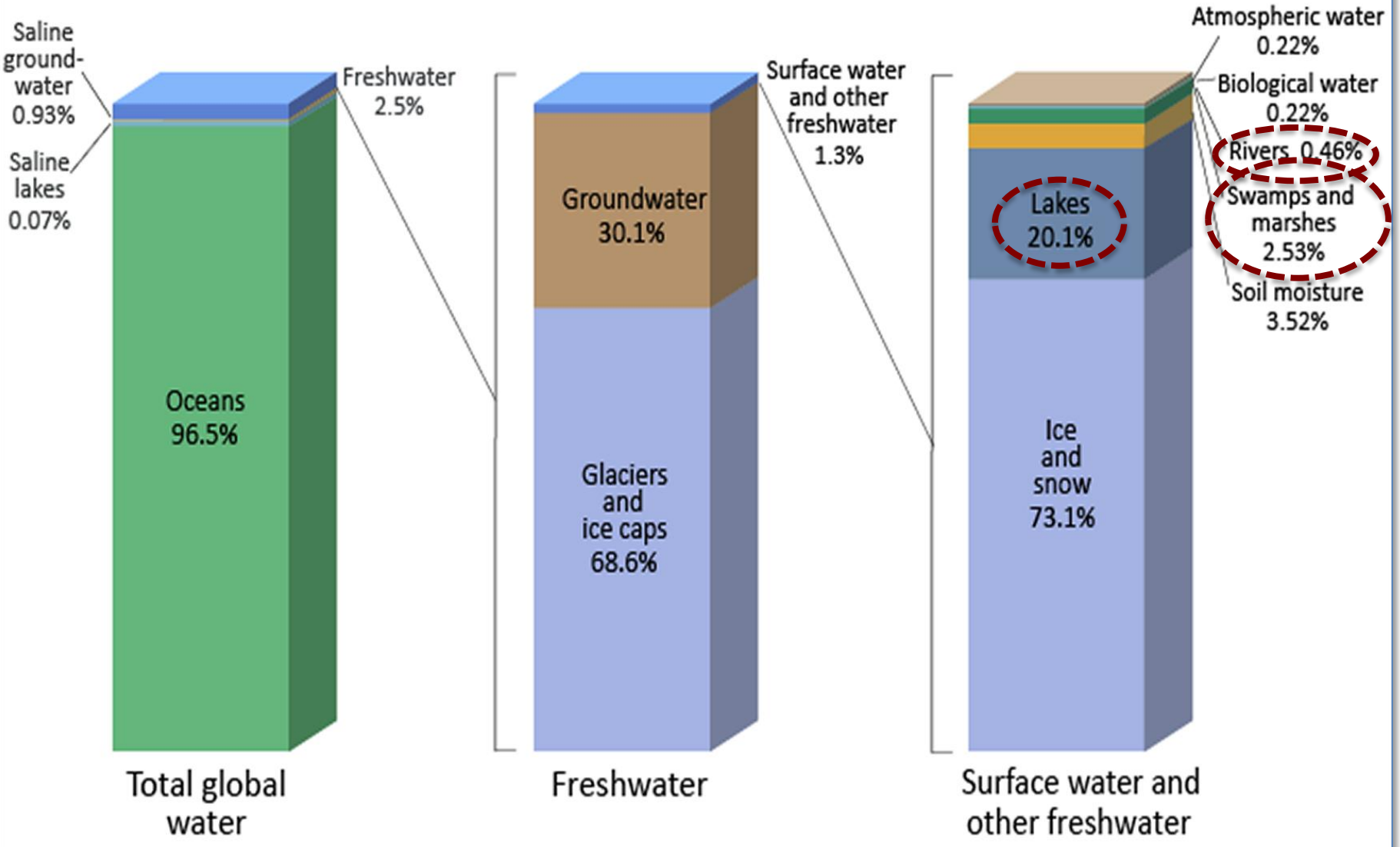
③ When and where have new water-bodies formed?

④ When and where have water-bodies disappeared?

⑤ When and where have coastlines and rivers moved?

⑥ Where in the world are the greatest changes in surface water occurring, what are the main drivers of this change and what are the consequences?

Distribution of Earth's Water



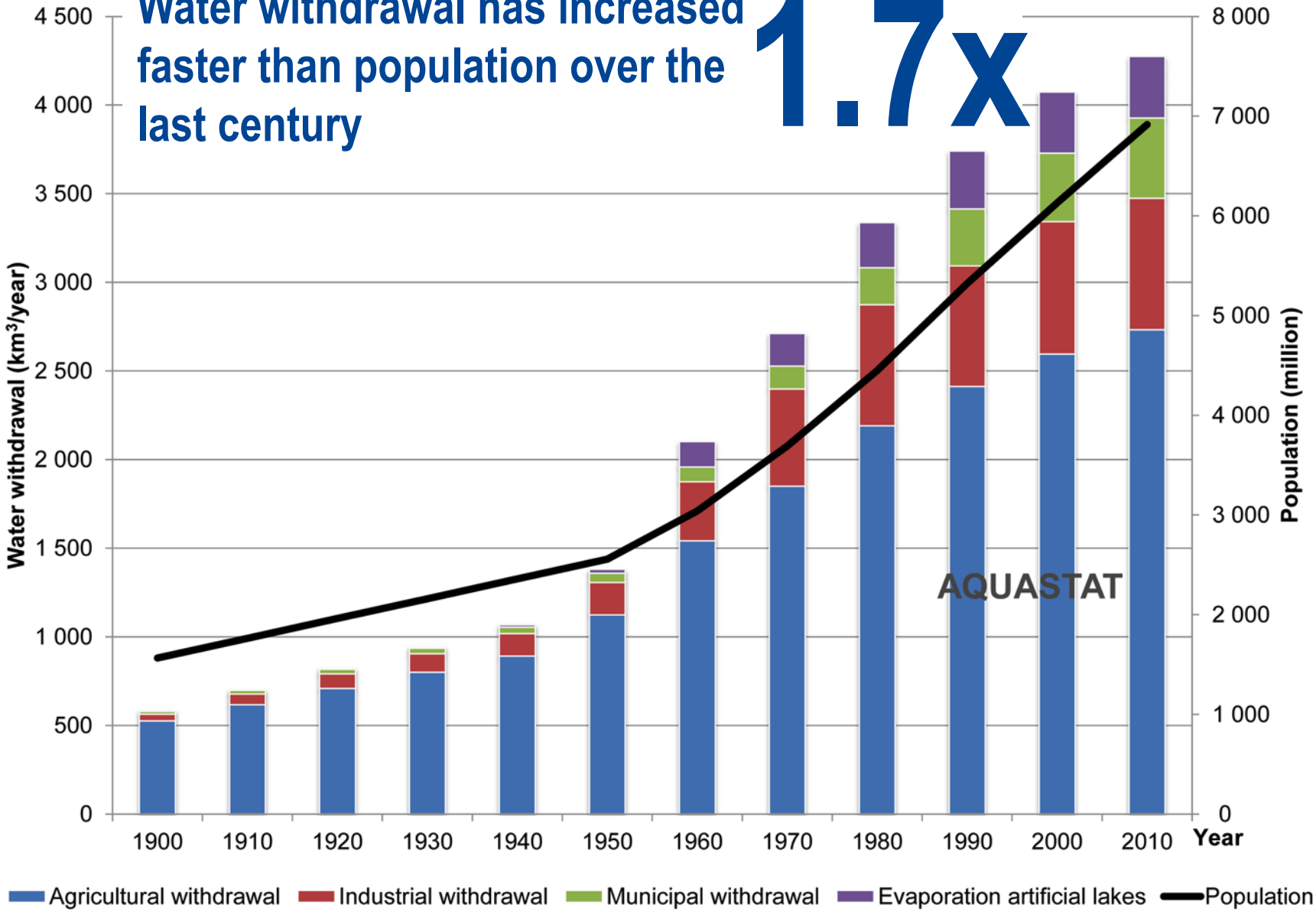
Source: Igor Shiklomanov's chapter "World fresh water resources" in Peter H. Gleick (editor), 1993, Water in Crisis: A Guide to the World's Fresh Water Resources.

