





Rare and Endangered Plant Species in the Russian part of the Amur River Basin: status and conservation

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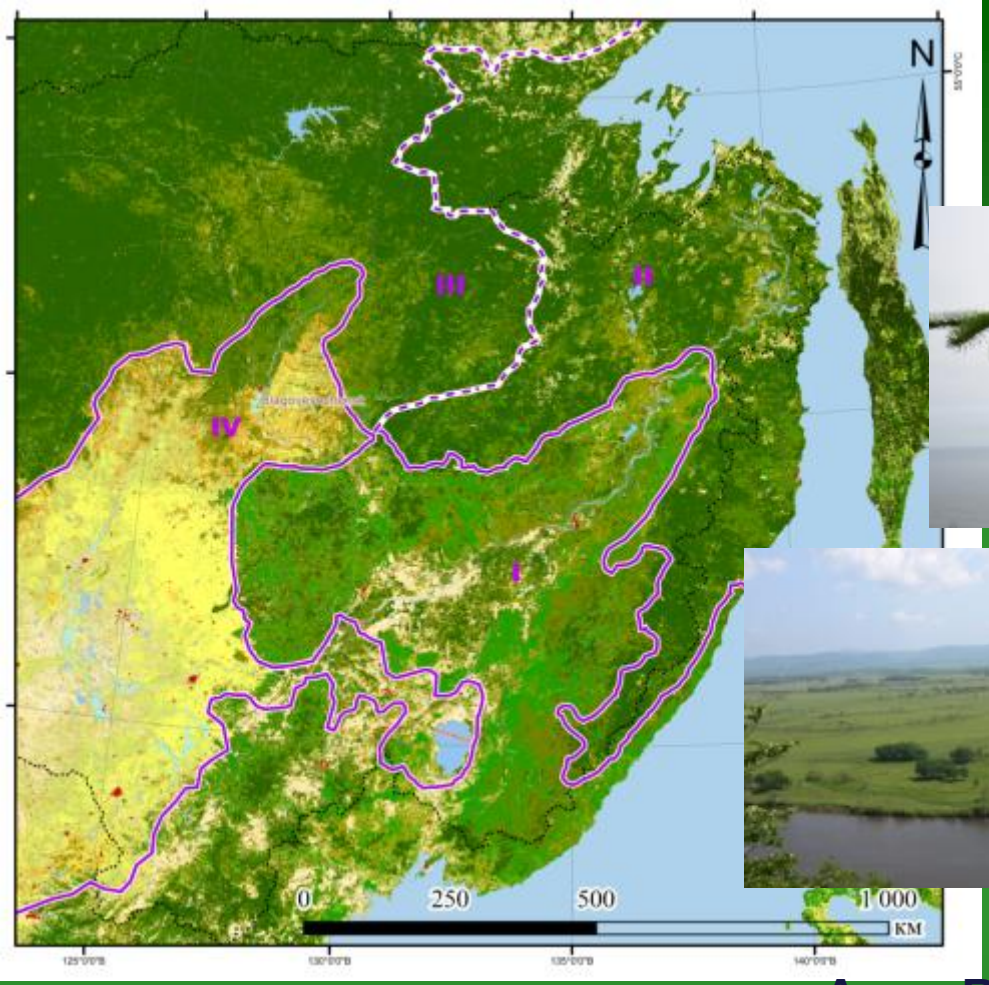






Biogeographical boundaries:

I – Far Eastern coniferous-broad-leaf region; Eurasian coniferous forest region: II – South Okhotsk subregion of dark coniferous forests; III – East Siberian subregion of light coniferous forests; IV – Daurian-Manchurian forest-steppe region

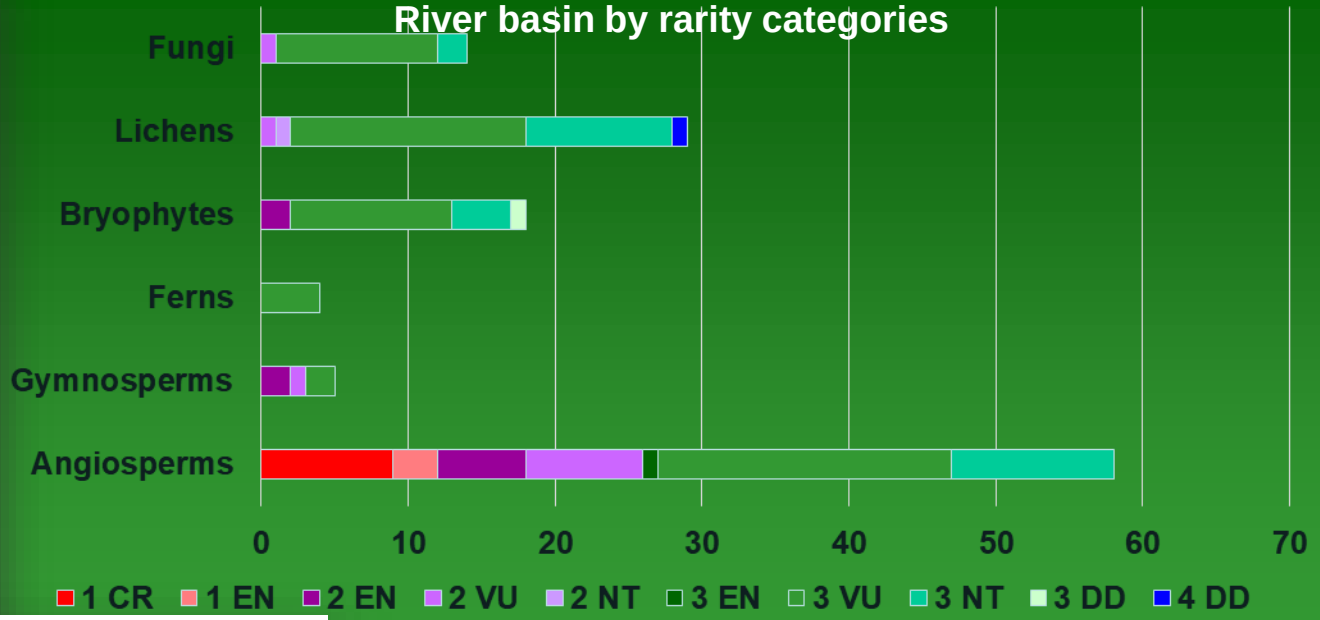
Amur River:

lenght - 4444 km (with Argun River);
total basin area– 1856 thousand sq. km;
maximum width - 5 km;
depth - 56 m;
water consumption: in winter - 600 m^3/s, in summer - 47000 m^3/s (near Khabarovsk);
water level – от 20 m (Khingan narrowing) до 5–6 m (flat areas)



Red Data Book of the Russian Federation. Plants and Fungi (2024)

Distribution of rare and endangered plant and fungy species of the Amur River basin by rarity categories





Женьшень настоящий
Panax ginseng C.A. Mey.

