



A REPORT FOR METAGRO

# Metagro ESIA Appendices

09 July 2024



*Creating Sustainable Value*



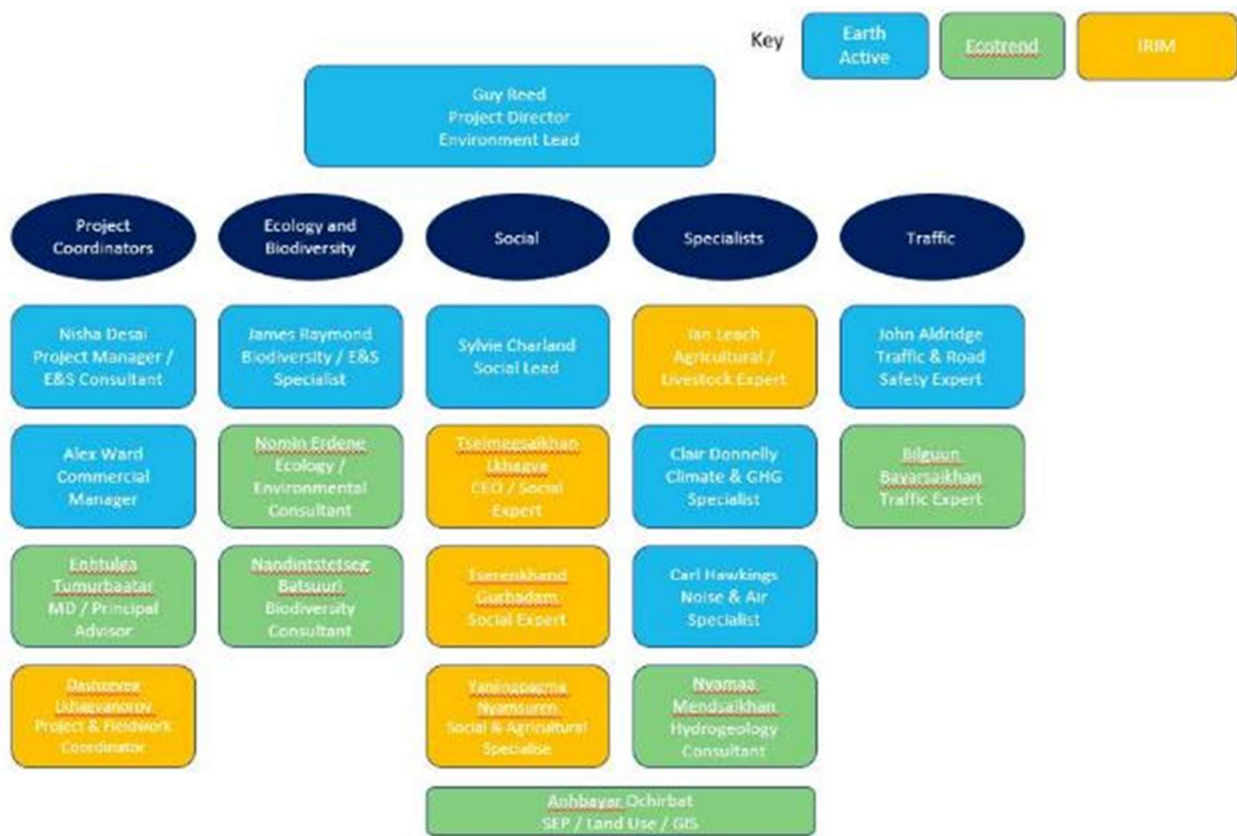
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# Appendix A - ESIA Team



ESIA Team Organogram



## Appendix B - Scoping Report Summary

The ESIA submitted a Scoping Report in July 2023. A summary of the topics scoped in or out are presented in the table below.

E&S Issue	Receptors	Impacts and Risks	Project Phase	Scoped In or Out
Air Quality	Site workers, Ulziit village residents, local species and habitats	Carbon-containing compounds Nitrogen-containing compounds GHG Hazardous fumes from fuels, oils and chemical consumables Unpleasant odours from animal agriculture Dust generation	Construction and operation	In
Traffic and Transport	Site workers, Ulziit village residents, species and habitat	Construction traffic Supply chain, imports and exports Employee transport Pressures on existing infrastructure	Construction and operation	In
Noise and Vibration	Site workers	Plant, machinery, tools and equipment Livestock presence Animal processing and transporting	Construction and operation	In
Climate	Climate, people, species and habitats	Climate change Extreme weather and temperatures Drought Flooding Soil erosion GHG emissions	Operation	In
Water Resources	Surface water, local springs and ponds, and groundwater	Crop production Animal husbandry Consumption for drinking Consumption for cleaning Use of fuels, oils, and chemicals Pressures on groundwater Pressures on Murun River Pressures on community wells Wastewater	Construction and operation	In
Waste	Soils, surface water and groundwater, species and habitats	Organic waste (animal waste) Inorganic waste Hazardous waste and contaminants Meat production and supply chain biohazardous wastes Materials and packaging Wastewater	Construction and operation	In



E&S Issue	Receptors	Impacts and Risks	Project Phase	Scoped In or Out
Geology and Soils	Metagro site, habitats	Construction earthworks and material management Aggregate use for construction purposes Agricultural management techniques and activities Use of fuels, oils, and chemicals Exposure to potential contaminants	Construction and operation	In
Biodiversity	Species and habitats, Murun River, Undurkhaan uul National Park	Disturbance to native species from introduction of new animals to landscape in form of cattle and pigs i.e. smells, noise Contamination risk to aquatic habitats Dietary shift of carrion species from livestock mortality, potential contamination risk Soil strip and removal of surface vegetation from proposed construction areas Removal of potential nesting and burrowing habitat Reduction in commuting routes for terrestrial species Animal welfare from existing and proposed fencing Biosecurity from potential pests, disease and invasive species introduced from imports Supply chain Ecosystem services	Construction and operation	In
Landscape and Visual	Ulziit village	No clear visual disturbance as the distance of main Farm infrastructure from Ulziit village is ~11km with limited sight lines, and height of structures is not significant.	Construction and operation	<b>Out</b>
Land Use	Herders and their livestock, other agricultural users	Limited effects as the Project is the renovation of existing agricultural land use and the development of related farm infrastructure at Metagro Farm.	Construction and operation	<b>Out</b>
Project Design and Facilities	Murun River water quality Herders and their livestock	Planned pig farm land plot is located in close proximity, within 100m, of the Murun River creating a threat of surface water pollution. Fenceline interruption to nomadic herding routes is limited, as the land	Construction and operation	In

E&S Issue	Receptors	Impacts and Risks	Project Phase	Scoped In or Out
		was previously fenced, however fence line design is a hazard to nomadic livestock and local wildlife.		
Engagement and Communication	Local stakeholders	Potential for the spread of grievances, misinformation, concerns about the future, and erosion of public acceptance due to lack of regular communication about Project activities with local stakeholders.	Construction and operation	In
Benefits Sharing	Local stakeholders Local administrative authorities	Potential for frustration of local stakeholders who expect more jobs than the Project can provide. Potential for frustration of local stakeholders due to unrealistic expectations of investments and benefits that the Project will provide. Potential conflict amongst stakeholders, and between stakeholders and the Project, over competition for benefits.	Construction and operation	In
Grievance Management	Local stakeholders	Potential that grievances from local stakeholders, particularly herders, are unaddressed and escalate to more serious problems.	Construction and operation	In
E&S Capacity	Project Local stakeholders	Potential that newly emerging Project risks will not be identified and addressed due to lack of an ESMS, limited experience in E&S risk identification and management, and limited community relations capacity	Construction and operation	In
Land Acquisition and Population Displacement	Local inhabitants Local herders and their livestock	There were no households on the site and no customary use of, or access to, the Project land when the Metagro Farm landholding was acquired, therefore no resettlement or economic displacement is envisaged for that workstream.	Feasibility, construction and operation	<b>Out</b>
Cultural Heritage	Sites of historical, cultural and spiritual significance Mongolian traditions and	This nearest culturally significant site in proximity to the Project area is 10km distant. Project workers and activities are not likely to affect this site, neither directly nor indirectly.	N/A	<b>Out</b>

E&S Issue	Receptors	Impacts and Risks	Project Phase	Scoped In or Out
	spiritual practices			
Indigenous People	Mongolian Indigenous People	There are no population groups that meet the IFC definition of “Indigenous Peoples” in the Project area.	N/A	<b>Out</b>
Population Influx	Inhabitants of Ulziit village	Potential for an influx of people from outside the project area in search of jobs and opportunities who would compete with inhabitants for Project benefits and would add pressure to existing infrastructures (schools, hospitals, housing, etc.). Potential resentment towards newcomers for accessing Project benefits, jobs and business opportunities.	Construction and operation	In
Occupational Health and Safety	Workers Contractors	Risks to worker and subcontractor health and safety during site construction activities, as illustrated by January 2023 working at height fatality during shed build. Operational phase risks will be primarily related to use of agricultural machinery, livestock handling especially slaughterhouse / meat processing operations, handling of agrochemicals/hazardous materials.	Construction and operation	In
Community Health and Safety	Ulziit residents Local herders	Movement of vehicles and construction machinery to and from the project site poses some risk for people and livestock. During operations, negative impacts may occur from the use of agrochemicals and potential effects on air and water quality, and interaction of workers at the facility from outside the Project area with the local people, such as the spread of communicable illnesses, respiratory infections and sexually transmitted infections (STIs).	Construction and operation	In
Gender	Ulziit girls and women	Potential for gender-based violence with the interaction of construction contractors and operations workers at	Construction and operation	In



E&S Issue	Receptors	Impacts and Risks	Project Phase	Scoped In or Out
		the facility with local community women/girls.		
Labour Management	Workers Contractors	Mongolia has a robust labour code, MCS Group has human resources management systems in place, and the consultant team has not seen any immediate cause for concern to date, this topic requires further study during the ESIA process to make a more informed assessment.	Construction and operation	In
Supply Chain	Project investors and partners Cattle livestock suppliers	Although the consultant team has not seen any immediate cause for concern to date, this topic requires further study during the ESIA process to make a more informed assessment.	Operation	In
Security and Human Rights	Local herders and their livestock	Potential for security contractors to use excessive force against herders and neighbouring livestock in restricting access to the Project site.	Construction and operation	In

The following E&S topics have therefore been scoped out from the full assessment process for the Metagro Farm site based on their limited potential to result in discernible impacts and risks because of the Project:

- Landscape and Visual
- Land Use
- Land Acquisition and Involuntary Resettlement
- Cultural Heritage
- Indigenous People

## Appendix C - Mongolian E&S Legislation

### The Constitution of Mongolia (January 13, 1992)

The Constitution of Mongolia (1992) stipulates that the land, subsoil, forests, water, wildlife, plants, and other natural resources of Mongolia shall be under the exclusive control of the people and the protection of the state. Mongolia's civil rights and freedoms are proclaimed, including the right to "live in a healthy and safe environment and to be protected from environmental pollution and disturbance".

The Constitution provides the basic principles of human and proprietary rights, and the release of land for public needs. It specifies that the State may give plots of land for private ownership except pasturage and land under public utilisation and special use, and only to citizens of Mongolia. The provision does not apply to the ownership of the subsoil thereof.

The State recognises all forms of both public and private property and protects the rights of the owner by law. A landowner's rights are limited exclusively to due process of law. Further, the State has the right to hold responsible the landowners in connection with the manner in which the land is used, to exchange or take it over with compensation on the grounds of special public need or confiscate the land if it is used in a manner adverse to the health of the population, the interests of environmental protection and national security.

The Constitution also enshrines the right to fair acquisition, possession, and inheritance of movable and immovable property. Illegal confiscation and requisitioning of citizens' private property is prohibited. If the State and its body's appropriate private property based on exclusive public need, they shall do so with due compensation and payment.

### International Agreements and Conventions

The tables below list the International Agreements and Conventions that Mongolia is signatory to and that are relevant to the Project.

International environmental conventions signed by Mongolia

#	Convention	Accession Year
1	World Heritage Convention	1990
2	Montreal Protocol on Substances that Deplete the Ozone Layer	1990
3	Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal	1989
4	Convention on the Conservation of Migratory Species of Wild Animals	1991
5	Convention on Biological Diversity	1992
6	UN Framework Convention on Climate Change (UNFCCC)	1994
7	Protocol on Energy Efficiency and Related Environmental Aspects to the Energy Charter Treaty	1994
8	UN Convention on Combating Desertification	1996
9	Vienna Convention for the Protection of the Ozone Layer	1996
10	Montreal Protocol (regulating substances that deplete the ozone layer)	1996

11	Convention on International Trade in Endangered Species of Fauna and Flora (CITES)	1996
12	Convention on the Transboundary Movement of Hazardous Waste (Basel)	1997
13	Convention on the Protection of Wetlands of International Importance (Ramsar)	1998
14	Kyoto Protocol	1999
15	Convention on the Conservation of Migratory Species of Wild Animals	1999
16	Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	2000
17	Stockholm Convention on Persistent Organic Pollutants	2001
19	The Paris Agreement Under the United Nations Framework Convention on Climate Change	2016

#### ILO Conventions ratified by Mongolia

Convention Name	Ratification date by Mongolia
<b>Freedom of association, collective bargaining, and industrial relations</b>	
C087 – Freedom of Association and Protection of the Right to Organise Convention, 1948 (No.87)	03 June 1969
C098 – Right to Organise and Collective Bargaining Convention, 1949 (No.98)	03 June 1969
C135 – Workers’ Representatives Convention, 1971 (No.135)	08 Oct 1996
<b>Forced Labour</b>	
C029 – Forced Labour Convention, 1930 (No.29)	15 Mar 2005
C105 – Abolition of Forced Labour Convention	15 Mar 2005
<b>Elimination of child labour and protection of children and young persons</b>	
C123 – Minimum Age (Underground Work) Convention, 1965 (No.123) Minimum age specified: 18 years,	03 Dec 1981
C138 – Minimum Age Convention, 1973 (No.138)	16 Dec 2002
C182 – Worst Forms of Child Labour Convention, 1999 (No.182)	26 Feb 2001
<b>Equal opportunity and treatment</b>	
C100 – Equal Remuneration Convention, 1951 (No.100)	03 Jun 1969
C111 – Discrimination (Employment and Occupation) Convention, 1958 (No.111)	03 Jun 1969
<b>Employment policy and promotion</b>	
C088 – Employment Service Convention, 1948 (No.88)	17 Apr 2015



Convention Name	Ratification date by Mongolia
C122 – Employment Policy Convention, 1964 (No.122)	24 Nov 1976
C159 – Vocational Rehabilitation and Employment (Disabled Persons) Convention, 1983 (No.159)	03 Feb 1998
C181 – Private Employment Agencies Convention, 1997 (No.181)	17 Apr 2015
<b>Occupational safety and health</b>	
C155 – Occupational Health and Safety Convention, 1981 (No.155)	03 Feb 1998
C176 - Safety and Health in Mines Convention, 1995 (No.176)	26 Nov 2015
<b>Maternity protection</b>	
C103 – Maternity Protection Convention, 1952 (No.103)	03 Jun 1969
<b>Tripartite consultation</b>	
C144 – Tripartite Consultation (International Labour Standards) Convention, 1976 (No.144)	10 Aug 1998

## Environmental Legislation

Mongolia has enacted a comprehensive legal framework for environmental assessment and management which is comprised of policies, legislation, and strategies. A fundamental principle of the Mongolian state environmental policy is that economic development must be in harmony with the extraction and utilisation of natural resources and that air, water, and soil pollution are controlled.

The government undertook a major environmental law reform in 1990 including the law of land, protected areas, water, forest, wildlife, and native flora resources, and a further reform was undertaken in 2012.

The following tables list the principal laws, regulations and guidelines related to environmental matters.

### Environmental laws of Mongolia

#	Law	Year enacted
1	The Constitution of Mongolia	1992
2	Law on Environmental Protection	1995
3	Law of Land	2002
4	Law of Sub-Soil	1988
5	Law of Soil protection and prevention from desertification	2012
6	Law on Special Protected Areas	1994
7	Law on Water	2012
8	Law on Forest	1995

#	Law	Year enacted
9	Law on Fauna	2000
10	Law on Natural Plants	1995
11	Law on Protection of Plants	1996
12	Law on Air	1995
13	Law on Environmental Impact Assessment	1998
14	Law on Waste	2003
15	Law on Toxic and Hazardous Chemicals	2006
16	Law on Protection of Cultural Heritage	2014
17	Law on Natural Resource Fee	2012
18	Law on Air Pollutant Fee	2012
19	Law on Water Pollutant Fee	2012
20	Law on Hygiene	2016
21	Law on Occupational Health and Safety	2008
22	Land Law	2002
23	Civil Code	1994
24	Mongolian Citizens Ownership of Land Law	2022

#### Environmental Regulations of Mongolia

#	Regulation	Year approved
1	Decree 152 of the Government of Mongolia on various measures on implementation of Law on Land Fee (Assessment regions of the total land of Mongolia)	1997
2	Regulation on granting land possession and use certificate (Annex to Order 83 by the Director of Administration of Land Affairs, Geodesy and Cartography)	2008
3	Amount of air quality monitoring service fee and cost (Annex to Order A-342 by the Minister of Environment and Tourism issued on 10 October 2011)	2011
4	Minister of Environment and Green Development, Ordinance A-03 (Public consultation procedure)	2014
5	Regulation on Development and Approval of the Environmental Management Plan (Order A/618 of Minister of Environment and Green Development)	2019
6	Regulation on Environmental Impact Assessment (Annex 2 to Decree 58 approved by Government of Mongolia)	2023

## Environmental Guidelines of Mongolia

#	Guideline	Year approved
1	Guideline on calculating environmental damage and compensation (approved in accordance with Order issued on 27 May 2010 by Minister of Nature Environment and Tourism)	2010
2	Amount of air quality monitoring service fee and cost (Annex to Order A-342 by the Minister of Environment and Tourism issued on 10 October 2011)	2011
3	Guideline Environmental Impact Assessment, Minister of Environment and Green Development, Ordinance A-117	2014
4	General methodology on conducting environmental audit, 2019 (annex 2 to Order A/809 by the Minister of Environment and Tourism)	2019

## Environmental Standards

Mongolian national standards applicable to the Project are listed in **Error! Reference source not found..**

List of Mongolian national standards (MNS) applicable to the Project

#	Code	Standard
1	MNS 17.5.13. 1980	Environmental Protection: Rehabilitation of eroded land, terms, and definitions
2	MNS 5914:2008	Environment. Land reclamation. Terms and definitions
3	MNS 5915:2008	Environment classification of land destroyed due to mining activities
4	MNS 5916:2008	Environment Requirements for fertile soil removing and its temporary storage during the earth excavation
5	MNS 5917:2008	Environment. Reclamation of land destroyed due to mining activities. General technical requirements
6	MNS 5918:2008	Environment. Re-vegetation of destroyed land. General technical requirements
7	MNS 4191:1993	Environmental protection standard system. Baseline climate parameters of Mongolia
8	MNS 4585:2016	Air quality. General technical requirements
9	MNS 4991:2000	Occupational safety and health. Requirement for method of determination of toxic substances concentration in the air of working zone
10	MNS 5885:2008	Acceptable concentration of air pollutant elements. General technical requirements
11	MNS 3384:1982	The general and technical requirements for sampling of air quality test
12	MNS 6063:2010	Air quality. Acceptable concentration of pollutant elements for atmospheric air in public area



#	Code	Standard
13	MNS 5803:2007	Occupational safety and health. General requirements for lead content in workplace air and the workplace
14	MNS 3383:1982	Atmosphere. Terms and definitions of pollutant sources
15	MNS 17.2.1.01:1978	Atmosphere. Terms and definitions of pollutant sources generated from internal combustion engine
16	MNS 3113:1981	Atmosphere. General requirement for determining air pollutants
17	MNS 5013:2009	Petrol engine vehicle – Maximum acceptable level and measuring method of exhaust emission
18	MNS 5014:2009	Diesel engine vehicles – Maximum acceptable level and measuring methods of opacity
19	MNS 5010:2001	General requirement for measuring dust concentration in the atmosphere of work area
20	MNS 17.1.1.10:1979	Water. Water use and protection. Terms and definitions.
21	MNS 17.1.1.14:1980	Hydrosphere. Classification of water use. General requirement
22	MNS 4047:1988	Hydrosphere. Procedure for monitoring surface water quality
23	MNS 4586:1998	Water quality. General requirements
24	MNS ISO 5667-14:2000	Guidance on quality assurance of environmental water sampling and handling
25	MNS ISO 5667-3:1999	Water quality. Sampling. Part 3: Guidance on processing and storage of samples
26	MNS 3342:1982	General requirement for preventing from groundwater pollution
27	MNS ISO 5667-11:2000	Water quality. Sampling. Part 4: Guidance on sampling of groundwater
28	MNS ISO 5667-4:2001	Environment. Water quality. Part 4: Guidance on sampling from natural and man-made lakes
29	MNS ISO 5667-6:2001	Environment. Water quality. Part 6: Guidance on sampling of rivers and streams
30	MNS 6148:2010	Water quality. Maximum limit of substance contaminating the ground water
31	MNS 0900:2005	Drinking Water. Hygienic requirements, and assessment of quality and safety
32	MNS ISO 5667-5:2001	Environment. Water quality. Part 5: Guidance on sampling of drinking water and water for beverage production
33	MNS 2573:1978	Hydrosphere. Water quality parameters
34	MNS 4943:2015	Water quality. Effluent treated wastewater. General requirements

#	Code	Standard
35	MNS ISO 5667-10:2001	Environment. Water quality. Part 4: Guidance on sampling of waste waters
36	MNS 6230:2010	Identification of wastewater discharge point. General requirements
37	MNS 5924:2015	Pit latrine and sewage pit. Technical requirements
38	MNS 3474:2003	Plant protection. Terms and definitions.
39	MNS 3475:2003	Plant quarantine. Terms and definitions.
40	MNS ISO 11269-1:2002	Soil quality. Methods to determine effects of the plant pollutants in soil. Part 1: Method to measure cease of plant root growth.
41	MNS ISO 11269-2:2013	Soil quality. Determination of the effects of the plant pollutants in soil. Part 2: Germination of upper plants in polluted soil.
42	MNS 5850:2008	Soil quality. Soil pollutants elements and substance
43	MNS 3297:1991	Environment protection. Soil. The norm for sanitary condition of soil in town and residential areas.
44	MNS 3298:1991	Soil. General requirements for sampling.
45	MNS 3985:1987	Soil. Sanitation parameters.
46	MNS 2305:1994	Soil. Procedure for sampling, packaging, transportation, and storage.
47	MNS 5546:2005	General requirements for assessment of soil erosion and degradation of vegetation cover in pasture lands.

## Environmental Impact Assessment Law (1998)

The Environmental Impact Assessment (EIA) requirements of Mongolia are regulated by the Law on EIA (1998, amended 2002 and again in 2012) and the purpose of the EIA law is environmental protection, the prevention of ecological imbalance, the regulation of natural resource use, the assessment of environmental impacts of projects and procedures for decision-making regarding the implementation of projects. The terms of the law apply to all new projects, as well as rehabilitation and expansion of existing industrial, agricultural, service or infrastructure/construction activities and projects that use natural resources.

The type and size of the planned activity defines responsibility as either the Ministry of Environment and Tourism (MET) or province (provincial) government.

There are two types of EIAs defined in Law, a General EIA (GEIA) and a Detailed EIA (DEIA); the EIA procedure requires the following:

- Preparation of a Baseline Environmental Assessment Report – this is prepared by a company licensed to conduct GEIA/DEIA studies.
- GEIA - screening - to initiate a GEIA (essentially, a decision by the regulator on what level, if any, of DEIA is required), the project implementer submits to MET (or Environmental department of corresponding province) the following: Finalised Project Design or an approved Feasibility Study, Baseline Environmental Assessment Report, a letter from the soum governor which requests GEIA, technical details, drawings, and other information. The GEIA may lead to one of four conclusions: (i) no DEIA is necessary, (ii) the

project may be completed pursuant to specific conditions, (iii) a DEIA is necessary, or (iv) project cancellation. The GEIA is free and usually takes up to 14-28 working days.

- DEIA – the scope is defined by the GEIA. The DEIA report must be produced by a Mongolian company which is authorised by MET with a special license to conduct DEIA. The developer of the DEIA should submit it to the MET (or Environmental department of corresponding province). An expert of MET who was involved in conducting the GEIA will make a review of the DEIA within 18 working days and present it to MET (or Environmental department of corresponding province). Based on the conclusion of the expert, MET (or province Environmental department) takes a decision about approval of the project. If the DEIA report is rejected by MET, further guidance is provided by MET and the report is submitted again. MET may also provide comments on the approved report.

## Environmental and Social Laws and Regulations

Applicable laws and their main regulations

Law	Main regulations
<b>Environment</b>	
Law on Environmental Impact Assessment	<p>The requirement for all projects that intend to alter or impact upon the natural environment for a commercial gain to undertake a Detailed Environmental Impact Assessment (DEIA) is stipulated in the Mongolian Law on Environmental Protection (1995). From this, the Mongolian Law on Environmental Impact Assessment was created in 1998 (and most recently amended in 2012), outlining the process that needs to be undertaken to meet these requirements. New projects, or the expansion of existing projects, shall first be subject to screening by Ministry of Environment and Tourism (MET) prior to the implementation of the Project with the following outcomes possible:</p> <p>Project may be implemented without the need for a DEIA;</p> <p>Project may be implemented pursuant to specific conditions;</p> <p>DEIA is required; or</p> <p>Project may be rejected on the grounds of non-conformity with legislation, or adverse impacts upon the environment.</p> <p>The DEIA process in Mongolia requires the following components to be addressed in the EIA reports:</p> <p>Baseline environmental and socioeconomic assessment of the proposed site;</p> <p>Description of the technical and engineering aspects of the proposal including wastes and emissions and their controls;</p> <p>An assessment of the economic feasibility of the proposal;</p> <p>Identification of potential negative environmental impacts including water resources, soil and land use; biological resources; and socio-economic resources.</p> <p>Measures proposed for impact control or mitigation;</p> <p>Details of risk management for hazardous materials including hydrocarbons; and</p> <p>Environmental Management Plan (EMP).</p>



Law	Main regulations
Law on Environmental Protection	This law regulates relation between the state, citizens, economic entities and organisations in order to guarantee the human right to live in a healthy and safe environment, have ecologically balanced social and economic development. The Law requires that natural resource and environmental impact assessments are conducted to preserve the natural state of the environment, among other considerations (Article 7). It also requires that businesses obtain a certification to conduct environmental impact assessments. Article 10 identifies the conduct of environmental monitoring on the state and changes of the environment.
Law on Land (1994, 2015)	Law on Land regulates the possession and use of land by a citizen, entity, organisation, and other related issues. Articles 42/43 provide guidance on removing possessed land and granting compensation relative to removing. The Mongolian Constitution provides for common use of pastureland and public ownership of natural resources unless granted through law. Land use for permanent infrastructure must be granted and fees paid in accordance with the Mongolian Law on Land and the Law on Land Fees.
Law on Air	The Law on Air regulates the emission of air pollutants to the atmosphere within Mongolia. It sets out the need for permitting of polluting activities and that facilities are constructed and operated with appropriate mitigation technology. Entities are also required to conduct internal air quality monitoring and present these results to the relevant government branches. The legislation and subsequent regulations set the emission and ambient air quality limits which apply in different locality settings within the country i.e. urban or rural.
Law on Water	This law regulates activities which either utilise or may impact upon water reserves within Mongolia. This law provides for the approval of such work and investigations by the newly created Water Reserve Committee and results are to be made available on the National Water Database. The law prohibits the pollution of waterways and reservoirs with waste, chemicals, and wastewater and to store items in the vicinity of water bodies. The use of water also requires an associated water use permit prior to extraction or utilisation.
Law on Waste (2012, revised on 2017)	The Law on Waste regulates economic entities on their waste disposal and intends to ensure that waste is appropriately separated based on its characteristics, stored appropriately and then disposed of to a specially designed and designated disposal area. Disposal of waste is intended to be carried out by a licensed waste contractor.
Law on Toxic and Hazardous Chemicals (2006)	This law regulates the export, import and transportation of toxic chemicals across the borders of Mongolia and production, storage, trade, transport, use, removal and control.
Law on Construction (2016)	The purpose of this Law is to regulate the relations in connection with the conducting construction operation, producing construction/building materials, performing construction work, and supervising and commissioning thereof.

Law	Main regulations
<b>Health and Safety</b>	
Law on Occupational Health and Safety, 2008, (amended in 2011, 2012, 2015, 2016, 2018, July 2021, December 2021, and 2022)	<p>This law sets out provisions in relation to the rights of workers; rights and duties of employers; use of machinery and equipment; use of toxic chemicals, explosives, radioactive and biological substances; fire safety; medical examinations of workers; protective equipment; workers with disabilities; registration, handling and investigation of accidents and diseases; sanctions for non-compliance; and division of powers between different government bodies.</p> <p>Employers are required to maintain safe and healthy working conditions. The law has detailed instructions for employers with regard to use of machinery and equipment, machineries for lifting, delivering and transporting as well as fire safety requirements. Employers are required to arrange free of cost preliminary and periodic medical check-ups (related to their work performance) for all workers.</p> <p>Workers also have a right to work at safe and healthy workplaces, have medical insurance to cover industrial accidents, and suspend work in the face of imminent danger.</p>
Law on Fire Safety (2015)	<p>The purpose of the law shall be to regulate the relations regarding rights and duties of legal entities, organisations and citizens in ensuring fire safety and the implementation thereof. The relevant legislation and the documents on fire safety norm and standards shall be strictly complied to formulate or renew or modify general plan of a town or village, construct newly or extend or use buildings or facilities and change industrial technology regime.</p>
Law on Hygiene (2016)	<p>The purpose of this law shall be to regulate relations regarding creating favourable conditions for human health and safety, prevent, mitigate and eliminate negative environmental impacts on human health.</p>
Law on Sanitation (1998, 2012)	<p>This law governs relationships concerning maintenance of sanitary conditions, defining the general requirements for sanitation to ensure the right of an individual to healthy and safe working and living conditions, ensuring normal sanitary conditions, and defining the rights and duties of individuals, economic entities and organisations with this respect.</p>
Law on Disaster Protection (2017)	<p>The purpose of this law is to organise disaster protection activities promptly and effectively, and to regulate relations related to the emergency organisation and disaster management system, organisational structure and activities. The Law defines roles and responsibilities of the state, local authorities, enterprises, entities and individuals in relation to disaster protection.</p>
Law on Pensions Benefits provided by the Social Insurance Fund in Case of Industrial Accidents and Occupational Diseases (1997)	<p>Under the law, sick leave is compensated from the Government-run social insurance program, except for the first five days of the leave. Leave is provided as determined by the designated medical commission at the local hospital. The compensation rate is determined by the social security legislation and depends on the number of years the employee has</p>

Law	Main regulations
	<p>worked. The first five days of the leave are to be paid by the employer. Employment of a worker is secure during the term of sick leave.</p> <p>There is provision for benefits in the case of industrial accidents and occupational diseases if the accident occurred at workplace or in discharge of duties elsewhere, before or after work and on the way to and from work. The law provides the following benefits to the insured persons: Disability pension; Dependent's pension; Temporary disability benefit; and Rehabilitation costs.</p>
<p>Ministerial Decree: Procedures for assessment of working conditions in workplaces (2015)</p>	<p>By enhancing workplace conditions for businesses and organisations, identifying factors that affect the workplace environment, identifying risk factors, measuring, researching, and evaluating underground, toxic, hot, and difficult conditions, and preventing occupational diseases, health, and safety, job creation serves the purpose of assessing working conditions. In order to assess the working conditions of the workplace, various chemical, physical, biological, psychological, physiological, and harmful factors affecting the workplace environment must be measured and researched. The results must then be compared to the appropriate and acceptable workplace indicators established by occupational hygiene standards in order to draw conclusions about risks.</p>
<b>Labor Relations</b>	
<p>Labor Code (revised version, 2021)</p>	<p>The Labour Code sets out the rights and duties of employers and employees including collective agreement, collective bargaining, collective and individual labour disputes, labour conditions, terms and conditions of work, liabilities for breach of the legislation, and to ensure gender equality. The Law bans gender-based discrimination in employment and provides protection to pregnant and nursing mothers. Additionally, the law prohibits discrimination in the workplace based on nationality, race, sex, social origin or status, wealth, religion, or ideology, but women are prevented from undertaking certain forms of work as set out in separate regulations. Women with children are protected from discrimination and are entitled to maternity leave. Parents with children under three years old may take childcare leave and employers must re-engage such employees on their return to work.</p> <p>Forced labor is prohibited.</p> <p>Worst child labor is also prohibited. Light work may be permitted for those aged between 13 and 15 with parents' consent if conditions health and safety requirements are fully met and it is not likely to harm their health and training/development rights are not jeopardised. In case of employment of a person between the ages of 15 and 18 in accordance, a tripartite employment contract should be signed between employer, the legal representative / parent, guardian, and the minor. The employer should in this case notify governmental organisation responsible for labor control issues.</p> <p>Legal entities with 20 or more employees are required to establish a permanent part-time Labor Dispute Resolution Commission ("<i>Commission</i>") which shall manage the conciliation process for individual labor rights</p>

Law	Main regulations
	<p>disputes. For each company the Commission shall be composed of representatives of the employer and the trade union of the business entity or organisation, or in the absence of a trade union, an equal number of employees elected by the general meeting of employees. The Commission is primarily responsible for the preliminary resolution of labor disputes, in particularly individual rights disputes arising in the organisation. The disputing party shall have the right to apply to the Commission for resolution of the labor rights dispute within 90 days from the date when he / she knew or should have known about an alleged violation of his / her rights. For those companies which have not established a "Commission", or in disputes between "individuals", the dispute shall be submitted for "conciliation" procedure to the local Tripartite Labor Rights Dispute Settlement Committee at the <i>soum</i> and district level. In the event the disputing parties do not agree with the decision of the Tripartite Settlement Committee, they may file a lawsuit at Civil court ("Court") within 10 working days from receiving the decision.</p> <p>Regardless of the type and form of ownership, enterprises and organisations with 25 or more employees shall employ persons with disabilities in at least four percent of the total number of workplaces (Article 144.2)</p> <p>This law provides for the rights of employees to be provided with labour conditions that comply with health and safety laws and regulations; to receive payment for work done; to holiday; to freely assemble with other employees for the purpose of protecting the rights and legitimate interests including through representative organisations and collective agreements; to strike in certain circumstances; to receive a pension, an entitlement to social insurance and death in service benefits and to other benefits as may be provided in employment and collective agreements.</p> <p>Collective agreements may be concluded within professions or economic sectors and registered with the applicable regulator. The Labour arbitration court settles collective labour disputes and a court or commission settles individual labour disputes.</p>
Civil Code (2002)	<p>Another option for employment arrangement in Mongolia, depending on duration or nature of work, is civil (hired work) agreements governed by the Civil Code. Civil agreements vs. employment contracts would normally apply to arrangements which are shorter, usually one-off, more flexible in terms of termination or workplace requirements.</p>
Law on Social Insurance (1994)	<p>The purpose of this law is to define the types and forms of social insurance, and the scope of its effect, to determine the legal basis for payment of insurance premiums, formation of the social insurance fund and its administration, social insurance institutions and the activities of social insurance inspectors, and to regulate relations related to their implementation.</p> <p>As prescribed by this law, employees are subject to mandatory social security withholdings. Social security contributions cover pension insurance, benefits insurance, health insurance, Industrial accident and occupational disease insurance;and unemployment insurance.</p>

Law	Main regulations
	In addition to the abovementioned contributions, the employers also contribute industrial accidents or occupational diseases insurance.
Law on Minimum Wage (revised version, 2010)	The minimum wage is adjusted at least once every two years by National Tripartite Committee on Labor and Social Consensus comprising representatives of the Government and representatives of employers and trade unions. Minimum wage shall not be lower than the minimum living standards as determined in accordance with Law on determining minimum living standards of population. Minimum wage can be fixed at higher level than that fixed by the National Tripartite Committee on Labor and Social Consensus. An employer or an individual employing a citizen on the basis of an employment contract or other types of contracts similar to employment contract shall be obliged to pay basic pay and wages not less than the minimum wage
Ordinance by the Minister of Labor and Social Welfare #A122, 10 June 2022.	It is prohibited to employ children in certain economic activities and processes including mining and quarrying, processing; agriculture, construction; activities related to water supply and waste management, household and health care and services, dry cleaning, sales and trade including whole trade, transportation and warehousing operations, entertainment including professional horse racing, hospitality and using in pornographic and professional performance art.
<b>Gender, Diversity and Inclusion</b>	
Constitution of Mongolia (1992, revised in 2019)	The Constitution enshrines equality between men and women in the political, economic, social, cultural life and in family relations in Article 16 and states that everyone shall be free from any type of ethnicity, language, race, age, sex, social status, wealth, employment, position, religious belief, viewpoint, and educational level (Article 14).
Civil Code (2002)	The law states equal rights of daughters and sons to inherit property (Article 520), female and male surviving spouses have equal inheritance rights to property (Article 520), unmarried men and unmarried women have equal ownership rights to property, similarly, married men and married women have equal ownership right to property (Articles 127.2, 128.1).
Law on Promotion of Gender Equality (2011, amended 2022)	The law specifically ensures gender equality in political, legal, economic, social, cultural and family relations, and regulates relations related to their implementation. It spells out the responsibilities of specific public agencies to ensure gender equality. This law broadly defines discrimination as “any action or inaction resulting in discrimination, exclusion or restriction based on sex or attributes of sex and marital status of men and women in political, economic, social, cultural, family and other spheres”. Article 6 of the law also states prohibition of gender discrimination.
Law on Rights of Persons with Disabilities (2016, amended 2022)	The law prohibits discrimination of Persons with Disability (PWD) and guarantees their rights to education, right to work, access to health and welfare services, right for legal assistance, among others.