7.5 ml per 100 lt

Source LtoR: A. Anlicker, M.O.Stevens, A.S. Belward, Ptijue, A.S. Belward, A. Jones, J & K. Hollingsworth, JohnnyOneSpeed, H. Varlan

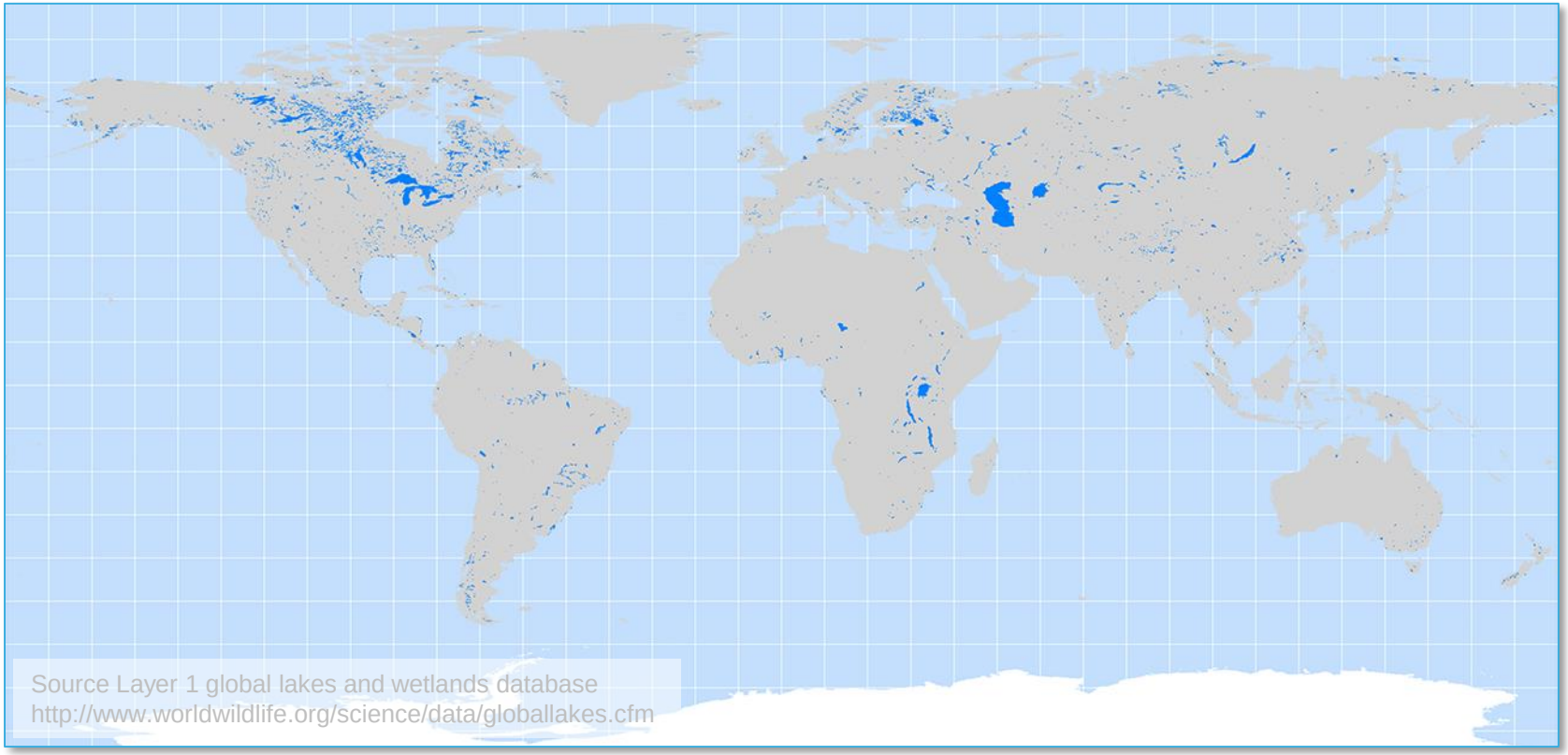
Water withdrawal has increased faster than population over the last century

1.7x



http://www.fao.org/nr/water/aquastat/water_use/index.stm

Date of preparation: September 2015



2,557,905 km²
(Bartholome & Belward 2005)
X

4,760,000 km²
(Verporter et al. 2014)
X

?

3,950,000 km²
(Gong et al. 2013)
X

2,679,000 km²
(Lehner & Doll 2004)
X

Source LtoR: T.J. Keegan, Vegafish, Ibdodane, skatebiker, US FishandWildlife, Unknownbutpublic

