IUCN Conservation Outlook Assessment 2017 **(archived)**
Finalised on 09 November 2017

Please note: this is an archived Conservation Outlook Assessment for Surtsey. To access the most up-to-date Conservation Outlook Assessment for this site, please visit https://www.worldheritageoutlook.iucn.org.

Surtsey

SITE INFORMATION

Country:
Iceland
Inscribed in: 2008
Criteria:
(ix)

Site description:

Surtsey, a volcanic island approximately 32 km from the south coast of Iceland, is a new island formed by volcanic eruptions that took place from 1963 to 1967. It is all the more outstanding for having been protected since its birth, providing the world with a pristine natural laboratory. Free from human interference, Surtsey has been producing unique long-term information on the colonisation process of new land by plant and animal life. Since they began studying the island in 1964, scientists have observed the arrival of seeds carried by ocean currents, the appearance of moulds, bacteria and fungi, followed in 1965 by the first vascular plant, of which there were 10 species by the end of the first decade. By 2004, they numbered 60 together with 75 bryophytes, 71 lichens and 24 fungi. Eighty-nine species of birds have been recorded on Surtsey, 57 of which breed elsewhere in Iceland. The 141 ha island is also home to 335 species of invertebrates. © UNESCO

SUMMARY

2017 Conservation Outlook

Good

Surtsey is a highly controlled, isolated environment and current threats are very low. Under the current regime of strict protection, the site's values are well preserved. The Surtsey Nature Reserve has, since its inception in 1965, de facto been managed in conformity with the requirements of an IUCN category 1a Strict Nature Reserve. The fact that the ongoing ecological processes have remained unaffected by human activities makes Surtsey a unique natural laboratory of global significance. The new management plan will strengthen protection and management of the site even more.

Current state and trend of VALUES

Good
Trend: Stable

Surtsey is of outstanding global significance because of its current geological and ecological features as well as the thoroughly studied geomorphological and biophysical processes which have created them. The fact that these features and processes have remained unaffected by human activities makes Surtsey a unique natural laboratory of global significance. The island's integrity and its values have been preserved through a very strict protection regime since 1965.

Overall THREATS

Low Threat

Overall the threats are low, but some concerns exist. Current threats include shipping lanes, large vessels, fishing boats and dumping of waste at sea. Vigilance is required to ensure that oil spills, the discharge of sewage or solid waste from visiting recreational boats, fishing boats or cruise ships, is prevented and no harm occurs to the marine areas and natural environment surrounding Surtsey. This threat will only increase with increasing number of sightseeing

tourism, recreational boats and cruise ships inside the Reserve. Invasive alien species are a major potential threat to the biodiversity of the island.
Data is needed to evaluate the scale of activities of fishing boats, recreational or sightseeing boats and cruise ships inside the Surtsey Nature Reserve.
Invasive alien species are a major potential threat to the biodiversity of the island. In the Management Plan, a five-year Action plan (2014-2019) includes actions needed to prevent invasive alien species from reaching the Surtsey island by humans and to exterminate them if they are found on the island (MP 2014).

Overall PROTECTION and MANAGEMENT

Mostly Effective

Under the current regime of strict protection, the Surtsey island essentially protects itself. The Surtsey Nature Reserve has, since its inception in 1965, de facto been managed in conformity with the requirements of an IUCN category 1a Strict Nature Reserve. New Management Plan (2014-2023) should strengthen further the protection, but it is important that it is fully implemented and the aims set out in the Action Plan are fulfilled.
Additional promotion about the Surtsey Nature Reserve is needed under the auspice of the Environment Agency.