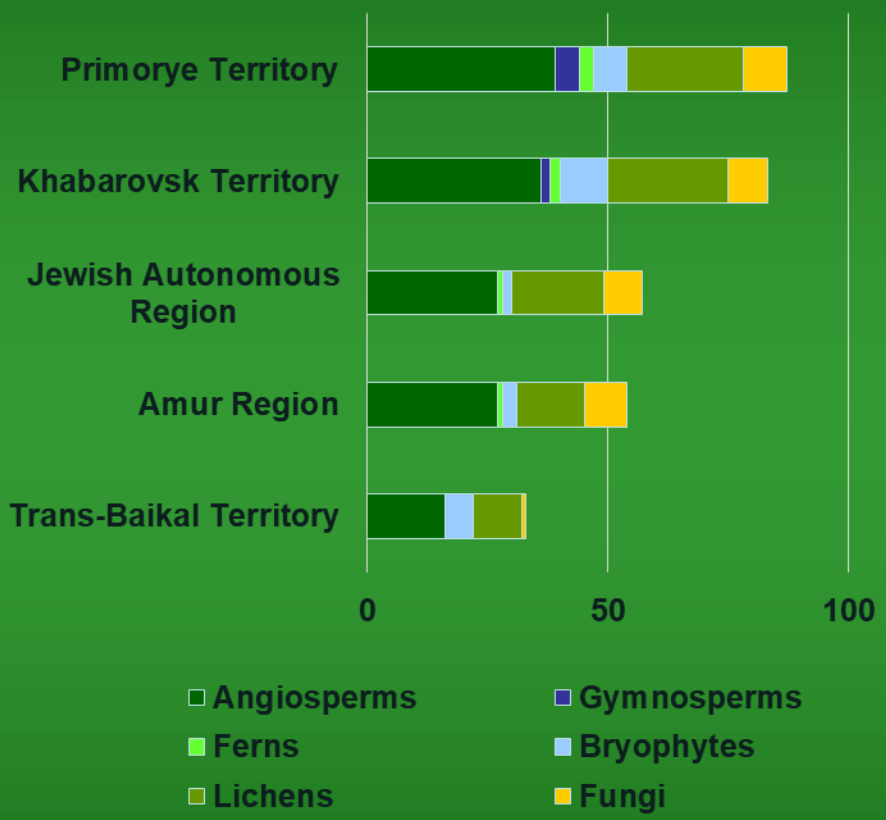
The rarity category of a species is determined by three parameters:

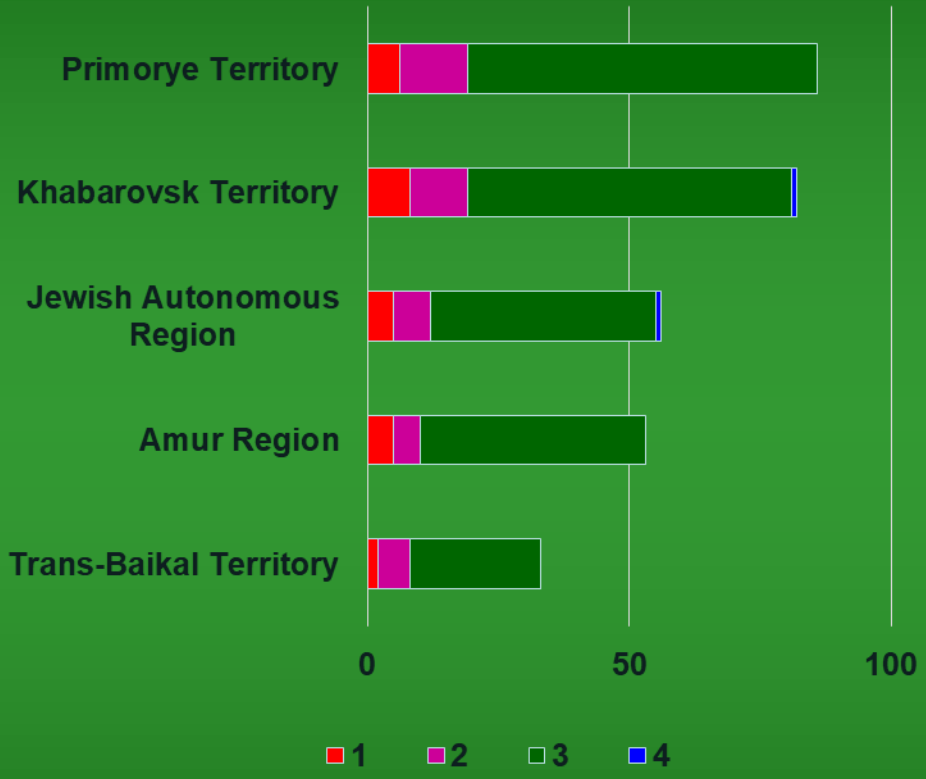
Rarity status categories: 0 – Probably Extinct; 1 – Endangered; 2 – Decreasing in numbers and/or distribution; 3 – Rare; 4 – Uncertain; 5 – Restorableand Restoring.

Categories of plant species' endangered status (IUCN): RE — Regionally Extinct; CR — Critically Endangered; EN — Endangered; VU — Vulnerable; NT — Near Threatened; LC — Least Concern; DD — Data Deficient.

Categories of the degree and priority of environmental protection measures being taken or planned for adoption (conservation status): Priority I – requires immediate adoption of comprehensive measures, including the development and implementation of a conservation strategy and/or a program for the restoration (reintroduction) of flora; Priority II – requires the implementation of one or more special measures to preserve the flora; Priority III – requires the implementation of general measures stipulated by regulatory legal acts of the Russian Federation in the areas of environmental protection, the organization, protection, and use of specially protected natural areas, and the protection and use of flora and their habitats.

