



Oyu Tolgoi LLC

Health, Safety and Environment

Biodiversity Monitoring and Evaluation Plan (BMEP)

Biodiversity Monitoring and Evaluation Plan		
Effective Date:	Document Number:	Version
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List of Abbreviations and Acronyms

BMEP	Biodiversity Monitoring and Evaluation Plan
BMP	Biodiversity Management Plan
CBMP	Core Biodiversity Monitoring Program
GBC	Global Biodiversity Conservation
LDCRMP	Land Disturbance Control and Rehabilitation Management Plan
MAT	Multi-Agency Team
MAPU	Mobile Anti-Poaching Patrol Units
OMP	Offset Management Plan
OT	Oyu Tolgoi
SEA	Sustainability East Asia – Mongolia
(SWP)	Standardized Work Procedures
WCS	Wildlife Conservation Society – Mongolia
WMC	Waste Management Center
WSCC	Wildlife Science and Conservation Center

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1 INTRODUCTION

The purpose of this Biodiversity Monitoring and Evaluation Programme (BMEP) is to define the scope, methods, and response for monitoring of priority species and habitats, based on those identified in the ESIA. It is a living document that will be periodically reviewed and updated based on the following key drivers:

- monitoring results and increased knowledge;
- revision of the actions and desired outcomes in the Offsets Management Plan (OMP); and
- accumulation of data on the scale of natural variation in biodiversity features (leading to changes of existing or new adaptive management thresholds).

Detailed monitoring methods are included as appendices and will form the basis of Standardized Work Procedures that are designed to capture institutional memory and to enable newcomers to reproduce the methods required for comparable and consistent long-term monitoring results.

2 OBJECTIVES

The objectives of the BMEP are to:

- assess impacts (positive and negative) of operational activities and the effectiveness of mitigation (including rehabilitation and offset) actions in order to allow for adaptive management;
- demonstrate that the project is on track for and, in the longer-term, results in a net gain or no net loss for priority biodiversity features; and
- evaluate experimental management options within a scientific framework.

Monitoring includes measurement of:

- biodiversity losses from Oyu Tolgoi (OT) activities; effectiveness of mitigation; and
- gains from implementation of the mitigation strategy, including offset activities over a long period of time.

Measurement of actual gains will be compared against actual losses to demonstrate progress towards achieving the aspired outcomes for priority biodiversity (i.e., to track progress toward the net gain or no net loss and update the forecast). The net gain target for each priority biodiversity feature is a feature-specific equation demonstrating precautionarily that gains exceed losses (as detailed in the net gain forecast). Measures of gains and losses are all captured in this BMEP.

This document brings together all strands of biodiversity monitoring so that they form an integrated programme. This is based on a “state-pressure-response” framework.

3 ROLES AND RESPONSIBILITIES

The OT Biodiversity Team (including flora, fauna, and rehabilitation expertise) is responsible for implementation of the BMEP, including developing and managing contracts and work plans with biodiversity science and conservation organizations with appropriate technical expertise to fulfil the BMEP requirements and timelines. Annual work plans will include:

- detailed time scheduling of monitoring fieldwork; project staffing;
- staff roles and responsibilities;
- equipment procurement and maintenance; analysis and technical planning;
- reporting schedules; and
- training and capacity-building plans.

The BMEP is used to guide both the OT Biodiversity Team’s higher-level planning (to ensure that all relevant biodiversity values are monitored adequately) and their day-to-day planning. The

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BMEP includes indicators to be used for Ecosystem Services monitoring. Additional indicators will be collected by the Communities Team, who will manage Ecosystem Services monitoring (including analysis, evaluation, and reporting) as detailed in the Ecosystem Services Monitoring Plan.

The OT Specialist Fauna is responsible for overall implementation of the BMEP and for coordinating management responses if/when thresholds are exceeded or opposite trends are observed. Although some management responses will require coordination amongst various OT departments, the Specialist Fauna will be responsible for coordination of response implementation.

The Flora Team is responsible for assessing impacts to priority plants and natural habitats (i.e., saxaul, elms, etc.) through the land disturbance process. The Flora Team is also responsible for rehabilitation of disturbed areas to achieve net gain/no net loss on priority plant species.

Consultants may also be used to carry-out the offsite monitoring of biodiversity features and specialized monitoring (e.g., ungulate population monitoring, collaring, etc.). The consultants will also assist in the development of annual reports.

3.1 Key Interfaces

Key internal interfaces in the implementation of this plan (i.e., roles with responsibility for delivering elements of this BMEP) include:

- water team (water monitoring results);
- environment team (air and dust monitoring results);
- Communities Team (community-related monitoring results); security team (illegal plant and wildlife inspection results); transportation team (off-site transport/vehicle monitoring results);
- training team (conducting biodiversity and environment training with employees and contractors); and
- ecosystem services working group.

Key external interfaces in the implementation of this plan (i.e., roles with responsibility for directing elements of this BMEP) include:

- Ministry of Environment, Green Development and Tourism;
- Ministry of Transportation;
- Green Trends;
- Mongolian Professional Biological Society (BMPS)
- Sustainable East Asia LLC (SEA)
- Wildlife Science and Conservation Center;
- Wildlife Conservation Society; and
- Tri Partite Council.

4 BACKGROUND ON BIODIVERSITY REGULATIONS AND NET GAIN GOALS

OT aims to ensure that the biodiversity of the southern Gobi region ultimately benefits from the project's presence. In keeping with the Rio Tinto corporate Biodiversity Strategy, OT follows the 'mitigation hierarchy' for avoiding and minimizing negative impacts on biodiversity and its goal is to have a net positive impact on the biodiversity of the southern Gobi region. OT aims, consistent with Rio Tinto strategy, to reach this goal by the time of mine closure; however, OT will seek opportunities to achieve net gain as early as practicable in the project life. OT aims to achieve a steady progress towards net gain over the duration of the mine. OT's annual progress reports will tabulate or plot the quantitative progress over time of relevant indicators, enabling a transparent assessment of their trajectory towards net gain.

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In addition, OT must comply with a set of environmental regulations and requirements from (see Figure 1):

- 1) the Government of Mongolia;
- 2) a group of international lenders who are financing development of the underground phase of the mine, including the International Finance Corporation and the European Bank for Reconstruction and Development, who require compliance with specific performance standards; and
- 3) other stakeholders, including Rio Tinto.

4.1 Overlaps With Other Management Plans

This Management Plan is one of a suite of documents that collectively outline OT’s approach to managing biodiversity risk (see Figure 1). The ESIA Appendix 1: Oyu Tolgoi LLC Biodiversity Strategy continues to accurately outline OT’s overall approach to biodiversity management. Underneath this, the following documents will be periodically updated, to reflect changes in knowledge and adaptive management:

- Oyu Tolgoi LLC Biodiversity Management Plan (BMP) - Details how OT has followed Rio Tinto’s approach to biodiversity action planning. It identifies priority biodiversity for the project, and assesses project risks to this biodiversity. It then outlines mitigation of critical and high risk project impacts to this biodiversity through avoidance and minimization.
- Oyu Tolgoi LLC Land Disturbance Control and Rehabilitation Management Plan (LDCRMP) – Addresses, in more detail, mitigation of project land disturbance impacts on priority biodiversity, with a focus on rehabilitation.
- Oyu Tolgoi LLC Offsets Management Plan (OMP) - Outlines the programme of biodiversity offset projects designed to address significant residual impacts after mitigation outlined in the BMP & LDCRMP.
- Oyu Tolgoi LLC Net Gain forecast - Calculates predicted residual biodiversity losses from critical and high risk impacts (after avoidance and minimisation), calculates projected gains from rehabilitation and offsets, and compares losses against gains to predict if and when OT expects to reach no net loss/net positive impact goals for priority biodiversity.
- Oyu Tolgoi LLC Biodiversity Monitoring and Evaluation Plan (BMEP; this plan) - Details monitoring to assess the state of priority biodiversity in the southern Gobi, project-related impacts/pressures, and project response at all steps of the mitigation hierarchy. As such, monitoring informs the net gain/no net loss forecast, clarifies whether the project remains on track to achieve net gain within its stated timeframe, and provides feedback for adaptive management of the BMP, LDCRMP, and OMP.