FULL ASSESSMENT

Description of values

Values

World Heritage values

- **Ongoing scientific research of the colonisation and succession of life**
  Criterion:(ix)

  Surtsey is a world-recognised model for research of the colonisation and succession of life on a totally sterile land surface. Surtsey was born as a new volcanic island in 1963-67 and since that time has played a major role in studies of succession and colonisation. (SoOUV, 2008)

- **Ongoing process of colonization by plants and animals**
  Criterion:(ix)

  Surtsey has been the site of one of the few long term studies worldwide on primary succession, providing a unique scientific record of the process of colonisation of land by plants, animals and marine organisms. (SoOUV, 2008)

- **Pristine natural laboratory**
  Criterion:(ix)

  Not only is it geographically isolated, but it has been legally protected from its birth, providing the world with a pristine natural laboratory, free from human interference (SoOUV, 2008). Because of its continuing protection, Surtsey will continue to provide invaluable data on biological colonisation long into the future. Long-term continuous scientific research and monitoring in Surtsey is valuable in valuating environmental changes. (SoOUV, 2008, NS report 2007)

Other important biodiversity values

▶ **Submarine eruption**

The Surtsey eruption is the best-documented submarine eruption to date.

▶ **Geological processes**

Surtsey has provided invaluable information on post-eruptional processes such as the alteration of tephra into tuff and the evolution of a geothermal area.

▶ **Erosion**

Study on the impacts of wave and wind erosion on the aerial and submarine parts of the volcano.

Assessment information

Threats

Current Threats

Low Threat

Current threats are low, but some concerns exist, particularly with regards to shipping lanes and large vessels and dumping of waste at sea. These threats can increase with increasing tourism in the ocean around Surtsey.

▶ **Solid Waste**

Low Threat
Inside site, localised(<5%)
Outside site

The dumping of waste at sea, including damaged nets, fishing gear,

containers or household garbage, is an issue of concern, as significant quantities of litter wash up on Surtsey´s shores every year (Nomination, 2007). Garbage is mainly found on the northern spit of the island. In 2016 the Surtsey Research Society provided funding to clean the northern spit of Surtsey of all garbage washed up from the sea. The cleaning was managed by the Environment Agency. The garbage collected was transported from the island to the mainland for disposal. Garbage collection on the spit will be done every year from now on, or as necessary.

► Tourism/ visitors/ recreation

Low Threat
Inside site, not applicable

There has been debate of whether or not to allow controlled tourism on the island. The municipality of Vestmannaeyjar has several times sent a request to the Environment Agency to have permission to go ashore in Surtsey with tourists (Nomination 2007). Currently, a very strict protection regime applies and there are no plans to change the management regime or access restrictions on Surtsey.

► Fishing / Harvesting Aquatic Resources

Low Threat
Inside site, extent of threat not known
Outside site

Fishing with gill nets, lines and traps are allowed inside the Surtsey Nature Reserve. Fishing with towed bottom gear is prohibited within the World Heritage site, but allowed in the buffer zone (Nomination 2007).
In the nomination dossier 2007 de Marine Research Institute provided data on fishing activities inside the Reserve for the period 1987-2005. It is important to get new data of fishing activities inside the Reserve, for comparison and to identify changes (if any).

► Shipping Lanes

Low Threat
Inside site, extent of threat not known
Outside site

Vigilance is required by visiting boats and vessels in the Reserve to ensure that oil spills, the discharge of sewage or the disposal of food or solid waste

from visiting recreational boats, fishing boats or cruise ships, is prevented and no harm occurs to the marine areas and natural environment surrounding Surtsey. This threat will increase with increasing number of recreational boats and cruise ships (Nomination, 2007).

Data is needed for the magnitude of recreational or sightseeing boats and cruise ship inside the Reserve. Available data for the harbour of Heimaey shows that 50 cruise ships are expected in the period from May to September 2017 (Heimaey 2017).

The Management Plan (MP 2014) and Action plan for 2014-2019 suggest a restriction zone along he coast of Surtsey that indicates the distance that boats can sail up to.

Potential Threats

Low Threat

Potential threats are low and not of much concern except for invasive alien species.

► Invasive Non-Native/ Alien Species

Low Threat
Inside site, not applicable
Outside site

Invasive alien species are a major threat to the biodiversity of remote islands of the world. Every effort will be made to ensure that Surtsey remains free of alien invasive species. If a new species of plant or animal is found on Surtsey, which is considered alien invasive on the mainland, actions are taken to remove it before it has a chance to spread. (MP, 2014). No invasive alien species have been reforded in the island so far. But invasive plants are found on the only inhabitated island in the Vestmannaeyjar archipielago, Heimaey, that is 18 km SE from Surtsey.

