**Brief description of proposed nature protected area «Nikolka»**

Irina S. Stepanchikova, Marina P. Vyatkina, Veronika V. Dirksen,
Gulnara M. Tagirdzhanova, Aleksandra V. Dyomina,
Natalia V. Golub, Vitaly A. Masnev, Dmitry E. Himelbrant

1. Aims and background.

The main nature objects to protect on Nikolka volcano are relict **primeval spruce (*Picea ajanensis*) forests** and their **unique biota**, including rare lichen ***Erioderma pedicellatum*** and complex of accompanying species.

Field studies of Nikolka volcano outside Kronotsky Reserve were carried out in 2014–2016 (2014–2015 – in the northern and southern part of the area in 2016 – in the northern part). Data on biodiversity (vascular plants, lichens, bryophytes) and plant communities (composition, age of trees, dominants, species density per sample plot etc.) were collected by group of specialists.





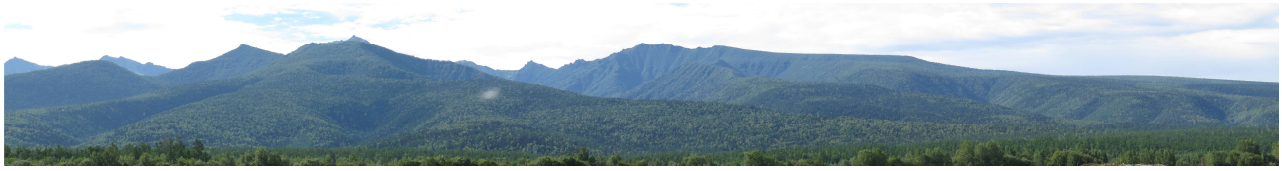

Fig. 1–4. Spruce forests on Nikolka Mt. Fig. 5. Nikolka Mountain. Photo: I. Stepanchikova, 2016

2. Location.

The proposed nature protected area «Nikolka» is situated in Mil'kovo District of Kamchatka Krai, S from Lazo village, on slopes and foot of Nikolka (Kunchokla) Mountain (fig. 6), N 55°04–28' E 59°34'–160°03' (WGS 1984).

Fig. 6. Nikolka Mountain (yellow) on Kamchatka Peninsula.

3. Borders.

We propose two variants of borders for the NPA:

(1) Landscape & botanical NPA: the whole Nikolka Mt., ca. 903.4 sq. km (fig. 7).

It is more logical to protect the landscape as a whole, including not only forest itself, but also the rivers which are so important for the plant communities, and their sources on the mountain top. The area is huge, therefore it may be difficult to organize proper management for such an area.

If the authorities decide so, we have alternative variant of borders,

(2) Botanical NPA: spruce forests on slopes of Nikolka Mt., ca. 585.5 sq. km (fig. 8).

On maps below (fig. 1, 2), yellow is proposed border, black lines delimit forest quarters, red are studied plots.