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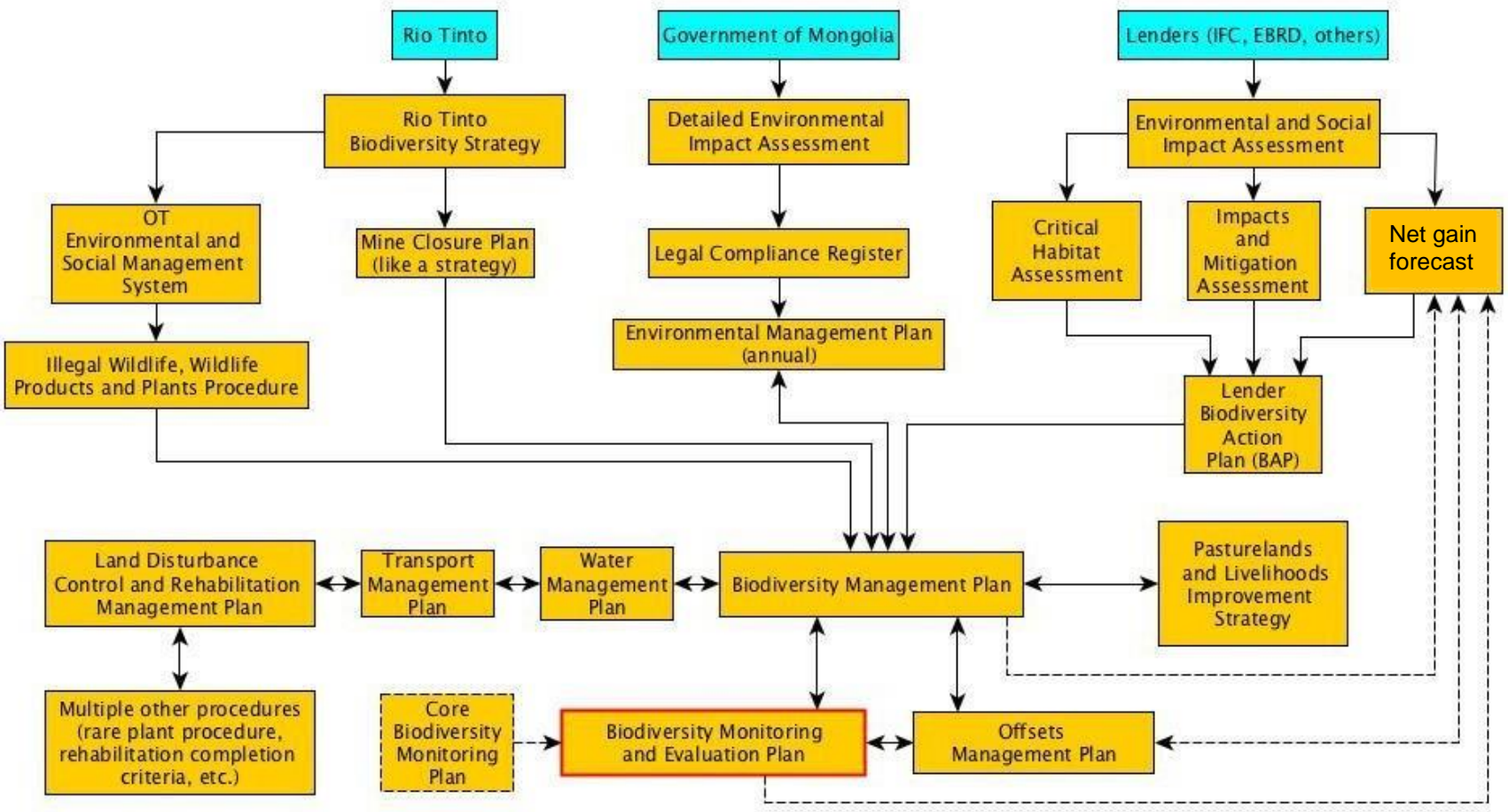


Figure 1 Relationship between the OT documents that relate to biodiversity monitoring

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5 BIODIVERSITY MONITORING COMPLETED UP TO END OF 2019

To support OT's commitments to managing biodiversity and to fill gaps in baseline data, OT has continuously monitored biodiversity since 2012. The Core Biodiversity Monitoring Program (CBMP) was started with a two-year pilot (2013 and 2014), which was aimed to test methods and consolidate baselines, including understanding the natural variation in high-priority biodiversity features. The CBMP monitoring has now been integrated into the BMEP and represents the key monitoring programs to assess mitigation performance and track progress towards achieving the offset outcomes. The CBMP currently included 37 different monitoring methods that measure 27 pressure indicators, 18 state indicators and 16 response indicators. Methods and indicators are assessed annually, as part of the data review and planning process. Some methods, such as the aerial and ground-based ungulate surveys, are extremely complex operations and are done at prescribed intervals. The CBMP monitoring is summarized as an annual report prepared jointly by OT and the CBMP contractors.

In line with adaptive management principles, several assessment exercises have also been completed:

- 1) Gap Analysis (2013) - OT, Wildlife Conservation Society (WCS), Sustainability East Asia, and Global Biodiversity Consultancy (GBC) completed a gap analysis to assess the completeness of the CBMP. The exercise checked whether indicators were selected for each significant positive and negative impact predicted by OT (based on the OT ESIA Appendix 3) on each Critical Habitat- qualifying biodiversity feature, plus Natural Habitats and houbara bustard.
- 2) Method and indicator evaluation (2015) - Prior to the close of the two-year pilot CBMP, OT, WCS, GBC and other partners evaluated the monitoring methods that had been tested in the CBMP. Methods were evaluated on a range of criteria including cost, risk of failure, soundness of assumptions, statistical power, practical management value, and usefulness for adaptive management. Many of these criteria involved real-world trade-offs. Individual indicators were evaluated on accuracy, precision, sensitivity and sample size. The result of the evaluation was a list of the monitoring methods that would be used in the next 5-year phase of monitoring and are included in this programme.
- 3) Annual Core Biodiversity Monitoring Program (since 2015) – various consultants are used to implement the long-term monitoring program that is implementing the monitoring program from item 2 above. Monitoring methods have been tested and modified as the annual results are reviewed and evaluated.
- 4) Annual planning workshops (from 2015 to 2019) – OT, SEA, WCS, GBC and other partners gather together every year to review the results of the current year's sampling and thresholds. The main goal of this workshop is to review and evaluate study results in previous years. If necessary changes have been made to CBMP as a result of these discussions.

6 MONITORING SCOPE

This BMEP is designed to support OT reach its ~~net-gain~~ goals of positive outcomes for biodiversity by monitoring OT activities and natural responses on both the positive and negative sides of the net gain balance sheet.

6.1 Monitoring Timeline

OT's biodiversity monitoring program will continue until mine closure (currently estimated to occur in 2055 based on the current life-of-mine and closure plan). The scope of biodiversity monitoring is likely to remain fairly stable for most habitats and species, while it is expected that some methods will be added, changed, or dropped over time to accommodate adaptive management priorities.

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6.2 Monitoring Scope - Geographic

A range of different geographic scales are required and included in this programme given the diverse set of research questions that guide the monitoring. Some biodiversity features can be monitored over a fine-scale in the immediate vicinity of OT, whereas large-scale monitoring across the southern Gobi region is needed for other features. For example, the success of OT's efforts to improve the quality (or condition) of Natural Habitat must be monitored at the landscape-scale so that the effects of numerous confounding factors (notably rainfall) can be better understood. As another example, OT has been surveying khulan across the whole range of the south-east Gobi khulan population (Figure 2). Note that as a result of the implementation of the railroad fence pilot project and additional satellite tracking data, the geographic scope of some of the monitoring will need to be expanded to the north and east of Sainshand in the coming years.

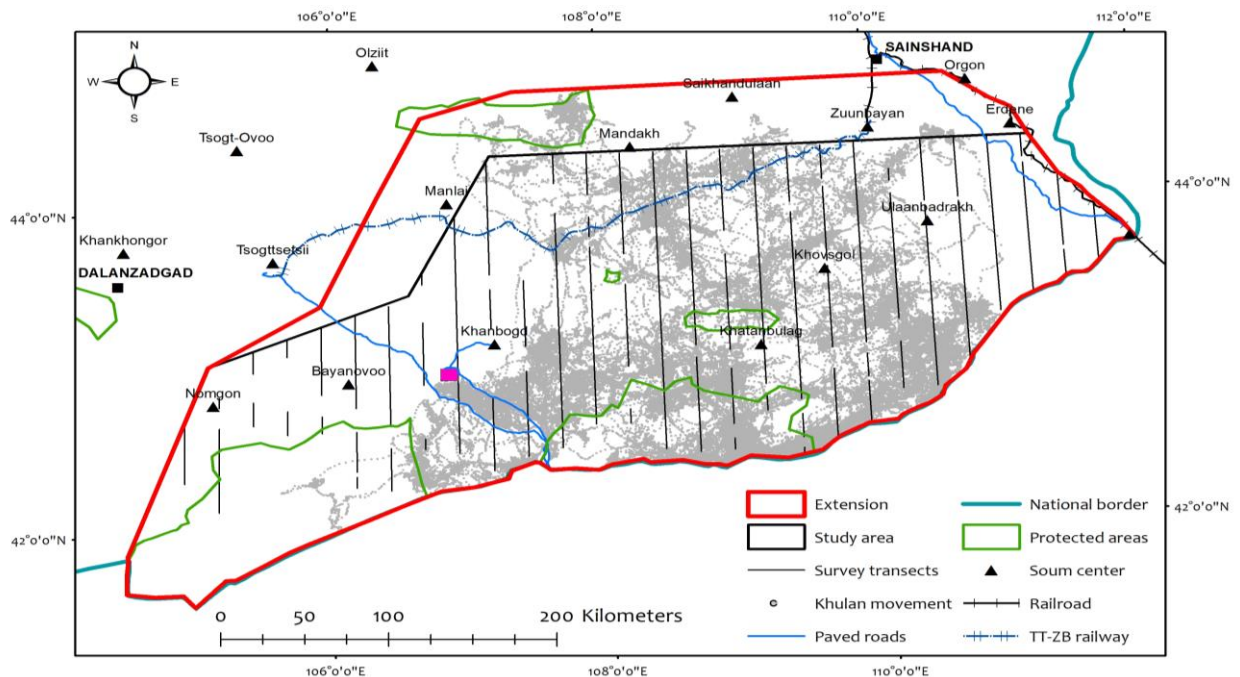


Figure 2 Example monitoring area: ground-based ungulate survey area

6.3 Monitoring Scope - Indicator Types

Three monitoring indicator types are used in this programme:

- State: the state of species, populations, and other natural resources;
- Pressure: the human pressure (including that from OT) on biodiversity; and
- Response: OT's management response to those pressures.

6.4 Monitoring Scope – Habitats and Species

The BMEP is monitoring a suite of habitats and species as defined in Annex 3 of the BMP and listed below in Section 7. This includes all Natural Habitat (rangeland), Critical Habitat-qualifying features and other priority biodiversity features identified by OT stakeholders.