3,066,102 Landsat scenes

16th March 1984

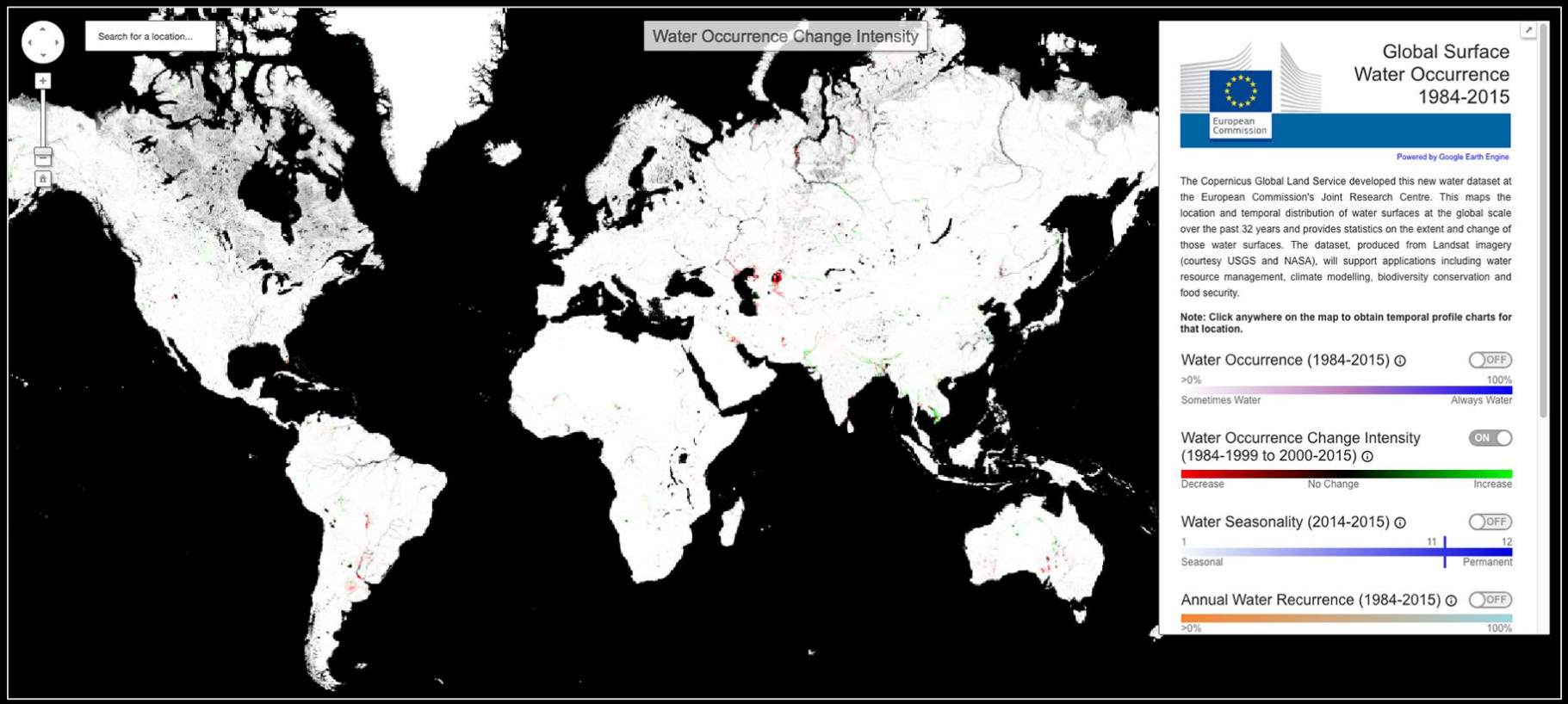
18th October 2015

1823 TB data

546 million

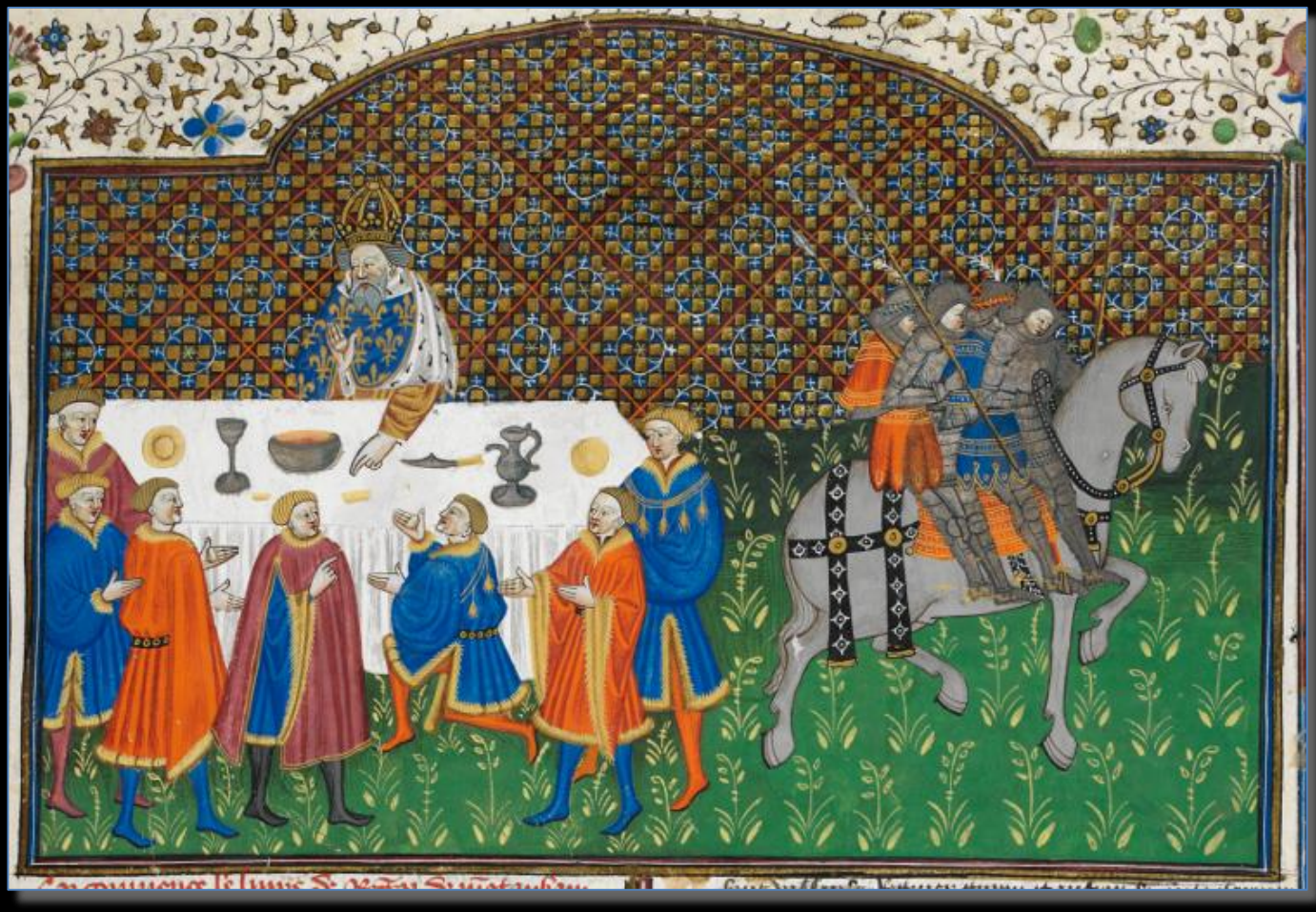
MP3 songs

1823 TB data



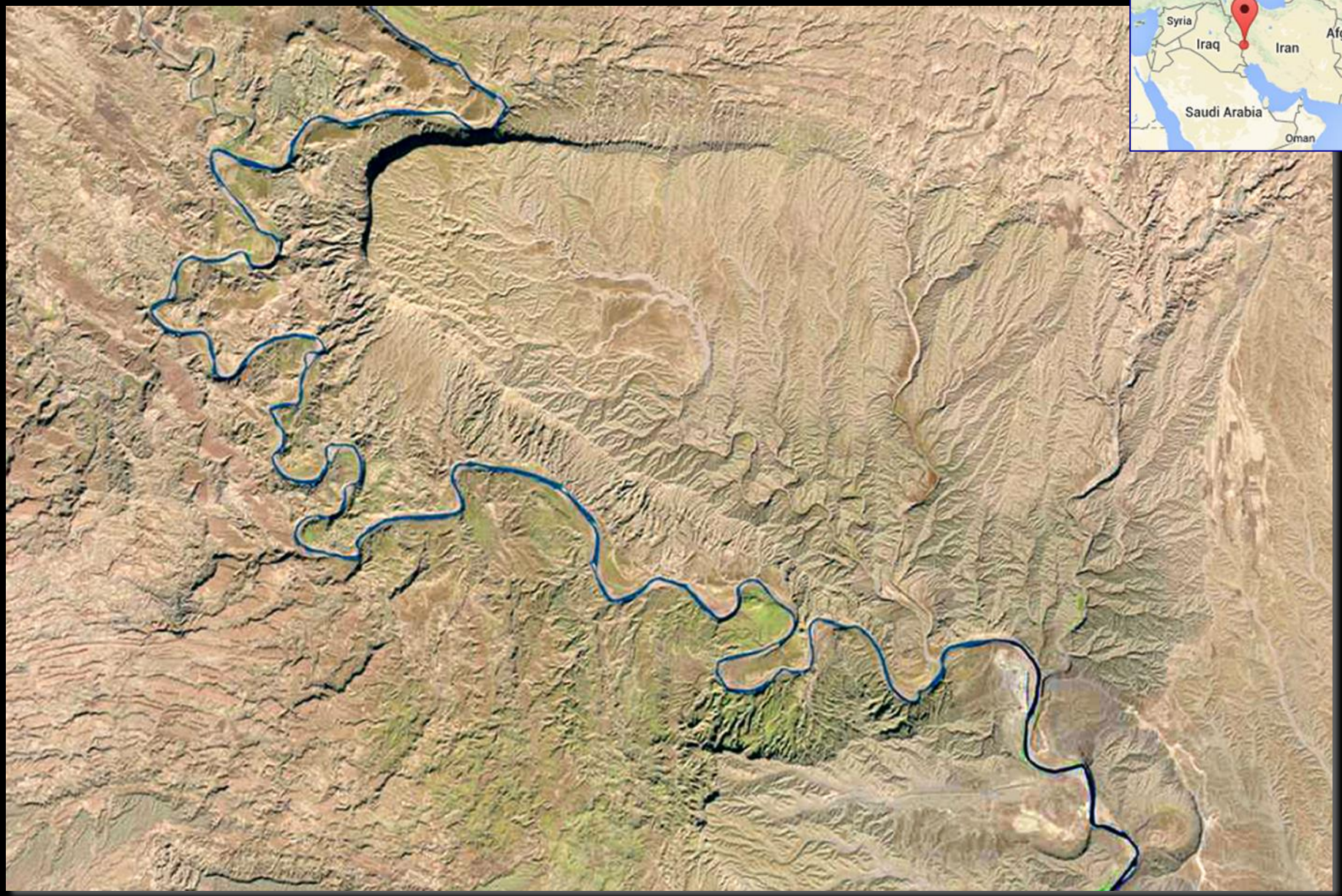
Processing 3 million
Scenes on one computer