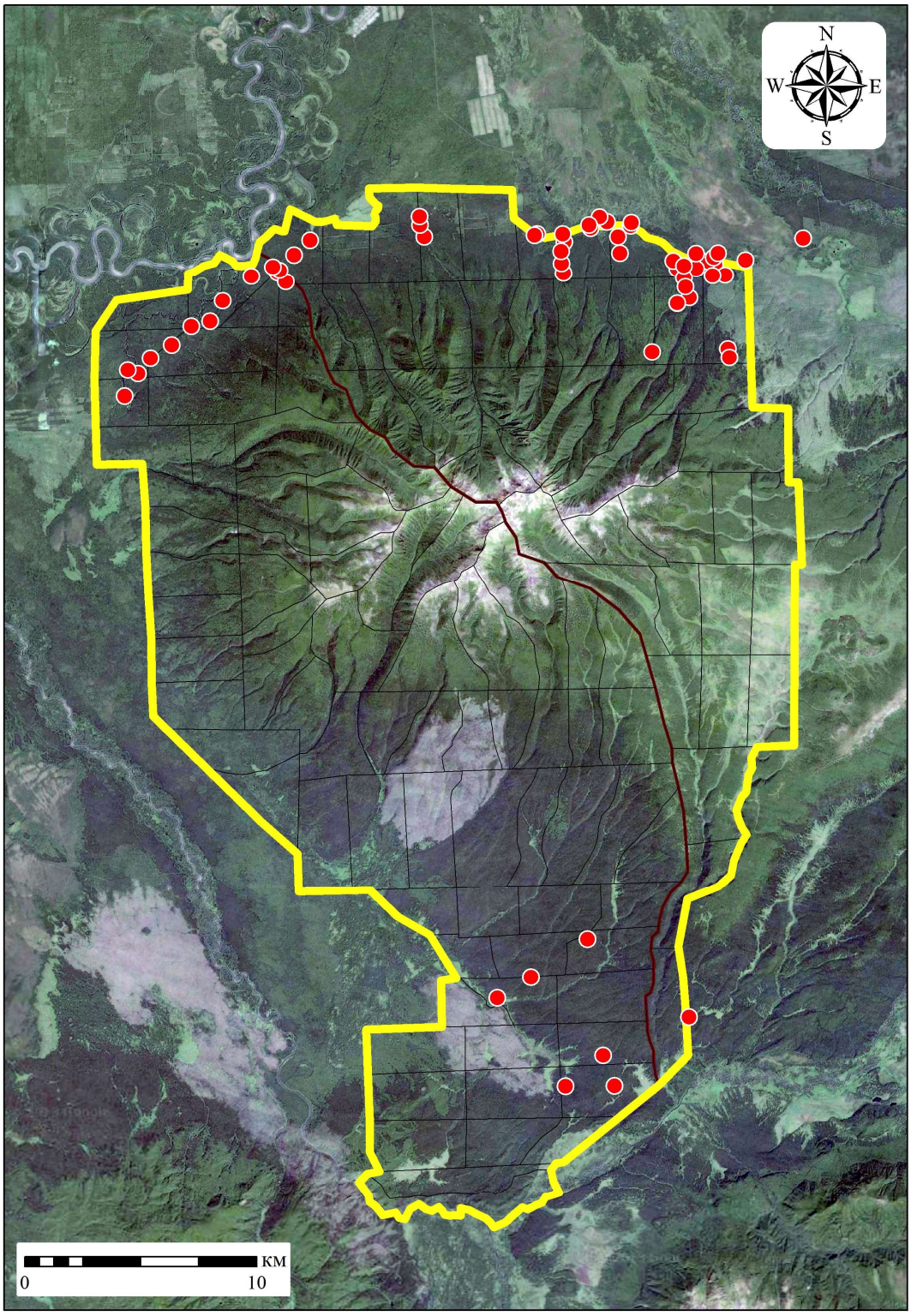


Fig. 7. «Nikolka». Landscape & botanical NPA (“maximum” borders).

