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RESEARCH REPORT

ON THE PROJECT 048
«THE ECOLOGICAL ATLAS OF THE BAIKAL BASIN»

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Summary

Keywords: Lake Baikal basin, ecological atlas, ecological maps, GIS mapping, formation of the ecological situation, environmental protection, optimization of nature management.

The Ecological Atlas of the Baikal Basin was created by order and under the auspices of the Global Environment Facility **using Grants: REQ-EMO-2013-048 Russia and REQ-EMO-2013-047 Mongolia** to integrate up-to-date information and knowledge on the key factors of formation of the ecological situation in the Baikal basin, and on the current state of the natural environment, and represents them in forms suitable for solving problems of economically and ecologically balanced development of the Baikal region.

The state-of-the-art developments in the atlas mapping, GIS-technologies, remote sensing techniques, and a constantly supplemented and updated thematic spacial data base available in the V.B. Sochava Institute of Geography SB RAS, Limnological Institute SB RAS, Institute of the Earth's Crust SB RAS, and Irkutsk State University (Irkutsk), Baikal Institute of Nature Management SB RAS (Ulan-Ude), Institute of Natural Resources, Ecology and Cryology SB RAS (Chita), and Sh. Tsegmid Institute of Geography of the Mongolian Academy of Sciences were used when compiling the Atlas.

Creation of the Atlas required an integrated study of environmental problems and situations in both territorial and content terms. The combination of natural-resource, biotic, economic, social, and demographic factors of formation of the ecological situation became possible due to a purposefully developed integrated electronic mapping program, which was considered as a procedure for preparing objective and available information about territorial objects for solution of assigned tasks of specific and integrated ecological mapping.

In the course of the work the following major steps in compiling the Atlas were specified: creation of cartographic bases; data collection for development of the thematic content of maps; digitization of necessary thematic layers of maps, determined by their program; formation of thematic databases; development of projects in the GIS-shells environment; and montage and layout of maps, etc.

Electronic atlas mapping of the Baikal basin was carried out using two main scale levels, namely: 1:5 000 000 for the maps of natural factors, and 1:6 000 000 for the maps of socio-economic factors of formation of the ecological situation. The database and its subject-matter coverage depended on the nature of phenomena and processes being mapped, the current state, and the presence of certain natural, resource, economic, social, demographic, environmental and other problems of nature management.

Structurally, the Atlas consists of seven blocks - introductory and six thematic ones, namely: 1) natural conditions of formation of the ecological situation, 2) resource factors of formation of the ecological situation, 3) socio-economic factors of formation of the ecological situation, 4) environment transformation, 5) medico-ecological situation, 6) environment protection, and 7) ecological state of Lake Baikal water area.

The concept, structure and scientific content of the atlas were developed by: the V.B. Sochava Institute of Geography SB RAS and Sh. Tsegmid Institute of Geography of the Mongolian Academy of Sciences.
Materials were provided by: the V.B. Sochava Institute of Geography SB RAS, Sh. Tsegmid Institute of Geography of the Mongolian Academy of Sciences, Baikal Institute of Nature Management SB RAS, Limnological Institute SB RAS, Institute of the Earth's Crust SB RAS, Institute of Natural Resources, Ecology and Cryology SB RAS, and Irkutsk State University.
Manuscript maps were compiled by the Laboratory of Cartography, Geoinformatics and Remote Sensing Methods of the V.B. Sochava Institute of Geography SB RAS under the supervision of A.R. Batuev.
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List of Creators