Representation of protected objects of the Red Data Book of the Russian Federation in the Russian Federation subjects (by systematic groups and rarity categories)





Criteria for assessing the status of a species population:

Ecological and biological

-area occupied by a cenopopulation;
- number;
- occurrence;
- vitality;
- population structure of the species;
- population structure;
- the ability of a species to reproduce generatively (% seedification);
- ability to vegetatively reproduce;
- morphometric parameters of plants.

Geographical

- area structure;
- number of localities;
- total area of localities, hectares.



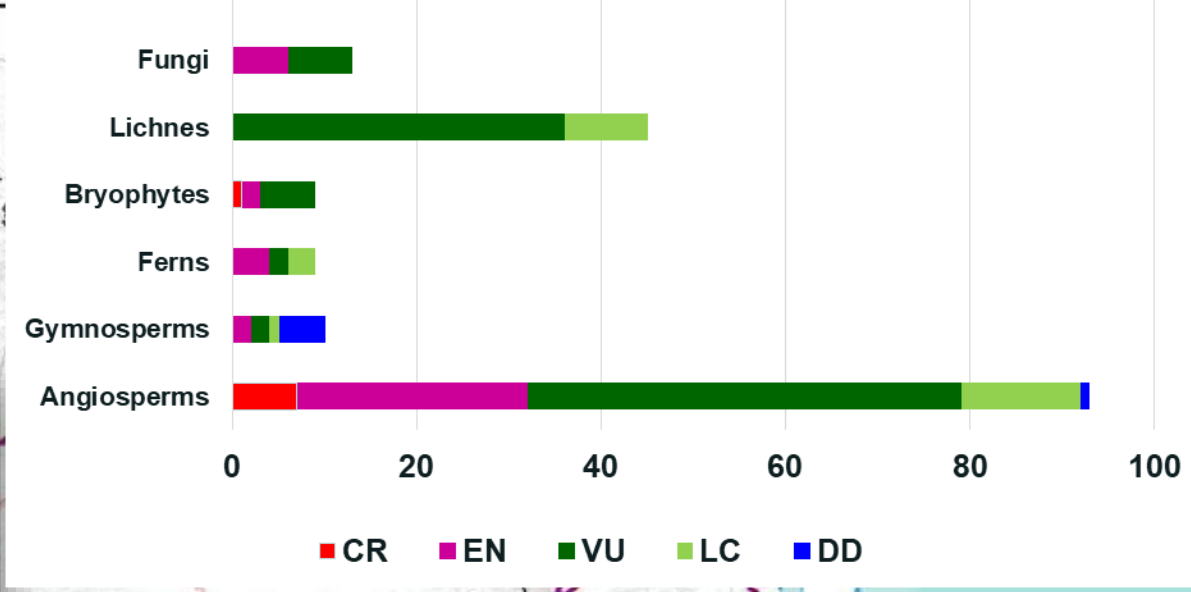




Monitoring the main parameters of cenopopulations of species and communities in areas where rare and endangered plant species grow

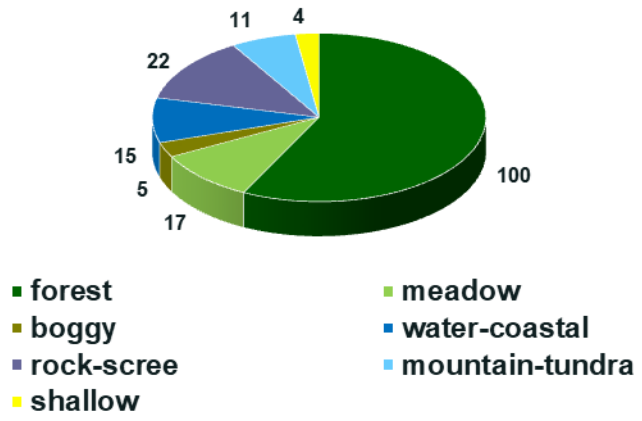
Red Data Book of the Primorye Territory (2008)

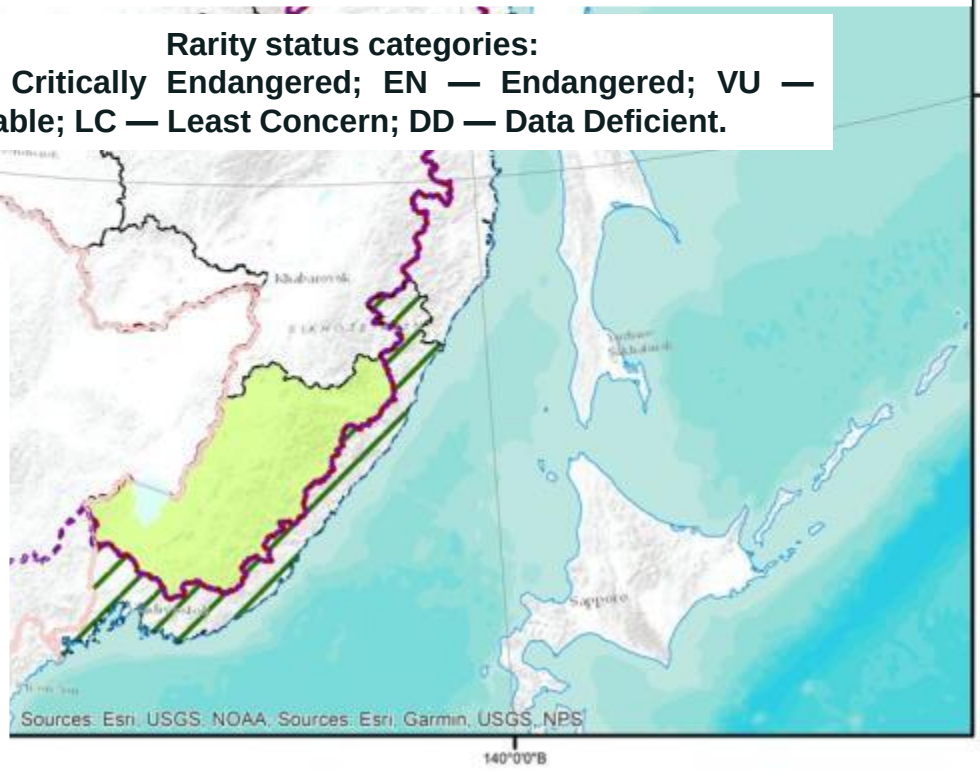




Rarity status categories:
CR — Critically Endangered; EN — Endangered; VU — Vulnerable; LC — Least Concern; DD — Data Deficient.

