Report on the State of Conservation of the UNESCO World Heritage Property Volcanoes of Kamchatka (Russian Federation, No 765 bis) in 2019

Response of the Russian Federation with regard to Resolution No. 42 adopted by the World Heritage Committee

1. Specification of Territories and Boundaries of "Volcanoes of Kamchatka" World Heritage Property

The World Heritage Site "Volcanoes of Kamchatka" comprises 6 parts – 2 specially protected areas (PAs) of federal significance (Kronotsky Federal Nature Biosphere Reserve and South Kamchatka Federal Sanctuary) and four clusters of "Volcanoes of Kamchatka" Nature Park of regional significance (Nalychevo, Bystrinsky, South Kamchatka and Kluchevskoy Nature Parks). As of November 1, 2017 the total area of the World Heritage Site "Volcanoes of Kamchatka" is 3 959 952,90 hectares, including:

1) 1 484 916,90 ha covered by areas of specially protected areas of federal significance, including:

a) Kronotsky Federal Nature Biosphere Reserve with area of 1 147 619.37 ha;

Kronotsky State Nature Biosphere Reserve is located on the eastern coast of the Kamchatka peninsula in the territory of the Elizovo administrative district within the boundaries: 54°05' - 55°10'N and 159° 35' - 162°10'E.

A 45,794-thousand ha part of Lazovskoye forestry connected to the Reserve territory in 1992 is located separately from the main territory within the boundaries of Milkovo administrative district with the geographical coordinates of 55°05'-55°20'N and 159° 55'-160° 25'E.

№ of point	Geographical coordinates		№ of point	Geographical coordinates	
	X	Y		X	Y
RESERVE MAIN TERRITORY					
reserve boundaries in the Yelizovo district of the Kamchatka region					
н1	690119.96	1499663.06	н930	801060.02	1573859.02
н256	722275.98	1485125.02	н1249	804288.12	1614842.16
н372	753306.96	1475026.94	н1458	772462.08	1636638.70
н520	769479.49	1490368.48	н1694	734113.52	1609062.08
н669	792861.87	1517809.76	н1820	730595.16	1582640.77
н687	801458.28	1524115.00	н1938	721666.51	1530616.34
н697	804965.63	1528847.82	н2131	686448.35	1499270.31

№ of point	Geographical coordinates		№ of point	Geographical coordinates	
	X	Y		X	Y
н764	794314.75	1543921.89			
reserve boundaries in the Milkovo district of the Kamchatka region					
н1	792866.98	1513809.00	н36	800962.47	1517467.98
н5	796616.70	1514166.97	н41	801741.16	1518277.62
н9	797110.48	1514699.19	н46	801855.01	1519182.92
н13	797441.12	1514279.58	н52	801464.53	1520113.81
н15	797696.78	1514087.37	н56	800226.44	1519465.31
н17	798242.66	1514266.24	н61	795637.52	1518546.66
н20	798715.55	1513987.78	н65	793295.71	1516921.66
н26	800310.28	1514067.28	н66	792974.36	1516043.67
н28	800947.19	1514116.63	н69	792864.94	1513890.32
н33	800567.75	1516908.79			
LAZOVSKY CLUSTER AREA					
reserve boundaries in the Milkovo district of the Kamchatka region					
н1	814232.27	1517924.47	н236	792134.70	1497135.01
н18	811627.07	1518943.28	н256	793760.50	1495436.80
н47	809997.93	1516111.22	н287	796190.66	1493599.30
н74	806220.67	1517494.87	н340	799278.53	1490652.02
н75	806162.36	1508966.90	н344	802880.67	1489777.57
н76	801715.47	1509007.81	н347	806022.17	1490150.63
н87	801996.44	1506015.54	н390	811624.83	1493560.91
н88	800180.37	1506029.42	н408	814020.57	1494223.62
н95	798019.74	1508484.81	н436	816595.07	1495901.60
н108	797378.35	1503808.56	н437	818027.94	1495883.44
н111	795607.27	1503522.63	н442	818997.13	1505857.57
н113	794509.00	1505406.80	н445	818139.69	1509857.17
н180	793218.26	1502288.27	н446	815055.13	1513935.85

№ of point	Geographical coordinates		№ of point	Geographical coordinates	
	X	Y		X	Y
н223	792216.81	1498787.47	н447	814587.48	1515930.59
PIKHTOVAYA ROSHCHA CLUSTER AREA					
reserve boundaries in the Yelizovo district of the Kamchatka region					
н1	690479.89	1495923.62	н9	689900.45	1496533.79
н2	690484.84	1496130.27	н10	689853.24	1496395.93
н3	690269.16	1496352.58	н11	689950.01	1496198.68
н4	690207.49	1496349.14	н12	690044.69	1496174.25
н5	690160.59	1496412.67	н13	690119.54	1496210.81
н6	690189.16	1496631.45	н14	690144.21	1496115.90
н7	690171.72	1496697.99	н15	690188.24	1496113.87
н8	689980.42	1496637.24	н16	690378.18	1495915.92

b) South Kamchatka Federal Sanctuary with area of 337 297.53 ha;

The northern boundary passes from the Pervaya River mouth along its right bank to the first major tributary; further to the northeast, to the mouth of the Shumnaya River, along the right bank of the Ozernaya River to the water-parting line of the rivers flowing into the Ozernaya River and the Pauzhetka River; further southward to the left mouth of the Kholodnaya River; further to the southeast to the water-parting line of the rivers flowing into the Pauzhetka River and Kuril Lake, further to the north excluding the Pauzhetka River water basin to the Ozernaya River. Further it goes up the Ozernaya River, along the right-bank of the water-parting line of the Ozernaya and Kayuk rivers; further - along the water-parting line of Kuril lake to the source of the Ilyinskaya River, further along the Ilyinskaya River to the Pacific Ocean coast;

The south-eastern boundary passes from the mouth of the Ilyinskaya River along the eastern coast of the peninsula southward to Cape Lopatka including the 3-mile (5586 m) Pacific Ocean water area and 3-mile of Utashud Island water area;

The southwestern boundary passes from Cape Lopatka along the western coast of the Kamchatka peninsula to the northwest to Cape Kambalny including a 3-mile (5586) water area. From Cape Kambalny along the western coast of the Kamchatka peninsula to the northwest to the mouth of the Pervaya River including a one-mile (1862 m) water area.

2) 2 524463.67 ha of areas of four clusters of “Volcanoes of Kamchatka” nature park of regional significance, including[1]:

a) Nalychevo Nature Park with area of 285 620.7 ha;

The northern boundary: commences at point 112 with the geographical coordinates of 53°43'48.6"N, 158°40‘52‘‘E located 1.2 km to the southwest from the place where the Dzenzur River right nameless tributary flows into the river, to the east as a straight line to point 113 with the geographical coordinates of 53°43’48.5‘‘N, 158°41’48.2‘‘E.

The boundary of the nature park passes from point 113 in the eastern and northeastern directions, along the right side of the Dzendzur River, at the distance of 1 km from the riverbed, crossing the right nameless tributaries, crossing the Kamenisty Stream, to point 132 with the geographical coordinates of 53°46’16.4‘‘N, 158°56’17.7‘‘E located 0.4 km north-east of the *406.4 m* level landmark. Further from point 132, the boundary runs for 3.6 km southward to point 133 with the geographical coordinates of 53°44’19.7‘‘N, 158°56’18.1‘‘E, further for 7.0 km to the east to point 134 with the geographical coordinates of 53°44’23.6‘‘N, 159°2’42.1‘‘E located at the source of the nameless right tributary of the Zhupanova river. From point 134, the park boundary runs up the water-parting line of the Zhupanova River right tributaries through the *580.1* and *660.1* landmarks to point 147 with the geographical coordinates of 53°42’06.2‘‘ N, 159°01’04.8‘‘ E located 0.8 km southward of the *660.1 m* level landmark. From point 147, the boundary extends 8.9 km eastward crossing the Bystraya River and its right tributaries to point 148 with the geographical coordinates of 53°42‘8.3‘‘N, 159°9’12.7‘‘E located in the Neprokhodnaya River bed, at the distance of 2.3 km to the southeast of the *544.6 m* level landmark and at the distance of 1.0 km to the northeast of the *416.5 m* level landmark. From point 148, the boundary runs to the southwest up the Neprokhodimaya River to point 193 with the geographical coordinates of 53°37’28.3‘‘ N, 159°3’31.1‘‘ E. From point 193, the boundary passes 12.7 km to the east to point 196 with the geographical coordinates of 53°37’24.2‘‘ N, 159°15‘0.2‘‘E located at the *1007 m* level landmark.

The eastern boundary: starts at point 196 with the geographical coordinates of 53°37’24.2‘‘N, 159°15‘0.2‘‘ E, the boundary runs for 6.6 km in the southwestern, southeastern directions along the right side of the Vakhil River, crossing its nameless tributaries, at the distance of 1.0 km from its bed to point 205 with the geographical coordinates of 53°34’18.9‘‘N and 159°16‘32‘‘E. From point 205, the boundary runs 8.3 km southward, crossing the streams of Krupeninsky, Vesenny, Gavrilina, to point 207 with the geographical coordinates of 53°29’48.3‘‘ N, 159°16’24.4‘‘ E. From point 207, the boundary stretches 4.2 km in the southeast direction to point 214 with the geographical coordinates of

[1] According to the results of land-survey work of 2019

53°28’17.2‘‘ N and 159°18’32.1‘‘E located in the place where the Gavrilin Stream flows into the Pravaya Ostrovnaya River. From point 214, the boundary runs along the Pravaya Ostrovnaya and Ostrovnaya rivers to point 611 with the geographical coordinates of 53°14’47.2‘‘ N, 159°33’13.4‘‘ E located in the place where the Ostrovnaya River flows into Avachinsky Gulf.

The southern boundary: commences at point 611 located in the place where the Ostrovnaya River flows into Avachinsky Gulf runs along the coastline of Avacha Bay in southwestern direction to point 783 with the geographical coordinates of 53°8’58.9‘‘ N and 159°14’21.4‘‘ E corresponding to the Nalychevo River mouth.

The boundary runs from point 783 along the bank of the Nalychevsky Lagoon, further along the right bank up the Nalychevo River to the mouth of the Mutnaya River (the right tributary of the Nalychevo River), further the boundary passes along the bed of the Mutnaya River to point 1020 with the geographical coordinates of 53°16’27.2‘‘N, 158°57’51.3‘‘ E further to the south as a straight line, crossing the valley of the Mutnushka River, to point 1021 with the geographical coordinates of 53°14‘6.2‘‘ N, 158°57’46.5‘‘ E, corresponding to the *864.2* level landmark. Further to the west as a straight line through the peak with the *2189.3* absolute landmark (Kozelskaya Mountain) to point 1022 with the geographical coordinates of 53°12’55.8‘‘ N and 158°45’12.2‘‘E, corresponding to the *1079.7* landmark (Monakh Mountain), further in the northwestern direction as a straight line, crossing the Zheltukha River and Sukhaya Rechka River to the point 1023 with the geographical coordinates of 53°14‘7.2‘‘ N, 158°40‘ 28.9‘‘ E, corresponding to the *613.1* landmark (Medvezhya Mountain). Further, the boundary runs directly to the north, northwest to point 1024 with the geographical coordinates of 53°17’28.1‘‘N, 158°38‘4.4‘‘E, corresponding to the *1002.2* level landmark, further to the northwest directly to point 1025 with the geographical coordinates of 53°20‘14‘‘N, 158°33‘15.2‘‘E located on the left bank of the Dremuchaya River. From point 1025, the boundary runs down the Dremuchaya River to its mouth (the place where it flows into the Pinachevskaya River) and corresponds to point 1087 with the geographical coordinates of 53°21’49.3‘‘N, 158°24’47.4‘‘E. From point 1087, the boundary runs 5.4 km northwest to point 1091 with the geographical coordinates of 53°22’53.9‘‘ N, 158°20’19.4 ‘‘ E located at the distance of 0.2 km to the southwest of the *306.0 m* landmark.

The western boundary: starts at point 1091 and runs as straight lines between points 1092 with the geographical coordinates of 53°23’1.6‘‘ N, 158°20’31.4‘‘ E, 1093 with the geographical coordinates of 53°23’13‘‘N, 158°20’34.7‘‘ E, 1094 with the geographical coordinates of 53°23’27.8‘‘N, 158°20’7.8‘‘E, 1095 with the geographical coordinates of 53°23’31.5‘‘ N, 158°20’7.5‘‘E, 1096 with the geographical coordinates of 53°23’44.7‘‘N, 158°20’33.2‘‘E, 1097 with the geographical coordinates of 53°23’53.1‘‘N, 158° 20’58.7‘‘E, 1098 with the geographical coordinates of 53°23’53.9‘‘ N, 158°21’8.4‘‘E, 1099 with the geographical coordinates of 53°23’57.7‘‘N, 158°21'8.1‘‘E, 1100 with the geographical coordinates of

53°24’4’‘N, 158°21'2.8’‘E, 1101 with the geographical coordinates of 53°24’14.8’‘N, 158°20’51.2’‘E, 1102 with the geographical coordinates of 53°24’21.3’‘N, 158°20’36.8’‘E, 1103 with the geographical coordinates of 53°24’25.1’‘N, 158°20'37.8’‘E, 1104 with the geographical coordinates of 53°24’25.2’‘N, 158°23'55.8’‘E, 1105 with the geographical coordinates of 53°25’24.5’‘N, 158°23’55.7" E, 1106 with the geographical coordinates of 53°25’24.5’‘N, 158°24’1’‘E, located on the bank of the Valobrnaya River. From point 1106 the boundary runs up the Valobrnaya River to point 1119 with the geographical coordinates of 53°26’42.5’‘N, 158°25’26.5’‘E. From point 1119 the boundary runs eastward as straight lines between points 1119 with the geographical coordinates of 53°26’42.5’‘N, 158°25’26.5’‘ E, 1120 with the geographical coordinates of 53°26’37.2’‘ N, 158°25’48.6’‘E, 1121 with the geographical coordinates of 53°26’37.8’‘N, 158°26’5.4’‘E, 1122 with the geographical coordinates of 53°26’47’‘N, 158°26'16.1’‘E, 1123 with the geographical coordinates of 53°26’54.7’‘N, 158°26’32.3"E located at the water-parting line of the Pinachevskaya and Valobrnaya rivers. Further the boundary passes to the northeast to the water-parting line of the Pinachevskaya and Valobrnaya rivers (the Poyasye Mountain Ridge) to point 1134 with the geographical coordinates of 53°28’27.5’‘N, 158°29’16.1’‘E located on the Kekhkuy Mountain summit. From point 1134 the boundary runs to the northwest along the water-parting line of the Sarainaya, Olkhovaya, Levaya Avacha and Kekhkuy rivers through the *1320.6*, *1248.7* landmarks, bypassing the *1273.3* landmark (Olkhovaya Mountain), through the *1259,3* landmark to point 1152 with the geographical coordinates of 53°32’19.6’‘N, 158°23’36.9’‘E and further along the water-parting line of the Kekhkuy River left nameless tributaries to point 1158 with the geographical coordinates of 53°33’42.9’‘N, 158°25'4.7’‘E located in the bed of the Kekhkuy River. From point 1158, the boundary of the park passes up the Kekhkuy River to point 1176 with geographical coordinates of 53°32’49.1’‘N, 158°27’5’‘E. From point 1176, the boundary passes to the northeast through the water-parting line of the Kekhkuy River right nameless tributaries to the *1194.1 m* level landmark, further as straight lines between points 1182 with geographical coordinates of 53°34’22.6’‘N, 158°28’54.9" E – 1202 with the geographical coordinates of 53°35’11.7’‘N, 158°33’15.6’‘E crossing the valley of the Poperechnaya River, to point 1203 with geographical coordinates of 53°35’12’‘N, 158°33’25.5’‘E corresponding to the *1385.0 m* level landmark. From point 1203, the boundary passes in the general northwestern direction along the water-parting line of the Poperechnaya River right nameless tributaries to point 1210 with the geographical coordinates of 53°36'14’‘N, 158°32’53.5’‘E located on the water-parting line of the Poperechnaya River right nameless tributaries. From point 1210 the boundary runs northward as a straight line crossing the Poperechnaya River right nameless tributary and the Vershinskaya River left nameless tributaries to point 1 with the geographical coordinates of 53°38’51.2’‘N, 158°32'52.4’‘E, located 90 m southeast of the *763.4 m* level landmark. From point 1, the boundary passes in the eastern,

southeastern directions along the water-parting line of the Vershinskaya River left nameless tributaries through the *1050.4 m* level landmark to point 12 with the geographical coordinates of 53°38’45.4’‘N, 158°38’12.6’‘E located in the bed of the Vershinskaya River. From point 12, the boundary runs to the northwest down the Vershinskaya River to point 51 with the geographical coordinates of 53°40’58.4’‘N, 158°36'10.1’‘E located 0.4 km to the east of the mouth of the Tikhaya River. From point 51 the boundary runs in the northeastern direction as a straight line to point 52 with the geographical coordinates of 53°41'2.9’‘N, 158°36’15.9’‘E located in the bed of the Tikhaya River. Further it passes up the Tikhaya River to the mouth of the Tikhiy Stream, further up the Tikhiy Stream to the mouth of its right nameless tributary, corresponding to point 93 with the geographical coordinates of 53°41'9’‘N, 158°39’11.1" E. From point 93, the boundary runs in the northeastern direction as straight lines between points 93 with the geographical coordinates of 53°41'9’‘N, 158°39'11.1’‘E - 103 with the geographical coordinates of 53°43’22.9’‘N, 158°40’28.7" E. Point 103 is located on the right side of the Dzendzur River right nameless tributary. Further to point 112, the boundary passes along the right side of the Dzendzur River right nameless tributary.

The Nalychevo Nature Park includes Krasheninnikov Island located in Avacha Bay opposite the mouth of the Ostrovnaya River. The boundary of the nature park on Krasheninnikov island runs as straight lines between points 1211 with the geographical coordinates of 53°13'30.1’‘N 159°32’11.9’‘E - 1262 with the geographical coordinates of 53°13’25.5" N 159°32’11.9’‘ E along the coastline of Avachinsky Gulf.

b) Bystrinsky Nature Park with area of 1 367 807.3 ha;

The northern boundary: the northern boundary of the nature park starts at point 1 located in the place where the Malaya Teklovayam River flows into the Tikhaya River, with geographical coordinates of 56°49’29.4 ‘‘ N, 157 °48’12.4 ‘‘ E. From point 1 in the middle of the Tikhaya River bed upstream to the place where the Bolshaya Teklovayam River flows into the Tikhaya River, further in the middle of the Bolshaya Teklovayam River upstream to point 240, which has geographical coordinates of 56 °47’58.2 ‘‘ N, 158 °27’59.8 ‘‘ E, corresponding to the place where the Bolshaya Teklovayam River left nameless tributary flows into the river. From point 240 the park boundary stretches for 25.5 km as a straight line in the southeastern direction to the summit of Eggella Hill (the *1052.1* landmark). From the summit of Eggella Hill, the park boundary stretches for 70.0 km as a straight line in the east-northeastern direction to point 261 with geographical coordinates of 56°41'33.5 ‘‘ N, 159°38’32.1 ‘‘ E corresponding to the summit of Aliyah Mountain (the *2598.0* landmark).

The eastern boundary: passes from point 261 southward to the east of the peaks with the *2435.7* (0.7 km from the peak) and *2285.0* (0.5 km from the peak) landmarks through the saddle of Aliya and Chashakondzha mountains between the

glaciers, through the peaks with the *2069.0, 2337.7* landmarks to point 297 with geographical coordinates of 56°36’56.7 ‘‘N, 159°38’56.8 ‘‘ E located on the summit of Chashakondzha Mountain (the *2526.6* landmark). Further from the summit of Chashakondzha Mountain (the *2526.6* landmark), the boundary of the park passes in the general southwestern direction through the peak with the *1320.4* landmark (0.2 km west of this peak), further along the water-parting line of the Pinapil River and the Khrebtovy Stream of the left tributary of the Bolshoi Tigil River, along the Sredinny Mountain Ridge through the peak with the *1346.4* landmark, the peak of Bolshoi Tigil Mountain (the *1437.4* landmark), to point 333 with the geographical coordinates of 56°30’50.3 ‘‘ N, 159°32'39.9 ‘‘ E located on the peak with the *1293.0* landmark. From point 333 along the water-parting line of the sources of the Leviy Stockavken (left tributary of the Bolshoi Tigil River) and Polovinnaya rivers, further in the southern and southwestern directions through the summit of Maly Tigil Mountain (the *1432.4* landmark), peaks with the *1346.0, 1198.0* landmarks to point 377 with the geographic coordinates of 56°24’51 ‘‘ N, 159°28'22.6 ‘‘ E located at the peak with the *1379.4* landmark. From the peak with the *1379.4* landmark the boundary of the park passes to the west along the Sredinny Mountain Ridge through the peaks with the *1403.5* and *1490.8* landmarks to point 418 with the geographical coordinates of 56°24’42 ‘‘N, 159°17’42.5 ‘‘ E located on the summit of the Sredinny Mountain Ridge – the water-parting line of the sources of the Vinvypil and Kreruk rivers. From point 418, the boundary of the park passes through the peak (an 8-meter-high skerry), which is the water-parting line of the source of the Anavgay River and the right source of the Kreruk River, further through the peaks with the *1407.0, 1668.5* landmarks, further the boundary of the park runs southward through the summit of Kreruk Mountain (the *1708.0* landmark), the peak with *1505.1* landmark, the peak of Avulka Mountain (the *1572.0* landmark), through the peaks with the *1617.0, 1595.5, 1763.0* landmarks to point 506 with the geographical coordinates of 56°11’35.4 ‘‘ N, 159°20’44.3 ‘‘ E located on the peak with the *1650.3* landmark. From point 506 the park boundary runs along the water-parting line of the sources of the Anyutin Klyuch Stream and the Sekhlun River, the summit of Ogonsigli Mountain (the *1694.2* landmark), through the Ogonsigli Pass (the *994.7* landmark), further westerly along the Bystrinsky Mountain Ridge through its peaks with the *1634.0, 1584.6, 1339.0* landmarks to Ilarman Pass (the *1031.0* landmark), further along the boundary of the municipal district it passes in the southwestern direction along the Bystrinsky Mountain Ridge which is the water-parting line of the tributaries of the Ilarman and Kavavlya rivers to point 547 with geographical coordinates of 56°12’0.8 ‘‘ N, 159°9’26.3 ‘‘ E located at the distance of 0.4 km to the southeast of the peak with the *1387.0* landmark. Further the park boundary runs along the water-parting line of the Nypkin and Chetlovari Streams, further the peaks with the *1296.8, 1420.2* landmarks, the summit of Chetlovari Mountain (the *1233.4* landmark) at the distance of 0.2 km to the east, through the peak with the *687.0* landmark, further at the distance of 0.25 km to the west of the peak of the *530.6* landmark, further through the peaks with the *688.6* and *462.1* landmarks, further southward along the

water-parting line of the Kavavlya and Bystrya rivers to point 656 with the geographical coordinates of 55°58’31.7 ‘‘ N, 159°9’3.5 ‘‘ E located in the place where the Kavavlya River flows into the Bystraya River. From point 656, the boundary passes along the line connecting points 656, 657 (Kamen Mountain, the *1111.4* landmark), 658 (peak with the *636* landmark), 659 with geographic coordinates of 55°32’43.8‘‘N, 158°54’37.4‘‘E located on peak with the *705.2* landmark.