Map No.	*Project No.*	**Title**	**Author**	**Compiled by**	**Coauthor**	**Editor**
1	*1*	Satellite image	D.A. Gales	D.A. Gales		A.R. Batuev
2	*2*	Lake Baikal basin on the Eurasia map	D.A. Gales	D.A. Gales		V.M. Plyusnin, D. Dorzhgotov
3	*3*	Lake Baikal basin borders and structure	A.R. Batuev D.A. Gales	D.A. Gales		V.M. Plyusnin, D. Dorzhgotov
4	*4*	Hypsography	A.V. Bardash	A.V. Bardash		A.R. Batuev, D. Enkhtaivan
5	*5*	Administrative-territorial system	A.R. Batuev D.A. Gales	D.A. Gales		V.M. Plyusnin, D. Dorzhgotov A.N. Beshentsev
1. Natural conditions of formation of the ecological situation in the Baikal basin						
6	*6*	Geology	E.E. Kononov	S.A. Sedykh	O. Tumertogoo	V.M. Plyusnin, D. Dorzhgotov
7	*7*	Seismic risk zoning	V.S. Imaev	S.A. Sedykh	A.V.Chipizubov, O.P.Smekalin, L.P. Imaeva, S. Demberel	K.G. Levi, D. Dorzhgotov
8	*8*	Relief	A.V. Kazakov	A.V. Kazakov	M. Ulziibat	A.R. Batuev E.E. Kononov
9	*9*	Steepness of slopes	A.V. Bardash	A.V. Bardash		A.R. Batuev D. Enkhtaivan
10	*10*	Geomorphology	D.V. Kobylkin	A.V. Bardash	D. Enkhtaivan	A.R. Batuev Yu.V. Ryzhov D. Dorzhgotov
11	*11*	Orographic Scheme of the Lake Baikal Basin	D.V. Kobylkin	A.V. Bardash	D. Enkhtaivan	Yu.V. Ryzhov D. Dorzhgotov

12	*12*	Modern exogenous processes of morphogenesis	V.B. Vyrkin	T.N. Tuzhikova, L.G.Maksimchuk, D.A. Gales		V.M. Plyusnin A.R. Batuev D. Dorzhgotov
13	*13*	Mean sea level pressure in January	O.P. Osipova	A.V. Bardash		L.M. Korytny D. Dorzhgotov
14	*14*	Mean sea level pressure in April	O.P. Osipova	A.V. Bardash		L.M. Korytny
15	*15*	Mean sea level pressure in July	O.P. Osipova	A.V. Bardash		L.M. Korytny D. Dorzhgotov
16	*16*	Mean sea level pressure in October	O.P. Osipova	A.V. Bardash		L.M. Korytny D. Dorzhgotov
17	*17*	_17_The average monthly temperature in January	A.V. Bardash	A.V. Bardash		L.M. Korytny D. Dorzhgotov
18	*18*	_18_The average monthly temperature in July	A.V. Bardash	A.V. Bardash		L.M. Korytny D. Dorzhgotov
19	*19*	Amounts of air temperatures for the period with temperatures above 10	A.A. Sorokovoy	A.A. Sorokovoy		L.M. Korytny D. Dorzhgotov
20	*20*	Average annual rainfall in mm	A.V. Bardash	A.V. Bardash		L.M. Korytny D. Dorzhgotov
21	*21*	Depth of snow cover	A.T. Naprasnikov	A.V. Bardash		L.M. Korytny D. Dorzhgotov
22	*22*	Climate discomfort	L.B. Bashalkhanova	A.V. Kazakov	I.A. Bashalkhanov	L.M. Korytny
23	*23*	Atmosphere Self-Purification Capacity	L.B. Bashalkhanova	A.V. Kazakov	D.A. Gales	A.R. Batuev, L.M. Korytny
24	*24*	Annual river	E.Zh. Garmaev	A.V. Bardash	G. Davaa T.A. Borisova	L.M. Korytny
25	*25*	Drainage Density	A.N. Beshentsev	A.V. Bardash	G. Davaa	E.Zh. Garmaev, D. Enkhtaivan
26	*26*	Averagelong-termrunoff	O.V. Gagarinova	A.V. Bardash	G. Davaa E.Zh. Garmaev	L.M. Korytny D. Enkhtaivan
27	*27*	Minimum summer runoff	O.V. Gagarinova	A.V. Bardash	E.Zh. Garmaev	L.M. Korytny
28	*28*	Maximum runoff during the flood	O.V. Gagarinova	A.V. Bardash	E.Zh. Garmaev	L.M. Korytny
29	*29*	Floods	N.V. Kichigina	D.A. Gales	A.N. Beshentsev T.A. Borisova G. Davaa	L.M. Korytny E.Zh. Garmaev
30	*30*	Surface-Water Self-Purification	O.V. Gagarinova	D.A. Gales		L.M. Korytny
31	*31*	Groundwater	P.S. Badminov	S.A. Sedykh	I.G. Kryukova N. Zhadamba	L.M. Korytny D. Dorzhgotov
32	*32*	Permafrost zoning	A.A. Sorokovoy	A.A. Sorokovoy	Ya. Zhambalzhav	V.M. Plyusnin, D. Dorzhgotov
33	*33*	Vegetation	A.V. Belov	D.A. Lopatkin	L.P. Sokolova I. Tuvshintogtokh	A.V. Belov, A.R. Batuev, D. Enkhtaivan
34	*34*	Amount of forests	E.L. Makarenko	D.A. Lopatkin	I. Tuvshintogtokh B. Bat-Enerel	A.R. Batuev D. Dorzhgotov
35	*35*	Soils	I.A. Belozertseva	A.A. Sorokovoy	D. Dorzhgotov, O. Batkhishig, L.L.Ubugunov, N.B. Badmaev, V.I.Ubugunova, A.B.Gyninova, L.D..Balsanova, V.L.Ubugunov,	D. Enkhtaivan