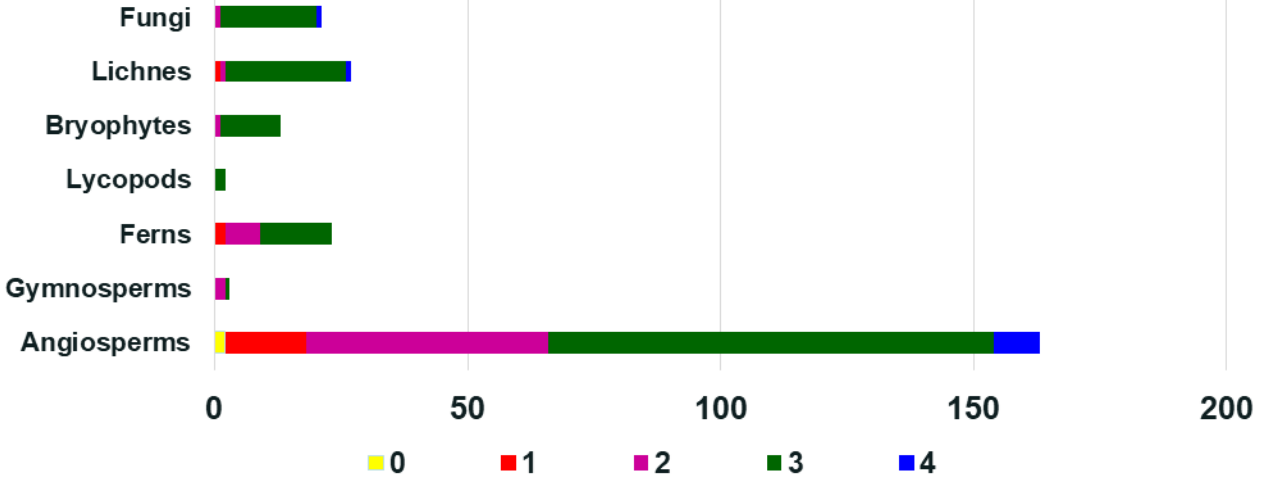
Ecology-geographical groups of the rare and endangered species

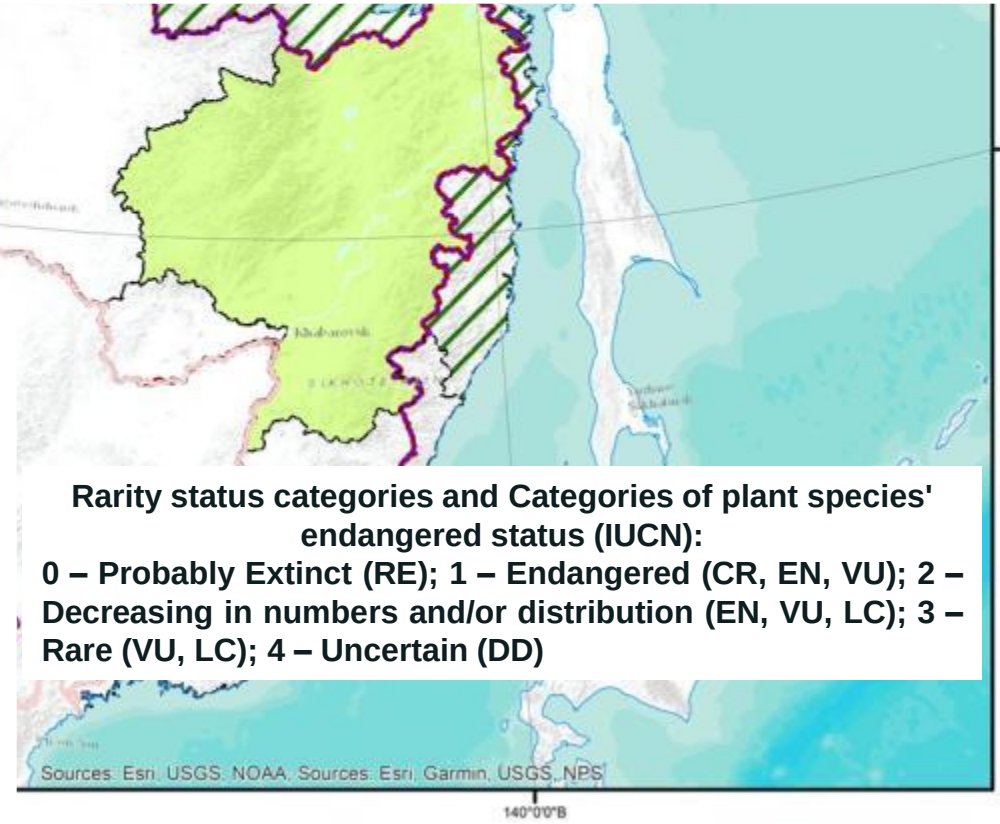




Red Data Book of the Khabarovsk Territory (2019)