The southern boundary: passes from point 659 in the general western direction along the water-parting line of the Sukhariki and Kozyrevka rivers through the peaks with the *1196, 1187, 1001* landmarks, Otkrytaya Mountain (1686.4) to point 704 with the geographical coordinates of 55°34’37.6 ‘‘ N, 158°23'40.2 ‘‘ E located on the summit of Kozyrevka Mountain (2015.9). From point 704, the boundary of the park passes in the general western direction along the water-parting line of the Bystraya and Kopylye rivers through the peaks with the *1889.8, 1805.1* landmarks, Snezhnaya Mountain (1950.8), the *1735.1* landmark, Pereval Mountain (1668.5), 1288.8, the *1793.* landmark, Znoynaya Mountain (1730.1), the *1837.2* landmark, Vershina Mountain (1829.0), the *1618.6* landmark, Tumannaya Mountain (1688.8) to point 830 with the geographical coordinates of 55°31’43 ‘‘ N, 158°1’4.9 ‘‘ E located at the source of the Vtoroy Ketochan River. From point 830 the boundary runs down the Vtoroy Ketochan River to point 956 with the geographical coordinates of 55°27’28 ‘‘ N, 157°44'4.9 ‘‘ E located at the confluence of the Vtoroy Ketochan and Perviy Ketochan rivers. From point 956, the park boundary passes down the Ketochan and Icha rivers to the mouth of the Khim River corresponding to the turning point 1074, with the geographical coordinates of 55 °17’49.5‘‘N, 157 °27’2.3‘‘E. From the mouth of the Khim River, the boundary runs to the northwest for 22143 meters to the summit of Urumchan Mountain to point 1075 with the geographical coordinates of 55°21’17.2 ‘‘ N, 157°7’0.5 ‘‘ E. Further, the boundary passes as straight lines connecting peaks with the *1017.4* (Lauchachan Mountain), *536.0* (Balaganchik Mountain), *665.0* (Keshum Mountain) landmarks, corresponding to point 1078 with the geographical coordinates of 55°45’55.2‘‘N, 156°51’53.4‘‘E.

The western boundary: runs from point 1078 in the southeastern direction for 22.7 km as a straight line that runs 0.4 km north of Otdelnaya Mountain with the *502.6* landmark, to the summit of Mountain Keshum Vtoroy with the *885.3* landmark and further in the same direction for 20.9 km as a straight line (at the distance of 0.4 km to the south of Dolinnaya Mountain with the *529.0* landmark and at the distance of 0.25 km to the south of Rezets Mountain with the *1169.0* landmark) to the summit of Lavovaya Mountain with the *1338.5* landmark, further for 3.5 km in a southeastern direction as a straight line to the summit of Dikaya Mountain with the *1385.2* landmark, for 7.5 km in the same direction as a straight line through a peak with the *1723.2* landmark to point 1096 with the geographical coordinates of 55°40’40.5 ‘‘ N, 157°43’0.3 ‘‘ E situated at the summit of Ichinsky Volcano marked 3607.0. Further, the boundary of the park passes from the summit of the Ichinskaya Sopka Volcano in the northwestern direction to the peak with the *1727.6* landmark, further northward along the water-parting line of the Pravaya

Rassoshina, the Nyulkandya and the Galdavit rivers, further in the northeastern direction (0.8 km eastward of Lake Prikrytoe) to the peak with the *1791.2* landmark, further in the northeastern direction along the water-parting line of the Moroshka and Galdavit rivers to point 1117 with the geographical coordinates of 55°46’29.3 ‘‘ N, 157°41’41.1 ‘‘ E located on the summit of the Galdavit Mountain with the *1810.5* landmark. From the summit of Galdavit Mountain, the boundary of the park runs in the southeastern direction (1.3 km) to the peak with the *1573.5* landmark, further goes to the north-northeast, crosses the Pervaya Belogolovaya River at the distance of 0.2 km downstream from the confluence of its two sources, further for 18.3 km as a straight line in the northeastern direction to the summit of Nosichan Mountain with the *1728.6* landmark and further for 35.6 km as a straight line in the same direction through the peak with the *1264.4* landmark to the summit of Chingeyngeyn Mountain with the *1921.7* landmark. Further the boundary goes northward for 4.0 km, further passing 1.0 km to the west of the peak with the *1425.4* landmark turns and runs westward along the water-parting line of the Yanga-Yagai and Emekenvayam rivers and further along the water-parting the line of the Chabo and Emekenvayam rivers (0.3 km to the north of Granichnaya Mountain with the *1004.5* landmark) through the peaks with the *820.1* landmarks, further in the general west-northwest direction through the peaks with the *707.8, 978.0* landmarks to the summit of Nochnaya Mountain with the *1099.1* landmark, further along the water-parting line of the Emekenwayam River and Uglovoy Stream through the peak with the *1103.0* landmark to the summit of Golaya Mountain with the *1264.0* landmark, further along the water-parting line of the Emekenvayam River and the Tayny Stream through the peak with the *977.8* landmark to point 1228, with the geographical coordinates of 56°13’31‘‘ N, 157°50'57.4 ‘‘ E located on the summit of Granichnaya Mountain with the *855.6* landmark.

From the summit of Granichnaya Mountain the boundary of the park runs to the northwest through the peak with the *780.1* landmark crossing the Tayny Stream in 1.5 km from its confluence with the Chabo river, further to the intersection with the Chabo river at point 1236 with the geographical coordinates of 56°16'47.6 ‘‘N, 157 градусов 44’1.9 ‘‘E (at the distance of 1.1 km to the northeast of the place where the Emekenwayam River flows into the Chabo River). From point 1236, the park boundary runs for 17.3 km as a straight line to the northwest to the summit of Bukanya Mountain with the *864.6* landmark, further as a straight line in the northwestern direction to the summit of Pestraya Mountain with the *598.7* landmark, further as a straight line in a northwestern direction to point 1252 with the geographical coordinates of 56°32’1.4 ‘‘ N, 157°28’6 ‘‘ E located in the place where the Shumny Stream flows into the Chananka River. From point 1252, the boundary of the park runs downstream in the middle of the bed of the Chananka River to point 1477 with the geographical coordinates of 56°41’10.3 ‘‘ N, 157 °33’18.4 ‘‘ E. From point 1477, the boundary of the park goes as a straight line for 21.7 km in the northeastern direction crossing a tractor road and an underground cable line at the distance of 8.6 km from the Chananka River, to point 1.

c) Kluchevskoy Nature Park with area of 372 600.76 ha;

1. The northern boundary: from turning point 1 with the geographical coordinates of 56°11’24.3’‘N and 160°6'3.3’‘E, located in the bed of the Ushkovskaya Rechka River at 2.1 km to the south-east from the *96 m* landmark, through point 2 with the geographical coordinates of 56°11’29.3’‘N and 160°9’41.5’‘E it passes for the space of 7.78 km in an eastern direction up to turning point 3 with the geographical coordinates of 56°11’20.3’‘N and 160° 13’33.5’‘E; further from point 3 for the space of 1.77 km in a northerly direction up to turning point 4 with the geographical coordinates of 56°12’17.6’‘N and 160°13’36.7’‘E, located in the bed of a nameless river which periodically dries up; further from point 4 for the space of 2.44 km in an easterly direction up to turning point 5 with the geographical coordinates of 56°12’21.5’‘N and 160°15’7.9’‘E, located to the south of the foot of Kraternyi Rodnik Hill (953 m). Further from turning point 5 the boundary passes for the space of 66.55 as straight lines through turning points 6 - 124 on the northern foot of Kraternyi Rodnik Hills, such volcanoes as Ploskaya Dalnyaya (Ushkovsky), Ploskaya Blizhnyaya (Krestovsky), Klyuchevskaya Sopka (Klyuchevskaya Hill), such hills as Karaulnaya and Tuilo in north-easterly and south-easterly directions, in some places approaching the upper edge of dwarf cedar and dwarf alder brushwood, up to turning point 125 with the geographical coordinates of 56°12’56.5’‘N and 160°49’49.6’‘E, located in the bed of the Krutenkaya River near the eastern foot of Tuilo crater. Further from turning point 125 the boundary passes for the space of 14.07 km as a straight line in an easterly direction through point 126 up to turning point 127 with the geographical coordinates of 56°12’39.5’‘N and 161°3' 25.2’‘E.

2. The eastern boundary: from turning point 127 for the space of 0.83 km in a south-easterly direction up to turning point 128 with the geographical coordinates of 56°12’15.1’‘N and 161°3'44.7’‘E; from turning point 128 in the general south-westerly direction upwards along the north-eastern slope Klyuchevskaya Sopka (Klyuchevskaya Hill) Volcano in the area of an unnamed stream for the space of 19.57 km, in the close vicinity of Podkova Crater (821 m), through turning points 129 - 157 up to turning point 158 with the geographical coordinates of 56°8'25.3’‘N and 160°46’52.7" E; further from point 158 the boundary passes in the general south-easterly direction for the space of 5.61 km through points 159 - 162, crossing the Mezhkraternyi Stream, up to turning point 163 with the geographical coordinates of 56°5’43.3’‘N and 160°49'6.6’‘E, which is located in the bed of the Novyi Stream near the northern Glacier Kellya tounge. Further from turning point 163 for the space of 8.66 km in the general south-easterly direction downstream the Novyi Stream through turning points 164 - 177 up to turning point 178 with the geographical coordinates of 56°5’38.2’‘N and 160°56’40.6’‘E, located in the bed of the Novyi Stream at the distance of 0.8 km to the south-east from the *458 m* landmark. Further from turning point 178 the boundary passes down the slope of Klyuchevskaya Sopka (Klyuchevskaya Hill) Volcano in the general south-easterly direction for the space of 5.38 km as straight lines through turning

points 179 - 182 to turning point 183 with the geographical coordinates of 56°4'52.7''N and 161°1'37.7''E; further from point 183 for the space of 7.01 km practically on the level of 200 m in a southerly direction along the slope of Klyuchevskaya Sopka (Klyuchevskaya Hill) Volcano through turning points 184 - 187 to turning point 188 with the geographical coordinates of 56°01'7.5'' N and 161°02'0.1''E; further from point 188 the boundary passes in a westerly direction for the space of 0.76 km through turning point 189 to turning point 190 with the geographical coordinates of 56°01'3.6''N and 161°01'17.3''E. Further от turning point 190 the boundary, crossing the beds of dry rivers, passes as straight lines in the general southerly direction for the space of 3.18 km through turning points 191 - 193 to turning point 194 with the geographical coordinates of 55°59'21.0''N and 161°01'30''E, located in the bed of the Golubichnaya River near the 244 water level mark. Further from turning point 194 the boundary passes in the general easterly direction for the space of 4.29 km down the bed of the Golubichnaya River through turning points 195 - 204 to turning point 205 with the geographical coordinates of 55°59'37.1''N and 161°5'30.7''E. Further from turning point 205 the boundary passes in the general south-westerly direction for the space of 10.97 km, crossing the Golubichnoye natural limit and such rivers as the Klyuch Lavovyi, Shavrikha, Golubelnaya rivers, through turning points 206 - 211 to turning point 212 with the geographical coordinates of 55°55'17.1" N and 160°58'21.6''E, located in the area of rock residual outcrop agglomeration with the height of 7-13 meters. Further от turning point 212 the boundary for the space of 9.1 km passes in the general south-easterly direction along the left side of the Sukhaya Khapitsa River through turning points 213 - 219 to turning point 220 with the geographical coordinates of 55°52'45.1''N and 161°5'40.4''E, located in the bed of the channel of the GornoTopolovaya River. Further from turning point 220 the boundary passes for the space of 23.5 km in the general south-westerly direction along the left side of the Bolshaya Khapitsa River up-stream through turning points 221 - 241 to turning point 242 with the geographical coordinates of 55°41'45.4''N and 160°57'1.5''E, located at the distance of 1.6 km to the south-west of the mouth of the Levaya Khapitsa River.

3. The southern boundary: from turning point 242 in a south-westrly direction through turning point 243 along the left side of the Levaya Khapitsa River upstream this river, bending round Udachina Lake in the south and Medvezhye Lake in the north, up to turning point 244 with the geographical coordinates of 55°40'35.4''N and 160°50'2.4''E, located 0.9 km to the south-east from the *744 m* landmark. Further from turning point 244 for the space of 3.1 km in the general south-easterly direction through turning points 246 - 249, crossing the Levaya Khapitsa River, up to turning point 250 with the geographical coordinates of 55°39'20.4''N and 160°51'56.3''E, located in the bed of an unnamed right tributary of the Levaya Khapitsa River. Further от turning point 250 the boundary for the space of 1.7 km passes upstream the tributary of the Levaya Khapitsa River through turning points 251 - 253 to turning point 254 with the geographical coordinates of 55°38'35.4''N and 160°51'25.3" E, located in the bed of the tributary.

Further from turning point 254 the boundary passes for the space of 16.5 km as a crooked alignment in the general westerly and south-westerly directions as straight lines through turning points 254 - 309 to turning point 310 with the geographical coordinates of 55°36’29.0’‘N and 160°41'47.0’‘E, located at the water-parting line of the Levaya Khapitsa River and the streams of Listvennyi and Shumnyi which are tributaries of the Pravyi Tolbachik River. Further from turning point 310 the boundary passes as a straight line in a westerly direction through turning point 311 to turning point 312 with the geographical coordinates of 55°36’29.1’‘N and 160°35’51.2’‘E, located on the level of 400 m at the distance of 2 km from the left side of the Listvennyi Stream; further to the south-west as a straight line through turning point 313, crossing the Shumnyi Stream, to turning point 314 with the geographical coordinates of 55°33'43.2’‘N and 160°29’46.7 " E. Further from turning point 314 as a straight line to the west up to turning point 315 with the geographical coordinates of 55°33'47.4’‘N and 160°27’8.2’‘E, located in the bed of the Pravyi Tolbachik River. From turning point 315 the boundary goes to the north upstream the Pravyi Tolbachik River for the space of 2.2 km through turning points 316 - 326 to turning point 327 with the geographical coordinates of 55°34'47.3’‘N and 160°27’6.1’‘E, located in the bed of the river. Further from turning point 327 as a straight line in a westerly direction through turning point 328 to turning point 329 with the geographical coordinates of 55°34'44.3’‘N and 160°14’4.4’‘E, located on the western slope of Dvoynaya Hill; further in the southern direction for 0.8 km to turning point 330 with the geographical coordinates of 55°34'27.2’‘N and 160°14’3.6’‘E. Further from point 330 in a westerly direction for 3.03 km through turning point 331 to turning point 332 with the geographical coordinates of 55°34'24.2’‘N and 160°11’10.5" E, located on the border of Lava natural limit of Yuzhnyi Proryv at the distance of 0.7 km to the east from the *335m* landmark.

4. The western boundary: from point 332 it passes as a straight line in a northerly direction, crossing from south to north the eastern part of the lava Yuzhnogo Proryva and Kekurnoye natural limits, on the western slopes of Kamenistaya and Vysokaya Hills for the space of 10.75 km through turning points 333 - 334 up to turning point 335 with the geographical coordinates of 55°40’10.8’‘N and 160°11’15.4’‘E, located near the western foot of Gorshkova Hill. Further from point 335 in the general south-westerly and westerly directions for the space of 5.33 km the boundary passes down the slope of Gorshkova Hill through turning points 336 - 341 to turning point 342 with the geographical coordinates of 55°39'41.3’‘N and 160°6’32.2’‘E Further from point 342 in the general north-north-westerly direction across the hills Belaya Gorka (376 m) and Krasnaya (373 m) for the space of 15.12 km through turning points 343 - 347 to turning point 348 with the geographical coordinates of 55°47’36.4’‘N and 160°4'41.4’‘E. Further from point 348 the boundary passes for the space of 0.7 km as a straight line to the east to turning point 349 with the geographical coordinates of 55°47’39.5’‘N and 160°5’18.9’‘E; further to the north-north-west for the space of 4 km to turning point 350 with the geographical coordinates of 55°49’49.4’‘N and 160°4 ' 31.7’‘E, located on the left bank of the Sukhaya River at the distance of 3.3 km to the

south-west from the *563 m* landmark. Further from turning point 350 the boundary passes as a straight line in a south-westerly direction for the space of 5.04 km along the left side of the Sukhaya River to turning point 351 with the geographical coordinates of 55°49’26.0’‘N and 160° 9’18.1’‘E. Further from point 351 in the general northerly direction for the space of 40.3 km through turning points 352 - 361, crossing the beds of the Studyonaya, the Kozyrevskaya, the Rybozavodskaya rivers, the Shiroky, the Kopyto, the Dalny, the Trushchobnyi streams and other run-offs taking their rise on the slopes of the following volcanoes: Ostryi Tolbachik, Ploskaya Dalnyaya (Ushkovsky), bezymyannyi and other peaks, to turning point 362 with the geographical coordinates of 56°10’55.5’‘N and 160°6’51.0’‘E, located in the basin of the dry Ushkovskaya River. Further from turning point 362 the boundary passes in a north-westerly direction down the bed of the Ushkovskaya Rechka River through turning points 363 - 365 to the initial turning point 1, where the boundary is closed.

d) South Kamchatka Nature Park with area of 498 434.91 ha.

1.1. The “Severnyi (Northern)” Cluster:

1) the northern boundary: from characteristic point 1 with the geographical coordinates of 52°42’17.2’’N and 158°16'53.8’’E, located on the top of Vilyuchinsky Volcano (2173 m), it passes in an easterly direction for the space of 21860 m as a straight line, connecting the summits with absolute marks *807 m* and *522 m*, corresponding to characteristic points 2 and 3 with the geographical coordinates of 52°42’14.1’’N and 158°27'53.9’’E, 52°41’52.9’’N and 158°33’52.4’’E respectively, to characteristic point 4 with the geographical coordinates of 52°41’39.7’’N and 158°36’13.5’’E, located on Cape Opasnyi of Avachinsky Gulf of the Pacific Ocean;

2) the eastern boundary: from characteristic point 4 in the general southerly direction along the coastal line of the Pacific Ocean for the space of 137097 m through characteristic points 5 - 837 to characteristic point 838 with the geographical coordinates of 52 °13’49.4’’N and 158°24’1.5" E, located in the mouth of an unnamed stream flowing into Mutnaya Bay and taking its rise on the southern slopes of Mutnaya Mountain (755 m);

3) the southern boundary: from characteristic point 838 in a north-westerly direction as a straight line for the space of 34313 m to characteristic point 839 with the geographical coordinates of 52°27’42.2’’N and 158°4’2.9’’E, corresponding to the place where the Osvistannaya River enters the Mutnaya River;

4) the western boundary: from characteristic point 839 as a crooked alignment for the space of 4619 m in the general northerly and north-easterly directions up the bed of the Osvistannaya River through characteristic points 840 - 908 to characteristic point 909 with the geographical coordinates of 52°29’25.3’’N and 158°5’59.4’’E; further as a straight line in the general north-easterly direction for the space of 2107 m to characteristic point 910 with the geographical coordinates of 52°30'31.5’’N and 158 °6’18.6’’E, corresponding to the *975.8 m* landmark, lo-

cated on the right bank of the Osvistannaya River; further from characteristic point 910 the boundary turns in the easterly direction, crosses the Osvistannaya River and passes as a straight line for the space of 12240 m through characteristic point 911 with the geographical coordinates of 52°30’17.7’’N and 158°10’34.2’’E, corresponding to the *1165.7 m* landmark, crossing the Falshivaya River, up to characteristic point 912 with the geographical coordinates of 52°30’47.3’’N and 158°17’03.5’’E, corresponding to the *1305.7 m* landmark; further from characteristic point 912 in a north-easterly direction as a straight line for the space of 10381 m through characteristic point 913 with the geographical coordinates of 52°33’1.6’’N and 158°20’28.4’’E, corresponding to the *1105.8 m* landmark, to characteristic point 914 with the geographical coordinates of 52°35’04.0’’N and 158°22’57.5’’E, corresponding to the *675.7 m* landmark; further from characteristic point 914 it passes for the space of 8119 m as a straight line in a north-westerly direction, crosses the Zhirovaya River, to characteristic point 915 with the geographical coordinates of 52°39’03.7’’N and 158°20’01.4’’E, corresponding to the *817 m* landmark; further from characteristic point 915 for the space of 6941 m it passes as a straight line in a north-westerly direction, crosses the Vilyucha River and reaches initial characteristic point 1, corresponding to the summit of Vilyuchinsky Volcano (2173 m), where the boundary is closed.

1.2. The “Yuzhnyi (Southern)” Cluster:

1) the northern boundary: from characteristic point 916 with the geographical coordinates of 52°26’5.6’’N and 158°55’51.5’’E, corresponding to the summit of Vysokaya Mountain (1234.5 m) it passes as a straight line for the space of 10807 m in the general southerly direction to characteristic point 917 with the geographical coordinates of 52°20’22.2’’N and 158°54’26.6’’E, corresponding to the summit of Zheltaya Mountain (885.0 m); from characteristic point 917 for the space of 11054 m to the south as a straight line through the rise of the Vysoky Stream along its left side, crossing the bed of the stream in its middle reaches, to characteristic point 918 with the geographical coordinates of 52°14’34.0’’N and 158°56’52.0’’E, located in the mouth of the Semeynyi Stream where it enters the Asacha River; further from characteristic point 918 for the space of 10358 m as a straight line in the general north-easterly direction to characteristic point 919 with the geographical coordinates of 52°16’58.9’’N and 158 °05’4.5’’E, corresponding to the summit with the *764 m* absolute landmark, located on the Pemzovyi Ridge; further from characteristic point 919 the boundary passes in the general south-easterly direction, for the space of 3879 m along the crest of the Pemzovyi Ridge - the water-parting line of the Mutnaya and the Asacha rivers, through characteristic point 920 with the geographical coordinates of 52°16’43.5’’N and 158°04’58.8’’E, corresponding to the *653 m* landmark, characteristic point 921 with the geographical coordinates of 52°16’23.5’’N and 158°05’3.8’’E, corresponding to the *916 m* landmark, characteristic point 922 with the geographical coordinates of 52°16’5.3’’N and 158° 05’34.9’’E, corresponding to the *664 m* landmark, characteristic point 923 with the geographical coordinates of 52°16’3.5’’N and 158°06’41.6’’E, corresponding to the *304 m* landmark, to characteristic point 924

with the geographical coordinates of 52°15’51.6’’N and 158°7’12.2’’E, corresponding to the *620 m* landmark; further from characteristic point 924 the boundary passes for the space of 673 m in the general north-easterly direction to characteristic point 925 with the geographical coordinates of 52°16’12.6’’N and 158°7’22.0’’E, corresponding to the *585 m* landmark; further from characteristic point 925 for the space of 2202 m along the crest of the ridge in the general north-easterly direction through characteristic points 926 - 928 to characteristic point 929 with the geographical coordinates of 52°17’11.8’’N and 158°08’22.7’’E, corresponding to the *853 m* landmark; further from characteristic point 929 in the general easterly direction for the space of 1025 m along the water-parting line through characteristic point 930 with the geographical coordinates of 52°17’14.1 " N and 158°9’1.2’’E to characteristic point 931 with the geographical coordinates of 52 °17’15.4 " N and 158°9’17.9’’E, located on the water-parting line of the Mutnaya - the Asacha rivers; further from characteristic point 931 the boundary passes in the general south-easterly direction for the space of 4617 m along the water-parting line of the Mutnaya - the Asacha rivers through characteristic points 932 - 936 to characteristic point 937 with the geographical coordinates of 52°15’47.1’’N and 158°11’39.6’’E, corresponding to the *916 m* landmark; further from characteristic point 937 in the general south-easterly direction for the space of 3974 m along the water-parting line of the Mutnaya - the Asacha rivers through characteristic points 938 - 940 to characteristic point 941 with the geographical coordinates of 52°14’45.5’’N and 158°14’29.1’’E, corresponding to the *664 m* landmark; further от characteristic point 941 in the general south-south-easterly direction for the space of 4002 m along the water-parting line of the Mutnaya - the Asacha rivers through characteristic points 942 - 947 to characteristic point 948 with the geographical coordinates of 52°12’55.4’’N and 158°16’3.9’’E, corresponding to the summit of Topkaya Mountain (304 m); further from characteristic point 948 the boundary passes in a south-south-easterly direction as a straight line for the space of 3806 m, crosses the Mezhdurechnaya channel and the Bolotistaya Tundra natural limit, to characteristic point 949 with the geographical coordinates of 52°11’8.4’’N and 158 °17’42.9’’E, located on the border of the tundra and the forest; further from characteristic point 949 along the water-parting line in the general easterly, south-easterly and southerly direction for the space of 8214 m through characteristic points 950 - 959 to characteristic point 960 with the geographical coordinates of 52°9’38.5’’N and 158°22’58.6’’E, corresponding to the *620 m* landmark, located in the southern part of the Asacha Ridge; further from characteristic point 960 the boundary passes as a crooked alignment for the space of 4491 m in the general north-north-easterly direction along the Asacha Ridge through characteristic points 961 - 968 to characteristic point 969 with the geographical coordinates of 52°11’27.1’’N and 158°24.0’42.5’’E, located on the coast of the Pacific Ocean, in the southern part of Mutnaya Bay on the traverse of Sivuchy Kamen Island;