					B.N.Gonchikov, Ts-D-Ts. Tsybikdorzhiev	
36	*36*	Stability of soils	I.A. Belozertseva	A.A. Sorokovoy	O. Batkhishig D. Enkhtaivan	D. Dorzhgotov
37	*37*	Legend_Soil-ecological zoning	I.A. Belozertseva	A.A. Sorokovoy	D. Dorzhgotov O. Batkhishig	A.R. Batuev, D. Enkhtaivan
38	*38*	Taxonomic diversity	E.P. Bessolitsyna	A.V. Bardash		A.V. Belov, A.R. Batuev
39	*39*	Ichthyogeographical complexes	A.V. Bardash, A.M. Mamontov	A.V. Bardash		A.R. Batuev, E.Zh. Garmaev, D. Dorzhgotov
40	*40*	Geosystems	E.G. Suvorov	D.A. Lopatkin	D. Dash	Yu.M. Semenov
41	*41*	Physiographic regionalization	E.G. Suvorov	D.A. Lopatkin		V.M. Plyusnin D. Dorzhgotov
42	*42*	Landscape Stability	A.D. Abalakov	D.A. Lopatkin	L.S. Novikova D. Enkhtaivan	
2. Resource factors of formation of the ecological situation in the Baikal basin						
43	*43*	Energy resources and their development	N.B. Bazarova	V.N. Bogdanov	G. Dezhidmaa N. Oyuuntuyaa	A.R. Batuev L.M. Korytny D. Dorzhgotov
44	*44*	Ferrous, nonferrous, rare and precious metal resources and their extraction	N.B. Bazarova V.S. Batomunkuev	V.N. Bogdanov	G. Dezhidmaa N. Oyuuntuyaa	L.M. Korytny A.R. Batuev D. Dorzhgotov
45	*45*	Main types of non-metallic materials	N.B. Bazarova V.S. Batomunkuev	V.N. Bogdanov	G. Dezhidmaa N. Oyuuntuyaa	L.M. Korytny A.R. Batuev D. Enkhtaivan
46	*46*	Water resources and consumptive water use	E.A. Ilyicheva M.V. Pavlov	A.V. Bardash	I.Yu. Amosova A.P. Chechel	L.M. Korytny
47	*47*	Natural resources of the ground waters	P.S. Badminov	S.A. Sedykh	I.G. Kryukova	L.M. Korytny
48	*48*	Mineral waters	А.И. Оргильямов	S.A. Sedykh	P.S. Badminov I.G. Kryukova B. Nambar	L.M. Korytny D. Enkhtaivan
49	*49*	Recreational Resources of Climate	L.B. Bashalkhanova	A.V. Kazakov	D.A. Lopatkin	L.M. Korytny D. Enkhtaivan
50	*50*	Population farmland provision and land use category	E.L. Makarenko	D.A. Lopatkin	S.Shiirev-Adyaa	A.R. Batuev Zh. Oyuungerel
51	*51*	Land resources use	E.L. Makarenko	D.A. Lopatkin	P. Myagmartseren B.O. Gomboev A.N. Beshentsev	A.R. Batuev D. Dorzhgotov
52	*52*	Forest resources and their use	E.L. Makarenko	D.A. Lopatkin	S.D.Puntsukova D.Bayasgalan	A.R. Batuev D. Dorzhgotov
53	*53*	Timber Stock of the Main Groups of Forest Forming Tree Species	E.L. Makarenko	D.A. Lopatkin		A.R. Batuev D. Dorzhgotov
54	*54*	Hunting Grounds	G.V. Ponomarev	A.V. Bardash		A.R. Batuev
55	*55*	Hunting resources. Ungulates	G.V. Ponomarev	A.V. Bardash		A.R. Batuev
56	*56*	Hunting resources. Predators	G.V. Ponomarev	A.V. Bardash		A.R. Batuev
57	*57*	Hunting resources. Fur-bearing animals	G.V. Ponomarev	A.V. Bardash		A.R. Batuev
58	*58*	Hunting resources. Squirrel and hare	G.V. Ponomarev	A.V. Bardash		A.R. Batuev
59	*59*	Hunting resources. Wild fowl	G.V. Ponomarev	A.V. Bardash		A.R. Batuev
60	*60*	Environmental landscapes	T.I. Kuznetsova	D.A. Lopatkin	A.R. Batuev A.V. Bardash	L.M. Korytny