► Other

Very Low Threat
Inside site, localised(<5%)

Some minor development activities may be required in the future for

monitoring, research and conservation within the Surtsey Nature Reserve. Any such development activities will be subject to a full Environmental Impact Assessment in accordance with national law and consent by the Environment Agency (MP, 2014). The hut in Surtsey and the automatic weather station need to be regularly maintained.

▶ Habitat Shifting/ Alteration

Data Deficient
Inside site, extent of threat not known
Outside site

Climate changes can in the future affect natural colonization process and ecosystem developments of terrestrial biota and marine organisms at Surtsey.

▶ Volcanoes

Very Low Threat
Inside site, extent of threat not known
Outside site

Surtsey belongs to the Vestmannaeyjar archipelago which constitutes a separate volcanic system at the southern end of the Eastern Volcanic Zone of Iceland, the Vestmannaeyjar volcanic system. Volcanic eruption within the system cannot be excluded (Nomination 2007). An earthquake of magnitude 3.1 in Richter scale happened off shore near Surtsey in April 2015 (Icelandic Met Office 2015).

Protection and management

Assessing Protection and Management

▶ Relationships with local people

Some Concern

The island of Surtsey is an important part of the inhabitant’s local pride and identity and symbolises their close relationship with the natural environment. There has been debate amongst local inhabitants about whether or not to allow controlled tourism on the island. Currently, there are no plans to

change the management regime or acess restrictions on Surtsey. Relationship with local people and stakeholders could be improved. In November 2014, the Surtsey Visitor Center was closed and the exhibition moved to the new volcano museum, Eldheimar, in Heimaey (Eldheimar 2017). Apart from the exhibition about Surtsey in the museum, additional promotion about the Reserve under the auspice of the Environment Agency is needed for the local people on Heigmaey island.

► Legal framework

Highly Effective

According to the Nature Conservation Act (No. 44/1999), the Environment Agency of Iceland is responsible for the management of protected areas, including preparation of management plans (MP 2008, Nomination 2007).

► Enforcement

Highly Effective

Under the current regime of strict protection and being isolated, the Surtsey island essentially protects itself. All visits to Surtsey causes some disturbance but the regulation limiting the possible number of visits in the period July to September and specific number of visitors in each tour, minimise disturbances on the environment. It is crucial that all research projects also strictly comply with the regulations to minimise any possible disturbance.

► Integration into regional and national planning systems

Mostly Effective

The Municipality of Vestmannaeyjar is the local guardian and physical planning authority for the Surtsey Nature Reserve.

► Management system

Mostly Effective

The supervision of the nature reserve is in the responsibility of the Environment Agency.
Six member advisory panel meets twice a year to discuss the Surtsey Nature Reserve issues. The panel includes representatives from the Agency, the Surtsey Research Society, the Icelandic Institute of Natural History, the

Marine Research Institute, and two representatives from the Municipality of Vestmannaeyjar. By special agreement of the Ministry of Environment, the Surtsey Research Society co-ordinates all research on the island and advises on other activities (IUCN Evaluation, 2008).
The Municipality of Vestmannaeyjar is the local guardian and physical planning authority for the Surtsey Nature Reserve.
Management Plan 2014-2023 for the site provides a long term vision for management of the Reserve, along with a series of goals and objectives that include the necessary measures for integrated conservation, research, monitoring and interpretation. The MP includes a five year Action plan (2014-2019) for the Reserve (MP, 2014).
Surtsey is a highly controlled, isolated environment and no visitors are allowed on the island (Nomination, 2007; SoOUV, 2008).

► Management effectiveness

Some Concern

The Action plan sets out several objectives for the period 2014-2019:
1) 2014: security plan with preventive measures, education and response plan; instruction about cleaning clothes and equipment before visiting Surtsey.
2) 2015: rules for sampling and good care of nature; instructions for applying for a permission to visit Surtsey; website about Surtsey in English.
3) 2016: response plan in case of pollution accident on land or sea; information and education plan for the next five years.
4) 2018: revised declaration for the Surtsey Nature Reserve; collection of all references about Surtsey (MP 2014)
So far none of these plans, rules or instructions set for 2014-2016 appear to have been introduced or can be found on the Agency website (www.ust.is).