2) the eastern boundary: from characteristic point 969 it passes in the general southerly direction along the coast line of the Pacific Ocean for the space of

135593 m through characteristic points 970 - 1533 to characteristic point 1534 with the geographical coordinates of 51°26’45.1’’N and 157° 30'5.1’’E, located in the mouth of the Ilyinskaya River, flowing into Vestnik Bay;

3) the southern boundary: from characteristic point 1534 it passes in the general north-westerly direction for the space of 28611 m as a crooked alignment upstream the Ilyinskaya River, along its right bank through characteristic points 1535 - 1650 to characteristic point 1651 with the geographical coordinates of 51°32’2.1’’N and 157°11’56.3’’E, located in the rise of the river; further from characteristic point 1651 as a straight line for the space of 1533 m to the west to characteristic point 1652 with the geographical coordinates of 51°32’1.1’’N and 157°10’36.8’’E, located on the administrative boundary of Yelizovsky and Ust-Bolsheretsky municipal districts; further from characteristic point 1652 the boundary passes for the space of 976 m in north-westerly and westerly directions along the administrative boundary of Yelizovsky and Ust-Bolsheretsky municipal districts to characteristic point 1655 with the geographical coordinates of 51°32’6.7"N and 157°9’49.8’’E, located at the distance of 0.8 km to the west of the *501.2 m* landmark;

4) the western boundary: from characteristic point 1655 it passes along the administrative boundary of Yelizovsky and Ust-Bolsheretsky municipal districts for the space of 12724 m along the water-parting line of the Pravyi Unkanovich and the Ilyinskaya rivers, at the distance of 200 m to the south of the summit with the *731.2 m* landmark in an easterly – north-easterly direction through characteristic points 1656 - 1683 to characteristic point 1684 with the geographical coordinates of 51°34’34’’N and 157°19’32.7’’E, corresponding to the summit of Zheltovskaya Sopka Volcano (the *1957.1 m* landmark); further from characteristic point 1684 the boundary passes for the space of 9614 m in a northerly direction down the slope of Zheltovskaya Sopka Volcano through characteristic points 1685 - 1707 to characteristic point 1707 with the geographical coordinates of 51 °38’39.5’’N and 157°20’53.1’’E, located on the water-parting line of the Zheltaya and the Belenkaya rivers; further from characteristic point 1707 the boundary passes for the space of 1495 m in the general north-north-easterly direction along the water-parting line of the Belenkaya River and the Ostrogornyi Stream (the right tributary of the Vestnik River) through characteristic points 1708 -1709 to characteristic point 1710 with the geographical coordinates of 51°39’24.4’’N and 157°21’20.6’’E, corresponding to the *940.8 m* landmark; further from point 1710 for the space of 1462 m to the north-north-east along the water-parting line of the Belenkaya River and the Ostrogornyi Stream through characteristic points 1711 - 1713 to point 1714 with the geographical coordinates of 51°39’59.4’’N and 157°22’6.7’’E, corresponding to the *712.4 m* landmark; further from characteristic point 1714 for the space of 2087 m through characteristic points 1715-1716 to characteristic point 1717 with the geographical coordinates of 51°40’58.1’’N and 157°22’57.0’’E, corresponding to the summit of Ostraya Mountain (871.9 m); further from characteristic point 1717 the boundary passes for the space of 14611 m in northerly and north-easterly directions along the boundary of Yelizovsky and

Ust-Bolsheretsky municipal districts, along the water-parting line of the Yuzhnyi Ksudach and the Vestnik rivers through characteristic points 1717 - 1748 to characteristic point 1749 with the geographical coordinates of 51°47’6.5’’N and 157°29’13.7’’E, corresponding to the landmark, located on the ridge of Ksudach Mountain; further from characteristic point 1749 in the general northerly direction for the space of 1152 m through point 1750 to characteristic point 1751 with the geographical coordinates of 51°47’36.2’’N and 157°28’39.4’’E, corresponding to the *966.6 m* landmark; further from characteristic point 1751 also in a northerly direction for the space of 2950 m along the ridge of Ksudach Mountain through characteristic points 1752 - 1755 to characteristic point 1756 with the geographical coordinates of 51°49’9’’N and 157° 28’45.4’’E, located on the ridge of Ksudach Mountain ; further from characteristic point 1756 the boundary passes for the space of 11229 m in a north-westerly direction along the water-parting line of the Lukavyi Steram (the right tributary of the Kuzanek River) and the Snezhnyi Stream (the right tributary of the Zapadnaya Khodutka River) through characteristic points 1757 - 1770 to characteristic point 1771 with the geographical coordinates of 51°53’36.8’’N and 157°23’14.4’’E, corresponding to the summit of Ozernaya Mountain (560.3 m); further from characteristic point 1771 the boundary passes in the general northerly and north-westerly directions for the space of 7641 m along the water-parting line of the Kuzanek River and the Zapadnaya Khodutka River through characteristic points 1772 - 1788 to characteristic point 1789 with the geographical coordinates of 51°55'15.5’’N and 157°18’3.8’’ E, corresponding to the summit, located near the south-eastern part of Ploskaya Mountain (689 m); further from characteristic point 1789 the boundary passes in the general north-easterly direction for the space of 7062 m through characteristic points 1790 - 1796, located on the south-easterly and easterly slopes of Ploskaya Mountain, to characteristic point 1808 with the geographical coordinates of 51°57’56.4’’N and 157°20’43.6’’E; further from characteristic point 1808 the boundary passes as a crooked alignment for the space of 5050 m in the general easterly direction through characteristic points 1809 - 1822 to characteristic point 1823 with the geographical coordinates of 51°58’5.4’’N and 157°24’40.9’’E, corresponding to the *646.2 m* landmark; further from characteristic point 1823 in the general northerly and north-easterly directions for the space of 4180 m along the water-parting line of the Levyi Savan River and the Yagodnyi Stream (the left tributary of the Zapadnaya Khodutka River) through characteristic points 1824 - 1829 to characteristic point 1830 with the geographical coordinates of 51°59’43.5’’N and 157°26’23.3’’E, corresponding to the summit of Sopka Kazantseva (828 m); further from characteristic point 1830 in a northerly direction for the space of 3036 m through characteristic points 1831 - 1836 to characteristic point 1837 with the geographical coordinates of 52°1’8.1’’N and 157°27’9.8’’E, corresponding to the *585.9 m* landmark; further from characteristic point 1857 in the general north-easterly, easterly and northerly directions for the space of 31910 m through characteristic points 1858 - 1919 to characteristic point 1920 with the geographical coordinates of 52°9'41.1’’N and 157 °37’48.2’’E, located at the distance of 200 m to the north of the summit of

Kruglaya Mountain (the *1069.4 m* landmark); further from characteristic point 1920 it passes in the general northerly direction along the administrative boundary of Yelizovsky and Ust-Bolsheretsky municipal districts along the water-parting line of the Pravyi Savan and the Asacha rivers for the space of 2258 m through characteristic points 1921 - 1923 to characteristic point 1924 with the geographical coordinates of 52°10’51.5’’N and 157°37’49.2’’E, corresponding to the *889.1 m* landmark; further from characteristic point 1924 the boundary passes in the general northerly direction for the space of 1164 m through characteristic point 1925 with the geographical coordinates of 52°11’13.3’’N and 157°38’2.5’’E to characteristic point 1926 with the geographical coordinates of 52°11’26.9’’N and 157°38’10.3’’E, corresponding to the *833.3 m* landmark; further from characteristic point 1926 in the general northerly and north-easterly directions for the space of 5446 m through characteristic points 1927 - 1937 to characteristic point 1938 with the geographical coordinates of 52°14’1.1’’N and 157°38’51.8’’E, corresponding to the *723.0 m* landmark; further from characteristic point 1938 in the general westerly, north-westerly and northerly directions for the space of 5425 m along the water-parting line of the Tundrovaya River (the right tributary of the Pravyi Savan River) and the Mezhkholmovyi Stream (the left tributary of the Asacha River) through characteristic points 1939 - 1953 to characteristic point 1954 with the geographical coordinates of 52°17’34.9’’N and 157°37’56.4’’E, corresponding to the summit of Kamen Mountain (864.6 m); further from characteristic point 1954 in the general north-easterly direction for the space of 5425 m through characteristic points 1955 - 1965 to characteristic point 1965 with the geographical coordinates of 52°19’20.4’’N and 157°40’41’’E, corresponding to the *722.4 m* landmark; further from characteristic point 1965 in the general northerly and north-easterly directions for the space of 1920 m to characteristic point 1970 with the geographical coordinates of 52°20’14.3’’N and 157°40’37.1’’E, located at the foot of the hill with the *722.4 m* landmark; further from characteristic point 1970 the boundary passes for the space of 9754 m in the general easterly direction, crossing the Mezhkholmovyi Stream at the distance of 400 m from the Vrezannyi Stream (of the basin of the Pravyi Savan River) and the Vrezannyi Stream at the distance of 2500 m to the east from the mouth of its right tributary, through characteristic points 1971 - 1987 to characteristic point 1989 with the geographical coordinates of 52°20’27.7’’N and 157°48’39’’E, located on the water-parting line of the Vrezannyi Stream and its right tributary; further from characteristic point 1989 the boundary passes in the general northerly direction for the space of 2052 m along the water-parting line of the Vrezannyi Stream and Podgornyi Stream (the left tributary of the Asacha River) through characteristic points 1990 - 1991 to characteristic point 1992 with the geographical coordinates of 52°21’26.4’’N and 157°49’28.6’’E, located at the distance of 340 m from the summit of the Asacha Mountain (1909.2 m); further from characteristic point 1992 along the administrative boundary of Yelizovsky and Ust-Bolsheretsky municipal districts in northerly and north-easterly directions for the space of 3975 m through characteristic points 1993 - 1998 to characteristic point 1999 with the geographical coordinates of

52°23’6.1’’N and 157°50’58.2’’E, located on the north-eastern spur of the Asacha Mountain in the rise of the Zaoblachnyi Stream; further from characteristic point 1999 the boundary passes for the space of 4552 m along the water-parting line of the Zaoblachnyi Stream (the left tributary of the Levaya Opala River) and the Gribnaya River (the right tributary of the Mutnaya River), crossing the Zaoblachnyi Stream, through characteristic points 1999 - 2005 to characteristic point 2006 with the geographical coordinates of 52°25’13.8’’N and 157°52’50.6’’E, corresponding to the summit of Golaya Mountain (934.2 m); further from characteristic point 2006 for the space of 1791 m through characteristic points 2007 - 2009 to characteristic point 2010 with the geographical coordinates of 52°25’57.3’’ N and 157°53’46.8’’E, located on the water-parting line of the nameless tributary of the Levaya Opala River and the Gribnaya River; further from characteristic point 2010 the boundary passes for the space of 2200 m in the general easterly direction through characteristic points 2011 - 2014 to characteristic point 2015 with the geographical coordinates of 52°25’54.3’’N and 157°55’42.0’’E, located on the south-western slope of Vysokaya Mountain (1234.5 m); further from characteristic point 2015 the boundary passes as a straight line in a north-easterly direction for the space of 392 m up the slope of Vysokaya Mountain up to initial characteristic point 916, where the boundary is closed.

The organizations, which manage specially protected natural areas of federal and regional significance within the territory of the World Heritage Property “Volcanoes of Kamchatka” - the Federal State Institution “Kronotsky Federal Nature Biosphere Reserve” (FSI “Kronotsky Reserve”) and the Regional Governmental Institution “Nature Park “Volcanoes of Kamchatka” (RGI “Nature Park “Volcanoes of Kamchatka”) – assure that their actual boundaries have not been changed during the reporting period. Insignificant discrepancy with numbers of the areas of PAs within the territory of the World Heritage Property “Volcanoes of Kamchatka”, presented earlier, are not due to actual changes in the areas, but to more accurate mapping of the boundaries of PAs and refinement of the numbers of their areas with the help of geoinformation system.

2. Activities aimed at protecting the areas from poaching

For enhancing the struggle with poaching material needs provision of the inspectorial staff of the Krai State Budgetary Institution (*KGBU*) «Nature Park «Volcanoes of Kamchatka» and reserve areas protection service of the Federal State Budgetary Institution (*FGBU*) «Kronotsky State Reserve» has been considerably improved. Directly in the protected territories the areas of all-year-round and seasonal patrolling are enlarged. As on the 1st of November, 2019, 4 lodges function all-year-round in the territories of the regional Specially Protected Natural Areas (the «Nalychevo», «South-Kamchatsky», «Bystrinsky» and «Klyuchevskoy» nature parks), 11 lodges – in Kronotsky Reserve, 4 lodges – in South Kamchatka Federal Sanctuary. The staff of Kronotsky Reserve includes 150.5 people, the staff of the Nature Park – 48 people.

For controlling the observation of environmental protection regime in the aquatic areas of Kronotsky State Reserve and State Nature Sanctuary of the Federal Significance «South Kamchatsky» sea-patrolling on the «Anisifor Krupenin» vessel is executed, which increases the efficiency of the struggle with violations of special protection regime, including interdicting illegal activity of official and legal entities implementing their activity aimed at extraction and processing of aquatic biological resources, as well as transport logistics companies which implement shipping operations in the border zones of protected natural areas.

Except for the activity of the inspectorial staff, in both organizations managing the components of the «Volcanoes of Kamchatka» World Heritage Site operational groups have been created for struggling with poaching (two groups in the KGBU «Nature Park «Volcanoes of Kamchatka» and three groups in FGBU «Kronotsky State Reserve») which provide protection of the most valuable spawning grounds and control over the places of concentration of the brown bears during the spawning period (July-October), and on the all-year-round basis – the protection of coastal aggregations of bighorn sheep, of the habitats of wild Northern reindeer and others.

For diminishing threats coming from the neighboring areas which border with the World Heritage Property an agreement has been concluded between the FGBU «Kronotsky State Reserve» and the Non-Commercial Organization «Association of Fishery Enterprises of Ozernovsky District», according to which the activity of the operational group responsible for the control over the observation of environmental laws during fishing comprises the spawning water bodies in the close vicinity of the State Nature Sanctuary of the Federal Significance «South Kamchatsky».

Hunting regulation in the territory of nature parks *Nalychevo*, *Bystrinsky*, *South Kamchatka and Klyuchevskoy* is ensured by the following Kamchatka Regionallegal acts:

– Resolution of the Governor of the Kamchatka Territory of July 30, 2018 No. 61 “On Amending the Resolution of the Head of the Kamchatka Region Administration of August 18, 1995 No. 194 “On Establishing of the Nalychevo Nature Park”;

– Resolution of the Governor of the Kamchatka Territory of July 30, 2018 No. 62 “On Amending the Resolution of the Head of the Kamchatka Region Administration of August 18, 1995 No. 192“ On Establishing of the Bystrinsky Nature Park”;

– Resolution of the Governor of the Kamchatka Territory of December 11, 2018 No. 102 “On Amending the Resolution of the Head of the Kamchatka Region Administration of December 14, 1999 No. 284“ On Establishing of a Nature Park of Regional Importance “Klyuchevskoy”;

– Resolution of the Governor of the Kamchatka Territory of April 18, 2019 No. 31 “On Amending the Resolution of the Head of the Kamchatka Region Administration of August 18, 1995 No. 193“ On Establishing of the South Kamchatka Nature Park”;

– special protection and environmental management regime.

Provisions on natural parks established the zoning of their territories with introduction of a special protection regime for each functional zone.

Thus, *special protection zones* have been identified to preserve and restore the unique population of snow sheep living on the rocky cliffs and slopes of the coastal terraces of the southeastern coast of Kamchatka Peninsula, spawning grounds for Pacific salmon, rare and endangered, listed in the Red Book Russian Federation and the Red Book of Kamchatka objects of fauna and flora and their key habitats, places of spring-summer concentration of brown bears, and populations of other economically and scientifically valuable species of flora and fauna and their key habitats.

Within this special protection zone, in addition to the prohibitions established for the entire territory of nature parks (set up by the Provisions of the parks), all types of hunting and fishing are prohibited (with the exception of hunting for scientificand population regulating purposes).

Permitted types of hunting, and sport fishing are allowed in the *zones of regulated tourism and recreation*.

Regulated hunting, including implementation of measures to preserve hunting resources and their habitat, creation of hunting infrastructure within the boundaries of the hunting grounds indicated in the hunting agreements, is permitted in *economically intended zones*.

At the same time, all types of hunting and fishing are prohibited on the territories of nature parks without permits and in violation of the requirements stipulated by the legislation of the Russian Federation.

In order to ensure the protection and preservation of key habitats of rare, endangered, and also some hunting and game species of animals, marine mammals and sea birds, which are decreasing in number, hunting of snow sheep and black-caped marmot is completely prohibited in Nalychevo and South Kamchatka nature parks; hunting of marine mammals and sea colonial birds is prohibited in the territory of the South Kamchatka nature park.

Kronotsky Reserve and South Kamchatka Federal Sanctuary:

According to the legislation of the Russian Federation hunting on the territories of Kronotsky Reserve and South Kamchatka Federal Sanctuary is prohibited:

– According to clause 6.1 of the Provision for the FSI Kronotsky Reserve (Approved by the Ministry of Natural Resources of the Russian Federation on May 16, 2001), any activity contrary to the objectives of the reserve and the regime of special protection of its territory, including fishing, sport hunting and fishing, other uses of the animal world, is prohibited in its territory and in protected water area of the reserve.

– According to clause 11 of the Provisionfor state nature reserves in the Russian Federation approved by Decree of the RSFSR dated 18.12.1991 No. 48 (as amended on 23.04.1996) any activity that contradicts the objectives of the reserve and the regime of special protection of its territory, including commercial, sporting and amateur hunting, and other uses of animal world, is prohibited.

– According to chapter 1 clause 3.1 part 3 of the Provision for South Kamchatka State Nature Sanctuary of Federal Importance (Approved by order of the Ministry of Natural Resources of Russia No. 254 of 19.08.2009) fishing, sporting and amateur hunting are prohibited on the territory of the reserve.

In the period from 2015 to 2019 in the territory of South Kamchatka Federal Sanctuary 7 facts of illegal hunting were revealed.On the territory of the Kronotsky State Natural Biosphere Reserve facts of illegal hunting were not revealed.Regulation of wildlife was not carried out.

3. Monitoring of Nature Complexes of "Volcanoes of Kamchatka" World Heritage Property

In the period of 2010-2018 the following research and monitoring studies were carried out for **Kronotsky Federal Nature Biosphere Reserve** and **South Kamchatka Federal Sanctuary**:

1. Distant and stationary observations of the condition of glaciers and firn fields. *Summary:*One of the most interesting sights of Kronotsky Reserve is represented by numerous snow fields and massive glaciers on the volcanoes. 46 of 414 glaciers in Kamchatka peninsula are situated in the Reserve. Glaciers play an important role in nature complexes, they feed water bodies and maintain the level of air humidity, also rare species of flora and fauna occur at the border of glaciers and other landscape elements. On the basis of nature observation data and GPS-measurements and the data of ASTER satellite survey it was revealed by the researchers that in 2014 the total area of glaciers and firn fields decreased in comparison with the period of 1960s-1970s. In 2015-2016 the conclusions about the withdrawal of Koryto and Kropotkina glaciers in the 20th century were clearly proved. However, for 2017 reverse dynamics is observed – the area of the glaciers increased a little. In 2018 Koryto and Taunshits glaciers were more or less stable. *Relevance for the management:* collected data contributes into the global climate change monitoring. *Executors:* FSI Kronotsky Reserve in collaboration with FSI "Denezhkin kamen" Reserve *Status:* ongoing

2. Monitoring of volcanic and seismic activity. *Summary:*The territory of the Reserve is located in the center of the Eastern volcanic belt represented by the Eastern volcanic ridge and the adjacent plateau. There are 8 active volcanoes in the territory of the Reserve (Kikhpinych, Krasheninnikova, Kizimen, Kronotsky, Komarova, Gamchen, Vysokiy, Taunshits). Practically the total relief of this area is formed by powerful volcanic activity in the late Quaternary period. In general, the Kamchatka peninsula belongs to seismically active zones of Russia. For recording and predicting catastrophic natural disasters, such as earthquakes and volcanic eruptions, a network of observation points was created in Kamchatka, including the territory of Kronotsky Reserve. *Relevance for the management:* Forecast of volcanic activity and dangerous natural processes. *Executors:* the Institute of Volcanology and Seismology FEB RAS, The Kamchatka branch of the Geophysical Service of the Russian Academy of Sciences/ *Status:* ongoing

3. Observations of the geysers regime. *Summary:*As the valley of the Geysernaya river is the only place in the world where geysers appear and disappear due

to natural reasons, the study of geysers mechanism and work is paid great attention to. Constant monitoring of hydrogeological regime has been implemented in the Valley of Geysers since 2007 with the purpose of revealing the dynamics of change after the catastrophic landslide of the 03 July, 2007 and the mudslide of the 03 January, 2014 at such geysers as Velikan, Bolshoy, at the mouth of the Geysernaya River, discrete testing of eleven basic regime geysers and springs as well as constant monitoring of the Mutny (Shaman) Geyser cyclicity in the Uzon caldera (since 2012) have been also carried out. The research is conducted with the use of the U12-015 and HOBO U12-015 loggers. The period of the Velikan Geyser eruptions currently averages 66 minutes; the average period of the Mutny Geyser eruptions is 86 minutes. *Executors:* FSI Kronotsky Reserve in collaboration with the Institute of Volcanology and Seismology FEB RAS. *Status:* ongoing

4. Phenology of plants. *Summary:*Phenologic observations in the territory of Kronotsky Reserve have been carried out since 1969. Changes in phenophases of main species of herbaceous and tree vegetation are observed. The observations are conducted by efforts of state inspectors on the constant phenological routes according to standard methodologies. Multi-year series of data, besides the internal use, take part in the international project «Eurasian Chronicle of Nature - Large Scale Analysis of Changing Ecosystems (ECN)», which is implemented in collaboration with the university of Helsinki. *Relevance for the management:* Plants are the most physiognomic component of the ecosystem and indicator of its health or changes. Phenological observations give information about general trends in ecosystems year life cycle. *Executors:* FSI Kronotsky Reserve in collaboration with FSI "Denezhkin kamen" Reserve. *Status:* ongoing (since 1969)

5. Inventory count of terrestrial invertebrate species. *Summary:*The work on the inventory count of terrestrial invertebrate species is conducted in several fields: herpetobium census by lines of pitfall traps, route censuses of day-flying Lepidoptera, censuses of insects flying to artificial light sources, registration of phyllophagous insects' mass reproduction explosions. As a result of the research data new species of invertebrates appear in the list of Kronotsky Reserve species every year. The definition of species is carried out by the Reserve's own efforts or by means of invited specialists from external Scientific Research Institutions. Currently 889 invertebrate species are described in Kronotsky Reserve, 8 of them are included in the Red Book of Kamchatka, 3 – in the Red List of IUCN. *Relevance for the management:* data needed for planning conservation activities and understanding the condition of conserved species and ecosystems. *Executor:* FSI Kronotsky Reserve. *Status:* ongoing

