

Tentative List Submission

WORLD HERITAGE CONVENTION

TENTATIVE LIST FOR EARTH'S ATMOSPHERE

Name of country: _____

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Name of Property: **Earth's Atmosphere**

Geographic Location:

From sea level to 50 km above the Earth. The area of the atmosphere to be protected includes the troposphere (0 km – 17 km) and stratosphere (17 km – 50 km) with an outer buffer zone from the stratosphere to the Kármán line (100 km), the recognized boundary of outer space.

Description:

Life on Earth depends on Earth's atmosphere, which is the basis of human survival. The atmosphere is a singular complex system, in which physical and chemical reactions take place and which maintains a dynamic balance. The atmosphere traps radiative heat from solar energy entering the atmosphere from the sun, and radiant energy leaving the atmosphere. It protects life on Earth by absorbing ultraviolet solar radiation and retaining heat at the Earth's surface.

The Earth's atmosphere remained relatively stable over the Cenozoic Era, taking into account glacial and interglacial fluctuations from 100 to 300 parts per million (ppm) in atmospheric carbon dioxide (CO₂) levels during the Pleistocene era, which allowed for the flourishing of flowering plants, insects, modern mammals, birds, and humans. Since the end of the last glaciation, roughly 12,500 years ago, atmospheric CO₂ levels have risen from 100 ppm to the current level of 392 ppmⁱ.

Anthropogenic production of greenhouse gases in the troposphere is actively altering the dynamic balance of the atmosphere by increasing the amount of heat radiated that bounces back to the ground. Over the last 150 years since the Industrial Revolution began, carbon dioxide concentrations have risen from 280 to 392 ppm, which has been correlated with anthropogenic sources. These sources include burning of hydrocarbon fuels, land use changes including deforestation, and the manufacture of cement and aluminum. The increasing level of CO₂ in the stratosphere traps more solar radiation with a range of impacts for global climate. Under current climate change mitigation policies, global greenhouse gas emissions will continue to grow over the next few decades.ⁱⁱ

As of April 2010, the level of greenhouse gas concentration of atmospheric CO₂ was 392 ppm.ⁱⁱⁱ It is forecast to increase to 450 ppm by 2050, with biosphere-wide implications resulting from positive radiative forcing of the climate system.

The increase of CO₂ and other greenhouse gases in the atmosphere^{iv} has been implicated, along with black carbon, in growing environmental damage, including the deterioration of glaciers crucial to river systems and water supply (e.g., the Himalayas), coral reef bleaching (e.g., the Great Barrier Reef/Palau), loss of keystone species for biodiversity (e.g., American Pika/Capelin^v), decrease of Arctic sea ice extent, sea level rise (e.g., the Maldives/Tokelau),^{vi} weather pattern alteration (e.g., the global monsoon system) and desertification (e.g., Lake Chad/the Aral Sea/the Amazon Rainforest).

The predicted near-future climate destabilization impacts, which vary by scenario, reveal shifts in the distribution and abundances of species^{vii}, loss and extinction of species (e.g., the projected loss of 39% of all lizards by 2080^{viii}), and further broad and accelerated environmental destruction. Continued and increasing climate change will increase

political and cultural inequity, and is a pretext for human conflict^{ix} resulting in the destruction of intangible cultural heritage, such as the loss of nomadic pastoral cultures in Africa.^x

Volatile organic compounds, sulfur oxides, nitrogen oxides and particulate matter emitted from burning hydrocarbon fuels, and other human sources also impact the atmosphere, creating ground level ozone, photochemical smog, and acid rain, while damaging human and environmental health and degrading the built environment.

The conservation of atmospheric chemistry from further anthropogenic insult will enhance and reinforce agriculture and local agrarian traditions, protect species biodiversity, and reduce water conflict, as well as safeguard against potential unforeseeable and explosive implications of rapid climate change, such as dramatic tundra and peat bog outgassing or the breakup of Antarctic ice sheets resulting in sudden sea level rise.

The outstanding universal value of the Earth's atmosphere as the common heritage of humanity requires that "the atmosphere should not be used in any way that threatens or degrades the quality of the resource itself, as well as the survival of humankind."^{xi} Protecting the atmosphere will also enhance principles of environmental justice through the recognition of the atmosphere as a "common heritage by nature,"^{xii} and will conserve the present atmosphere, climate, and air quality for future generations.