Law	Main regulations
	<p>Article 17.1 states: “Persons with disabilities have fundamental right to work, advance careers, receive salaries and compensation, engage in self-employment and entrepreneurship and to get involved in employment support services on an equal basis with others;”</p> <p>Entities shall provide a working environment that meets the special needs of disabled people. Public service providers and other organisations serve disabled people regardless of the order.</p>
Law on Seniors (amended, January 2017)	The Law guarantees rights of elderly people to get pensions, welfare assistance, health care, own, use and dispose of immovable property, right to self-development and right to work and earn according to their wishes, interests, health, knowledge and abilities.
<b>Cultural Heritage</b>	
Law on Cultural Heritage Protection (2014)	<p>The Law regulates the collection, registration, research, classification, evaluation, preservation, protection, promotion, restoration, of cultural heritage.</p> <p>Law on Protection of Cultural Heritage of Mongolia 2014 protects all archaeological sites, whether on public/state or private land. Burial sites and rock art sites are protected regardless of age. A permit is required for any subsurface investigation of an archaeological site or investigation with the intent to locate a site. The Government Implementing Agency is responsible for administering the Law on Protection of Cultural Heritage 2014, maintaining a database of recorded archaeological sites in the Department of Culture and Arts. Also, “National Centre for Cultural Heritage” is (Ministry of Education, Science and Sports of Mongolia) in charge of Protection of historical and movable cultural monuments as tangible cultural heritage.</p> <p>A person or legal entity that violates this Law on Cultural Heritage 2014 shall be subject to liability specified in the Law on Criminal Procedure or the Law on Violations.</p> <p>Entities shall by own expenses undertake baseline archaeological, paleontological, and ethnographic surveys to determine the presence and condition of cultural relics where construction works have the potentiality to damage them and take measures to protect identified cultural relics</p>
<b>Indigenous Groups/ Ethnic Minorities</b>	
The Constitution of Mongolia (1992, amended 2021)	No person shall be discriminated against based on ethnic origin, language, race, age, sex, social origin and status, property, occupation and position, religion, opinion and education. Everyone shall be a person before the law.
Government Resolution on Ethnic Minorities, No 213 (2018)	The Ministry of Labor and Social Labor is responsible for allocating budget to support for adults and children in <i>Tsaatan</i> households who live in <i>taiga</i> . Once every 3 years, <i>Tsaatan</i> families are entitled for financial support to visit their relatives who live in Toj village of the Republic of Tyva of the Russian Federation. The Ministry of Education and Science is responsible for training Tuva language teachers in order to ensure that Tuvan (also) Tyvan children’s right to education in their mother tongue.



Law	Main regulations
<b>Land Acquisition</b>	
The Constitution of Mongolia (1992, revised in 2019)	<p>“The State shall have the right to hold landowners responsible in connection with the manner the land is used, to exchange or take it over with compensation on the grounds of special public need, or confiscate the land if it is used in a manner adverse to the health of the population, the interests of environmental protection and national security” and “If the State and its bodies appropriate private property on the grounds of exclusive public need, they shall do so with due compensation and payment” respectively.</p>
Law on Land (2002)	<p>The Land Law governs expropriation of land allocated for possession or use.</p> <p>Article 13.1 of the Land Law lists special needs for which land in private possession can be acquired by the state: (i) land under special government protection; (ii) border strip lands; (iii) land for ensuring national defence and security; (iv) land for foreign diplomatic missions and consulates, as well as resident offices of international organisations; (v) free zone area; (vi) land for scientific and technological tests, experiments and sites for regular environmental and climatic observation; and (vi) aimag level reserve rangelands.</p> <p>Article 41 of the Law on Land states that the central state administrative body in charge of land issues may submit to the government, after prior agreement with the owner of the land, a proposal to replace or reclaim all or part of the land owned by citizens, enterprises, and organisations for special state needs before the end of the contract period. In the case of land under ownership title, the compensation is based on market rates assessed by certified appraisers. For land under possession and land use rights, no eligibility for compensation unless converted to an ownership title.</p>
Law on Land Fee (1997, amended in 2019)	<p>This law regulates the relations concerning the imposition of fees for the possession and use of state-owned land for citizens, business entities and organisations as well as the payment of such fees to budget. Entities shall have the land possession license and the contract to use land. The entities possessing and using the land shall pay the land fee in compliance with appropriate legislation and contract.</p>
Civil Code (2002)	<p>The Civil Code of Mongolia (2002) is applicable to land acquisition by an entity, insofar as it regulates transactions and contracts.</p> <p>In the absence of legal provisions regulating land acquisition and resettlement in the context of local scale infrastructure facilities, including roads and sewerage networks, the Civil Code provides a legal framework which place land acquisition and resettlement in the context of negotiated settlement. This implies that the State or its legally appointed agents and affected persons engage with each other contractually as equal and autonomous legal persons and participants in a civil legal relationship (Article 1). Citizens and organisations, as well as <i>aimags</i>, the capital city, <i>soums</i> and districts are able to enter into civil legal relations with regard to</p>

Law	Main regulations
	<p>objects of material and non-material wealth and their acquisition and possession (Articles 6, 7 and 8).</p> <p>Chapter 10 of the Civil Code defines property and assets, including land and other immovable property. Chapter 11 details provisions for their possession by legal acquisition and Chapter 12 for property ownership by individuals and other legal persons. The Civil Code in Article 101 provides general terms for the possession, use and disposal of property (further elaborated in Articles 109 to 112), but refers to the subsequently enacted Land Law and Land Allocation Law with regard to land ownership and possession. Several special provisions pertaining to common property ownership (Article 108), common property of family members (Articles 126 and 128) and easements (servitude) (Article 151) may be applicable to specific cases in any particular project. Central to a negotiated agreement on transfer of land are the stipulations regarding contracts in Chapter 15.</p>
<b>Public Consultation and Information Disclosure</b>	
Law on Environmental Impact Assessment (2012)	Public consultation is required to conduct in appropriate ways a Detailed Environmental Impact Assessment process to disclose the project information, consult on the scope of impacts, and identify potential mitigation measures and obtain full feedback from project affected people and local administration.
Minister of Environment and Green Development, Ordinance A-03 (Public consultation procedure), 2014	<p>This Ordinance applies to Environmental Strategic impact assessment, Cumulative impact assessment and DEIAs. The following is required:</p> <p>Information disclosure and transparency of, and access to, information, ensuring exchange of information; consultation and negotiation between proponents of development policy, programs and plans and potentially affected people (directly and indirectly affected), local communities and other organisations; use of data and suggestions by project stakeholders in designing mitigation measures; respect for local peoples' traditional culture, traditions, values, traditional way of life and rights. Information on potential negative impacts on the environment and human health should be open and accessible with citizens and the public provided free access to this information.</p> <p>The public participation required during the DEIA process is as follows:</p> <p>The DEIA should ensure public participation at assessment stages;</p> <p>People's feedback on predicted impacts should be obtained using a participatory approach;</p> <p>Direct and indirect impacts should be assessed using such tools like consultation, discussions, surveys and cover livelihoods and social issues;</p> <p>Information on the project and its positive and negative impacts, and mitigation measures, should be provided;</p> <p>The DEIA consultant and project proponent should, within 15 days after completion of developing the DEIA Report and Environmental Management Plan, disclose these documents to the <i>bagh/khoroo</i> Public meetings and seek feedback; this should cover all <i>baghs</i> and <i>soums</i> in the project area;</p>

Law	Main regulations
	<p>Affected communities should provide their feedback/suggestions to <i>bagh/khoroo</i> Public meetings before a final decision is made on the proposed project;</p> <p>The project proponent, Governors of <i>soum</i>/districts, <i>bagh/khoroo</i> Public meetings and <i>aimag</i>/capital city Environmental agencies are responsible for providing access to the approved DEIA Report;</p> <p>The project proponent must report to communities and the public at least once a year on project implementation;</p> <p>Grievances on gaps in the DEIA Report may be logged by people/communities with the project, local authority and/or the Ministry of Environment;</p> <p>The Ministry of Environment shall resolve grievances within laws; in case the person/community does not agree with resolution of such grievance, they may log compliant with the courts.</p>
Minister of Environment and Green Development, Ordinance A-117 (Inclusion of social impacts in DEIA), 2014	<p>The Ordinance sets out requirements for disclosure of the DEIA results and consultation with the local community. It stipulates that the DEIA company/consultant should obtain feedback from local government, potentially affected persons and local residents. It also requires that the DEIA consultant should organise project specific engagement selecting appropriate measures to ensure participation and disclose project information. The following methods are identified as useful: sample surveys, questionnaires, interviews, community resource mapping, open discussions and Focus Group Discussions (FGDs).</p> <p>The DEIA Report should include the following information:</p> <p>Meetings and consultations with the project's affected persons and project stakeholders, surveys conducted, when and how information was disclosed; participants' attendance;</p> <p>Main themes discussed, information on major issues raised during consultation; and</p> <p>Reasonable suggestions raised during consultations which should be reflected in project planning, implementation and operation.</p> <p>Where a project covers the territory of several <i>baghs</i> and <i>soums</i>, the DEIA consultant should feedback the DEIA results to each <i>bagh</i> public meeting and <i>soum's Hural</i> to get their feedback/suggestions.</p>
<b>Consumer protection</b>	
Consumer Protection Law (26 December 2003)	<p>The law defines rights of buyers/consumers, as well as responsibilities of sellers in terms of quality, price, packaging, misleading information, warranty period/shelf life, expiry date; complaints log by consumers, timeframe to resolve consumer grievance, and liabilities (fines) in case of the breach of law.</p> <p>Products sold to customers which may adversely affect consumers life or health must be changed immediately upon complaint.</p> <p>The law is salient of timeframe for replacement of other consumables.</p>
Law on Infringements (11 May 2017), Article 10.2	5 mln. MNT fine is imposed for breach of the Consumer Protection Law, to replace damaged goods and products

Law	Main regulations
	<p>If the manufacturer or seller sells goods that do not meet the warranty period requirements, the legal entity shall be fined 5 mln. MNT.</p> <p>If goods, works, and services supplied by manufacturer, seller, or contractor cause harm to the consumer's life, health, or the environment, or if they do not meet the requirements of mandatory standards and technical regulations, the legal entity will be imposed 9 mln. MNT fine in addition to compensation for the damage caused.</p> <p>If a manufacturer, seller, or contractor causes damage to the consumer's interests due to false information related to goods, work, or services, the legal entity shall be fined 5 mln. MNT.</p>

### Key regulations for the agricultural sector

Law	Regulations
Law on agriculture product and commodity stock market (2011, amended in 2013, 2015, 2017, 2018)	This law aims to establish the exchange of agricultural goods and raw materials, to establish the legal basis of its organisation and operation, and to regulate relations arising in connection with the preparation and supply, storage, transportation and trading of agricultural goods and raw materials.
Law on soil conservation and prevention of desertification (2012)	<p>The regulation of this law is aimed at clarifying the duties and responsibilities of the state, citizens, enterprises, and organisations for soil protection and desertification prevention. The purpose of this law is to regulate relations related to the protection and restoration of soil from degradation and prevention of desertification.</p> <p>This law applies to the activities of the state, citizens, enterprises, and organisations to protect soil and prevent desertification. This law applies to the land of the main category except for the water reservoirs of the Unified Land Fund of Mongolia.</p> <p>In this law, the degree of soil degradation and desertification status, common measures for soil protection and desertification prevention and control, the powers of government organisations, citizens and legal entities regarding soil protection and desertification prevention, encouraging soil protection and desertification prevention activities, soil degradation and desertification Regulations on state survey, soil damage compensation, and liability for law breakers are included.</p> <p>Section 7.1 of the law provides measures to be taken to protect agricultural land and prevent desertification.</p>
Government Resolution No.131 on determining crop production areas (16 May 2018).	The government determined/designated crop production areas in 113 <i>baghs</i> in 60 soums of seven aimags, namely Selenge, Tuv, Darkhan-Uul, Khentii, Uvurkhangai, Bulgan and Arkhangai aimags.
Guidance on simplified introduction of good agricultural practices in fruit and vegetable production	By this regulation, Governors and Citizen Representative Khurals were advised to: gradually implement measures in accordance with the local development policy and Aimag and soum development general plans in order to

Law	Regulations
(joint Ordinance No. A/166, A/251, by Minister for Food, Agriculture and light industry and Minister for Health, dated 29 May, 2019).	intensify and diversify agricultural production, and develop intensive livestock production in a planned and phased manner; transfer livestock (in these designated agricultural areas) to areas with available pastureland and water sources, carry out training and advocacy measures in diversifying their herd, engaging in intensive animal husbandry, and take measures to provide comprehensive support
Joint Ordinance No.A/166, A/251 (dated 29 May 2019) Minister for Food, Agriculture and Light Industry and Minister for Health on introducing Good agricultural practices (GAP).	This procedure covers site history and management. Quality plan, planting material, water (irrigation), harvesting and handling procedure, traceability etc.
Land Law	Article 54.3 of the Land Law prohibits letting livestock to graze on agricultural land without the official permission of the owner, possessor or user.
Law on crop farming	Article 24 of the Law on crop farming prohibits letting animals and livestock to cross pass and to graze, as well as have structures like herders' seasonal camps. And fine for such action is 300,000-5,000,000 MNT as per Article 8.1 of the Law on Infringements, individuals and organisations will be fined 300,000-5,000,000 MNT.
Joint Ordinance No. A-136, A-158, A-210, by Minister for Food, Agriculture and Light Industry, Minister for Justice and Home Affairs and Minister for Finance, dated 20 August, 2018.	This Ordinance approved a methodology for calculating damaged caused to crop producers by animals entering crop field.

## Customary Land Use

Customary "law" develops over time through accepted patterns of behaviour within societies that become accepted as law within such communities. Customary law is still used in Mongolia for the allocation of grazing rights between herder families and communities. Grazing rights may be acquired under customary law through the:

- Use of land for generations;
- Construction of animal shelters;
- Possession of a well close to grazing land; and
- Possession of cropland close to grazing land.
- Pasture use issues among communities are settled via consultation with neighbours.

Customary land use rights will need to be considered in the event of impacts on herder water supplies or resettlement of herders.

## Appendix D - Stakeholder Engagement During ESIA Scoping

### List of Stakeholders

Stakeholders in Ulaanbaatar
IFC
FA
Domestic banks
EDP project -World Bank
IFC- Mongol Meat
The Ministry of Food, Agriculture, and Light Industry
Water Authority
Agricultural Support Fund
The Ministry of Environment and Tourism
International NGOs in Ulaanbaatar, Mongolia, e.g. WWF, The Nature Conservancy, WCS etc.
Mongolia National Crop Farmers Association
Mongolian Meat Association
Mongolian University of Life Science
General Department of Veterinary Medicine
Research Institute of Animal Husbandry under the Mongolian University of Life Science
Research and development centre for food, agriculture and light industry
National Centre for Livestock Genealogy
Sanitary Central Laboratory of the State Veterinary Hospital
Soil testing laboratory
Suppliers:
Seed suppliers
Machinery and equipment suppliers
Fertiliser and pesticide suppliers
Fuel suppliers
Cattle medicine suppliers
Feed supplement suppliers
Meat processing plant



Construction companies
Service providers-camp service, security, transportation
Other suppliers – Consultants
<b>Customers:</b>
Flour mill, Rapeseed dealers, Arable farmers, Restaurants
<b>Stakeholders in Site community:</b>
Government agencies
Khentii Aimag- Government authorities
Department of Food and Agriculture of Khentii province
Local community - Ulziit village
Kherlen River Basin Authority
Mongolian National Federation of Pasture User Groups
Khentii Aimag's Crop Farmers' Association
Administration of inter-provincial grazing land use
Herders
Cattle suppliers
Workers hired from Khentii aimag
<b>Internal Stakeholders:</b>
Workers (full-time personnel & casual workers)
Contractors
Syndicate/union reps (if applicable)
Department managers
Senior management team (corporate & site)

## Appendix E - Full species lists from biodiversity surveys

List of plant species in the June 2023 survey

No.	Species name	Age	Life form	Status	Usage	Along the Murun river	Arable land			Cattle feedlot	Homestead	Old camp
							Field 1	Field 2	Field 3			
	<u>Euphorbiaceae</u>											
1	<i>Euphorbia esula</i> L.	Perennial	Herb	Abundant	Medicinal and forage plant	+	+	+	+	+	+	-
	Fabaceae											
2	<i>Astragalus brevifolius</i> Ledeb.	Perennial	Herb	Abundant	Unknown	+	+	+	+	+	-	-
3	<i>Astragalus galactites</i> Pall.	Perennial	Herb	Abundant	Poisonous plant	-	-	-	+	-	-	-
4	<i>Caragana pygmaeae</i> DC.	Perennial	Shrub	Abundant	Forage plant	+	+	+	+	+	+	-
5	<i>Caragana microphylla</i> DC.	Perennial	Shrub	Abundant	Forage plant	+	+	+	+	+	+	-
6	<i>Medicago ruthenica</i>	Perennial	Herb			-	-	-	+	+	-	+
7	<i>Thermopsis dahurica</i> Czefr.	Perennial	Herb	Abundant	Medicinal and forage plant	-	+	-	+	-	-	-
	Rosaceae											
8	<i>Chamaerhodos erecta</i> Bunge.	Annual	Herb	Abundant	Medicinal and forage plant	+	+	+	-	-	-	-
9	<i>Potentilla bifurca</i> L.	Perennial	Herb	Abundant	Medicinal and forage plant	+	+	+	-	+	-	-
10	<i>Potentilla sericea</i> L.	Perennial	Herb	Abundant	Medicinal and forage plant	+	+	+	+	-	+	-
11	<i>Potentilla tanacetifolia</i> Willd. Ex Schlecht	Perennial	Herb	Abundant	Medicinal and forage plant	+	+	-	-	-	-	-
12	<i>Sibbaldia adpressa</i> Bunge	Perennial	Herb	Abundant	Forage plant	+	+	-	-	+	-	-
13	<i>Ptilotrichum tenuiflium</i> C.A.Mey	Perennial	Herb	Abundant	Forage plant	-	+	-	+	-	-	-
	Brassicaceae											

No.	Species name	Age	Life form	Status	Usage	Along the Murun river	Arable land			Cattle feedlot	Homestead	Old camp
							Field 1	Field 2	Field 3			
14	<i>Dontostemon integrifolius</i> C.A.Mey	Perennial	Herb	Abundant	Medicinal and forage plant	+	+	+	+	-	-	-
	Rutaceae											
15	<i>Haplophyllum dauricum</i> G.Don	Annual	Herb	Abundant, relict	Medicinal, tea and forage plant	+	+	+	-	-	+	-
	Boraginaceae											
16	<i>Lappula redowskii</i> Greene	Annual	Herb	Abundant	Unknown	-	+	-	-	-	-	+
	Plantaginaceae											
17	<i>Plantago depressa</i> Willd	Perennial	Herb	Abundant	Medicinal and forage plant	+	-	-	-	-	-	+
	Lamiaceae											
18	<i>Cymbaria daurica</i> L.	Perennial	Herb	Abundant	Medicinal and forage plant	-	+	-	+	+	+	-
19	<i>Thymus gobicus</i> Czern	Perennial	Herb	Abundant	Medicinal and cosmetics plant	+	-	-	-	-	-	-
	Convolvulaceae											
20	<i>Convolvulus ammanii</i> Desr.	Perennial	Herb	Abundant	Medicinal plant	-	+	-	+	-	-	+
21	<i>Convolvulus arvensis</i>	Perennial	Herb	Abundant	Medicinal and forage plant	-	+	-	+	-	-	-
	Asteraceae											
22	<i>Artemisia scorpi</i> Waldst, Kitam	Perennial	Herb	Abundant	Medicinal and forage plant	-	+	-	+	-	-	-
23	<i>Artemisia frigida</i> Willd.	Perennial	Herb	Abundant	Forage plant	+	+	+	+	+	+	+
24	<i>Artemisia adamsii</i> Bess.	Perennial	Herb			+	+	+	+	+	+	+
25	<i>Crepidiastrum akagii</i> J.W.Zang & N.Kilian	Perennial	Herb	Abundant	Medicinal and forage plant	-	+	-	+		-	-
26	<i>Heteropappus hispidus</i> Novopokr	Perennial	Herb	Abundant	Melliferous and forage plant	+	+	-	+	+	-	-
27	<i>Lactuca tatarica</i> (L.) C.A.Mey.	Perennial	Herb	Abundant	Medicinal and forage plant	+		-	+	-	-	-

No.	Species name	Age	Life form	Status	Usage	Along the Murun river	Arable land			Cattle feedlot	Homestead	Old camp
							Field 1	Field 2	Field 3			
28	<i>Saussurea amara</i> (L.) DC.	Perennial	Herb	Abundant	Forage plant	+	+	-	-	-	-	-
29	<i>Scorzonera divaricata</i> Turcz.	Perennial	Herb	Abundant	Forage plant	-	+	-	+	-	-	-
30	<i>Serratula centauroides</i> L.	Perennial	Herb	Abundant	Medicinal, melliferous and forage plant	+	-	-	+	-	-	-
31	<i>Taraxacum officinalis</i>	Perennial	Herb	Abundant	Medicinal, melliferous and forage plant	+	-	-	+	+	-	-
Lilaceae												
32	<i>Allium anisopodium</i> Lbd.	Perennial	Herb	Abundant	Food and forage plant	+	+	+	-	-	+	-
33	<i>Allium polyrhizum</i> Turcz. Ex Regel	Perennial	Herb	Abundant	Food and forage plant	-	+	+	+	+	+	-
34	<i>Asparagus dahuricus</i> Fisch. Ex Link	Perennial	Herb	Abundant	Medicinal and forage plant	-	+	+	+	+	+	+
Cyperaceae												
35	<i>Carex duriuscula</i> C.A.Mey	Perennial	Herb	Abundant	Forage plant	+	+	+	+	+	+	+
Poaceae												
36	<i>Achnatherum splendens</i> (Trin.) Nevski	Perennial	Herb	Abundant	Forage plant	+	-	+	+	-	-	-
37	<i>Agropyron cristatum</i> (L.) Gaertner	Perennial	Herb	Abundant	Forage plant	+	+	+	+	+	+	-
38	<i>Cleistogenes squarrosa</i> (Trin.) Keng	Perennial	Herb	Abundant	Forage plant	+	+	+	+	+	+	+
39	<i>Leymus chinensis</i> (Trin.) Tzvelev	Annual	Herb	Abundant	Forage plant	+	+	+	+	-	-	+
40	<i>Poa attenuata</i> Trin.	Perennial	Herb	Abundant	Forage plant	+	-	-	-	+	-	-
41	<i>Setaria viridis</i> (L.) P.Beauv.	Annual	Herb	Abundant	Medicinal and forage plant	+	-	-	+	-	-	-

No.	Species name	Age	Life form	Status	Usage	Along the Murun river	Arable land			Cattle feedlot	Homestead	Old camp
							Field 1	Field 2	Field 3			
42	<i>Stipa glareosa</i> (P.A.Smirn.) Tzvelev	Perennial	Herb	Abundant	Forage plant	+	+	-	+	+	+	+
43	<i>Stipa krylovii</i> Roshev.	Perennial	Herb	Abundant	Forage plant	+	-	-	+	+	+	-
44	<i>Festuca sibirica</i>	Perennial	Herb	Abundant	Forage plant	+	+	+	+	-	-	-
	Ranunculaceae											
45	<i>Thalictrum squarrosum</i> Stephan ex Willd	Perennial	Herb	Abundant	Medicinal and forage plant	-	+	-	-	-	+	-
46	<i>Halerpestes salsuginosa</i> (Pall. Ex Georgi) Greene.	Perennial	Herb	Abundant	Medicinal and forage plant	+	-	-	-	-	-	-
	Plumbagnaceae											
47	<i>Limonium bicolor</i> (Bunge) Kuntze	Perennial	Herb	Abundant	Medicinal and ornamental plant	-	+	-	-	-	-	-
	Polygonaceae											
48	<i>Polygonum divaricatum</i>	Perennial	Herb	Abundant	Medicinal and forage plant	-	+	-	+	-	+	-
49	<i>Rheum undulatum</i>	Perennial	Herb	Abundant	Medicinal and forage plant	-	+	+	+	-	+	-
	Amaranthaceae											
50	<i>Amaranthus retroflexus</i> L.	Annual	Herb	Abundant	Unknown	-	+	-	-	-	-	-
	Iridaceae											
51	<i>Iris tenuifolia</i> Pall	Perennial	Herb	Abundant	Medicinal and forage plant	+	+	+	+	-	-	+
	Chenopodiaceae											
52	<i>Chenopodium album</i>	Annual	Herb	Abundant	Medicinal and forage plant	+	+	-	-	-	-	+
	Caryophyllacea											
53	<i>Stelleria dichotoma</i>	Perennial	Herb	Abundant	Medicinal and forage plant	+	+	+	+	+	+	-
54	<i>Sillene repens</i> Patrín	Perennial	Herb	Abundant	Medicinal and forage plant	+	-	+	+	-	+	-

No.	Species name	Age	Life form	Status	Usage	Along the Murun river	Arable land			Cattle feedlot	Homestead	Old camp
							Field 1	Field 2	Field 3			
55	<i>Atriplex sibirica</i> L.	Perennial	Herb	Abundant	Unknown	-	+	-	-	-	-	-
	Thymelaeaceae											
56	<i>Stellera chamaejasme</i>	Perennial	Herb	Abundant	Medicinal and forage plant	-	+	-	+	-	-	-

List of plant species identified in the October 2023 survey

No.	Species name	Age	Life form	Status	Usage	Along the Murun river	Arable land			Cattle feedlot	Homestead	Old camp
							Field 1	Field 2	Field 3			
	<u>Euphorbiaceae</u>											
1	<i>Euphorbia esula</i> L.	Perennial	Herb	Abundant	Medicinal and forage plant	-	+	+	+	+	-	-
	Fabaceae											
2	<i>Astragalus brevifolius</i> Ledeb.	Perennial	Herb	Abundant	Unknown	+	+	-	-	+	-	-
3	<i>Astragalus galactites</i> Pall.	Perennial	Herb	Abundant	Poisonous plant	-	-	+	+	-	-	-
4	<i>Caragana pygmaeae</i> DC.	Perennial	Shrub	Abundant	Forage plant	+	+	+	+	-	+	-
5	<i>Caragana microphylla</i> DC.	Perennial	Shrub	Abundant	Forage plant	+	+	+	+	+	-	-
6	<i>Medicago ruthenica</i> L.	Perennial	Herb	Abundant	Forage plant	-	-	-	+	-	-	+
7	<i>Thermopsis dahurica</i> Czefr.	Perennial	Herb	Abundant	Medicinal and forage plant	-	-	-	+	-	-	-
	Rosaceae											
8	<i>Chamaerhodos erecta</i> Bunge.	Annual	Herb	Abundant	Medicinal and forage plant	+	-	+	+	+	-	-
9	<i>Potentilla bifurca</i> L.	Perennial	Herb	Abundant	Medicinal and forage plant	+	+	+	-	-	-	-



No.	Species name	Age	Life form	Status	Usage	Along the Murun river	Arable land			Cattle feedlot	Homestead	Old camp
							Field 1	Field 2	Field 3			
10	<i>Potentilla sericea</i> L.	Perennial	Herb	Abundant	Medicinal and forage plant	+	-	-	-	-	-	-
11	<i>Potentilla tanacetifolia</i> Willd. Ex Schlecht	Perennial	Herb	Abundant	Medicinal and forage plant	+	+	+	+	+	+	+
12	<i>Potentilla acaulis</i>	Perennial	Herb	Abundant	Medicinal and forage plant	-	-	+	+	-	-	-
13	<i>Potentilla anserina</i>	Perennial	Herb	Abundant	Medicinal and forage plant	+	+	+	+	-	-	+
14	<i>Sibbaldia adpressa</i> Bunge	Perennial	Herb	Abundant	Forage plant	+	-	-	-	-	-	-
15	<i>Sanguisirba officinale</i> L.	Perennial	Herb	Abundant	Medicinal and forage plant	+	-	-	-	-	-	-
Brassicaceae												
16	<i>Dontostemon integrifolius</i> C.A.Mey	Perennial	Herb	Abundant	Medicinal and forage plant	+	+	+	+	+	-	-
Rutaceae												
17	<i>Haplophyllum dauricum</i> G.Don	Annual	Herb	Abundant, relict	Medicinal, tea and forage plant	+	-	+	-	+	-	-
Plantaginaceae												
18	<i>Plantago depressa</i> Willd	Perennial	Herb	Abundant	Medicinal and forage plant	+	-	+	+	-	-	-
Lamiaceae												
19	<i>Cymbaria daurica</i> L.	Perennial	Herb	Abundant	Medicinal and forage plant	-	+	-	+	+	-	-
20	<i>Thymus gobicus</i> Czern	Perennial	Herb	Abundant	Medicinal and cosmetics plant	+	+	-	-	-	-	-
Convolvulaceae												

No.	Species name	Age	Life form	Status	Usage	Along the Murun river	Arable land			Cattle feedlot	Homestead	Old camp
							Field 1	Field 2	Field 3			
21	<i>Convolvulus ammanii</i> Desr.	Perennial	Herb	Abundant	Medicinal plant	-	+	-	+	-	-	-
22	<i>Convolvulus arvensis</i>	Perennial	Herb	Abundant	Medicinal and forage plant	-	+	-	-	-	-	-
Asteraceae												
23	<i>Artemisia scorpioides</i> Waldst, Kitam	Perennial	Herb	Abundant	Medicinal and forage plant	+	+	+	+	+	+	+
24	<i>Artemisia frigida</i> Willd.	Perennial	Herb	Abundant	Forage plant	+	+	+	+	+	+	+
25	<i>Artemisia adamsii</i> Bess.	Perennial	Herb			+	+	+	+	+	+	+
26	<i>Heteropappus hispidus</i> Novopokr	Perennial	Herb	Abundant	Melliferous and forage plant	-	-	+	-	-	-	-
27	<i>Lactuca tatarica</i> (L.) C.A.Mey.	Perennial	Herb	Abundant	Medicinal and forage plant	+	-	-	-	-	-	-
28	<i>Saussurea amara</i> (L.) DC.	Perennial	Herb	Abundant	Forage plant	-	+	-	-	-	-	-
29	<i>Serratula centauroides</i> L.	Perennial	Herb	Abundant	Medicinal, melliferous and forage plant	-	+	-	+	-	-	-
30	<i>Taraxacum officinale</i> G.H. Weber ex Wiggers.	Perennial	Herb	Abundant	Medicinal, melliferous and forage plant	+	-	-	+	-	-	+
Lilaceae												
31	<i>Allium anisopodium</i> Lbd.	Perennial	Herb	Abundant	Food and forage plant	-	+	+	-	-	-	-
32	<i>Allium polyrhizum</i> Turcz. Ex Regel	Perennial	Herb	Abundant	Food and forage plant	-	+	+	+	+	+	-
33	<i>Asparagus dahuricus</i> Fisch. Ex Link	Perennial	Herb	Abundant	Medicinal and forage plant	-	+	+	+	-	-	-

No.	Species name	Age	Life form	Status	Usage	Along the Murun river	Arable land			Cattle feedlot	Homestead	Old camp
							Field 1	Field 2	Field 3			
	Cyperaceae											
34	<i>Carex duriuscula</i> C.A.Mey	Perennial	Herb	Abundant	Forage plant	+	+	+	+	+	+	+
	Poaceae											
35	<i>Achnatherum splendens</i> (Trin.) Nevski	Perennial	Herb	Abundant	Forage plant	+	+	+	+	+	-	-
36	<i>Agropyron cristatum</i> (L.) Gaertner	Perennial	Herb	Abundant	Forage plant	+	+	+	+	+	+	-
37	<i>Cleistogenes squarrosa</i> (Trin.) Keng	Perennial	Herb	Abundant	Forage plant	+	+	+	+	+	+	+
38	<i>Leymus chinensis</i> (Trin.) Tzvelev	Annual	Herb	Abundant	Forage plant	+	+	+	+	+	+	+
39	<i>Poa attenuata</i> Trin.	Perennial	Herb	Abundant	Forage plant	+	-	-	-	-	-	-
40	<i>Setaria viridis</i> (L.) P.Beauv.	Annual	Herb	Abundant	Medicinal and forage plant	-	-	+	-	-	-	-
41	<i>Stipa glareosa</i> (P.A.Smirn.) Tzvelev	Perennial	Herb	Abundant	Forage plant	+	+	+	-	+	-	+
42	<i>Stipa krylovii</i> Roshev.	Perennial	Herb	Abundant	Forage plant	+	+	+	+	+	+	+
43	<i>Festuca sibirica</i> Hack. ex Boiss.	Perennial	Herb	Abundant	Forage plant	+	+	+	+	-	-	-
44	<i>Eragrostis minor</i> Host	Annual	Herb	Abundant	Forage plant	-	-	+	-	-	-	-
	Ranunculaceae											
45	<i>Thalictrum squarrosum</i> Stephan ex Willd	Perennial	Herb	Abundant	Medicinal and forage plant	-	+	-	-	-	-	-
46	<i>Halerpestes salsuginosa</i> (Pall. Ex Georgi) Greene.	Perennial	Herb	Abundant	Medicinal and forage plant	+	-	-	-	-	-	-
	Polygonaceae											

No.	Species name	Age	Life form	Status	Usage	Along the Murun river	Arable land			Cattle feedlot	Homestead	Old camp
							Field 1	Field 2	Field 3			
47	<i>Polygonum divaricatum</i> L.	Perennial	Herb	Abundant	Medicinal and forage plant	-	+	+	+	-	+	-
48	<i>Rheum undulatum</i> L.	Perennial	Herb	Abundant	Medicinal and forage plant	-	-	-	+	+	-	-
Iridaceae												
49	<i>Iris tenuifolia</i> Pall.	Perennial	Herb	Abundant	Medicinal and forage plant	+	+	+	+	-	-	-
50	<i>Iris lactea</i> Pall.	Perennial	Herb	Abundant	Medicinal and forage plant	+	-	-	+	-	-	-
Chenopodiaceae												
51	<i>Chenopodium album</i> L.	Annual	Herb	Abundant	Medicinal and forage plant	+	-	-	-	-	-	-
Caryophyllacea												
52	<i>Stellaria dichotoma</i> L.	Perennial	Herb	Abundant	Medicinal and forage plant	-	-	+	+	-	+	-
53	<i>Sillene repens</i> Patrin	Perennial	Herb	Abundant	Medicinal and forage plant	-	-	+	+	+	-	-
Thymelaeaceae												
54	<i>Stellera chamaejasme</i> L.	Perennial	Herb	Abundant	Medicinal and forage plant	-	+	-	+	-	-	-