would have taken 1,212 years

Processing 3 million
Scenes in Google's Earth
Engine took 45 days

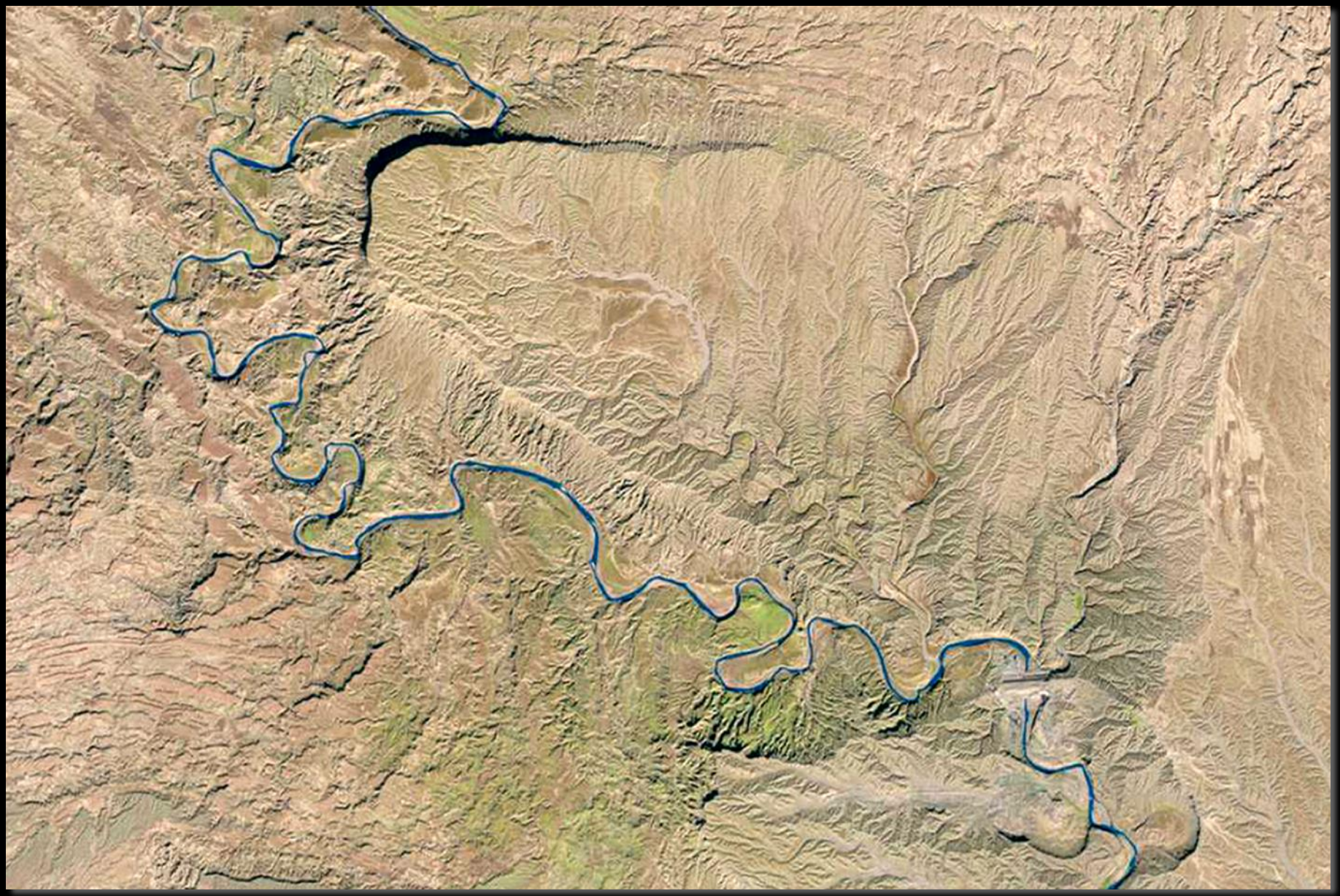


Start your computer running just after Charlemagne conquers Saxony in 804... leave it running 24 hours a day, 7 days a week and the water maps just might be ready today