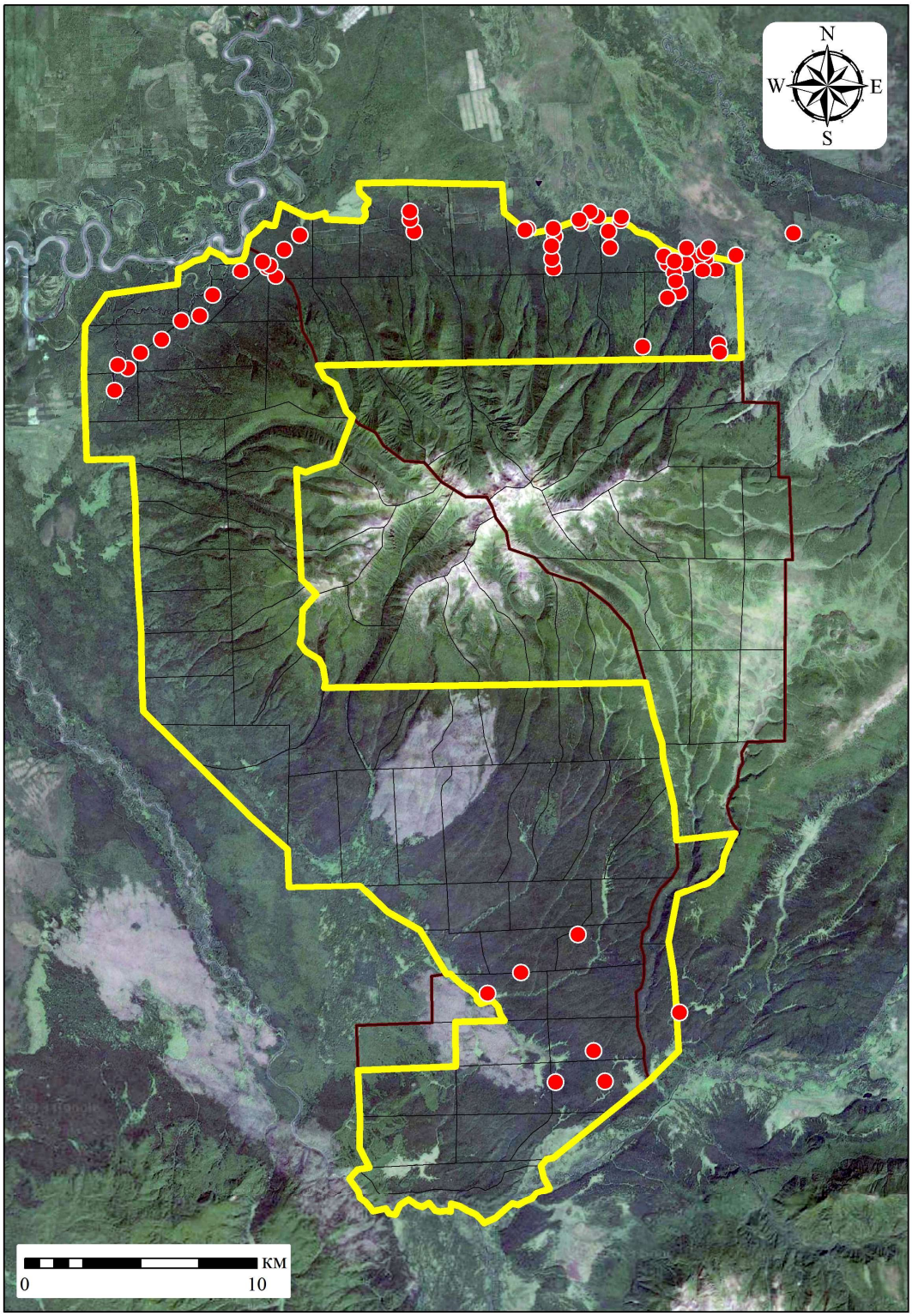


Fig. 8. «Nikolka». Botanical NPA (“minimum” borders).

4. Biodiversity: plants, fungi and lichens. Protected species (fig. 9–21).

| **Red-listed species in Russian Federation and/or Kamchatka Krai, found on Nikolka Mt.** | | | |
|---|---|---|---|
| **№** | **Species** | **Category** | |
| | | **Red Data Book of Russia** | **Red Data Book of Kamchatka** |
| ***Vascular plants*** | | | |
| 1 | *Epipogium aphyllum* Sw. | 2 а | EN |
| ***Lichens*** | | | |
| 2 | *Chaenotheca phaeocephala* (Turner) Th. Fr. | | LR |
| 3 | *Chaenotheca stemonea* (Ach.) Müll. Arg. | | LR |
| 4 | *Cliostomum corrugatum* (Ach.: Fr.) Fr. | | VU |
| 5 | *Erioderma pedicellatum* (Hue) P. M. Jørg. | to be included | to be included |
| 6 | *Fuscopannaria ahlneri* (P. M. Jørg.) P. M. Jørg. | | VU |
| 7 | *Lobaria pulmonaria* (L.) Hoffm. | 2 б | VU |
| 8 | *Nephroma helveticum* Ach. | | CR |
| 9 | *Nephroma resupinatum* (L.) Ach. | | EN |
| 10 | *Pseudocyphellaria crocata* (L.) Vainio | to be included | to be included |
| 11 | *Ramalina thrausta* (Ach.) Nyl. | | VU |
| 12 | *Sphinctrina turbinata* (Pers.: Fr.) De Not. | | VU |
| 13 | *Sticta limbata* (Sm.) Ach. | 3 б | VU |
| 14 | *Usnea lapponica* Vain. | | VU |
| 15 | *Usnea longissima* Ach. | | CR |
| 16 | *Usnea subfloridana* Stirt. | | EN |
| ***Fungi*** | | | |
| 17 | *Hericium alpestre* Pers. | 3 д | |
| 18 | *Ganoderma lucidum* (Fr.) P. Karst. | 3 б | VU |

*Erioderma pedicellatum* (Hue) P. M. Jørg. (Pannariaceae) is an epiphytic cyanolichen (fig. 9, 10) found in coniferous forests of the temperate and boreal Northern Hemisphere. This species has been classified as a Critically Endangered species by the International Union for the Conservation of Nature (Scheidegger 2003). Currently four disjunct regional populations are known: Norway (Ahlner 1948, Holien et al. 1995, Holien 2016), Atlantic Canada (Ahti & Jørgensen 1971, Wiersma & Skinner 2011, Cameron & Tomps 2016), Alaska (Nelson et al. 2009) and Russia (Stepanchikova & Himelbrant 2012, Tagirdzhanova et al. 2016).