6. Monitoring of wild Northern reindeer population (*Rangifer tarandus phylarchus*). *Summary:*The decrease in Kamchatka's wild Northern reindeer population size began in the 1970s. It was caused by uncontrolled hunting, extensive development of domestic reindeer breeding and increasing the disturbance factor in winter stay habitats. By 2002 the wild Northern reindeer was preserved only in the territory of Kronotsky State Nature Biosphere Reserve and in its neighboring areas of Eastern Kamchatka. In 2006 wild Northern reindeer of Kamchatka was included in the regional Red Book as a «small-numbered species with reducing population

size and the focal character of spread». In 2011 the population faced critical habitat conditions – winter rains caused the formation of snow ice crust in the areas of mountainous pastures, Kizimen Volcano became active and its main ash-falls covered the traditional places of the hoofed mammals' winter stays. The quantity of the reindeer reached critical values. According to the results of the aerial census the quantity of the wild Northern reindeer was approximately 400 individuals in 2015. During the season of 2016-2017 the group quantity was likely to go on decreasing slightly. According to the results of the aerial census of March 2017, the size of the biggest registered congregation of the animals was only 150 individuals, in general, the population size is estimated at 300 individuals. For the observation of the reindeer population quantity aerial censuses are carried out in winter pastures on a periodical basis of once 2-3 years and annual terrestrial counts are conducted. *Relevance for the management:* data needed for planning conservation activities and understanding the condition of conserved species and ecosystems. *Executor:* FSI Kronotsky Reserve, FSI Sayano-Shushenskiy Reserve, the Forestry and Wildlife Protection Agency of Kamchatka. *Status:* ongoing

7. Study of current evolution processes by the example of Chars (Salmonidae) of Kronotsky Reserve. *Summary:* Chars represent one of the most diverse and adaptive groups of animals inhabiting our planet. The question of modern diversity formation mechanisms is studied by hundreds of researchers all over the world. The group of endemic char forms living in Kronotskoye Lake is one of the most vivid examples of ecological and evolutionary plasticity of the chars in the territory of Russia. It took scientists ten years of research to describe the diversity of chars in Kronotskoye Lake basin. Five new forms were found which differed in the external morphology, feeding habits, reproductive biology. Distinct reproductive isolation between some forms was shown. Also the structure of the Kronotskoye Lake ecosystem was described, main nature factors facilitating the launch and sustainable maintenance of evolutionary processes were revealed. The leading role of the current velocities and the water temperature in the formation of reproductive isolation between the forms with river spawning was shown. At the present moment the sympatric complex of Kronotsky Chars is the most diverse for salmonids all over the world. *Relevance for the management:* data needed for planning conservation activities and understanding the condition of conserved species and ecosystems. *Executor:* FSI Kronotsky Reserve. *Status:* ongoing

8. The census of anadromous Sockeye salmon in Kurile Lake. *Summary:* Sockeye salmonis one of the most valuable species of Pacific salmon. About 80-85% of this species living in Asia reproduce in the basins of the Ozernaya and Kamchatka rivers nowadays. In 1995–2005 the Sockeye salmonschool of the Ozernaya River displayed a high level of quantity comparable with the level of the first ten-year period (1952–1961) of Japanese drift-netting development in the sea. The level of the overall commercial fishery extraction in both periods under consideration and the quantity of the spawning part of the population close to the optimal one were approximately equal. Over the recent 13 years the Sockeye salmon of the Ozernaya River school has been extracted mostly in the framework of the coastal fishing. In2006–2018 the average quantity of the mature part of the school

was 10,6 million individual fish. Since 2006 the population has reached a new, higher population quantity level, which presents the historical maximum (since 1941). In the river areas in 2013-2018 a schedule of pass days in the Ozernaya River was established: two days of fishing – two days of fish passing. It should be noted that the fishery extraction of the Sockeye salmon of the Ozernaya River school during the days of commercial fishing, on the average, during the spawning season did not exceed 90.0% and the pass of sufficient number of spawners to the spawning grounds would be impossible in these conditions. It is on the fish passing days that the pass of Sockeye salmon to the spawning grounds was implemented. As a result, 1.778 million of Sockeye salmon spawners came into Kurile Lake for spawning in 2018, which is within the optimal limits and is sufficient for enlarged reproduction of this Sockeye salmon population in the current period and for providing high quantity runs of mature salmon in the future. *Relevance for the management:* data needed for management of sustainable fishing and conservation of Pacific salmon. *Executor:* Federal State Budgetary Institution of Science "Kamchatka Branch of Russian Federal ResearchInstituteofFisheriesandOceanography" (KamchatNIRO). *Status:* ongoing

9. Monitoring of the quantity of sea mammals. *Summary:* Kronotsky Reserve and South-Kamchatka Sanctuary have a protected marine aquatic area in which 22 species of sea mammals occur the majority of which are included in the red Books and Protected Species Lists of different levels. The investigation of sea mammals is carried out in several fields: registration of encounters with cetaceous, censuses of earless and eared seals on the coastal rookeries, censuses of Northern Sea otters (*Enhydra lutris lutris*) in the coastal aquatic area, observations of the Northern Sea lion population (*Eumetopius jubatus*). The quantity and species diversity of cetaceous and earless seals arouse no concerns and are stable over a number of years. The population of Sea otters is also stable and tends to increase the quantity. It is the condition of the Sea lion population that causes great concerns. Kamen Kozlova (Kronotsky Reserve) is the only reproductive rookery of this species preserved in Kamchatka, there are also several single-male rookeries in the territory of the Reserve and Sanctuary and the peninsula on the whole. The observations of the rookery are conducted with the help of autonomous photocameras. Annually on Kamen Kozlova about 80 cubs of Sea lions are born. Simultaneously, not only in the SPNA, but in the whole world the quantity of this species tends to decrease. As the animals spend only insignificant part of their life in the protected marine aquatic area, the study of the quantity decrease causes requires additional investigations. *Relevance for the management:* data needed for planning conservation activities and understanding the condition of conserved species and ecosystems. *Executor:* FSI Kronotsky Reserve, Kamchatka Branch of Pacific Institute of Geography FED RAS. *Status:* ongoing

10. Monitoring of the quantity of main hunted and game animal species. *Summary:*Monitoring of the quantity of main hunted and game animal speciesin the territory of Kronotsky reserve is carried out every year by means of the winter route census method. Multi-year series of quantity data have been accumulated since 1975. The total length of census routes is 350 – 420 km.

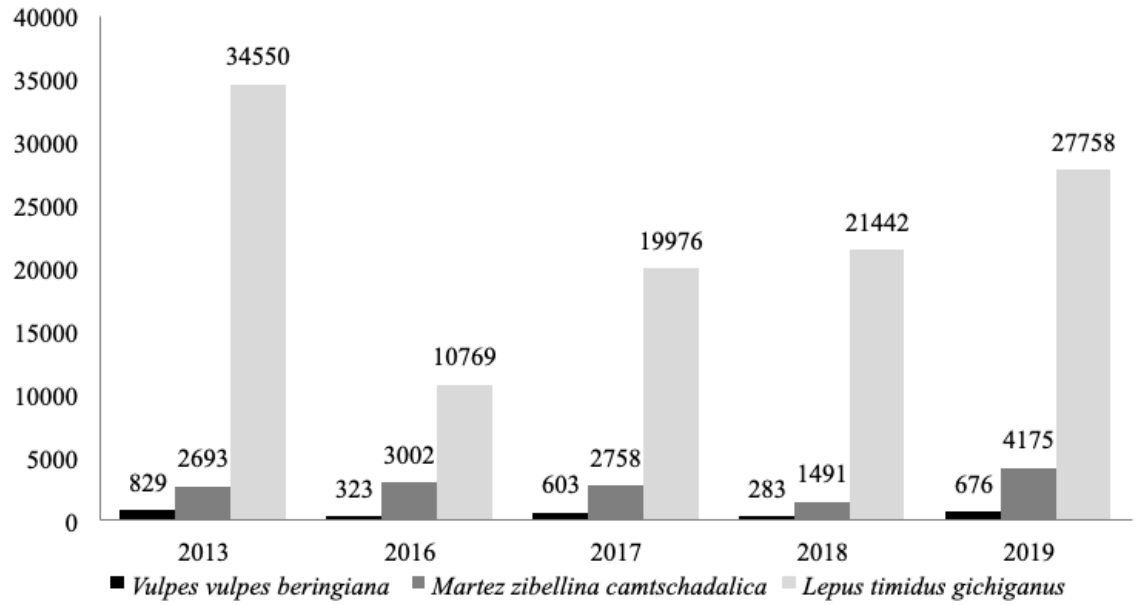

Fig. 1. The dynamics of the quantity of main game animal speciesfor the period of 2013 – 2019[2]

Relevance for the management: data needed for planning conservation activities and understanding the condition of conserved species and ecosystems. *Executor:* FSI Kronotsky Reserve. *Status:* ongoing

10.1. Kamchatka Brown bear (*Ursus arctos piscator*). *Summary:* Kamchatka Brown bear is one of the biggest representatives of this species and the most widely-spread big predator in Kamchatka. Kamchatka bear is an important object of ecotourism, trophy hunting and cultural traditions of the native population. Nowadays the population size in Kamchatka is stable or slowly increasing, in spite of the current increase in the anthropogenic pressure (habitat disturbance; overexploitation of Pacific salmon stocks; direct destruction of bears by hunters and poachers, including selective extraction of big males). The biggest protected population of this species in the world inhabits the South Kamchatka Sanctuary. The count of this predator quantity is carried out by means of aerial census on a periodical basis of once 5 years. According to the latest censuses in the territory of Kronotsky Reserve we have 831 individuals (2013), in the territory of South Kamchatka Sanctuary – 990 individuals (2017). *Relevance for the management:* data needed for planning conservation activities and understanding the condition of conserved species and ecosystems. *Executor:* FSI Kronotsky Reserve, the Forestry and Wildlife Protection Agency of Kamchatka. *Status:* ongoing

11. Ornithological studies. *Summary and management implications:* On the territory of Kronotsky Reserve and South Kamchatka Sanctuary there are more than 240 species of birds, 50 of which are listed in the protection lists of different levels. Significant seasonal concentrations of large birds of prey (Kurile Lake in the Sanctuary, the coast of the Kronotskiy Bay), waterfowl (Olga Bay), including rare ones, are formed almost annually here. The central and northwestern part of Kronotsky Gulf and adjacent coastal territories has the status of a “key ornithologi-

[2]The quantity data for 2014, 2015 are not presented because they are not representative

cal territory (water area)" according to BirdLife International. Large nesting colonies of Aleutian terns (IUCN Red List) are located in this area and significant number of Far Eastern curlews (IUCN Red List) nests. The entire coast, floodplains of large rivers and Pacific salmon spawning grounds, located in their basins – are nesting and autumn-winter concentrations sites of Steller's sea eagles (IUCN Red List). In winter time, a large number of wintering waterfowl gather in Kronotsky Gulf – sailing ducks, blue-headed humpback turps, Siberian gag, gag-comb (IUCN Red List). On the coastal territories of Kronotsky Reserve there are 3 large areas (Semyachik estuary, the area between Tikhaya and Stolbovaya rivers, the lower reaches of Chazhma river) with a rich nesting fauna of water birds. In floodplain and shrubby habitats, a large number of passerines nest. The main ornithological studies are conducted in the following areas:

– Cumulative route counts of birds, allowing to evaluate and control changes in the numbers of different species of birds in the long-term scale. Counts are carried out in different seasons and in different biotopes. Over the past few years, for example, Schapino spruce forests were examined for the first time in winter, as well as the "middle" belt of stony birch forests in summer.

– Monitoring of breeding biology of indicator species (Pacific gull, Alekut tern, Far Eastern Curlew, Steller's sea eagle), with determination of the main reproductive parameters (breeding dates, clutch size and brood, chicks survival). Studies are conducted on model sites or colonies, in addition, regular surveys of the territory are carried out in order to clarify the local breeding ranges of various species.

– Bird counts in seasonal gatherings: monitoring of the largest natural wintering of birds of prey on Kurile Lake (South Kamchatka Sanctuary), counting of waterfowl in wintering concentrations on the Semyachik and Kronotsky estuaries, in Olga Bay and on the coast of the Kronotskiy Peninsula.

– Tagging birds (Steller's sea eagle, Far Eastern Curlew) with remotely identifiable color marks.

– Monitoring and detailed description of local avifauna of territories attractive from the point of view of ecological tourism are carried out. The purpose of the work is to provide managers with sufficient scientific data for planning tourism in these areas and minimizing environmental impacts associated with the presence of people – mainly to develop optimal routes and dates for visiting.

Executors: FSI Kronotsky Reserve in collaboration with Russian scientific institutions. *Status:* ongoing

12. Recreational impact on protected nature complexes. *Summary:*The territories of Kronotsky Reserve and South-Kamchatka Sanctuary are the most important objects not only of environmental significance but also remarkable and significant tourist objects. Annual control over the number of the SPNA visitors is implemented, the dynamics of the visitors number is observed. In 2018 Kronotsky Reserve was visited with different purposes by 6 094 people, South-Kamchatka Sanctuary was visited by 5 201 people, the sum total of all visitors in the two areas was 11295 people. The aggregate annual recreational load on the territory (includ-

ing the aquatic area) of Kronotsky Reserve amounted to 8 108 person-days; on the territory of South-Kamchatka Sanctuary – 9 024 person-days. At that, 61 volunteers in Kronotsky Reserve provide the load of 1 573 person-days; 58 volunteers in South-Kamchatka Sanctuary – 1 521 person-days. The number of volunteers in Kronotsky Reserve remained factually the same as in 2017 (60 people), in South-Kamchatka Sanctuary the number has increased twice (in 2017 29 people visited the Sanctuary with the purpose of rendering volunteer assistance), the volunteer-related load measured in person-days has increased by as much. *Relevance for the management:* collected data is used for managing recreational impacts upon the ecosystems of protected areas as well as for tourism management and planning, and its harmonization with conservation purposes. *Executors:* FSI Kronotsky Reserve. *Status:* ongoing

13. Bear tourism in South Kamchatka Sanctuary and the Valley of Geysers (Kronotsky Reserve): visitors and wildlife monitoring project. *Summary and management implications:* With growth in the numbers of tourists, it is becoming necessary to design mechanisms to provide appropriate visitor experiences that can protect vulnerable ecosystems and reduce the negative impact of tourism. The basis for protection proposal of brown bears – key fauna species of the Sanctuary – are complex scientific studies, providing information on threats to protected species, the factors influencing the population and information for development of practical measures to protect them. The research project is focused on putting together conservation and visitors use interests – gathering knowledge needed to create tools to save the harmony of the place, to preserve this corner of the earth in its pristine form, to keep its animals wild, and to offer visitors the profound experience of bear viewing in natural habitats, or. It utilizes an interdisciplinary approach, including zoological studies of bear-human interactions and sociological studies of visitors' use. The research is conducted on a regular basis in the annual environmental monitoring and the project includes the following works:

– research of tourism impact upon wildlife, local economies and visitors experience;
– creating tools for managing recreation activities in space and time;
– development and implementing a code of ethical bear viewing practices for the area (official guidelines and brochures for tourists);
– trainings in bear viewing guiding for local guides and Reserve’s rangers
– educational and interpretative programmes for visitors

On the results of the work recommendations were developed the implementation of which will make it possible to decrease considerably the impact of the disturbance factor on the animals and the probability of conflict situation occurrence. *Executors:* FSI Kronotsky Reserve in collaboration with Russian scientific institutions. *Status:* ongoing (since 2017), Supported by the Russian Geographic Society

14. Bears and humans in the Southern Kamchatka – sharing one home

Summary and management implications:

– research of bear-human conflicts in settlements of the Southern Kamchatka and during tourism development in South Kamchatka Federal Sanctuary;

– creating framework of wildlife tourism in the Southern Kamchatka with international team of experts;

– capacity building of local guides and rangers in bear ecology and ethics of observation: trainings in interpretation of nature, bear ecology and behavior, creating educational programme and series of field trainings and video-lessons;

– capacity building of local residents in minimizing bear-human conflicts: developing codes of living in bear country and keeping bears wild, developing school educational program about brown bears, implementing educational campaign on garbage keeping;

– working with administrations of settlements and fishing industries on issues of garbage keeping and utilization.

Executors: FSI Kronotsky Reserve in collaboration with Russian scientific institutions and International experts in relevant fields. *Status:* ongoing (since 2018), Supported by the Fund of President's Grunts of the Russian Federation

15. Assessment of values and ecosystem services of Kronotsky Reserve and South-Kamchatka Sanctuary

*Summary:*The projects is an attempt to assess the monetary value of complex natural systems and their services of Kronotsky Reserve and South Kamchatka Sanctuary. Kronotsky Reserve and South Kamchatka Sanctuary provide a wide range of values and benefits for local residents and visitors, as well as play an important role in socio-economic development of local communities and regional economy of Kamchatka through protecting gene pool, habitats and populations of commercial species (primarily — Pacific salmon, bighorn sheep, sable, brown bear, etc.). They also ensure the flow of direct benefits through tourism development, support and help to maintain local culture and livelihoods of remote communities, which are linked to the natural areas, and provide educational, recreational and other services. Calculations that were based on the concept of total economic value demonstrated that the estimated total value of both protected areas was quite significant — about US $ 3.9 billion per year for Kronotsky Reserve, and more than US $ 1.3 billion per year for South Kamchatka Sanctuary. *Direct use value* of ecosystem services that was estimated to be US $ 1.9 million per year for Kronotsky Reserve and US $ 1.1 million per year for South Kamchatka Sanctuary. Tourism benefits make up the most significant part of direct use value (more than US $ 1.5 million per year for Kronotsky Reserve and US $ 0.8 million for South Kamchatka Sanctuary). In addition, tourism development in these areas generates US $ 14.2 million per year of regional multiplier effect, which is 5 times greater than the direct benefits from implementation of ecotourism programs in the Reserve and Sanctuary themselves. The main part (more than 98 %) of economic value of both PAs is *indirect use value*, which is associated with the role of these areas in regulating local and global environmental processes — carbon storing, air purification, protection of habitats and populations of endangered and commercial species, flow regulation, etc. This estimated value amounted to more than US $ 3.9

billion per year for Kronotsky Reserve and about US $ 1.3 billion per year for South Kamchatka Sanctuary. Among the most "tangible" regulatory services for local and regional economies provided by both PAs — ecosystem services associated with protection of habitats and populations of commercially valuable species and rebuilding stocks (primarily — aquatic biological resources), that provide significant revenues for the fishing industry in the region. The *cost of existence*, or *non-use value* of protected areas, that was calculated with an attempt to estimate quite delicate ethical aspects — the intrinsic value of nature itself for local residents and visitors, sacred and spiritual values, and etc. — was measured as residents' and visitors' "willingness to pay" for the existence and conservation of Kronotsky Reserve and South Kamchatka Sanctuary. The estimated value was US $ 19.2 million for the Reserve, and US $ 13.5 million for the Sanctuary. One US $ invested by the state in the preservation of natural ecosystems of these protected areas, provides a flow of ecosystem services worth US $ 2,802 for Kronotsky Reserve, and US $ 1,375 for South Kamchatka Sanctuary and, as a result of maintaining high aesthetic qualities, biodiversity and the recreational value of ecosystems, generates a regional and local multiplier effect of tourism in the amount of US $ 7.43 and US $ 4.60 for the Kronotsky Reserve and the South Kamchatka Sanctuary respectively. *Relevance for the management:* Attempts to assess ecosystem services and natural processes are important steps to improve the competitiveness of nature, and create economic barriers for its over-exploitation. The results of the research were published in a book (**Zavadskaya, A.V.,** Nikolaeva, E.A., Sazhina, V.A., Shpilenok, T.I, Shuvalova, O.V. (2017). *Values and ecosystems services of Kronotsky reserve and South Kamchatka Sanctuary*. Petropavlovsk-Kamchatsky: 244 p.)And series of brochures, and distributed among businessmen, governmental organizations, local communities, scientific institutions, etc. *Status:* completed.

In the period of 2010-2018 the following research and monitoring studies were carried out for **4 regional nature parks** (Nalychevo, Bystrinsky, South Kamchatka and Klyuchevskoy) which are the components of the "Volcanoes of Kamchatka" WHS:

1. Meteorological (weather) monitoring. *Summary:* Daily meteorological observations are recorded by an automatic weather station in Nalychevo and Bystrinsky parks. The recorded parameters: air temperature, air humidity, precipitation, wind direction and strength, atmospheric pressure, dew point. Additionally, inspectors at the cordons do notes about weather in the observation diaries. *Relevance for the management:* data needed for understanding local and global climate conditions, planning touristic and other activities (including helicopter flights) as well as processing results of zoological and botanical studies. *Executors:* RBI Volcanoes of Kamchatka in collaboration with scientific institutions. *Status:* ongoing

2. Visitor use monitoring. *Summary:* The recorded parameters: number of visitors (split into the following categories: residents of Kamchatka, Russian citizens, foreign citizens (indicating the country where tourist came from), duration of a tourist's stay in the park, number of vehicles (helicopters, airplanes, cars, snowmobiles, ATVs, motorcycles, bicycles, dog teams). *Relevance for the management:* collected data is used for managing recreational impacts upon the ecosystems of

parks as well as for tourism management and planning, and its harmonization with conservation purposes. *Executors:* RBI Volcanoes of Kamchatka in collaboration with scientific institutions and universities *Status:* ongoing since 1995

3. Botanical studies (phenological observations and conditions of red-listed orchid plants) *Summary:* The goal of the studies is to identify connections in the "plants – habitat" system. Objects of observation – plants of 36 trivial species. The dates of the main morphological phases of plant life cycle are recorded. Observations are carried out within the Nalychevo intermountain basin and along permanent observation routes. Observations of the state of rare orchid plants listed in the Red Book of the Russian Federation and Kamchatka are carried out within the Nalychevo intermountain basin. *Relevance for the management:* Plants are the most physiognomic component of the ecosystem and indicator of its health or changes. Phenological observations give information about general trends in ecosystems year life cycle. Monitoring of condition of red-listed species is used for identifying the needs in their conservation and planning of conservation activities. *Executors:* staff of RBI Volcanoes of Kamchatka. *Status:* ongoing

4. Monitoring of volcanic activity. *Summary:* Monitoring of volcanic activity, the activity of active volcanoes as well as studies of connection between volcanic earthquakes and volcanic eruptions are carried out for natural parks. Assessment of the activity (state) of volcanoes is made also on the basis of satellite data about thermal anomalies and ash emissions. On the territory of the Nalychevo park, the Avachinsky group of volcanoes has being studied. Seismic monitoring is carried out using a network of RTSS (radio telemetric seismic stations) installed on volcanic structures: Koryaka, Avacha, Somma, Saddle, and Corner. In the area of Cape Nalychevo, the RTSS "Nalychevo" has been installed. Observations are carried out in real time. *Relevance for the management:* Forecast of volcanic activity and dangerous natural processes. *Executors:* the Institute of Volcanology and Seismology FEB RAS, The Kamchatka branch of the Geophysical Service of the Russian Academy of Sciences, in the framework of the program “Seismic Monitoring of Kamchatka and the Komandor Islands”. *Status:* ongoing

5. Zoological monitoring of focal species. *Summary:* Monitoring of ornithological complexes, spatial structure of populations and seasonal distribution of mammals, the state of the population of salmon fish, amphibians, insects is carried out.

During the monitoring the following methods and techniques are utilized:

- spring route counts of animals footprints (since 2018);
- land accounting (for bighorn sheep, 2011, 2012, 2014, 2015, 2017, 2018);
- hunting grooves (for voles and shrews, 2014);
- registration of visual encounters and mapping of habitats of marmot settlements;
- tape accounting of the Kamchatka machaon.

Also zoological data is collected by park inspectors and kept in their diaries.