OT uses an adaptive management approach towards biodiversity. OT acknowledges that knowledge of biodiversity will always be incomplete, and the system itself is a moving target, because of the impacts of management and external human influences.

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7 ADAPTIVE MANAGEMENT APPROACH TO BIODIVERSITY

One of the aims of adaptive management, in the context of this plan, is to quickly and flexibly respond to negative changes in the status of a priority feature, and to experiment with solutions in an intelligent framework that makes it possible to learn quickly from successes and mistakes. Key principles include:

- active adaptive management requires that management actions are designed as experiments, that they occur in a well-designed monitoring framework in which the results can be quantitatively evaluated, and that actions which improve learning are valued over those which do not; and
- management policies should be chosen in light of the assumptions they test, so that the most important uncertainties are tested rigorously and early. As well as improving understanding through an experimental/learning approach, a key objective of adaptive management is to take timely corrective action if needed.

Based on monitoring activities and analysis, OT will apply an adaptive management approach as outlined in Figure 3.

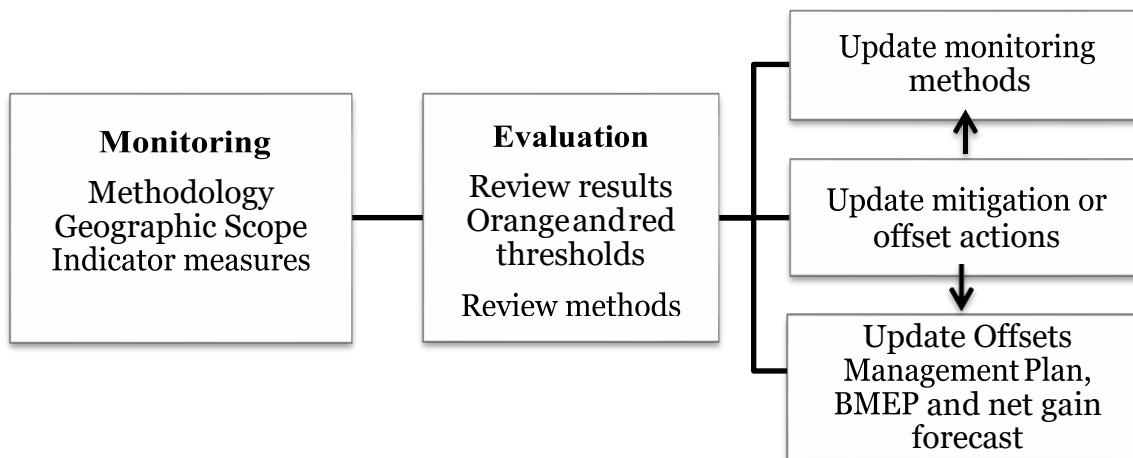


Figure 3 Interrelationship of activities and documents impacted by adaptive management

OT will regularly review the monitoring program and will modify monitoring methods and other components of the biodiversity approach as needed, always with the goals of measuring progress towards NPI and serving the needs of adaptive management (**Error! Reference source not found.**).

Table 1. Types of review that the components of the monitoring plan will undergo, and the frequency undertaken.

Review activity	Frequency
Compare monitoring data with indicator thresholds (see below).	Evaluation of indicators and thresholds done as part of the preparation of the annual summary report.
Evaluate methods and indicators and adjust methods as necessary.	Once per year during the annual review and planning session.

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Review activity	Frequency
Adaptive review of BMEP	Once per year, following review of methods and NPI forecast*
Internal review of net gain forecast and adjust forecast if necessary.	Once per year, following completion of the CBMP report.
Fully revise net gain forecast.	Every five years.
Review adaptive management thresholds and revise as necessary.	Once per year, following the field season.
Review adaptive management actions or experiments and revise management as necessary.	At a minimum, once per year. Additional review may be required if there is evidence that approaches are failing (e.g., indicator thresholds are crossed) or that there is an opportunity for a major improvement.

*the annual report to the lenders will comprise both reporting on the results and reporting on any updates to indicators, methods, and thresholds as they are developed based on the new data collected (form of reporting still to be agreed by OT and lenders).

8 MONITORING PLAN

This section summarizes the current biodiversity monitoring (**Error! Reference source not found.**). This plan is documented with the explicit intention that it will be periodically adapted and updated based on monitoring results and other inputs (see **Error! Reference source not found.**).

Detailed monitoring methods are included as appendices and will form the basis of Standardized Work Procedures (SWP) that describes detailed step-by-step procedures for each method.

9 MONITORING TARGETS AND THRESHOLDS

9.1 Net Gain Targets

A quantitative net gain target has been set for most indicators. This is the target to meet the outcomes predicted in the net gain forecast. Additional interim targets (e.g., over 5 or 10 years) can be developed when adequate data are available. A few indicators do not feed directly into the NPI forecast because they have an insignificant quantitative impact relative to the uncertainties around indicators of other much larger impacts.

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Table 2. Summary of indicators for priority biodiversity (further details included in Appendix)

Biodiversity Feature	Pressure State or Response/ OMP KPI	Indicator (refer to appendices for details)	Net Gain Target (over the 25- year Net Gain timeframe)	Orange Threshold	Red Threshold	Comments
1. Critical Habitat qualifying features						
1a. Predicted critical risk from OT impacts						
Asiatic wild ass (khulan) and Goitered gazelle	Pressure (OMP-KPI-1)	Carcass density within the anti-poaching offset landscape (from line transects)	18% reduction in new carcasses (from 2015 baseline)	Any inter-annual increase, or <30% reduction over ten years	No decrease in carcasses over any 5 years	Based on 2019 CBMP analysis the changes this indicator is trying to detect are not possible to detect. Work is underway to develop a better indicator of poaching pressure.
	Pressure / Response (OMP-KPI-3)	Avoidance of infrastructure	8.5% reduction where anti-poaching work is implemented	To be set when baseline data are available	To be set when baseline data are available	
	Pressure	Number of crossings of OT-GS road (by GPS collared individuals)	Any animal crossing/year (from 20 collared Asiatic wild ass) Any animal crossing/year (from 10 collared goitered gazelle)	<5 animals crossing/year (from 20 collared Asiatic wild ass) <5 animals crossing/year (from 10 collared goitered gazelle)	<1 animal crossing/year (from 20 collared Asiatic wild ass) <1 animal crossing/year (from 10 collared goitered gazelle)	

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Biodiversity Feature	Pressure State or Response/ OMP KPI	Indicator (refer to appendices for details)	Net Gain Target (over the 25- year Net Gain timeframe)	Orange Threshold	Red Threshold	Comments
	Pressure	Number of confirmed incidents of illegal hunting, collecting or possession (from enforcement teams)	Detectable reduction per unit effort (from 2015-2016 baseline)	More than 15 incidents for khulan. More than 18 incidents for gazelle	More than 22 incidents for khulan. More than 29 incidents for gazelle	
	Pressure	Number of OT inspections finding illegal wildlife products	n/a	Any inspection finding any listed priority mammal or bird species	>1 inspection finding any listed priority species mammal or bird	
	Pressure	Number of OT related incidents	n/a	Any incidents	>1 Asiatic Wild Ass incident/quarter >4 Goitered Gazelle incident	This indicator was originally focused only on OT-GSK road traffic. Changed to be broader and include non-vehicle related incidents.
	Pressure	Number of OT vehicle transgressions (speeding, driving and parking off-road)	n/a	>0 incident	>10 km/h above speed limit	
	Pressure	Traffic volume and number of speeding vehicles on OT-GS road	n/a	No Threshold	No Threshold	Monitoring data has demonstrated that OT vehicles account for <1% of vehicles documented speeding. While the OT monitoring station continues to

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Biodiversity Feature	Pressure State or Response/ OMP KPI	Indicator (refer to appendices for details)	Net Gain Target (over the 25- year Net Gain timeframe)	Orange Threshold	Red Threshold	Comments
						collect this information, the indicator is not effective as OT-GS is now a public road and OT has no control over speeding local vehicles.
	State (OMP-KPI-2)	Population over approx. 100,000 km ² (from line transects) (ground based survey every 2 years)	Detectable increase (p<0.2; from 2013-2015 baseline)	>10% mean decline over 3 years	>30% mean decline over 3 years	
	State	Population over approx. 100,000 km ² (from aerial photography or other remote sensing methods) every 6 years	Detectable increase (from 2013 baseline)	>10% mean decline over 3 surveys approx. 18 years)	>30% mean decline over 3 surveys (approx. 18 years)	Cancelled (NOC 2019-001). Surveys stopped because they duplicated ground based population surveys (see line above).
	State (OMP-KPI-5)	Extent of Occurrence of Asiatic wild ass in the southern Gobi	Expanded range includes 5,000 km ² of suitable habitat east of the UB-Beijing railway	No expansion east of railway within 2 years of pilot fence removal	No expansion east of railway within 5 years of full fence removal	
	Response (OMP-KPI-6)	Total number of detected crossings of UB-Beijing railway	>10 crossings of both species per month	<5 crossings of both species per year within 4 years of pilot	No crossings within 5 years of full fence removal	

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Biodiversity Feature	Pressure State or Response/ OMP KPI	Indicator (refer to appendices for details)	Net Gain Target (over the 25- year Net Gain timeframe)	Orange Threshold	Red Threshold	Comments
				fence removal		
	Response	% staff/contractors trained (in driver awareness)	100%	<80%	<60%	
	Response	Number of person-days Multi-Agency Teams (MAT) and Multi-Agency Patrol Units (MAPU on patrol	n/a	<1000 person-days	<800 person-days	
	Response	Facilitate the development of a regional biodiversity plan	n/a	To be set when baseline data are available	To be set when baseline data are available	
1b. Predicted high risk from OT impacts						
<i>Amygdalus mongolica, Cistanche lanzhouensis, Spongocarpella grubovii, Zygophyllum potaninii</i>	Pressure	Number of individuals lost under OT associated Infrastructure	N/A	To be set when MLA plant community map is prepared	To be set when MLA plant community map is prepared	Cancelled as the plant community mapping is not static and continues to evolve with each LDP. Also the net gain and NNL commitments are not based on a maximum threshold.
	State	Estimated distribution areas as based on CBMP priority plant surveys in KB soum	No decline attributable to OT (from baseline or compared to controls)	No threshold	No threshold	