List of bird species identified in the June 2023 survey

No.	Latin name	English name	Arable land			Cattle feedlot	Old camp	Homestead	Along the Muru n river	Along the Dam	Total number	IUCN Red List status	
			Field 1	Field 2	Field 3							Regionally	Global
1	<i>Buteo hemilasius</i>	Upland Buzzard	+	+	+	-	-	-	+	-	5	LC	LC
2	<i>Buteo rufinus</i>	long-legged Buzzard		+	-	-	-	-	-	-	1	LC	LC
3	<i>Syrrhaptes paradoxus</i>	Pallas's Sandgrouse	+	+		-	-	-	-	-	9	LC	LC
4	<i>Anthropoides virgo</i>	Demoiselle Crane	+	+	+	-	-	-	+	+	12	LC	LC
5	<i>Melanocorypha mongolica</i>	Mongolian Lark	+	+	+	-	-	-	+	+	401	LC	LC
6	<i>Aegypius monachus</i>	Cinereous Vulture		+	+	-	-	-	-	-	4	LC	NT
7	<i>Falco amurensis</i>	Amur falcon	+	-	-	-	-	-	-	-	1	LC	LC
8	<i>Falco peregrinus</i>	Peregrine Falcon	-	+	-	-	-	-	-	-	2	LC	LC
9	<i>Sterna hirundo</i>	Common tern	-	-	-	-	-	+	+	+	12	LC	LC
10	<i>Mareca strepera</i>	Gadwall	-	-	-	-	-	-	+	-	2	LC	LC
11	<i>Spatula clypeata</i>	Northern Shoveler	-	-	-	-	-	-	+	-	1	LC	LC
12	<i>Tringa ochropus</i>	Green Sandpiper	-	-	-	-	-	+	+	+	15	LC	LC
13	<i>Actitis hypoleucos</i>	Common Sandpiper	-	-	-	-	-	+	+	+	6	LC	LC
14	<i>Eremophila alpestris</i>	Horned lark	+	+	+	+	-	-	+	+	407	LC	LC
15	<i>Calandrella branchydactyla</i>	Greater Short-toed Lark	+	+	+	-	-	-	+	+	405	LC	LC
16	<i>Alaudala cheleensis</i>	Asian short-toed Lark	-	-	-	-	-	-	-	-	0	LC	LC
17	<i>Streptopelia decaocto</i>	Eurasian Collared-dove	-	-	-	-	-	+	-	-	1	LC	LC
18	<i>Aquila nipalensis</i>	Steppe Eagle	-	-	+	-	-		-	-	2	LC	LC
19	<i>Tadorna tadorna</i>	Common Shelduck	-	-	-	-	-	+	+	-	8	LC	LC
20	<i>Tadorna ferruginea</i>	Ruddy Shelduck	-	-	-	-	-	-	+	+	8	LC	LC
21	<i>Ardea cinerea</i>	Grey Heron	-	-	-	-	-	-	+	-	1	LC	LC
22	<i>Passer montanus</i>	Eurasian Tree sparrow	+	+	+	+		+	+	+	326	LC	LC
23	<i>Passer domesticus</i>	House sparrow	+	+	+	+	+	+	+	+	334	LC	LC
24	<i>Petronia petronia</i>	Rock Sparrow	+	+	-	+	-	-	-	-	20	LC	LC
25	<i>Motacilla alba</i>	White wagtail	-	-	-	-	+	+	-	-	2	LC	LC
26	<i>Anas platyrhynchos</i>	Mallard	-	-	-	-	-	-	+	-	2	LC	LC
27	<i>Columba Livia</i>	Rock Dove	-	-	-	+	+	+	-	-	15	LC	LC

No.	Latin name	English name	Arable land			Cattle feedlot	Old camp	Homestead	Along the Murun river	Along the Dam	Total number	IUCN Red List status	
			Field 1	Field 2	Field 3							Regionally	Globally
28	<i>Apus apus</i>	Common swift	-	-	-	-	+	-	-	-	1	LC	LC
29	<i>Cuculus canorus</i>	Common cuckoo	-	-	-	-	-	-	-	-	1	LC	LC
30	<i>Charadrius dubius</i>	Little ringed plover	-	-	-	-	-	+	+	-	4	LC	LC
31	<i>Vanellus vanellus</i>	Northern Lapwing	-	-	-	-	-	-	-	-	1	NT	LC
32	<i>Milvus migrans</i>	Black kite	+	+	+	+	-	+	-	-	6	LC	LC
33	<i>Pyrhcorax pyrrhcorax</i>	Red-billed Chough	-	-	-	-	-	-	-	+	25	LC	LC
34	<i>Corvus corax</i>	Common raven	+	+	-	-	-	-	-	-	8	LC	LC
35	<i>Corvus corone</i>	Carrion crow	-	-	+	-	-	-	-	-	1	LC	LC
36	<i>Hirundo rustica</i>	Barn Swallow	-	-	-	+	+	+	-	-	29	LC	LC
37	<i>Emberiza pallasi</i>	Pallas's bunting	+	-	-	-	-	-	-	-	1	LC	LC
38	<i>Oenanthe Oenanthe</i>	Northern Wheatear	+	+	+	+	-	-	-	+	17	LC	LC
39	<i>Oenanthe isabellina</i>	Isabelline Wheatear	-	-	-	+	-	-	+	-	6	LC	LC
40	<i>Emberiza cioides</i>	Meadow Bunting	-	-	-	-	-	-	-	+	1	LC	LC
41	<i>Aquila chrysaetos</i>	Golden Eagle	-	-	+	-	-	-	-	-	1	LC	LC

List of bird species identified in the October 2023 survey

No.	Latin name	English name	Arable land			Cattle feedlot	Old camp	Homestead	Along the Murun river	Along the Dam	Total number	IUCN Red List status	
			Field 1	Field 2	Field 3							Regionally	Globally
1	<i>Buteo hemilasius</i>	Upland Buzzard	+	+	+	-	-	-	+	-	18	LC	LC
2	<i>Buteo buteo</i>	Common buzzard		+	-	-	-	-	-	-	1	LC	LC
3	<i>Heliaetus leucoryphus</i>	Pallas's fish-eagle	+	+		-	-	-	-	-	1	LC	LC
4	<i>Ciconia nigra</i>	Black stork	+	+	+	-	-	-	+	+	2	LC	LC
5	<i>Melanocorypha mongolica</i>	Mongolian Lark	+	+	+	-	+	-	+	+	401	LC	LC
6	<i>Aegypius monachus</i>	Cinereous Vulture		+	+	-	-	-	-	-	41	LC	NT
7	<i>Falco sp</i>	Kesptel sp	+	-	-	-	-	-	-	-	1		
8	<i>Falco cherrug</i>	Saker Falcon	-	+	-	-	-	-	-	-	2	VU	EN
8	<i>Eremophila alpestris</i>	Horned lark	+	+	+	+	-	-	+	+	170	LC	LC
9	<i>Sitta european</i>	Eurasian nuthatch	+	+	+	-	-	-	+	+	1	LC	LC

No.	Latin name	English name	Arable land			Cattle feedlot	Old camp	Homestead	Along the Murun river	Along the Dam	Total number	IUCN Red List status	
			Field 1	Field 2	Field 3							Regionally	Globally
10	<i>Alauda arvensis</i>	Eurasian Skylark	-	-	-	-	+	-	-	-	15	LC	LC
11	<i>Streptopelia decaocto</i>	Eurasian Collared-dove	-	+	-	-	-	-	-	-	7	LC	LC
12	<i>Periparus ater</i>	Coal tit	-	+	-	+	-	-	-	-	4	LC	LC
13	<i>Aegithalos caudatus</i>	Long tailed tit	-	-	-	-	-	+	+	-	7	LC	LC
14	<i>Tadorna ferruginea</i>	Ruddy Shelduck	-	-	-	-	-	-	+	+	2	LC	LC
15	<i>Phoenicurus aureus</i>	Daurian redstart	-	-	-	-	-	-	+	-	1	LC	LC
16	<i>Passer montanus</i>	Eurasian Tree sparrow	-	+	+	+	-	+	+	+	326	LC	LC
17	<i>Passer domesticus</i>	House sparrow	+	+	+	+	+	+	+	+	13	LC	LC
18	<i>Petronia petronia</i>	Rock Sparrow	-	-	+	-	-	-	-	-	1	LC	LC
19	<i>Motacilla alba</i>	White wagtail	-	-	-	-	-	+	-	-	2	LC	LC
20	<i>Motacilla cinerea</i>	Gray wagtail	-	-	-	-	-	-	+	-	7	LC	LC
21	<i>Columba rupestris</i>	Hill pigeon	-	-	-	-	+	+	-	-	30	LC	LC
22	<i>Montifringilla davidiana</i>	Pere David's snowfinch	-	-	-	-	+	-	-	-	13	LC	LC
23	<i>Pyrrhocorax pyrrhocorax</i>	Red-billed Chough	-	-	+	-	-	-	-	-	3	LC	LC
24	<i>Corvus corax</i>	Common raven	+	+	+	-	-	-	-	-	30	LC	LC
25	<i>Hirundo rustica</i>	Barn Swallow	-	-	-	-	-	+	-	-	1	LC	LC
26	<i>Emberiza pusilla</i>	Little bunting	+	-	-	-	-	-	-	-	57	LC	LC
27	<i>Circus cyaneus</i>	Hen harrier	-	-	-	-	-	-	-	+	7	LC	LC
28	<i>Aquila chrysaetos</i>	Golden Eagle	-	-	+	-	-	-	+	-	2	LC	LC



## Appendix F - Site Visit Itinerary

Date	Time	Activities	Topics	Location	Participants
30/05/2023	10AM – 13:00 PM	Discussion with Metagro team	Project meeting	Metagro Office, F8, Central Park building, Chinggis Avenue Street, Recreation Center, Sukhbaatar District-1, Ulaanbaatar Mongolia	<b>IFC:</b> Louis-Pilippe Mousseau
					<b>Earth Active:</b> Guy Reed, Sylvie Charland, Enhtulga Tumurbaatar, Ian Leach, Tserenkhand Gurbadam
					<b>Metagro team:</b> Munkhtur.T(CEO), Munkhbat.Sh(COO), Solongo.B(COS), Munkh-Od.D(CFO), Altanbadralt.Sh(Arable farm), Orgil.B(Cattle and Pig farm), Onolbaatar.B(Cattle farm), Mendsaikhan.D(Project management), Zoljargal.U(Finance), Byambasuren.S(HR)
	13-2:00 PM	Lunch		Veranda Restaurant	Metagro and Earth Active team
	2:00 PM	Meeting with The Ministry of Food, Agriculture and Light Industry of Mongolia	Operations and Permit	Монгол улс, Улаанбаатар хот 13381, Баянзүрх дүүрэг, Энхтайваны өргөн чөлөө 16а, Засгийн газрын IXа байр	Earth Active team, Metagro team (Gerelt-Od ESG, Altanzaya.B Public relation, Battogtokh Business development, Zoljargal.U Finance)
					Representatives from: - Crop-farming Policy Implementation and Coordination Department, - Livestock Policy Implementation and Coordination Department, - Food Production Policy Implementation and

Date	Time	Activities	Topics	Location	Participants
					Coordination Department, - Livestock Genetic And Resource Division.
	4:00 PM	Meetings with WWF, WCS, The Nature Conservancy	Biodiversity	Metagro Office, F8, Central Park building, Chinggis Avenue Street, Recreation Center, Sukhbaatar District-1, Ulaanbaatar Mongolia	Earth Active team, Metagro team(Gerelt-Od ESG, Altanzaya.B Public relation, Battogtokh Business development, Zoljargal.U Finance), Representatives from WWF, WCS, The Nature Conservancy
	18:00 PM	Dinner		Hazara Restaurants - Indian cuisine	Earth Active team, Metagro team
31/05/2023	9:00 AM	The Ministry of Environment and Tourism	Operations	Улаанбаатар хот, Хан-Уул дүүрэг, 4-р хороо, Арцатын 624, Байгаль орчны шинжилгээ, судалгааны төв УТҮГ-ын байр	Earth Active team, Metagro team(Gerelt-Od ESG, Altanzaya.B Public relation, Zoljargal.U Finance)
					Representatives from: -Department of Natural Resources Policy Implementation and Coordination Department
	11:00 PM	Water authorities	Water	Чингүнжавын гудамж, 2 дугаар хороо, Баянгол дүүрэг, Улаабаатар хот , 16050	Earth Active team, Metagro team(Gerelt-Od ESG, Altanzaya.B Public relation, Zoljargal.U Finance, Mendsaikhan.D Project management, Sainzaya.U Project management)
					Representatives from: -Department of Natural Resources Policy Implementation and Coordination Department
	12:30 PM	Baranchuluun	Surface water study	Metagro Office	Earth Active team, Metagro team

Date	Time	Activities	Topics	Location	Participants
	13:00 PM	Lunch		Chinese restaurant, Bayangol district	Earth Active team, Metagro team
	15:00 PM	Supply chain visit	Trust trade LLC – Metagro’s service provider for Meat processing, Deboning and Packaging	Nalaikh District	Earth Active team, Metagro team(Ganzorig.S Sales, Zoljargal.U Finance, Altanzaya.B Public relation)
	18:00 PM		Dinner	Shangri-La Naadam	
04/06/2023	~1700hrs	Earth Active team arrive Homestead			Earth Active Team
	1700-2000	Informal site familiarisation & dinner			Earth Active Team
05/06/2023	0700hrs	Breakfast			Earth Active Team
	0730hrs	2.5 hour site tour			Earth Active Team
	1000hrs	Depart for Chinggis to rendezvous with Metagro / IFC team			Earth Active Team

Date	Time	Activities	Topics	Location	Participants
05/06/2023	7:00 AM	Departs to Khentii		Metagro Office	IFC, Metagro team(Munkhtur.T CEO,Orgil.B Cattle and Pig farm, Altanbadralt.Sh Arable farm, Onolbaatar.B Cattle farm, Munkhbat.Sh COO, Mednsaikhan.D Project management, Byambasuren.S HR, Zoljargal.U Finance, Altanzaya.B Public relation)
	11:00 AM	Meeting with Khentii aimag		Khentii aimag Governer	IFC, Earth Active team, Metagro team
					Representatives from: -Khentii aimag Governer -Khentii aimag Environment, Tourism department -Khentii aimag Agriculture department -Khentii aimag Kherlen Basin authority -Khentii aimag, Land Authority
	1:00 PM	Lunch		KH restaurant	
	2:00 PM	Meeting with Museum	Culture Heritage	Khentii aimag, Setsen Khan Ordon Museum	IFC, Earth Active team, Metagro team
					Setsen Khan Ordon Museum Director Women Representatives from Khentii aimag
		Additional meetings in Chinggis - including Livestock Supply Chain [detailed feedback to follow]			

Date	Time	Activities	Topics	Location	Participants
	4:00 PM	Dinner		Khanburged Restaurant	
06/06/2023	10:00 AM	Meetings with Ulziit vilage	Interviews with Local community	Ulziit village	Ulziit Village Governors Ulziit Village People
	2:00 PM	Meetings with Herders		Metagro Garden camp	IFC, Earth Active team, Metagro team
	Full day	Site inspection		Metagro - Homestead, Feedlot, Arable lands	IFC, Earth Active team, Metagro team
6June / 7June		Additional visits & meetings (based on observations from Site Inspection) - likely including downstream water users, Moron village, local downstream coal mine			
07/06/2023	1600hrs	Feedback & Next Steps meeting (~1.5hrs)			IFC, Earth Active team, Metagro team
08/06/2023	11:00 AM	Departs to Ulaanbaatar			

## Appendix G - Meeting Minutes

### WCS

NAME	AFFILIATION
Ankhaa	TNC
Tuguldur	WCS
Guy Reed	EA
Enhtulga	EcoTrend
Zoljargal	MetAgro
Salnzaya	MetAgro

ISSUES DISCUSSED
Wild Ass were poached during COVID - traditional medicine suggested Wild Ass lungs are good for human lungs
TNC focuses on how economic activities affect the environment and protect ecologically important areas - 213 areas have been studied to date
Agree on these areas? - already covered in policy documents, assessment of environmental sensitivity of proposed areas
Planting trees in the greenhouse, good practice - 3 greenhouses already built at pilot scale, more built after policy becomes clear (30 million tree seedlings)
NGO participation? - WCS is not involved, doubt about suitability of planting trees in the steppe.
Sensitivity of the area? Mongolian gazelle movement - antelope/gazelle found dead due to improper fencing/barbed wire - MetAgro has no barbed wire on fence
5 important ecological sites
Ecosystem and Landscape - subject to corridor for movement of wild animals, state protected area (Khurkh and Khuiten Valley), corridor/strip area mapped in report, project areas is located between important areas
NGO and scientists propose to the Ministry of Environment and Tourism (MET) → Parliament → enacts relevant legal document
Plan that 30% of Mongolian territory will be designated SPA by 2030 - currently 21%
Map showing designation of SPAs and future plan for SPA (unsure where map is)
Pink - proposed area for mining tender
Orange - mine
Blue - mining exploration
Mitigation measures in place? - offset can be considered if it is required - IFC publicly discloses report
Mongolian EIA law - mining companies implement offset programs - energy production and agricultural activities impact the environment - residual impact offset elsewhere
Proposed plan for 2 seasons of biodiversity - ask TNC&WCS if they have suggestions
Check Bird Conservation Center, Wildlife Science and Conservation Center - Ramsar sites/IBA
WCS is supportive of MCS's proposed agricultural business - small companies couldn't do that in a responsible manner

### Berkh-Uul Mine

PARTICIPANTS		
NAME	AFFILIATION	INITIALS
Ganchuluun	A director of the mine	GA
Guy Reed	EA	GR

Enhtulga.T	Ecotrend	ET
Tugssaikhan	MetAgro community relations officer	TU

ISSUES DISCUSSED
Operation history of the Berkh Uul Mine - operating since 1965, operation suspended for 10 years, back in operation 1996.
Who the mine supplies coal to - customers of all soums of Khentii province and western soums of Sukhbaatar province.
Number of employees and residence - ~30 employees, all local to surrounding provinces
Issues with employees - stealing from mine so prefer to hire external people
Mine discharges groundwater from open pit since Dec 22 - pit is 50m x 50m x 6m deep
Mine operation - Oct to March due to demand
GA heard about MetAgro's project - impressed by the project
Other mine information - currently stripping oil, waiting for outstanding payment of 400 mil MNT from customers
Mine director tel number: 88047232, email: batmunkhganchuluun@gmail.com

## Herders

ISSUES DISCUSSED
Lost many animals during last heavy snow storm; min 100 head of livestock – loss by herders; some herders lost new born baby animals in this storm as well as female animals; many goats had miscarriage
Herders sell their animals to aimag (market) all year round
If animal price at Khentii aimag market is high, herders will sell locally
At first herders were opposed to new development since they were afraid of perceived mining project; but later they were supportive (in favour agriculture and farming project); they have expectations to get hay/fodder
Main issue faces by herders- lack of good pasture; land competition between traditional herders and agriculturalists
Quality of pasture is deteriorated a lot; poor output; grass quality is bad, no rotation of pasture land by herders; pasture is overgrazed
Average price for 3 yrs. old male cattle is 1.5 mln.MNT; 2 mln. MNT for a female cattle (with no calf); average price for 2 yrs. cattle=1 mln. MNT – herders sell at theses price beef during late autumn when traditionally Mongolians who live in cities buy meat in bulk to eat during winter and early spring.
During these group meeting herders were interested in cattle purchase price by Metagro; if price is competitive (not less than market price), herders are interested in selling to Metagro
Metagro announced that they will implement artificial insemination project; this new project will start end June/early July; Metagro is going to consult with interested herders; in this case, interested herders will need to sign a contract with Metagro

## Khentii Aimag Administration

PARTICIPANTS		
NAME	AFFILIATION	INITIALS
Mr Munkh-Erdene	Head of Development Policy Planning and Investment Division, Khentii Aimag Governor's Office Environment and Tourism Agency of Khentii Aimag	ME
Ms Nandinsetseg	Head of Kherlen River Basin Authority	NA
Mr Sundui/Sungee	Head of Land Relations and City Planning Agency of Khentii Aimag	SU

Mr Manaljav	Geology and Mining Inspector	MA
Mr Gantumur	Food and Agricultural Agency	GA
Oyun-Erdene	Specialist, Land Relations and City Planning Agency	OE
Ms Ariunchimeg	Specialist, Agricultural Policy	AR
Louis Phillipe	IFC	LP
Munkhbat	COO, MetArgo	MU
Guy Reed	EA	GR
Zoljaral	Financial Analyst, MetArgo	ZO
Enkhtulga		EN

ISSUES DISCUSSED	WHO
The province is working to support the growth of domestic products and food production (ME)	ME
Permissions (GR) - RBA representatives visited the site, water use contracts have not been signed by relevant authorities yet, MetAgro has made the request (NA)	GR NA
Annual report/requirements/water use monitoring & reports (LP) - GEIA was issued to MetArgo, 2022 EMP approved, implementation report for EMP has been fulfilled, 2023 EMP in approval stage (ME)	LP ME
MetArgo's wells in the nation-wide groundwater monitoring network (EN) - Kherlen RBA has no budget for installing loggers, possible that project proponent could install water level loggers themselves and share info (NA)	EN NA
PS-1-8 E&S report - Mongolia have legislation regulating the relations, what local assesment and support will be provided? (LP) - Environment and Tourism Office, general environemntal impact assessment was conducted on a cattl farm, EMP should have been confirmed in Q1, running behind legal requirement (ME)	LP ME
Undurkhaan SPA approved? Significance of River Murun? Importance of downstream? (GR) - 2012 approved by Parliament, Undurkhaan mountain designated nature reserve for habitat of wild sheep, deer and worship value - Murun river flows in Kherlen river, Murun river has special (50m) and ordinary (200m) protection zones (ME)	GR ME
Expand SPA area? (GR) - no plan to expand, no survey conducted for that purpose (ME)	GR ME
Worried about -ve impact of agricultural activities in close proximity to SPA (GR) - Land permits issued to MetAgro, complained about local government agencies slow speed of issuing permissions - wooden house construction, no land permit for silage area, standard of fence (SU)	GR SU
Earth moving activities/storage lake (GR) - aggregate use inspected, used illegalls and topsoil dumped incorrectly (MA)	GR MA
How often are inspections done? (GR) - planned and unplanned	GR MA
Development policy - Help and support provided after emergency, Government of Mongolia aiming to promote self-sustaining provinces (not dependent on state budget subsidies), permission will be granted is required materials are submitted, province fully support the project, company security checked (very good), MCS directors visit every fortnight, the budget (7-10 billion MNT) is approved by Provincial Assembly, focuses on infrastructure development (ME)	ME
Financed by the provincial fund? Cultural centre being bult with state budget funds? (GR) - road built from Murun to Ulziit, 2024 MetAgro with use the road, a system of 10 is implemented in Khentii province, Bayan-Ovoo soum became the best soum in the country, Herders work cooperatively, cooperativesare rewarded with 100-200 mil MNT total, herders supply their meat directly to market, Department of Food and Agriculture working together with them, herdmen workshop held regularly. (ME)	GR ME



5000 cattles at a time and 20000 cattles a year - not easy to improve the breed and buy from breeders (MU)	MU
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## KII 1 Metagro HQ

PARTICIPANTS		
NAME	AFFILIATION	INITIALS
Turmandakh Tumurbat	Project Coordinator	TT
Mon Vegi	Executive Director of Mongolian Farmers Association for Rural Development (MFARD) - NGO	MV

ISSUES DISCUSSED
MFARD information - established 2004, 1500 member farmers, branches in 36 soums, farmers mostly grow potatoes and vegetables
Mongol Potato Programme - implemented 2004-2015 in 3 stages, 2004 - 8000 ha (harvest 75-80 tons), 2022 - 20000 ha (harvest 216 tons)
MONVEGI project - implemented 2016-2023 Nov, 2015 - 7900 ha (harvest 76000 tons), 2022 - 12000 ha (harvest 146000 tons)
Challenge for farmers - crop sector is young, developed since 1959 - short growing season, key produce (cereals, wheat, barley)
Greenhouses not well developed - 2022 greenhouse production increased
Central Agricultural Region - at soum centers around 40% of vegetable growing farmers raise cows
Crop farmers fence small areas - 10-50 ha
Vegetable farmers use hand irrigation - potatoes, 60-70% non-irrigated
Other NGOs - National Farmer's Association of Mongolia, Mongolian National Association of Fruit and Berries

## KII 2

PARTICIPANTS		
NAME	AFFILIATION	INITIALS
Tsog Bayarsaikhan	Union Leader - Head of Khentii aimag Branch (National Farmers' Association of Mongolia (NGO)	TB

ISSUES DISCUSSED
The National Farmers' Association of Mongolia – has members in 20 aimags (out of 21 aimags); an umbrella organization; works at policy level; represents interests of its members; training; research; main counterpart – MOFALI
Developed a 5 yrs Strategic Plan in 2023
Has 8 member associations; and 20 branches (1 in each of 20 aimags)
Members are cooperatives
Farmers - commercial farmers (companies with mostly 40,000 ha, and Household based/individual farmers with small land, around 200ha)
Concerns by farmers - Taxes; limits to CSR
Conflicts - fencing, competition over land between herders and agricultural farmers
Tripartite agreement between Khentii aimag, crop farmers and herders about avoiding conflict arising from fencing crop land by providing green fodder to herders (200 bundles) every year - aimag administration is in charge of establishing disaster relief fund (hay and fodder) - 50% or 100 bundlers should be distributed to herders who signed the contract while the remaining 50% - to aimag fund; this fund is used during dzud to badly affected herders

In 2018, a procedure was approved by 3 ministers (MOFALI, Minister for Justice and Minister for finance) based on Law on agriculture, Law on breaches on how to estimate loss to harvest as a result of grazing animals on crop land; responsibilities for implementation of this procedure is opaque

The NGO's Branch in Khentii aimag and the Aimag Agri. agency will implement the agreement in 14 soums of the aimag, including Kherlen soum.

As per the Law on Land, allocation of land in agricultural areas is prohibited.

## KII 3

NAME	AFFILIATION
Ms Nyamsuren	Director of Setsen Khaan Palace Museum
Mr Baatartsogt	Director of Culture Department of the Aimag Cultural Agency
Mr Tugsjargal	Museum's Researcher

### ISSUES DISCUSSED

The Aimag Museum has a data base on CH

5km from MetAgro's old camp is a state protected area on the territory of Murun soum - called Salbar Uul

No protected cultural site in Ulziit village

Ethnic groups - Kazakh ethnic minority families live in Ulziit village; the aimag population around 76 thousand, of which 3-4% are *Kazakh*, some 20% are *Buriads*, there are also other ethnic groups like *Barag*, *Durvud*; Kazakh people live in Ulziit and Berkh villages; Buriads mostly live in *Binder*, *Batshireet* and *Dadal soums*, northern soums

Ethnographic study would be required

40 historical memorials

Gelen Staute - near Chinggis City, needs to be protected, tourist attraction

2 state protected areas - 13th century memorial - rock painting from the Kidan period in the Salbar Uul near Chandgana open pit coal mine, worshipped by locals

Other site is called Zadgai Bulag - square tombs, not registered in database

Contracted guards - local people that live close to heritage sites, look after artifacts

## KII 4

NAME	AFFILIATION
Ms Kherlenchuluun	Chairwoman, Khentii Aimag Citizen's Representatives Khural Working as Head of Women's Committee (past 3 yrs)

### ISSUES DISCUSSED

Participation of women in labor market - 49%; migration is not big/severe

Issues faced by women - employment, domestic violence, work and life balance; income

The only pre-kindergarten education organization in Mongolia is situated in Khentii aimag - 7 kindergartens; preschool children enrollment - 97%; school enrollment - 99%

Women are engaged in all types of employment, but they mostly work in SMEs, in household based businesses, in food production; in artisanal (hand made products) sectors

Administration's policy is to support those women to self-organize, set up cooperatives or groups

Women would be interested in the project's operations

Expectation - to support the administration to build a Women Development Center (e.g. family counseling)

## Murun Soum

PARTICIPANTS		
NAME	AFFILIATION	INITIALS
Guy Reed	EA	GR
Enhtulga.T	EcoTrend	ET
Altanbadralt	Dok	AT
Enkhmanlai	Dispatcher/Electrician	EN

ISSUES DISCUSSED
Background of Enkhmanlai - born and raised in Murun soum, joined company in May 22, received vocational electrician training at 'Chukhal amjilt' company, works between March and November
8-10 people from Murun soum work for MetAgro
Water tariff in Murun - 1L = 2 MNT, people buy water 2/3 times a week
Murum well - in operation for 15 years, water quality information not available
Other wells - one was built in 2026 and cost ~7 mil MNT (~50m deep), no water quality test done, 2-3 households have private wells

## Site Coordinator

PARTICIPANTS		
NAME	AFFILIATION	INITIALS
Mr Tugssaikhan	MetAgro	TU

ISSUES DISCUSSED
Used to work as vet, Since 1990s, the agricultural land was abandoned; the agri land was partially fenced, Pasture degradation
Project was introduced to soum Citizen Representatives' Khural (local government), He acts as the company liaison person in communications with local communities and herders, He gets any complaints from communities, There is 1 veterinary office, private, 30 Kazakh HHs in Ulziit village

## Ulziit Village Administration

PARTICIPANTS		
NAME	AFFILIATION	INITIALS
Mr Enkh-Erdene	Mayor of Ulziit Village	EE
Ms Battsetseg	Medical center	BA
Ms Gantsetseg	Accountant, Village Administration	GA
Amgalanmurun	Cultural Center	AM
Ms Ariuntsetseg	Head of Kindergarten	AR

ISSUES DISCUSSED	WHO	WHEN
Village Admin welcomed MetAgro as a national investor		
Citizens Representatives Khural discussed land permitting issue		
Company consults with herders		
Following heavy snow storm 19-20 May, the administration requested the Company to help with disaster follow up measures and they helped to dispose of carcasses (7,000)		
The company supports school, kindergarten (provided learning toys worth 3 mln. MNT in 2022-2023 academic year) and hospital as well as with waste disposal management		

The village administration have expectation of developing/having long-term cooperation, namely providing village residents with jobs, support with waste management; planting trees; and improving livelihoods (e.g. income of village small shops increased)		
Village population=1,089, 550 households; many herders live in 70km radius; PWD, women and elderly as vulnerable groups, with increasing mobile workforce hospital workload increases in 3 summer months, negotiation with company to help with healthcare services (e.g. visits to remotely located patients; first aid), 10 bed 2 story hospital was commissioned on 13 August 2021; well equipped with equipment, expressed a wish to setup a diagnostic center at village hospital since Metagro workforce go to soum center for medical checkups, 3 people from Ulziit village work at Metagro, also expressed a wish to build apartment/s for Metagro workforce at the village	BA	

## Ulziit Village

PARTICIPANTS		
NAME	AFFILIATION	INITIALS
Louis Phillipe	IFC	LP
Guy Reed	EA	GR
Enhtulga.T	EcoTrend	ET
Tserenkhand	IRIM	TS
Sylvie Charland	EA	SC
Zoljargal	MetAgro	ZO
Altanzaya	MetAgro	AL
Enkh-Erdene.M	Ulziit Village, Governor's office	EEM
Battseteg	Doctor, a Head of the Hospital	BA
Gantseteg	Accountant, Governor's Office	GA
Ariuntsetseg	Head of a Kindergarten	AR
Amgalan	Head of Cultural Centre	AM
Tugssaikhan	MetAgro Community Relations Officer	TU

ISSUES DISCUSSED	WHO
Cooperation between Ulziit Village and MetAgro - waste disposal of dead livestock caused by natural disaster (TU), donations and support (EEM), donated 3 million MNT toys to kindergarten (EEM), kindergarten employees work for MetAgro farm during summer (EEM)	EEM TU
MetAgro built a fence for the hospital (BA), the village is becoming well known (BA)	BA
Communicate over a Facebook chat to exchange information - usually with Tugssaikhan (BA)	BA
MetAgro organised a job fair on 26 Oct 22 - 10 people attend from Ulziit Village, should be advertised/announced better (BA)	BA
Impacts of the natural disaster - 63 households lost 13200 livestock, a family lost all 500 animals	EEM
Historical change in livestock numbers - in 1990 there were 10,000 animals, now local herders have 110,000 livestock.	EEM
Impacts of livestock on environment - pasture is overgrazed and degraded, Umnudelger soum has large number of livestock so herders move to village territory for better pasture.	EEM
Access to a private veterinary company by herders - Yes. Nomgon Sureg LLC - Veterinarian Purevsuren- 94824028	EEM

## Water Authority

PARTICIPANTS		
NAME	AFFILIATION	INITIALS
Guy Reed	EA	GR
Enhtulga Tumurbaatar	EcoTrend	ET
Zoljaral	MetArgo	ZO
Boldbaatar	Head of Water Resource Department	BO
Manguntuul	Specialist, Water Exploration and Survey	MA
Amartaivan	Specialist	AM

ISSUES DISCUSSED	WHO
Estimated 8 mill m <sup>3</sup> water needed for the project - assumed that wells would dry up and run out of water - sustainable water use is very important - the project will use water by building a dam, water sourced from surface and groundwater combined (GR)	GR
Detailed water reserve report will be developed (ZO)	ZO
Current resources can provide 50% of water demand, build a dam to use surface water, groundwater will be used to some extent, MetArgo will conduct a groundwater exploration (within 5-10km radius), groundwater reserves will be approved for future. (BO)	BO
The water demand for the project is high - can current sources provide? - The president of Mongolia is supporting food production projects - prelim study has been completed (MU)	MU
Final demand and supply survey hasn't been completed yet - the WA will support the project (BO)	BO
Groundwater Reserve of potential 7.26 l/s and probable 12 l/s is approved according to the regulation A/73 - conducted that groundwater reserve could be increased if more detailed survey conducted.	
Guarantee of investment in water supply of the project? - WA will support, large projects to be implemented in phases, animal husbandry/greenhouse etc to be done in detail during development stage	
Okhi Us prepared the report - Dr Tuvdendorj, reserve is approved with 7.26 l/s yield.	
IFC take the water issue seriously, to persuade IFC the client has sustainable water IFC hired someone - IFC didn't provide the report	
Magro and MetArgo will hire professional companies to conduct detailed surveys, cannot guarantee at this time - surveys will be conducted at appropriate times	
Currently water will be supplied from groundwater reserve, dam will be built, if water is not sufficient it can be sourced from the Kherlen River, considered possible to provide in moderation	
Examples of irrigation projects in Mongolia - some in Khangal region, varying in size, only 100 ha	
Any agri projects using groundwater for irrigation? - no big/benchmark projects, all small scale in Khentii, Bulgan and Selenge provinces, specialised in agriculture	
Water used by mines - quantity of water use is recorded	
BO comments: give all MoM to EA, give suggestions, get info on irrigated farms from Ministry of Agriculture, information related to water, updated information	
Sharing mining projects water information? - info on ground and surface water, water use data for the last 5 years (2019-2022)	
Water use is based on the approved reserves in Mongolia, define the reserve, possible amount of use determined (water dam/groundwater etc) - limitation as a resource-based project	
Agricultural University for research papers and information	

## Appendix H - List of Key References

### Documents Reviewed

Documents Reviewed
3 Years Safety Improvement Plan
50ha Cattle Feedlot construction word order
A register of grievance received
Accommodation management plan
Administration worker
Afforestation agreement - Khentii province
All workers safety training regisatration 2023
Analysis of the training materials and quality of training provided by Contractors
Arable farm preparation
Baganuur Land Documents
Cattle breeder's consultation 2023
Chandgana state farm history
Chemical safety procedure
Chemical safety training
Chemical training
Chemicals List Metagro
Chemicals MSDS
Community Health and Safety Management Plan
Compliance assessment 2022
Compliance assessment 2023
Contract draft of supplier
Contractor Safety Evaluation Form
Contractor Safety Inspection Form
Contractor saftey Prequalifcation Form
Contractors daily workflow - safety
Contractors evaluation template
Contractors incident logs
Contractors workflow
Cooperation agreement - Khentii Province
Cooperation agreement - Ulziit village
Coopereation agreement - Khentii province
Crop farmers consultation 2023
CTM Land Contract
Current land certificates
DEIAs for Cattle Feedlot, Homstead and Arable Farming
Detailed designs for the different site components
Emergency contact list
Emergency preparedness plan
Environmental Management Plan 2021
ESHS Plan 2023
Evaluation Form Safety Cards
Fire safety policy
First aid training material - new worker
GEIA assessments ofr homestead, cattle feedlot and arable land

Documents Reviewed
General description of process for managing grievances and incidents
Grievance mechanism
Harvest
Homestead work order
HS breaches log 2022-2023
HS incident logs
HS Procedures
HS Reports for 2022 and 2023
HS Site Inspection - Construction
HSE - work permit issuance policy for hot work
HSE Action Plan 2023
HSE agreement - New construction LLC
HSE Daily Reports May and June 2023
HSE Management System
HSE Monthly Reports
HSE procedure for contractors
HSE Training Report 2022
HSE Training Report 2023
HSE Weekly Reports
Hydrology Study
Incident and accident logs
Inspections
Job Description - Environment Officer
Job Description - HSE Senior Specialist
Job Description - HSE Specialist
Job fair 2023
Key labour force policies
Key local stakeholders considered vulnerable
Land Acquisition Loan
Land History
List of key stakeholders
Local community meetings
MA Orgchart
M-Agro EHS new organogram
Major accident and disaster recovery response plan - plus incident log
Management Plan 2022
Management Plan 2023
MCS - General conditions of tender
MCS - Suppliers Portal
MCS Group Anti-corruption procedure
MCS Group Anti-money laundry procedure
MCS Group Compliance Policy
MCS Group Political contribution procedure
MCS Legal Updates
MCS Procurement Policy
MCS Sustainability Report 2021
MCS Tender Policy
MCS Workers Grievance Policy - Process

Documents Reviewed
MCS Workers Grievance Policy - Speak Out Policy 2019
Meat processing plant - waste water treatment plant selection material
Meat processing plant tender selection material - Trust trade LLC
Metagro - Control of Contractor
Metagro Code of Ethics
Metagro contamination containment plan
Metagro ESG Policy
Metagro ESMP
Metagro HSE FDA 2022
Metagro OSH Policy
Metagro Stakeholder List
Metagro Surface Water Study
Ministry of Food and Agriculture, Light Industry of Mongolia Information
NDC Carbon Assessment
New employee job process
New employee safety induction
New workers training 2023
Onboarding materials
Operational Permits
Orientation
Permit to work 2023
Permits and Compliance Register List
Prestart presentations
Public relationship specialist
Report a near miss you don't have to report an accident
Reporting process, schedule and content for any existing functions - Contractors
Reporting process, schedule and content for any existing functions - HSE
Risk assessment - Construction 2023
Risk assessment - Cattle Feedlot 2023
Risk assessment - Homestead 2023
Safety alerts
Safety Card
Safety employee daily workflow
Safety inductions
Safety training materials
Safety Training Schedule 2022
Safety Training Schedule 2023
Sample Contracts
Sanction handbook
Security plans
Seeding and fertiliser application
Site coordinator
Site inspection logs
Site plans and layouts
Spot audit of contractors
Spot tests of quality of training of training that Contractors have undertaken
Spot tests of staff
Standard operating procedure on managing grievance



Documents Reviewed
Toxic and dangerous chemical substance waste disposal agreement with Element LLC
Traffic management plans
Various work orders
Waste disposal agreement with Ulziit Village
Waste Incident Log
Waste management and consulting agreement with Ungu nem LLC
Waste management policy, trip policy, hazardous waste policy - HSE
Water Consumption - Ulziit Community

## **Appendix I    Full Critical Habitat Assessment**

A REPORT FOR METAGRO

# Critical Habitat Assessment

02 March 2024



*Creating Sustainable Value*





## Document control

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## Abbreviations

AoI	Area of Influence
BAP	Biodiversity Action Plan
CH	Critical Habitat
CHA	Critical Habitat Assessment
CR	Critically Endangered
CTM	Custom Tarialan Management
DD	Data Deficient
EAAAs	Ecologically Appropriate Area(s) of Analysis
EcAoA	Ecological Area of Analysis
EN	Endangered
EOO	Extent of Occurrence
ESIA	Environmental and Social Impact Assessment
GBIF	Global Biodiversity Information Facility
GIS	Geographical Information System
GN6	Guidance Note 6
GoM	Government of Mongolia
IBAs	Important Bird and Biodiversity Areas
IBAT	Integrated Biodiversity Assessment Tool
IFC	International Finance Corporation
IUCN	International Union for Conservation of Nature
KBAs	Key Biodiversity Areas
LC	Least Concern
MCS Group	Metagro's Parent Company
NDVI	Normalized Difference Vegetation Index
NG	Net Gain
NNL	No Net Loss





NT	Near-Threatened
PS6	Performance Standard 6
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
VU	Vulnerable





## Executive Summary

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This document assesses whether the proposed Metagro agricultural development is within critical habitat according to the requirements of the International Finance Corporations (IFC) Performance Standard 6 (PS6). Critical habitat describes a subset of both natural and modified habitat that deserves particular attention due to its high biodiversity value. This assessment utilises the numerical Critical Habitat thresholds and guidance of the IFC Guidance Note 6 (2016).

