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**ЗАПОВЕДНАЯ  
РОССИЯ**

Ministry of Natural Resources and Ecology  
of the Russian Federation



**KRONOTSKIY  
RESERVE**

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Nature hides its secrets very proficiently.  
But sometimes it generously leaves  
the clues on the surface, inviting people  
to try their hand at discovering the secrets.

G. A. Karpov



**The caldera of Uzon volcano** is a huge bowl with dimensions of 9 x 12 kilometers, which combines live and inanimate nature harmoniously. The bottom of the caldera is located at an altitude of 650 – 700 meters above sea level. The highest point is the Baraniy peak (1617 meters). A volcano existed here about 300,000 years ago, reaching a height of 3 kilometers.

After a series of eruptions destroyed the volcano about 40,000 years ago, the ground beneath it sank and formed a caldera.

Multicolored thermal fields, steam-gas jets discharges, thermal springs, lakes and mud pots – all this looks like the formation of a new planet, where life starts. One can observe the process of mineral ore formation here and today, as well as the deposition of minerals and the youngest oil on the planet.

This caldera is located in Kronotskiy Reserve, 180 km to the north from Petropavlovsk-Kamchatskiy.

Total area of this anomaly is **61 000 km<sup>2</sup>**  
The emitted energy is **291,3 Megawatts thermal (MWt)**

**YOU CAN OBSERVE:**

**5** THERMAL FIELDS:  
Yuzhnoye (Southern), Zapadnoye (Western),  
Severnoye (Northern),  
Ozernoye (Lake), Vostochnoye (Eastern)

**1000**  
THERMAL SPRINGS (45-98°C)

**5** LARGE THERMAL LAKES

**THERMAL LAKES\***

**LAKE VOSMYORKA  
(EIGHT)**



t – 18-20 °C  
Sodium-chloride-sulfate  
composition with a share  
of iron and aluminum

**LAKE BANNOYE  
(BANYA)**



t – 40 °C  
Sulfate composition  
(radon, elemental sulphur)



**LAKE  
KHLORIDNOYE  
(CHLORUM)**

t – 28-30°C  
Chloride-sodium  
composition (arsenic  
antimony, mercury, silicon).

**LAKE  
FUMAROLNOYE  
(FUMAROLA)**



t – 18-24 °C  
Chloride-sodium  
composition with a high  
content of arsenic and antimony.

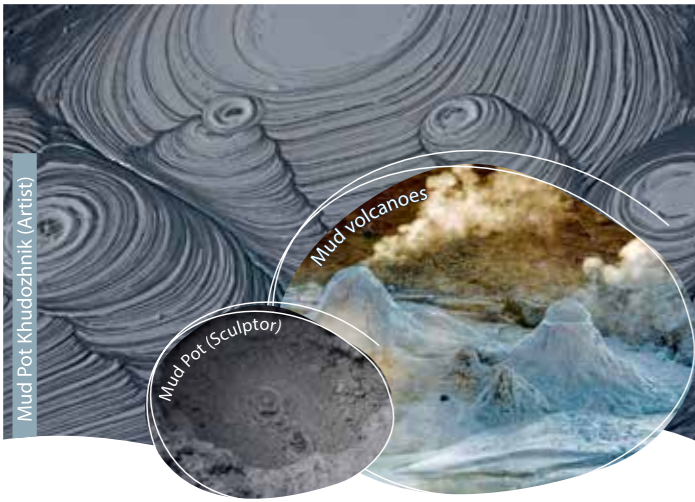


**LAKE DALNEYE  
(THE FAR LAKE)**

t – 18-24 °C  
Hydrocarbonate  
composition

**Swimming is prohibited in the reservoirs of the Reserve, any interference can cause irreparable damage to a fragile ecosystem!**

\* The average summer temperature of the lake surface is given. Only large caldera lakes are listed.



Mud Pot (Sculptor)

Mud volcanoes

Mud Pot (Sculptor)

### THE PROCESS OF MINERALIZATION

At present, a deposit of arsenic-antimony-mercury sulfide ores is being formed in the caldera. According to scientists calculations, there are approximately 7,000 tons of arsenic, about 350 tons of antimony, about 2,125 tons of mercury.

Rare compounds of arsenic sulphides – uzonite and alacranite are found here.

### THE YOUNGEST OIL ON THE EARTH

In the caldera of Uzon volcano the outcrops of the youngest oil on the planet are found. When the oil was discovered in the 20th century, its age was about 50-100 years old.