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Biodiversity Feature	Pressure State or Response/ OMP KPI	Indicator (refer to appendices for details)	Net Gain Target (over the 25- year Net Gain timeframe)	Orange Threshold	Red Threshold	Comments
	Response	Number of individuals in rehabilitated rangeland (indicators under review)	More than were lost	Rehabilitation has replaced <50% of the number lost within 15 years of initial impacts	Rehabilitation has replaced <90% of the number lost within 15 years of initial impacts	
1c. Predicted low / moderate risk from OT impacts						
Granite outcrop floral communities		Statistically significant changes in woody shrub and <i>Amygdalus mongolica</i> in buffer rings set up around KB town center (See CBMP 2016 report)	No change	Any change	n/a	New targets established based on monitoring methods developed by CBMP
Short-toed snake-eagle	Pressure	Number of electrocution carcasses found under power infrastructure	Zero electrocution carcasses	Any electrocution carcasses	>1 electrocution carcasses / year	
	Pressure	Number of collision carcasses found under power lines	Zero collision carcasses	Any Short-toed Snake-eagle collision; >4 Houbara Bustard collisions in any year.	>1 Short-toed Snake-eagle collision; >6 Houbara Bustard collisions in any year.	
	State	Number of active nests in Khanbogd survey area	No decline (from 2013-2015 baseline)	<7	<4	
	Response	% bird flight diverters along OT powerline infrastructure	n/a	n/a	n/a	It has proven impractical to replace bird flight diverters on the

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Biodiversity Feature	Pressure State or Response/ OMP KPI	Indicator (refer to appendices for details)	Net Gain Target (over the 25- year Net Gain timeframe)	Orange Threshold	Red Threshold	Comments
						energized power lines. While the flapper type diverters are failing, the spiral diverters remain in place. Monitoring has shown bird strikes occur in low rates and are random (i.e. they occur at the same rate whether or not bird flight diverters are present).
	Response	Effectiveness of the insulators.	80% incident reduction (2017 as baseline data)	<80%	<60%	This indicator was initially focused on completion percent of insulations. Since the installation process has finished the focus is shifted to the effectiveness of the insulators.
Saker falcon	Response (OMP-KPI-8)	Predicted number of averted saker falcon deaths	>1000 predicted saker falcon deaths per year averted	<1000 predicted saker falcon deaths per year averted	<500 predicted saker falcon deaths per year averted	
2. Other stakeholder priority features						
2a. Predicted high risk from OT impacts						
Houbara bustard	Pressure	Number of collision carcasses (before applying correction factors) found	≤4 collision carcasses / year	>4 collision carcasses / year	>6 collision carcasses / year	

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Biodiversity Feature	Pressure State or Response/ OMP KPI	Indicator (refer to appendices for details)	Net Gain Target (over the 25- year Net Gain timeframe)	Orange Threshold	Red Threshold	Comments
		under power lines				
	Pressure	Number of OT-related construction and maintenance activities in the Galba Gobi IBA during the bustard lekking season	n/a	Any activity	>1 activity in same area in same year	
	Pressure	Number of wildlife collisions with OT and contractor vehicles	n/a	Any bustard collisions	>1 bustard collisions/year	
	Pressure	Number of unburied food waste events based on number of random checks	Daily cover	Covered during <90% of checks	Covered during <80% of checks	Cancelled. Organic food waste is now being composted in a dedicated compost facility to provide organic material for rehabilitation. This indicator would be used again if there are changes in the composting program in the future.
	State	Number of scavenger birds at the composting area	Not exceeding 2018 baseline which is: 514 Common raven; 22 Daurian Jackdaw; 13 Black kites;	20% exceedance	50% exceedance	Monitoring focus shifted from WMC to composting area. Food waste is now being

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Biodiversity Feature	Pressure State or Response/ OMP KPI	Indicator (refer to appendices for details)	Net Gain Target (over the 25- year Net Gain timeframe)	Orange Threshold	Red Threshold	Comments
			9 magpies. In total 558 scavenger birds.			composted in a dedicated compost facility to provide organic material for rehabilitation.
	State	<i>Based on results of monitoring pressure, annually review the periodicity and methods for monitoring population density</i>				
	Response	% bird flight diverters along all OT related powerline infrastructure malfunctioning / missing	n/a	n/a	n/a	
	Response (OMP- KPI- 7)	Kilometers of non-OT low and medium voltage powerline built in Mongolia following a new national standard.		0 kms by 2025.	0 kms by 2030.	
Other priority plants		Potential impacts from loss and degradation of rangeland habitat: same methods as Critical Habitat-qualifying priority plants (above); and potential impacts from over-harvesting: same methods as saxaul forest (below)				

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Biodiversity Feature	Pressure State or Response/ OMP KPI	Indicator (refer to appendices for details)	Net Gain Target (over the 25- year Net Gain timeframe)	Orange Threshold	Red Threshold	Comments
2b. Predicted low / moderate risk from OT impacts						
Riverine elm and poplar	Pressure	Hydrological flows near springs and trees	No significant change in areas potentially impacted by OT compared to controls	A sustained groundwater level change (either rising or falling) over >2 measurement periods	A sustained groundwater level change (either rising or falling) over >4 measurement periods	
	Pressure	Number of trees lost under infrastructure	Zero additional loss	Any adult tree lost	Any two adult trees lost	
	State	% elm canopies dead	No significant change in areas potentially impacted by OT compared to controls	>5% mean increase in % canopy dead in areas potentially impacted by OT compared to controls in any year	>20% mean increase in % canopy dead in areas potentially impacted by OT compared to controls in any year	This indicator will be linked to the Elm Metric that is part of the Rangeland Metric and tested during the 2019 CBMP.
	Response	Number and survival of elm trees planted	More than the number of impacted individuals	Equal to the number and survival of impacted individuals	Less than the number of impacted individuals	New targets added in 2020
Saxaul forest	Pressure	Density and area lost under infrastructure	Zero additional loss beyond that predicted in the ESIA	Any saxaul forest lost beyond that predicted in the	>1 ha saxaul forest lost beyond that	

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Biodiversity Feature	Pressure State or Response/ OMP KPI	Indicator (refer to appendices for details)	Net Gain Target (over the 25- year Net Gain timeframe)	Orange Threshold	Red Threshold	Comments
				ESIA	predicted in the ESIA	
	Pressure	Number of reported incidents of illegal hunting, collecting or possession (from enforcement teams)	Detectable reduction (from 2015-2016 baseline)	>0 incidents	>10 incidents	Cancelled as this is duplicative with the indicators below.
	Pressure	Levels of use for Khanbogd soum (including KB town)	Detectable reduction (from 2016 household survey baseline)	>20% decrease from initial use level (2016)	>40% decrease from initial use level (2016)	
	Pressure	Levels of use for Khanbogd soum herders	N/A	>20% decrease from initial use level	>40% decrease from initial use level	Cancelled as this is duplicative with the indicators above.
	State	Area and quality (indicators under review)	To be set when indicators are finalised	To be set when baseline data are available	To be set when baseline data are available	
	Response	Area and quality of saxaul planted	More QH than were lost	<75% of the QH that was lost regained by 2026	<50% of the QH that was lost regained by 2026	
Natural habitat / rangeland	Pressure	Area lost under OT associated infrastructure	Not more than the predicted impact of 8500 QH	>500 QH in addition to map used for NPI forecast	n/a	
	Pressure	Overall mean grazing	n/a	n/a	n/a	Refer to monitoring of

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		effect, measured as change between plots inside and outside enclosures				KB soum as part of the Ecosystem Services Monitoring report
	State / Response (OMP- KPI- 4)	Rangeland quality (across established rangeland monitoring control sites)	10% gain across 350,000 ha within the SCP offset area (compared to controls)	No threshold	No threshold	
	Response	Quality of rehabilitated rangeland	Meet completion criteria	n/a	n/a	Modified to be consistent with rehabilitation plan and government completion criteria
	Response	Area of rehabilitated rangeland	Rehabilitate all disturbed area that are available for rehabilitation	If rehabilitated not initiated within 1 year	If not rehabilitated within 5 years	Modified to be consistent with rehabilitation plan and government completion criteria
	Response	Density of goats (and other livestock) in sustainable cashmere project area	% reduction in goat numbers to support achieving net gain goals of the SCP offset	Increase in livestock numbers in SCP cooperatives over 2017 to 2020 baseline	20% increase in livestock numbers in SCP cooperatives over 2017 to 2020 baseline	New targets set in 2020 based on current understand of herd dynamics and new pasture management practices being implement in 2019/2020
	Response	Increase in rangeland condition in the SCP offset delivery area (Nomgon and Bayan oboo soums) when compared with control sites (based on rangeland metric,	10% gain across 350,000 ha within the SCP offset area compared to control sites (using 2017 to 2020 rangeland	No improvement in rangeland metric score in the SCP area compared to control sites after	No improvement in rangeland metric score in the SCP area compared to control sites	New indicator in 2020 to assess performance of SCP offset based on using the new rangeland metric tool