If critical habitat is identified, a net gain should be achieved for the features for which Critical Habitat thresholds have been met. Site based biodiversity management measures to achieve the avoid, reduce and restore components of the mitigation hierarchy are covered in the full environmental and social impact assessment (ESIA). The project's net gain actions will be covered in the Biodiversity Action Plan (BAP).

Critical Habitat is an approach for identifying areas of particularly high biodiversity value. Triggering Critical Habitat does not automatically mean that those Critical Habitat features will be adversely impacted by the Project. IFC PS6 requires that Critical Habitat is assessed and determined irrelevant of potential project impacts. All impacts, both positive and negative, are assessed in the biodiversity impact assessment of the ESIA.

**The Mongolian marmot (*Marmota sibirica*) qualifies as critical habitat under criterion 1a and 1c.** It has been deemed to qualify on a precautionary basis. Five individuals were observed during field surveys and there was evidence of a larger local population also identified. The global population of the Mongolian marmot is unknown and thus, as per IFC PS6 GN65, a surrogate metric was used to assess the species against Criterion 1a and 1c thresholds. The species EAAA (see Figure X) was compared to the global extent of occurrence (EOO), and was found to constitute 1.84% of the global EOO. Consultation with species experts was unable to provide any additional insight or data to determine the likely significance of the local population. Therefore, on a precautionary basis the Project is considered to qualify as critical habitat for this species.

The predominant threats to the Mongolian marmot are hunting for skins, meat and for use in traditional medicines, for local, national, and international trade. A 2005 Conservation Action Plan<sup>1</sup> for the species in Mongolia identified the following key conservation measures for this species, that should be considered during the development of a Project Biodiversity Action Plan (BAP. A requirement of IFC PS6 once critical habitat has been triggered) The Conservation measures required:

- Enhance enforcement of existing protective legislation.
- Conduct further ecological research and monitor population trends in order to develop a sustainable harvest management programme.
- Protect and maintain habitat through community based initiatives.
- Develop a public awareness programme to highlight the protective legislation in place for this species and its conservation status.
- Review and assess the effectiveness of reintroductions into areas of its former range.

No significant residual impacts are expected for the Mongolian marmot and as such additional conservation actions (as opposed to an offset), will be sufficient to achieve net gain.

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<sup>1</sup> See: *Summary Conservation Action Plans for Mongolian Mammals, 2006*



# 1 Introduction

---

The International Finance Corporation (IFC) is considering providing finance to the MCS Group for their Metagro agribusiness project located in eastern Mongolia. Metagro is seeking IFC finance for its overall operations which consist of the Metagro Farm in Eastern Mongolia, which is herein referred to as the 'Project'.

This report describes the findings of the Critical Habitat Assessment (CHA) for the Project. It assesses the species, habitats, and protected areas with high biodiversity value that regularly occur in the Project Area of Influence (AoI) to determine if they meet or exceed the Critical Habitat criteria and thresholds as defined by the International Finance Corporation (IFC) Performance Standard 6 (PS6).

The assessment comprises a review of data from the Integrated Biodiversity Assessment Tool (IBAT), national biodiversity records, scientific literature, national experts, and data obtained from two biodiversity field surveys.

## 2 Project Description

---

### 2.1 Project Background

Metagro was established in December 2021 as the agriculture division of the MCS Group, the largest private sector business in Mongolia. Metagro's vision is to create a vertically integrated agriculture business model by integrating arable farming with livestock projects. MCS Group's motto is "Introducing world standards to Mongolia", which includes the implementation of advanced global agriculture technologies at Metagro.

Metagro will supply beef to the national market in response to growing domestic meat consumption demands and to reduce the import dependency on these products. Exports to international markets are also included in the Metagro business model. Cattle will be supplied to the Metagro Farm (henceforth the 'Project') and fattened on-site prior to processing for meat. Feed for the cattle will be supplied by a combination of crops grown in the Project's arable fields and feed imported from external suppliers.

The Project will be part of the wider MCS Group business that currently employs 13,000 people full-time and provides 30,000 direct and indirect job opportunities<sup>2</sup>.

### 2.2 Project Location

Metagro's headquarters are in Mongolia's capital city of Ulaanbaatar. The Project site is based on portions of the former Chandgana collective farm in Khentii aimag [province], about 330km east of Ulaanbaatar. The Farm is in Kherlen soum [district] of the Khentii aimag. Chinggis is the capital of Khentii aimag.

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<sup>2</sup> <https://mcs.mn/en/about-us/mcs-group/>



Figure 1. Location of the Project in Mongolia

The nearest local community to the Project is the village of Ulziit, about 3km east of the Project site at its closest point, with a population of approximately 1,100 people. The next nearest community is Murun [Mörön], with a population of approximately 1,800 about 16km east-south-east of the Project. Murun is a soum located in the Khentii province. Chinggis is the capital of the Khentii aimag and is located approximately 40km south-east of the Project and has a population of approximately 25,000 people, home to almost a third of the Khentii aimag's overall estimated population of 80,000.

### 2.2.1 Metagro Farm Site

The Metagro Farm site comprises arable land, an in-development cattle feedlot, associated agricultural buildings and facilities including the Homestead housing complex. The general layout and some surrounding features are shown in Figure 2 below.

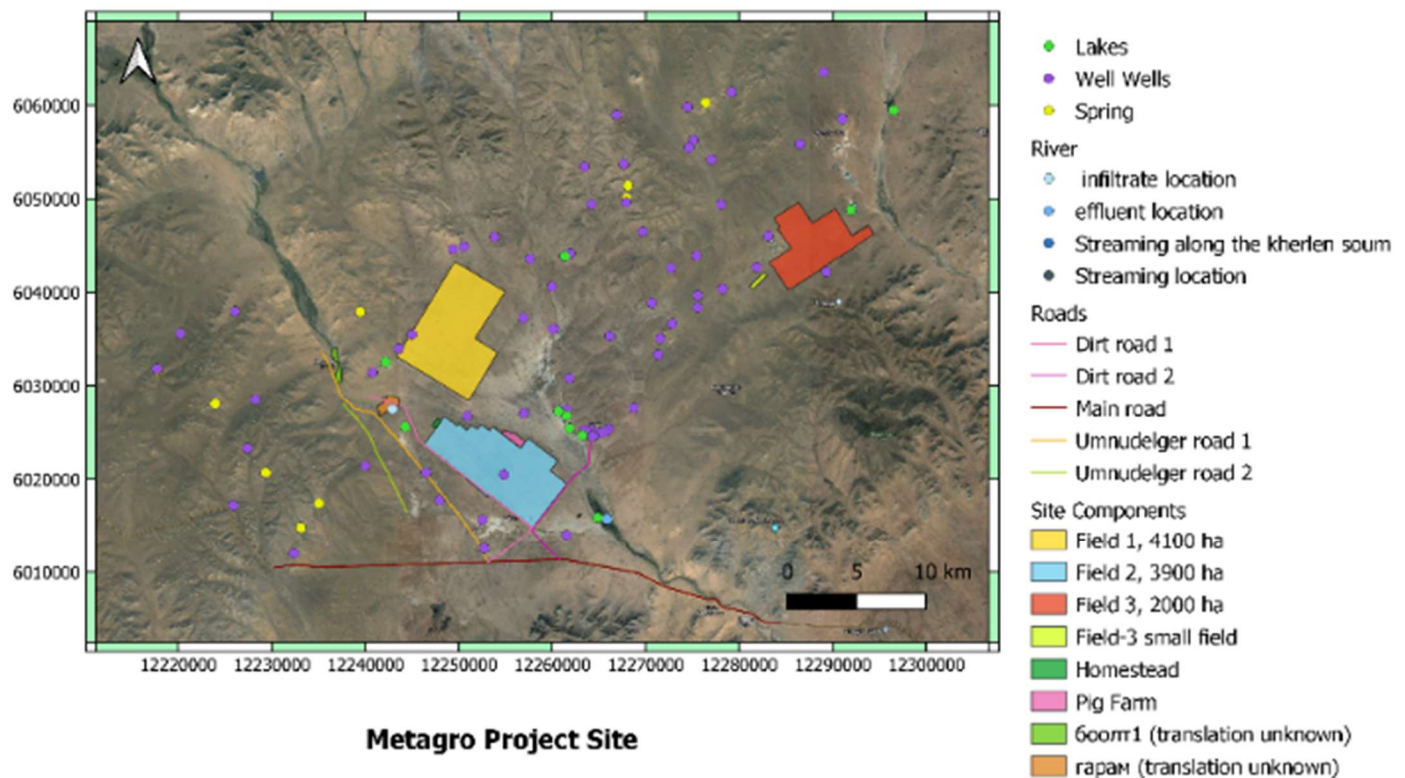


Figure 2. Metagro Farm layout showing arable fields, cattle feedlot, associated agricultural buildings and facilities, proposed pig farm location, community water wells and surface waterbodies

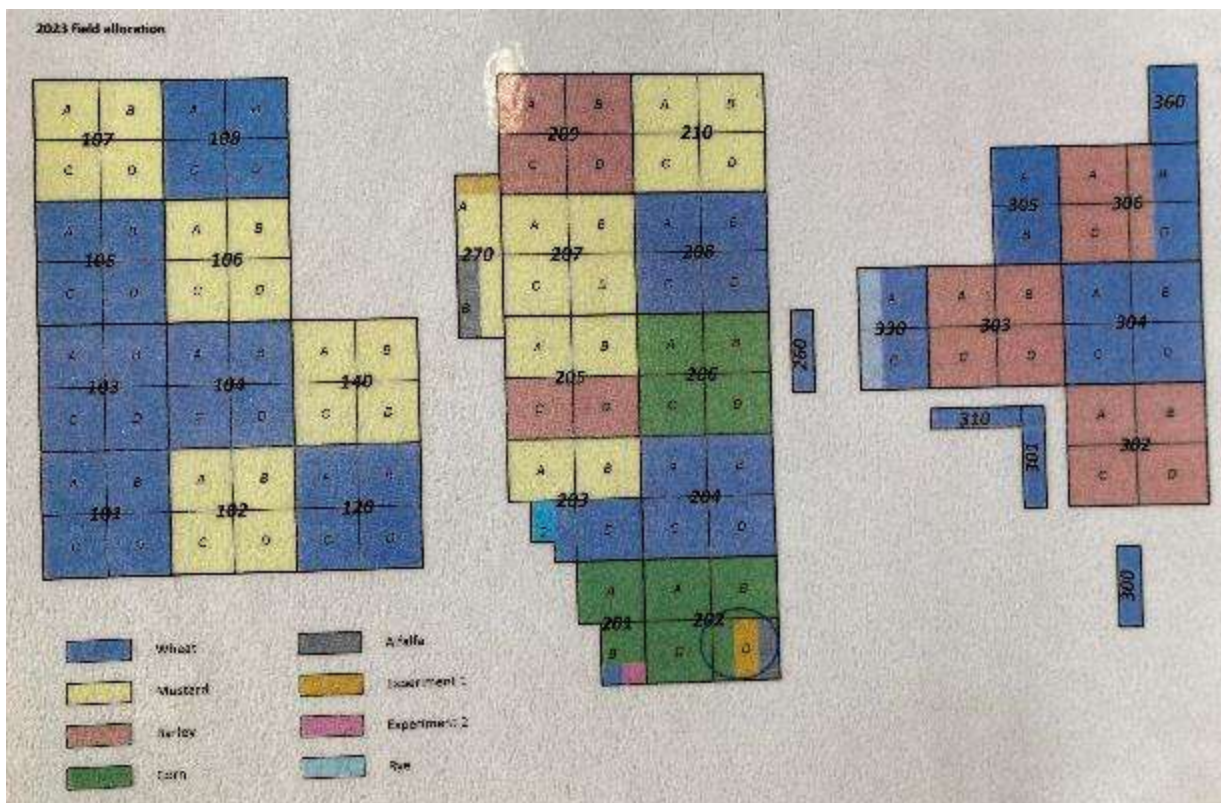
The two main agribusiness components of the Project are:

#### Arable land:

The arable land operations consist of three very large arable fields, referred to as Fields 1, 2 and 3), totalling approximately 10,200ha. Crops grown in the fields are primarily wheat, barley and mustard, plus corn, alfalfa and other trial crops, primarily as the main fodder source for the on-site livestock operations. The distribution of crops for the 2023 season is shown in the Figure 3.

Metagro intends to cultivate crops using no-till agricultural techniques and showcase regenerative farming good practice. Irrigation techniques will be used to enhance crop yields.





**Cattle feedlot / cattle slaughterhouse:**

A cattle slaughterhouse and primary carcass processing unit will be constructed adjacent to the cattle feedlot, with works currently planned to commence in October/November 2023. This will give a projected yield of 3,000 tonnes of beef per year. Quartered carcasses will be transported to Ulaanbaatar for further meat processing (de-boning / cutting), packaging and sale.

Future beef packaging activities will be carried out by third parties. Metagro plans to retail traceable packed meat to the market mainly in Ulaanbaatar using its own channel and some of the existing sales and distribution channels of the MCS Group.



### 2.2.2 Project Land History

The Metagro Project operations are established on the former Soviet-era Chandgana collective farm of about 20,000ha that was set-up by the Government of Mongolia (GoM) in 1976 in the Chandgana valley of Khentii province. On March 13, 1977, a resolution of the Provincial People's Party Committee was issued to cultivate 20,000ha, initiated by the Soviet expedition for cultivation of the Chandgana collective farm. Until the collapse of the centrally planned economy, the Chandgana collective farm was one of the leaders of Mongolian agriculture by combining arable farming with dairy farming (400 cows).

After 1992, all collective farms were dissolved and the arable lands of Chandgana farm were acquired by 12 private entities. Thereafter the arable lands of the Chandgana valley were not in regular annual cultivation, mainly due to capital costs and financial problems.

In 2014, Custom Tarialan Management (CTM) acquired 8,000ha of the 20,000ha which led to this land parcel being cultivated more regularly. In December 2021 Metagro was established, and thereafter acquired 30-year possession rights on this 8,000ha via investment in Ulziit Ensada LLC. In January 2022, rights to an additional 2,200ha of arable land were acquired, creating the current landholding of 10,200ha of arable land, and Ulziit Ensada LLC was later renamed Metagro LLC.

## 2.3 Project Area of Influence

The Area of Influence (AoI) selected for the CHA mirrors that in the environmental and social impact assessment (ESIA) for biodiversity, 500m out from the major components of the Project. See Figure 4 below for mapping.



Figure 4. Project Aol (500 m buffer around each component)





### 3 Critical Habitat Assessment Methodology

Critical habitat is defined by IFC PS6 as a subset of both natural and modified habitat that has high biodiversity value and thus warrants particular attention. IFC PS6 critical habitat definitions are in line with criteria captured from a range of definitions and priority habitat for biodiversity conservation in use by the conservation community and incorporated in related governmental legislation and regulations. The critical habitat criteria, according to the IFC PS6, are:

- Criterion 1: Critically Endangered (CR) and/or Endangered (EN) species
- Criterion 2: Endemic or restricted-range species
- Criterion 3: Migratory or congregatory species
- Criterion 4: Highly threatened and/or unique ecosystems
- Criterion 5: Key evolutionary processes


Projects that are located within internationally and/or nationally recognised areas of high biodiversity value may require a CHA. Examples include the following:

- Areas that meet the criteria of the International Union for Conservation of Nature (IUCN) Protected Area Categories Ia, Ib and II.
- Key Biodiversity Areas (KBAs), which encompass Important Bird and Biodiversity Areas (IBAs).

There is no universally accepted or automatic formula for making determinations on critical habitat. IFC Guidance Note 6 (GN6) provides numerical thresholds that can be applied to the critical habitat criteria. These thresholds are broadly based upon globally standardised numerical thresholds published in the IUCN's "A Global Standard for the Identification of Key Biodiversity Areas and Red List Categories and Criteria". The thresholds are only indicative and serve as a guideline for decision-making only. Relevant experts should be engaged with throughout to confirm if the thresholds and approach taken are appropriate to the biodiversity values under assessment. To complete the CHA and identify areas of critical habitat for the Project, the IFC GN6 has been adopted and applied throughout.


A more thorough coverage of IFC PS6 CHA requirements, including the PS6 numerical thresholds which have been applied for this CHA, are presented in Appendix A.

A CHA consists of the following steps:

Approach to Critical Habitat Assessment	
Step 1: Screening	 <b>Iterative Process</b>
1.1 Define appropriate landscapes and/or seascapes for assessment, 1.2 Using a combination of desk-based study (e.g. IBAT), field surveys, stakeholder engagement and expert input, identify biodiversity features likely or potentially present within the landscapes and/or seascapes being assessed, and establish a candidate long-list for assessment, 1.3 Cross-reference and validate candidate long-list with biodiversity feature experts when appropriate,	





<div><div>1.4 Screen candidate long-list to determine if features regularly<sup>3</sup> occur in project area of influence or ecosystem and their likelihood of meeting IFC PS6 critical habitat criteria and thresholds,</div><div>1.5 Categorise each biodiversity feature with a likelihood score and screen out any feature that is unlikely to meet criteria and thresholds. Validate assumptions made for screening out with biodiversity feature experts.</div></div>	<div>Ongoing data collection (surveys, expert consultation, etc) and updates to the CHA</div> <div></div>
<div>Step 2: Ecologically Appropriate Areas of Analysis</div>	
<div><div>2.1 For all biodiversity features that scored likely or possible at the screening stage, define the Ecologically Appropriate Area(s) of Analysis (EAAA),</div><div>2.2 Gather the necessary data and conduct necessary consultation to be able to define the ecological patterns, processes, features and functions that are necessary for maintaining each biodiversity feature under assessment,</div><div>2.3 Where it can be shown that multiple biodiversity features have largely overlapping ecological requirements, a common or aggregated EAAA may be appropriate,</div><div>2.4 Gather the necessary data and conduct necessary consultation to quantify local population (or species appropriate surrogate) of biodiversity feature under assessment within the EAAA.</div></div>	
<div>Step 3: Confirm and Map Critical Habitat</div>	
<div><div>3.1 Complete assessment to determine whether local population (or species appropriate surrogate) meets or exceeds IFC PS6 critical habitat criteria numerical thresholds,</div><div>3.2 Validate assumptions with biodiversity feature experts (e.g. IUCN Working Groups),</div><div>3.3 Map areas of critical habitat using GIS.</div></div>	

It is also recognised that some other species that are not CR, EN or VU or that do not trigger critical habitat thresholds may still be present in the AoI. Therefore, these species have the potential to be impacted by construction and operation of the Project. As such the mitigation hierarchy (see Figure 5) will be applied to the Project to prevent net loss of these species and this will be detailed in the environmental and social impact assessment.

<sup>3</sup> IFC PS6 Guidance Note Paragraph 59 states that ecologically appropriate areas of analysis should be identified for each species with *regular* occurrence in the project's area of influence or ecosystem.

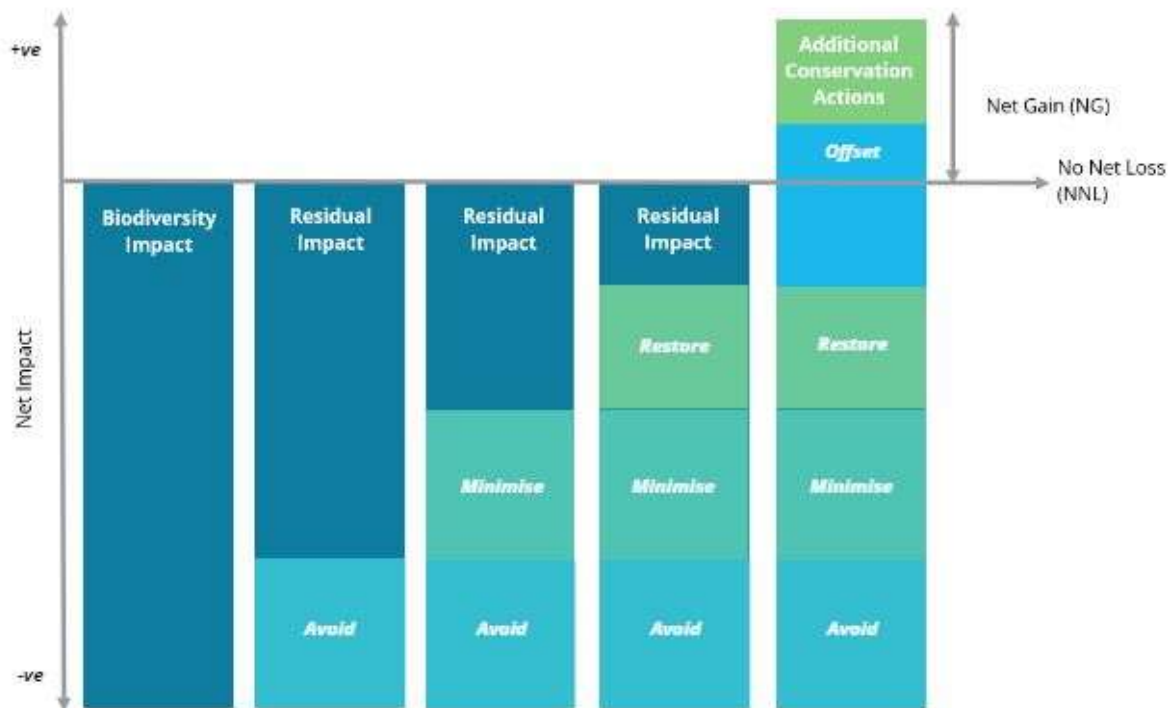


Figure 5. Mitigation Hierarchy

## 4 Data Collection and Consultation

Recent, accurate, and representative data and information is a cornerstone of a high-quality CHA and should be collected from a combination of desk-based study, biodiversity baseline surveys, and stakeholder consultation, as required.

Desk-based studies, including for this CHA, typically utilise a range of online tools (e.g. IUCN, IBAT, UN Biodiversity Lab, etc), existing ecological scientific and grey literature, and national biodiversity records.

As per PS6 Guidance Note 58, for project's with potentially significant impacts on Natural and Critical Habitats, the biodiversity baseline should include field surveys over multiple seasons (and throughout suitable periods of the year), to be undertaken by competent professionals and with the involvement of external experts, as necessary. Field surveys and assessments should be recent, and data should be acquired for the direct project footprint, including related and associated facilities, the project's area of influence, and potentially beyond.

For the purposes of this CHA the following was used:

- Desk-based study was conducted between June – October 2023
- A range of site assessments and surveys across 2023 (described below).

### 4.1 Desk-Based Study

The following resources were utilised in the desk based study:



- The IBAT, set to identify all species and protected/designated sites within a 50km radius of the Project. The tool draws on data from the IUCN, Alliance for zero extinction sites, Birdlife important bird areas, Key Biodiversity areas etc.
- The IUCN red list species database
- Other online species databases, including eBird and the Global Biodiversity Information Facility (GBIF)

The first stage of assessment involves researching and identifying species, habitats and protected/designated sites within 50 km of the Project AoI (see Figure 11), that fall within the IFC PS6 Critical Habitat criteria. The Integrated Biodiversity Assessment Tool (IBAT) provides an extensive preliminary dataset. This data is supplemented with the most recent and reliable field data, consultation with local and international experts, and additional desk-based research, for example species that are recorded as present in local designated sites. An assessment is made to determine whether each species, habitat or protected/designated site regularly occurs (as per IFC GN6) in the Project AoI. The likelihood of regular occurrence is informed by a species' characteristics, such as the geographical range, habitat requirements, movement patterns, migratory routes, breeding sites and population distribution.

All species that are likely to regularly occur in the AoI and that have the potential to meet IFC GN6 critical habitat criteria are subject to further analysis to determine whether they meet or exceed critical habitat criteria and thresholds.

## 4.2 Biodiversity Baseline Field Surveys

The field survey team collected data on flora, fauna and habitat types using industry recognised survey methods in line with IFC guidance note 6. This included a combination of literature review, stakeholder engagement and consultation, field surveys, and other relevant assessments.

Site level assessments and surveys were as follows:

- Initial rapid field assessment with international consultants and national team was conducted between 24<sup>th</sup> May – 10<sup>th</sup> June 2023
- Biodiversity baseline field surveys were conducted during two site visit periods 29<sup>th</sup> June – 4<sup>th</sup> July 2023 and 2<sup>nd</sup> – 6<sup>th</sup> October 2023
- Consultation with local communities and Metagro workers was conducted between 29<sup>th</sup> June – 4<sup>th</sup> July 2023 and 2<sup>nd</sup> – 6<sup>th</sup> October 2023

Baseline surveys focused on mammals, birds, reptiles, amphibians, and vegetation within the project's AoI, to include:

- Current & proposed construction areas (approx. 200ha (2km<sup>2</sup>),
- 500m buffer area around current & proposed construction areas,
- Existing fields and arable land including routes within, field boundaries, and any area which fell within the current & proposed construction areas' 500m buffer zone.

More details on the survey methodology can be found in Appendix B.



# 5 Existing Conditions

## 5.1 Protected and Designated Sites

There is one protected area within 10km of the project site; the Undurkhaan uul National Park. It is approximately 6.5 km from Field 3 which is the closest distance between the national park and any of the Project site components (Figure 6Figure 6). The Eastern Mongolian Steppes UNESCO World Heritage site is a network of protected areas located 173 km from the Project AoI at the closest point, the Toson Khulstai National Park. Due to the limited coordinates provided by UNESCO World Heritage online site, it was difficult to determine the shape of the sites. Figure 8 illustrates the best representation of the UNESCO World Heritage sites in relation to the project site.

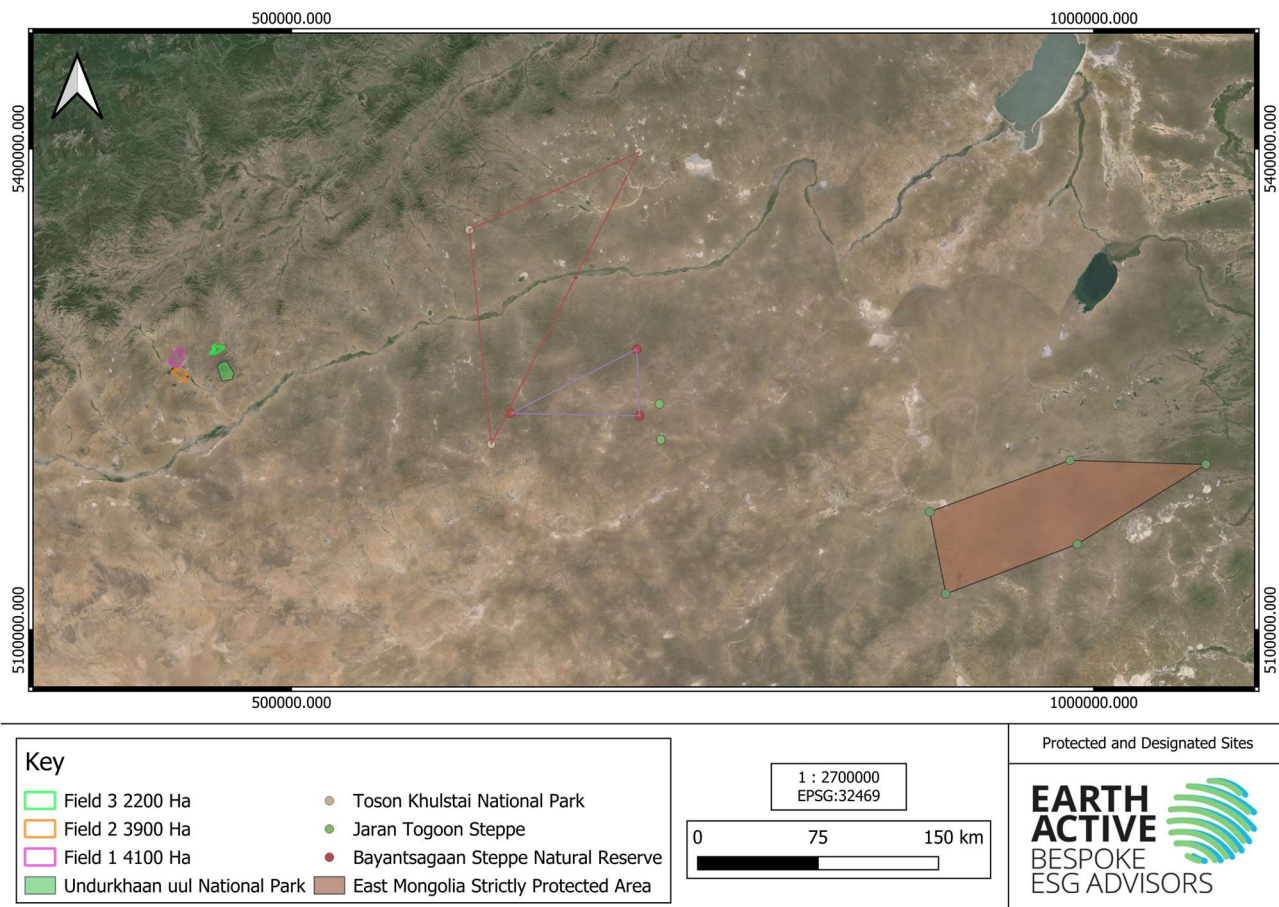


Figure 6. The Undurkhaan uul National Park and UNESCO world heritage site locations in relation to the main site components.

## 5.2 Habitats Present

The eastern Mongolia region primarily consists of vast semi-arid grasslands, inland wetlands, Central Asia mountain ranges, and long meandering rivers. Rich fauna and flora biodiversity in the region remains undisturbed in areas due to the remoteness and relative inaccessibility of habitats for humans. The Eastern Mongolian Steppes are a UNESCO World Heritage site and are a representative area of intact and pristine grassland.



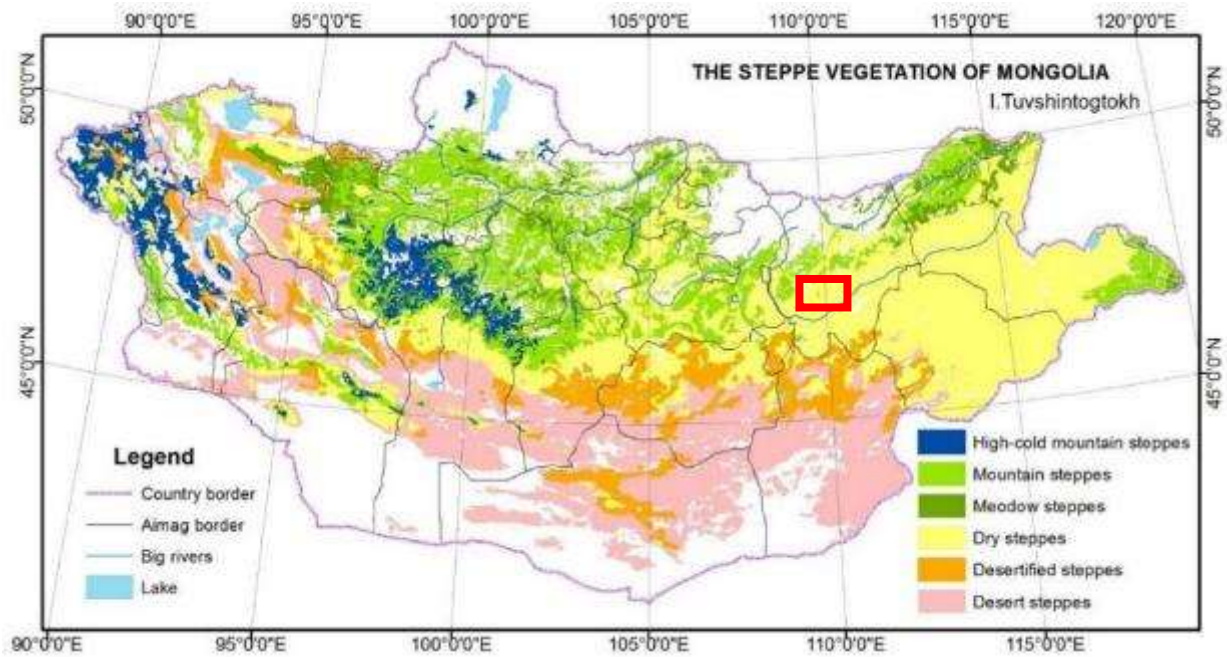


Figure 7. Distribution of Mongolian Steppes with the Project Site Location shown in the red box

Examples of the types of habitats seen on site are shown in the photos below.

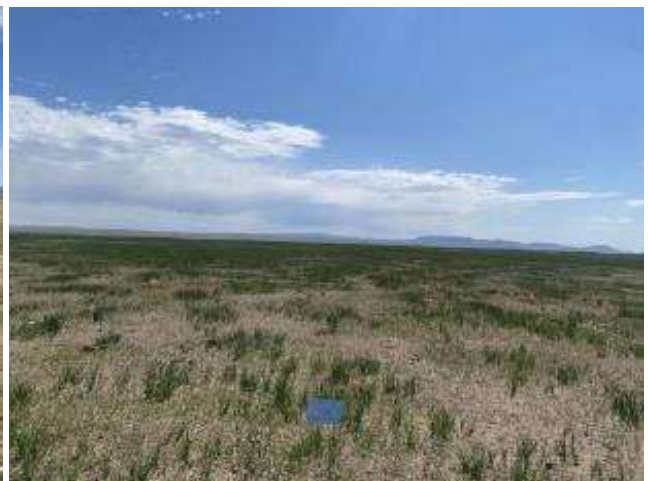




Figure 8. Habitats present on site

NDVI - The Normalized Difference Vegetation Index indicates the amount of vegetation on the ground. The index is calculated from the wavelengths of the near-red and violet-red channels, which are absorbed by plants and reflected from them. NDVI ranges from -1 to 1, where 1 represents very green vegetation, and 0 represents bare land with no vegetation. On the other hand, a value close to 0 indicates non-vegetated surfaces, such as water, snow, and clouds.

As of the first 10 days of July 2023, the vegetation condition is moderate, at around 0.3. This indicates low vegetation cover and slow growth<sup>4</sup>.

