



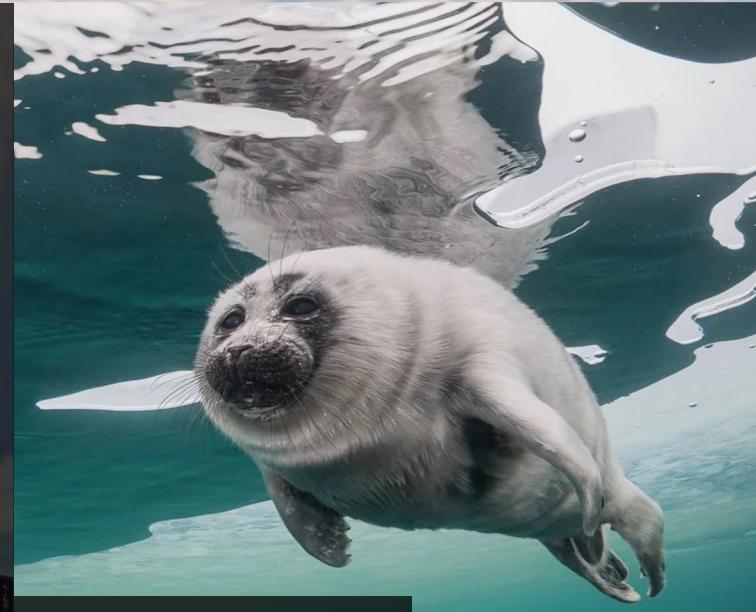
PRIBAIKALSKY NATIONAL PARK

MOULIK JAIN

ECOLOGICAL BASIS OF CONSERVATION

- **Rich biodiversity and high endemism:** There are over 2,500 species of animals, different types living in each biome. Most of the animals are typical such as the caspian deer, siberian roe deer, moose, weasels, and ermines.
- **Variety of habitats and landscapes:** The different habitats, such as taiga forests, steppe zones and alpine meadows, provide a mosaic of habitats across elevations around the lake.
- **Unique aquatic ecosystem:** The park is home to amphipods, crustaceans, endemic fish and the Baikal seal, which is only freshwater seal in the world.

Lake Baikal functions as a global freshwater ecosystem, providing water purification, climate regulation, and habitat services at a planetary scale, which justifies strict conservation and international protection.



SOCIAL ISSUES AND HOW THEY CHANGED OVER TIME



Founding and Early Tensions

This park was established in 1986 to protect Lake Baikal's western shore; restrictions on fishing, hunting, and land use created conflict with local communities dependent on those resources.



Tourism Boom (2020s)

Rapid rise in tourism led to overcrowding, unregulated guesthouses, pollution, and stress on park infrastructure.



Regulation & Conflict (2010s)

Enforcement against illegal construction and environmental violations sparked tensions – conflicting zoning laws and weak governance complicated sustainable management



Current Challenges (2020s)

Mass tourism remains a threat; pollution, waste, water-quality deterioration, and ecosystem stress documented in "Over Tourism at Baikal" highlight need for sustainable tourism, strict environmental protection, and community engagement.

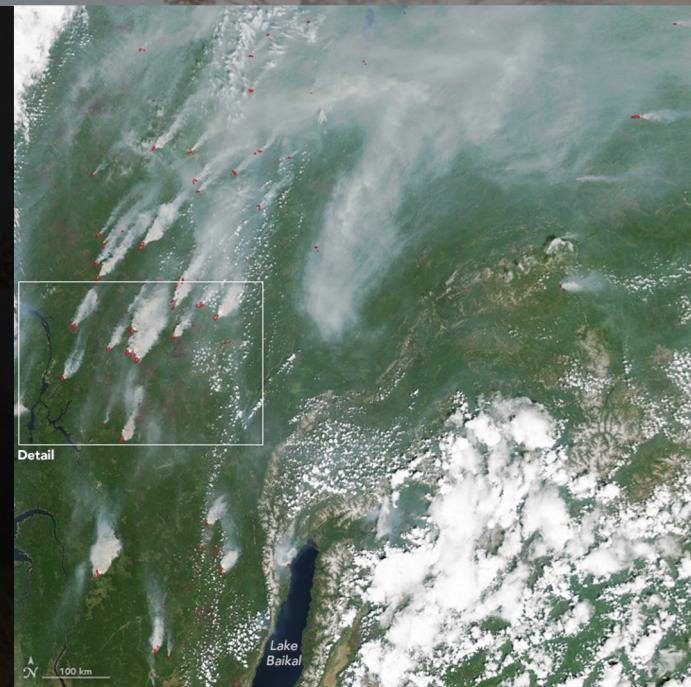
DRIVER 1: CLIMATE WARMING, WILDFIRES, AND SOIL DEGRADATION

Key Mechanism

- **Rapid Regional Warming:** Annual air temperatures have increased by 1.2 C over the last century, twice the global average.
- **Increased Fire Frequency:** Warming leads to abnormally dry conditions and "dry thunderstorms," major causes of intense, inaccessible fires.