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Biodiversity Feature	Pressure State or Response/ OMP KPI	Indicator (refer to appendices for details)	Net Gain Target (over the 25- year Net Gain timeframe)	Orange Threshold	Red Threshold	Comments
		with a 2017 to 2020 baseline)	metric baseline)	5 years (2025) of monitoring	after 10 years (2030) of monitoring	
Argali	Pressure	Number of reported incidents of illegal hunting, collecting or possession (from enforcement teams)	Detectable reduction (from 2015-2016 baseline)	1 case reported	>1 case reported	
	Pressure	Number of OT inspections finding illegal wildlife products	n/a	>0	>10	
	State	Population over approx. 100,000 km ² (from aerial photography)	Detectable increase (from 2013 baseline)	>10% mean decline over 3 surveys (approx. 15 years)	>30% mean decline over 3 surveys (approx. 15 years)	Canceled. Changed to reflect the cessation of the aerial surveys noted above.
	State	Population estimation based on density surveys in the Khanbogd Massif	Detectable increase from baseline	To be set when baseline data are available	To be set when baseline data are available	Annually for 3 years (until 2022). Frequency should be re-discussed after 3 years.
	Response	Amount of wildlife products confiscated (from OT inspections at mine site)	n/a	>0	>10	Cancelled as this is duplicative with the monitoring of the possession of illegal wildlife above.
Mongolian gazelle		Potential impacts as goitered gazelle but occurs in small numbers in impact area: same methods, targets and thresholds as goitered gazelle (above)				

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Biodiversity Feature	Pressure State or Response/ OMP KPI	Indicator (refer to appendices for details)	Net Gain Target (over the 25- year Net Gain timeframe)	Orange Threshold	Red Threshold	Comments
Long-eared jerboa Marbled polecat Mongolian accentor		No monitoring proposed as no records within the impact area. Rangeland condition monitoring provides a surrogate for these species as the primary risk to these species is habitat degradation.				
Swan goose, Ferruginous duck, Saker falcon, Lammergeier, Great bustard, Relict gull, and Dalmatian pelican		Potential impacts from power lines: same monitoring methods, targets and thresholds as short-toed snake-eagle and houbara bustard (above)	≤4 collision carcasses / year	>4 collision carcasses / year	>6 collision carcasses / year	
Pallas' sandgrouse Mongolian ground-jay		Potential impacts from power lines: and potential impacts from loss and degradation of rangeland habitat. Monitoring methods as houbara bustard rangeland habitat above	To be set when baseline data are available	To be set when baseline data are available	To be set when baseline data are available	Baseline would be available in 2021.
2c. Predicted negligible risk from OT impacts						
Ephemeral lakes & pools		No monitoring proposed until ephemeral lakes and pools appear within the impact area				
Yellow-breasted Bunting		No monitoring proposed as no records within the impact area				

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As an example, the ‘Number of OT vehicle transgressions (speeding, driving and parking off-road)’ is quantitatively insignificant compared to the habitat loss under the project footprint and the vehicle-avoidance behaviour caused by illegal hunting, but it remains important to OT and its stakeholders that this impact is addressed and monitored. Other indicators are ‘input indicators’ (e.g., number of person-days MATs and MAPUs on patrol) – although most input indicators are documented as part of the BMP or OMP and not this BMEP, some (such as this example) are considered important to feed into adaptive management as well as external communication.

Targets and thresholds assume a static baseline (i.e., no change in non-OT impacts), which will be tested by analysis of monitoring and other research data.

9.2 Thresholds for Adaptive Management

In general, ‘state’ indicators should follow an upward trend to demonstrate net gain. In some cases it might not be technically possible to improve their state (e.g., houbara bustard and priority plants unaffected by collecting), so the state target is no change, with additional response indicators to monitor gains from offsets and/or rehabilitation. In general, ‘pressure’ indicators should follow a downward trend. In some cases (e.g., the direct project footprint), the target is set at no additional impacts over those already predicted in the NPI forecast. In general, ‘response’ indicators should follow an upward trend. In many cases, it is not applicable to set a response target because the responses are ‘inputs’ which are better monitored through their impact on pressure or state indicators (and additional ‘input’ indicators are listed in the Offsets Management Plan).

Thresholds are used as part of the monitoring analysis and serve as warning signals. The thresholds, if exceeded, will trigger a review to determine whether the negative change in the indicator was caused by OT or by an external driver. If it is determined that OT activities were responsible, further review will determine whether it is necessary to adapt current management. The monitoring partners will annually review whether thresholds have been exceeded. However, in some circumstances (e.g., vehicle collision with Asiatic wild ass), crossing thresholds can be quickly identified. When thresholds are crossed the process outlined below will be followed.

To support adaptive management, thresholds:

- are written in terms of absolute values and time periods; and
- warn of large movements in an indicator over a short period, or sustained incremental variations that add up to significant changes over longer timeframes.

Two levels of thresholds are used and are defined in Figure 4, with different responses (refer to Section 9.2.1 for more details on responses):

- Orange threshold exceedances will trigger further investigation to determine the cause; OT might need to modify current mitigations or offsets in order to remain on track to deliver on its net gain goals.
- Red threshold exceedances will trigger urgent additional studies to understand the cause and determine what actions are needed for OT to remain on track to deliver on its net gain goals. Action Plans are to be reviewed by two OT- appointed external reviewers and will outlined recommendations for modifications to mitigation efforts (e.g., additional offsets may be required).

These thresholds are listed in **Error! Reference source not found.**, showing that measured values of an indicator are likely to fluctuate, trigger investigation if exceeding an orange threshold, and trigger urgent investigation if exceeding a red threshold. Based on the investigation, mitigation may need to be adapted. It is predicted that net gain will be achieved (i.e., the project is on track) if the indicator remains above the orange threshold, but there is an increasing level of risk that net gain will not be achieved if indicators head below orange and red thresholds. It is noted that the net gain forecast is intentionally precautionary, so crossing the orange threshold does represent a risk of

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not reaching NPI; however, it is intended to identify negative trends early enough that responses can be implemented before sizeable risk develops.

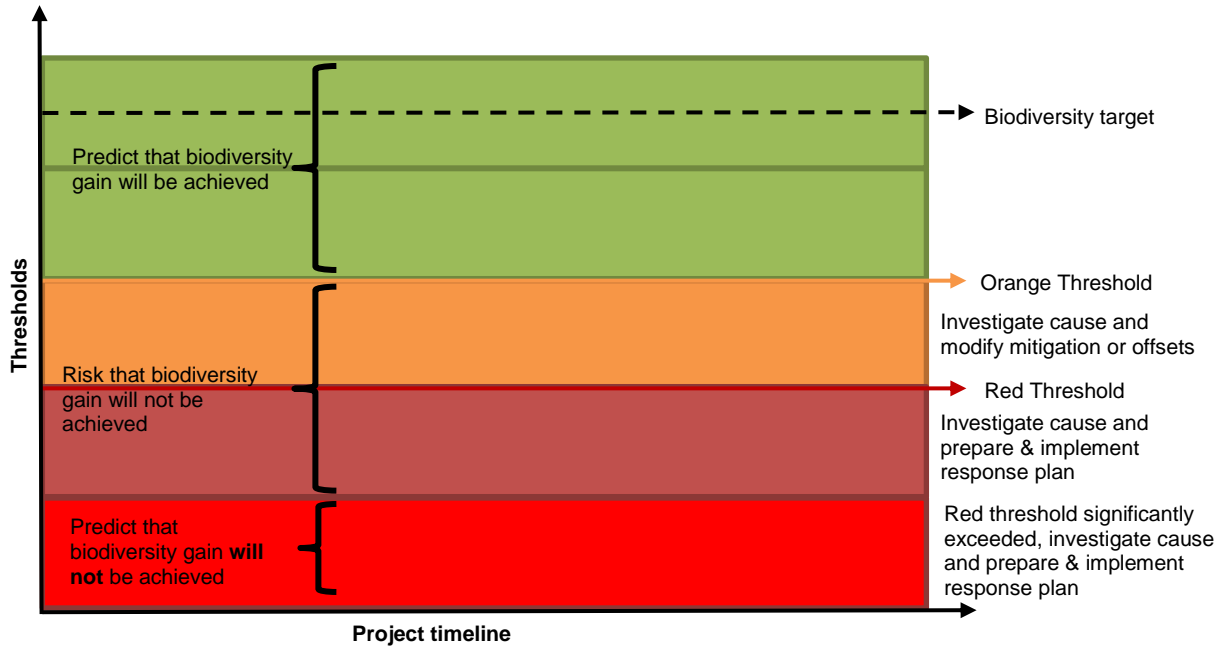


Figure 4 Schematic representation of thresholds, actions and consequences for biodiversity gain

The range of natural variation in most of OT’s biological indicators (particularly state indicators), as well as sampling error, is not yet well enough understood to develop robust evidence-based thresholds based on population trends. For many ‘state’ indicators, at least three years of standardised robust monitoring is necessary to estimate a baseline, and longer to understand natural population variability and to interpret erratic or gradual trends in population size. Some other indicators lack three years of standardised robust monitoring because monitoring methods have been incrementally revised.

Until more data are available, thresholds are set precautionarily and are based on expert opinion. These thresholds should be considered as preliminary, with explicit review at nominated time intervals in the future, with such review informed by the targeted and adaptive monitoring program (such as three years of standardised robust data). These preliminary thresholds are based on comparing standardised data between years or over longer time periods (maximum change through ‘moving windows’ with no set start or end point).