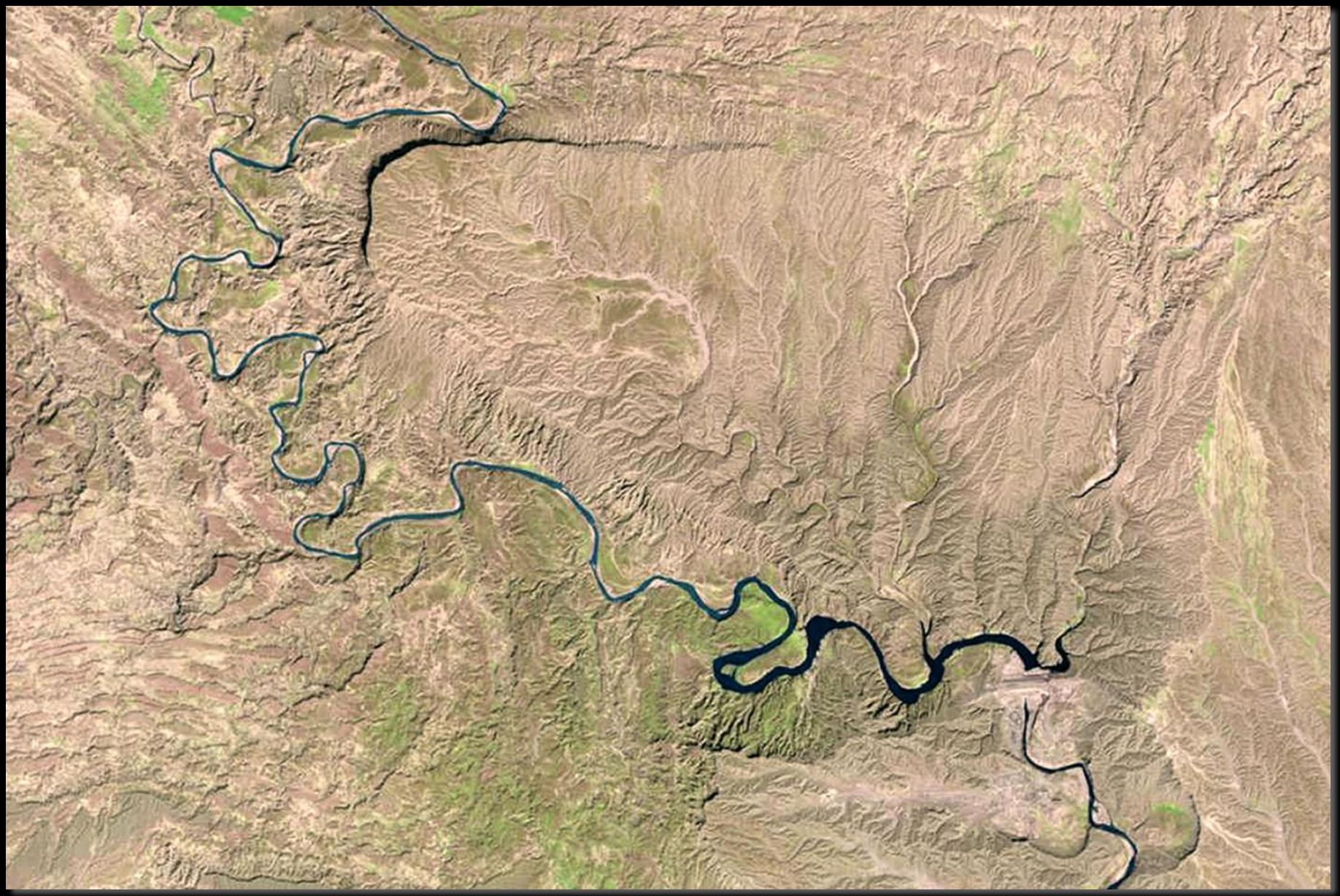
Charlemagne at dinner; detail of a miniature from BL Royal MS 15 E vi, f. 155r (the "Talbot Shrewsbury Book").
Held and digitised by the British Library.



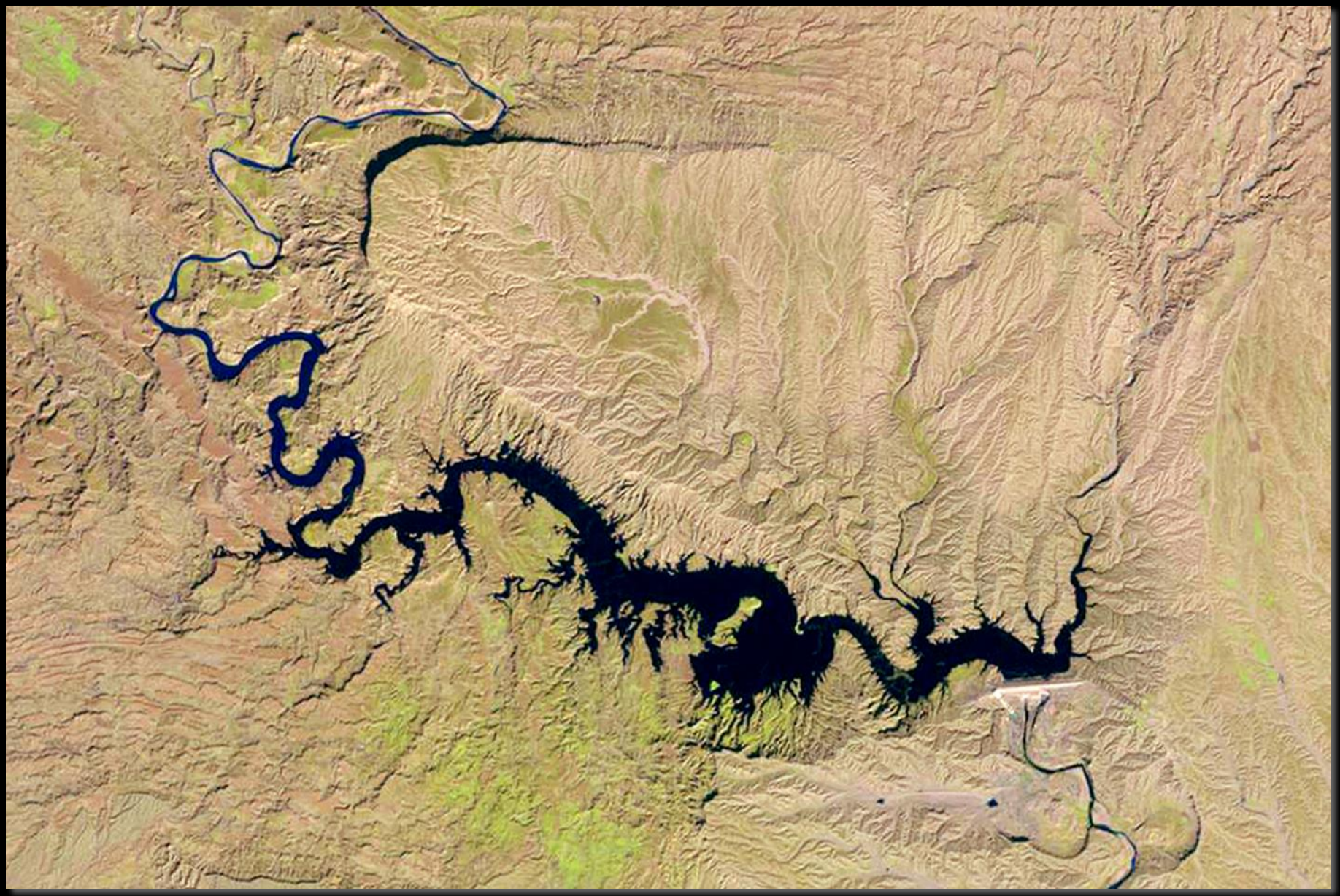
Karkheh River, Iran 21st July 1993 merged into 21st December 1999 Landsat courtesy USGS / NASA