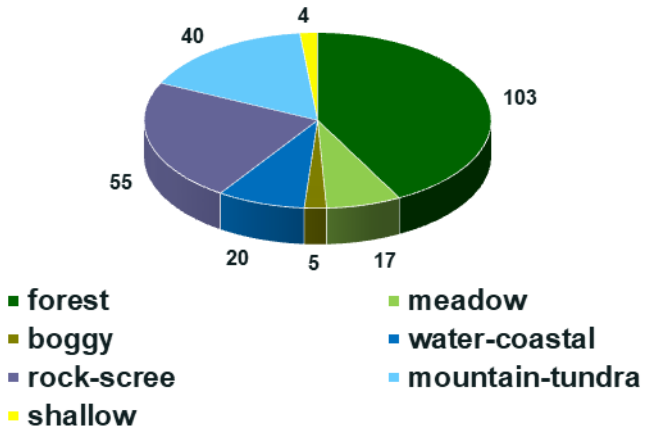




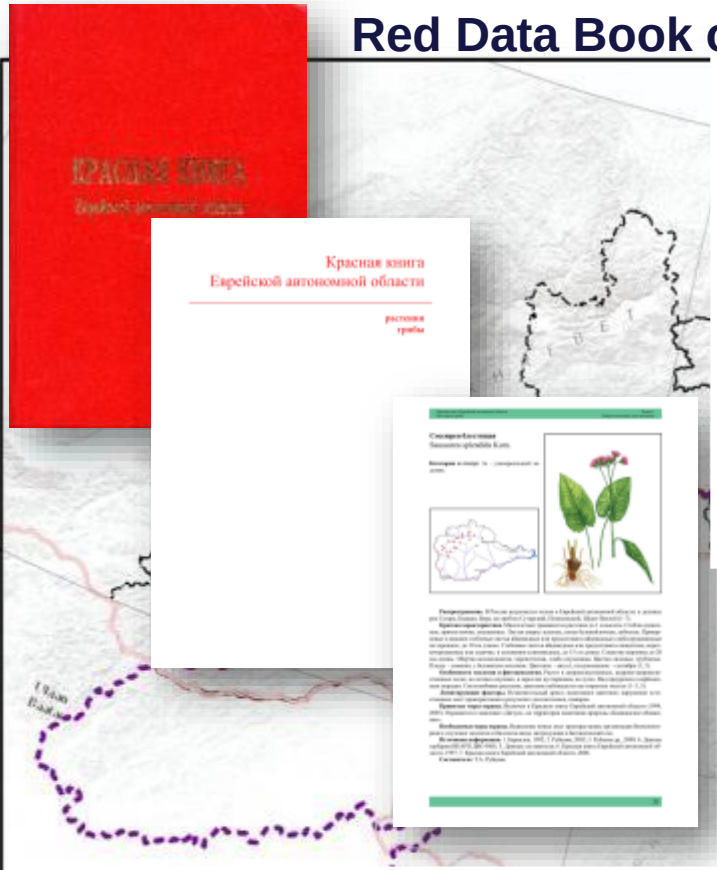


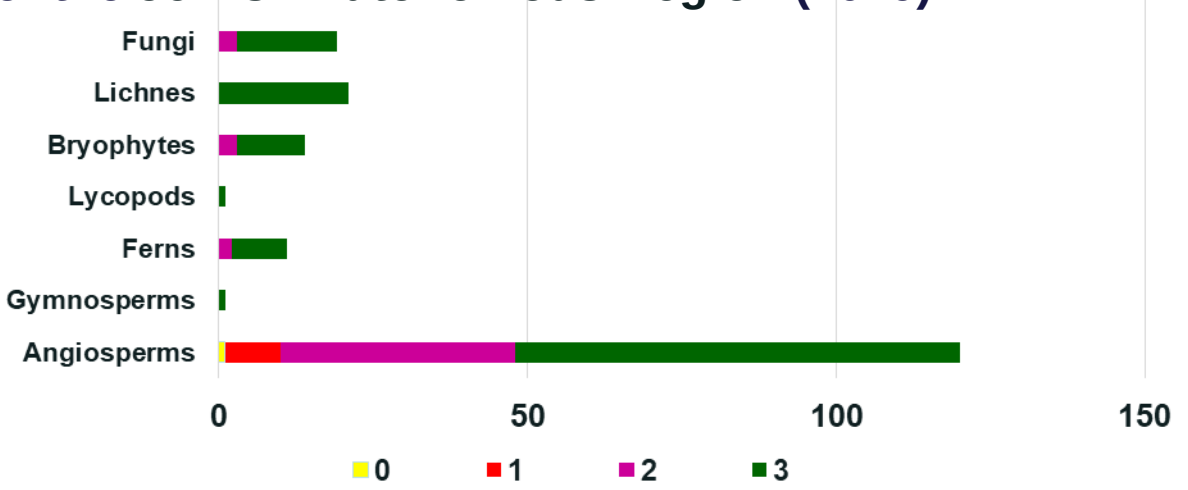
Rarity status categories and Categories of plant species' endangered status (IUCN):
0 – Probably Extinct (RE); 1 – Endangered (CR, EN, VU); 2 – Decreasing in numbers and/or distribution (EN, VU, LC); 3 – Rare (VU, LC); 4 – Uncertain (DD)

Ecology-geographical groups of the rare and endangered species



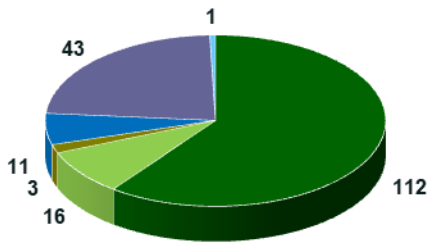
Red Data Book of the Jewish Autonomous Region (2019)



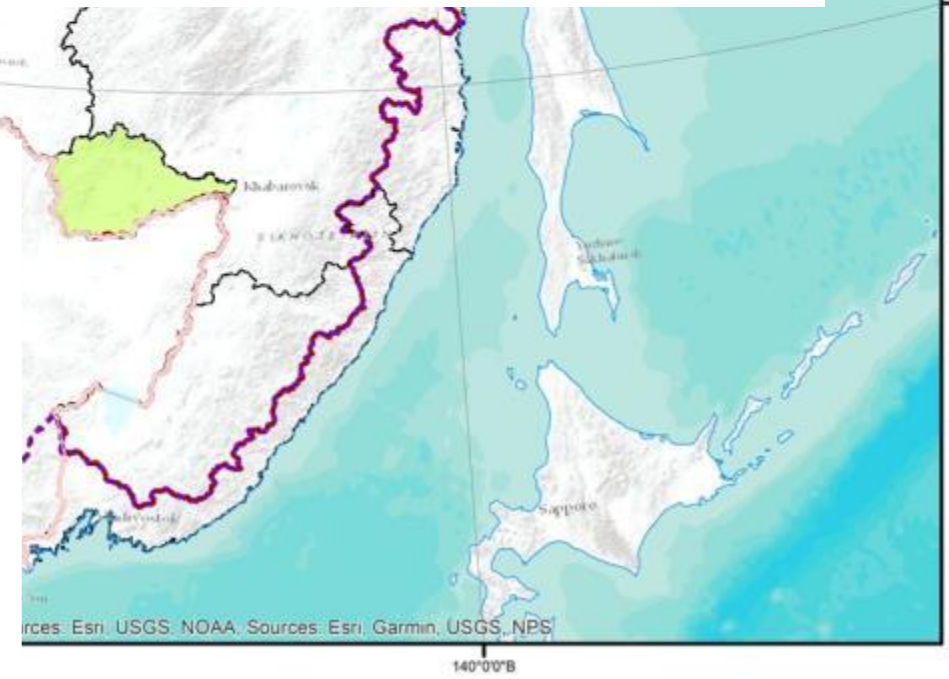


Rarity status categories:
0 – Probably Extinct; 1 – Endangered; 2 – Decreasing in numbers and/or distribution; 3 – Rare