61	*61*	Susceptibility to external input	T.I. Kuznetsova	D.A. Lopatkin	A.R. Batuev	L.M. Korytny
62	*62*	Environmental potential	T.I. Kuznetsova	D.A. Lopatkin	A.V. Bardash	L.M. Korytny
63	*63*	Environmental functions	T.I. Kuznetsova	D.A. Lopatkin	A.R. Batuev	L.M. Korytny
3. Socio-economic factors of formation of the ecological situation in the Baikal basin						
64	*64*	Industry and Its Environmental Impact	N.A. Ippolitova	D.A. Gales		T.I. Zabortseva
65	*65*	Construction	T.I. Zabortseva	D.A. Gales	O.A. Ignatova, L.M. Khandozhapova	A.R. Batuev
66	*66*	Animal industry	N.V. Rogovskaya	V.N. Bogdanov		Zh. Oyuungerel A.N. Beshentsev
67	*67*	Crop	N.V. Rogovskaya	V.N. Bogdanov		Zh. Oyuungerel A.N. Beshentsev
68	*68*	Transport infrastructure	Ts.B. Dashpilov	V.N. Bogdanov		L.M. Korytny Zh. Oyuungerel
69	*69*	Functional-ecological types of settlements	A.V. Bardash	A.V. Bardash		A.R. Batuev D. Enkhtaivan
70	*70*	Population Density	A.N. Vorobyev	A.N. Vorobyev	Zh. Oyuungerel	A.R. Batuev, N.V. Vorobyev, D. Enkhtaivan
71	*71*	Rural population density and urban settlement population size, 1989	A.N. Vorobyev	A.N. Vorobyev	Zh. Oyuungerel	A.R. Batuev, N.V. Vorobyev, D. Enkhtaivan
72	*72*	Rural population density and urban settlement population size, 2013	A.N. Vorobyev	A.N. Vorobyev	Zh. Oyuungerel	A.R. Batuev, N.V. Vorobyev, D. Enkhtaivan
73	*73*	Population Dynamics	A.N. Vorobyev	A.N. Vorobyev		A.R. Batuev, N.V. Vorobyev, Zh. Oyuungerel
74	*74*	Natural population increase	N.V. Vorobyev	A.N. Vorobyev	Zh. Oyuungerel	A.R. Batuev, D. Enkhtaivan
75	*75*	Urbanization	N.V. Vorobyev	A.N. Vorobyev	Zh. Oyuungerel	A.R. Batuev D. Enkhtaivan
76	*76*	Net migration rate	N.V. Vorobyev	A.N. Vorobyev	Zh. Oyuungerel	A.R. Batuev, D. Enkhtaivan
77	*77*	Housing Conditions	T.I. Zabortseva	D.A. Gales	O.A. Ignatova	A.R. Batuev
78	*78-1*	Comfort of Available Housing (Russian part)	T.I. Zabortseva	D.A. Gales	O.A. Ignatova, P.V. Rogov, B. Batbuyan	A.R. Batuev Zh. Oyuungerel
79	*78-2*	Comfort of Available Housing (Mongolian part)	T.I. Zabortseva	D.A. Gales		
80	*79*	Culture	T.N. Shekhovtsova	D.A. Gales	N.G. Turkina Zh. Oyuungerel	M.V. Ragulina D. Enkhtaivan
81	*80*	Education	T.N. Shekhovtsova	D.A. Gales	N.G. Turkina Ts. Otgonkhuu	M.V. Ragulina D. Enkhtaivan
82	*81*	Religions	V.G. Saraev	D.A. Gales	N.G. Gomboeva, Zh. Oyuungerel	A.R. Batuev D. Enkhtaivan
83	*82*	Tourism	O.V. Evstropyeva	A.V. Kazakov	D. Enkhtaivan	A.R. Batuev Zh. Oyuungerel
4. Environment transformation in the Baikal basin						
84	*83*	Trends in air temperature	A.A. Sorokovoy	A.A. Sorokovoy		L.M. Korytny
85	*84*	Trends rainfall	A.A. Sorokovoy	A.A. Sorokovoy		L.M. Korytny
86	*85*	Atmospheric air condition	S.Zh. Vologzhina	A.A. Shagdurov	A.V. Arguchintseva	L.M. Korytny A.R. Batuev
87	*86-1*	Atmospheric air condition	S.Zh.	A.A. Shagdurov	A.V.	L.M. Korytny