Indicator thresholds currently used to trigger adaptive management actions are based primarily on ‘pressure’ indicators, and their purpose is to determine whether OT remains on track to deliver NPI or whether any NPI predictions or underlying assumptions are challenged by the monitoring data. Pressure indicators are particularly valuable since they are less costly to monitor than ‘state’ indicators, may show changes more quickly, and are easiest to attribute to OT. Pressure indicators can measure not just OT’s negative impacts but also OT’s positive impacts in reducing the baseline (pre-project / counterfactual) pressures (e.g., the rate of illegal hunting). Given that the relationship between ‘pressure’ and ‘state’ is not always well known (e.g., additional unidentified pressures may be impacting the state), state indicators are monitored for all priority biodiversity features, and thresholds will be identified as soon as practicable. These thresholds will be refined, and new

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thresholds added, as additional data becomes available, but will not be adjusted solely because they are triggered.

Orange and red thresholds are set at a level indicating when the project is at risk of not meeting its NPI targets, because indicators suggest that reality is moving too far from assumptions or pressure or state values predicted in the net gain forecast. No thresholds are given for response indicators as 'input indicators' are set in contracts and work plans, and monitored by implementation reports. 'Outcome indicators' for responses are generally the same as pressure indicators (e.g., the anti-poaching offset work will monitor its effectiveness by monitoring the pressure indicators already established for hunted species) or state indicators (e.g., the rangeland offset work will monitor its effectiveness by monitoring the state indicators already established for rangeland and constituent rare plant species).

9.2.1 Threshold Response Plans

As noted above, when an orange or red threshold has been reached, this will trigger a set of OT responses. The actions guide the development of response plans and actions are outlined below.

Adaptive management action/response when Orange thresholds are exceeded

When any orange threshold has been crossed by the relevant indicator, biodiversity risks are indicated and adaptive management actions are triggered. The process to respond is:

1. Check the original data to corroborate findings;
2. Compare the data with other datasets to clarify what has happened and why (e.g., is OT the root cause of the threshold being crossed, were external factors the driver, or some combination of the two?);
3. Assess whether mitigation measures were being implemented effectively:
 - a. if not, would thresholds have been exceeded had mitigation been implemented correctly? Remedial action should be taken; or
 - b. if mitigation was being implemented correctly but thresholds were crossed, the mitigation is not as effective as it was designed to be or the impact was caused by some external driver outside of OT control. If the threshold breach is attributable to OT's primary or secondary impacts, additional/different mitigation actions should be implemented if appropriate; and
4. Consider whether the threshold should be re-calibrated.

Adaptive management action/response when RED thresholds are exceeded

When a red threshold has been crossed, the actions outlined for an orange threshold will initiate the response. Additionally, the assessments must be undertaken within one month of OT being aware of passing the threshold:

- These assessments and recommended actions to be reviewed by two OT-appointed external reviewers; and
- Modify the BMEP to include monitoring of remedial or additional/different mitigation actions required, if the exceedance are attributable to OT's primary or secondary impacts.

9.3 Offset Plan and Mitigation Actions

Mitigation and offset actions require specific monitoring to determine how successful the actions are in meeting biodiversity net gain goals. Monitoring needs may change when a new management approach is tried, or an existing approach is modified. Therefore, a feedback loop between monitoring and mitigation or offset actions is designed into this plan. All contracts and work plans for mitigation and offset actions include the monitoring and reporting of 'input indicators'. 'Outcome indicators' for responses are generally the same as pressure indicators (e.g., the anti-poaching offset work will monitor its effectiveness by monitoring the pressure indicators already established

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for hunted species) or state indicators (e.g., the rangeland offset work will monitor its effectiveness by monitoring the state indicators already established for rangeland and constituent rare plant species). In combination, these monitoring data will be used to evaluate management actions once per year, unless a threshold is crossed or there is another reason (logistics, cost, stakeholder concerns, seasonality, etc.) to evaluate the management strategy more often. These evaluations will be fed back into the mitigation and offset actions as well as the BMEP and net gain forecast.

9.4 Feedback to Net Gain Planning and Forecast

A forecast of the likelihood that OT will succeed in having a net gain for biodiversity was included in the 2012 ESIA and updated in 2015 and 2017. The NPI forecast is an important component of OT’s overall plan, and it will be revised regularly as the environment changes and/or new information becomes available. The forecast is a set of predictions about losses and gains to priority biodiversity features. These losses and gains were first estimated based on baseline data, analogous studies elsewhere, and expert opinion. These estimations or predictions were precautionary and included various assumptions are transparently. In later version of the net gain forecast, these losses and gains are based on empirical data gathered formation from OT’s biodiversity monitoring and OT’s other biodiversity research.

Biodiversity monitoring data will be evaluated, annually, for its significance (e.g., changes in means and confidence intervals) with regard to net gain calculations and the ability of the selected indicators to detect change (either positive or negative). This review is done as part of the annual CBMP review. The net gain forecast will be updated every five years, based on the previous data and experience. A summary report will be prepared that includes an assessment of progress towards net gain and any recommendations for changes to mitigation, offsets or monitoring programs.

10 DOCUMENT CONTROL

File Name	OT-10-E14-PLN-0006-E-Biodiversity Monitoring and Evaluation Plan
Description	Biodiversity Monitoring and Evaluation Plan.
Original Author(s)	Global Biodiversity Conservation
Creation Date	2015.12.01
Approved by	Dennis Hosack
Approval Date	2016.03.01
Change Record Number	###

Risk Ranking	Assessment Date	Risk Assessor	Review Schedule	Next Review Date
Moderate	2016.03.01	Dennis Hosack	2 Yearly	2022.04.01

Version	Revision Date	Author(s)	Approved By	Revision Notes
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1.0	2016.03.01	Various	Dennis Hosack, Biodiversity Principal Advisor	Approved
1.1	2018.05.31	Various	Samdanjigmed Tulganyam Biodiversity Superintendent	Update to reflect new data from core biodiversity monitoring program (NOC 2018-005). Reformatted into OT template
1.2	2020.04.10	Various	Samdanjigmed Tulganyam Biodiversity Superintendent	Minor changes and revisions to some indicator thresholds as part of routine bi- annual review (NOC 2020-006).

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APPENDIX: DETAILED MONITORING METHODS

This appendix summarizes each of the monitoring methods and thresholds of the indicators listed in **Error! Reference source not found.** Full details are being progressively documented as S WPs.

Indicator	Carcass density within the anti-poaching offset landscape (from line transects)	
Biodiversity feature	Asiatic Wild Ass, Goitered Gazelle	
Lead organization	WCS / National University of Mongolia	
Threat	Illegal hunting	
Geographic scope	All.	
Frequency	Annual	
Method	As detailed in CBM report	
Analysis	Analyse mortality rate and poaching rate. Relate to co-variants	
NPI Goal	Orange Threshold	Red Threshold
18% reduction in new carcasses across the anti-poaching offset landscape (Nomgon, Bayan Ovoo, Khatanbulag, Khuvsgul and Khanbogd soums)	Any inter-annual increase, or <30% reduction over ten years	No decrease in carcasses over any 5 years.
Assumptions	The subpopulation size [indicator = Density of animals, from driven line transects] remains approximately stable).	

Indicator	Number of crossings of OT-GS road (by GPS collared individuals)	
Biodiversity feature	Asiatic Wild Ass; Goitered Gazelle	
Lead organization	WCS	
Threat	Fragmentation	
Geographic scope	OT to GS road	
Frequency	Asiatic Wild Ass GPS collars in late 2015 and continued every 2 years (collars transmit for ~ 2 years) Goitered Gazelle: Fix collars in late 2015 to transmit until late 2015 and in late 2018 to transmit until late 2020.	
Method	See CBM reports	
Analysis	See CBM reports	
NPI Goal	Orange Threshold	Red Threshold

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Not set.	Orange threshold: <5 animals crossing/year (from 20 collared Asiatic Wild Ass). <5 animals crossing/year (from 10 collared Goitered Gazelle).	<1 animal crossing/year (from 20 collared Asiatic Wild Ass). <1 animal crossing year (from collared goitered gazelle)
Assumptions	At least 20 collars (Khulan) or 10 collars (Goitered Gazelle) will be active at all times. Data gathered by collars will also be used in evaluation of offsets and other mitigation measures.	

Indicator	Number of confirmed incidents of illegal hunting, collecting or possession (from enforcement teams)	
Biodiversity feature	Asiatic Wild Ass, Goitered Gazelle, Argali, Mongolian Gazelle	
Lead organization	WCS	
Threat	Illegal hunting	
Geographic scope	MAT and MAPU offsets landscape	
Frequency	Ongoing	
Method	Ongoing documentation and collation of incidents related to illegal hunting (violations), household surveys and market surveys, and sampling effort.	
Analysis	Calculate changes over time. Relate to educational work and support to enforcement agencies.	
NPI Goal	Orange Threshold	Red Threshold
Detectable reduction per unit effort (from 2015-2016 baseline)	More than 15 incidents for khulan. More than 18 incidents for gazelle	More than 22 incidents for khulan. More than 29 incidents for gazelle
Assumptions	<p>The orange threshold is the average of the number of recorded poaching incidents from 2015 and 2016, as reported in the SEA & WCS Anti-poaching reports. It is assumed the anti-poaching work would lead to a reduction in poaching rate; therefore, a response should be triggered if there was no reduction (i.e., if rates were at the average).</p> <p>Khulan: 2015 was 18, 2016 was 12 = 15 incidents on average Goitered Gazelle: 2015 was 33, 2016 was 3 = 18 on average</p> <p>The red threshold is just values 50% above the orange threshold.</p>	

Indicator	Number of OT inspections finding illegal wildlife products
Biodiversity feature	Asiatic Wild Ass; Goitered Gazelle; Argali; Saxaul; Priority Plants