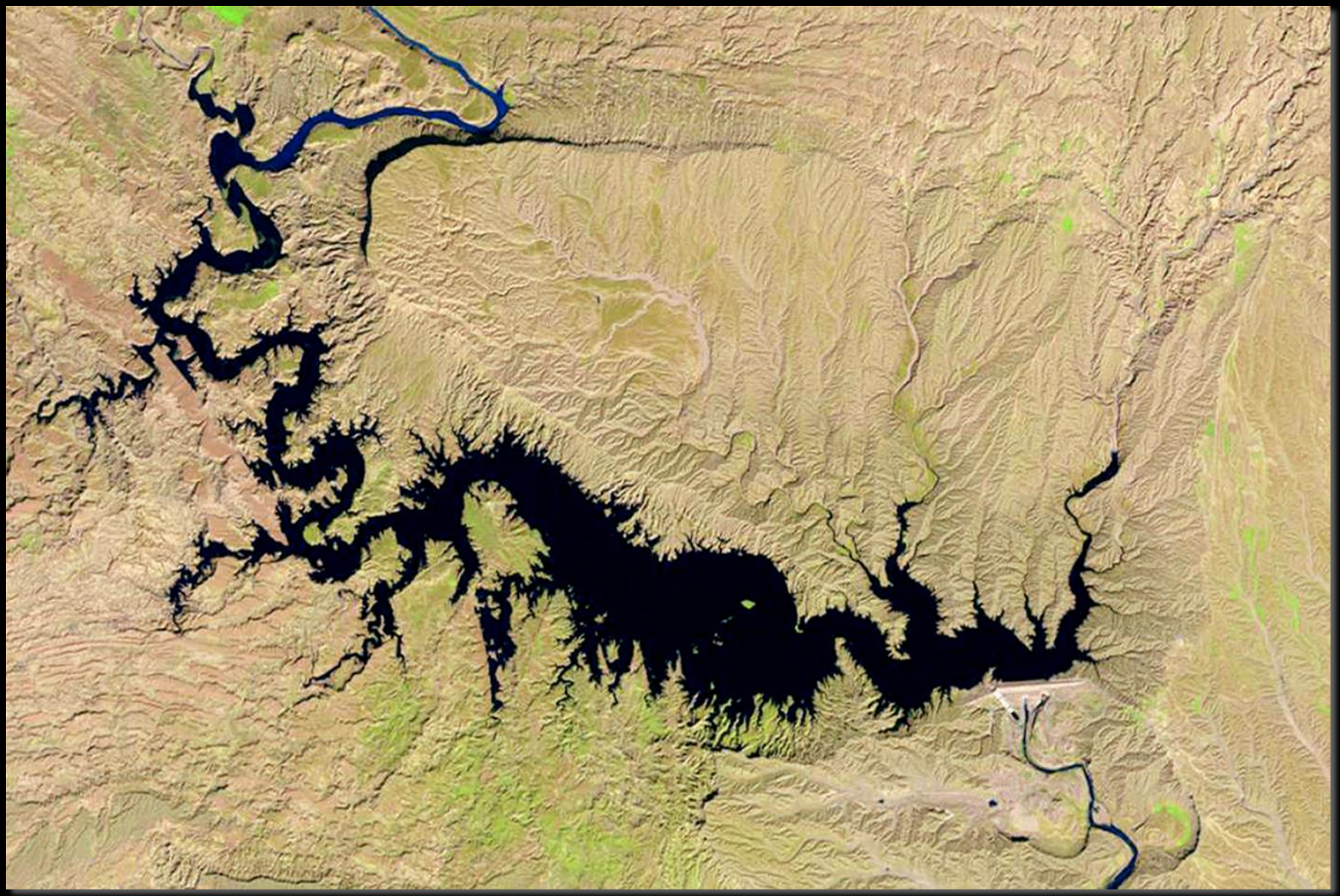
Karkheh River, Iran 21st December 1999 Landsat courtesy USGS / NASA



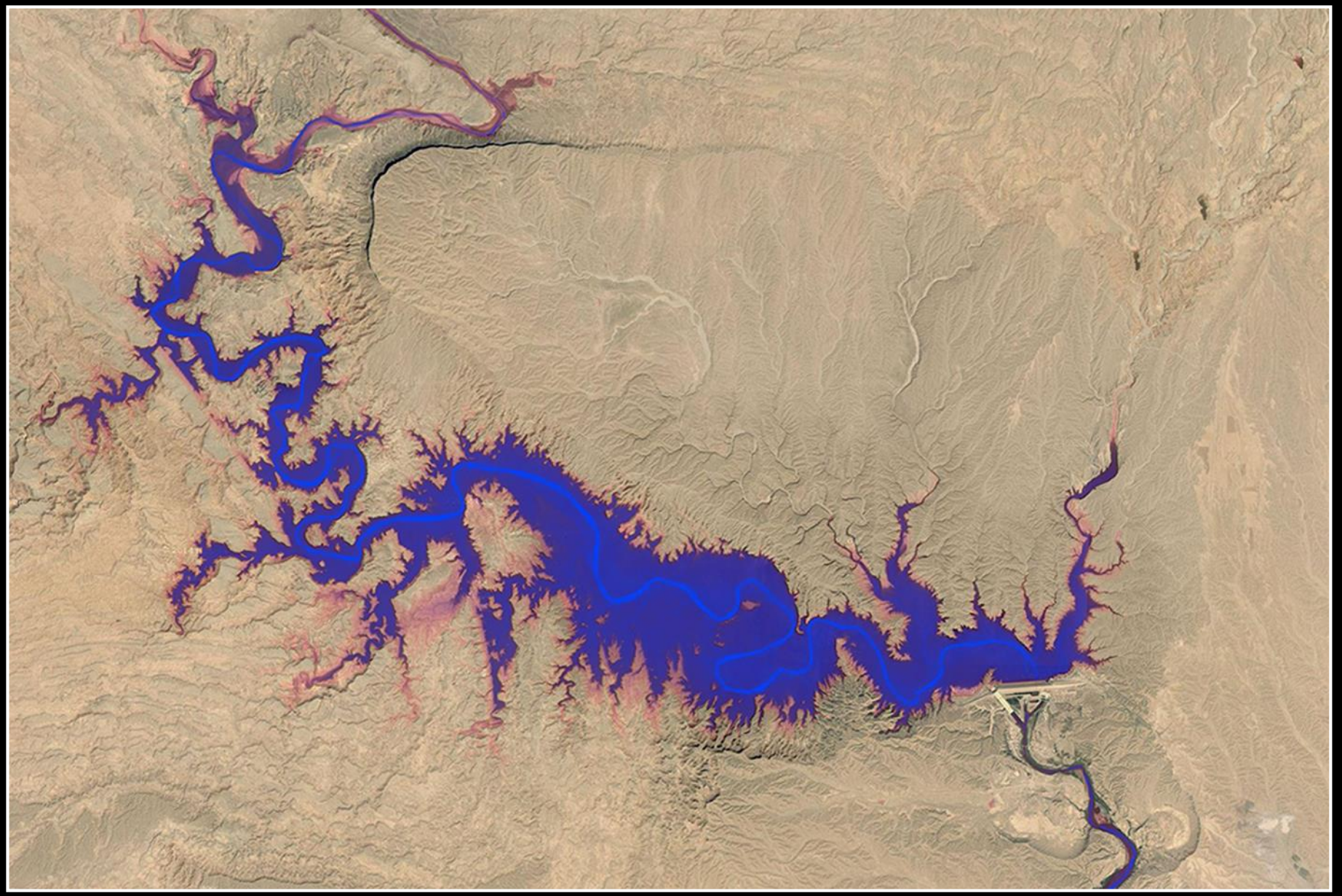
Karkheh River, Iran 23rd February 2000 Landsat courtesy USGS / NASA