Relevance for the management: data needed for planning conservation activities and understanding the condition of conserved species and ecosystems. *Execu-*

tors: RBI Volcanoes of Kamchatka in collaboration with scientific institutions and universities. *Status:* ongoing

6. Monitoring of radon emissions into the atmosphere and studying of its effect on biota

Summary: Is carried out in Nalychevo Park. The volumetric activity of radon is recorded at three points (in the aeration zone and in the well #3). *Relevance for the management:* Volumetric concentration of radon is monitored in order to search for precursors of strong earthquakes. *Executors:* Laboratory for a comprehensive study of the precursors of earthquakes and volcanic eruptions of the Institute of Volcanology and Seismology, Far Eastern Branch of the Russian Academy of Sciences. *Status:* completed in 2016

7. Monitoring the state of objects of flora and fauna, environment and biodiversity

Summary: Every year scientific expeditions are conducted to assess the biological diversity of the parks or to study selected species of flora and fauna. According to the results of the expeditions, an annotated list of liverworts of the Nalychevo Natural Park, including 84 species and 2 varieties, of which 33 species are listed for the park for the first time, was compiled. Information about the ecological conditions of growth, the altitude range of distribution in the park, and data on related species is given for each taxon. Some species are proposed for inclusion into the Red Book of Kamchatka. In 2017, the collaboration of specialists from the Kamchatka Branch of Pacific Institute of Geography FEB RAS and staff of the parks in studies of Lake Nalychevo turned out to be very productive: the species *Aegagropila linnaei* was found and entered into the Red Book of Kamchatka based on this find. The habitat of two species of freshwater sponges (invertebrate animals), also included in the Red Book of Kamchatka, has also been confirmed, which made it possible to strengthen the position when including Nalychevo Lake into the special protection zone of the Nalychevo Park. In early September 2018, a researcher of Kamchatka Branch of Pacific Institute of Geography FEB RAS, with the assistance of the staff of the park carried out work to refine the composition of macroscopic freshwater algae and cyanobacteria living in Nalychevo Lake and to take samples to determine the species of midwort living in the lake. As a result of these studies, the colonial form of *Nostoc pruniforme*, cited for this lake at the beginning of the 20th century and have not been noted in the lake until 2018, was found again and its habit was confirmed. The proposal to include the species into the Red Book of Kamchatka had been done. Also it had been proved that *Isoëtes maritima* Underv, listed in the Red Book of the Russian Federation, lives in the Nalychevo Lake, forming extensive thickets in the shallow waters of the lake. In July-August 2018, in the framework of cooperation with Lomonosov Moscow State University, a researcher of the Department of Biology S.M. Lyapkov, has started research on the distribution of lake frogs and Siberian beetles in the Bystrinsky park, which is ongoing now. In addition to the above described biodiversity research projects, staff of the parks is carrying out the following *monitoring studies of individual species* or groups of species:

1) the state of the coastal group of snow sheep *Ovis nivicola nivicola* (Eschscholtz, 1829) population is carried out around Cape Nalychevo (Nalychevo park).

Within the boundaries of nature parks, the state of wild animal populations is assessed as sustainable;

2) the state of model population groups of the black-cap marmot *Marmota camtschatica camtschatica* (Pallas, 1811). Observations of the state of the black-cap marmot colonies are carried out in three areas with an intensive visitors use:

- in the area of Avachinsky Pass (Nalychevo park),
- at the foot of the Mutnovsky volcano (South Kamchatka park),
- in the area of Natural Monument "Polennitsa Mountain" (Klyuchevskoy park).

The most regular and long-term series of observations (for more than 9 years, starting from 2010) is carried out in the area of Avachinsky Pass.

In July-August 2018, a route survey and mapping of a colony of black-cap marmots in the area of Polennitsa Mountain (2 square kilometers), was first conducted. As a result of these studies, 25 individuals were recorded within the colony.

Winter route counts of the number of hunting animal species are carried out annually in Nalychevo and Bystrinsky nature parks.

Among other research projects on biodiversity and selected species, conducted during 2011 – 2018, there are:

– *geobotanical expeditions:*

- in Bystrinsky nature park on the northwestern slope of Ebev-Bunanya mountain on an area of more than 300 square meters, the *Chrysosplenium wrightii* Franch et Savat community was found. The abundance of habitats similar to those in which the species was found, in the central part of the Bystrinskiy park suggests that it is distributed much wider in this part of the park and the Sredinniy (Central) Mountain Range;
- in the vicinity of Ploskiy Tolbachik volcano (Klyuchevskoy park) to the west of Kopyto Mountain at an altitude of 1,039 m above sea level (55° 57.824' N, 160° 14.557' E), two species of vascular plants from the Red Book of Kamchatka were found–*Lomatogonium carinthiacum* (Wulfen) Rchb. and *Leontopodium kamtschaticum* Kom. Both species grew on the mixed grass slope with southeast exposure. Edelweiss was noted earlier in this area only around Ploskaya hill (Ushkovsky volcano);
- a comprehensive geobotanical expedition carried out by specialists of the Botanical Institute by V.L. Komarov RAS, collected data on the lichenology of the Klyuchevskoy cluster. As a result a field identifier of lichens was published (2014-2015). The status of this project is completed.
- the work on the topic: "Preserving the biodiversity of Basidiomycete in the Collection of their Cultures" in Bystrinsky Park and in the Avachinskiy Pass area (2016–2018); the status of the project – ongoing;
- studies of vegetation cover of fluvioglacial surfaces, moraines and slag cones in the region of the Koryak glaciers;

- study of vegetation cover and organization of plant communities in the Tolbachinsky plateau (Klyuchevskoy park);

– *accounting of breeding pairs of birds of prey* at the control site on Cape Nalychevo (2017), conducted by German ornithologists; status – completed;

– *studies of distribution of the lake frog and Siberian beetle* in Bystrinskiy park, and in the central part of Nalychevo park, conducted by senior scientist of Lomonosov Moscow State University and staff of the parks; status – ongoing (since 2017);

– *studies of the diversity of lake forms of char*, living in large lakes, conducted by KamchatNIRO; status – ongoing (started in 2014);

– project *"Characteristics of Pacific salmon stocks in the rivers Nalycheva, Ostrovnaya and Vakhil (southeastern Kamchatka) in 1980–2017"* (by O.M. Zaporozhets and G.V. Zaporozhets). Two of the investigated rivers (Nalycheva and Ostrovnaya) are located within the boundaries of Nalychevo Park. Based on the results of the studies, the following conclusions were made:

- in the basins of the three northernmost rivers of the Avacha Gulf the Vakhil River is considered to have the largest total stocks of Pacific salmon for the period 1980–2017 – an average of ~ 160 thousand individuals a year. It is followed by Ostrovnaya river with ~ 75 thousand individuals and Nalycheva river having ~ 70 thousand individuals per year. In all three rivers, pink salmon accounted for a significant proportion of the resources (68, 64, and 54%, respectively). The next most significant species in Vakhil and Ostrovnaya rivers was chum salmon (15% each), and in Nalycheva river – sockeye salmon (19%). The third by average annual stock in these rivers is coho salmon (13, 14, and 16%, respectively);
- a study of the dynamics of stocks of sockeye salmon, pink salmon, chum salmon and coho salmon of Nalycheva, Ostrovnaya and Vakhil rivers over the past 37 years showed that the average annual number of salmon has generally positive trends only in Vakhil river, while for the other two rivers for most species (except pink salmon) it is negative;

– *databases* on flora, fauna, forest management, nature users (travel agencies, hunting users, etc.), registration of visitors, thermal and cold springs, natural monuments, landscape objects, park infrastructure were being maintained.

8. Salmon monitoring results in the components of the "Volcanoes of Kamchatka" WHS (brief summary)

– Information on salmon populations monitoring results on the WH property is given below according to official information of Kamchatka branch of the Federal State Budgetary Scientific Institution "Russian Federal Research Institute of Fisheries and Oceanography" (KamchatNIRO) from 08.23.2019.

– *South Kamchatka Federal Sanctuary.*Since 2000 an increase in the supplies of Asiatic schools Sockeye salmon has been observed, mainly, at the expense of the school of the Ozernaya River. The amount of runs and coastal catch of Sockeye salmon in this water basin continues to be at a very high level up to now.

– Since 2006 the population has reached the high, historically maximum (since 1941) population quantity level. The population size of the mature part of the

school exceeding 10.0 million individuals was recorded only twice before 2006 – in 1990 and 2002, and over the last 13 years – ten times (in 2006-2007 and 2011-2018). The average quantity of the Ozernaya River school Sockeye salmon return runs in 2006-2018 amounted to 11.8 million individuals, and for the last 5 years (in 2014-2018) —12,2 million individual fish.

– The research performed by KamchatNIRO specialists shows that at the existing in the current period high level of reproduction the filling-up of the spawning grounds in the Ozernaya River (including Kurile Lake) should be kept, on average, within the limits of 1.50-1.80 million of Sockeye salmon spawners (Selifonov, 1988; Bugayev, Maslov, Dubynin, 2009; Dubynin, 2012; Lepskaya et al., 2017; Feldman et al., 2019). According to the calculations, this number of spawners is sufficient for providing maximum return runs.

– For reaching the abovementioned optimum, the collection of operational information on the spawners passing to Kurile Lake spawning grounds is implemented annually during the spawning run. The recording work is executed by means of direct inventories of fish individuals migrating to Kurile Lake through the fish counting facility, as well as with the help of the "Biosonic" hydro-acoustic complex at the cross-sectional area in the middle reaches of the Ozernaya River.

– During the last five years (2014-2018) averagely 1.87 (1.65-2.35) million Sockeye salmon spawners came to Kurile Lake (the Ozernaya River) for spawning.

– Coastal catches of the Ozernaya River school Sockeye salmon in this period averagely amounted to 24.9 thousand tons (from 20.0 to 29.4) per year. It provided, on the average, 84.1% (80.9-87.6) of the total catch along the Western coast of Kamchatka annually. The percentage of the Ozernaya River school Sockeye salmon in the catches of this species around the whole Kamchatka peninsula has been, on average, 64.4% (57.5-69.9) for the last 5 years.

– According to the preliminary data, about 1.8 million spawners (the upper limit of the optimum) came to spawn to Kurile Lake (the Ozernaya River) in 2019, and the coastal catch of the salmon of this school exceeded 24.6 thousand tons. Thus, in 2019 the optimal (from the point of view of salmon conservation) pass of the Sockeye salmon spawners to the basin of the Ozernaya River, first of all to Kurile Lake, was provided; also the commercial development of the valuable water bioresources stocks (of Ozernaya sockeye salmon) was implemented at a high level.

– *Nalychevo nature park.*There are two rivers flowing in the territory of the Nalychevo nature park – the Nalycheva River and the Ostrovnaya River. In the basin of the Nalycheva River Sockeye salmon mainly spawn in Nalychevo Lake and its tributaries, as well as in Ozernaya channel, and only a small portion – in the stony channels along the whole river. In the basin of the Ostrovnaya River this species mainly spawns also in the lakes — Bolshoye and Maloye lakes, and in the middle reaches of the river.

– According to the available data of the catches and passes to the spawning grounds, the quantity of Sockeye salmon stocks in the basin of the Nalycheva River in the period of 1991-2010 was three times as high (about 10 thousand individu-

als) as in the basin of the Ostrovnaya River. On the average, the share of Sockeye salmon in total runs of Pacific salmon to the first of the rivers is approximately ~ 19%, to the second river ~ 9%. As during those years the illegal catch of salmon by poachers in the Nalycheva River was from 40 to 95% of the runs, and in the Ostrovnaya River ~ 10-30%) (Zaporozhets, Zaporozhets, 2011), the real stocks were much larger, in particular, the stocks of Sockeye salmon in the Nalycheva River was on average ~ 40 thousand individuals. As a result of illegal catch, the quantity of Sockeye salmon in the basins of these rivers reduced considerably. For example, the catch of Sockeye salmon in the Nalycheva River decreased from 17.4 tons to 0.006 tons (~ 3,000 times more). And the control catch implemented during the mass run of Sockeye salmon – in the middle of July 2017 – made it possible to catch only 5 individuals of this species in the estuary of the river.

– The summarized catch of Sockeye salmon in 2017 (1.5 tons) is 15 times less than in 2000 (21.6 tons). The examination of Sockeye salmon spawning grounds carried out in 2018 by KamchatNIRO specialists with the help of a quadcopter allowed them to make a conclusion that the quantity of Nalycheva Sockeye salmon is gradually restored. However, for the normalization of this process it is necessary to put an end to poaching not only in the middle reaches of the river, but also in the sea area of its estuary.

– *Bystrinsky nature park.*The «Bystrinsky» nature park is located in the valley of the Bystraya River which is a first order tributary flowing to the mainstream of the Kamchatka River in the middle reaches. In the lower reaches of the Bystraya River the Bystrinskaya small scale hydropower plant is located which is a derivational hydropower plant with a river-intake (drainage canal) that is necessary for the unobstructed run of the salmon for spawning.

– The quantity of the Sockeye salmon reproducing in the Bystraya River basin is relatively low. The maximum pass of spawners before 2006 was registered at the level of not more than 20 thousand fish, with the average pass of 4 thousand fish. In the period from 2007 to the present moment the quantity of the spawners at the spawning grounds has decreased to mean values of 2 thousand fish. The monitoring of Sockeye salmon populations reproducing in the river systems (the Falshivaya River, the Zhirovaya river, the Asacha River, the Khodutka River, the Vestnik River) in the territory of the South Kamchatka nature park, on account of reducing the funding of aero-visual research, was ceased in mid-2000. In the period of regular aerial surveys in the basins of the abovementioned stream flows up to 2.5 thousand fish spawned averagely. The base for reproduction was formed by the populations of Sockeye salmon reproducing in the Asacha и the Bolshaya Khodutka rivers, which accounted for, on average, up to 60% of Sockeye salmon spawners in this area.

– *Kronotsky Reserve.* The salmon populations spawning in Kronotsky reserve are not monitored by KamchatNIRO. The below information is given according to annual research results of staff scientists of the Reserve.

– Several genera of the Salmonid family (*Salmonidae*) are observed in the territory of Kronotsky Reserve: Pacific salmon (*Oncorhyncus*), Pacific trout (*Para-*

salmo) and Chars (*Salvelinus*). Pacific salmon (*Oncorhyncus nerka* (Sockey salmon), *O. gorbusa* (Pink salmon), *O. kisutch* (Coho salmon), *O. tshawytscha* (Chinook salmon), *O. keta* (Chum salmon), *O. masou* (Cherry salmon) are numerous, their quantity is stable and subject to natural fluctuation. The existence of these species is not threatened, therefore no special research on the study of pacific salmon is conducted. Pacific trout (*Parasalmo mykiss* (Raibow trout)) are small in numbers and choose specific conditions for habitation, therefore they occur only in several rivers of the Reserve. The existence of this species is not threatened either. Special attention should be paid to the populations of the Char genus (*Salvelinus malma* (Dolly Varden), *S. leucomaenis* (White spotted charr)). Representatives of this genus are characterized by high ecological plasticity and live everywhere, practically in all the water-bodies of Kamchatka. It can be said that Kamchatka in general and Kronotsky Reserve in particular are one of the biggest center of new Char forms evolution. Several unique groups of Char forms were found and described in the Reserve, they were found in Kronotskoye Lake and in the lakes of the Uzon Volcano Caldera. Representatives of this genus are an important object of study for modern sympatric evolution. Also recent research made it possible to reveal several epibiotic forms of Chars. In the Specially Protected Nature Area there are no threats for the existence of these species but on the whole the species is subject to severe pressure on the part of the fishers. For decreasing the impact made and supporting the population some representatives of the Char genus were included into the Red Book of Kamchatka in 2018.

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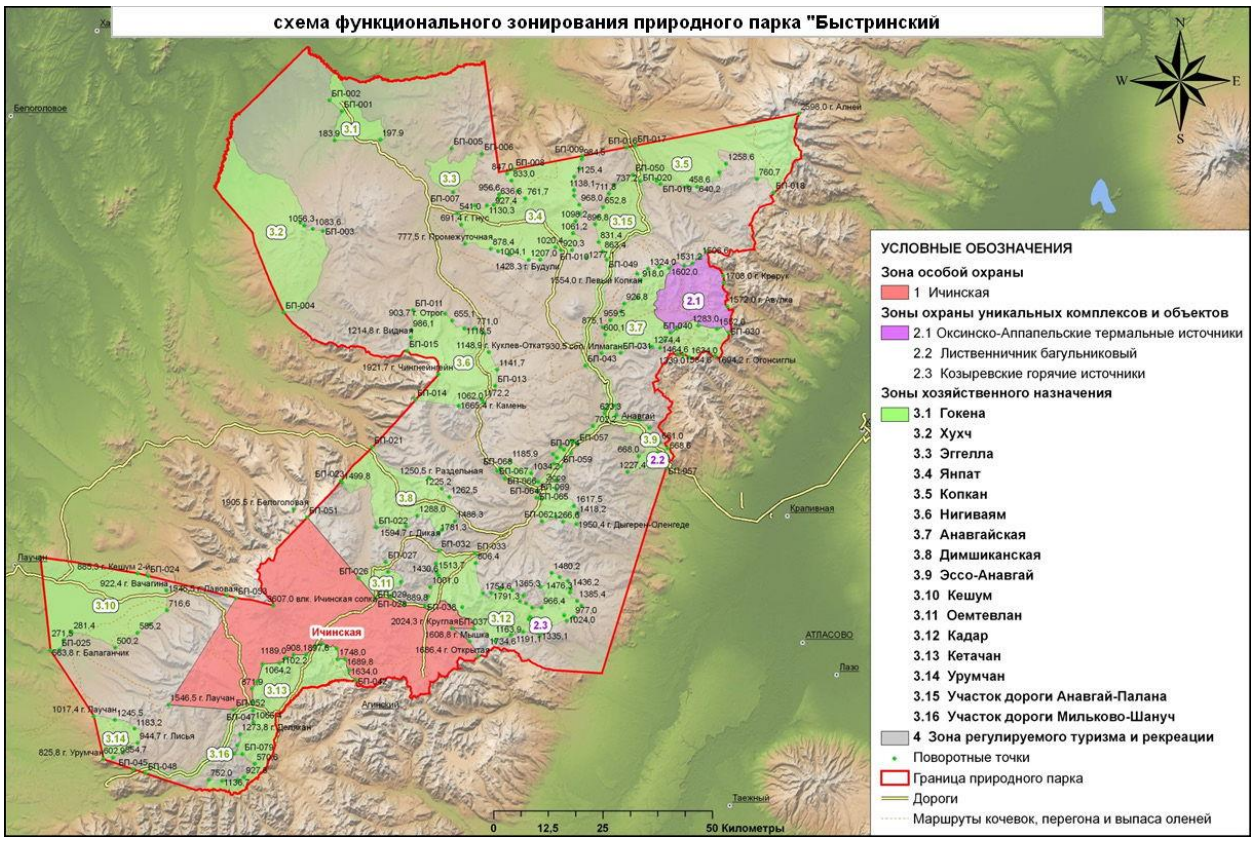
4. Regime of zonation and activity allowed in the territory of the «Volcanoes of Kamchatka» Nature Park

“Bystrinsky” nature park



Territory protection regime of "Bystrinsky" nature park. The special protection regime of the Nature park's territory is a complex of administrative and legal measures aimed to regulate issues concerning permissible types of activity implemented by economic entities and individuals in the territory of the Nature park.

The functional zonation of the Nature park's territory reflects space differentiation of its nature protection regimes, permitted kinds of economic and other activity.

Within the territory of the Nature park types of economic and other activity causing the reduction of ecological, aesthetic, cultural and recreational value of the area can be prohibited.

Commercially oriented production of fine arts items, printed materials, souvenirs and other replicated products and goods of people's consumption with the use of brand marks and the name of the Nature park is implemented in accordance with the established procedure with the permission of the Institution.

Project documentation of the objects which are intended to be built or reconstructed in the territory of the Nature park is to be subject to the state ecological expertise of the regional level, with the exception of project documentation of the objects specified in sub-section 71, article 11 of the Federal Law of 23.11.1995 № 174-FZ «On ecological expertise».

In the territory of the Nature park activity is prohibited that causes change in historically formed nature landscape , reduction or destruction of ecological, aesthetic and recreational properties of the Nature park, violation of historical and cultural landmarks maintenance regime. Such types of activity include:

- Provision of land (forest) sites for purposes which are not connected with

the goals of creation and functioning of the Nature park, including individual home building, gardening and vegetable gardening;

- Activity causing defection, damage, destruction of nature complexes and objects, relief forms, geological deposits, mineralogical formations, natural, archeological and cultural sites, soil and vegetation cover, rare plant species habitats and habitats of rare animal species included in the Red Book of the Russian Federation and the Red Book of Kamchatka krai;

• Activity on utilization of protection forests of the Nature park, incompatible with their special purpose and useful functions, including the following:

a) construction, reconstruction of objects including linear-type ones without experts' positive decision in the framework of state ecological expertise;

b) wood logging in the form of clear cutting and selective cutting (with the exception of cases specified in points 5 - 7 of part 3.11, point 8 of part 3.19, point 9 of part 3.21 of this section);

c) collecting comestible forest resources, medicinal herbs, other non-wood forest resources (with the exception of citizens' gathering such resources for their individual needs);

d) water logging (rafting along water channels and water bodies);

e) processing of timber and other forest resources;

f) growing fruit, berry, decorative, medicinal plants in the forest areas;

• Development of mineral resources deposits, exploration and other types of work connected with subsurface resources management, with the exception of work on geological study, prospection and extraction of widespread mineral resources required for construction and road- works, as well as work on geological investigation aimed at the search and assessment of subsurface water supplies (drinking water, technical water, mineral water and heat energy water), work on subsurface waters extraction according to the established legal procedure;

• Execution of blasting work, with the exception of liquidation cases and emergency prevention;

• Execution of hydro-ameliorative, irrigational, bottom-deepening and other types of work associated with changing the bottom, banks and water protective zones of water bodies, with the exception of liquidation cases and emergency prevention;

• Hiking tourism, horse-riding (with the exception of activity connected with Northern domestic reindeer breeding, other kinds of traditional extensive nature exploitation, hunting industry), travelling of mechanical transport means beyond the roads of common use and established routes of travel;

• Parking all types of mechanical transport means beyond specially equipped places, with the exception of liquidation cases and emergency prevention, as well as snowmobile vehicles in the period of constant snow cover formation (with consideration for the requirements of point 6 part 3.16 of this section);

• Landing aerial vehicles beyond specially provided places, with the exception of emergency liquidation and emergency prevention cases, organization and implementation of election campaigns, activity connected with Northern domestic reindeer breeding, other kinds of traditional extensive nature exploitation, hunting

industry (at that for the purposes of this Provision Northern domestic reindeer breeding refers to a kind of traditional economic activity of small-numbered peoples that provides preservation of Northern ethnos lifestyle, culture and traditions, sub-branch of animal breeding);

- Travelling of any watercrafts equipped with combustion engine along the water bodies, with the exception of watercrafts used by the Institution employees who are engaged in performing their area protection tasks;
- Violation of fire safety rules in forests, including making up the fire beyond specially provided places, vegetation burning, agricultural burning, with the exception of fire protection activities;
- Disposal of production and consumer waste, arrangement of places (grounds) of temporary waste accumulation in disregard of requirements of the Federal Law of 24.06.1998 № 89-FZ «On production and consumer waste»;
- Burning of production and consumer waste;
- Damage and pollution of lands;
- Storage of combusting and lubricating materials beyond specially established and equipped places;
- Arrangement of animal burial sites, cemeteries, radioactive, chemical, explosive, toxic, noxious and poisonous substances;
- Introduction of live organisms, hybridization of fauna objects, artificial reproduction of water bioresources, aquaculture (fish farming);
- Fish farming amelioration;
- Usage of toxic chemical substances for protecting and guarding forests, as well as with scientific purposes;
- Pollution of the aquatic areas of water bodies, their water protection zones, ground waters with production and consumer waste; wash of transport devices in the water bodies;
- Usage of water objects including thermo-mineral springs without permits for the right of use of the water object and entrails;
- Usage of the water object coastline buffer zone with violation of restrictions of economic and other activity (special regime) established by the water legislation;
- Implementation of tourist and recreational activity with commercial purposes, conducting sports, mass cultural and other events, including those connected with the use of horses and mechanical transport means, including snowmobiles, beyond specially provided functional zones;
- Staying at tourist lodgments, camps and bases, places of servicing visitors and other places of peoples mass presence with firearm, pneumatic and bladed weapons, with the exception of officials of the Russian Federation state power executive bodies, executive organs of Kamchatka krai and their subordinate bodies authorized to implement state supervision in the sphere of protection and exploitation of specially protected areas of regional significance, inspectors of regional state ecological supervision authority, federal state forest supervision authority (forest service), federal state supervision in the sphere of protection, reproduction and utilization of fauna objects and their habitat authority, federal state control (supervision)

in the sphere of fishery and water bioresources preservation authority, federal state hunting supervision authority, representatives of hunting control within the boundaries of hunting lands specified in hunting industry agreements, in case they have a staff pass and documents confirming the presence of these officials in the territory of the Nature park for work-related purposes, in the discharge of their duties, as well as of the territories of bases (camps) which belong to people implementing activity in the sphere of hunting industry, domestic reindeer breeding;

- All types of hunting and fishing without permits and in breach of the requirements established by the Russian Federation legislation;
- Unauthorized archeological excavations, collection and transportation of items that have historic and cultural value;
- Destruction or damaging of boom barriers, information boards, stands and other information signs and pointers, equipped ecological tracks and recreation places (camps) and their facilities, making unauthorized inscriptions on stones, trees, structures and information signs.
- In the whole territory of the Nature park the following kinds of economic and other activity are allowed:
- Scientific-research activity aimed at the study of biological and landscape diversity, dynamics and structure of nature complexes and objects including creation of zoological, botanical, mineralogical and paleontological collections according to the procedure established by the Russian Federation legislation and this Provision;
- Monitoring of the environment condition (ecological monitoring);
- Execution of environmental and biotechnical activities (aimed at preserving, restoring and maintaining in balanced condition nature ecosystems, preserving and restoring the habitats of flora and fauna that need special protection measures);
- Reintroduction of extinct species of animals, plants and mushrooms;
- Execution of activities aimed at forests reproduction, their productivity increase and their useful functions preservation, including activities on reforestation, forest care with the consideration of peculiarities of forest exploitation, protection, guarding, reproduction in specially protected areas approved by the Order of the Russian Federation Ministry of Natural Resources of 16.07.2007 № 181;
- Clear-cutting in case selective cutting does not provide the replacement of forest ranges which lose their environment-forming, sanitary and hygienic, health-improving and other useful functions by other forest ranges which preserve the intended purpose of protection forests and their useful functions;
- Selective cutting of forest range with the purpose of providing sanitary and fire safety, the intensity of the cutting does not exceed 10%;
- Execution of activities on protection of forest from pollution and other negative impact including measures aimed at preserving forest range, forest soil, fauna objects habitats, other nature objects in the forests;
- Clearing of forests from littering in case there is a threat of hazardous organisms foci appearance or for fire safety in the forests;
- Execution of activities on recultivation of damaged lands (liquidation of

accumulated ecological damage), also by means of reforestation;

- Storage and gathering of the following by citizens for their individual consumption: non-wood forest resources, forest food resources and medicinal herbs, with the exception of plant objects included in the Red Book of the Russian Federation or the Red Book of Kamchatka krai, as well as implementation of the above-mentioned activity in the Nature park's zone of special protection;
- Northern domestic reindeer breeding;
- Ecological and educational activity;
- Scientific tourism.
- Taking into account ecological, recreational and historic-cultural value of nature complexes and objects, other features of the Nature park, they established a differentiated regime of its special protection and natural resource exploitation by means of distinguishing the following functional zones:
- zones of special protection;
- zones of unique nature complexes and objects protection;
- zones of regulated tourism and recreation;
- economically intended zones.