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Lead organization	OT Biodiversity Team with assistance of OT Security Department and Airport Team
Threat	Illegal hunting and increased (legal and illegal) collecting
Geographic scope	OT mine site and airport
Frequency	Security Department to inspect every day at the airport, randomly at the site north gate, and less often at accommodation and offices. OT Biodiversity Team to request information once per quarter.
Method	The OT Environmental Manager to agree with the OT Security Manager for OT security officers to x-ray the baggage of the all passengers (OT and contractor employees and visitors) arriving at and departing from OT by a plane, car or other vehicle, and to inspect the commercial cargo of all types of vehicles entering and exiting the OT site.
Analysis	<p>If any signs of wildlife products (meat, skin, skull, horn, claw, dried plants etc.) are detected via X-ray, the airport security officer will inspect the bag. If any wildlife products are detected, the security officer will record the offender’s personal information (name, job title, department etc.) and photograph and identify the wildlife species, number of animals and which part of body (e.g., how many skins, skulls or horns) or the plant species and number or kg of items. When impossible to identify the wildlife product, the security officer will contact the security supervisor who will contact the OT Biodiversity Team to ask the assistance for identification.</p> <p>The OT Environmental Manager also to agree with the OT Security Manager for OT security officers to search for wildlife products when they are conducting other searches elsewhere on the OT site, including vehicles and personal rooms, or if they are suspicious of illegal possession of wildlife products.</p> <p>The OT Environmental Manager also to agree with the OT Security Manager for OT security officers to count the number of random inspections of vehicles, and the number which discover wildlife products.</p> <p>The OT Biodiversity Team will request from the security supervisor at the end of each quarter the number of inspections finding wildlife products (identified to species where possible) and the total amount (kg or pieces) of wildlife products confiscated in total across the OT site (identified to species where possible), and will record the above information in a standard data sheet.</p> <p>The OT Biodiversity Team will offer advice to the security team (e.g., identifying products, and the importance of inspections) but will not initiate any disciplinary or legal action.</p> <p>Analysis: Preliminary data analysis will be done by OT Biodiversity Team. Data will be transcribed from the data sheets</p>

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	into MS Excel. % of inspection that detected wildlife products will be analyzed. Number of each wildlife species will be analyzed.	
NPI Goal	Orange Threshold	Red Threshold
Not applicable	>0 inspections finding any listed priority mammal or bird species.	>10 inspections finding any listed priority mammal or bird species
Assumptions		

Indicator	Number of OT related incidents	
Biodiversity feature	Asiatic Wild Ass; Goitered Gazelle; Houbara Bustard	
Lead organization	OT Biodiversity Team	
Threat	Direct collisions with vehicles and any other OT related incidents	
Geographic scope	All OT infrastructures	
Frequency	Monthly and when any incident is recorded	
Method	<p>A driver and one observer will drive along all OT major roads, including OT-GS, Gunii Hooloi maintenance, airport and OT-KB roads, at a speed of 40 kmph, observing for collision carcasses or signs of collisions. When signs of a dead animal, of any species or size, are sighted, the observer will stop the vehicle and record the species, number, sex/age (if possible), cause of mortality and GPS coordinates, and take photos of the carcass or remains and record the picture number. Carcasses will be brought to OT and disposed in landfill or incinerator. Any wildlife incidents are reported by project staff to OT control room under OT camp rules. OT control room to contact OT Biodiversity Team and provide details about the incidents including location and species identification etc. OT Biodiversity Team to go to incident place and repeat the above steps (this applies only for wild animals, not dogs and/or livestock). Bring the carcasses to OT and dispose in landfill or incinerator. The above information will be recorded on a standard data sheet.</p> <p>When any dead animal (except livestock, cat and/or dog) is recorded (via observation or via a call) Officer Fauna or Specialist Fauna will investigate the cause of death of the animal and if it is OT caused death (e.g. drowned in OT pond, collided with OT MLA fence, collided with OT vehicle etc.) and if it is triggering any threshold management action steps will be taken.</p>	
Analysis	Preliminary data analysis will be done by OT Biodiversity Team. Incidents for all wild animals and each species will be reported and mapped per quarter and per year, noting number found on standard monitoring and number reported from other ST staff.	
NPI Goal	Orange Threshold	Red Threshold

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Not applicable. (Any animals killed by OT traffic will be factored into NPI calculations.)	Any incident.	>1 Asiatic Wild Ass incident/quarter >4 Goitered Gazelle incident
Assumptions		
Note	This indicator was originally focused on the OT-GSK road traffic. Changed to be broader to include non-vehicle related incidents.	

Indicator	Number of OT vehicle transgressions (speeding, driving and parking off-road)	
Biodiversity feature	Natural habitat; Asiatic Wild Ass; Goitered Gazelle.	
Lead organization	OT Biodiversity Team and OT Journey Dispatch Team	
Threat	Habitat loss and degradation. Direct collisions with vehicles. Avoidance of vehicles and infrastructure by hunted ungulates	
Geographic scope	All	
Frequency	OT Biodiversity Team to request information from OT Journey Dispatch Team quarterly	
Method	OT Environmental Manager to agree with the OT Security Manager for OT Journey Dispatch Team to control OT vehicles that have GPS units to ensure that they are following the speed limits on and off lease areas. Maximum allowed speed limits are set at 60 kmph on-site and 80 kmph off-site. In-vehicle GPS units will be adjusted to signal to the driver and the Journey Dispatch Team when exceeding the speed limit for the area. OT Environmental Manager to request the records of vehicles that have exceeded the speed limit from the journey dispatch supervisor at the end of each quarter, and will record the information on a standard data sheet. OT Environmental Manager to agree with the OT Security Manager for OT Journey Dispatch Team to control OT vehicles that have GPS units to ensure that they stay within agreed transport corridors, and share data as above.	
Analysis	Preliminary data analysis will be done by OT Biodiversity Team. Data will be transferred from the data sheets into Excel	
NPI Goal	Orange Threshold	Red Threshold
Not applicable	>0 incidents	>10 km above speed limit
Assumptions		

Indicator	Traffic volume and number of speeding vehicles on OT-GS road	
Biodiversity feature	Asiatic Wild Ass, Goitered Gazelle	
Lead organization	OT Biodiversity Team	

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Threat	Direct collisions with vehicles, population fragmentation	
Geographic scope	OT to GS road	
Frequency	Real time monitoring devices and data loggers will operate continuously. Preliminary reports will be produced weekly and detailed analysis quarterly	
Method	Traffic volume will be monitored using inductive loop and infrared radar traffic detectors. An inductive loop system is to be buried shallowly in road pavement and connected to a control panel with 200 m of cable. An infrared sensing radar will also be located adjacent to the road and connected to the control panel. The induction loop and radar system count the number of vehicles and classify each vehicle according to vehicle-classes (initially only light vehicle and haul truck), speed and direction of travel. Inside the control panel, data are continuously logged. If mobile communication (GPRS) system is installed, data can be transferred directly to OT site computer. Traffic monitoring devices are to be located approximately halfway along the OT-GS road (between 40 km and 60 km from OT). All vehicles counted by these surveillance devices are considered to be driving on the OT-GS road and count towards the total traffic volume regardless of the departure and arrival points of each journey.	
Analysis	Data will be downloaded from datalogger and transcribed into MS Excel. The peak hours in a day; peak day of a week/month; and peak month of a year will be identified. The data will be analyzed for each vehicle-classification (haul truck and light vehicle) as well for OT vehicles (identified from Journey Dispatch data) and non-OT vehicles. The raw data will then be correlated with movement of collared animals, camera trap surveillance data and other any type of field observations in order to identify any statistically valid correlation with wildlife collisions and crossings. The speed of each vehicle will be compared against the incidents of speeding OT vehicles recorded from the journey dispatch data.	
NPI Goal	Orange Threshold	Red Threshold
Not applicable	No threshold	No threshold
Assumptions		
Note	Threshold cancelled. OT doesn't have any control over speeding local vehicles on OT-GS road.	

Indicator	Population over approx. 100,000 km ² (from line transects)
Biodiversity feature	Asiatic Wild Ass, Goitered Gazelle
Lead organization	WCS
Threat	Illegal hunting, habitat fragmentation, encroachment of livestock

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Geographic scope	Study area defined around Asiatic Wild Ass subpopulation range	
Frequency	Once every 3 years depending on preferred confidence limits	
Method	Drive transects and record GPS location, angle, and distance to all animals. See SWP and CBM reports	
Analysis	Distance software, generalized linear models, and ArcMap 10.x software. Correlate to environmental and human factors, e.g., vegetation, altitude, slope, household, distance to surface water, roads and settlements. Calculate population size (with confidence limits) in survey area and map distributions. See SWP.	
NPI Goal	Orange Threshold	Red Threshold
Detectable increase (p<0.2; from 2013-2015 baseline)	>10% mean decline over 3 years	>30% mean decline over 3 years
Assumptions	Static population baseline.	

Indicator	Population over approx. 100,000 km ² (from aerial photography or other remote sensing methods)	
Biodiversity feature	Asiatic Wild Ass, Goitered Gazelle.	
Lead organization	WCS	
Threat	Illegal hunting, habitat fragmentation, encroachment of livestock	
Geographic scope	Study area defined around Asiatic Wild Ass subpopulation range	
Frequency	Once every approx. 6 years	
Method	Fly a 5 km or 10 km grid, taking photographs. Count animals and other visible features from a proportion of the photographs. Details to be revised based on lessons from previous study and updated needs.	
Analysis	Calculate and map densities. Correlate to distance from road and other natural and human factors at a resolution of 10 x 10 km.	
NPI Goal	Orange Threshold	Red Threshold
Detectable increase (from 2013 baseline)	>10% mean decline over 3 surveys approx. 18 years)	>30% mean decline over 3 surveys (approx. 18 years)
Assumptions		
Note	Cancelled. Surveys stopped as it was duplicative with the ground based population surveys (see line above).	