JUSTIFICATION OF "OUTSTANDING UNIVERSAL VALUE"

The atmosphere is a system that is fundamental for maintenance of essential ecological processes and life-support systems. It is universally important as a fundamental component of the global environment, owing to its unique role in the development and sustenance of life on Earth.

Criteria met:

Cultural Criterion (iv): The Earth's atmosphere has played a central cultural role in human history from the pantheon of creation myths, and wind and sky deities embodying atmospheric properties, to paintings concerned with or reflecting atmospheric conditions, including Caspar David Friedrich's *Wanderer Above the Sea of Fog*, and works by Pieter Bruegel the Elder, William Turner, Frederic Church, William Ashcroft, and Edvard Munch.

In its centrality to human life, it has provided space for a range of human aesthetic, intellectual, and psychological inquiry and reflection, and in its unboundedness and ambiguity, frames the "discourse of the sublime."

Since the Industrial Revolution, social and environmental movements have been concerned with declining air quality, along the way making contributions to culture. This spectrum of works includes Charles Dickens's *Bleak House*, Rachel Carson's *Silent Spring*, Werner Herzog's *Lessons of Darkness*, and ecofeminist cultural production, along with cultural ephemera marking the atmosphere's degradation, such as the Donora Smog Museum and a growing body of artistic and literary production created in response to climate change.

Human culture also reflects an ongoing fascination with symbolic and functional attempts to control the atmosphere from enhancing agricultural fecundity to political domination. This manifests in works from fertility figurines to hail cannons and conceptual artworks like *Fresh Air Cart* (1979) by artist Gordon Matta-Clark, who invited residents of Manhattan to inhale unpolluted oxygen from a mobile tank.

Atmospheric pollution will result in the physical loss of sites resulting from the geophysical impacts of damage to the atmosphere (erosion, sinking islands), social failures to protect fragile and vulnerable places and cultures from these impacts (adaptation for some, mitigation for others), and the loss of intangible heritage associated with the loss of place. For example, in the Peruvian Andes, the glacier Apu Pachatusan, one of the most important sites in Incan religion, is in danger of disappearing.^{xiii}

Furthermore, the quality of the Earth's atmosphere is inseparable from the protection of cultural properties currently inscribed on the World Heritage List. Atmospheric pollution degrades existing World Heritage sites, for example by chemical corrosion to the built environment by acid rain and black carbon (e.g., the Parthenon/the Axum Obelisk). It was noted by the World Heritage Committee in 2005 "that the impacts of climate change are affecting many and are likely to affect many more World Heritage properties, both natural and cultural, in the years to come."^{xiv}

Natural Criterion (vii): The atmosphere is a superlative and singular natural phenomenon, making most life on earth

viable and cherished current ecosystem states possible. Its exceptional beauty is an unending source of human fascination and aesthetic pleasure.

The atmosphere touches, contains, and makes possible superlative natural phenomena, areas of exceptional natural beauty, and aesthetic importance. Protecting the atmosphere is a pre-condition to ensuring the protection of the most important and significant natural habitats for in-site conservation of biological diversity.

For example, increased levels of greenhouse gases in the atmosphere are forecast to increase sea temperatures in the tropical Atlantic Ocean, creating drought conditions in the Amazon Basin resulting in higher temperatures and less rainfall in tropical forests, a shift from tropical forest to savanna, biodiversity and endangered species loss, and the depletion of crucial “carbon sinks,” which are “at risk of being lost entirely.”^{xv} The loss of tropical forests in the Amazon is likely to release huge quantities of carbon, creating positive feedback and accelerating warming.^{xvi} This damage would be compounded by the loss of the natural beauty and aesthetic importance of the Amazon Rainforest as it exists now.

Our ability to visually perceive sites of exceptional natural beauty is dependent on air quality, which impacts atmospheric visibility. During the 2008 Olympic Games in Beijing, the final leg of the Olympic torch relay to the Great Wall of China, and the Great Wall itself, which can be seen from space, was obscured by smog with a density of 468 micrograms per cubic meter.^{xvii}

Natural Criterion (viii): The atmosphere represents the present state of Earth’s history, and is simultaneously a record of anthropogenic alteration of atmospheric chemistry, specific to the distinct chemical half-life of each compound.^{xviii} It is inseparable from the Earth’s geological processes, including the hydrologic cycle and its effects on land, including wind, weathering, and erosion, and ocean-atmosphere interactions including thermohaline circulation.

Ice sheets have trapped ancient atmosphere, allowing for paleoatmospheric sampling of ice cores. Climate change, in melting ice sheets, destroys these irreplaceable remnants of ancient atmosphere, which are irreplaceable data sources, along with the attendant scientific benefits derived from an intact paleoclimatological record.