The zone of special protection is designed for the preservation in pristine condition and restoration of special, irrecoverable, environmental, scientific and aesthetic significance of unique nature objects and landscapes, Pacific salmon spawning grounds, rare and endangered species of animals, plants, fungi, thermophilous and other organisms and their habitats which are included in the Red Book of the Russian Federation or the Red Book of Kamchatka krai and are of economic and scientific value.

- Within the zones of special protection, in addition to the prohibitions stated in part 3.10 of the this section, the following is prohibited:
- Implementation of any economic, recreational and other activity, including recreation and tourism (with the exception of organized scientific tourism and activity associated with Northern domestic reindeer breeding);
- All kinds of hunting (with the exception of extraction of animal objects with the purpose of their quantity regulation);
- All kinds of fishing (with the exception of winter amateur ice fishing in the water bodies of fishery importance in case of having a permit for visiting which is given by the Institution and provided the observation of fishery rules);
- All kinds of fishing at Angre Lake;
- All kinds of forest resource exploitation;
- Travelling of mechanical transport means, horses, helicopters and other aircrafts at the altitude lower than 500 meters from the earth surface without the Institution's permission, as well as landing of helicopters and other aircrafts, parking of mechanical transport means beyond specially designated places (with the exception of emergency liquidation and emergency prevention cases, execution of scientific and regulation-related activities, activity connected with Northern domestic reindeer breeding, as well as with the Institution's tasks performance);
- Presence in the territory with dogs including hunting dogs (with the excep-

tion of activity connected with Northern domestic reindeer breeding);

• Arrangement and equipment of stopping places, tent camps, campfire sites beyond specially designated places (with the exception of activity connected with Northern domestic reindeer breeding).

The zone of unique nature complexes and objects protection is designed for the preservation in natural condition of some particular nature complexes and objects that are of special environmental, scientific, cultural, aesthetic, recreational and health-related importance, including discharge areas of natural thermal and mineral springs and their unique ecosystems in pristine condition, as well as isolated habitats of rare plant, fungus and animal species which are included in the Red Book of the Russian Federation or the Red Book of Kamchatka krai.

Within the zone of unique nature complexes and objects protection, in addition to the prohibitions stated in part 3.10 of the this section, the following is prohibited:

• Construction, reconstruction and exploitation of any objects, with the exception of the objects necessary for the Institution for the implementation of its tasks, as well as the objects of recreational, forestry and hunting infrastructure;

• All kinds of fishing and hunting (with the exception of extraction of animal objects with scientific and quantity regulation purposes, with the purpose of traditional extensive natural resource exploitation);

• Use of horses (with the exception of activity connected with Northern domestic reindeer breeding);

• Landing and parking of helicopters beyond specially equipped grounds with hard covering (with the exception of emergency liquidation and emergency prevention cases, organization and implementation of election campaigns, activity connected with Northern domestic reindeer breeding and other kinds of traditional extensive nature exploitation, execution of activities with scientific and quantity regulation purposes, activity connected with the Institution’s tasks performance);

• Arrangement of grounds for helicopters parking at a distance less than 200 meters from the border of thermal (mineral) waters discharge;

• Parking of all kinds of mechanical transport means at a distance less than 150 meters from the border of thermal (mineral) waters discharge;

• Unauthorized arrangement of stopping places, recreational places, including tent camps, campfire sites, picnic areas (with the exception of activity connected with Northern domestic reindeer breeding).

Within the zone of unique nature complexes and objects protection regulated use of unique nature complexes and objects with scientific, ecological and educational, recreational and balneological purposes is permitted within the scope of their established recreational capacity and terms of visit.

The zone of unique nature complexes and objects protection includes three parts with the total area of 21 812 hectares:

• The zone of unique nature complexes and objects protection «Oksinsko-Appapelskiye thermal springs» with the total area of 21 346 hectares;

• The zone of unique nature complexes and objects protection «Kozy-

revskiye hot springs» with the total area of 368 hectares;

• The zone of unique nature complexes and objects protection «Larch cajandery/Listvennicnik bagulnikovyi» with the total area of 98 hectares.

The economically intended zone is designed for the implementation of economic activity permitted by the current legislation and the given Provision, including activity on providing comfortable rest, recreational and tourist infrastructure, cultural and information service rendering to the visitors of the Nature park.

In the economically intended zone the following is allowed:

• Construction, reconstruction, repair and exploitation (at specially designated land plots) of economic and other objects necessary for conducting permitted economic activity, which are also used for providing the Institution's activity (with the observation of requirements specified in part 3.5 of the given section);

• Construction, reconstruction, repair and exploitation (at specially designated land plots) of tourist infrastructure objects, including leisure bases, hotels, excursion tracks and routes, stationary observation points, observation grounds, stopping places, parking lots for mechanical transport means, places for tent camps location, picnic areas, campfire sites (with the observation of requirements specified in part 3.5 of the given section);

• tourism;

• touristic and recreational activity;

• implementation of traditional extensive natural resource exploitation;

• running hunting industry, including execution of activities aimed at preserving hunting resources and their habitats, creating hunting infrastructure within the boundaries of hunting areas specified in hunting industry agreements;

• amateur and sports fishing;

• temporary disposal of waste (for the period not more than 6 months) in places (on the grounds), specially defined by the institution and equipped according to the Russian Federation legislation requirements in the sphere of environmental protection, with the purpose of further utilization, transportation and disposal of waste at waste disposal objects;

• Storage, gathering and processing of wild fruit, berries, nuts, mushrooms, other edible forest resources (food forest resources), non-wood forest resources, as well as selective cutting executed by legal entities and private entrepreneurs implementing recreational and hunting activity with the purpose of logging timber for their needs (on agreeing the places of cutting and the volume of wood with the Institution);

• Placement of roads, power lines, other linear objects;

• Conducting socially important sports and mass cultural events.

The economically intended zone may be distinguished according to the established procedure within the zone of regulated tourism and recreation in the process of further development of the Nature park recreational infrastructure (in accordance with the prospective Plan of Development of the Nature Park agreed with the Ministry).

The zone of regulated tourism and recreation is designed for organization of regulated tourism and recreation of citizens in the wild nature conditions, seeing the sights of the Nature park, permitted kinds of hunting, amateur and sports fishing.

The zone of regulated tourism and recreation is designed for organization of regulated tourism and recreation of citizens in the wild nature conditions, seeing the sights of the Nature park, permitted kinds of hunting, amateur and sports fishing.

Within the zone of regulated tourism and recreation the following is allowed:

- Construction, reconstruction, repair and exploitation (at specially designated land plots) of economic and other objects necessary for conducting permitted economic activity, which are also used for providing the Institution's activity (with the observation of requirements specified in part 3.5 of the given section);
- Construction, reconstruction, repair and exploitation (at specially designated land plots) of tourist infrastructure objects, including leisure bases, hotels, excursion tracks and routes, stationary observation points, observation grounds, stopping places, parking lots for mechanical transport means, places for tent camps location, picnic areas, campfire sites (with the observation of requirements specified in part 3.5 of the given section);
- tourism;
- touristic and recreational activity;
- implementation of traditional extensive natural resource exploitation;
- running hunting industry, including execution of activities aimed at preserving hunting resources and their habitats, creating hunting infrastructure within the boundaries of hunting areas specified in hunting industry agreements;
- amateur and sports fishing;
- Northern domestic reindeer breeding and other kinds of traditional extensive natural resource exploitation;
- Storage, gathering and processing of wild fruit, berries, nuts, mushrooms, other edible forest resources (food forest resources), non-wood forest resources, as well as selective cutting executed by legal entities and private entrepreneurs implementing recreational and hunting activity with the purpose of logging timber for their needs (on agreeing the places of cutting and the volume of wood with the Institution);
- Conducting socially important sports and mass cultural events.

"Klyuchevskoy" Nature Park

In compliance with the Provision on "Klyuchevskoy" Nature Park and according to nature characteristics, goals and tasks and of the territory a differentiated regime of protection, conservation and environmental management is established on the territory of the Nature Park.

To protect biological objects, nature, historical and cultural complexes and objects they distinguish the following zones:

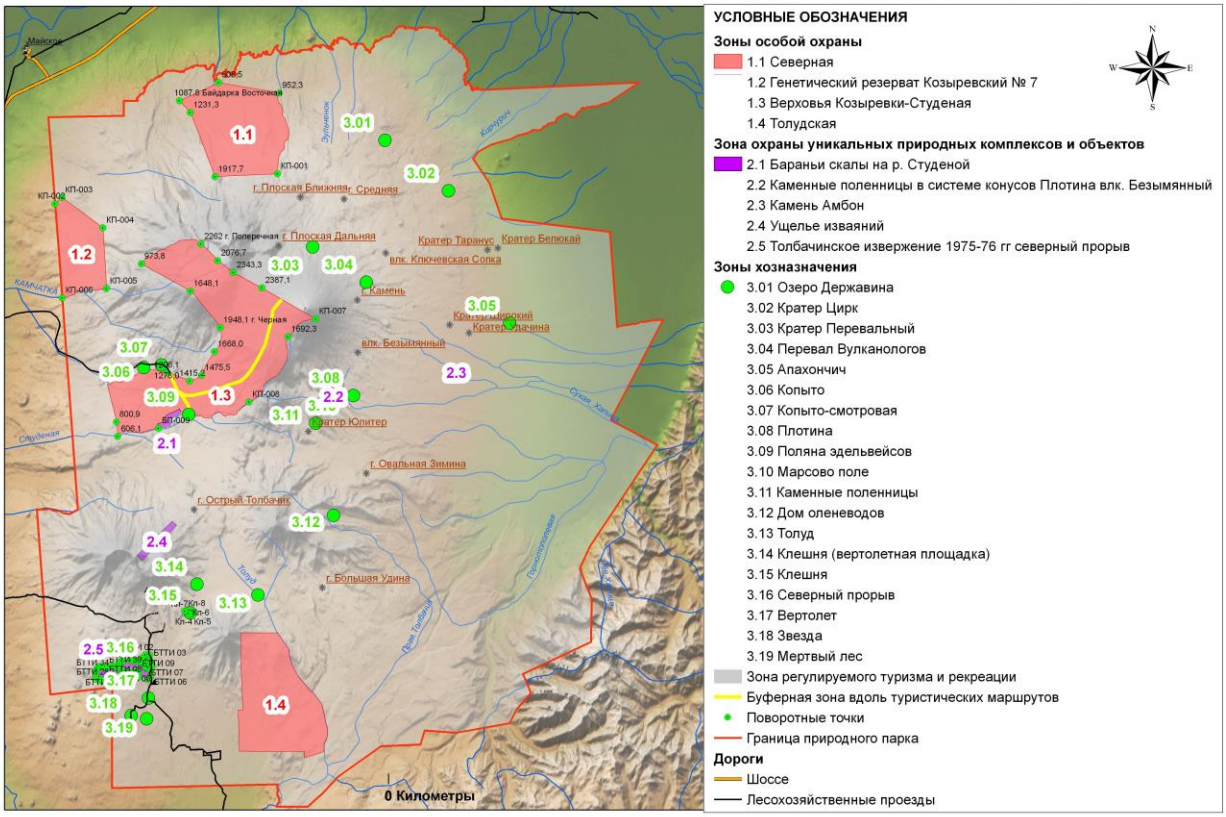
- **four zones of special protection:** include 4 land plots on a total area of 33210,35 ha. (“Severnaya”, “Kozyrevsky” Genetic Reserve No. 7”, “Upper reaches of Kozyrevka - Studenaya river”, “Toludskaya”)

Zone of unique nature complexes and objects protection includes 5 land plots on a total area of 1762,5 ha. (“Baranyi Rocks on the Studenaya River”, “Kamenniye polennitsy” in the system of cones “Plotina” of Bezymyannyi Volcano, “Ambon Stone”, “Izviyaniye Gorge”, “Northern Fissure of GFTE (Great Fissure Tolbachinsky Eruption) 1975-1976”)

economically intended zones, for conducting well-established forms of management and the regulated ecosystem exploitation. Economically intended zone includes 19 land plots on a total area of 65,5 ha. (“Derzhavina Lake”, “Tsirk Crater”, “Perevalny Crater”, “Vulcanology Pass”, “Apakhonchich”, “Kopyto”, “Kopyto - viewing point”, “Plotyna”, “Polyana Edelveisov”, “Marsovo polye”, “Dom olenevodov”, “Tolud ”, “ Kleshnya (heliport deck) ”, “Kleshnya” (Tolbachik)”, “Severny proryv”, “Vertolyot”, “Zvezda”, “Myortvy les”).

The rest of the Park "Klyuchevskoy" territory not included in the boundaries of the above mentioned functional zones is a zone of regulated tourism and recreation.

СХЕМА ФУНКЦИОНАЛЬНОГО ЗОНИРОВАНИЯ ПРИРОДНОГО ПАРКА "КЛЮЧЕВСКОЙ"



In the territory of the Nature Park activity is **prohibited** that causes change in historically formed nature landscape, reduction or destruction of ecological, aesthetic and recreational properties of the Nature Park, violation of historical and cultural landmarks maintenance regime. Such types of activity include:

1) provision of land (forest) sites for purposes which are not connected with the goals of creation and functioning of the Nature park, including individual home building, gardening and vegetable gardening;

2) activity causing defection, damage, destruction of nature complexes and objects, relief forms, geological deposits, mineralogical formations, natural, archeological and cultural sites, soil and vegetation cover, rare plant species habitats and habitats of rare animal species included in the Red Book of the Russian Federation and the Red Book of Kamchatka krai;

3) Activity on utilization of protection forests of the Nature park, incompatible with their special purpose and useful functions, including the following:

a) construction, reconstruction of objects including linear-type ones without experts' positive decision in the framework of state ecological expertise;

b) wood logging in the form of clear cutting and selective cutting (with the exception of cases specified in points 5 - 7 of part 3.10, point 7 of part 3.18, point 8 of part 3.20 of this section);

c) collecting comestible forest resources, medicinal herbs, other non-wood forest resources (with the exception of citizens' gathering such resources for their individual needs);

d) water logging (rafting along water channels and water bodies);

e) processing of timber and other forest resources;

f) farming

g) growing fruit, berry, decorative, medicinal plants in the forest areas;

4) development of mineral resources deposits, exploration and other types of work connected with subsurface resources management;

5) execution of blasting work, with the exception of liquidation cases and emergency prevention;

6) execution of hydro-ameliorative, irrigational, bottom-deepening and other types of work associated with changing the bottom, banks and water protective zones of water bodies, with the exception of liquidation cases and emergency prevention;

7) hiking tourism, horse-riding, travelling of mechanical transport means beyond the roads of common use and established routes of travel;

8) parking of all types of mechanical transport means beyond specially equipped places, with the exception of liquidation cases and emergency prevention, as well as snowmobile vehicles in the period of constant snow cover formation (with consideration for the requirements of point 6 part 3.15 of this section);

9) landing aerial vehicles beyond specially provided places, with the exception of emergency liquidation and emergency prevention cases;

10) travelling of any watercrafts equipped with combustion engine along the water bodies, with the exception of watercrafts used by the Institution employees who are engaged in performing their area protection tasks;

11) violation of fire safety rules in forests, including making up the fire beyond specially provided places, Vegetation buming, agricultural burning, with the exception of fire protection activities;

12) disposal of production and consumer waste, arrangement of places

(grounds) of temporary waste accumulation in disregard of requirements of the Federal Law of 24.06.1998 № 89-FZ «On production and consumer waste»;

13) burning of production and consumer waste;

14) damage and pollution of lands;

15) storage of combusting and lubricating materials beyond specially established and equipped

places;

16) arrangement of animal burial sites, cemeteries, radioactive, chemical, explosive, toxic, noxious and poisonous substances;

17) introduction of live organisms, hybridization of fauna objects, artificial reproduction of water bioresources, aquaculture (fish farming);

18) fish farming amelioration;

19) cattle grazing, loose housing of dogs (except for dogs of hunting breeds during hunting in compliance with the hunting regulations);

20) usage of toxic chemical substances for protecting and guarding forests, as well as with scientific purposes;

21) pollution of the aquatic areas of water bodies, their water protection zones, ground waters with production and consumer waste; wash of transport devices in the water bodies;

22) usage of water objects including thermo-mineral springs without permits for the right of use of the water object and entrails;

23) usage of the water object coastline buffer zone with violation of restrictions of economic and other activity (special regime) established by the water legislation;

24) implementation of tourist and recreational activity with commercial purposes, conducting sports, mass cultural and other events, including those connected with the use of horses and mechanical transport means, including snowmobiles, beyond specially provided functional zones;

25) staying at tourist lodgments, camps and bases, places of servicing visitors and other places of peoples mass presence with firearm, pneumatic and bladed weapons, with the exception of officials of the Russian Federation state power executive bodies, executive organs of Kamchatka krai and their subordinate bodies authorized to implement state supervision in the sphere of protection and exploitation of specially protected areas of regional significance, inspectors of regional state ecological supervision authority, federal state forest supervision authority (forest service), federal state supervision in the sphere of protection, reproduction and utilization of fauna objects and their habitat authority, federal state control (supervision) in the sphere of fishery and water bioresources preservation authority, federal state hunting supervision authority, representatives of hunting control within the boundaries of hunting lands specified in hunting industry agreements, in case they have a staff pass and documents confirming the presence of these officials in the territory of the Nature park for work-related purposes, in the discharge of their duties, as well as of the territories of bases (camps) which belong to people implementing activity in the sphere of hunting industry, according to the terms and requirements established by the legislation on hunting and on preservation of hunting

resources and hunting regulations;

26) all types of hunting and fishing without permits and in breach of the requirements established by the Russian Federation legislation;

27) bighorn sheep and black-headed marmot hunting;

28) unauthorized archeological excavations, collection and transportation of items that have historic and cultural value;

29) Destruction or damaging of boom barriers, information boards, stands and other information signs and pointers, equipped ecological tracks and recreation places (camps) and their facilities, making unauthorized inscriptions on stones, trees, structures and information signs.

In the territory of the "Klyuchevskoy" Nature park the following activities are **allowed**:

In the whole territory of the Nature park the following kinds of economic and other activity are allowed:

1) scientific-research activity aimed at the study of biological and landscape diversity, dynamics and structure of nature complexes and objects including creation of zoological, botanical, mineralogical and paleontological collections according to the procedure established by the Russian Federation legislation and this Provision;

2) monitoring of the environment condition (ecological monitoring);

3) execution of environmental and biotechnical activities (aimed at preserving, restoring and maintaining in balanced condition nature ecosystems, preserving and restoring the habitats of flora and fauna that need special protection measures);

4) reintroduction of extinct species of animals, plants and mushrooms;

5) execution of activities aimed at forests reproduction, their productivity increase and their useful functions preservation, including activities on reforestation, forest care with the consideration of peculiarities of forest exploitation, protection, guarding, reproduction in specially protected areas approved by the Order of the Russian Federation Ministry of Natural Resources of 16.07.2007 № 181;

6) clear-cutting in case selective cutting does not provide the replacement of forest ranges which lose their environment-forming, sanitary and hygienic, health-improving and other useful functions by other forest ranges which preserve the intended purpose of protection forests and their useful functions;

7) selective cutting of forest range with the purpose of providing sanitary and fire safety, the intensity of the cutting does not exceed 10%;

8) execution of activities on protection of forest from pollution and other negative impact including measures aimed at preserving forest range, forest soil, fauna objects habitats, other nature objects in the forests;

9) clearing of forests from littering in case there is a threat of hazardous organisms foci appearance or for fire safety in the forests;

10) execution of activities on recultivation of damaged lands (liquidation of accumulated ecological damage), also by means of reforestation;

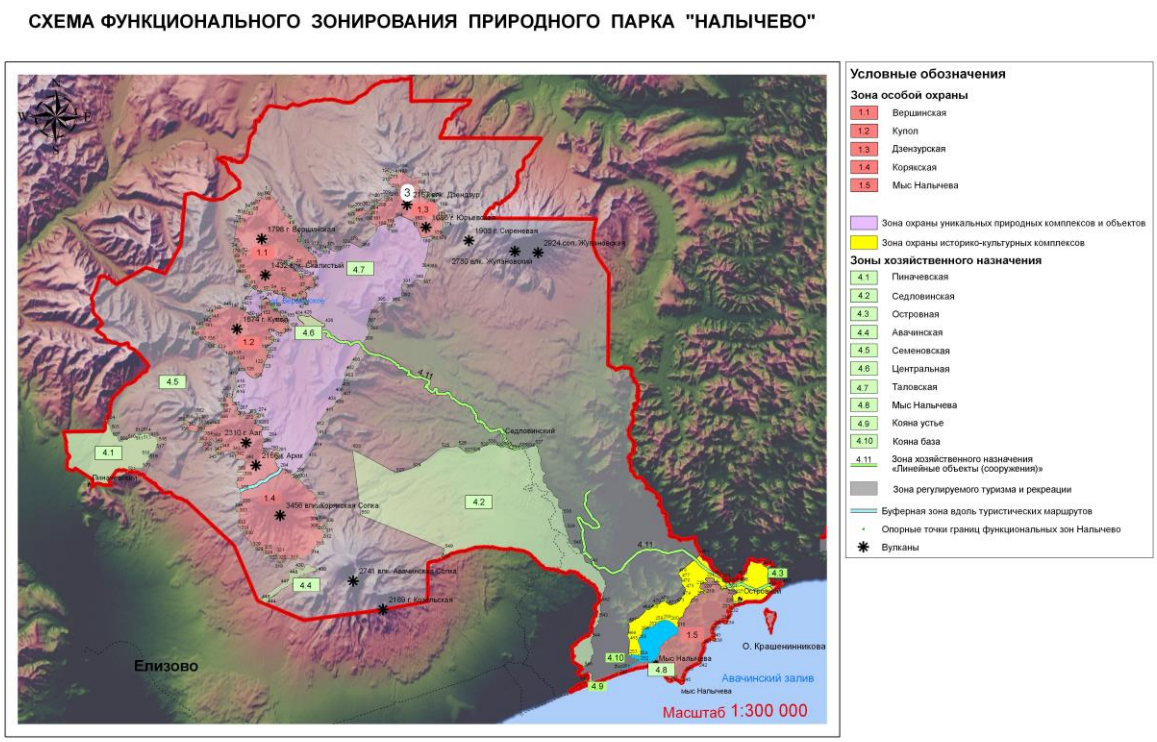
11) collection and gathering of the following by citizens for their individual consumption: nonwood forest resources, forest food resources and medicinal herbs,

with the exception of plant objects included in the Red Book of the Russian Federation or the Red Book of Kamchatka krai, as well as implementation of the above-mentioned activity in the Nature park's zone of special protection;

12) ecological and educational activity;

13) scientific tourism.