► Implementation of Committee decisions and recommendations

Highly Effective

No Committee Decisions so far

► Boundaries

Highly Effective

The total area of Surtsey Nature Reserve is 65,6 km2. The size of the area

listed on UNESCO World Heritage List is 33.7 km2 and coincides with the strictly protected part of the nationally designated Reserve. It encompasses the entire Surtsey volcano, of which 1.4 km2 is above and 13.2 km2 below sea surface, plus 19.1 km2 of surrounding ocean. The remaining 31.9 km2 oceanic area of the nationally designated Reserve is defined as a buffer zone for the nature heritage site (Nomination 2007, IUCN Evaluation 2008).

► Sustainable finance

Some Concern

The Environment Agency receives yearly national budget from the state to manage protected areas. Those that get permission for filming or photographing on Surtsey pay fees to the Agency for the transport and supervision of the warden while visiting the island.
Sustainable financing for research and monitoring are restricted. To ensure regular scientific excursions to the island and material costs for regular monitoring and further scientific work on the island funds need to be secured for the long-term.
The Surtsey Research Society (SRS) provides funding to maintain the hut in Surtsey and for regular aerial photographing of the island every second year. In 2016 the SRS financed the transport of collected garbage from the island.

► Staff training and development

Some Concern

The Environment Agency is responsible for providing trained staff to ensure day-to-day management of the Surtsey Nature Reserve. The Head Warden has an office in the town of Vestmannaeyjar.
Surtsey Visitor Centre was closed in 2014 and the exhibition part was moved to the volcano museum Eldheimar in Vestmannaeyjar town (Eldheimar, 2017). Since then the Head Warden is the only staff member, year-round, in the Reserve.

► Sustainable use

Mostly Effective

All visits to Surtsey are under supervision of the Head Warden. Research expeditions in Surtsey are sustainable and researchers are aware of making no impact on the environment while staying on Surtsey. Sampling is minimal

and taken with care. All garbage is transported back in the end of each expedition.

► Education and interpretation programs

Some Concern

The Environment Agency is responsible for providing up-to-date information and interpretation material on the Surtsey Nature Reserve through brochures, posters and the Internet.
An interpretation and education strategy for five years period is foreseen in the Management plan 2014-2023 but has not yet been introduced or published (MP 2014).
In June 2013 Surtsey monument and information signs were set up in Heimaey ba the Environment Agency and revealed by the Ministry of Environment to celebrate Surtsey being a UNESCO World Heritage Site (Surtsey monument 2013).

In Autumn 2013 the 50th Anniversary of the birth of new island and ongoing scientific research was celebrated with a confernce in Reykjavík (Surtsey Research Society 2013).

► Tourism and visitation management

Mostly Effective

The Surtsey exhibition was moved to the new volcanic museum Eldheimar in Vestmannaeyjar town (heimild). Since visits to Surtsey are de facto prohibited the main focus for tourism development relating to the island will be indirect rather than direct and therefore education and interpretation programmes on Surtsey are important.
Although tourists are as a rule prohibited from going ashore on Surtsey, it is permissible to travel by boat within the Reserve and view the island from the sea or air. Opportunities exist for boat trips to the Reserve from the harbour in Vestmannaeyjar. Aerial sightseeing, when undertaken in a controlled and responsible manner, also provides an excellent means of viewing the island and its geological formations. Tourism is an important element of the economy of the Vestmannaeyjar Municipality and there is a need to communicate and promote the site in the municipality after the island was

inscribed on the UNESCO World Heritage List.