Ecology-geographical groups of the rare and endangered species

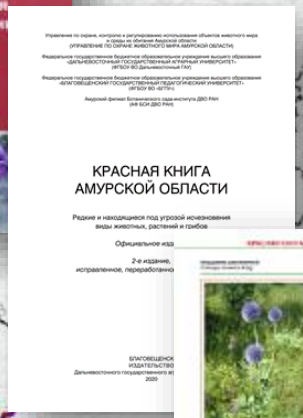


forest
meadow
boggy
water-coastal
rock-scree
shallow

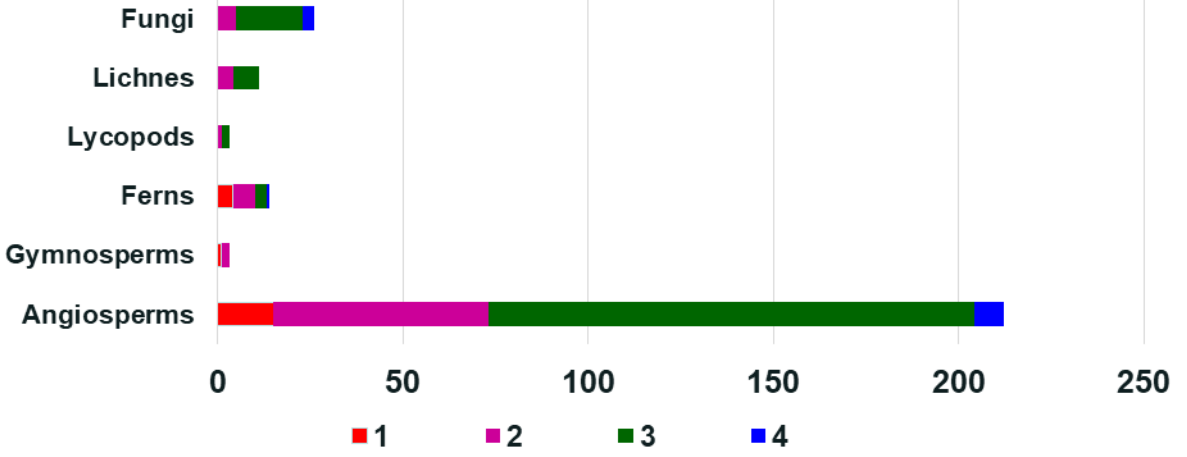


Red Data Book of the Amur Region (2020)

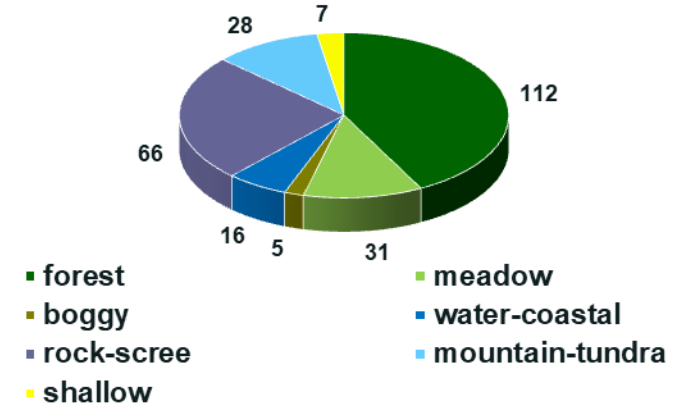








Ecology-geographical groups of the rare and endangered species

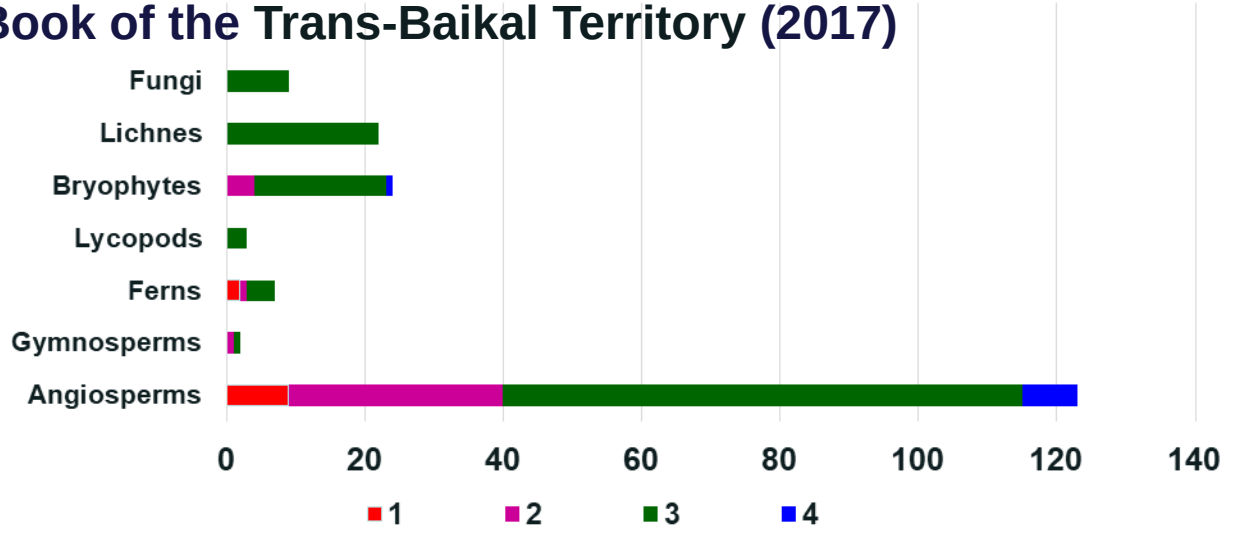


Rarity status categories:
1 – Endangered; 2 – Decreasing in numbers and/or distribution; 3 – Rare; 4 – Uncertain