Ecological Impact

- **Massive Landscape Damage:** Over 153,000 hectares were affected by fires in the Baikal region in 2015, including parts of Pribaikalsky National Park.
- **Erosion Risk:** Loss of forest cover and soil degradation from fires exacerbates erosion, which increases the deposition of sediments and solids into the lake's delicate nearshore waters.



DRIVER 2: INDUSTRIAL POLLUTION & EUTROPHICATION

Key Mechanism

- **Sewage & Wastewater Discharge:** Rapid tourism development and outdated infrastructure release untreated sewage into Baikal's shoreline, polluting with nitrogen and phosphorus.
- **Legacy Industrial Contamination:** Soviet-era pulp, paper, and chemical facilities left behind pollutants that continue to leach into the waters and accumulate in nearshore sediments.



Ecological Impact

- **Harmful Algal Blooms:** Nutrient overload fuels *Spirogyra* algae growth, harming native species and reducing oxygen in shallow waters.
- **Endemic Species Decline:** Pollution and algae leading to mass extinction of Baikal sponges and stress amphipods, fish nurseries, and other unique shoreline organisms.



From Ecological Pressure to Sustainable Pathways: How Sustainability Can Be Achieved

Potential Eco-Tourism Development

- **Regulated ecotourism** limits unplanned shoreline development, reducing soil disturbance and erosion that increase sediment runoff into Lake Baikal's nearshore waters.
- **Organized and designated tourism infrastructure** prevent the spread of informal infrastructure that contributes to sewage leakage and land degradation.
- **Year-round tourism models** reduces peak season land pressure, lowering the risk of vegetation loss, trail erosion, and wildfire ignition during increasingly dry summers.



- **Community-based tourism and service employment** reduces reliance on environmentally damaging land use, decreasing incentives for illegal construction, deforestation, and unmanaged waste disposal.
- **Planned tourism infrastructure** enables proper waste handling, directly reducing nutrient inputs that drive eutrophication and harmful algal blooms.

Green Economy Strategies for Long-Term Conservation

- Modern wastewater treatment and sewage infrastructure directly target nitrogen and phosphorus inputs responsible for eutrophication and *Spirogyra* algal blooms.
- Transition from fossil-fuel-dependent industries to renewable energy reduces greenhouse gas emissions that intensify regional warming and wildfire frequency.
- Green energy development (solar, wind, biomass) lowers air pollution and reduces climate-driven stress on forests, helping stabilize soils and reduce erosion.
- Industrial modernization and remediation programs address legacy contamination from pulp, paper, and chemical facilities that continue to pollute nearshore sediments.
- Green job creation reduces economic dependence on extractive land use, lowering pressure on forests and soils already vulnerable to climate-driven degradation.





Final Takeaway: A Model for Global Parks

- Pribaikalsky National Park illustrates how protected areas must integrate ecology, society, and economics to remain viable in the 21st century.
- Science-based policy and forecasting tools allow managers to anticipate environmental change rather than respond too late.
- Ecotourism and green economic development provide realistic, scalable solutions that protect ecosystems while supporting local communities.
- Lake Baikal serves as a global benchmark, where success or failure will inform conservation strategies worldwide.
Sustainability is the only pathway that preserves both natural heritage and human livelihoods in the Baikal region.

References

- Hays, Jeff. "Facts And Details." *WESTERN AND EASTERN SHORES OF LAKE BAIKAL*, 2025,
https://factsanddetails.com/russia/Places/sub9_9e/entry-7095.html#:~:text=The%20biodiversity%20of%20animals%20in%20the%20park,roe%20deer%2C%20moose%2C%20Siberian%20weasels%20and%20ermes. Accessed 12 December 2025.
- "International Parks Find Your Parks." *Pribaikalsky Russia*, 2025, <https://www.internationalparks.org/park/Pribaikalsky>. Accessed 12 December 2025.
- Aleksandrova, A. Yu. et al. "Overtourism at Baikal: Problems and Ways of Addressing Them." *Geography and Natural Resources* vol. 42,3 (2021): 248–257. doi:10.1134/S1875372821030033
- HAMPTON, STEPHANIE E et al. "Sixty years of environmental change in the world's largest freshwater lake – Lake Baikal, Siberia." *Global Change Biology* vol. 14,8 (2008): 1947–1958. doi:10.1111/j.1365-2486.2008.01616.x
- International Union for Conservation of Nature. "World Heritage Outlook." *Lake Baikal*, 2025,
<https://worldheritageoutlook.iucn.org/explore-sites/lake-baikal>. Accessed 12 December 2025.
- Kirillov, Sergey, et al. "Sustainable Tourism Development in Russia: The Case of the Baikal Harbour Project." *European Journal of Sustainable Development*, vol. 9, no. 3, 2020, pp. 179–188, doi:10.14207/ejsd.2020.v9n3p179.
- Bilgaev, Anatoly, et al. "Baikal Region (Russia) Development Prospects Based on the Green Economy Principles." *Sustainability*, vol. 13, no. 1, 2021, article 157, doi:10.3390/su13010157.