Natural Criterion (ix): The Earth’s atmosphere is a system which makes possible the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals. The changing dynamics of the atmosphere caused by atmospheric pollution influence ongoing ecological and biological processes, driving heritable genetic changes to animals, plants and microorganisms; ecosystem-wide changes to the distribution of plants and pathogens; and changes to bird migration patterns^{xix}.

For example, long-range transport of air pollution from industry in the Northern Hemisphere sends pollutants into the Arctic biosphere. There, endocrine-disrupting airborne chemical pollutants move up the food chain, altering sex characteristics in polar bears to create hermaphrodites, further complicating species survival already impacted by declining sea ice extent.

Natural Criterion (x): Important and significant natural habitats for in-site conservation of species are at risk worldwide from anthropogenic pollution of the atmosphere. These risks and their probabilities, based on a range of scenarios for future mitigation, have been extensively documented in reports by the Intergovernmental Panel on Climate Change’s Fourth Assessment Working Groups I and II, *The Physical Science Basis*, and *Impacts, Adaptation, and Vulnerability*. The United Nations Environment Program’s *Global Biodiversity Outlook 3* report projects a high risk of biodiversity collapse with extinction rates already 1,000 times higher than the historical background rate.^{xx} Not only is the loss of biodiversity an “issue of profound concern for its own sake,” it has major implications as a feedback loop driver for further climate change. Climate change puts pressure on the abundance and distribution of species worldwide with serious consequence for human societies.^{xxi} Protecting the atmosphere would broadly support a worldwide strategy for enhancing biological diversity.

Assurances of authenticity or integrity:

The need to protect the atmosphere from anthropogenic impacts “for present and future generations of humankind” has been increasingly recognized over the last forty years. The atmosphere is a priceless and irreplaceable global commons existing beyond national jurisdictions and is worthy of special protection against further deterioration.

Examples of policies, treaties, and commissions created to conserve and protect the Earth’s atmosphere at local, regional, national, and international levels include *The Clean Air and Action Plan for the City of Stuttgart* (2006),

California's *Global Warming Solutions Act of 2006*, *The Clean Air Act (1963/1970)*, *The Partial Test Ban Treaty (1963)*, the *Environmental Modification Convention (1977)*, *The Montreal Protocol on Substances that Deplete the Ozone Layer (1987)*, *UN Resolution 43/53 (1988)*^{xxii}, and the *Kyoto Protocol (ratified 2005)*.

UN Resolution 43/53 (1988) has defined the atmosphere as *res communis* – space belonging to everyone, with “common heritage” language originating in 1968 with Arvid Pardo. Inscription of the Earth's atmosphere on the World Heritage list would further acknowledge its outstanding universal value as both a unique environmental system central to life, and as *res communis*^{xxiii}.

This significance has been previously recognized in the 1980 report *World Conservation Strategy*, where atmosphere and climate were designated as a global commons: “The behavior of the atmosphere, like that of the ocean, is indifferent to political boundaries. Impacts on the atmosphere in one country can affect the living resources of other countries, both directly and by altering climate. Such impacts are increasing.”^{xxiv}

Current efforts to adequately preserve and protect the atmosphere from anthropogenic insult have been inadequate to date. In light of the lack of a binding agreement at the 2009 United Nations Climate Change Conference, or other successful collaborative processes to produce a favorable, fair, or adequate outcome to the task at hand to date, every means to further protect the atmosphere must be utilized.

All life depends on the protection of Earth's atmosphere through the equitable conservation of this global commons, a uniquely singular dynamic system, from the adverse effects of neglect in the form of its destruction by anthropogenic pollution.

Comparison with other similar properties:

Earth's Atmosphere is unique; there are no other similar properties.

ⁱ Atmospheric CO₂ for April 2010, Mauna Loa Observatory: NOAA-ESRL. co2now.org

ⁱⁱ *Climate Change 2007: Mitigation*. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [B. Metz, O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer (eds)], Cambridge University Press, Cambridge, United Kingdom and New York, NY, US

ⁱⁱⁱ *Recent Mauna Loa CO₂*, Dr. Pieter Tans, NOAA/ESRL (www.esrl.noaa.gov/gmd/ccgg/trends/) and Dr. Ralph Keeling, Scripps Institution of Oceanography (scrippsco2.ucsd.edu/)

^{iv} List: Greenhouse Gases (Intergovernmental Panel on Climate Change), [scorecard.org](http://scorecard.org/scorecard.org/chemical-groups/one-list.tcl?short_list_name=gg).