► Monitoring

Highly Effective

The Icelandic Institute of Natural History, Marine Research Institute and the Agricultural University of Iceland, in cooperation with the Surtsey Research Society, conduct research and monitoring of the state of natural phenomena within the Reserve.
Ever since Surtsey emerged from the sea during the 1963—1967 submarine eruption, the geomorphological processes, biological and geological features have been studied and monitored with minimal human impact. This also includes regular aerial photographs, mapping and multi-beam bathymetric mapping of the surrounding sea floor (Nomination 2007, IUCN Evaluation, 2008; SoOUV, 2008; Surtsey Research Society, 2015).

► Research

Highly Effective

The Surtsey Research Society coordinates research and furthers scientific knowledge about the Reserve (www.surtsey.is).
The Icelandic Institute of Natural History, the Marine Research Institute and Agricultural University of Iceland conduct research and regular monitoring of the natural conditions of the island of Surtsey.
All research within Surtsey Nature Reserve should contribute to the greater understanding and appreciation of the Reserve.

In August 2017 started a new international research project named SUSTAIN (Surtsey Underwater volcanic System for Thermophiles, Alteration processes and INnovative Concretes). This is a drilling project sponsored by International Continental Drilling Program (ICDP) and other institutions. Two drill holes will be parallel with the drill hole from 1979. One hole will be used to study how microbial succession and ecology in the hydrothermal system change over time. The second hole is drilled under set angle to explore the internal structure and architecture of Surtseyan volcanism (Jackson et.al. 2015).
The preparation for the SUSTAIN project started in 2014 and strict precaution has been applied in consultation with the Environment Agency to minimise

any human disturbance on the island under the drilling. Surtsey Research Society, Icelandic Institute of Natural History, Vestmannaeyjar Municipality all supported this project in written letters.
Over twenty scientists from ten countries participate in the SUSTAIN project. Further information's are available on the project website https://surtsey50years.utah.edu/.

Overall assessment of protection and management

Mostly Effective

Under the current regime of strict protection, the Surtsey island essentially protects itself. The Surtsey Nature Reserve has, since its inception in 1965, de facto been managed in conformity with the requirements of an IUCN category 1a Strict Nature Reserve. New Management Plan (2014-2023) should strengthen further the protection, but it is important that it is fully implemented and the aims set out in the Action Plan are fulfilled.
Additional promotion about the Surtsey Nature Reserve is needed under the auspice of the Environment Agency.

► Assessment of the effectiveness of protection and management in addressing threats outside the site

Highly Effective

Threats outside the site are mainly the shipping lane with large vessels sailing south of Surtsey. Oil spills, sewage and disposal of garbage waste from vessels, fishing boats and cruise ships are all of some concern. In 2009 a new regulation proposed by the Icelandic Maritime Administration delimited a zone defined as an "Area to be 'Avoided" that put the main shipping lane farther out south from the Reserve.

State and trend of values

Assessing the current state and trend of values

World Heritage values

► Ongoing scientific research of the colonisation and succession of life

Good
Trend:Improving

The pristine volcanic island of Surtsey remains a natural laboratory of global significance for studying ongoing geological, geomorphological and ecological processes in the development of landforms and biological communities (NS report, 2007). In 2013 the 50th Anniversary of the birht of the new island and ongoing scientific research was celebrated with a conference in Reykjavík (Surtsey Research Society, 2013).
New International research project, SUSTAIN, was started in August 2007.

► Ongoing process of colonization by plants and animals

Low Concern
Trend:Stable

Colonisation and ecosystem developments of terrestrial biota on Surtsey have been followed since the formation of the island (SR, 2009). Thanks to strict regulations and effective management, all natural processes remain largely unaffected by human activities. Fishing with towed bottom gear is allowed in the buffer zone of the Reserve is of some concern but they are prohibited within the WH area (NS report, 2007). New data is needed to monitor and evaluate the fishing activities inside the Reserve.

► Pristine natural laboratory

Good
Trend:Stable

Strict regulations for research are in place and no tourists are allowed on the island. The island remains a unique natural laboratory and various long-term research projects provide important baseline and indicators concerning the response of a young island system to disturbances such as climate change (NS report 2007, SR 2009).