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<sup>4</sup> [www.icc.mn](http://www.icc.mn)



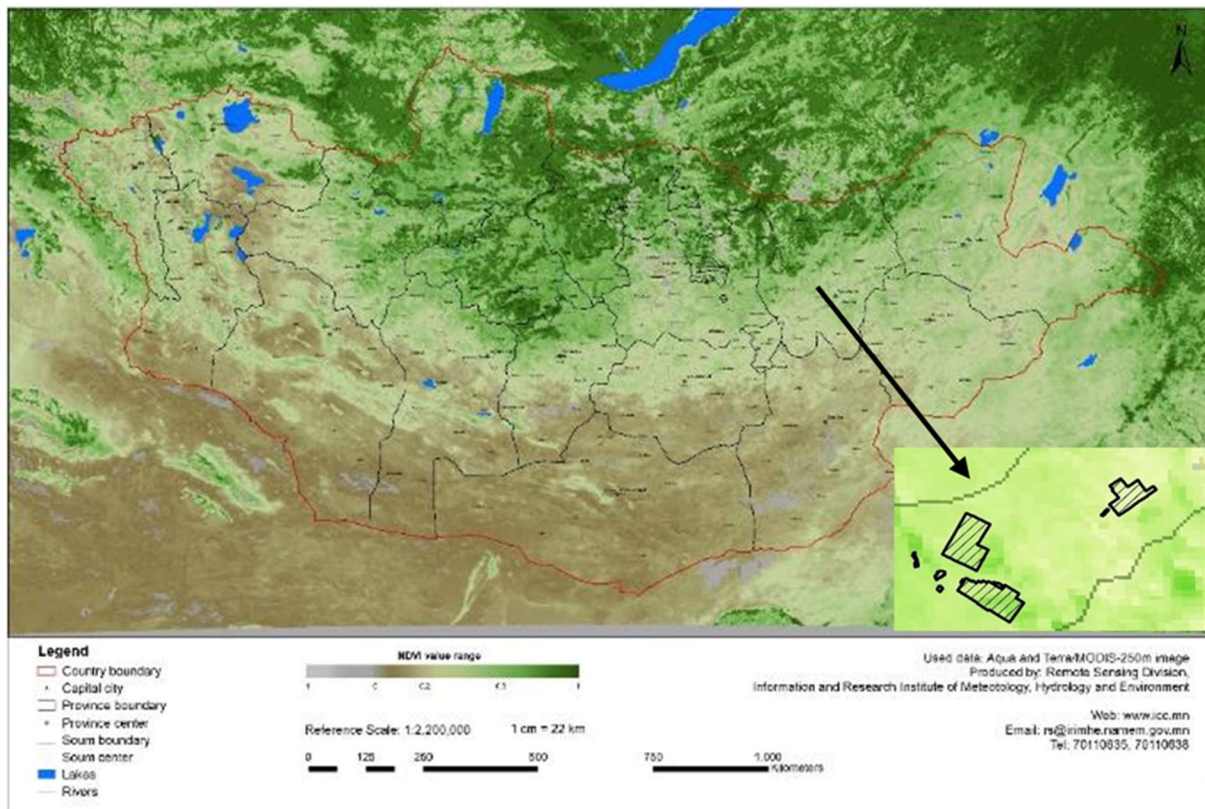


Figure 9. Vegetation map

There were no signs of drought observed in the 1st and 2nd fields of arable land, cattle feedlot, old camp and homestead areas. However, there were signs of slight and moderate drought observed in northern part of the 3rd field of arable land.

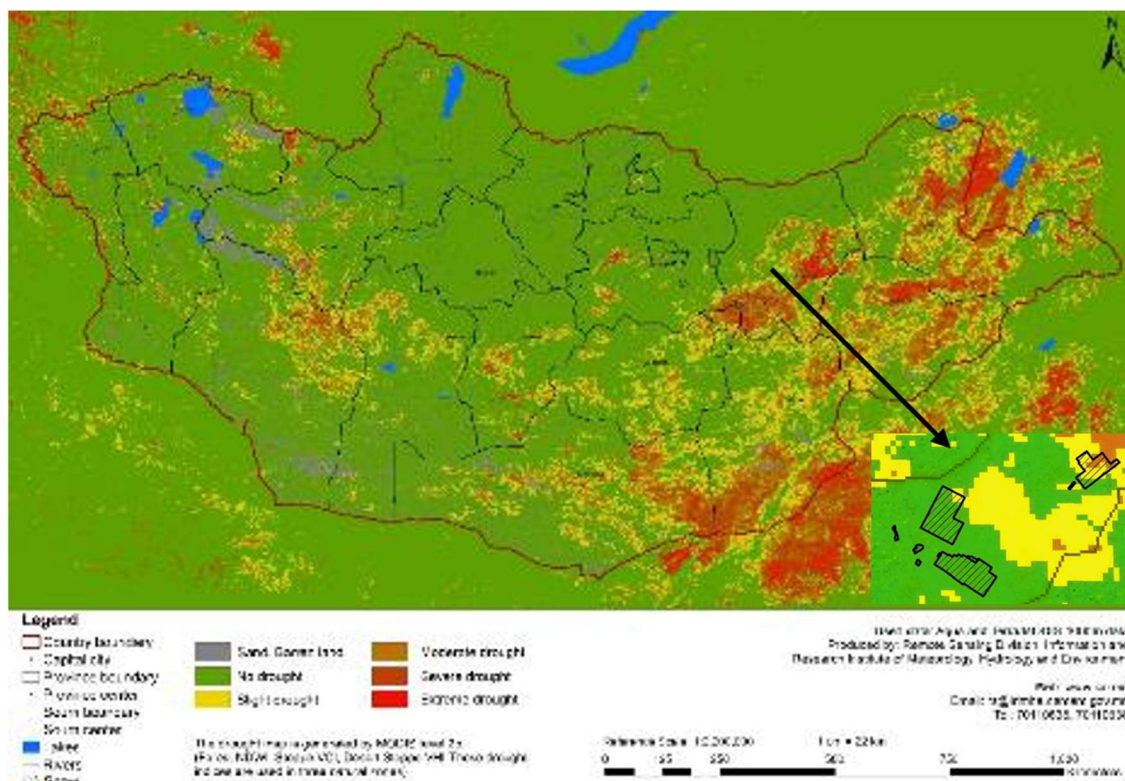


Figure 10. Drought map



## 6 Critical Habitat Assessment

### 6.1.1 Landscape of Assessment

The landscape used for the initial phases of the CHA was a 50km area around the Project. IBAT and other tools were used to determine the candidate longlist of all biodiversity species and features that could potentially be present within that area.

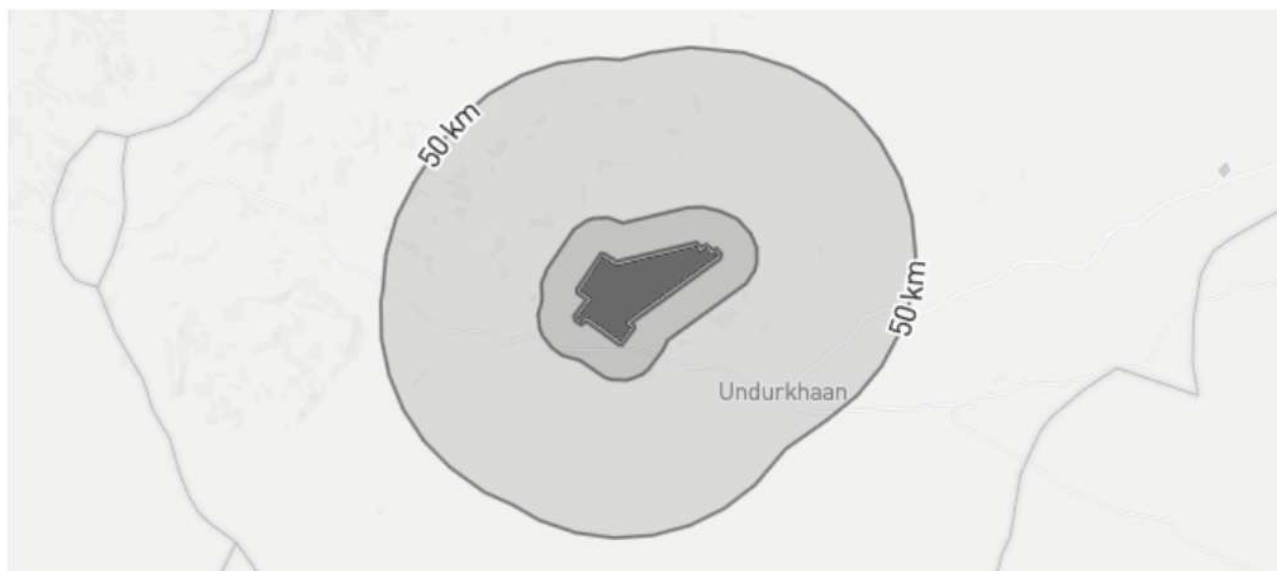


Figure 11. Landscape area of assessment used for Critical Habitat Assessment

### 6.1.2 Natural and Modified Habitats

Critical habitat is a subset of either modified or natural habitat. IFC PS6 requires developers to identify and map modified and natural habitats.

According to IFC GN6 “Habitats can be divided into natural habitats (which are land and water areas where the biological communities are formed largely by native plant and animal species, and where human activity has not essentially modified the area’s primary ecological functions) and modified habitats (where there has been apparent alteration of the natural habitat, often with the introduction of alien species of plants and animals, such as agricultural areas). Both types of habitat can support important biodiversity at all levels, including endemic or threatened species”.

Mapping should be completed for the point the borrower signed the contract for the property and began initial Project works.

The steppes are home to the largest remaining intact temperate grasslands on earth and are characterised by treeless flat steppes, gently rolling hills, wetlands, and interlinkages with the Khyangan Mountain Range. However, habitats and species in areas of eastern Mongolia are subject to climatic and anthropogenic pressures from extreme weather and activities such as nomadic herding, farming, mining, and hunting. These pressures have led to significant issues with desertification and land degradation in the region. Whilst there are shrub and low-lying woody vegetation species across the grasslands, there are also forest resources in the region, however they are limited and have been diminished, and continue to be, due to logging, fires, pests, and disease.





Initial desk-based screening of the Project Aol using the UNEP WCMC Natural and Modified Habitat screening layer indicated it was made up entirely of likely modified” and “potential modified” habitat (see Figure 12)

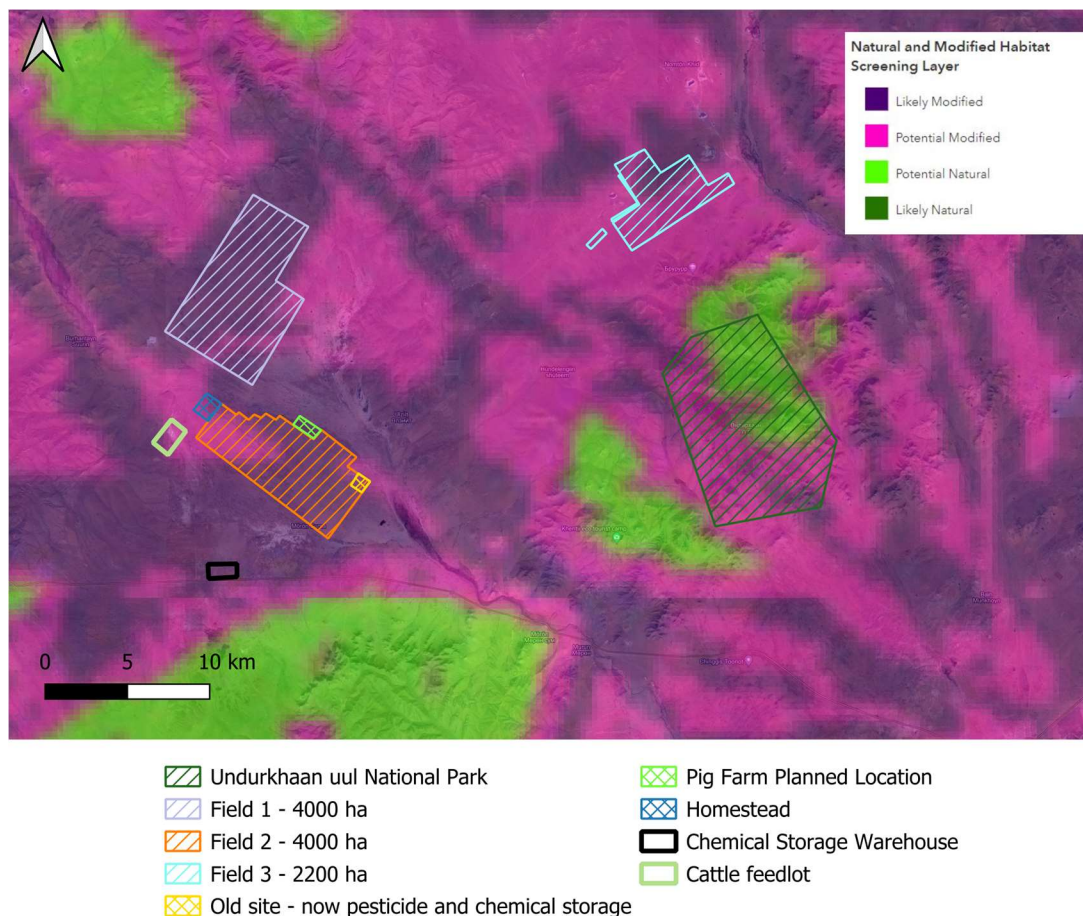


Figure 12. Natural vs Modified habitat of the Project Aol (Using the UNEP WCMC screening layer)

Whilst the UNEP WCMC screening layer provides a useful guide, typically additional research and site level assessment is required to confirm the habitat status within a Project area.

The Project Aol has been a farm since the mid-1970s and over recent decades, has been subject to arable and animal farming which have included cultivation techniques, mechanical mowing, and animal grazing. Where the Project Aol will have historically been natural grassland habitat, the field surveys identified clear signs of significant anthropogenic modification as a result of the farming and grazing, including aridness likely partially caused by climate change and drought.

It is noted that there was a high percentage of vegetation cover along the Murun River, with no recorded areas of barren land. In contrast, along the old camp, there was less vegetation cover and more barren land recorded.

Figures 13 and 14 below show a timelapse series of images of the Project Aol dating back to 2017. A false colour vegetation analysis was applied, with the red areas essentially identifying vegetation loss or degradation. The maps go back to 2017 as this was the earliest available data set to conduct this analysis.

The maps clearly show that the Project Aol has been in agricultural configuration since 2017 and show significant vegetation loss or degradation across that period. The Metagro Project started in 2021 and thus this should be the baseline year for natural and modified habitat mapping.



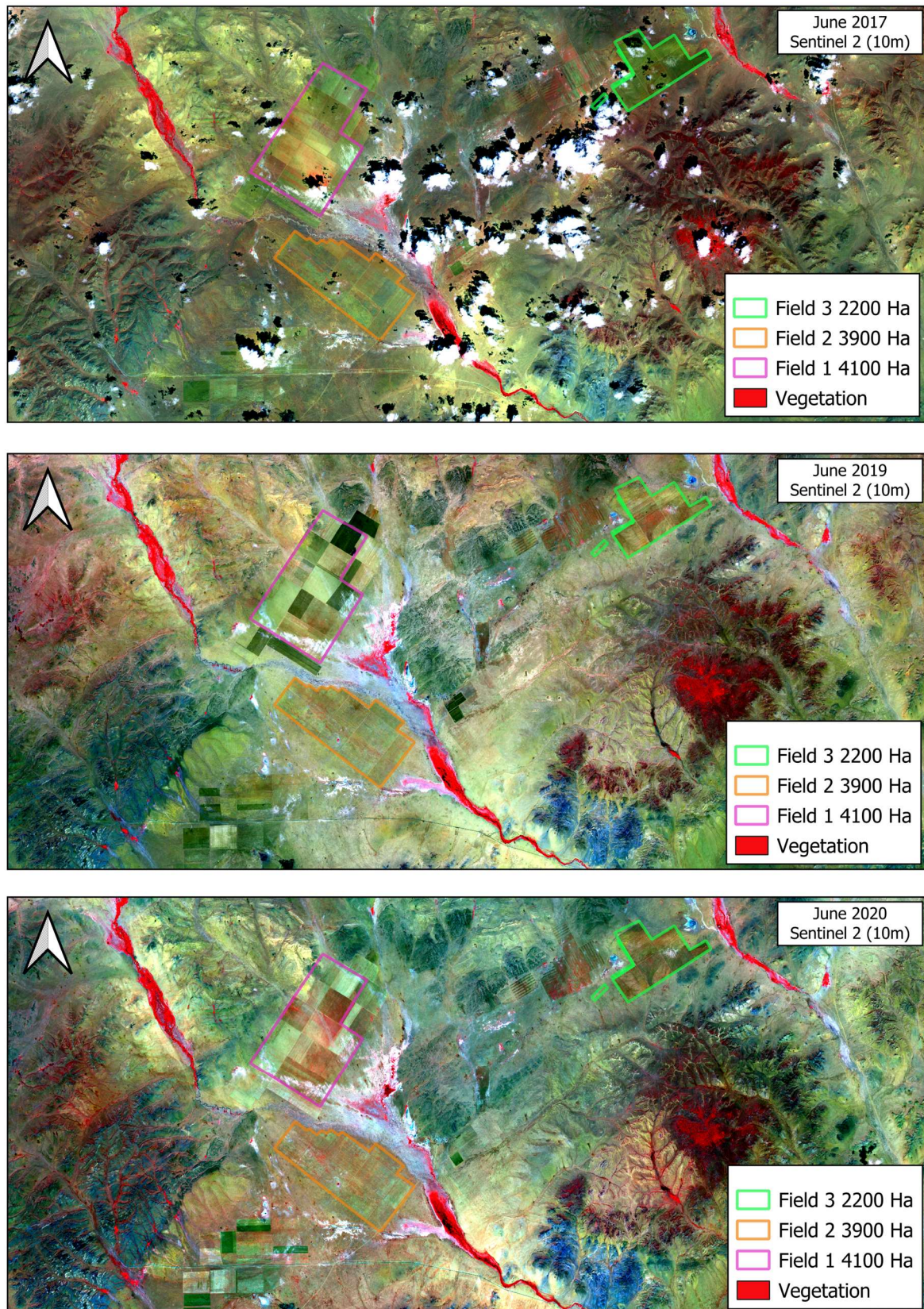


Figure 13. Sentinel Two false colour vegetation analysis; 10m resolution; <20% cloud coverage; June 2017, 2019, 2020.



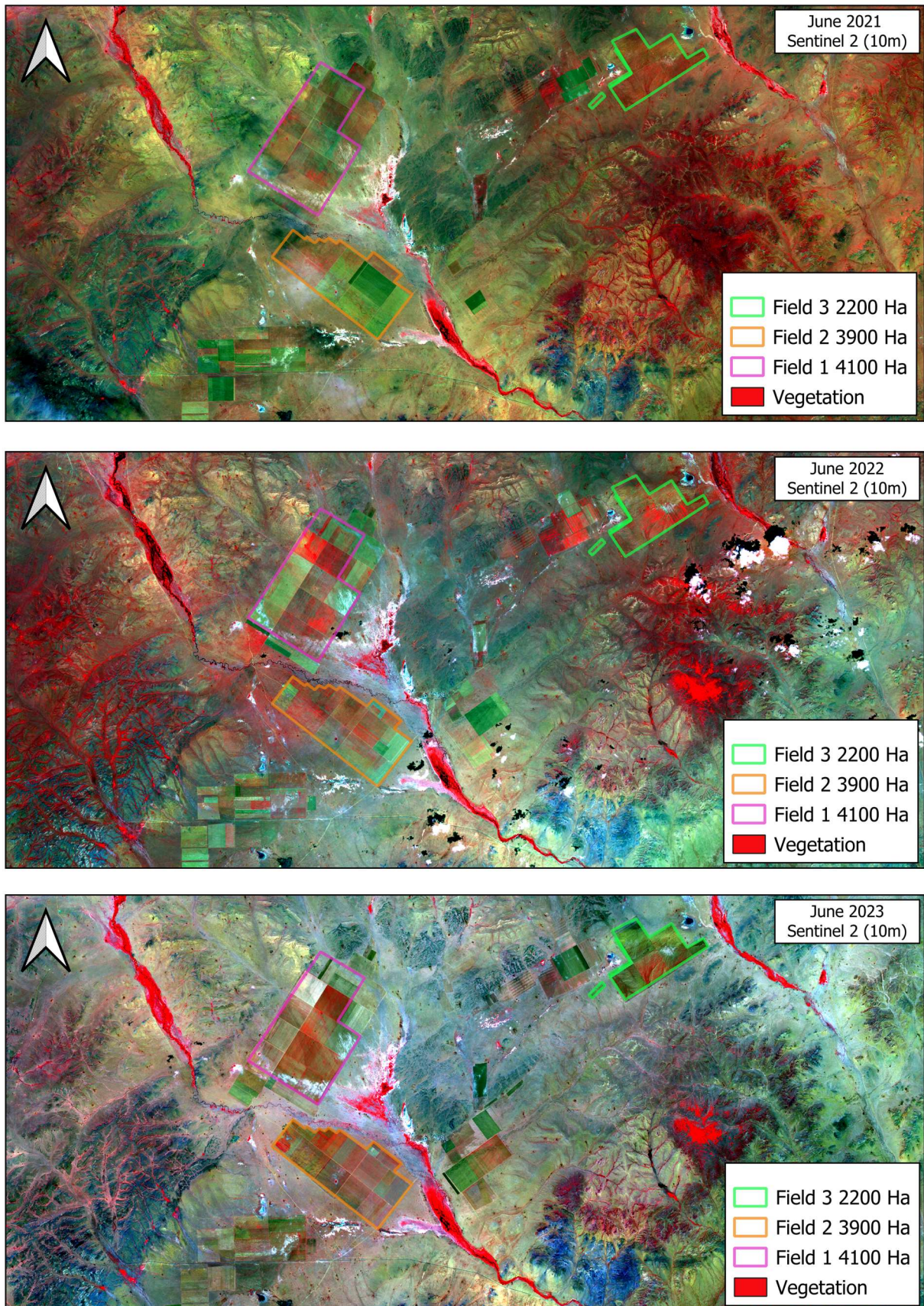


Figure 14. Sentinel Two false colour vegetation analysis; 10m resolution; <20% cloud coverage; June 2020, 2022, 2023.





Based on the evidence above, the entire Project Aol is considered to be modified habitat.

## 6.2 Species Present

The data collected through the IBAT and other reliable and relevant sources shows that 288 species are potentially present within 50 km of the Project alignment. The species, their taxonomic groups, and IUCN Red List global conservation status, are presented in Table 1 below.

Table 1. Species potentially present within 50km of the Project

Group	Critically Endangered	Endangered	Vulnerable	Near Threatened, Least Concern, Data Deficient	Total
Birds	1	4	8	157	170
Mammals	0	2	2	54	58
Reptiles	0	0	0	5	5
Amphibians	0	0	0	2	2
Fish	0	0	1	22	23
Invertebrates	0	0	0	12	12
Plants	0	0	0	15	15
Fungi	0	0	1	2	3
Total	1	6	12	269	288

Of the 288 species, 132 species were screened out as they cannot qualify for either Criterion 1, Criterion 2, or Criterion 3 of IFC PS6. More detailed description of the screening process and critical habitat assessment methodology is provided in Appendix A.

The results of the assessment for each of the IFC critical habitat criterion are summarised below. Each criterion concludes whether the Project triggers critical habitat.

## 6.3 Critical Habitat Criterion 1 – Critically Endangered (CR) or Endangered (EN) Species

The IFC GN6 for this criterion is as follows:

- a) Areas that support globally important concentrations of an IUCN Red-listed EN or CR species ( $\geq 0.5\%$  of the global population AND  $\geq 5$  reproductive units of a CR or EN species).
- b) Areas that support globally important concentrations of an IUCN Red-listed Vulnerable (VU) species, the loss of which would result in the change of the IUCN Red List status to EN or CR and meet the thresholds in GN72(a)
- c) As appropriate, areas containing important concentrations of a nationally or regionally listed EN or CR species.

The IBAT and other research identified 19 globally Critically Endangered (CR), Endangered (EN), or Vulnerable (VU) species that could occur within 50 km of the Project Aol.

**The Mongolian marmot (*Marmota sibirica*) qualifies as critical habitat under criterion 1a and 1c.** It has been deemed to qualify on a precautionary basis. Five individuals were observed during field surveys and there was evidence of a larger local population also identified. The global population of the Mongolian marmot is unknown and thus, as per IFC PS6 GN65, a surrogate metric was used to assess the species



against Criterion 1a and 1c thresholds. The species EAAA (see Figure X) was compared to the global extent of occurrence (EOO), and was found to constitute 1.84% of the global EOO. Consultation with species experts was unable to provide any additional insight or data to determine the likely significance of the local population. Therefore, on a precautionary basis the Project is considered to qualify as critical habitat for this species.

The predominant threats to the Mongolian marmot are hunting for skins, meat and for use in traditional medicines, for local, national, and international trade. A 2005 Conservation Action Plans<sup>5</sup> for the species in Mongolia identified the following key conservation measures for this species, that should be considered during the development of a Project Biodiversity Action Plan (BAP. A requirement of IFC PS6 once critical habitat has been triggered) The Conservation measures required:

- Enhance enforcement of existing protective legislation.
- Conduct further ecological research and monitor population trends in order to develop a sustainable harvest management programme.
- Protect and maintain habitat through community based initiatives.
- Develop a public awareness programme to highlight the protective legislation in place for this species and its conservation status.
- Review and assess the effectiveness of reintroductions into areas of its former range.

No significant residual impacts are expected for the Mongolian marmot and as such additional conservation actions (as opposed to an offset), will be sufficient to achieve net gain.

Despite not meeting critical habitat criterion 1 thresholds, some of the other species assessed may be present in the AoI, albeit not regularly or in an abundance that meets the thresholds. It is recognised that risks to vulnerable or globally threatened species recorded within the Project AoI must still be mitigated during the Project construction and operation activities. The mitigation hierarchy will be applied to the Project to prevent net loss of these species. As such, they will be considered during the design of the mitigation measures in the Environmental Impact Assessment (EIA) and the conservation actions proposed in the Biodiversity Action Plan (BAP), should a BAP be recommended.

**The Project does contain critical habitat under Criterion 1.**

## 6.4 Critical Habitat Criterion 2 – Endemic or Restricted-range Species

IFC GN6 defines a terrestrial restricted-range species as having an EOO (Extent of Occurrence) of less than 50,000 km<sup>2</sup>. The IFC thresholds for this Criterion 2 are:

- a) *Areas that regularly hold  $\geq 10\%$  of the global population size AND  $\geq 10$  reproductive units of a species.*

There were no restricted-range or endemic species identified in this assessment for the Project.

**The Project area does not contain critical habitat under Criterion 2**

## 6.5 Critical Habitat Criterion 3 – Migratory and Congregatory Species

The IFC thresholds for this Criterion 3 are:

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<sup>5</sup> See: Summary Conservation Action Plans for Mongolian Mammals, 2006



- a) *Areas known to sustain, on a cyclical or otherwise regular basis,  $\geq 1$  percent of the global population of a migratory or congregatory species at any point of the species' lifecycle.*
- b) *Areas that predictably support  $\geq 10$  percent of the global population of a species during periods of environmental stress.*

**The Project area does contain critical habitat under Criterion 3.**

## 6.6 Critical Habitat Criterion 4 – Highly Threatened and/or Unique Ecosystems

The assessment under this Criterion 4 focuses on ecosystem type and the available data on threatened ecosystems. This calls upon data from the IUCN Red List of Ecosystems, and national/regional level assessments carried out by recognised institutions.

The IFC thresholds for Criterion 4 are:

- a) *Areas representing  $\geq 5\%$  of the global extent of an ecosystem type meeting the criteria for IUCN status of CR or EN.*
- b) *Other areas not yet assessed by IUCN but determined to be of high priority for conservation by regional or national systematic conservation planning.*

The area has not yet been assessed by the IUCN and there is currently no national or regional conservation planning for the land within the Project AoI. The Project AoI does not hold any unique or highly threatened ecosystems. The dominant ecosystem type is steppe lands which are under threat globally from agricultural land degradation and more frequent severe climate conditions. However, the Eurasian steppe is around 10.5 million km<sup>2</sup> and the project site only has a span of 140km<sup>2</sup>, and thus only accounts for around 0.001% of the total ecosystem type in Eurasia. Studies have assessed land in the Khentii Aimag and discussions held with the local Environment Protection Agencies and Land Use Agencies in Khentii but the Project AoI was not deemed a high priority area for conservation<sup>6</sup>.

**The Project area does not contain critical habitat under Criterion 4.**

## 6.7 Critical Habitat Criterion 5 – Key Evolutionary Processes

IFC GN6 states that "the structural attributes of a region, such as its topography, geology, soil, temperature, and vegetation, and combinations of these variables, can influence the evolutionary processes that give rise to regional configurations of species and ecological properties.

Areas associated with key evolutionary processes tend to have high spatial heterogeneity, which can lead to speciation via isolation, divergent evolution or environmental gradients, also known as ecotones, which produce transitional habitat and can increase the chances of speciation occurring.

The Project AoI holds no unique habitats or assemblages of organisms. It is homogenous with the wider surrounding areas, and thus does not provide any key evolutionary processes.

**The Project area does not contain critical habitat under Criterion 5.**

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<sup>6</sup> <https://www.nature.org/media/smart-development/mongolia-grasslands-development-by-design.pdf>



## 7 Conclusions

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The assessment concludes that critical habitat is triggered under criterion 1 for the Mongolian marmot (*Marmota sibirica*). Thus a BAP is required to ensure a net gain of this species. Additional management measures, in line with the mitigation hierarchy are described in the ESIA.

A range of other rare and threatened biodiversity has also been identified as likely being present, despite the high historical degrees of modification to the Project Aol. Measures are also outlined in the ESIA to manage risks and impacts to these species in line with IFC PS6.



## Appendix A: Critical Habitat Assessment Process

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### Aim of a Critical Habitat Assessment

The main aim of a Critical Habitat Assessment (CHA) is the identification of areas of particularly high biodiversity value that require special attention and a bespoke set of management and mitigation measures to meet the no net loss and net gain requirements of International Finance Corporation (IFC) Performance Standard 6 (PS6).

### Definition of Critical Habitat (IFC PS6)

Critical habitat is considered to refer to the most significant and highest priority areas of the planet for biodiversity conservation. Its designation takes into account both global and national priority setting systems and builds on the conservation biology principles of 'vulnerability' (degree of threat) and 'irreplaceability' (rarity or uniqueness).

According to IFC PS6, critical habitat criteria to be followed as part of a CHA are:

- (i) Criterion 1: Critically Endangered (CR) and/or Endangered (EN) species
- (ii) Criterion 2: Endemic or restricted-range species
- (iii) Criterion 3: Migratory or congregatory species
- (iv) Criterion 4: Highly threatened and/or unique ecosystems
- (v) Criterion 5: Key evolutionary processes

In areas of critical habitat, the client will not implement any project activities unless all of the following are demonstrated:

- No other viable alternatives within the region exist for development of the project on modified or natural habitats that are not critical;
- The project does not lead to measurable adverse impacts on those biodiversity values for which the critical habitat was designated, and on the ecological processes supporting those biodiversity values;
- The project does not lead to a net reduction in the global and/or national/regional population of any Critically Endangered (CR) or Endangered (EN) species over a reasonable period of time; and
- A robust, appropriately designed, and long-term biodiversity monitoring and evaluation program is integrated into the client's management program.

Projects that are located within internationally and/or nationally recognised areas of high biodiversity value may require a CHA. Examples include the following:

- Areas that meet the criteria of the International Union for Conservation of Nature (IUCN) Protected Area Categories Ia, Ib and II.
- Key Biodiversity Areas (KBAs), which encompass Important Bird and Biodiversity Areas (IBAs).

In such cases where a client is able to meet the requirements defined above, the project's mitigation strategy will be described in a Biodiversity Action Plan and will be designed to achieve net gains of those biodiversity values for which the critical habitat was designated.





In instances where biodiversity offsets are proposed as part of the mitigation strategy, the client must demonstrate through an assessment that the project's significant residual impacts on biodiversity will be adequately mitigated to meet the requirements of paragraph 17 of IFC PS6.

## Critical Habitat Assessment Process

CHA is a process to identify those areas of highest biodiversity value which are considered particularly sensitive to impacts and where special attention must be paid. The project type, impacts and proposed mitigation are not considered relevant in the identification of critical habitat and both natural and modified habitats may contain areas that could qualify as critical habitat.

Specific methods for the assessment of biodiversity will inherently be project and site specific, considering the uniqueness of biodiversity at a local level.

The first stage of assessment involves researching and identifying species and protected sites within 50 km of the Project AoI. The Integrated Biodiversity Assessment Tool (IBAT) provides an extensive preliminary dataset. This data is supplemented with the most recent and reliable field data, consultation with local and international experts, and additional desk-based research, for example species that are recorded as present in local designated sites. An assessment is made to determine whether each species or protected site regularly occurs (as per IFC GN6) in the Project AoI. The likelihood of regular occurrence is informed by a species' characteristics, such as the geographical range, habitat requirements, movement patterns, migratory routes, breeding sites and population distribution.


All species that are likely to regularly occur in the AoI and that have the potential to meet IFC GN6 critical habitat criteria are subject to further analysis to determine whether they trigger critical habitat. For those species deemed likely to occur in the Project AoI, an Ecologically Appropriate Area of Analysis (EAAA) may be defined to assist in determining whether the local population forms a significant proportion of the global population.

The approximate location of a project and its AoI should be considered when establishing Step 2, your ecological area of analysis (EcAoA), but the project type, its impacts and its mitigation strategy are irrelevant in carrying out Steps 1 through 3. The definition of the critical habitat and the impacts of a particular project are two unrelated concepts. The definition of the critical habitat is based on the presence of high biodiversity values whether or not a project is to be undertaken in that habitat. Clients should not assert that they are not in critical habitat on the basis of the project's footprint or its impacts. For example, if the biodiversity value is an endangered reptile (that meets the thresholds in Criterion 1), and the client is developing a windfarm in such critical habitat, the client would be in a critical habitat regardless of the impacts (or "non-impacts") of that windfarm. In either case, the client is responsible for recognising the existing biodiversity values of the area in which it is located.

There is no exact science to completing a CHA, however the following steps have been designed based on project experience, and to be compliant with IFC PS6:

Approach to Critical Habitat Assessment	
Step 1: Screening	
1.1 Define appropriate landscapes and/or seascapes for assessment, 1.2 Using a combination of desk-based study (e.g. IBAT), field surveys, stakeholder engagement and expert input, identify biodiversity features likely or potentially	



<p>present within the landscapes and/or seascapes being assessed, and establish a candidate long-list for assessment,</p> <p>1.3 Cross-reference and validate candidate long-list with biodiversity feature experts when appropriate,</p> <p>1.4 Screen candidate long-list to determine if features regularly<sup>7</sup> occur in project area of influence or ecosystem and their likelihood of meeting IFC PS6 critical habitat criteria and thresholds,</p> <p>1.5 Categorise each biodiversity feature with a likelihood score and screen out any feature that is unlikely to meet criteria and thresholds. Validate assumptions made for screening out with biodiversity feature experts.</p>	<b>Iterative Process</b>  Ongoing data collection (surveys, expert consultation, etc) and updates to the CHA
<b>Step 2: Ecologically Appropriate Areas of Analysis</b>	
<p>2.1 For all biodiversity features that scored likely or possible at the screening stage, define the Ecologically Appropriate Area(s) of Analysis (EAAA),</p> <p>2.2 Gather the necessary data and conduct necessary consultation to be able to define the ecological patterns, processes, features and functions that are necessary for maintaining each biodiversity feature under assessment,</p> <p>2.3 Where it can be shown that multiple biodiversity features have largely overlapping ecological requirements, a common or aggregated EAAA may be appropriate,</p> <p>2.4 Gather the necessary data and conduct necessary consultation to quantify local population (or species appropriate surrogate) of biodiversity feature under assessment within the EAAA.</p>	
<b>Step 3: Confirm and Map Critical Habitat</b>	
<p>3.1 Complete assessment to determine whether local population (or species appropriate surrogate) meets or exceeds IFC PS6 critical habitat criteria numerical thresholds,</p> <p>3.2 Validate assumptions with biodiversity feature experts (e.g. IUCN Working Groups),</p> <p>3.3 Map areas of critical habitat using GIS.</p>	

<sup>7</sup> IFC PS6 Guidance Note Paragraph 59 states that ecologically appropriate areas of analysis should be identified for each species with *regular* occurrence in the project's area of influence or ecosystem.



## Appendix B: Biodiversity Survey Results

### Methodology

The first survey visit was to collect a baseline dataset and inform any specific requirements of subsequent surveys, possibly across multiple seasons. This first survey visit fell within the May – September period, which is the migratory season for birds and a variety of species migrate through during different parts of the season. Thus, ideally two survey visits are required within the migratory season to capture the variety of species migrating through, but due to project delays the second survey was undertaken in October. Mammals are most active during summer as winter conditions in the area are typically too harsh for mammals. The survey areas included the project footprint, associated facilities, and the project's Area of Influence (AoI).