Karkheh River, Iran 24th January 2001 Landsat courtesy USGS / NASA

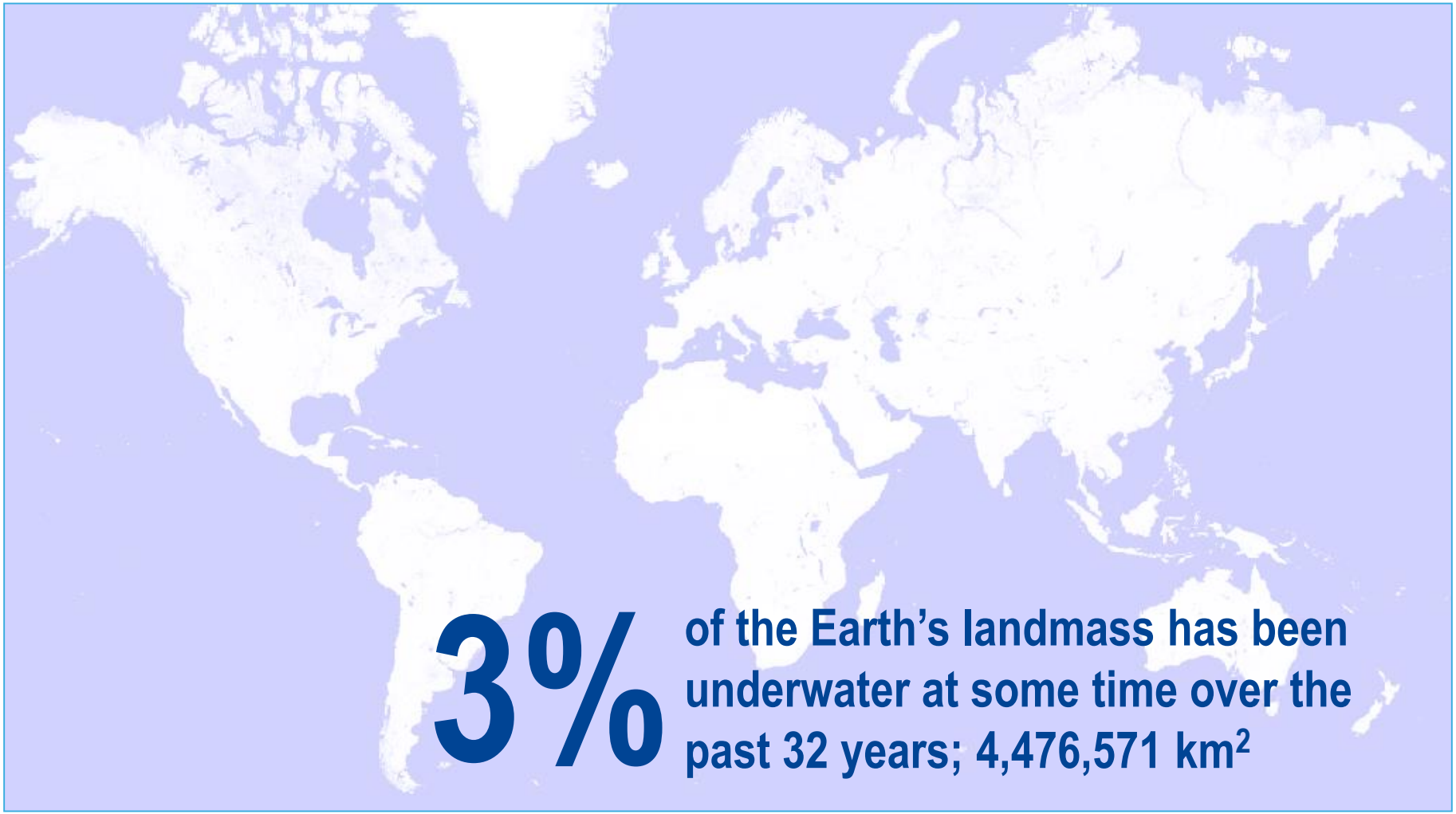


Karkheh River, Iran 27th January 2002 Landsat courtesy USGS / NASA



Karkheh River, Iran Global Water Occurrence 1984 – 2014 Source JRC and GEE

Source Global Surface Water Occurrence: JRC/GEE 2016



Source Global Surface Water Occurrence: JRC/GEE 2016

Water Seasonality (2014-2015)

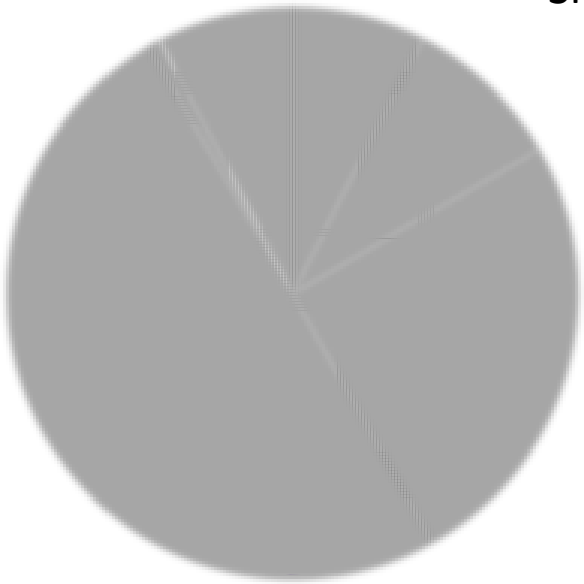
1 11 12

Seasonal Permanent

In 2015 there were 3,599,127 km²

807,843 km² seasonal and 2,791,284 km² permanent

Share of permanent surface water



Africa

Asia

Europe

North America

Oceania

South America

Share of human population

Africa

Asia

Europe

North America

Oceania

South America

Source Global Surface Water Occurrence: JRC/GEE 2016

Water Occurrence (1984-2015)

>0% 100%

Sometimes Water Always Water

2,396,821 km² have been permanently under water since the 1980s

Source Global Surface Water Occurrence: JRC/GEE 2016

Water Occurrence Change Intensity
(1984-1999 to 2000-2015)