Red Data Book of the Trans-Baikal Territory (2017)

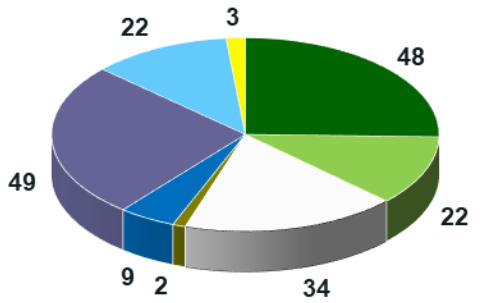




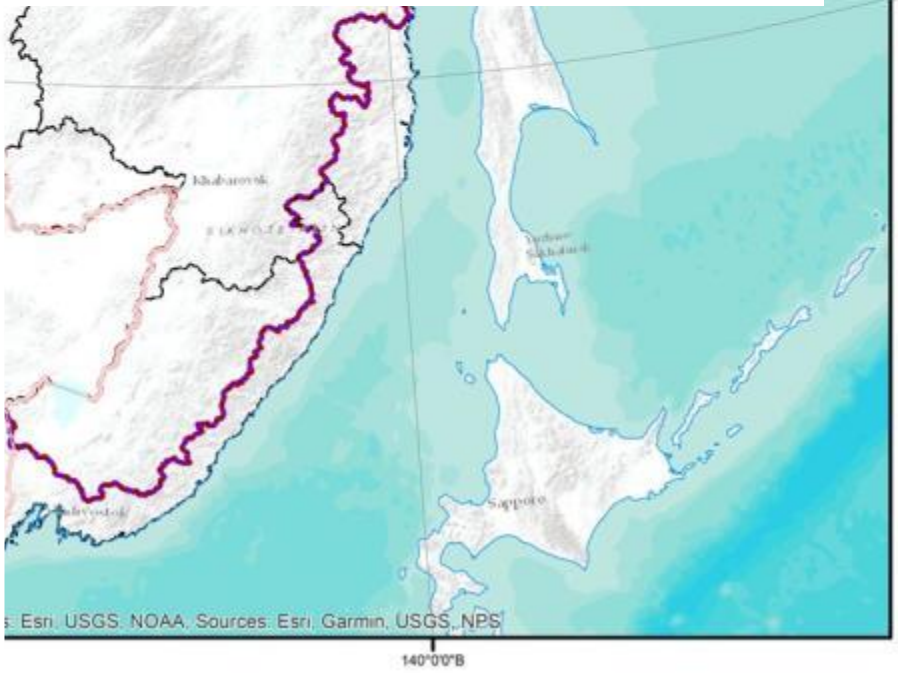


Rarity status categories:
1 – Endangered; 2 – Decreasing in numbers and/or distribution; 3 – Rare; 4 – Uncertain

Ecology-geographical groups of the rare and endangered species



- forest
- meadow
- steppe
- boggy
- water-coastal
- rock-scree
- mountain-tundra
- shallow



Natural limiting factors

Geographical

- limited distribution area for endemic species;
- growth at the border of the range;
- mosaic or fragmented area and etc.

Ecology-biological

- demanding of growing conditions, limited ecological niche;
- poor seed productivity;
- depressive and regressive structure of populations (predominance of senile individuals, low vitality indicators, etc.);

The number of the endemic rare and endangered species

Russian Federation subject	The number of species
Primorye Territory	8
Khabarovsk Territory	53
Jewish Autonomous Region	1
Amur Region	16
Trans-Baikal Territory	9



Centers of endemic flora diversity:
1 – Bureya, 2 – Sikhote-Alin, 3 – Amur-Amgun, 4 – Khanka

The number of the rare and endangered species growing on the border of their areas

Russian Federation subject	The number of species
Primorye Territory	41
Khabarovsk Territory	152
Jewish Autonomous Region	69
Amur Region	152
Trans-Baikal Territory	93



Sheme of the "concentration zones" (synperates) of the boundaries of the ranges of vascular plant species in the eastern part of the Amur River basin

Anthropogenic factors

- development of residential (including urbanized) landscapes, industrial and agricultural production, hydraulic construction, subsoil use, forestry;
- ecologically unadapted economy and environmental management;
- pollution of ecosystems with untreated or insufficiently treated industrial, agricultural, municipal and other discharges and emissions;
- forest and meadow fires;
- logging;
- consumer attitude in society towards natural resources, including the selective use of certain types of resources, etc. poaching of medicinal raw materials.