- Existing fields were surveyed by vehicle/drone as they were too large to be walked given the time allowance for the visit. It is assumed that sufficient baseline ecology data can be collected using this methodology.
- Local water bodies were checked, such as known ponds, for the presence of amphibians or suitable habitat features including vegetation, rocks, stones etc.
- Water quality sampling at points along the nearby Murun River watercourse was conducted and this included a habitat assessment to determine suitability for supporting fauna and flora.
- Additional non-ecology surveys were carried out during the visit to collect more accurate location data on construction areas.
- Survey team captured as many photos as practical to help inform analysis and report writing. This included not only specific ecological data captured, but also wider landscape and proposed construction area site images.
- Specific consideration for the methods required to survey the eight identified potential Critical Habitat (CH) trigger species were included in the survey strategy. The results of these surveys then informed the subsequent Critical Habitat Assessment (CHA).
  - Yellow-breasted bunting (*Emeriza aureola*); Aves; CR
  - Monogolian Marmot (*Marmota sibirica*); Mammalia; EN
  - Hoffmann's Pika (*Ochotona hoffmanni*); Mammalia; EN, Restricted Range
  - Far Eastern Curlew (*Numenius madagascariensis*); Aves; EN
  - Pallas's Fish-eagle (*Haliaeetus leucoryphus*); Aves; EN
  - Steppe Eagle (*Aquila nipalensis*); Aves; EN
  - Saker Falcon (*Falco cherrug*); Aves; EN
  - Relict Gull (*Larus relictus*); Aves; Restricted Range

### 7.1.1 Vegetation Survey

The survey team completed the detailed geobotanical recordings using the method developed by A. P. Shennikov (1964) to determine a species composition and to estimate a canopy cover of vegetation. At each site, we selected 3-5 plots for geobotanical assessment within selected sites (standard plot size was 10m by



10m). For the estimation of relative abundance of species we used an evaluation method developed by O. Drude (Shennikov 1964). Nomenclature followed V. I. Grubov 1982 (The Key to Vascular Plants of Mongolia).

We collected the following data from our survey area during the field survey:

- The location of survey points and photograph of plant community;
- The species richness by using the method of richness in flora, and then check the species name from Grubov (2007);
- Vegetation condition was assessed by using B.J. Keighery scale. Vegetation condition means the rating given to native vegetation using the Keighery scale and refers to the degree of change in the structure, density, and species present in the particular vegetation in comparison to undisturbed vegetation of the same type.
- Plant species abundance was estimated based on the amount and coverage of plants, recorded in Drude scales: soc (socialis) – the dominant species, frequency of occurrence/coverage exceeds 90%; cop3 (copiosus) – an abundant species, frequency of occurrence/coverage is up to 80%; cop2 – a species is represented by numerous individuals, frequency of occurrence/coverage is up to 20%; cop1 – frequency of occurrence/coverage is up to 4%; sp (sparsus) – frequency of occurrence/coverage about 0.8%; sol (solitarius) – scanty individuals, frequency of occurrence/coverage not exceeds 0.16%; un (unicum) – a single individual;
- Determine the species abundance using by the method of Braun-Blanquet; such as plants, litter, stone, and bare ground;
- A list of all the plants and assessment of the vegetation canopy;
- Species diversity: The Shannon's Diversity Index is a way to measure the diversity of species in a community. The higher the value of  $H'$  the higher the diversity of species in a particular community. The lower the value of  $H'$  the lower the diversity. A value of  $H = 0$  indicates a community that only has one species. Value of  $H'$  - Up to 1 is bad, 1-2 is average, 2-3 is good, and more than 3 is considered very good.

$$H' = - \sum_{i=1}^s P_i \log P_i$$

$H'$  - Species diversity

Log – Natural log

s – Total of number species

$P_i$  – The proportion of the entire community made up of species  $i$

The Shannon Equitability Index is a way to measure the evenness of species in a community. The term "evenness" simply refers to how similar the abundances of different species are in the community.

Denoted as EH, this index is calculated as:

$$EH = H / \ln(S)$$

H: The Shannon Diversity Index

S: The total number of unique species

This value ranges from 0 to 1 where 1 indicates complete evenness.

### 7.1.2 Fauna Survey

The fauna survey was conducted using appropriate methodology for each group of animals and specified in the following table.

Survey Type	Methodology	Equipment Required
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<b>Mammal</b>	<ul style="list-style-type: none"> <li>Walking transect survey to detect signs of activity/presence such as wildlife trails, prints, faeces, burrows/signs of habitat use.</li> <li>Walking the preferred method however, if not practical/safe to do so, then driving/drone surveys can be carried out.</li> <li>Track routes surveyed via GPS.</li> <li>Specific consideration of CH trigger species: <ul style="list-style-type: none"> <li>Mongolian Marmot (<i>Marmota sibirica</i>)</li> <li>Hoffmann's Pika (<i>Ochotona hoffmanni</i>)</li> </ul> </li> </ul>	GPS tracker; Survey writing equipment; Off-road vehicle; Drone; Camera; Binoculars
<b>Birds</b>	<ul style="list-style-type: none"> <li>Walking transect survey for visual ground/inflight detection and any nesting activity.</li> <li>Vantage Point (VP) observations to be carried out if higher areas are practical/safe to use.</li> <li>If dense areas of vegetation are present, then recommend 30-minute stationary assessment (if practical given time allowance).</li> <li>Track routes surveyed via GPS.</li> <li>Specific consideration of CH trigger species: <ul style="list-style-type: none"> <li>Yellow-breasted bunting (<i>Emeriza aureola</i>)</li> <li>Far Eastern Curlew (<i>Numenius madagascariensis</i>)</li> <li>Pallas's Fish-eagle (<i>Haliaeetus leucoryphus</i>)</li> <li>Steppe Eagle (<i>Aquila nipalensis</i>)</li> <li>Saker Falcon (<i>Falco cherrug</i>)</li> <li>Relict Gull (<i>Larus relictus</i>)</li> </ul> </li> </ul>	GPS tracker; Survey writing equipment; Off-road vehicle; Camera; Binoculars
<b>Reptiles</b>	<ul style="list-style-type: none"> <li>Walking transect survey through suitable habitat.</li> <li>Check for signs of activity such as burrows, including reptile refugia e.g. rocks, logs, scrap metal etc. if safe to do so.</li> <li>Track routes surveyed via GPS.</li> </ul>	GPS tracker; Survey writing equipment; Off-road vehicle; Camera; Binoculars
<b>Amphibians</b>	<ul style="list-style-type: none"> <li>Walking survey of waterbody within Homestead site.</li> <li>Checking the Homestead waterbody for presence of amphibians or suitable habitat features such as vegetation, rocks, stones etc.</li> <li>Other suitable waterbodies to be surveyed as per above.</li> </ul>	GPS tracker; Survey writing equipment; Off-road vehicle; Camera; Binoculars

### Point Count

Point count (Ungulate): Only plains and rolling hill country were considered suitable for the survey. Observation points had to be elevated and ideally allow for a largely unobstructed 360° view. Estimating distances, the most crucial aspect for the distance sampling approach, estimated satellite image views of each observation point with distance rings at 100, 500, 1000, 2000, 3000 meters around the observation point. Observer spent 20 minutes at one point each, scanning the surrounding with 8x42 binoculars 360° clockwise starting from north. Once an animal or group of animals were spotted, observers used a compass



to measure the bearing, a watch to determine time of observation and a map to help estimate the distance of the observation.

## Typical Wildlife Signs

Signs of wildlife presence, such as tracks, scat, and feeding remains were documented: The observations may include the animal in question but must also collect photographic evidence of tracks, scat, remains (such as bones or shed antlers), feathers, an identifiable den or nest, or other features that could be used to identify the animal. Observers walked along predetermined routes for five days.

## Transect

Transect (Birds): Transect surveys were conducted to gather data on bird species distribution and habitat preferences. Observers walked along predetermined routes for five days. Binoculars, specifically the 10x42 Nikon Prostaff 3s and Vortex Crossfire, were used to aid in species identification. During the surveys, encountered bird species were noted down, and their behaviour was recorded.

The data collected during the field studies allowed for the following observations and findings:

1. Species Diversity: A diverse range of bird species was observed in the study area. Species richness and diversity were assessed based on the encounters during the transect surveys.
2. Breeding Information: Observations made during the monitoring period included breeding behaviours and evidence of nesting activities. Breeding bird species and their preferred habitats were identified, contributing to our understanding of local breeding populations.
3. Notable Findings: Any remarkable or significant findings during the monitoring period, such as rare or uncommon species sightings, behavioural observations, or noteworthy ecological interactions, were documented and recorded.

## Survey Questionnaire

The survey team gathered information and insights from local communities. Anecdotal evidences were collected from 11 residential area around Ulziit village, Kherlen soum and workers of Metagro LLC.

Community interview questionnaire for faunal survey

1. Date: \_\_\_\_\_

2. Interviewer: \_\_\_\_\_

3. Name of the interviewee: \_\_\_\_\_

4. Location: \_\_\_\_\_

5. How many years have you lived in this area? \_\_\_\_\_

6. What fauna species have you seen in this area?

#	Local and scientific name	Description	Number and dates of places observed in the past and recently	Other explanations
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

7. Have you seen any rare animal species in the area? If yes, please name these species.

8. Have you also seen these species with a focus on the potential 9 Critical habitat trigger species?

9. What trends have they seen in the presence/absence of the animal species?

10. Which species do you see?

11. Which areas do you see them in?

12. How frequently do you see them?

13. What (benefit) do you see to these species?

14. Do you think the project will affect any of these species?

15. Do wildlife have your landmarks in this area?

Local and scientific name	Type of damage/loss	When? Where? How many?	Description	Date

16. This was a traditional hunting area, is it still?

Hunting species	Why do it (for meat, for control predators etc)	Hunting season

17. Other notes:

Appendix to the community interview questionnaire for faunal survey

1. Mongolian Marmot (Marmota sibirica) CN

2. Red-tailed Hawk (Bubo urus) CN

3. Yellow-bellied Sapsucker (Picus psittacus) CN

4. Great Horned Owl (Bubo virginianus) CN

5. Golden Eagle (Aquila chrysaetos) CN

6. Common Raven (Corvus corax) CN

7. Common Crow (Corvus cornix) CN

8. Common Magpie (Pica pica) CN

9. Common Starling (Sternia bergii) CN

10. Common Pheasant (Phasianus versicolor) CN

11. Common Quail (Coturnix coturnix) CN

12. Common Partridge (Ardeotis scottii) CN

13. Common Gull (Larus argentatus) CN

14. Common Duck (Anas platyrhynchos) CN

15. Common Frog (Rana chrysina) CN

16. Common Snake (Elaphe bimaculata) CN

17. Common Lizard (Lacerta agilis) CN

18. Common Insect (Coleoptera) CN

19. Common Bird (Columba livia) CN

20. Common Mammal (Canis lupus) CN

Figure 15. Image of the survey questionnaire used in the data collection





During the field work we did a total of 38 geobotanical recordings (some geobotanical recordings are repeated)

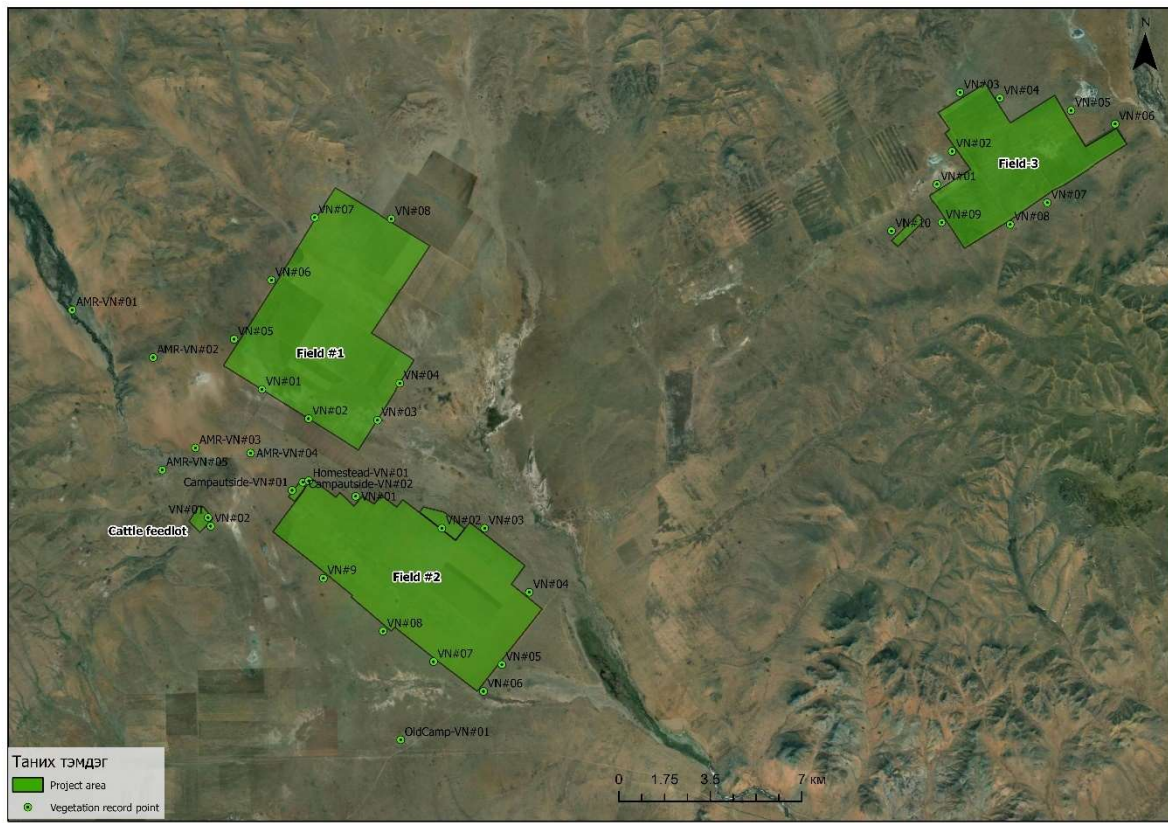


Figure 16. Geobotanical record (June 2023)



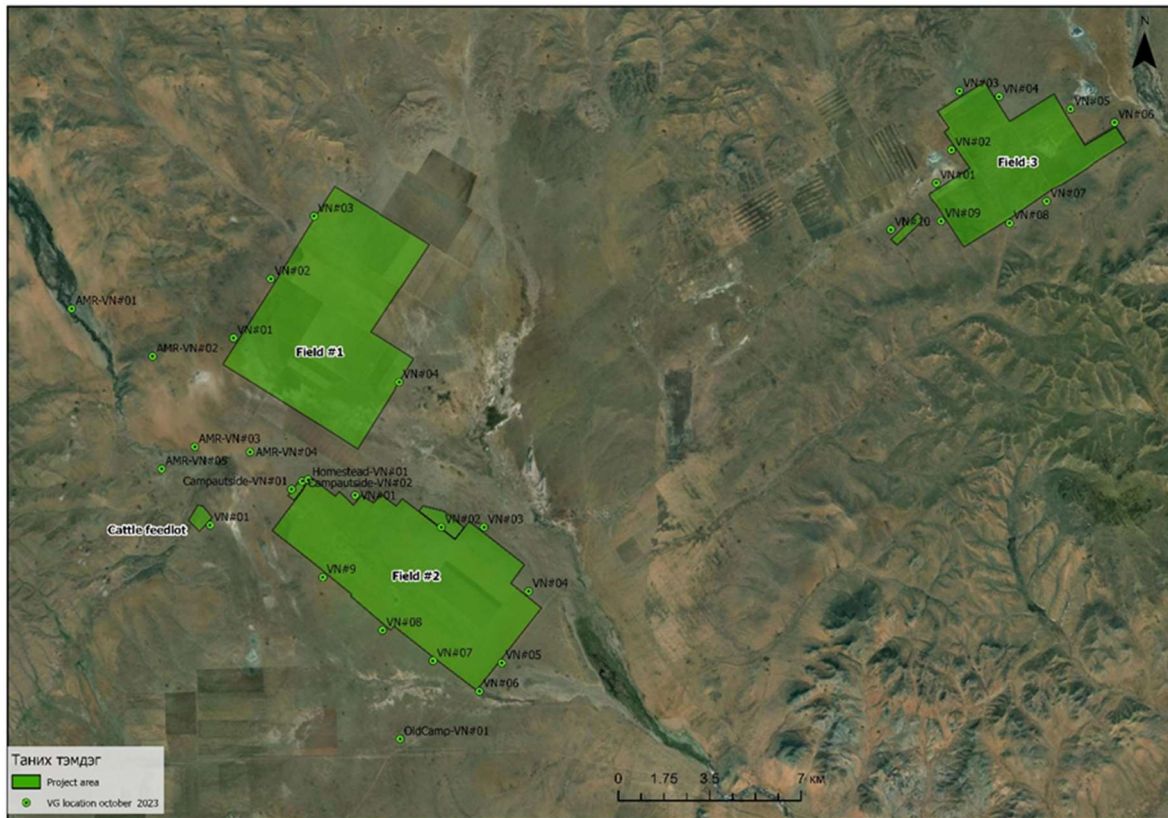


Figure 17. Geobotanical record (October 2023)



## Survey Results

### 7.1.3 Species identified during the surveys

#### Vegetation

The vegetation survey utilised industry recognised botanical survey techniques to assess 10m x 10m plots to determine plant cover and vegetation characteristics. This technique was used to calculate the percentage of vegetation cover per community according to the Drude scale.

For the Aol, on average, 12 to 18 plant species were recorded per 10 x 10 m plot of vegetation cover. A total of 57 species of plant species in the Project area and its vicinity were recorded during the field survey. To determine the floral community composition, 31 plots were selected and recorded. In most cases, vegetation cover was degraded, and vegetation cover was between 40-70%, sedge cover 10-30%, and barren land area 25-35%. During the survey, very rare and rare floral species were not recorded in the Aol.

There were five vegetation communities distributed within the Metagro site area. Out of which, the most commonly distributed vegetation community were grass-forb, grass-carex, grass-forb-artemisa. Dominant species were: *Stipa glareosa*, *Stipa krylovii*, *Agropyron cristatum*, *Cleistogenes squarrosa*, *Carex duriuscula*, *Artemisa adamsii*, *Aretmisa frigida*, *Caragana pygmaea*, *Convolvulus ammanii*, *Haplophyllum dauricum*, *Potentilla sericea*, *Medicago ruthenica*, and *Saussurea amara*.

Vegetation condition along the nearby Murun river was 80-90% and noted as a key habitat area for fauna.

As a result of the vegetation survey, one (1) plant species (*Allium anisopodium* - Шувуун хөл /сарвуун/) was recorded, which is listed as a rare plant species in the appendix to Mongolian Government Resolution No. 153 of 1995.

#### Species composition

##### June 2023 survey result

The survey conducted around flora registered a total of 56 vascular plant species belonging to 47 genera and 21 families. During the survey, the area was very arid and dry, and pastures were degraded.

##### October 2023 survey result

The survey conducted around flora registered a total of 54 vascular plant species belonging to 43 genera and 18 families. During the survey, the area was very arid and dry, and pastures were degraded. At the time of the survey, most of the plant species recorded had turned yellow.

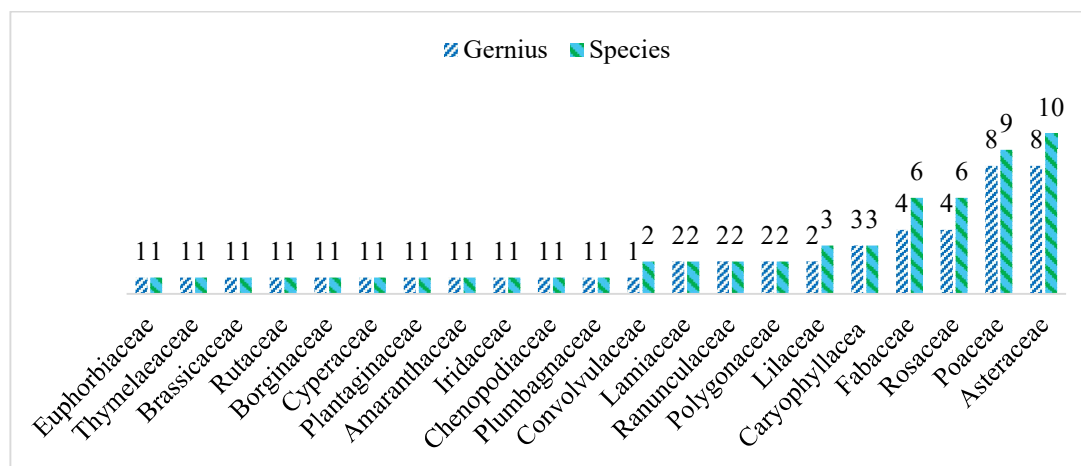


Figure 18. Taxonomy analysis of Metagro project site (as of June 2023)

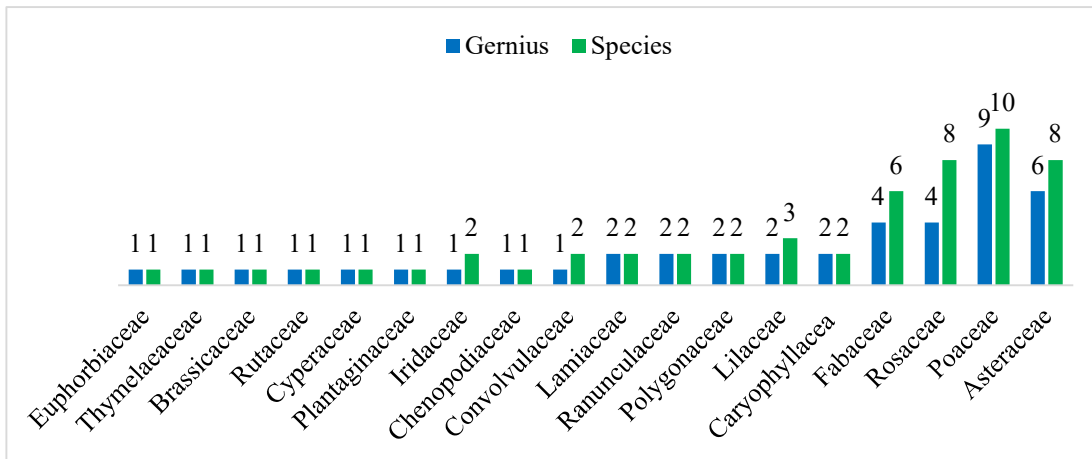


Figure 19. Taxonomy analysis of Metagro project site (as of October 2023)

It was observed that perennial and herb plants are dominant in vegetation survey sites.

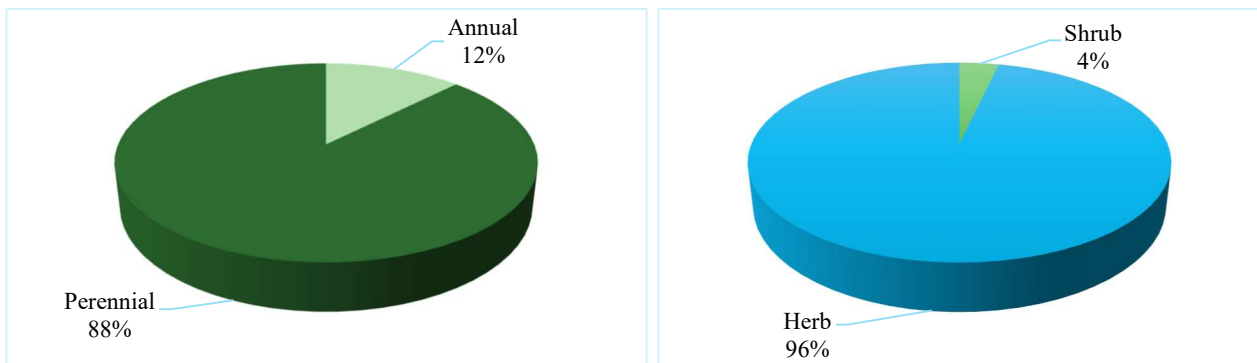


Figure 20. Analysis of the life forms (as of June 2023)

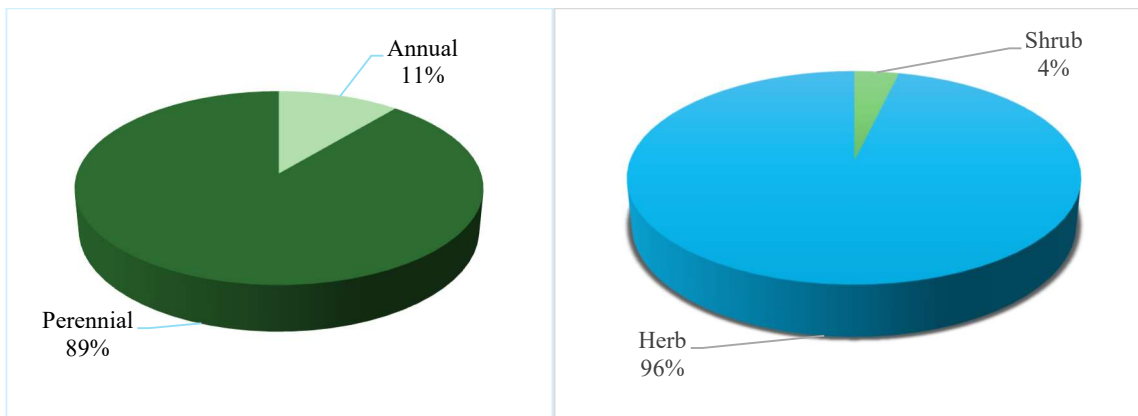


Figure 21. Analysis of the life forms (as of October 2023)

### Species richness

Species richness is the number of species within a community or area. Species richness was greatest in arable land and along the Murun river.

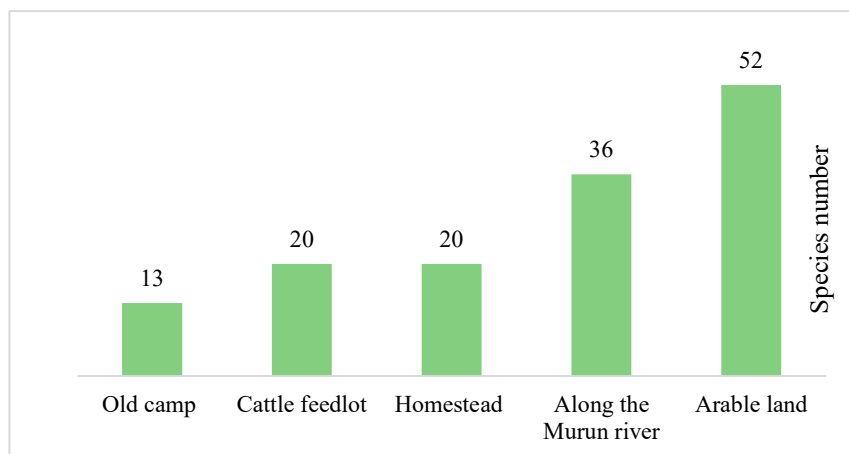


Figure 22. Species richness (as of June 2023)

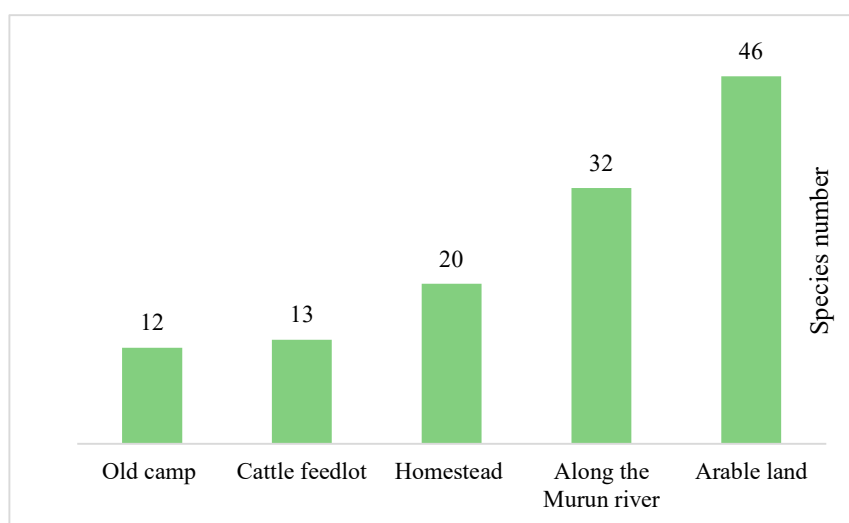


Figure 23. Species richness (as of October 2023)

#### Species diversity index

The species diversity of the group depends on the species richness, abundance and relative uniformity of the plant species. Determining the species diversity by Shannon's method, many species were evenly distributed around the arable land area and along the Murun River.

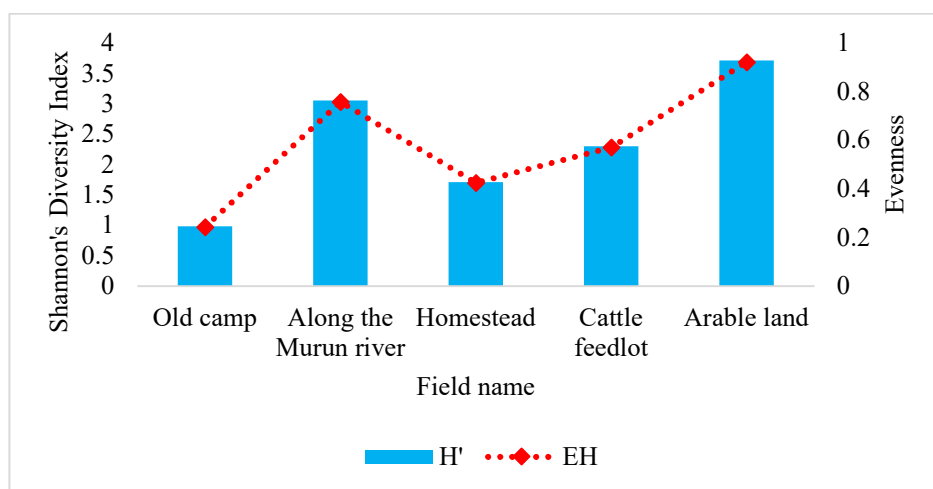


Figure 24. Shannon's diversity index of species (as of June 2023)

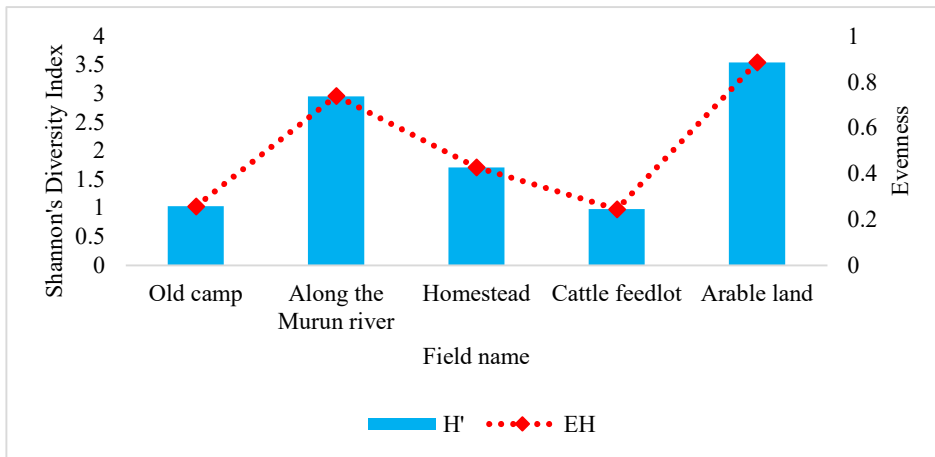


Figure 25. Shannon's diversity index of species (as of October 2023)

### Vegetation Cover

Vegetation cover is the area of the ground surface covered by vegetation or other coverages including stones, litter (dried plants), or bare ground. Cover is expressed in percentage (%) of area.

Not only there was a high percentage of vegetation cover along the Murun River, but also no barren land were observed. In contrast, along the old camp, there was less vegetation cover and more barren land.

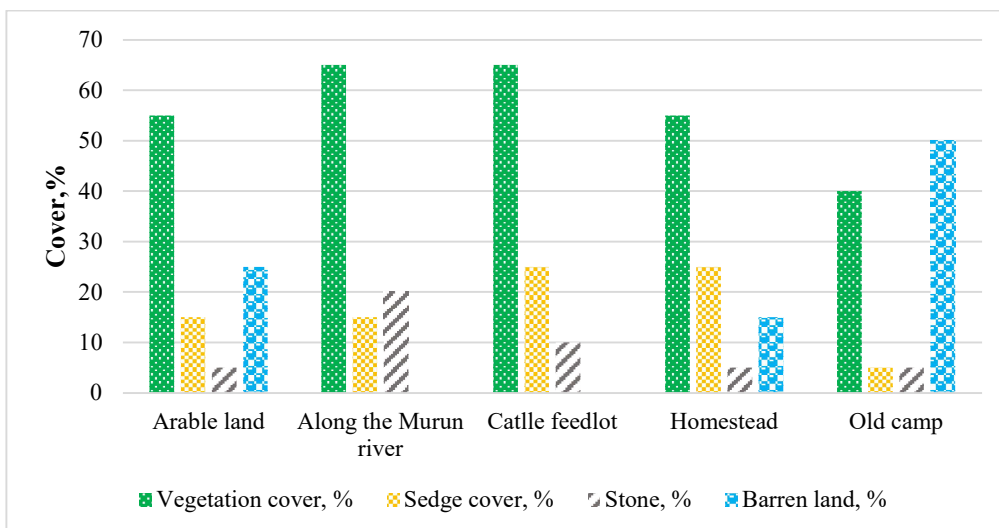


Figure 26. Vegetation cover (as of June 2023)



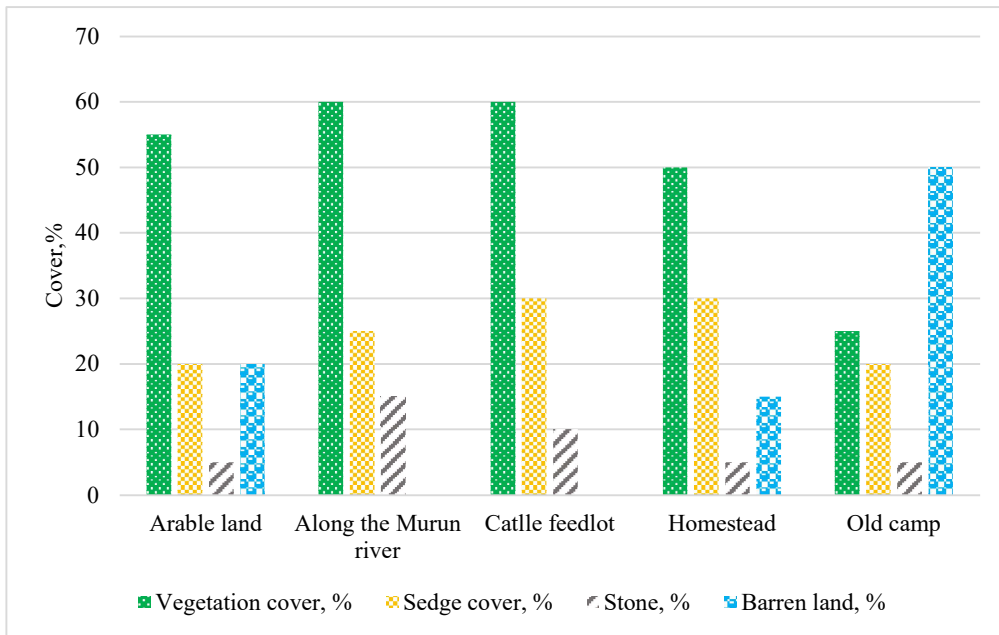


Figure 27. Vegetation cover (as of October 2023)

## Fauna

The following figure shows fauna survey GPS tracks and observation points of wildlife recorded during surveys in Metagro project sites in June and October 2023.