Decrease — No Change — Increase

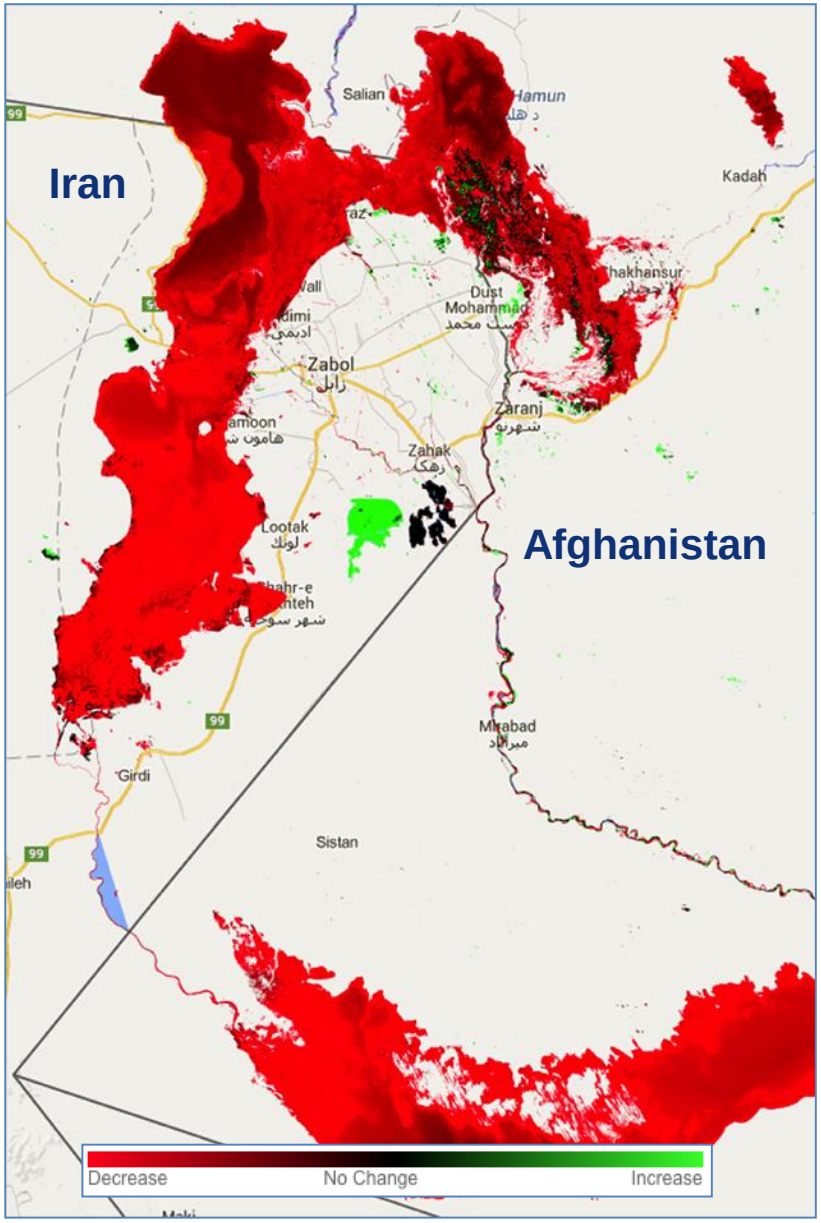
89,703 km^2 of surface water previously thought of as permanent have vanished, and more than 184,126 km2 of new permanent water-bodies have formed

Source Global Surface Water Occurrence: JRC/GEE 2016

Water Transitions
(First Year to Last Year)

Over 70% of the net permanent water loss is concentrated in five countries: Kazakhstan, Uzbekistan, Iran, Afghanistan, and Iraq

Iran and Afghanistan have lost 56% and 54% of the permanent surface water area they had in the 1980s: people, agriculture and ecosystems suffer

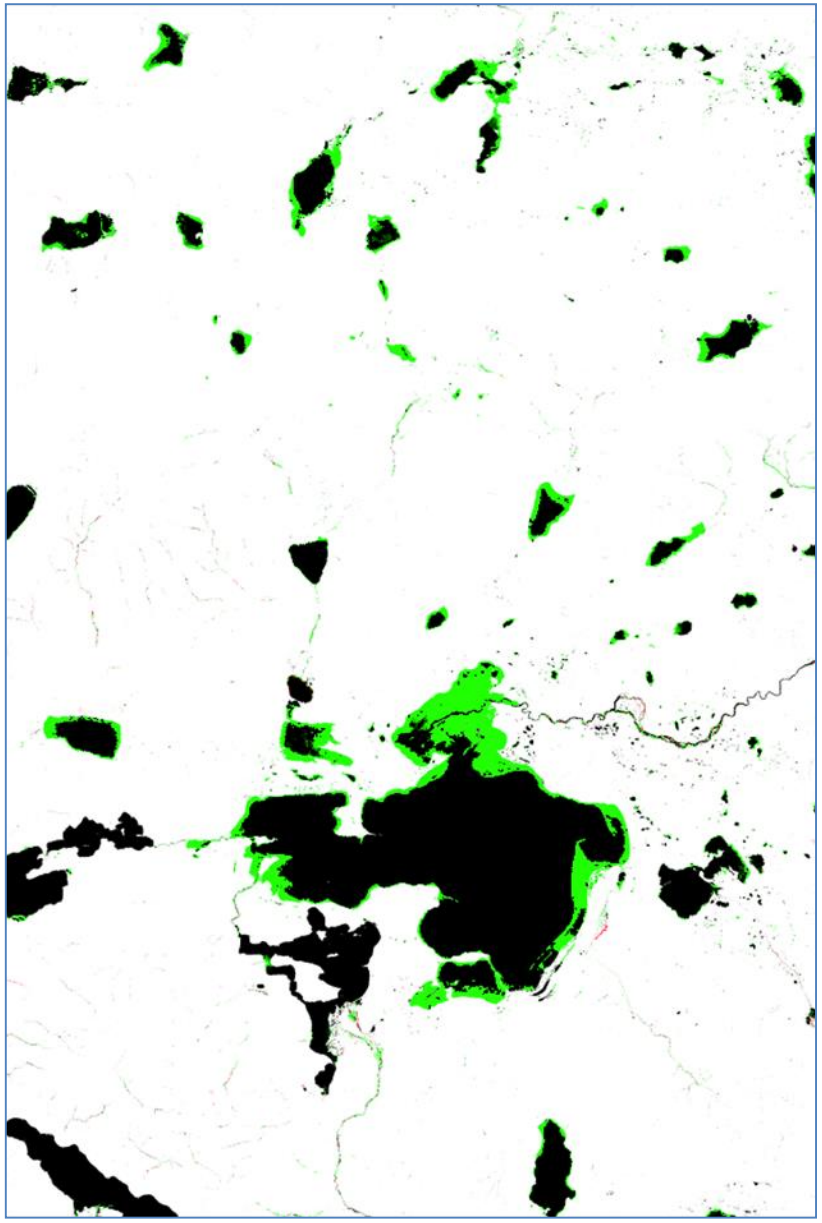


Hamoun wetlands Source Global Surface Water occurrence JRC/GEE

Source: United Nations information centre Tehran

Lakes on the Tibetan Plateau have increased in area by 20% with respect to the 1980s: Grazing land is lost and transport links threatened

Source Dennis Jarvis: Yundrok_Yumtso_Lake



Siling Lake, Tibet Source Global Surface Water occurrence JRC/GEE

Source Global Surface Water Occurrence: JRC/GEE 2016

Annual Water Recurrence (1984-2015)

>0% 100%

87% of permanent water-bodies are truly permanent

Between 1984 and 2015

90,000 km² of surface water previously thought of as permanent have vanished

and more than km² **185,000** of new permanent water bodies have formed

5 countries account for 70% of the net loss in permanent surface water since the 1980's

Kazakhstan, Uzbekistan, Iran, Afghanistan, and Iraq

24 countries have each gained at least 1,000 km² of new permanent surface water

Russia, Canada, China, Turkmenistan, Brazil, United States, India, Kazakhstan, Argentina, Turkey, Peru, Uzbekistan, Myanmar, Indonesia, Australia, Pakistan, Mexico, Vietnam, Egypt, Bangladesh, Colombia, Venezuela, Thailand, Mozambique

Maximum Water extent 1984 - 20153% of the Earth's landmass has been underwater at some time over the past 32 years; 4,476,571 km2 Source Global Surface Water Occurrence: Joint Research Centre and Google Earth Engine 2016