Rock mining quarries

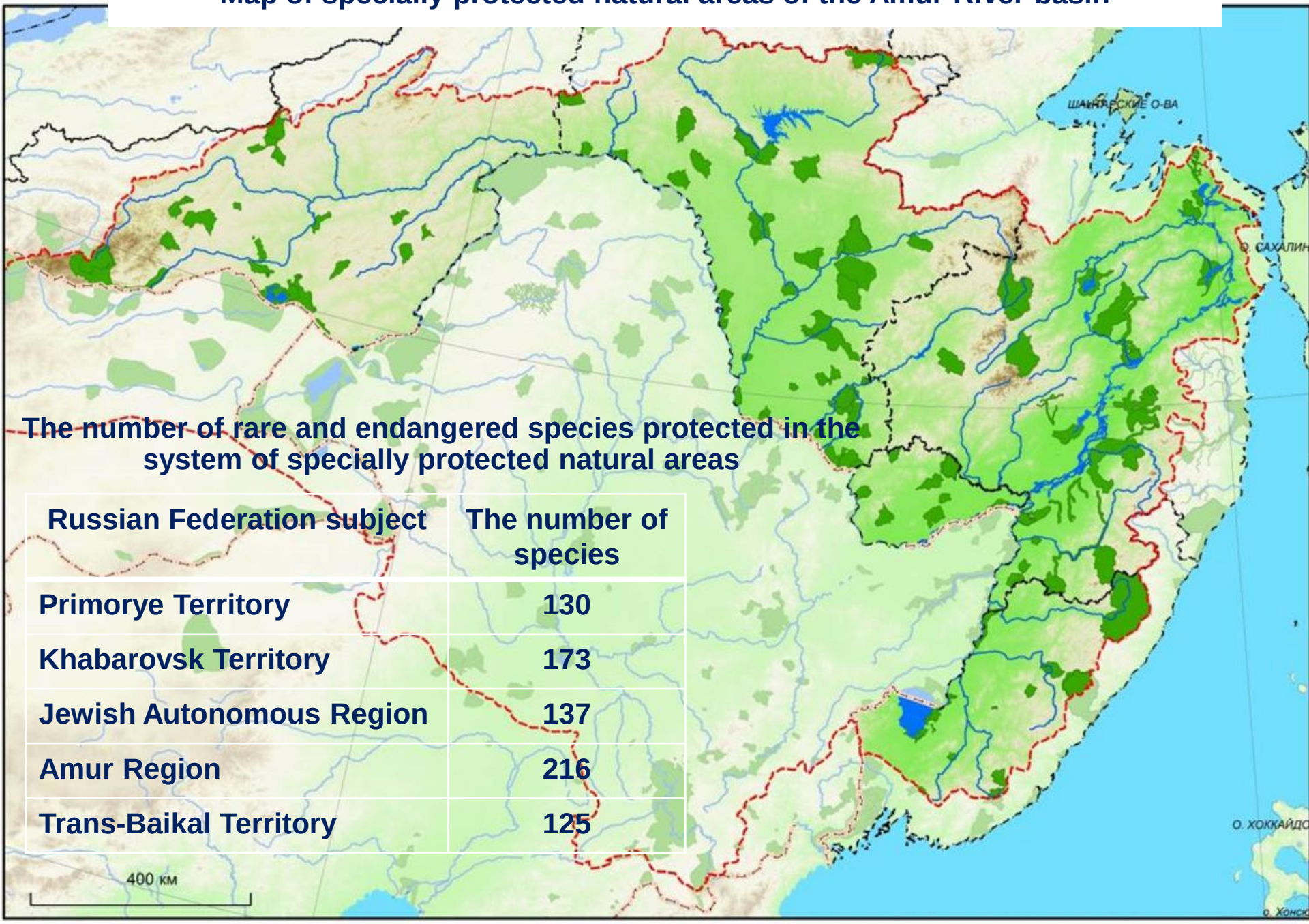


Areas covered by logging (soil erosion, littering with logging residues)



Poaching of medicinal raw materials

Map of specially protected natural areas of the Amur River basin



The number of rare and endangered species protected in the system of specially protected natural areas

Russian Federation subject	The number of species
Primorye Territory	130
Khabarovsk Territory	173
Jewish Autonomous Region	137
Amur Region	216
Trans-Baikal Territory	125

The number of flora objects included in the Red Data Books of the Russian Federation and the Red Data Books of federal subjects, which should be protected in the system of the specially protected natural areas

Protected area category	Trans-Baikal Territory	Amur Region	Jewish Autonomous Region	Khabarovsk Territory	Primorye Territory
State natural reserves	95	124	75	109	91
National and nature parks	24	14	-	26	-
State biological (hunting) and fisheries reserves	30	33	45	21	-
Natural monuments	2	8	50	26	4



Pyrrosia petiolosa (Christ et Baroni) Ching



Taxus cuspidata Siebold et Zucc. ex Endl.



Tripogon chinensis (Franch.) Hack.



Nelumbo nucifera Gaertn.



***Iris ventricosa* Pall**
(http://www.csbg.nsc.ru/catalog/iridaceae.html)



***Caldesia reniformis* (D. Don) Makino**
(https://powo.science.kew.org/taxon/urn:lsid:ipni.org:names:58293-1)



***Adenophora stenanthina* (Ledeb.) Kitag.**
(https://www.plantarium.ru/page/view/item/2684.html)



***Taraxacum lineare* Vorosch. & Schaga**
(photo by Darman G.F.)



Pentactina schlothauerae (Ignatov & Vorosch.) Jakubov
(https://www.gbif.org/taxon/BRJZY)



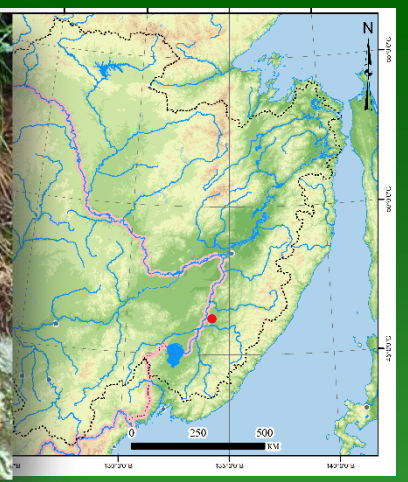
Allium neriniflorum (Herb.) G. Don
(https://www.plantarium.ru/page/image/id/112397.html)





***Astragalus tumninensis* N.S. Pavlova et Bassargin.**









Kitagawia eryngiifolia (Kom.) Pimenov

Pleopeltis ussuriensis Regel et Maack





Physocarpus amurensis (Maxim.) Maxim.



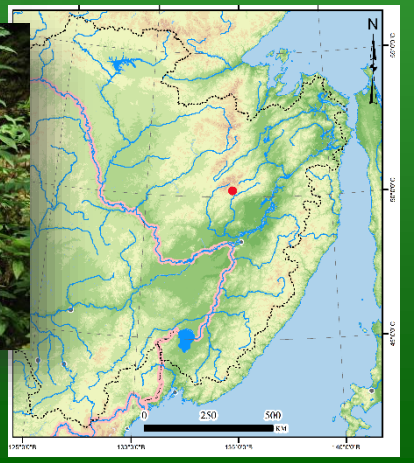


Phyllitis japonica Kom.



***Pentactina schlothauerae* (Ignatov et Vorosch.) Yakubov**

(https://www.plantarium.ru/page/image/id/214926.html)



Recommended special conservation measures for rare and endangered species:

- monitoring local populations of rare and endangered flora using modern information technologies (the use of remote sensing, tools for modeling population status and range dynamics and etc.);
- multi-level digital database - cadaster of rare and endangered species;
- optimization of the system of specially protected natural areas and the organization of new specially protected natural areas with the corresponding regulatory documentation;
- environmental assessment of investment projects, territorial development plans, and economic facilities;
- search for and development of technologies and methods for preserving plants in the natural environment and artificially created conditions;
- promotion of ideas for preserving biological diversity and the formation of an environmental culture in society.



Thank you for attention!