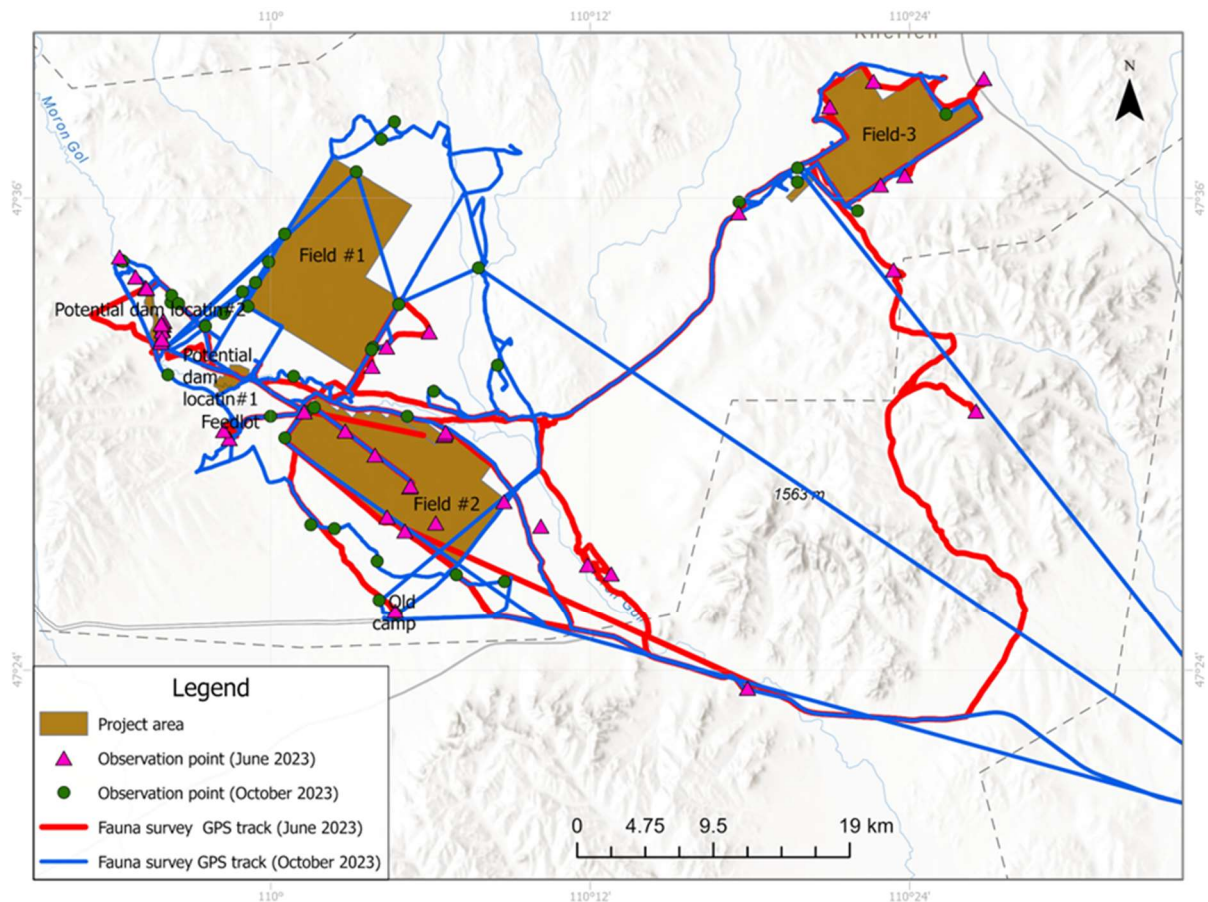


Figure 28. Fauna survey GPS tracks and observation points of wildlife



## Mammals

### June 2023 survey

During the field survey, 4 species of mammals; ; Mongolian gazelle (*Procapra gutturosa*), Bradt's vole (*Lasiopodomys brandtii*), Monglian marmot (*Marmota sibirica*), and red fox (*Vulpes vulpes*), were recorded along the arable land and Murun river, and no mammals were recorded in the cattle feedlot and homestead area.

Table 2. List of mammal species identified by the June survey

No.	Latin name	English name	Arable land			Along the Murun river	Methods	
			Field 1	Field 2	Field 3		Point count	Wildlife typical signs
Least concern								
1	<i>Procapra gutturosa</i>	Mongolian gazelle	6	-	13	-	+	-
2	<i>Lasiopodomys brandtii</i>	Brandt's vole	Nest			-		+
Near Threatened								
3	<i>Marmota sibirica</i>	Mongolian marmot	-	-	-	5	+	-
Endangered								
4	<i>Vulpes vulpes</i>	Red fox	-	-	-	1	+	-



Figure 29. *Procapra gutturosa* (Mongolian gazelle)



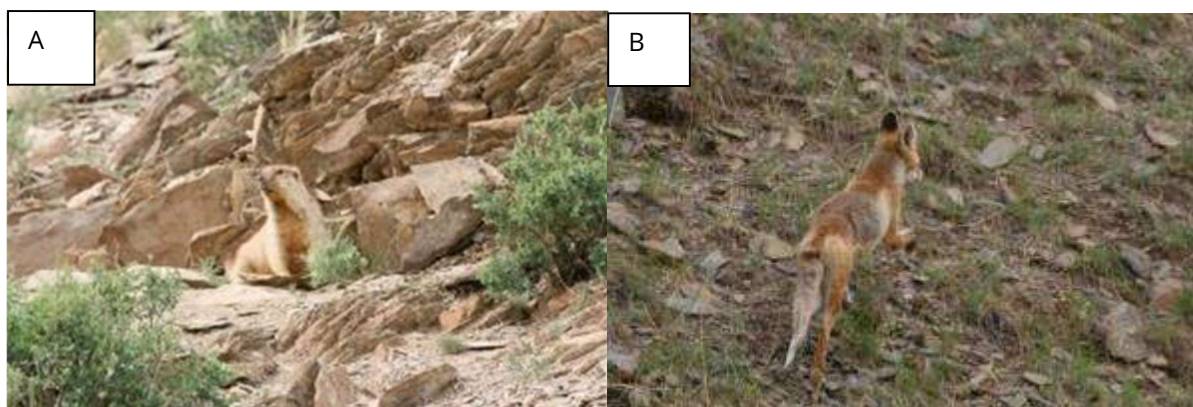


Figure 30. Mammals observed during survey done in June 2023 (A. *Marmota sibirica*, B. *Vulpes vulpes*)

#### October 2023 survey

During the field survey, 2 species of mammals were recorded along the river, and no mammals were recorded in the cattle feedlot, arable land and homestead area.

Table 3. List of mammals identified in the October survey

No.	Latin name	English name	Arable land			Along the Murun river	Methods	
			Field 1	Field 2	Field 3		Point count	Wildlife typical signs
Least concern								
1	<i>Vulpes corsac</i>	Corsac fox			-	-	+	+
2	<i>Lasiopodomys brandtii</i>	Brandt's vole	Nest			-		+



Figure 31. *Lasiopodomys brandtii* (Brandt's vole)



Figure 32. *Vulpes corsac* (Corsac fox)

### Reptiles

#### June 2023 survey result

During the survey, no reptiles were observed. However, according to anecdotal evidence, two (2) species of snakes including the Siberian pit viper (*Gloydius Halys*) and the slender racer (*Orientocoluber spinalis*) might occur in the region.

#### October 2023 survey result

No reptile species of were observed during the field survey done in early October 2023.

### Amphibians

#### June 2023 Survey

One species of amphibian, Mongolian toad (*Strauchbufo raddei*), was observed and recorded during the field survey done in later June and early July.

No.	Latin name	English name	Conservation status		Arable land - Field 3	Along the Murun river	Home stead	Methods
			Global	Regional				Point count
1	<i>Strauchbufo raddei</i>	Mongolian toad	LC	LC	2	5	1	+





Figure 33. Mongolian toad (*Strauchbufo raddei*) observed along the Murun river

#### October 2023 survey result

No amphibian species were observed during the field survey done in early October 2023.

#### Birds

##### June 2023 survey

A total of 2,104 individual birds belonging to 41 species were recorded during the June/July 2023 survey visit. The distribution of species and their respective counts varied across different locations. The most common species observed in the study area was the Mongolian lark (*Melanocorypha mongolica*). At the homestead and old camp there were 72 individuals recorded, comprised of 17 species, and at the cattle feedlot there were 43 individuals recorded, comprised of nine species. In contrast, the arable land displayed the highest number of birds at 1,382 individuals, comprised of 20 species. Along the Murun river and dam, 36 species, 607 individuals, were observed.

Table 4. Observed bird counts during the field work

No.	Observation Location	Bird Species	Total Number
1	Arable land	20	1382
2	Cattle feedlot	9	43
3	Old camp	5	24
4	Homestead	12	48
5	Along the Murun river	18	536
6	Along the Dam 2	18	71



In the study region several abundant species were observed. Those species include the *Melanocorypha mongolica*, *Eremophila alpestris*, *Passer montanus*, and *Calandrella branchydactyla* etc (Table 5).

Table 5. Commonly observed bird species

No.	Latin name	English name	IUCN Red List status		Total number
			Regional	Global	
1	<i>Buteo hemilasius</i>	Upland Buzzard	LC	LC	5
2	<i>Anthropoides virgo</i>	Demoiselle Crane	LC	LC	12
3	<i>Melanocorypha mongolica</i>	Mongolian Lark	LC	LC	401
4	<i>Aegypius monachus</i>	Cinereous Vulture	LC	NT	4
5	<i>Eremophila alpestris</i>	Horned lark	LC	LC	407
6	<i>Calandrella branchydactyla</i>	Greater Short-toed Lark	LC	LC	405
7	<i>Passer montanus</i>	Eurasian Tree sparrow	LC	LC	326
8	<i>Passer domesticus</i>	House sparrow	LC	LC	334
9	<i>Petronia petronia</i>	Rock Sparrow	LC	LC	20
10	<i>Milvus migrans</i>	Black kite	LC	LC	6
11	<i>Oenanthe Oenanthe</i>	Northern Wheater	LC	LC	17
LC-Least concern, NT- Near threatened					

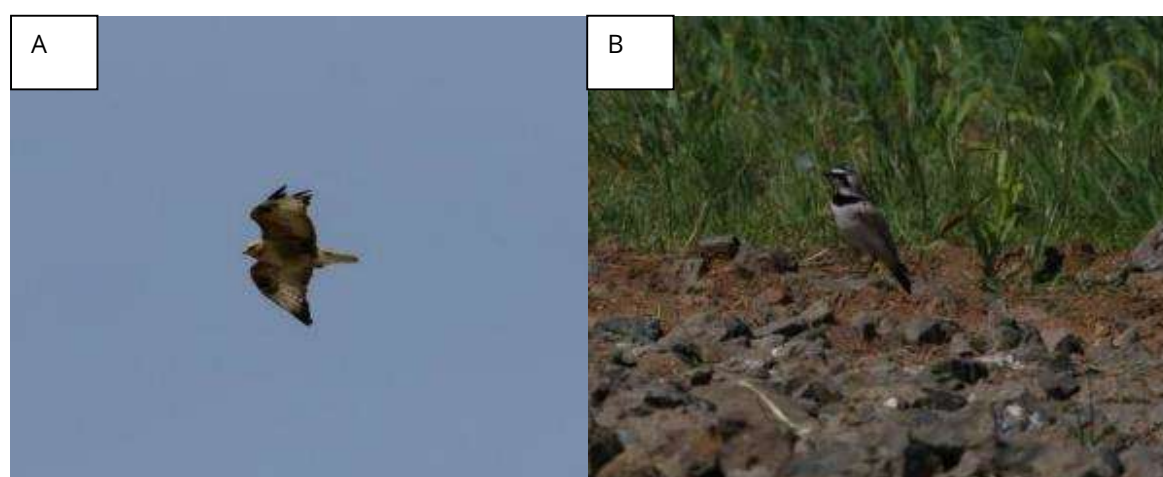


Figure 34. Most abundant bird species (A. *Buteo hemilasius*, B. *Eremophila alpestris*)

A rare bird species was observed and recorded in the survey area, which is classified as endangered according to the IUCN list, Steppe Eagle (*Aquila nipalensis*). No other CR, EN or VU species were recorded in this survey.



Figure 35. Steppe Eagle (*Aquila nipalensis*).

#### October 2023 survey

A total of 1166 individuals belonging to 28 different bird species were observed in the October 2023 survey. The distribution of species and their respective counts varied across different locations. The most common species observed in the study site was Mongolian lark (*Melanocorypha mongolica*).

At the homestead and old camp revealed 13 bird species, with a combined count of 239 individuals. Cattle feedlot, 2 bird species were observed, also amounting to 119 individuals. In contrast, the Arable land displayed the highest diversity of bird species, with 20 species observed but with a total count of 637 individuals. (Table 6). Along the Murun river and Dam 2, 9 species were observed, a total of 165 individuals.

Table 6. Observed bird counts during the field work

No.	Observation Location	Bird Species	Total Number
1	Arable land	13	637
2	Cattle feedlot	2	119
3	Old camp	7	32
4	Homestead	12	207
5	Along the Murun river	6	45
6	Along the Dam 2	5	120

There were several abundant species in the study region which are detailed in the table below.

Table 7. Most abundant bird species

No.	Latin name	English name	IUCN Red List status		Total number
			Regionally	Globally	



1	<i>Buteo hemilasius</i>	Upland Buzzard	LC	LC	18
2	<i>Circus cyaneus</i>	Hen harrier	LC	LC	12
3	<i>Melanocorypha mongolica</i>	Mongolian Lark	LC	LC	401
4	<i>Aegypius monachus</i>	Cinereous Vulture	LC	NT	41
5	<i>Eremophila alpestris</i>	Horned lark	LC	LC	170



Figure 36. Most abundant bird (A. *Buteo hemilasius*, B. *Eremophila alpestris*)

A Pallas's fish eagle (*Haliaeetus leucoryphus*) was observed in the October survey and was also mentioned by the local community as being present.

The full list of all birds recorded during both the June and October surveys will be presented in the full ESIA.





## Appendix C: Detailed Assessment of Criterion 1 – Critically Endangered (CR), Endangered (EN) and Vulnerable (VU) Species

This section comprises the CHA of the Critically Endangered (CR), Endangered (EN) or Vulnerable (VU) species that may regularly occur in the AoI and meet IFC GN6 critical habitat Criterion 1 thresholds.

### Criterion 1 thresholds 1a and 1b assessment

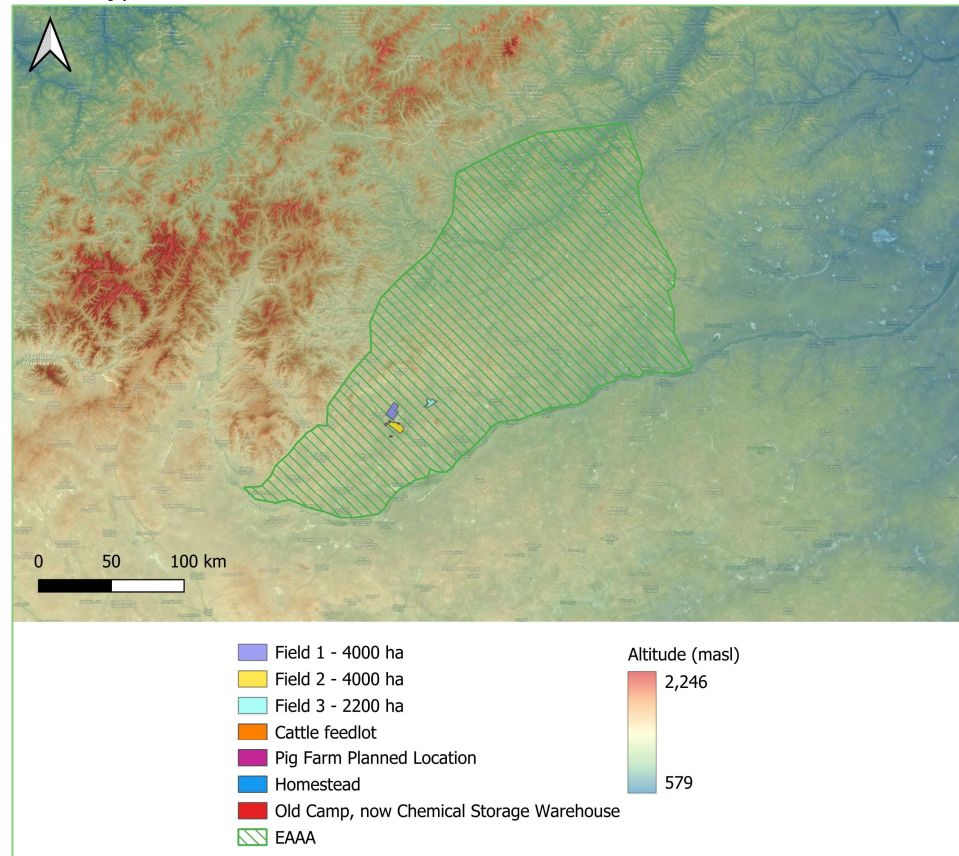
Scientific Name	Common Name	IUCN Red List Status	Critical Habitat Triggered	Justification
<i>Emberiza aureola</i>	Yellow-breasted bunting	CR	No	The site is at the edge of this species known breeding extant. Severe declines of this species have been noted in Mongolia. It breeds in wet meadows with tall vegetation and scattered scrub, riverside thickets and secondary scrub. It winters in large flocks in cultivated areas, rice fields and grasslands, preferring scrubby dry-water rice fields for foraging and reedbeds for roosting (T. Gray in litt. 2007). The breeding season is normally from the second half of June to the beginning of July. The nest is built by the female alone and is placed either on the ground in a depression under tussocks or roots or slightly above ground in well covered vegetation. The species is migratory, wintering from central and eastern Nepal, Bangladesh, north-east India east to south-east China (Guangdong) and Taiwan (Province of China), south to the north Malay Peninsula and south-east Asia (Copete and Sharpe 2016). eBird has some records of this species in the Project site area, but this species was not observed during the June/July 2023 survey which coincides directly with the breeding season. It was also not observed in the October survey. <b>Critical habitat is not triggered.</b>



<i>Grus leucogeranus</i>	Siberian Crane	CR	No	The Siberian Crane is a rare migrant and summer visitor that has been reported to breed in central Mongolia and close to the Russian-Mongolian border in the past. The species covers less than 1% of the country and birds have been recorded in summer in eastern Mongolia. Globally, the population estimation is 3500-4000 individuals based on counts done in 2008, 2011 and 2012. However, national population numbers are unknown. According to IUCN this species' range does not overlap with the project Aol. Breeding occurs in territorial pairs at a density estimated in the 1970s to be around one pair per 625 km <sup>2</sup> . The Siberian Crane is the most aquatic member of its family, breeding and wintering in wetlands, and shows a general preference for wide expanses of shallow (up to 30 cm) fresh water with good visibility. It discriminates strongly in favour of sites that are infrequently visited by people. All these factors suggest it is highly improbable that this species will be present in the Aol and thus, <b>critical habitat is not triggered</b> .
<i>Acipenser baerii</i>	Siberian sturgeon	CR	No	The Siberian Sturgeon occupies an area of less than 10km <sup>2</sup> with three spawning sites (two in the Selenge River and one in the Orkhon River). <b>Therefore, critical habitat is not triggered.</b>
<i>Marmota sibirica</i>	Mongolian marmot	EN	Yes	The Project site is part of this species known extant (resident). This species known distribution is in piedmont and mountain steppes and alpine meadows (up to 3,800 m above sea level (ASL) in Tuva, and Transbaikalia (Russia), Mongolia, and China (Nei Mongol, Heilongjiang). In Mongolia there are two subspecies; <i>M.s. sibirica</i> which is known to be distributed in eastern steppe habitats in the Khentii Mountain Range, and <i>M. s. caliginosus</i> which occurs in northern, western and central Mongolia, including Hangai, Hövsgöl and the Mongol Altai mountain ranges (Adiya 2000). Once common in Mongolia, hunting has fragmented its distribution and led to an estimated 70% decline in population size during the 1990s (Batbold 2002). Numbers are believed to have since declined even further (K. Olson pers. comm). The species inhabits open steppe, semi-desert, forest-steppe, mountain slopes and valleys. Marmots of all ages forage on grasses, but also on 10-15 species of herbs and a few woody plants such as sagebrush. Autumn hibernation is initiated in September but is influenced by summer food conditions and fall weather. Predators include wolves, red foxes, and several species of large eagles and hawks. Mating begins in April, after they have aroused from hibernation. Gestation lasts 40-42 days. Young marmots appear above ground in June; typical litter



size is four-six, occasionally eight. Five individuals were observed during the June/July 2023 survey along the Murun river. There were no wildlife signs of burrowing or grazing. Marmots are known to use both grazed (modified habitat) or ungrazed steppe (natural habitat) as they burrow in both habitat types.<sup>8</sup>



8

[https://www.researchgate.net/publication/230788788\\_Complementary\\_effects\\_of\\_disturbance\\_by\\_livestock\\_and\\_marmots\\_on\\_the\\_spatial\\_heterogeneity\\_of\\_vegetation\\_and\\_soil\\_in\\_a\\_Mongolian\\_steppe\\_ecosystem](https://www.researchgate.net/publication/230788788_Complementary_effects_of_disturbance_by_livestock_and_marmots_on_the_spatial_heterogeneity_of_vegetation_and_soil_in_a_Mongolian_steppe_ecosystem).



				<p>Determining an EAAA on ecological grounds for this species was challenging. It's adaptability at using both natural and modified habitats and the surrounding, wide ranging steppe habitat known to be preferred habitat meant significant geographical features were used to define the EAAA instead. The EAAA is therefore bounded by the Kherlen river to the south of the site, the Khentii mountains to the north and as an eastern boundary could not be readily delineated, the province boundary was used. Despite efforts, engagement with experts to provide a better understanding of a suitable EAAA and estimates of potential local population was not possible. Due to data deficiency therefore a precautionary approach is taken. As per PS6 GN65 the EAAA was used as proxy against global extent of occurrence (EOO) to determine significance of the local area. The EAAA covers 36,800 km<sup>2</sup> whilst the EAO covers just over 2 million km<sup>2</sup>, meaning the EAAA constitutes 1.84% of the EOO, exceeding criterion 1a thresholds. Therefore, <b>critical habitat is triggered</b>.</p>
<i>Ochotona hoffmanni</i>	Hoffmann's pika	EN	No	<p><i>Ochotona hoffmanni</i> is known to occur in two restricted ranges. It occupies the subalpine regions of the Hentiyn Nuruu ridge of the Bayan-Ulan range in Mongolia, as well as the Erman Mountain range of the Russian Federation. The ranges do not directly overlap the Project site and is around 40km at their closest points. Therefore, unlikely to be present in the Aol. <b>Critical habitat is not triggered</b>.</p>
<i>Numenius madagascariensis</i>	Far eastern curlew	EN	No	<p>This species breeds in eastern Russia, from the upper reaches of the Nizhnyaya Tunguska river east though the Verkhoyarsk mountains to Kamchatka, and south to Primorye and north-eastern Mongolia (del Hoyo et al. 1996). The known global population has recently been estimated at 32,000 individuals (Wetlands International 2015), including 28,000 in Australia (Bamford et al. 2008). The known global population is declining, as indicated by reduced numbers at stopover points in the Republic of Korea and Japan, and a rapid decline in the number of non-breeding individuals wintering in Australia and New Zealand. The species breeds on open mossy or transitional bogs, moss-lichen bogs and wet meadows, and on the swampy shores of small lakes; in the non-breeding season it is essentially coastal, occurring at estuaries, mangrove swamps, saltmarshes and intertidal flats, particularly those with extensive seagrass (Zosteraceae) meadows. It often roosts in salt-marshes, behind mangroves, or on sandy beaches (del Hoyo et al. 1996). As well as tidal flats, salt-pans in the Inner Gulf of Thailand provide important roosting and feeding sites for overwintering shorebirds such as <i>N. madagascariensis</i> (Sripanomyom et al. 2011). The Project site does not contain the preferred habitat type for this species, as supported by the June/July 2023 field surveys, and it is highly unlikely that this species will be present. <b>Critical habitat is not triggered</b>.</p>
<i>Haliaeetus leucoryphus</i>	Pallas's fish-eagle	EN	No	<p>The Project site is part of this species' known non-breeding extant. This species was previously thought to be a migratory breeder north of the Himalayas, with a stronghold in Mongolia, and a resident population in the Indian subcontinent, recent evidence and re-evaluation of historical data has since suggested that this is not, and may never have been, the case. Surveys in Mongolia</p>



				<p>between 2005-2009 found the species to be absent from 13 of 21 historically known sites (Gilbert et al. 2014) and found very little evidence for the species breeding anywhere north of the Himalayas. Further surveys in Mongolia between June-August in 2012-2015 similarly found no evidence of breeding. The species may instead breed only in northern India (apparent strongholds in Assam and Uttarakhand), Bangladesh and Myanmar, with very small numbers in Bhutan, dispersing north of the Himalayas to Kazakhstan, Russia and Mongolia in its non-breeding season (May to September). It is closely associated with wetlands, principally large lakes and rivers, from the lowlands to 5,000 m ASL, and it is known generally to nest in trees near water. Based on surveys and available data from across the species' known extant distribution, the population is estimated to fall well below 2,500 mature individuals (M. Steele and M. Gilbert in litt. 2016). It is therefore placed here in the band 1,000-2,499 mature individuals. The known global population is considered to comprise a single migratory population, rather than multiple isolated subpopulations (Steele 2017). There are no recordings of this species in the immediate vicinity of the site on eBird or GBI. This species was not observed during the June/July 2023 survey but one was recorded in the October survey. One resident also identified this species to be present in the project area. This individual was likely on passage to its breeding grounds south of the Himalayas. As this was the only individual observed and the Aol does not represent suitable habitat of significant value for this species, it is <b>not deemed critical habitat</b>.</p>
<i>Oxyura leucocephala</i>	White-headed Duck	EN	No	<p>The White-Headed Duck resides in the north-west of Mongolia in the Uvs, Bayan-Olgii and Khovd provinces and they are seasonally uncertain in the north-west corner of the Bulgan province. These are all hundreds of km away from the Aol. <b>Therefore, critical habitat is not triggered.</b></p>
<i>Aquila nipalensis</i>	Steppe eagle	EN	No	<p>This species is known to breed in European Russia from the Republic of Kalmykia (I. Karyakin in litt. 2016), across Kazakhstan into Kyrgyzstan, China and Mongolia (Meyburg and Boesman 2013). The important breeding populations include: Western Mongolia (forming the transboundary Russian-Mongolian population, the majority of which are in the Altai-Sayan region in Russia in an area of c.372,283 km<sup>2</sup>) with an estimated 3,000 breeding pairs; approximately 2,600 breeding pairs in the Volga-Urals (steppe region between the Volga and Ural rivers to the south to the Urda sands) (in an area of c.69,472 km<sup>2</sup>); approximately 2,000 breeding pairs in Dahuria (transboundary Russian-Mongolian population) (in an area of c.153,896 km<sup>2</sup>) and an estimated 4,000 breeding pairs in Central Mongolia (410,736 km<sup>2</sup>) (Karyakin et al. 2016). In Mongolia the population may range from 1,500-2,000 up to 6,000-18,000 pairs (Karyakin 2013, I. Karyakin in litt. 2016). It inhabits areas of steppe and semi-desert, and is recorded breeding up to 2,300 m ASL in mountainous regions. Nests have traditionally been built as large platforms on the ground, although recent habitat alterations seem to have caused a shift to building a few metres higher in bushes or trees. It also nests on artificial structures and will occur on rubbish grounds and waste sites. Migrants leave their breeding</p>



				<p>grounds between August and October/November, returning between January and May. It avoids sea crossings and thus forms large concentrations at bottleneck sites. The known population is declining owing to habitat destruction (especially conversion of steppe into agricultural land), persecution, and collisions with power lines. There, are several recorded sightings of this species in the Project site according to eBird. The survey team observed one steppe eagle in the residential area in Ulziit during the site visit in June/July 2023, but it is difficult to determine what was the likely activity of the individual. Five members of the community interviewed claimed to have seen eagles in the area. The species inhabits steppe, which is present in the project area. It prefers to breed in bushes or trees, but there is barely any tree or bush cover in the project area. Therefore, based on the lowest population estimates and number of confirmed sightings of steppe eagle, this species does not meet Criterion 1 thresholds of 0.5% of the known global population as this would require between 250-375 individuals to be present. Therefore, <b>Critical habitat is not triggered.</b></p>
<i>Falco cherrug</i>	Saker falcon	EN	No	<p>This species is resident across Mongolia in elevations of 0-4700m ASL. It is physically adapted to hunting close to the ground in open terrain, combining rapid acceleration with high manoeuvrability, thus specialising on mid-sized diurnal terrestrial rodents (especially ground squirrels (<i>Spermophilus</i>)) of open grassy landscapes such as desert edge, semi-desert, steppes, agricultural and arid montane areas. In some areas, particularly near water and even in urban environments (A. Kovács in litt. 2016), it switches to birds as key prey, and has recently substituted domestic pigeons for rodents in parts of Europe. It is known to use copses or cliffs for nest sites, sometimes nesting on ground), and occupying the old nests of other birds. The species usually occurs singly or in pairs (Ferguson-Lees and Christie 2001). Birds are sedentary, part-migratory or fully migratory, largely depending on the extent to which food supply in breeding areas becomes highly scarce in winter. Migrant birds winter in East Africa, southern Europe and southern Asia, with 25-50% of the known global population wintering on the Qinghai-Tibetan Plateau (Dixon et al. 2015b), and generally leave their breeding grounds in September and October, returning between February and May. According to eBird there are numerous recorded sightings at the Project site and the wider region. Global populations are estimated between 12,200 – 29,800 mature individuals. Of the 11 people interviewed in the June/July 2023 survey, 7 identified the saker falcon to occur in the Project area and the residential area. However, based on the global population around 60 individuals would need to be present to trigger critical habitat. Therefore, based on the numbers recorded in the surveys (2 in June and 2 in October) and that this species tends to be found solitary or in pairs, it is highly unlikely that this species is present in numbers high enough to reach thresholds. <b>Critical habitat is not triggered.</b></p>





<i>Gazella subgutturosa</i>	Goitered gazelle	VU	No	<p>This species is resident in Mongolia including in the Project area but most of its known range is to the south of the site. This gazelle inhabits a wide range of semi-desert and desert habitats. It ascends into foothills and penetrates mountain valleys in Central Asia, to altitudes of 2,700 m ASL in Mongolia. Goitered gazelles make seasonal movements in search of pasture and water and in northern parts of the range avoid areas of heavy snow in winter. Known global population estimates were at 120,000-140,000 individuals in Mallon and Kingswood (2001), but populations throughout the range have decreased since then and are subject to continuing illegal hunting and habitat loss. Mongolia was thought to contain the largest remaining population of the species (estimated at 60,000 in the early 1990s; Amgalan 1995), so holding an estimated 40-50% of the global population (Lhagvasuren et al. 2001). However, this population has been heavily reduced by poaching and this decline is continuing. This species was not observed in the June or October 2023 survey and there were no reports of this species presence from consultation with local people. Therefore, as this species is unlikely to be present in significant numbers, it would not result in a change in conservation status from vulnerable to endangered.</p>
<i>Moschus moschiferus</i>	Siberian musk deer	VU	No	<p>This species occurs widely in the Russian Federation (Siberia and the Far East), extreme eastern Kazakhstan, northeastern and northwestern China, Mongolia, Republic of Korea and Democratic People's Republic of Korea (Tsendjav 2002). In Mongolia, <i>Moschus moschiferus</i> is found regionally in the forested habitats in the northern Mongol Altai mountain range (Togtokhbayer et al., 2000), Hangai mountain range (Sosorburam 1970, Dulamtseren 1977, Dulamtseren et al. 1989), Hentii and Hövsgöl mountain ranges, and possibly around Han Höhii Mountain in the western Hangai mountain range (Dulamtseren et al. 1989, Wemmer 1998, Tsendjav 2002). Inhabiting mountainous taiga (broadleaf and needle forest), these animals are typically found in forests of dense birch (<i>Betula</i> spp.) and larch (<i>Larix</i> spp.), and shrub-covered slopes in sub-alpine zones (Dulamtseren 1977, Dulamtseren et al. 1989, Tsendjav 2002). Lichens are the main part of Siberian musk deer diet, accounting for up to 99% of the food intake in winter. During the rest of the year the percentage of lichen in the diet is still high, but these deer also consume grasses, leaves and mushrooms. Population density is highly correlated with the availability of food and hiding places. It is solitary, though it sometimes occurs in small groups (no more than three individuals) of a female with her young. In the Altai, family groups consist usually of an adult permanent pair and the young of the year. The territory of female and young lies within the territory of a male. Sometimes the group includes young males up to two years old, that are submissive to the adult male, but actively participate in making and protecting common territory (Prohod'ko 2002). The species is primarily active at dusk and dawn. While foraging, a Siberian musk deer may travel 3-7 km per night, generally returning to the same spot (a "lair") every morning. Individuals inhabit home ranges between 200 and 300 hectares in size, sticking to the boundaries steadfastly. The size of the home range</p>



				decreases markedly during the second half of winter. Seasonal migrations are minimal if present at all. Reproduction starts in December, although some females do not mate until March (Prohod'ko 2002). Females gestate for just over 6 months, and give birth to 1-3 offspring, usually in May or June. The Project site does not provide the preferred habitat or suitable sources of food and hiding places. Therefore, it is highly unlikely that a significant portion of the population is present. <b>Critical habitat is not triggered.</b>
<i>Anser cygnoid</i>	Swan goose	VU	No	Anser cygnoid has its known key breeding grounds in the border area between Russia, Mongolia and mainland China (BirdLife International 2001), with totals of 33,000 and 12,000 birds recorded in east Mongolia during surveys in 2003 (O. Goroshko in litt. 2003) and 2004 (Robson 2004) respectively. The species' global wintering range has contracted dramatically in recent decades, and the species is now restricted to China, largely the Yangtze floodplain, where its range is understood to be contracting rapidly. It breeds in wetlands in the steppe and forest-steppe zones, including river deltas, river valleys with meadows, the margins of brackish and freshwater lakes, and in mountainous areas along narrow, fast-flowing rivers. Recent research involving the satellite tagging of individuals has revealed that birds migrate in stages, stopping at a number of sites en route between breeding and wintering grounds. Birds gather in large flocks to moult in late July prior to migration. Recorded sightings on eBird place this species around 11km from the Project site at its closest point. The species have been recorded frequently in the wider region. This species was not observed in the June/July 2023 survey and the Project AoI does not contain the preferred habitat for this species. Therefore, it is unlikely to be present in significant enough numbers to support globally important concentrations of the species to meet Criterion 1 thresholds. <b>Critical habitat is not triggered.</b>
<i>Anser erythropus</i>	Lesser white-fronted goose	VU	No	Birds from the Western Asian main population occur during passage mainly in Kazakhstan, but also Syria, Turkmenistan, Ukraine, and Uzbekistan (Jones et al. 2008); and birds from the Eastern Asian main population possibly stop-over in Mongolia (A. Bräunlich in litt. 2011, N. Mikander in litt. 2016). This species is fully migratory, and information about its migration routes has only recently come to light as a result of satellite telemetry studies and increased monitoring efforts. During winter and on migration, this species frequents open short grassland in the steppe and semi-arid zones, particularly in sodic (e.g. seashore) pastures, arable farmland, pastures and meadows. Winter roosting colonies are also formed on large lakes and rivers, or in reedbeds and rushes. There is only one recorded sighting on eBird for Mongolia and it is 26km west of the Project site. Whilst the site does provide suitable habitat and appropriate stopover sites for this species, it was not observed in June/July 2023 survey, and it is highly improbable that they could occur in significant enough numbers to reach criterion 1 thresholds. <b>Critical habitat is not triggered.</b>