		- Irkutsk_The isolines of absolute concentration of soot in wintertime	Vologzhina		Arguchintseva	A.R. Batuev
88	*86-2*	Atmospheric air condition - Irkutsk_The isolines of excess frequency of the average daily maximum allowable concentration of suspended substances in december	S.Zh. Vologzhina	A.A. Shagdurov	A.V. Arguchintseva	L.M. Korytny A.R. Batuev
89	*86-3*	Atmospheric air condition - Irkutsk_The isolines of excess frequency of the average daily maximum allowable concentration of nitrogen dioxide in December	S.Zh. Vologzhina	A.A. Shagdurov	A.V. Arguchintseva	L.M. Korytny A.R. Batuev
90	*86-4*	Atmospheric air condition - Irkutsk_The isolines of excess frequency of the average daily maximum allowable concentration of soot in December	S.Zh. Vologzhina	A.A. Shagdurov	A.V. Arguchintseva	L.M. Korytny A.R. Batuev
91	*87*	Atmospheric air condition - Ulan-Ude_Frequency of excess average daily mpc nitrogen dioxide in Ulan-Ude in December	S.Zh. Vologzhina	A.A. Shagdurov	A.V. Arguchintseva, А.С.Михеева	L.M. Korytny A.R. Batuev
92	*88-1*	Atmospheric air condition - Ulaanbatar_The isolines of concentration of dust in Ulaanbaatar when eastern wind is 5 MPs	S.Zh. Vologzhina	A.A. Shagdurov	A.V. Arguchintseva	L.M. Korytny A.R. Batuev
93	*88-2*	Atmospheric air condition - Ulaanbatar_The isolines of concentration of dust in Ulaanbaatar when western wind is 5 MPs	S.Zh. Vologzhina	A.A. Shagdurov	A.V. Arguchintseva	L.M. Korytny A.R. Batuev
94	*88-3*	Atmospheric air condition - Ulaanbatar_The isolines of concentration of dust in Ulaanbaatar when calm is	S.Zh. Vologzhina	A.A. Shagdurov	A.V. Arguchintseva	L.M. Korytny A.R. Batuev
95	*88-4*	Atmospheric air condition - Ulaanbatar_The excess frequency of the average daily maximum allowable concentration of soot around airport of Ulaanbaatar	S.Zh. Vologzhina	A.A. Shagdurov	A.V. Arguchintseva	L.M. Korytny A.R. Batuev
96	*88-5*	Atmospheric air condition - Ulaanbatar_The excess frequency of the average daily maximum allowable concentration of dust in Ulaanbaatar in April	S.Zh. Vologzhina	A.A. Shagdurov	A.V. Arguchintseva	L.M. Korytny A.R. Batuev
97	*89*	The quality of surface water	O.V. Gagarinova	A.V. Bardash	G. Davaa	L.M. Korytny D. Dorzhgotov
98	*90*	Conventional symbols Mining enterprises	A.D. Abalakov N.B. Bazarova	V.N. Bogdanov	D. Enkhtaivan , E. Odbaatar, V.S.Batomunkuev	A.R. Batuev L.M. Korytny Zh. Oyuungerel
99	*91*	Soil degradation and contamination	I.A. Belozertseva	A.A. Sorokovoy	O. Batkhishig T.Oyuunchimeg A.N. Beshentsev, Z.Z. Pakhakhinova	A.R. Batuev D. Dorzhgotov