^v Rose, G. A. 2005. Capelin (*Mallotus villosus*) distribution and climate: a sea “canary” for marine ecosystem change. *e ICES Journal of Marine Science*, 62: 1524e1530. doc.nprb.org/web/BSIERP/Rose_Capelin_Canary_Climate%20Change_2005.pdf

^{vi} McLean, R.F. and d'Aubert, A.M., 1993; Implications of Climate Change and Sea Level Rise for Tokelau, *UNEP and the Office of Tokelau Affairs*. sprep.org/att/IRC/eCOPIES/countries/tokelau/1.pdf

^{vii} *Extinction risk from climate change*, *Letters to Nature*, *Nature*, Volume 427, January 2004, Chris D. Thomas, Alison Cameron, Rhys E. Green, Michel Bakkenes, Linda J. Beaumont, Yvonne C. Collingham, Barend F. N. Erasmus, Marinez Ferreira de Siqueira, Alan Grainger, Lee Hannah, Lesley Hughes, Brian Huntley, Albert S. van Jaarsveld, Guy F. Midgley, Lera Miles, Miguel A. Ortega-Huerta, A. Townsend Peterson, Oliver L. Phillips & Stephen E. Williams, eprints.whiterose.ac.uk/83/1/thomascd1.pdf

^{viii} Biello, D., May 16, 2010, Lizards Feel the Heat from Climate Change, *Scientific American* podcast. scientificamerican.com/podcast/episode.cfm?id=lizards-feel-the-heat-from-climate-10-05-16

^{ix} CNA Corporation, 2007: National Security and the Threat of Climate Change. securityandclimate.cna.org/report/National%20Security%20and%20the%20Threat%20of%20Climate%20Change.pdf

^x Desanker, P.V., 2010, Impact of Climate Change on Life in Africa, Centre for African Development Solutions. worldwildlife.org/climate/Publications/WWFBinaryitem4926.pdf

^{xi} Beslar, K., 1998, *The Concept of the Common Heritage of Mankind in International Law*, p. 306

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- ^{xii} Kiss, A., 1999, Nature, the common heritage of humankind, Naturopa No. 91.
<http://128.121.10.98/coe/pdfopener?smd=1&md=1&did=594641>
- ^{xiii} National Geographic Global Action Atlas. Retrieved May 15, 2010.
actionatlas.org/climate-change/reforestation/forests-for-water-in-theandes/summary/paa1C2766DDB04833B21
- ^{xiv} UNESCO World Heritage Committee, Climate Change and World Heritage. whc.unesco.org/en/climatechange
- ^{xv} Risto Seppälä, Alexander Buck and Pia Katila. (eds.). 2009. Adaptation of Forests and People to Climate Change. A Global Assessment Report. IUFRO World Series Volume 22, Helsinki. Presented at the UN Forum on Forests, April 20-May 1, 2009.
sciencedaily.com/releases/2009/04/090417084128.htm
- ^{xvi} Ibid.
- ^{xvii} Shekhar Bhatia and Kiran Randhawa, Smog all the way to Great Wall, London Evening Standard, August 07, 2008.
thisislondon.co.uk/standard-olympics/article-23528389-smog-all-the-way-to-great-wall.do
- ^{xviii} Climate Institute, Climate Change, climate.org/topics/climate-change/index.html
- ^{xix} Jenni, L. and Kéry, M., May 30, 2003, Timing of autumn bird migration under climate change: advances in long-distance migrants, delays in short-distance migrants, The Royal Society.
www.pubs.royalsoc.ac.uk_cbi.nlm.nih.gov/pmc/articles/PMC1691393/pdf/12965011.pdf
- ^{xx} Ahmed Djoghlaif, Secretariat of the Convention on Biological Diversity, January 2010. Global Biodiversity Outlook-3. ISBN: 92-9225-220-8. gbo3.cbd.int/the-outlook/gbo3/executive-summary.aspx
- ^{xxi} Ibid.
- ^{xxii} United Nations General Assembly, 1988, Protection of Global Climate for Present and Future Generations of Mankind, (A/RES/43/53). un.org/documents/ga/res/43/a43r053.htm
- ^{xxiii} Beslar, K., 1998, The Concept of the Common Heritage of Mankind in International Law, p. 92
- ^{xxiv} International Union for Conservation of Nature and Natural Resources (IUCN), 1980, World Conservation Strategy.