### MUD VOLCANISM

An abnormally high reservoir pressure is necessary for the creation of mud volcanism, powerful plastics, the formation of water, the accumulation of continuously incoming gases, and the existence of tectonic ruptures.

**A mud volcano** is a hole in a conical hill with a crater periodically erupting mud masses and gases to the surface of the earth.

**A mud pot** is a kind of acid hot spring or fumaroles with limited water intake. Usually it looks like a bath with bubbling clay. Acid and microorganisms transform surrounding rocks into clay and mud. Gases rising from the bottom to the surface make the clay "boil."



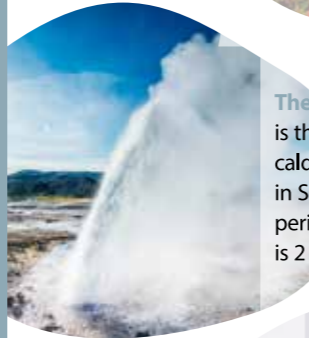
## UNIQUE OBJECTS



**Sulfur beach** is a picturesque beach on the shore of Lake Khlordnoye, formed by round and disk-like particles of sulfur of sandy dimension.



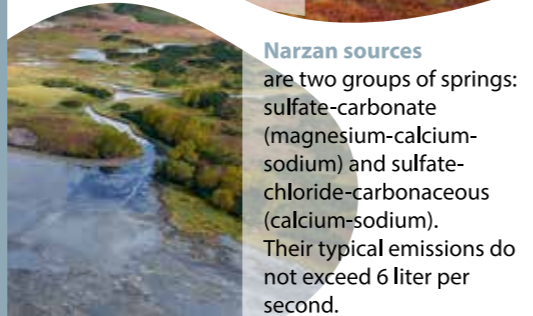
**The dancing forest** is a part of the stone-birch forest, which, due to the impact of unfavorable factors (evaporation from thermal fields, wind, heavy snowfalls), consists of weirdly curved thin trees.



**The Mutny geyser** is the only geyser in the caldera. It began erupting in September 2008. The periodicity of the eruption is 2 hour 15 minutes.



**Mount Belaya (White)** is the guardian of the secret of fire and ice. At the bottom of this mountain there are numerous hot springs. The top of the mountain is icebound, preserved since the last glaciations.



**Narzan sources** are two groups of springs: sulfate-carbonate (magnesium-calcium-sodium) and sulfate-chloride-carbonaceous (calcium-sodium). Their typical emissions do not exceed 6 liter per second.

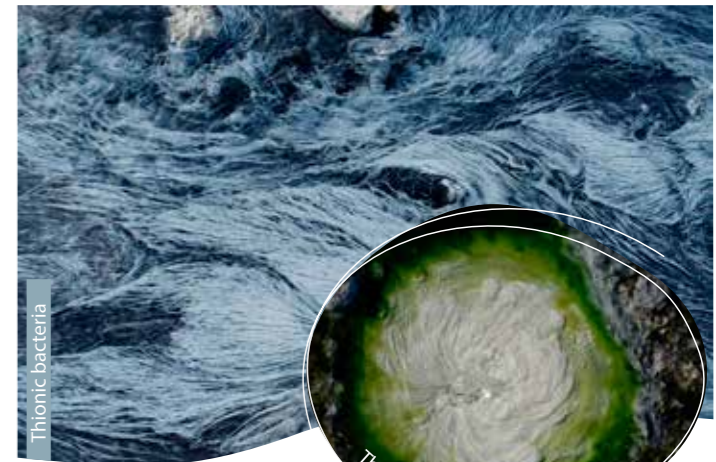


## ANIMALS

Despite the chemical evaporation in this natural laboratory, there are many waterfowl in Uzon caldera. Sandpipes, whooping cranes and various kinds of ducks nest there. The birds use warm soils as an incubator. Due to this fact, time of nesting and breeding is much earlier than in other areas of Kamchatka. The caldera is inhabited by wolves, wolverines, foxes, rabbits, ermines and rodents such as voles, lemmings, and Beringian gophers (yevrazhkas). Wild reindeer from the Siny Dol valley have been seen here. Bears live comfortably here. They are attracted by the ripe berries of blueberries and crowberries that appear in the middle of August here, and the arsenic deposits are a cure for parasites for the bears. Dalneye and Tsentralnoye lakes are inhabited by isolated populations of char and some salmon species.