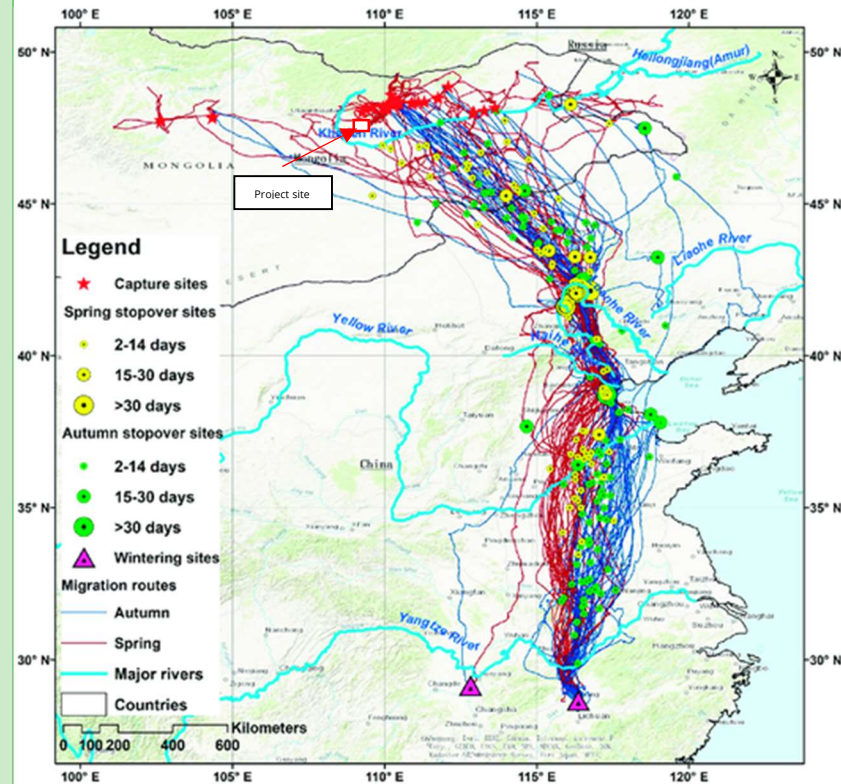
<i>Aythya ferina</i>	Common pochard	VU	No	<p>The species is known to breed from western Europe through central Asia to south-central Siberia and northern China (Carboneras and Kirwan 2014), including in Mongolia. It is present throughout the year but may make movements within the winter months. European migratory populations winter mostly in north-western and western Europe, the eastern Mediterranean, Black Sea and the Caspian Sea, as well as in Turkey, the Middle East and as far south as sub-Saharan Africa (Hagemeijer and Blair 1997, Carboneras and Kirwan 2014). Birds breeding in the eastern range winter in south-east and east Asia across the Indian sub-continent as far east as Japan. This species requires well-vegetated eutrophic to neutral swamps, marshes, lakes and slow-flowing rivers with areas of open water and abundant emergent fringing vegetation. It also breeds on saline, brackish and soda lakes and occasionally even in sheltered coastal bays (Kear 2005). The breeding grounds are reoccupied from early March (in the south) to early May (in Siberia) (Scott and Rose 1996) with breeding starting from April-May. During the winter the species frequents similar habitats to those it breeds in, including large lakes, slow-flowing rivers, reservoirs, brackish waters, marshes, weirs (Africa) and flooded gravel pits. The nest is a depression or shallow cup in a thick heap of vegetation positioned on the ground in shallow water. As in the breeding season, the species will shift to coastal habitats such as brackish lagoons, tidal estuaries and inshore waters (where it may associate with sewage outfalls [Kear 2005]) when driven by frost or other compelling factors. The global population is estimated to number 760,000-790,000 mature individuals, which equates to approximately 1.14-1.18 million individuals in total (Wetlands International 2021). Three flyways are identified, with the following population estimates: North-East/North-West Europe with 100,000 mature individuals (150,000 total); Central and North-East Europe/Black Sea and Mediterranean with 350,000 mature individuals (530,000 total); Western Siberia/South-West Asia with 310,000-330,000 mature individuals (460,000-500,000 total). Sightings on eBird are all 10+km away from the Project site and the site does not provide suitable habitat for this species. Therefore, it is unlikely to be present and <b>critical habitat is not triggered.</b></p>
<i>Otis tarda</i>	Great bustard	VU	No	<p>There are around 1,000 birds known to be resident and breeding in Mongolia. The eastern subspecies that breeds in Mongolia, eastern Russia, and north-east China is fully migratory, spending four months on migratory stopovers and four months on wintering grounds in central China. Originally a species of the Eurasian steppe, this species has acclimated to agricultural landscapes. It occurs in open, flat or somewhat rolling landscapes, usually with a mixture of crops such as cereals, vineyards, and fodder plants, and in some countries also with steppic grassland. The eastern subspecies inhabits both open steppe and forest steppe, including small forest openings. Areas with little or no disturbance and abundant supply of insects as a food source are required for successful breeding. Nest sites are selected in grassland, fallow or cereal fields (Rocha et al. 2013) (primarily alfalfa in Central Europe and wheat in Russia, Mongolia and Kazakhstan [M. Kessler in litt.</p>



				<p>2016]) in areas of low patch-type diversity, far from human infrastructure and with good horizontal visibility (Magaña et al. 2010). The eastern subspecies nests in agricultural mosaics, open steppe, and adjacent to forest edge (Kessler 2015). It exhibits highly variable migratory behaviour across populations, including obligate winter migrants (Asia, Russia), facultative migrants (central European populations) and partial winter and summer migrants with differential migratory pattern by sex (Iberian populations). Alonso (2014) estimates the global population to number 43,847 – 56,695 individuals. The species is suspected to have historically undergone a rapid population decline, owing to habitat loss and fragmentation for agricultural intensification, as well as hunting and collision with power lines. There is a lack of accurate data on current trends in several countries with important populations (e.g. parts of Russia, Mongolia, China). This species was not observed during the June/July or October 2023 survey. As the global population is estimated between 43,847-56,695 individuals, there would need to be a minimum of 219 birds on site to meet critical habitat thresholds. Based on the survey data and consultation, it is highlight unlikely that this species is present in those numbers. Therefore, <b>Critical Habitat is not triggered.</b></p>
<i>Grus vipio</i>	White-naped crane	VU	No	<p>The Project site is on the edge of this species' known passage extant. Three stopover sites are used regularly; Duolun in Inner Mongolia, Cangzhou (Hebei)/Beidagang (Tianjin) along Bohai Bay and the Yellow River Delta National Nature Reserve in China. The total population is estimated at c.6,250-6,750 individuals. In winter, it frequents freshwater lakes, farmland and occasionally coastal flats. Some recorded sightings near the Project area are found on eBird. The species was not observed during the June/July or October 2023 surveys. One resident named it as a species present in the area</p>

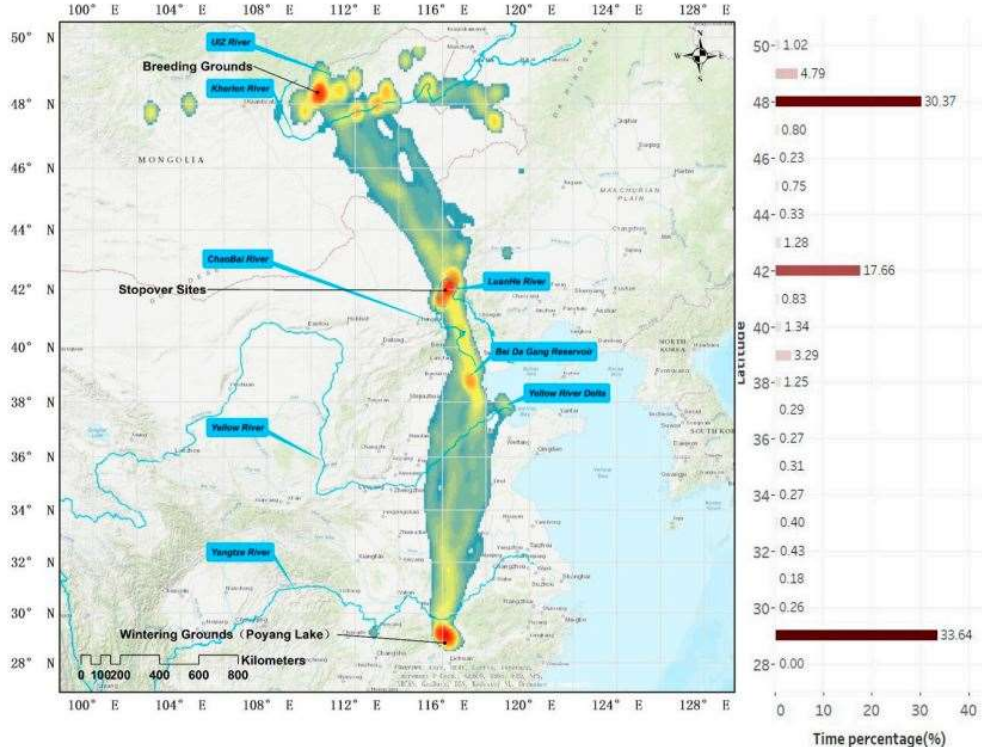


during consultation. Based on tracking data from Batbayar *et al.* 2021, of 39 western flyway white-naped cranes, the species does fly over the project site.<sup>9</sup>



<sup>9</sup> [https://www.researchgate.net/publication/355170940\\_Combining\\_Tracking\\_and\\_Remote\\_Sensing\\_to\\_Identify\\_Critical\\_Year-Round\\_Site\\_Habitat\\_Use\\_and\\_Migratory\\_Connectivity\\_of\\_a\\_Threatened\\_Waterbird\\_Species](https://www.researchgate.net/publication/355170940_Combining_Tracking_and_Remote_Sensing_to_Identify_Critical_Year-Round_Site_Habitat_Use_and_Migratory_Connectivity_of_a_Threatened_Waterbird_Species)



				
				<p>Habitat suitability for the white-naped crane is very low in the modified habitat area of the Project, and therefore it is not expected to regularly occur within the Project Aol.<sup>10</sup> There are breeding grounds near the project site for the Western population of the species, but the lack of protective vegetation cover and available nesting material within the Project Aol means that it is unlikely to use the project Aol for breeding and thus meet the population thresholds to trigger Critical Habitat.</p>
<i>Larus relictus</i>	Relict gull	VU	No	<p>This species is known to breed at two localities in eastern Kazakhstan, regularly only at one [Rubini and Berezovikov 2002], one in Russia and several in Mongolia, whilst the largest colonies are thought to occur in China, at Honjian Nur Lake, Shaanxi (up to 5,000 pairs [He Fenqi and Ren Yong-qui 2006]) and previously at Taolimiao-Alashan Nur on the Ordos Plateau in Inner Mongolia (up to 3,000 pairs [He Fenqi and Qiao Zhenzhong in litt. 2004]), although this site was recently abandoned. All known</p>

<sup>10</sup> <https://www.nature.com/articles/s41598-022-23108-w>

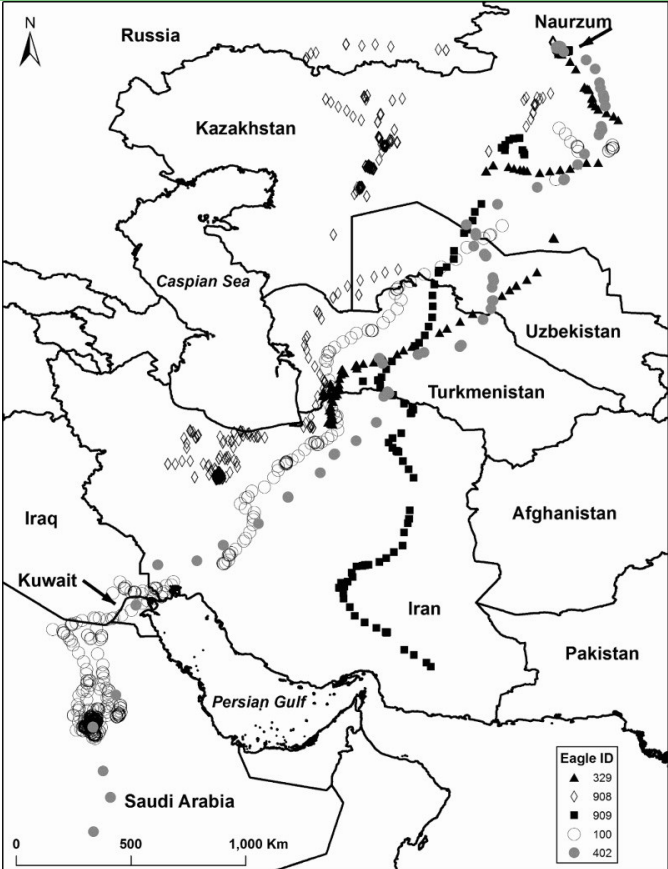




				<p>breeding colonies are below 1,500 m ASL, in the arid-steppe zone, and on islands in saline and slightly saline lakes with fluctuating water levels. No nesting occurs if lakes dry up, if the islands become joined to the shore, or if the water level is too high and the islands become too small or overgrown with vegetation.</p> <p>In the non-breeding season, foraging relict gulls are near-confined to tidal flats with firmer sandy substrates and patches of silt or mud (typically the outer parts of estuaries) which support a high concentration of shellfish, with only a few individuals (mostly first-winters) also found on sandy beaches in bays and close to river mouths. There are no sightings on eBird near the Project area, or observed during the June/July 2023 survey, and the area does not provide suitable habitat for nesting. <b>Critical habitat is not triggered.</b></p>
<i>Aquila heliaca</i>	Eastern imperial eagle	VU	No	<p>This species is known to breed in Austria, Azerbaijan, Bulgaria, China, Czechia, Macedonia, Georgia, Greece, Hungary, Kazakhstan, Russia, Mongolia, Serbia, Slovakia, Turkey and Ukraine. This is a lowland species that has been pushed to higher altitudes by persecution and habitat loss in Europe. In central and eastern Europe, it breeds in forests up to 1,000 m ASL and also in steppe and agricultural areas with large trees, and nowadays also on electricity pylons. In the Caucasus, it occurs in steppe, lowland and riverine forests and semi-deserts. Eastern populations breed in natural steppe and agricultural habitats. Both adults and immature individuals of the eastern populations are migratory, wintering in the Middle East, East Africa and south to Tanzania, the Arabian Peninsula, the Indian Subcontinent and south and east Asia; wintering birds have also been reported in Hong Kong (China). These birds make their southward migration between September and November, returning between February and May. Wetlands are apparently preferred on the wintering grounds. Birds are usually seen singly or in pairs, with small groups sometimes forming on migration or at sources of food or water. In exceptional cases large groups of up to 200 have been known to form on autumn migration. eBird recorded sightings near the Project area but this species was not observed during the June/July or October 2023 surveys. The global population is estimated between 3,750-14,999 mature individuals so 19 individuals would need to be present in order to meet critical habitat thresholds. Based on tracking data of this species in Poessel <i>et al.</i>'s 2018 paper on movements of Eastern Imperial Eagles in Central Asia, the species range is much further West of Mongolia<sup>11</sup>.</p>

<sup>11</sup> <https://www.tandfonline.com/doi/full/10.1080/00063657.2018.1447907>



				 <p>Following the migration route data and the fact that this species typically occurs singly or in pairs, it is highly unlikely that this species will occur in great enough numbers to trigger critical habitat thresholds or cause a change in IUCN status. Therefore, <b>Critical Habitat is not triggered.</b></p>
<i>Emberiza rustica</i>	Rustic bunting	VU	No	<p>The rustic bunting breeds across northern latitudes of the Palaearctic from Norway in the west to Kamchatka (Russia) in the east. It is a full migrant, wintering in central and eastern Asia, primarily from eastern China to Japan. Mongolia is part of its known passage extant. The species breeds in swampy lowland spruce (<i>Picea</i>) or pine (<i>Pinus</i>) forest with some deciduous trees such as birches (<i>Betula</i>) and willows (<i>Salix</i>). It also uses scrub along riverbanks and around Sphagnum bogs. In flooded pine forests it is frequently found where stunted pines and dead trees are covered with moss. Undergrowth is usually present, usually consisting of horsetail (<i>Equisetum</i>) and bushes such as</p>



				<p>Rubus (Copete and Garcia 2016). It is thought that the rustic bunting may benefit from the construction of dams by beavers and the habitat conditions created (Hagemeyer and Blair 1997, Dale and Hansen 2013, Copete and Garcia 2016). The breeding season starts in May or early June. Nests are usually situated on the ground often near water and among grassy vegetation. Occasionally nests are built in the lower sections of a tree. Europe forms c.20% of the global range, so a very preliminary estimate of the global population size is 6,800,000-8,300,000 mature individuals, although further validation of this estimate is needed. This species is very widespread and mostly focused further north in Palearctic regions from Norway to Russia so unlikely to be present in the Project area in any significant numbers compared to the known global population size and thus a change in IUCN status is highly unlikely. <b>Critical habitat is not triggered.</b></p>
<i>Hucho taimen</i>	Siberian taimen	VU	No	<p>The Siberian taimen is known to occur in Europe and Asia, including parts of the Caspian and Arctic drainages in Eurasia (Volga, Ural, Pechora, Yenisey, Lena) and portions of the Pacific drainage in Mongolia, Russia, and China. In Mongolia, the Siberian taimen is found in the Shiskhed, Eg, Uur, Delger Moron, Ider, Chuluud, Eroo, Selenge, Orkhon, and Tuul rivers, and Darkhad Depression (Arctic drainage), and Onon, upper Kherlen and Khalkhin rivers (Amur drainage). Siberian taimen occur exclusively in freshwater, predominantly in swift flowing rivers and streams. They have been known to occur at altitudes above 1,500 m ASL and in coastal rivers near sea level. Home range of the species can be quite extensive, up to 93 km within the river based on telemetry studies in Northern Mongolia (Gilroy et al. 2010). Siberian taimen are apex predators in most systems where they occur, feeding on fish, rodents, aquatic birds, and even bats.</p> <p>This species was not observed in the June/July 2023 survey and the river that runs through the site has sections that were dry river beds during June/July. Therefore, it is unlikely this species is present as there is no suitable habitat during several months of the year. <b>Critical habitat is not triggered.</b></p>
<i>Tricholoma acerbum</i>		VU	No	<p>Tricholoma acerbum has a wide distribution in southern, western and eastern Europe, with outpost areas to the north in southwestern Fennoscandia (Brandrud 2013, Christensen and Heilmann-Clausen 2013). The species is also reported from southeast Asia (the conspecificity of the Asian populations should be verified genetically). The species is mainly associated with Quercus spp. (mycorrhiza), but is known also to be associated with Castanea, Tilia and Corylus, possibly also with Fagus. The species occurs in montane forests with deciduous Quercus species (such as Quercus robur and also Quercus pubescens) and Castanea in southern Europe, but in Mediterranean areas also with the sclerophyllous Quercus ilex. The June/July 2023 surveys did not record these botanical species and the Project site does not provide suitable growing conditions for their establishment. <b>Critical habitat is not triggered.</b></p>



<i>Uncia uncia</i>	Snow leopard	VU	No	The known extant of this species is in other regions of Mongolia towards the west and south. IUCN also suggest there is possible extant of this species in the north of the Khentii province towards the Russian border and north of the Onon Gol river and between the Onon Gol river and the Ulzda Gol river. Both of these suspected ranges are over 150 km away from the project site. Therefore, critical habitat is not triggered.
<i>Aquila clanga</i>	Greater Spotted Eagle	VU	No	The Greater Spotted Eagle occurs in the north of Mongolia in the taiga forest and forest steppe in the Khentii mountain range as well as being recorded in the Khangai region. It has a fragmented range that covers eastern Europe, Russia, east-central Asia and mainland China. Mongolia is part of the species' breeding range but its range does not overlap with the project Aol. The global population size is estimated at 3,900-10,000 mature individuals and it is estimated that less than 250 mature individuals live in Mongolia. Therefore, the Mongolian population makes up 2.5 - 6% of the global population as a maximum. It occurs in lowland forests near wetlands, nesting in different types of (generally tall) trees, depending on local conditions. Project Aol does not provide the preferred habitat for this species. As this species' range does not overlap with the Aol, the preferred habitat is not present and there were no observations of this bird during the 2 seasonal surveys, it is highly unlikely that this species is present in any significant numbers in the Aol. <b>Therefore, critical habitat is not triggered.</b>

#### Criterion 1c – Nationally Endangered Species

Scientific Name	Common Name	National Red List Status	Critical Habitat Triggered	Justification
<i>Ursus arctos gobiensis</i>	Gobi bear	CR	No	Brown bears ( <i>Ursus arctos</i> ) inhabit much of the northern hemisphere, including portions of North America, Europe, and Asia. Whereas northern populations generally are healthy, their distribution becomes fragmented and conservation status more tenuous in their southern range. Many fragmented populations across southern Asia are poorly understood, and abundance and distribution data are minimal. One such population contains the Gobi bear, a brown bear surviving in the Great Gobi Strictly Protected Area of southwestern Mongolia, which is hundreds of kilometres from the Project Aol. Therefore, <b>critical habitat is not triggered.</b>



<i>Equus ferus przewalskii</i>	Przewalski's horse	CR	No	<p>Until the late 18th century, this species ranged from the Russian Steppes east to Kazakhstan, Mongolia and northern China. After this time, the species went into catastrophic decline. The last wild population of Przewalski's Horse (<i>Equus ferus przewalskii</i>) survived until the mid-20th century in southwestern Mongolia and adjacent Gansu, Xinjiang, and Inner Mongolia (China). Wild horses were last seen in 1969, north of the Tachin Shaar Nuruu in Dzungarian Gobi Desert in Mongolia (Paklina and Pozdnyakova 1989).</p> <p>There are now approximately 387 free-ranging reintroduced and native-born Przewalski's Horses in Mongolia at three reintroduction sites (Zimmerman 2014). Between 1992 and 2004, 90 captive-born horses were transported to the Takhin Tal acclimatization site, from where they were released into the Great Gobi B Strictly Protected Area (SPA) (ITG International Takhi Group, Zimmermann 2008). A further three males were translocated from Hustai National Park to Takhin Tal in 2007 (Zimmermann 2008). In 2008 there were approximately 111 free-ranging horses in this subpopulation (Zimmerman 2008, Kaczensky and Walzer 2004). By December 2009 there were 138 individuals, but due to an extremely harsh winter (dzud) in 2009/2010 the population suffered extreme mortality: in April 2010 only 49 individuals remained (Kaczensky et al. 2011). By 2012 the population had increased to 71. By the end of 2013 there were 90 horses forming six harems and several bachelor groups. Sixteen foals were born in 2013; three of these foals died, and one adult male disappeared and is presumed dead (P. Kaczensky pers. comm.).</p> <p>From 1992 to 2000, 84 horses were brought to Hustai National Park (NP) by the Foundation for the Preservation and Protection of the Przewalski Horse and Mongolian Association for Conservation of Nature and the Environment (MACNE) from reserves in Europe (King and Gurnell 2005). As of the middle of 2012 this population had approximately 275 individuals (Zimmerman 2014). By the end of 2013, there were 297 horses, of which 228 were members of 29 harems and the rest were bachelors. Sixty-four foals were born in 2013, with a 61% survival rate by year's end: 25 foals, four yearlings, and seven adults died during 2013 (Usukhjargal 2013).</p> <p>This species is thoroughly tracked and the specific population numbers regularly recorded. None of the individuals are present near the site so <b>critical habitat is not triggered</b>.</p>
<i>Grus leucogeranus</i>	Siberian Crane	CR	No	<p>The Siberian Crane is a rare migrant and summer visitor that has been reported to breed in central Mongolia and close to the Russian-Mongolian border in the past. The species covers less than 1% of the country and birds have been recorded in summer in eastern Mongolia. Globally, the population estimation is 3500-4000 individuals based on counts done in 2008,</p>



				2011 and 2012. However, national population numbers are unknown. According to IUCN this species' range does not overlap with the project Aol. Breeding occurs in territorial pairs at a density estimated in the 1970s to be around one pair per 625 km <sup>2</sup> . The Siberian Crane is the most aquatic member of its family, breeding and wintering in wetlands, and shows a general preference for wide expanses of shallow (up to 30 cm) fresh water with good visibility. It discriminates strongly in favour of sites that are infrequently visited by people. All these factors suggest it is highly improbable that this species will be present in the Aol and thus, <b>critical habitat is not triggered.</b>
<i>Cervus elaphus</i>	Red deer	CR	No	According to IUCN this species is not present in Mongolia and its range is now only in Europe, the Middle East and northern Africa. Therefore, critical habitat is not triggered.
<i>Marmota sibirica</i>	Mongolian marmot	EN	Yes	Addressed in criterion 1a and b above.
<i>Spermophilus alashanicus</i>	Alashan ground squirrel	EN	No	This species range is much further south in Mongolia and is over 600km away at its closest point. Therefore, critical habitat is not triggered.
<i>Castor fiber</i>	Eurasian beaver	EN	No	According to IUCN, this species is not present in Mongolia. Therefore, critical habitat is not triggered.
<i>Allactaga elater</i>	Small five-toed jerboa	EN	No	According to IUCN this species range only crosses into Mongolia in the southwest of the country over 1000km away from the site. Therefore, critical habitat is not triggered.
<i>Stylodipus sungorus</i>	Mongolian three-toed jerboa	EN	No	According to IUCN this species range is only in southwest Mongolia, over 1000km from the project site. Therefore, critical habitat is not triggered.
<i>Meriones tamariscinus</i>	Tamarisk gerbil	EN	No	According to IUCN this species range only crosses into Mongolia in the southwest of the country over 1000km away from the site. Therefore, critical habitat is not triggered.
<i>Uncia uncia</i>	Snow leopard	EN	No	The known extant of this species is in other regions of Mongolia towards the west and south. IUCN also suggest there is possible extant of this species in the north of the Khentii province towards the Russian border and north of the Onon Gol river and between the Onon Gol river and the Ulzda Gol river. Both of these suspected ranges are over 150 km away from the project site. Therefore, critical habitat is not triggered.
<i>Equus hemionus</i>	Asiatic wild ass	EN	No	This species' range is in Southern Mongolian and adjacent to China. Therefore, critical habitat is not triggered.
<i>Camelus bactrianus ferus</i>	Bactrian camel	EN	No	This species is only present in southern Mongolia. Therefore, critical habitat is not triggered.
<i>Ovis ammon</i>	Argali	EN	No	<b>Distribution and preferred habitat:</b>



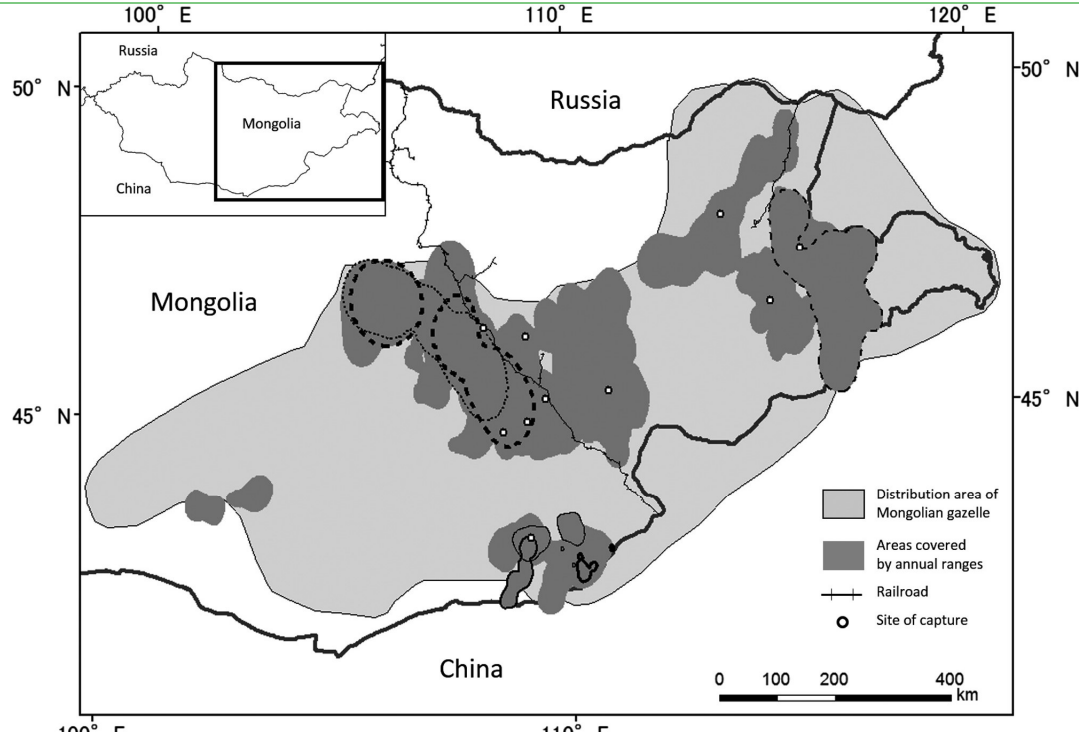


			<p>Argali (<i>O. a. ammon</i> and <i>O. a. darwini</i>) are distributed widely, but patchily across a large portion of Mongolia. Historically, argali occurred in disjunct populations across all, but eastern Mongolia, in areas with rolling hills, mountains, rocky outcrops, canyons, and plateaus. Argali appeared to be expanding their distribution in eastern Mongolia, but contracting and becoming even more fragmented in western Mongolia. Large areas formerly occupied by argali in western Mongolia now lack the species. The species' current distribution includes portions of the Altai, Trans-Alai, Gobi-Altai, Khangai, Khentii, and Khovsgol Mountain ranges, as well as isolated areas in the Gobi Desert. More specifically, isolated populations exist in the mountains of the Mongolian Altai and Gobi Altai Mountains, primarily the western and southern Khangai Mountains, near the source of the Arsain River in the Khovsgol Mountains, and the southernmost Khentii Mountains. Other populations persist patchily in the Dzungarian Gobi, Great Gobi, Trans-Altai Gobi, Alashan Gobi, Middle Gobi, and eastern Gobi. Argali inhabit mountains, steppe valleys and rocky outcrops; they also occur in open desert habitats at the south-eastern end of its range, mostly preferring rolling slopes to steeper areas. Argali are sensitive to deep snow, particularly if forage is limiting; often migrating from high mountain habitats during winter, but are present all year round at lower elevations in the Gobi desert. Most argali live on alpine grasslands between 3,000-5,500 m, often descending lower in winter (particularly if snow accumulates to more than a few cm). In some areas, (e.g., Gobi desert of southern Mongolia, Karaganda area of Kazakhstan), they live in lower elevation, semi-arid areas. They generally avoid forested. They prefer to occupy open areas with a gentle slope; females generally occupy steeper (cliff) terrain following lambing. Argali feed on grasses, sedges, and some herbs and lichens, and they regularly drink from open springs and rivers.</p> <p><b>Mongolian population:</b></p> <p>The most recent nationwide and local data were produced by a survey conducted in autumn 2009. Field teams sampled a total of 134 argali distribution units within Mongolia, which are estimated to occupy approximately 46,603 km<sup>2</sup> of the total area of 60,237 km<sup>2</sup> that was previously mapped as occupied by argali. They observed 385 groups of argali, totalling 3,373 individuals and estimated the argali population at 19,701 (95% confidence limits 9,193–43,135). However, post-survey concerns about sampling in some aimags (provinces) and estimates derived previously allowed adjustments that resulted in the best single estimate for Mongolia being 17,903 argali.</p> <p><b>Site Visit</b></p>
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				<p>During consultations with the local communities in June 2023, 5 out of 11 people identified argali as being present in the area. In the October 2023 survey, 1 of the 9 people identified argali as being present in the area.</p> <p>Argali are rarely seen outside of mountain terrain, therefore, it is likely that the residents have seen this species in the wider area towards the Khentii Mountains and not in the project Aol. Therefore, <b>critical habitat is not triggered</b>.</p>
<i>Procapra gujurosa</i>	Mongolian gazelle	EN	No	<p>This species occurs in eastern Mongolia and adjacent areas of Russia and north-eastern China. Inhabits rolling arid steppes and grassy plains; in particular feather grass (<i>Stipa</i> spp.) steppes and sometimes semi-deserts (Sokolov and Lushchekina 1997). Mongolian Gazelles move constantly over their range in search of food, except during the rutting and birthing seasons. Smaller populations are still found in central and western Mongolia where they were previously abundant. There is a translocated population on Homin Tal steppe in Zavkhan Province of west-central Mongolia. In the past 50 years, the geographic range of the Mongolian Gazelle has been reduced by about 76%. The vast majority of Mongolian Gazelles are now found in Mongolia itself; and within Mongolia the species is found in large numbers in only four provinces: Dornod, Khentii, Sukhbaatar and Dornogobi and in smaller numbers in other provinces. One paper from 2008 shows the annual ranges of tracked Mongolian gazelles and it shows the project site to be on the edge of this species' range. IUCN also shows the project Aol to be just north of the species' range.</p>



				<div><p>12</p><p>Mongolian gazelles have a typical density of 3-11 gazelles/km<sup>2</sup><sup>13</sup> and a total population of 500,000-1,500,000 mature individuals. Therefore, 2,500 individuals would need to be present to meet critical habitat thresholds. The June survey identified 6 gazelles in Field 1 and 13 gazelles in Field 3. It is difficult to determine an EAAA for this species as its preferred habitat is wide ranging. From information gathered through surveys, this species does not regularly occur or congregate in the project AoI. The project AoI does not provide any suitable features for breeding or calving as it is modified. Therefore, this species does not trigger Critical Habitat.</p></div>
<i>Saiga tatarica</i>	Saiga antelope	EN	No	The Saiga occurs in western Mongolia and areas of central and western Kazakhstan. Small populations are found in the Khovd and Govi-Altai provinces of Mongolia. 90% of the

12 [https://zslpublications.onlinelibrary.wiley.com/doi/full/10.1111/jzo.12402?saml\\_referrer](https://zslpublications.onlinelibrary.wiley.com/doi/full/10.1111/jzo.12402?saml_referrer)

13 <https://www.sciencedirect.com/science/article/pii/S0140196310001643#sec2>



				population occurs in and around Sharga Nature Reserve in the Mongol Altai Mountain Range with the second population 200km north-west in Mankhan Nature Reserve, therefore <b>critical habitat is not triggered.</b>
<i>Moschus moschiferus</i>	Siberian musk deer	EN	No	Addressed in criterion 1a and b above.
<i>Alces alces</i>	Elk	EN	No	The Elk has two subspecies that reside in Mongolia. <i>A. a. cameloides</i> occur along the Halh River and in Nomrog River Basin in the Ikh Hyangan Mountain Range. <i>A. a. pfizenmayeri</i> occur along the Onon and Herlen rivers in the north-eastern Khentii Mountain Range and along the Eroo and Minj rivers in the western Khentii Mountain Range. They are also distributed in the Ikh Dalbai River Basin, Horidol Saridag and Tsagaan mountains, Buteel Mountain and upstream of Tuul River. The main provinces this species inhabits are Ulaanbaatar, Khentii, Darkhan-Uul, Khovd, Bayan-Olgii, Uvs, Zavkhan and Khovsgol. Only a small population of <i>A. a. cameloides</i> occur in Mongolia, however <i>A. a. pfizenmayeri</i> has greater abundance with estimates of 10,000 individuals inhabiting the Khentii and Khangai mountain ranges. The total population consists of more than 14,000 individuals. They are found in a range of woodland habitats, both coniferous and broadleaved, from the tundra and taiga southwards through boreal to temperate zones. This species prefers a mosaic of second-growth boreal forest, openings, swamps, lakes and wetlands. It is also found in open country in the lowlands and mountains, including farmland, if there is forest nearby. During the June survey consultation 6 out of 11 people identified elk as being present in area and in the October survey 4 out of 9 identified this species to be present. This species relies on forested habitat and the project Aol does not contrain any forestry. Therefore, it is likely that the residents saw this species in the wider area but the project Aol <b>does not contain any critical habitat</b> for this species.
<i>Pelecanus crispus</i>	Dalmatian Pelican	CR	No	The Dalmatian Pelican resides in western Mongolia across the Khovd, Zavkhan, Uvs, Govi-Altai and Bayan-Olgii provinces as well as other areas of east-central Asia and eastern Europe. However, its migration routes to the east coast of China cross through central Mongolia. The provinces across the migration route are: Zavkhan, Govi-Altai, Bayankhongor, Ovorkhangai, Arkhangai, Khovsgol, Omnogovi, Dundgovi, Dornogovi, NW Tov and W/NW Bulgan. This does not include the Khentii province where the project is. <b>Therefore, critical habitat. Is not triggered.</b>
<i>Oxyura leucocephala</i>	White-headed Duck	EN	No	The White-Headed Duck resides in the north-west of Mongolia in the Uvs, Bayan-Olgii and Khovd provinces and they are seasonally uncertain in the north-west corner of the Bulgan province. These are all hundreds of km away from the Aol. <b>Therefore, critical habitat is not triggered.</b>



<i>Larus relictus</i>	Relict Gull	EN	No	Addressed in criterion 1a and b above.
<i>Aquila clanga</i>	Greater Spotted Eagle	EN	No	Addressed in criterion 1a and b above.
<i>Haliaeetus leucoryphus</i>	Pallas's Fish-eagle	EN	No	Addressed in criterion 1a and b above.
<i>Circaetus gallicus</i>	Short-toed Snake-eagle	EN	No	This species occurs in the Bulgan, Selenge and Khovsgol provinces of Mongolia. It breeds in the Selenge River valley and migrates through Orkhon, Selenge, Tuul River valleys and the western Khentii mountain range. The population for Mongolia is estimated at less than 250 mature individuals. According to IUCN this species' range does not overlap with the project Aol and is over 400 km away. <b>Therefore, critical habitat is not triggered.</b>
<i>Paradoxornis heudei</i>	Reed Parrotbill	EN	No	The Reed Parrotbill nests and winters along the Tashgain Tavan Lake and the delta of Khalkh River on the eastern-most border between Mongolia and Inner Mongolia. <b>Therefore, critical habitat is not triggered.</b>
<i>Acipenser baerii</i>	Siberian sturgeon	CR	No	Addressed in criterion 1a and b above.
<i>Barbatula dgebuadzei</i>	Gobi loach	EN	No	The species has only been identified once in Zag stream in the Southern province Bayankhongor. <b>Therefore, critical habitat is not triggered.</b>
<i>Leuciscus dzungaricus</i>	Dzungarian dace	EN	No	This species is only found in the western province of Khovd. <b>Therefore, critical habitat is not triggered.</b>
<i>Coregonus pidschian</i>	Pidschian	EN	No	This species is found in the Darkhad Depression and the Ur and Eg rivers, all of which are over 600km from the Project Aol. <b>Therefore, critical habitat is not triggered.</b>
<i>Thymallus grubii</i>	Amur grayling	EN	No	The species occurs in the Amur River Basin, Kherlen, Onon and Khalkhin rivers. The Kherlen river is the closest habitat to the project Aol but it is over 40km away at its closest point. This species habitat is temperate freshwater. <b>Therefore, critical habitat is not triggered.</b>
<i>Thymallus nigrescens</i>	Hövsgöl grayling	EN	No	This species is only found in Khuvsul Lake on the Northern border of Mongolia, over 700 km from the project Aol. <b>Therefore, critical habitat is not triggered.</b>
<i>Hucho taimen</i>	Taimen	EN	No	Addressed in criterion 1a and b above.

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