Summary of the Values

► Assessment of the current state and trend of World Heritage values

Good

Trend: Stable

Surtsey is of outstanding global significance because of its current geological and ecological features as well as the thoroughly studied geomorphological and biophysical processes which have created them. The fact that these features and processes have remained unaffected by human activities makes Surtsey a unique natural laboratory of global significance. The island’s integrity and its values have been preserved through a very strict protection regime since 1965.

► Assessment of the current state and trend of other important biodiversity values

Good

Trend: Improving

Geologist visit Surtsey every second year to measure and investigate changes in geological processes. Geothermal heat is measured and erosion on the shores are inspected, measured with GPS and compared with aerial photographs from the year before (NI 2017).
Interesting on-going research on soil development on Surtsey and other belowground processes that are important drivers of primary succession (Sigurdsson, B.D. et.al. 2015).
New drilling project, SUSTAIN, will add valuable information in volcanology, hydrothermal processes, mineralogy and microbiology (Witze, 2017, Jakson et. al 2015, Jakson 2014).

Additional information

Benefits

Understanding Benefits

► Contribution to education

Education and interpretation programmes aim to increase awareness of the importance of the Surtsey Nature Reserve and the measures taken to protect its natural heritage. Education programmes will provide the public with a comprehensive overview of the importance the Reserve and the rationale for managing it in a pristine condition.

Long term continuous scientific research on Surtsey are ideal contribution to education in explaining how volcanic island evolves, how ecosystem develops and how climate changes and invasive species could negatively affect the isolated islands environment.

► Outdoor recreation and tourism

Interpretation and education activities for tourists relating to the Surtsey Nature Reserve. Controlled and guided sightseeing tours by boats or flights in the Reserve would benefit local tourist agencies.

No information is available about how many sightseeing tours visit the Reserve yearly or what kind of interpretation is offered in these tours. Surtsey exhibition in the volcano museum is the main interpretation for tourists. With increasing sightseeing tours or cruise ships inside the Reserve there will be increasing risk of pollution at sea and marine invasive species.

► Importance for research

Long-term continuous scientific research and monitoring in Sursey contribute to the understanding of environmental changes, at present and in the future.

Long-term continuous research and monitoring without any humans interaction inside the environment make it possible to follow the development and obtain any natural changes. However, humans activities outside the Reserve could definitely affect the island environment.

Summary of benefits

Education and interpretation programmes of Surtsey are important both inside and outside the local community. Long-term continuous scientific research and

monitoring in Sursey contribute to the understanding of environmental changes, at present and in the future.

Projects

Compilation of active conservation projects

№	Organization/ individuals	Project duration	Brief description of Active Projects
1	Icelandic Institute of Natural History (since 1963)		Birds population and breeding species of birds. Erosion by wind and water. Coastal erosion. Submarine erosion.
2	Icelandic Institute of Natural History (since 1965)		Monitoring of plant colonisation (vascular plants, moss, lichen and fungi) and ecosystem development.
3	Icelandic Institute of Natural History (since 1964)		Monitoring of the terrestrial invertebrates and colonisation.
4	Marine Research Institute (Since 1964)		Monitoring of the marine benthos around Surtsey. Littoral and sublittoral zone.
5	Vör Marine Research Center at Breiðafjörður (since 1980)		Observation of seals and whales. Seals breeding on Surtsey.
6	Agricultural University of Iceland (since 2000)		Soil research, soil development on Surtsey, biological activity of soil and nutrient status.
7	Icelandic Institute of Natural History (since 1967)		Hydrothermal system on Surtsey. Monitoring with regular measurements of heat and mapping.
8	Icelandic Institute of Natural History (since 1969)		Alteration of tephra into palagonite tuff. Monitoring by measuring areas of tephra and tuff. Geological mapping.
9	Environment Agency of Iceland (since 2016)	From: 2016	Monitoring of garbage at sea collected on Surtsey.

№	Organization/ individuals	Project duration	Brief description of Active Projects
10	SUSTAIN, International drilling and research project	From: 2017	Microbial colonization of tephra. The drill hole will become the Surtsey subsurface observatory for future research. Investigation of internal structure and facies architecture of the type locality of Surtseyan volcanism.

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