Fig. 9, 10. *Erioderma pedicellatum* on *Picea ajanensis* twigs: dry (fig. 9) and wet (fig. 10) thalli. Photo: I. Stepanchikova, 2016

Fig. 11. *Epipogium aphyllum.* Photo: M. Vyatkina

Fig. 12. *Hericium alpestre.* Photo: M. Vyatkina

Fig. 13. *Lobaria pulmonaria*. Photo: I.Stepanchikova, 2016

Fig. 14. *Sticta limbata*. Photo: I. Stepanchikova, 2016

Fig. 15. *Usnea longissima*. Photo: I. Stepanchikova, 2016

Fig. 16. *Ramalina thrausta.* Photo: M. Vyatkina

Fig. 17. *Fuscopannaria ahlneri.* Photo: I. Stepanchikova, 2016

Fig. 18. *Nephroma helveticum.* Photo: I. Stepanchikova, 2016

Fig. 19. *Usnea lapponica.* Photo: M. Vyatkina

Fig. 20. *Usnea subfloridana.* Photo: M. Vyatkina

Fig. 21. *Pseudocyphellaria crocata.*
Photo: I. Stepanchikova, 2016

5. Problems and threats.

(1) Forest fires. In 2016 vicinities of Nikolka river were seriously burnt, in spite of attempts of forestry staff to stop the fire.

(2) Forest cuttings. Although according to the Russian Law, all the species included in the Red Data Book should be protected everywhere they are found, in practice the relict forests with thousands of rare organisms are cut just because when the cuttings were planned nobody knew about the unisue biodiversity, and now we can't just stop it. The best way to protect relict spruce forests in Kamchatka, in our oppinion, is to make NPA.

Fig. 22. Dead *Lobaria pulmonaria* thalli.
Photo: I. Stepanchikova, 2016

Fig. 23. Cuttings on northern slope of Nikolka Mt.
Photo: I. Stepanchikova, 2016

## References


(1) Ahlner S (1948) Utbredningstyper bland Nordiska barrträdslavar. Almquist & Wiksells, Uppsala

(2) Ahti T, Jørgensen P (1971) Notes on the lichens of Newfoundland. I. *Erioderma boreale*, new to North America. Bryologist 74: 378–381

(3) Cameron RP, Toms B (2016) Population decline of endangered lichen *Erioderma pedicellatum* in Nova Scotia, Canada. Botany 94: 565–571

(4) Holien H, Gaarder G, Hapnes A (1995) *Erioderma pedicellatum* still present, but highly endangered in Europe. Graph Scr 7:79–84

(5) Holien H (2016) Faggrunnlag til handlingsplan for fire lavarter i boreal regnskog. Høgskolen i Nord-Trøndelag Utredning nr 177, Steinkjer (in Norwegian)

(6) Nelson P, Walton J, Roland C (2009) *Erioderma pedicellatum* (Hue) P.M.Jørg. new to the United States and western North America, discovered in Denali National Park and Preserve and Denali State Park. Evansia 26:19–23

(7) Scheidegger C (2003) *Erioderma pedicellatum*. In: IUCN (ed) 2008 IUCN Red List of Threatened Species. IUCN, Gland, available at www.iucnredlist.org

(8) Stepanchikova IS, Himelbrant DE (2012) Lichen diversity hot spot in Kronotsky Nature Reserve, Kamchatka. Proceedings of the 7th International Association for Lichenology Symposium. Bangkok, Thailand

(9) Tagirdzhanova GM, Stepanchikova IS, Himelbrant DE, Vyatkina MP (2016) First results obtained in a study of the Asian population of *Erioderma pedicellatum*. Proceedings of the 8th International Association for Lichenology Symposium. Helsinki, Finland

(10) Wiersma YF, Skinner R (2011) Predictive distribution model for the boreal felt lichen *Erioderma pedicellatum* in Newfoundland, Canada. Endang Species Res 15:115–127.