100	*92*	Pasture Degradation	I.A. Belozertseva	A.A. Sorokovoy	A.N. Beshentsev, Z.Z. Pakhakhinova S.Shiirev-Adyaa	A.R. Batuev D. Dorzhgotov
101	*93*	The disturbance of vegetation in the lake Baikal basin	L.P. Sokolova	S.A. Sedykh		A.V. Belov, A.R. Batuev
102	*94*	Disturbance of Forest Lands	E.L. Makarenko	D.A. Lopatkin	I. Tuvshintogtokh	A.R. Batuev D. Dorzhgotov
103	*95*	Disturbance of wildlife	V.A. Prelovsky	S.A. Sedykh		A.V. Belov, A.R. Batuev
5. Medico-ecological situation						
104	*96*	Ecological preconditions for the spread of zooanthroponoses	I.V. Koneva	D.A. Lopatkin	A.R. Batuev	S.V. Ryashchenko
105	*97*	Free Medical Care system	V.G. Saraev	D.A. Gales	V.N. Veselova, Zh. Oyuungerel, N.G. Gomboeva, E.V. Pomazkina, Yu. B. Zhamyanova A.N. Beshentsev	S.V. Ryashchenko D. Dorzhgotov
106	*98*	Medical service density – Doctors	V.G. Saraev	D.A. Gales	Zh. Oyuungerel, N.G. Gomboeva, E.V. Pomazkina Yu. B. Zhamyanova A.N. Beshentsev	S.V. Ryashchenko D. Dorzhgotov
107	*99*	Medical service density – Nursing staff	V.G. Saraev	D.A. Gales	Zh. Oyuungerel, N.G. Gomboeva, E.V. Pomazkina Yu. B. Zhamyanova A.N. Beshentsev	S.V. Ryashchenko D. Dorzhgotov
108	*100*	Hospital bed capacity	V.G. Saraev	D.A. Gales	Zh. Oyuungerel, , N.G. Gomboeva, E.V. Pomazkina Yu. B. Zhamyanova A.N. Beshentsev	S.V. Ryashchenko D. Dorzhgotov
109	*101*	General population morbidity	V.G. Saraev	D.A. Gales	Zh. Oyuungerel, N.G. Gomboeva, E.V. Pomazkina Yu. B. Zhamyanova A.N. Beshentsev	S.V. Ryashchenko D. Dorzhgotov
110	*102*	Infectious and parasitic diseases	V.G. Saraev	D.A. Gales	Zh. Oyuungerel, Yu. B. Zhamyanova N.G. Gomboeva, E.V. Pomazkina	S.V. Ryashchenko
111	*103*	Respiratory diseases	V.G. Saraev	D.A. Gales	Zh. Oyuungerel, Yu. B. Zhamyanova N.G. Gomboeva, E.V. Pomazkina	S.V. Ryashchenko
6. Environment protection						
112	*104*	Digestive system diseases	V.G. Saraev	D.A. Gales	Zh. Oyuungerel, Yu. B. Zhamyanova N.G. Gomboeva, E.V. Pomazkina	S.V. Ryashchenko
113	*105*	Genitourinary system diseases	V.G. Saraev	D.A. Gales	D.Baasandorzh Yu. B. Zhamyanova N.G. Gomboeva, E.V.	S.V. Ryashchenko Zh. Oyuungerel,