Nalychevo Nature Park



On the territory of the Nalychevo Nature Park, taking into account the natural features, goals and objectives of the functioning of the territory, a differentiated regime of protection, protection and nature management is established.

According to the Regulation on the Nalychevo Nature Park, a differentiated nature management and protection regime is established on the territory of the natural park, taking into account the goals and objectives of its functioning.

The following functional zones have been identified for the protection of biological objects, natural and historical-cultural complexes and objects:

1. **Special protection zone**: includes 5 plots on a total area of 33,287.7 ha.
- "Vershinskaya" (area of 7,116.1 ha).
- "Kupol" (area 4728.1 ha).
- "Dzenzurskaya" (area 3,455.4 ha).
- "Koryakskaya" (area of 11,667.3 ha).
- "Nalycheva Cape" (area 6,320.8 ha).

2. **The protection zone of unique natural complexes and objects**: includes two sites on a total area of 26,514.3 ha

-Nalychevo hydrothermal system, including Nalychevo hot springs, Goryachechenskiye springs, Zheltorechenskiye hot springs, Kraevedcheskiye hot springs, Talovskiye springs, Shibnyie thermal springs, Shumninskiye hot springs, Aagskiye

mineral springs, Chistinskiye springs, Koryakskiye springs, Kitkhoyskiye mineral springs, Vershinskiye hot springs, Izotov mineral springs, Dzendzurskoye fumarole field (VerkhneZendzurskiye springs), as well as for the protection of rare plant species, thermophilic x key organisms and their habitats, protection of colonies of black-capped marmot.

- "Verblud Extrusion" (area 15.0 ha)

3. **The zone of protection of historical and cultural complexes** is designed to preserve and study the monuments of archeology, history and culture represented by ancient sites of the Neolithic man in the Nalychevo river valley and included in the Unified State Register of Cultural Heritage Sites (historical and cultural monuments) of the peoples of the Russian Federation.

- "Lake Nalychevo - Right Ostrovnaya" covers an area of 4,450.2 ha

4. **The economic zone** includes 11 plots on a total area of 31,284.1 hectares and is intended for the implementation of permitted economic activities, including activities for providing comfortable rest, recreational and tourist infrastructures, cultural and information services for visitors to the Natural Park.

- "Pinachevskaya" (area 4,439.7 ha)
- "Sedlovinskaya" (area 24,982.8 ha)
- "Ostrovnaya" (area 447.4 ha)
- "Avachinskaya" (area 285 ha)
- "Semenovskaya" (area 9 ha)
- "Central" (area 407 ha)
- "Talovskaya" (area 13 ha)
- "Nalychevo Cape" (area 20 ha) covers an area within a radius of 250 meters from the cordon "Nalychevo Cape".
- "Nizhnenalychevsky Ustevoy" (area 20 ha)
- "Nizhnenalychevsky Yurtovsky" (area 0.2 hectares)
- "Linear objects (structures)" with a total area of 660 hectares stands out along existing traffic routes of 50 m on each side: Mutnaya - Central cordon - 33 km, Ostrovnaya - 7 km, Nalychevo River - Ostrovnaya River - 26 km.

5. **Regulated tourism and recreation area**

The entire remaining territory of the Nalychevo Park, not included in the borders of the above functional zones, is a zone of regulated tourism and recreation (area - 190084.4 ha).

The boundaries of the zones are given in the Zoning Scheme.

On the territory of the Nalychevo Nature Park, **it is forbidden** to ensure any activities that entail changing the historically formed natural landscape, reducing or destroying the ecological, aesthetic and recreational qualities of the Natural Park, violating the maintenance of historical and cultural monuments, including:

1) the provision of land (forest) plots for purposes not related to the goals of the creation and functioning of the Nature Park, including individual housing construction, gardening and gardening; 2) activities that entail violation, damage, destruction of natural complexes and objects, landforms, geological deposits, mineralogical formations, natural monuments, archeology, history and culture, soil and vegetation cover, habitats of rare plant species and habitats of rare animal spe-

cies listed in the Red Book of the Russian Federation and the Red Book of Kamchatka Territory; 3) activities for the development of the protective forests of the Nature Park, incompatible with their intended purpose and useful functions, including: a) construction, reconstruction of facilities, including linear ones, without a positive conclusion from the state environmental review; b) cutting of forest stands in the form of clear and selective cutting (with the exception of cases specified in clauses 5-7 part 3.10, clause 7 part 3.21, clause 8 part 3.23 of the Regulation); c) harvesting of forest resources suitable for consumption (food forest resources), medicinal plants, other non-timber forest resources (except for the harvesting by citizens of such resources for their own needs); d) alloy of wood along waterways and ponds; e) processing of wood and other forest resources; f) farming; g) the cultivation of forest fruit, berry, ornamental, medicinal plants; 4) development of mineral deposits, surveying and other work related to the use of mineral resources; 5) blasting operations, except in cases of liquidation and prevention of emergency situations; 6) conducting irrigation, irrigation, dredging and other works related to changing the bottom, banks and water protection zones of water bodies, with the exception of cases of liquidation and prevention of emergency situations; 7) hiking, horse riding, the movement of motor vehicles outside public roads and established routes; 8) parking of all types of motor vehicles outside specially equipped places, except in cases of liquidation and prevention of emergency situations, including those related to extinguishing forest fires, as well as snowmobiles during the establishment of permanent snow cover (subject to the requirements of paragraph 6 of part 3.15 of this section); 9) landing of aircraft outside designated areas, except in cases of liquidation and prevention of emergency situations; 10) movement on water bodies of any floating means having internal combustion engines, with the exception of floating means used by officials of the Institution in the performance of tasks to protect the territory; 11) violation of fire safety rules in the forests, including lighting a fire outside designated areas, burning vegetation, launching fires, with the exception of fire-fighting measures; 12) disposal of production and consumption waste, arrangement of places (sites) for temporary accumulation of waste in violation of the requirements of the Federal Law dated 24.06.1998 Ш.89-ФЗ “On production and consumption waste”; 13) incineration of production and consumption waste; 14) damage and pollution of land; 15) storage of fuels and lubricants outside established specially equipped places; 16) the location of cattle cemeteries, cemeteries, radioactive, chemical, explosive, toxic, poisonous and toxic substances; 17) introduction of living organisms, hybridization of objects of the animal world, artificial reproduction of aquatic biological resources, aquaculture (fish farming); 18) fisheries land reclamation; 19) grazing, loose- keeping dogs (with the exception of hunting dogs when hunting in accordance with hunting rules); 20) the use of toxic chemicals to protect and protect forests, including for scientific purposes; 21) pollution of the water area of water bodies, their water protection zones, groundwater by production and consumption waste; washing in water bodies of vehicles; 22) use of water bodies, including thermal mineral springs, without permits for the right to use a water body and subsoil; 23) use of the coastal protective strip of the water body, the water protection zone of the water body in

violation of the restrictions of economic and other activities (special regime) established by water legislation; 24) implementation of tourist and recreational activities for commercial purposes, the conduct of sports, cultural and mass and other events, including those related to the use of horses and motor vehicles, including snowmobiles, outside functional areas specially provided for these purposes; 25) staying with firearms, pneumatic and melee weapons in tourist shelters, camps and bases, in places where visitors are served and in other places of mass presence of people, with the exception of officials of the executive bodies of state power of the Russian Federation, Kamchatka Territory and state institutions subordinate to them authorized to carry out state supervision in the field of protection and use of specially protected natural territories of regional significance, regional state environmental supervision, federal state forest supervision (forest protection), federal state supervision in the field of protection, reproduction and use of wildlife and their habitats, federal state control (supervision) in the field of fishing and preservation of aquatic biological resources, federal state hunting supervision , industrial hunting control within the boundaries of the hunting grounds indicated in the hunting agreements, if there is an official certificate and a document confirming presence of these officials in the territory of the Nature Park for official purposes, in the performance of duties, as well as the territories of bases (camps) belonging to persons engaged in activities in the field of hunting, in accordance with the terms and requirements established by the legislation on hunting and preservation hunting resources and hunting rules; 26) all types of hunting and fishing without permits and in violation of the requirements stipulated by the legislation of the Russian Federation; 27) hunting for a snow sheep and black-caped groundhog; 28) unauthorized archaeological excavations, collection and removal of objects of historical and cultural value; 29) destruction or damage of barriers, full houses, stands and other information signs and signs, equipped ecological paths and recreation places (parking lots) and elements of their improvement, drawing on stones, trees, buildings and information signs of unauthorized inscriptions

On the territory of the Nalychevo Natural Park the following **is allowed**: 1) research activities aimed at studying the biological and landscape diversity, dynamics and structure of natural complexes and objects, including the collection of zoological, botanical, mineralogical and paleontological collections in the manner established by the legislation of the Russian Federation and these Regulations; 2) environmental monitoring (environmental control); 3) the implementation of environmental and biotechnological measures (to preserve, restore and maintain the equilibrium state of natural ecosystems, to preserve and restore the habitats of objects of the animal and plant world that need special protection measures); 4) reintroduction of extinct species of animals, plants and mushrooms; 5) implementation of measures aimed at reforestation, increase of forest productivity, preservation of their useful functions: measures for reforestation, forest care (including thinning of forest stands), other activities carried out in accordance with the rules of reforestation and rules for caring for forests, taking into account the peculiarities of the use, protection, protection, reproduction of forests located in specially protected natural areas, approved by order of the Ministry of Natural Resources of Russia dated

16.07.2007 No.181; 6) clear cutting in cases where selective cutting does not provide replacement of forest stands that are losing their environmentally-forming, water-protecting, sanitary-hygienic, health-improving and other useful functions, to forest stands that ensure the preservation of the intended purpose of protective forests and the useful functions performed by them; 7) selective cutting of forest stands in order to ensure sanitary and fire safety, the intensity of which does not exceed 10%; 8) the implementation of measures to protect forests from pollution and other negative impacts, including measures to preserve forest plantations, forest soils, the habitat of wildlife, and other natural objects in forests; 9) cleaning forests from cluttering if there is a threat of pockets of pests or fire safety in the forests; 10) the implementation of measures for the restoration of disturbed lands (elimination of accumulated environmental damage), including through reforestation; 11) preparation and collection by citizens for personal consumption: non-timber forest resources, food forest resources and medicinal plants, with the exception of plant world objects listed in the Red Book of the Russian Federation and the Red Book of Kamchatka Territory, as well as the implementation of these activities in the special protection zone of the Nature Park; 12) environmental and educational activities; 13) scientific tourism.

All owners, owners and users of land plots located within the boundaries of the Nalychevo Nature Park, as well as other individuals and legal entities, are required to comply with the special protection regime established in the territory and bear responsibility for violation established by the laws of the Russian Federation and the Kamchatka Territory.

Users of land plots on the territory of the Nalychevo Nature Park conclude an agreement on environmental conditions with the Directorate and sign a security obligation to ensure the safety of natural communities represented on the land plots occupied by them, and to comply with the established protection regime.

KGBU “Nature Park “Volcanoes of Kamchatka” has the right to introduce temporary restrictions on visits to certain sections of the territory, with the exception of economic zones.

In 2018, a project for functional zoning of the territory of the natural park was developed. Corresponding changes and additions to the Regulation on the nature park have been prepared.

Zoning is based on an inventory of biota and especially valuable park objects, as well as factors of anthropogenic impact on natural complexes (zoning scheme of the Nalychevo Nature Park).

In the territory of the natural park, taking into account the natural features of the territory, the ecological and recreational value of natural areas, the goals and objectives of the functioning of the natural park, a differentiated regime of special protection, protection and use is established with the following functional zones:

For the protection of biological objects, natural and historical-cultural complexes and objects are defined:

special protection zone;

protection zone of unique natural complexes and objects;

protection zone of historical and cultural complexes;

economic zones;

regulated tourism and recreation area.

The developed scheme of functional zoning allows maintaining the ecological balance in the conditions of recreational use of the park, and fully reflects the interests of all interested parties. After the approval of functional zoning, the boundaries of the functional zones shall be removed to the local area by installing information stands, full-house signs, signs and other things.

After a certain time, the correction of the boundaries of the functional zones is possible. This is dictated by objective reasons, is based on the results of monitoring studies of the state of natural complexes and objects of the natural park, aims at preventing the change of the historical landscape, reducing or destroying the ecological, aesthetic and recreational qualities of the territory; reduction of anthropogenic impact on ecosystems or its complete exclusion in certain areas of the natural park.

"South Kamchatsky" Nature Park

On the territory of "South Kamchatsky" Nature Park, taking into account the natural features, goals and objectives of the functioning of the territory, a differentiated regime of protection, protection and nature management is established.

According to the Regulation on "South Kamchatsky" Nature Park, a differentiated nature management and protection regime is established in the territory of the natural park, taking into account the goals and objectives of its functioning.

For the protection of biological objects, natural and historical-cultural complexes and objects, the following functional zones are allocated:

Special protection zone "Chubuk Coast" with an area of 52,257.5 ha

Purpose - protection of the southern population of snow sheep and brown bear.

The following economic zones located within the boundaries of its contour are not included in the special protection zone "Chubuk Coast": "Siamo" (area 390.8 ha), "Bolshaya Khodutka" (289.3 ha), "Malaya Khodutka" (0.4 ha), "Yellow Cape" (806.1 ha), and "Vestnik" (162.8 ha).

The natural park includes 7 protection zones of unique natural complexes and objects with a total area of 8,961.84 hectares, designed to be preserved in their natural state and used in regulated tourism, tourist and recreational activities of individual natural complexes and objects, primarily of volcanogenic origin having special environmental, scientific, cultural, aesthetic, recreational and health-improving significance, including areas for unloading natural thermal and mineral springs and their ikalnyh ecosystems caldera complexes, unique coastal ecosystems, including marine mammal rookeries, breeding grounds of marine colonies and rare species of birds of prey, as well as historical and cultural monuments:

-protection zone of unique complexes and objects "Khodutkinskiye hot springs" with an area of

39 ha;

- protection zone for the unique complexes and objects of the caldera of the

Ksudach Volcano with an area of 5,250.9 ha;

- protection zone for the unique complexes and objects “Crater of Mutnovskiy Volcano” (an area of 427.9 ha) is established to protect and regulate the use of a highly decorative volcanic landscape represented by Mutnovskiy Volcano (2323 m) - one of the largest active volcanoes in Kamchatka, in shape and geological the structure, which is a ridge-like mountain range oriented in the northwestern direction and consisting of four consecutively formed and closely standing cones of stratovolcanoes from the top calderas, subsidiary intracalderal structures, glaciers, intense fumarole-hydrothermal activity with the temperature of some fumaroles exceeding 300°C, water and mud boilers flowing from the North-East crater by the acid Vulkannaya River, which together classifies the Mutnovskiy Volcano as unique natural monuments of world significance .

The protection zone of the unique complexes and facilities of “Asacha Thermal Springs” with area of 12.57 ha.

The protection zone of the unique complexes and facilities of “Krivulkinsky Hot Springs” with area of 12.57 ha.

The protection zone of the unique complexes and facilities of “Zheltovskiye Hot Springs” with area of 12.57 ha.

The protection zone of unique complexes and objects “Russian Bay - Kekurny Cape” with area of 3,206.33 hectares.

The nature park includes 16 economic zones on a total area of 2,735.49 ha intended for implementation of permitted economic activities, including activities to ensure a comfortable stay, the creation of a tourist, including recreational, hunting, fisheries, cultural and information service of the visitors of the Nature Park:

-“Vilyuchinskaya” economic zone with an area of 66.4 hectares;
- “Vayvaychik” economic zone with an area of 0.54 hectares;
- “Zhirovaya Bay” economic zone with an area of 763.3 hectares;
- “Mutnovskiy Cordon” economic zone with an area of 1.8 hectares;
- Vakin’s Lodge” economic zone with an area of 14.0 hectares;
- “Lighthouse “Russian” economic zone with an area of 0.8 hectares;
- “Throat of the Russian Bay” economic zone with an area of 187.3 hectares;
- “Listvennichnaya Bay” economic zone with an area of 0.95 ha;
- “Assachinskaya” economic zone with an area of 1.0 ha;
- “Siamo” economic zone with an area of 390.8 hectares;
- “Khodutka-1” economic zone with an area of 45.0 hectares;
- “Khodutka-2” economic zone with an area of 5.0 hectares;
- “Bolshaya Khodutka” economic zone with an area of 289.3 hectares;
- “Malaya Khodutka” economic zone with an area of 0.4 hectares;
- “Yellow Cape” economic area with an area of 806.1 hectares;
- “Vestnik” economic zone with an area of 162.8 hectares.

Regulated tourism and recreation area. The remaining territory of “South Kamchatsky” Nature Park, not included in the boundaries of the above functional zones, is a zone of regulated tourism and recreation with an area of 434,480.08 ha.

The boundaries of the zones are given in the Zoning Scheme.

On the territory of the Nature Park, any activity that entails a change in the historically formed natural landscape, a decrease or destruction of the ecological, aesthetic and recreational qualities of the Natural Park, a violation of the maintenance of historical and cultural monuments, including:

1) the provision of land (forest) plots for purposes not related to the goals of the creation and functioning of the Natural Park, including individual housing construction, gardening and gardening; 2) activities that entail violation, damage, destruction of natural complexes and objects, landforms, geological deposits, mineralogical formations, natural monuments, archeology, history and culture, soil and vegetation cover, habitats of rare plant species and habitats of rare animal species listed in the Red Book of the Russian Federation and the Red Book of Kamchatka Territory; 3) activities for the development of the protective forests of the Nature Park, incompatible with their intended purpose and useful functions, including: a) construction, reconstruction of capital construction facilities, including linear ones, non-capital construction facilities, structures without a positive conclusion from the state environmental review; b) arrangement of places for landing, parking, recreation, including camps, campfires, picnic points, other non-capital buildings and structures outside specially designated places and without the permission of the Institution; c) cutting of forest stands in the form of clear and selective cutting (with the exception of cases specified in clauses 5-7 part 3.10, clause 7 part 3.21, clause 8 part 3.23 of the Regulation); d) preparation of edible forest resources (food forest resources), medicinal plants, other non-timber forest resources (except for the procurement by citizens of such resources for their own needs); e) alloy of wood along waterways and ponds; f) processing of wood and other forest resources; g) farming; h) cultivation of forest fruit, berry, ornamental, medicinal plants; 4) development of mineral deposits, surveying and other work related to the use of subsoil (with the exception of using subsoil for the extraction of drinking underground water at the Akhomtenskoye field located in Russian Bay); 5) blasting operations, except in cases of liquidation and prevention of emergency situations; 6) conducting irrigation, irrigation, dredging and other works related to changing the bottom, banks and water protection zones of water bodies, with the exception of cases of liquidation and prevention of emergency situations; 7) hiking, horse riding, the movement of motor vehicles outside public roads and established routes; 8) parking of all types of motor vehicles outside specially equipped areas with hard surface, except in cases of liquidation and prevention of emergency situations, including those related to extinguishing forest fires, as well as snowmobiles during the establishment of permanent snow cover (subject to the requirements of paragraph 6 parts 3.15 of the Regulation); 9) landing and parking of helicopters outside specially equipped places that are paved, except in cases of liquidation and prevention of emergency situations; 10) movement of vessels and other floating vehicles with internal combustion engines on water bodies, with the exception of fishing and commercial fish farming within the boundaries of fishing areas No.999, 1002, 767, 987 and the use of floating equipment by the officials of the Institution in carrying out tasks on territory protection; 11) violation of fire sa-

fety rules in the forests, including lighting a fire outside designated areas, burning vegetation, launching fires, with the exception of fire-fighting measures; 12) placement of production and consumption waste, arrangement of places (sites) for temporary waste accumulation in violation of the requirements of the Federal Law dated 24.06.1998 Ш.89-ФЗ "On Production and Consumption Waste"; 13) incineration of production and consumption waste; 14) damage and pollution of land; 15) storage of fuels and lubricants outside established specially equipped places; 16) the location of cattle cemeteries, cemeteries, radioactive, chemical, explosive, toxic, poisonous and toxic substances; 17) introduction of living organisms, hybridization of objects of the animal world; 18) fisheries land reclamation, with the exception of the specified activities within the boundaries of fishing areas No.761, 762, 763, 999, 1002, 767, 987; 19) grazing, loose-keeping dogs (except for dogs of hunting breeds when hunting in accordance with hunting rules and functional zoning of the territory of the Nature Park); 20) the use of toxic chemicals to protect and protect forests, including for scientific purposes; 21) pollution of the water area of water bodies, their water protection zones, groundwater by production and consumption waste; washing in water bodies of vehicles; 22) use of water bodies, including thermal mineral springs, without permits for the right to use a water body and subsoil (except for the use of water bodies for personal and domestic needs); 23) use of the coastal protective strip of the water body, the water protection zone of the water body in violation of the restrictions of economic and other activities (special regime) established by water legislation; 24) implementation of tourist activities for commercial purposes, the conduct of sports, cultural and other events, including those related to the use of horses and power-driven vehicles, including snowmobiles, outside functional areas specially provided for these purposes; 25) staying with firearms, pneumatic and melee weapons in tourist shelters, camps and bases, in places where visitors are served and in other places of mass presence of people, with the exception of officials of the executive bodies of state power of the Russian Federation, Kamchatka Territory and state institutions subordinate to them authorized to carry out state supervision in the field of protection and use of specially protected natural territories of regional significance, regional state environmental supervision, federal state forest supervision (forest protection), federal state supervision in the field of protection, reproduction and use of wildlife and their habitats, federal state control (supervision) in the field of fishing and preservation of aquatic biological resources, federal state hunting supervision, industrial hunting control within the boundaries of the hunting grounds specified in the hunting agreements, with an official certificate and a document s confirming the presence of these officials in the territory of the Natural Park for official purposes, in the performance of duties, as well as the territories of bases (camps) belonging to persons engaged in activities in the field of hunting, in accordance with the terms and requirements established by the legislation on hunting and preservation hunting resources; 26) all types of hunting and fishing without permits and in violation of the requirements stipulated by the legislation of the Russian Federation; 27) hunting for a snow sheep and black-caped groundhog; 28) prey of marine mammals and marine colonial birds; 29) unauthorized archaeological excavations, collection and