Rock ptarmigan



Thionic bacteria

Thermophile blue-green algae

## LIFE IN BOILING WATER

The caldera of Uzon volcano provides a natural ecosystem for the preservation of the gene pool of extreme thermophilic microorganisms, that are of exceptional scientific and practical value.

Thermal springs with a water temperature of up to 96 °C are inhabited by cyanobacteria or blue-green algae – the most ancient inhabitants of the Earth. The name of these microorganisms is derived from the color of their blue-green cells. They have an ability to carry out photosynthesis which releases oxygen.

The interest in these thermophiles results from the enzymes that they extract, which are widely used in the production of cleaning agents, food products, and the processing of various wastes. In the process of anaerobic respiration, thermophilic microorganisms can restore various metals – iron, for example. This ability can be used in technologies for industrial effluent treatment technology from toxic metals or radionuclides.

## PLANT WORLD

Typical plants of the Uzon volcanic caldera include the dwarf cornel, the blueberry, the marsh tea, the crowberry (black crowberry), the dwarf birch, the Alpine azalea, cedar elfin wood, bracken.

Areas of stone-birch forests are surrounded by fern thickets. In September the caldera landscape is colored in bright yellow, red and orange tones, with a background of the dark green of the cedar.



BEHAVIOR RULES

So, you are in Kronotsky Reserve, in Uzon volcano caldera, a kingdom of wild nature, without a human being around. You are a guest here, and for the animals and birds – an uninvited guest. Entering someone else's house, be polite, follow a few simple rules, and we will preserve the unique nature of this area together!

All excursions on the territory are made only in the company of the employees of the Reserve and fulfillment of their requirements is compulsory for visitors.

Believe us, there are two equally important reasons for restrictions and prohibitions: the safety of plants and animals and, of course, your own safety.

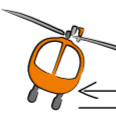


Trip is available for people of all ages without special physical training, who are enthusiastic and inquisitive.



Duration of excursion is 1-2 hours.

1-2 h.



Duration of round-trip helicopter flight is 2 hours 30 minutes.

-2.5 h.

- We recommend taking some bug repellent with you for protection from mosquitoes and flies, and binoculars for observing animals.
- Visit-center is opened for visitors, where you can buy print production and souvenirs.

DURING EXCURSIONS IN UZON CALDERA GUESTS ARE NOT ALLOWED TO:



stray from excursion trails or walk without the presence of a Reserve employee;



damage touristic infrastructure;



collect plants and mushrooms – do not forget that you are in the nature Reserve;



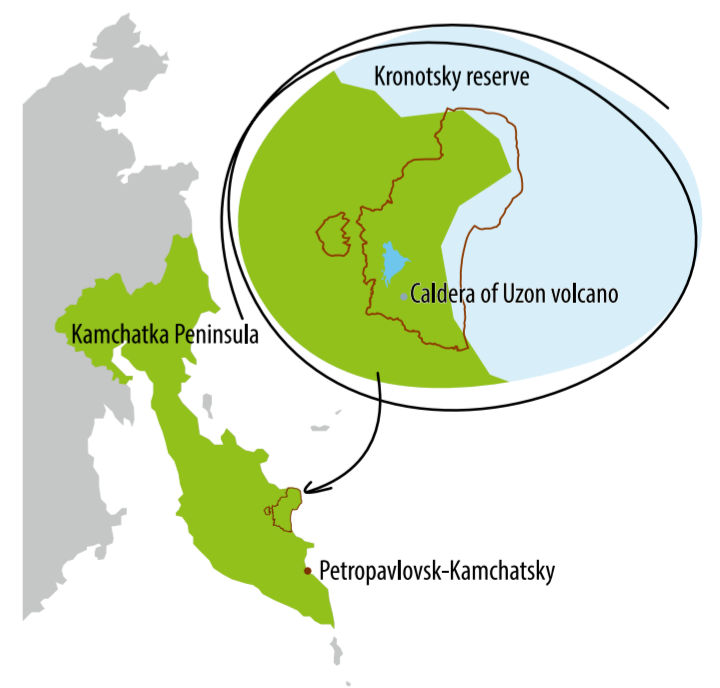
bring any pets with you;



leave garbage;



use drones without permission from the administration of the Reserve.



Kronotsky State Natural Biosphere Reserve was established on November 1, 1934  
 Territory: 1 147 619,37 hectares  
 Water area: 135,000 hectares.  
 International status: since 1985 it has been a part of the International Network of Biosphere Reserves; in 1996 was included in the list of the World Natural Heritage of UNESCO in the nomination "Volcanoes of Kamchatka".