					Pomazkina	
114	*106*	Circulatory system diseases	V.G. Saraev	D.A. Gales	D.Baasandorzh Yu. B. Zhamyanova N.G. Gomboeva, E.V. Pomazkina	S.V. Ryashchenko Zh. Oyuungerel,
115	*107*	Injuries and toxications	V.G. Saraev	D.A. Gales	D.Baasandorzh Yu. B. Zhamyanova, N.G. Gomboeva, E.V. Pomazkina	S.V. Ryashchenko Zh. Oyuungerel,
116	*108*	Malignant neoplasms	V.G. Saraev	D.A. Gales	Zh. Oyuungerel, Yu. B. Zhamyanova, N.G. Gomboeva, E.V. Pomazkina	S.V. Ryashchenko
117	*109*	Adult population disability	V.G. Saraev	D.A. Gales	V.N. Veselova, S.M.Samokhvat Yu. B. Zhamyanova A.N. Beshentsev	S.V. Ryashchenko
118	*110*	Child population disability	V.G. Saraev	D.A. Gales	V.N. Veselova, S.M.Samokhvat Yu. B. Zhamyanova, A.N. Beshentsev	S.V. Ryashchenko
119	*111*	Working-age population disability	V.G. Saraev	D.A. Gales	V.N. Veselova, S.M.Samokhvat Yu. B. Zhamyanova A.N. Beshentsev	S.V. Ryashchenko
120	*112*	Environmental protection infrastructure	T.I. Zabortseva	V.N. Bogdanov	O.A.Ekimovskaya, Zh. Oyuungerel, Nimaeva	N.M. Sysoeva D. Enkhtaivan
121	*113*	Recommended landscape use provisions of the lake Baikal basin	T.I. Kuznetsova	D.A. Lopatkin	A.R. Batuev A.V. Bardash D. Enkhtaivan E. Avirmed	L.M. Korytny
122	*114*	Rare species of vascular plants	N.I. Novitskaya	D.A. Lopatkin	D. Bayasgalan	A.V. Belov D. Dorzhgotov
123	*115*	Rare species of vascular plants of regional conservation	N.I. Novitskaya	D.A. Lopatkin		A.V. Belov
124	*116*	Endangered vegetation communities	N.I. Novitskaya	D.A. Lopatkin		A.V. Belov
125	*117*	Distribution of rare animal species	V.A. Prelovsky	A.V. Bardash		Yu.S. Malyshev
126	*118*	Distribution of rare animal species	V.A. Prelovsky	A.V. Bardash		Yu.S. Malyshev
127	*119*	Distribution of rare animal species	V.A. Prelovsky	A.V. Bardash		Yu.S. Malyshev D. Dorzhgotov
128	*120*	Rare animals distribution	V.A. Prelovsky	A.V. Bardash		Yu.S. Malyshev D. Dorzhgotov
129	*121*	Rare animals distribution	V.A. Prelovsky	A.V. Bardash		Yu.S. Malyshev D. Dorzhgotov
130	*122*	Rare animals distribution	V.A. Prelovsky	A.V. Bardash		Yu.S. Malyshev D. Dorzhgotov
131	*123*	Rare animals distribution	V.A. Prelovsky	A.V. Bardash		Yu.S. Malyshev D. Dorzhgotov