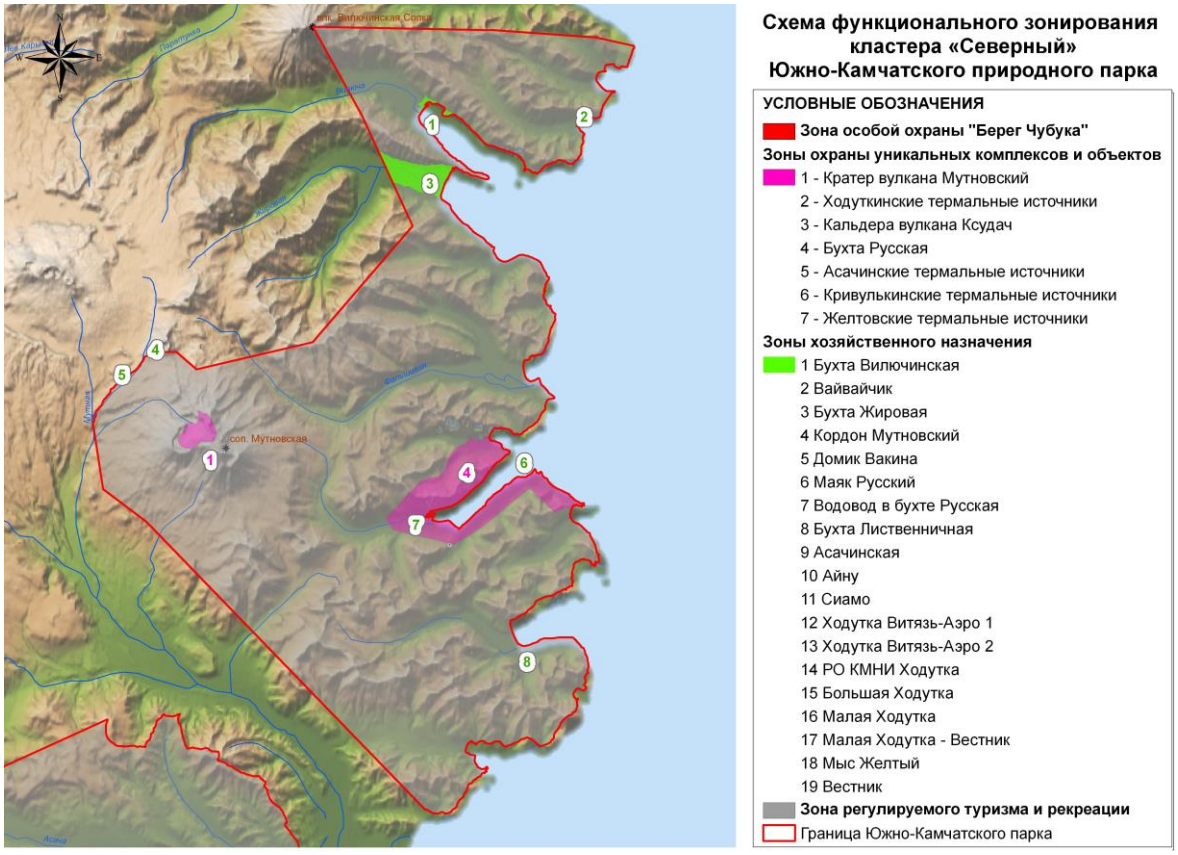
removal of objects of historical and cultural value; 30) destruction or damage of barriers, full houses, stands and other information signs and signs, equipped ecological paths and rest places (parking lots) and elements of their improvement, drawing on stones, trees, buildings and information signs of unauthorized inscriptions. 3.10. The following economic and other activities are allowed throughout the Nature Park: 1) research activities aimed at studying the biological and landscape diversity, dynamics and structure of natural complexes and objects, including the collection of zoological, botanical, mineralogical and paleontological collections in the manner established the legislation of the Russian Federation and these Regulations; 2) environmental monitoring (environmental monitoring); 3) implementation of environmental and biotechnological measures (to preserve, restore and maintain the equilibrium state of natural ecosystems, to preserve and restore the habitats of objects of the animal and plant world that need special protection measures); 4) reintroduction of extinct species of animals, plants and mushrooms; 5) implementation of measures aimed at reproduction of forests, increasing the productivity of forests, preservation of their useful functions: measures for reforestation, forest maintenance (including thinning of forest stands), other activities carried out in accordance with the rules of reforestation and forest care rules, taking into account the Peculiarities of use, protection, protection, reproduction of forests located in specially protected natural areas, approved by order of the Ministry of Natural Resources of Russia dated 16.07.2007 No.181; 6) clear cutting in cases where selective cutting does not provide replacement of forest stands that are losing their environmentally-forming, water-protecting, sanitary-hygienic, health-improving and other useful functions, to forest stands that ensure the preservation of the designated purpose of protective forests and their useful functions; 7) selective cutting of forest stands in order to ensure sanitary and fire safety, the intensity of which does not exceed 10%; 8) the implementation of measures to protect forests from pollution and other negative effects, including measures to preserve forest plantations, forest soils, the habitat of wildlife, and other natural objects in forests; 9) cleaning up forests from cluttering if there is a threat of foci of harmful organisms or fire safety in the forests; 10) the implementation of measures for the restoration of disturbed lands (elimination of accumulated environmental damage), including through reforestation; 11) preparation and collection by citizens for personal consumption: non-timber forest resources, food forest resources and medicinal plants, with the exception of plant world objects listed in the Red Book of the Russian Federation and Red Book of Kamchatka Territory, as well as the implementation of these activities in the special protection zone of the Nature Park; 12) environmental and educational activities; 13) science tourism

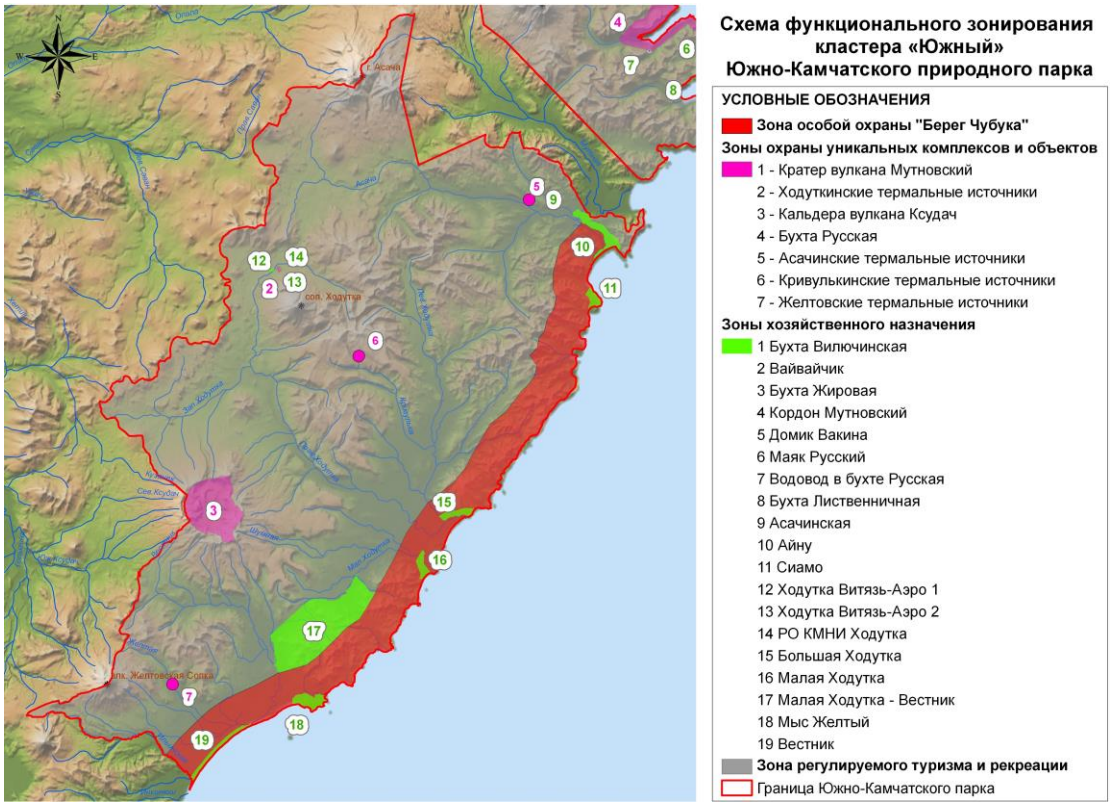
All owners, owners and users of land located within the boundaries of “South Kamchatsky” Nature Park, as well as other individuals and legal entities, are required to comply with the special protection regime established in the territory and bear responsibility for violation established by the laws of the Russian Federation and the Kamchatka Territory.

Users of land plots in the territory of “South Kamchatsky” Nature Park conclude an agreement on environmental conditions with the Directorate and sign a

security obligation to ensure the safety of natural communities represented on the land plots occupied by them, and to comply with the established protection regime.

KGBU “Nature Park “Volcanoes of Kamchatka” has the right to introduce temporary restrictions on visits to certain sections of the territory, with the exception of economic zones.





5. Complex plan of the property management

As was discussed during the visit of the Mission, there is no joint management plan for the whole property (UNESCO World Heritage Site "Volcanoes of Kamchatka"), so we provide separately management plans of individual components (protected areas), which are part of “Volcanoes of Kamchatka” WHS:

1) summary of MP of Kronotsky Nature Biosphere Reserve, including management actions and strategies both for Kronotsky Federal Nature Reserve and South Kamchatka Federal Sanctuary as two clusters of the Biosphere reserve – on 79 pages (Annex 1);

2) MP of Nalychevo Regional Nature Park – on 34 pages (Annex 2);

3) MP of South Kamchatka Regional Nature Park – on 32 pages (Annex 3);

4) MP of Bystrinsky Regional Nature Park – on 39 pages (Annex 4);

5) MP of Klyuchevskoy Nature Park – on 31 pages (Annex 5).

Given the different levels of affiliation of government agencies managing components of the WHS (federal and regional government bodies), there is now no possibility to create a united management plan, but for integrated management of the property a special Coordination Committee, including representatives of two Institutions, responsible for management of the WHS, was created.

Common principles of the overall management goals for the property are:

− preservation of unique natural complexes;

− long-term ecological research and monitoring;

− preservation of the environmental support systems of the local population;

− development of traditional environmentally friendly land use practices and preservation of associated cultural values;

− assistance in development of local and regional environmental management;

− exchange of knowledge and experience at local, national and international levels;

− cooperation in solving problems of protection of natural resources and assistance in conflict solving.

Collaboration of two managing institutions (RBI Volcanoes of Kamchatka and FSI Kronotsky Reserve) have been carried out in the following directions and activities:

1) joint work to protect the components of the WHS. Within the framework of the cooperation agreement between two Institutions, a constant information exchange regarding persons who have committed violations in the field of environmental legislation is carried out;

2) joint professional training of the inspection staff (rangers) with the involvement of experienced experts from the Ministry of Emergencies, Regional Agency for the Protection of Wildlife and State Nature Refuges of Kamchatka, Regional Institution "Protection Kamchatka Forests", the Ministry of Internal Affairs of Russia in Kamchatka, etc.;

3) organizing meetings and working groups on developing joint management actions in the field of biodiversity conservation on the area of the property or its separate components;

4) joint participation in regional public commissions under the Ministry of Natural Resources and Ecology of Kamchatka on different managementissues regarding protected areas – components of the WHS;

5) staff exchange between institutions managing different components of the WHS;

6) organizing joint educational and environmental awareness rising events: "Auto Expedition 2018" (educational expedition of the staff of two managing institutions into remote villages of Kamchatka), festival "Sea of Life", environmental educational events in the library of Esso village in Bystrinsky Nature Park, moving cinema "Bears of Kamchatka. Beginning", holiday "Day of Volcanoes" and many others;

7) participation in the All-Russian and International tourist exhibitions;

8) because of the lack of scientific specialists in the staff structure of the RBI Volcanoes of Kamchatka, the research department of the FSI Kronotsky Reserve is actively involved in various research projects and activities, implemented on the territory of regional components of the property – the study of natural landscapes and components of natural complexes, fundamental and practically oriented research of biodiversity of nature parks, organization and running some components of environmental monitoring of natural complexes, etc. Joint work and involvement of scientific specialists from FSI Kronotsky Reserve is also planned in the field of botanical, ichtyological, theriological, oceanological surveys, as well as in conducting monitoring of recreational impacts.

6. Potential threats to the territory of the «Volcanoes of Kamchatka» World Heritage Site

The gas industry of Kamchatka does not affect any component of “Volcanoes of Kamchatka” WHS due to the significant remoteness of its objects from the WH property.

In the territory of the Bystrinsky nature park, within the boundaries of the zones of economic activities, there are several areas listed in the subsoil fund, on which economic activity is carried out for the following purposes:

– providing heat supply and indirectly for recreational purposes for local communities (subsoil areas containing thermal energy groundwater: Anavgaysky (license PTR 00843 PE), Bystrinsky (license PTR 00844 PE) and Essovsky (license PTR 00850 PE));

– extraction of drinking groundwater to ensure drinking and domestic water supply for local communities (subsurface site “Essovsky-1” (license 00765 VE));

– maintenance of infrastructure facilities of inter-populated territories and settlements of the Bystrinskiy municipal region (subsoil areas containing sand and

gravel mix: PK-44 km and PK-37 km (license PTR 05089 TR), Andesitovy (license PTR 05025 TE)).

Large enterprises of the mining complex of Kamchatka are located outside the borders of Bystrinskiy natural park (near its south-south-western border), their influence on the specially protected natural area is absent and there are no threats connected with these enterprises for protected area nowadays.

In the immediate vicinity of the southern border of the Nalychevo nature park, there are subsoil plots containing volcanic slag: Kozelskoshlakovy-1, Kozelskoshlakovy-2, Kozelskoshlakovy-3, Kozelskoshlakovy-4 (license ПТР 05108 ТР), which are currently not operating. In case of beginning of their functioning, negative impacts on the nearby protected areas is not expected.

Within the boundaries of the Northern cluster of the South Kamchatka nature park, within the boundaries of the respective zones of economic activities, there is a subsoil plot containing drinking groundwater (Nizhnezhirovskaya-1, license PTR 00641 BP) and the Akhomtenskoye drinking ground water deposit (license ПТР 00389 BP). At the moment there is no economic activities on them. Due to their specificity, economic activities in the extraction of groundwater will not have any significant impact on protected areas in future.

Near the western border of the Northern cluster of the South Kamchatka nature park, the Mutnovskoye gold deposit is located (license PTR 10691 BR). Currently, economic activity is not carried out on it, and if it starts, in case of utilizing modern technologies for mining and mineral processing, it will not cause a negative impact on the protected area. Also in this area there is the largest in Russia Mutnovskaya geothermal power plant with direct steam use, the operation of which is environmentally safe.

Near the north-north-eastern border of the Southern cluster of the South Kamchatka nature park, the production complex of the Asachinsky mining plant, processing gold and silver ore, as well as projections on the surface of the boundaries of several subsurface areas, the right to use of which belong toTrevozhnoe Zarevo closed joint-stock company, are located. Carrying out activities for the extraction of precious metals at the enterprise, in case of following the laws in the field of environmental protection, does not have negative impacts for ecosystems of the South Kamchatka park.

One of the potential threats to the safety of Kronotsky State Natural Reserve nature complexes is the construction of Zhupanovskaya Hydro-Electric Power Station at a distance less than 50 km from the boundaries of the biosphere reserve. In October 2018 the Corporation of Kamchatka Development concluded an agreement of intent on joint implementation of the investment project «Construction of Zhupanovskaya Hydro-Electric Power Station» with the Chinese Company “Harbin ZhongJiGuoNeng Investment Corporation (ZJGN)”. In May 2019 it was confirmed that the company was intent on participating in the construction of the hydro-electric power station cascade on the Zhupanova River «with the total 100% investment of the project»[3]. The project of the Zhupanovskaya Hydro-Electric

3 Подробно: https://kamchatinfo.com/news/economics_and_business/detail/30983/

Power Station Cascade supposes not only constructing the hydro-electric power stations themselves, but also power transmission lines to remote hard-to-reach districts of Kamchatka and roads for maintaining the functioning of the Hydro-Electric Power Station. This, in its turn, will increase the accessibility of the reserve. As a result of the Hydro-Electric Power Station dam construction large areas will be flooded, including winter pastures of the wild Northern reindeer that was preserved exceptionally in the territory of Kronotsky reserve. According to the Investment Portal of Kamchatka Krai[4]: Zhupanovskaya Hydro-Electric Power Station-1 — the height is 122 m, the area of flooding is 13.6 thousand ha; Zhupanovskaya Hydro-Electric Power Station-2 — the height is 99 m, the area of flooding is 2.45 thousand ha. The flooding of these areas will cause a change in the hydrological regime of spawning rivers not only in Kronotsky reserve, but also in the eastern coast of the peninsula on the whole.

But a greater threat to the territory of Kronotsky reserve is posed by the planned construction of a fish channel[5] in the heart of the reserve – Kronotskoye Lake. Kronotskoye Lake is the biggest fresh water body of Kamchatka krai. The lake is isolated from the coastal fresh-water ecosystems by impassable rapids which were formed 12–14 thousand years ago as a result of great lava flows obstructing the river flowing from the lake. A long period of isolation and evolution independent on water systems which are connected with the sea led to the formation of a unique ecosystem. Specific ecological connections, special mechanisms of biological product formation and other features were formed in the lake. The lake is the center of “explosive” intermutation of salmonids. Not less than 7 endemic small-realm forms of char and 2 specialized forms of landlocked sockeye (Kokani) dwell here together.

The question of creating a migratory school of sockeye salmon in the basin of Kronotskoye Lake has been raised for several times. In case of successful implementation of the project Kamchatka krai is supposed to get a commercial school of sockeye salmon the quantity of which will exceed manifold the one of Kronotskoye Lake – the largest commercial school in Asia. Unfortunately, in the course of the project development some factors that are of crucial importance for the project implementation were not taken into considerartion:

1. Kronotskoye Lake is a water body of a lava-dam type, it emerged approximately 12-14 thousand years ago as a result of the Krasheninnikov Volcano eruption products blocking the valley of the Paleokronotskaya River. Consequently, the lake and the lava dam with its rapids impassable for migratory fish appeared simultaneously. Before it there had been a river in the place of the current lake. Thus, a gigantic in quantity school of sockeye salmon had NEVER existed. The basin was inhabited by ordinary migratory fish, and, judging by the absence of stickleback in the modern Kronotskoye Lake, it was at that time that the river was characterized by a considerable tilting of the bed. The current ichthyofauna of the

[4] http://investkamchatka.ru/строительство-каскада-жупановских/
[5] https://www.kommersant.ru/doc/3875955

lake was made up by fish inhabiting the upper river and able to make landlocked forms.

2. The appearance of a new, gigantic in quantity population will influence the conditions of sockeye salmon feeding on during the marine period of life in the northern part of the Pacific Ocean. Potentially it can lead to significant decreases in other sockeye salmon schools of eastern Kamchatka, in particular, the basin of the Kamchatka River. Such a scenario will cause significant economic losses connected with the reduced profitability of fish-processing enterprises, and the necessity of transferring the infrastructure to new commercial fishing areas.

3. The lava dam forming the lake is composed by porous crumbling rocks and is highly penetrable for the "under-bed" stream of the river. A considerable part of the aqueous run-off occurs under the dam. Judging by the reports of Lengidroproyekt the underground river commences at the distance of 1.5 km from the rise of the Kronotskaya River at the depth of about 60 meters. The discharge of the river in the area of the biggest rapids increases several times. Bursting the rapids will lead to the destruction of the temporary basis of erosion that will inevitably facilitate a change in the longitudinal cross-section of the river balance. In its turn, it will lead to a change in the hydraulic loads on the river bed rocks. Taking into account high penetrability of the grounds, bursting the rapids may in the end activate the processes of the depth erosion that will result in the formation of new rapids or the destruction of the dam body and emptying of the lake.

4. The construction of the channel with the elevation difference of about 150 m bypassing the rapids in the Kronotskaya River has no analogues in the world and will require conceptually new fishery solutions. The world practice shows that in case of high dams creation passive belt-type fish channels are made more often. Nevertheless, it has been shown more than once that they work effectively with the elevation difference of not more than several dozens of meters. The record examples are: Nizhne-Tulomskaya Hydro-Electric Power Station – the elevation difference of 20 m, the Sir River (Norway) – 27 m, the Columbia River (the USA) – 40 m. The efficiency of such fish channels with the elevation difference of 30 m stands at approximately 10%, and with the difference of 50 m – less than 7%. With maximum differences special hydraulic elevators are also constructed. Their real fish-passing capacity was estimated at less than 10%. The highest elevator in the world (63 m) is made for Atlantic salmon on the basis of Verkhne-Tulomskaya Hydro-Electric Power Station. Technologies of such structures building for passing mass species are not available. By the way, elevators are installed in the reinforced-concrete dams rather than in the banked earth, and they require electric power supply for concentrators and guide apparatuses for fish, lifting mechanisms. There is no experience of applying these facilities for Pacific salmon.

Besides, the delivery of sockeye salmon spawners to the lake is only half the problem. Its second part is the necessity of the young salmon delivery to the sea through the abovementioned rapids. According to American authors, with the speed of the stream at more than 3 m/s the mortality rate of the young salmon can be up to 30%, with the speed of the stream at more than 5 m/s almost all young

salmon die. Let us remind that, according to the data of Leningidroproyekt, the speeds of stream in some areas of the river reach 7 m/s.

5. The ecosystem of Kronotskoye Lake is a unique natural site – the center of the formation of char new species. As of the present moment 7 species (forms) of endemics are described for the lake. The well-known diversity of chars is the highest in the world that makes this site exceptionally important for solving fundamental and applied scientific tasks connected with the issues of evolution and efficient use of fresh water bodies resources. Beside chars, two forms of landlocked sockeye salmon – Kokani – dwell in the lake. In 1970—1980s Kokani were used as the object of acclimatization in empty water reservoirs of the peninsula. The main purpose is to increase the fish productivity of the internal water bodies of the peninsula. World experience of hydro-construction and introductions showed that endemic species complexes are extremely vulnerable and can be destroyed within a short period of time. A vivid example is provided by the destruction of chars in great American Lakes (the USA – Canada), of barbs in Lake Lanao (the Philippines) and so on.

6. Kronotskoye Lake is situated in the territory of Kronotsky State Natural Biosphere Reserve which is a biosphere reservation (the category of SPNA, in compliance with International Union for Conservation of Nature and Natural Resources: IA – strict nature reserve) and the UNESCO World Heritage site. Any activities connected with changing the boundaries of unique sites, hydrological conditions of the territory, introduction of species, violation of biological and ecological balance of the territory and so on will result in the violation of the Russian Federation's commitments on the preservation of these unique in the framework of the world nature objects.

Despite the fact that the implementation of the project may potentially bring significant economic benefits in the future, the abovementioned aspects considerably decrease its value, and in the pessimistic variant of events makes the implementation of this activity disadvantageous for the region and harmful for the unique nature complexes of Kamchatka krai on the whole.

A rational alternative for this project can be the restoration of the sockeye salmon schools which were destroyed as a result of excessive fishing pressure and anthropogenic pressure. Particularly, for the latest half of a century the sockeye salmon school of the Avacha River has been almost fully destroyed. For example, in 1957-1959 the population of sockeye salmon spawning in Verkneavachinskiye Lakes was estimated at 10-40 thousand individuals. As of now, very few sockeye salmon spawners are found in the lake. The sockeye salmon schools of the Bolshaya River have been considerably damaged. The restoration of these schools by means of constructing special fish-breeding farms can be much more efficient and economically advantageous than the creation of the school of migratory sockeye salmon in Kronotskoye Lake. By the way, Kamchatka has positive experience of exploiting a farm for breeding the sockeye salmon juveniles in the basin of the Bolshaya River (Malkinsky fish-breeding farm). On the basis of this farm all necessary technologies which are required for the restoration of historical schools of

sockeye salmon that once existed in the rivers of Kamchatka krai are developed and successfully employed.