132	*124*	Specially protected natural areas	T.P. Kalikhman	V.N. Bogdanov	B. Oyuungerel D. Enkhtaivan	A.R. Batuev Yu.M. Semenov Zh. Oyuungerel
133	*125*	Non-profit environmental organizations	V.G. Saraev	D.A. Gales	D. Enkhtaivan , E.A. Batotsyrenov	A.R. Batuev
7. Ecological state and protection of Lake Baikal **7.1. Natural ecological state**						
134	*126*	Bottom contour	P.P. Sherstyankin	D.A. Lopatkin	S.P. Alekseev, M. Kanals, M. De Batist	A.R. Batuev
135	*127*	Angles of inclination of slopes	P.P. Sherstyankin	D.A. Lopatkin	S.P. Alekseev, M. Kanals, M. De Batist	A.R. Batuev
136	*128*	Slope exposure of the bottom of Lake Baikal	P.P. Sherstyankin	D.A. Lopatkin	S.P. Alekseev, M. Kanals, M. De Batist	A.R. Batuev
137	*129*	Cloudiness	V.L. Potemkin			L.M. Korytny
138	*130*	Fogs	M.N. Shimaraev	A.A. Shagdurov		L.M. Korytny
139	*131*	Radiation balance	V.L. Potemkin	A.A. Shagdurov		L.M. Korytny
141	*132*	Heat balance	V.L. Potemkin	A.A. Shagdurov		L.M. Korytny
142	*133*	Temperature	M.N. Shimaraev	A.A. Shagdurov		L.M. Korytny
143	*134*	Surface temperature baikal water from satellite measurements	M.N. Shimaraev	A.A. Shagdurov		L.M. Korytny
144	*135*	Ice conditions. Subglacial currents	M.N. Shimaraev	A.A. Shagdurov		L.M. Korytny
145	*136*	Currents	M.N. Shimaraev	A.A. Shagdurov		L.M. Korytny
146	*137*	Uninodal, binodal, trinodal, and quadrinodal seiche oscillations with the periods of 278, 151, 84 and 67 minutes	K.M. Kucher	D.A. Lopatkin	I.A. Aslamov, S.V. Smirnov	A.R. Batuev
147	*138*	Bubble the gas emissions from the bottom sediments	M.M. Makarov	D.A. Lopatkin	N.G. Granin	A.R. Batuev, E.E. Kononov
148	*139*	Distribution of omul	A.I. Degtev	V.N. Bogdanov		A.M. Mamontov
7.2. Optimization of nature management and environment protection						
149	*140*	Recreation on Lake Baikal shores	V.M. Khromeshkin	A.A. Shagdurov		V.M. Plyusnin
150	*141*	Natural management and environmental condition of the CEZ	I.N. Vladimirov	V.N. Bogdanov		V.M. Plyusnin
151	*142*	Aesthetic image of the Baikal shore	V.M. Khromeshkin	A.A. Shagdurov		V.M. Plyusnin