Indicator	% of staff/contractors trained (driver awareness and training
Biodiversity feature	Asiatic Wild Ass, Goitered Gazelle

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Lead organization	OT Biodiversity Team with assistance of OT Environmental Training Team and Training Department	
Threat	Direct collisions with vehicles	
Geographic scope	OT roads, especially OT-GS road, and mine site	
Frequency	OT Biodiversity Team to request information from OT Training Department and/or Environmental Training Team quarterly	
Method	OT Biodiversity Team to develop a training module on priority biodiversity features that includes the reason for following speed limits, driving on designated roads or tracks, not to chase or frighten wild animals, not to collect plants or hunt wildlife, giving way for wildlife crossing the road, etc. OT Training Department to deliver this module as part of the biodiversity training module in the induction training programme or/and OT Environmental Training Team to provide on-the-job toolbox talk.	
Analysis	Preliminary data analysis will be done by OT Biodiversity Team. Data will be transcribed from the data sheets into MS Excel.	
NPI Goal	Orange Threshold	Red Threshold
100%.	<80%	<60%
Assumptions		

Indicator	Number of person-days Multi-Agency Teams (MAT) and Multi-Agency Patrol Units (MAPU) on patrol	
Biodiversity feature	Asiatic Wild Ass, Goitered Gazelle, Argali, Mongolian Gazelle	
Lead organization	WCS	
Threat	Illegal hunting	
Geographic scope	MAT and MAPU offsets landscape	
Frequency	Ongoing.	
Method	Ongoing documentation and collation of patrol effort	
Analysis	Relate to number of incidents	
NPI Goal	Orange Threshold	Red Threshold
Not applicable	<1000 person-days	<800 person-days
Assumptions		

Indicator	Facilitating with the development of a regional biodiversity plan	
Biodiversity feature	All	

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Lead organization	OT Biodiversity Team (collaborating with Regional Development and Sustainable Performance, Government Relations and Social Investment teams)	
Threat	Cumulative impacts from non-OT activities	
Geographic scope	Southern Gobi region	
Frequency	Annual	
Method	OT Biodiversity Team to collaboratively develop annual workplans to implement the regional plan as stated in the lender BAP (viz: "As part of the development of the offset program, OT will undertake formal engagement with regional bodies and institutions involved with regional-scale sustainable development, such as the Regional Development Council and the Cooperation Agreement Working Group, on the implementation of certain on-site and offset mitigation measures that may have relevance to regional-scale sustainable development. As a component of OT's wider regional engagement, it will consult with companies and other users of regional infrastructure, including the coal road, in order to develop an options paper evaluating different schedules for vehicle movements and restrictions on vehicle movement"). Each annual workplan will report on the % of the actions proposed in the previous year which were implemented.	
Analysis	Determine % of proposed actions which were implemented.	
NPI Goal	Orange Threshold	Red Threshold
Will be set once baseline data are available	Will be set once baseline data are available	Will be set once baseline data are available
Assumptions	Regional development plans and reports of local soums. Annual working plans and reports of other OT departments.	

Indicator	Number of individuals lost under OT-associated infrastructure	
Biodiversity feature	Priority Plants (notably <i>Amygdalus mongolica</i> , <i>Cistanche lanzhouensis</i> , <i>Spongiocarpella grubovii</i> , <i>Zygophyllum potaninii</i>).	
Lead organization	OT Biodiversity Team	
Threat	Loss under project infrastructure	
Geographic scope	All OT infrastructure	
Frequency	Priority plants will be counted for each Land Disturbance Permit request. Preliminary data about priority plant counts will be reported weekly and detailed analysis quarterly.	
Method	After any receiving Land Disturbance Permit request form, the OT Biodiversity Team botanist or flora team officers will check and count if priority plants exist inside of the requested area of disturbance. If any exist, the team will develop a plan to apply the mitigation hierarchy of avoidance, minimization and rehabilitation.	

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	Every priority plant inside the area to be disturbed will be counted or density will be estimated using a belt transect count over a 2m x 50m sample area, then extrapolating to the affected area.	
Analysis	Data will be copied from Land Disturbance Permit pre-disturbance checklist form and compiled in MS Excel. Point localities will be integrated into the OT Environmental Department GIS database.	
NPI Goal	Orange Threshold	Red Threshold
N/A	To be set when MLA plant community map is prepared	To be set when MLA plant community map is prepared
Assumptions		
Note	Cancelled as the plant community mapping is not static and continues to evolve with each LDP. Also the net gain and>NNL commitments are not based a maximum threshold.	

Indicator	Number of individuals in rehabilitated rangeland	
Biodiversity feature	Priority Plants (notably <i>Amygdalus mongolica</i> , <i>Cistanche lanzhouensis</i> , <i>Spongiocarpella grubovii</i> , <i>Zygophyllum potaninii</i>).	
Lead organization	OT Biodiversity Team	
Threat	Loss under project infrastructure, lack of rehabilitation	
Geographic scope	All OT infrastructure	
Frequency	Routine monitoring of rehabilitation areas.	
Method	Priority plants to be included in rehabilitation areas where habitat conditions are suitable for the species specific habitat requirements.	
Analysis	Success of planting will be evaluated as part of the LDP and rehabilitation process, when assessing if sites have achieved completion criteria.	
NPI Goal	Orange Threshold	Red Threshold
Rehabilitation planting includes more plants than were lost.	Rehabilitation has replaced <50% of the number lost within 15 years of initial impacts	Rehabilitation has replaced <90% of the number lost within 15 years of initial impacts
Assumptions	Rehabilitation of priority plants is a critical part of the management strategy; therefore, the indicators have been selected to challenge the rehab team to progress rehabilitation as quickly as possible. Selected 15 years to give a stretch target and accelerate rehabilitation, rather than waiting until construction was complete. Also provides time to respond to the threshold before the net gain assessment.	

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Indicator	Granite outcrop floral communities (methods pending).	
Biodiversity feature	Granite outcrop floral communities	
Lead organization	WCS	
Threat	(legal and illegal) collecting, over-grazing by induced in-migration	
Geographic scope	Khanbogd massif	
Frequency	3 years	
Method	Assess woody shrub conditions and proportion of <i>Amygdalus mongolica</i> in a series of buffers rings established at different radius from KB soum center (see 2016 CBM report)	
Analysis	See 2016 CBM report.	
NPI Goal	Orange Threshold	Red Threshold
No change	Any change	N/a
Assumptions	This will be reviewed after additional surveys of the granite floral communities have been undertaken as part of the CBM program.	

Indicator	Number of electrocution carcasses found under power infrastructure	
Biodiversity feature	Short-toed Snake-eagle, Saker Falcon	
Lead organization	Electrocution on power infrastructure	
Threat	All OT electrified power infrastructure	
Geographic scope	OT Biodiversity Team	
Frequency	Monthly	
Method	A driver and one observer drive along all OT power lines (the entire length of each power line's access road), including substations and other electrified infrastructure, at a speed of 30kph. Observe as wide an area as possible under the line and around the base of poles or pylons for carcasses or feathers (noting that carcasses are sometimes >300 m away from wires). When signs of any dead bird are seen, stop the vehicle and record the species, number, sex/age (if possible), cause of mortality, distance from power line access road and GPS coordinates. Record any evidence for cause of mortality (e.g., burn marks or traumatic injuries to wings), otherwise any carcasses of species which rarely perch and are found under spans of wire are assumed to be collisions, and any carcasses of species which commonly perch and are found under poles or pylons are assumed to be electrocutions. Take photos of the carcass or remains and note the picture number. For each electrocution, check whether insulators have been fitted on the pole or pylon. Bring the carcasses to OT and dispose in the landfill or	

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	incinerator. Record the above information in a standard data sheet. Add any mortalities recorded by other OT teams (but keep these records dis-aggregated in reporting and analysis, as the effort is not standardised).	
Analysis	Preliminary data analysis will be done by OT biodiversity team. Data will be transferred from the data sheets into MS Excel. The number of carcasses found will be a sample of the total carcasses present, and will be extrapolated to an estimated absolute number by applying a correction factor for removal by scavengers and observer detectability. The number of mortalities of each species per month and per year will be analysed.	
NPI Goal	Orange Threshold	Red Threshold
Zero Short-toed Snake-eagle or Saker Falcon	Any Short-toed Snake-eagle or Saker Falcon electrocution	>1 Short-toed Snake-eagle or Saker Falcon electrocution / year
Assumptions		

Indicator	Number of collisions found under OT power lines
Biodiversity feature	Short-toed Snake-eagle, Houbara Bustard
Lead organization	Collision with power lines
Threat	All OT power lines
Geographic scope	OT Biodiversity Team
Frequency	Monthly
Method	A driver and one observer drive along all OT power lines (the entire length of each power line's access road); noting the total km which are close enough to the lines to enable effective monitoring of collision casualties) at a speed of 30kph. Observe as wide an area as possible under the line and around the base of poles or pylons for carcasses or feathers (noting that carcasses are sometimes >300 m away from wires). When signs of any dead bird are seen, stop the vehicle and record the species, number, sex/age (if possible), cause of mortality, distance from power line access road and GPS coordinates. Record any evidence for cause of mortality (e.g., burn marks or traumatic injuries to wings), otherwise any carcasses of species which rarely perch and are found under spans of wire are assumed to be collisions, and any carcasses of species which commonly perch and are found under poles or pylons are assumed to be electrocutions. Take photos of the carcass or remains and note the picture number. For each bird collision with a power line, check the functioning of the overhead bird flight diverters (measure the % of the BFDs which are functioning correctly in the span between two poles or pylons). Bring the carcasses to OT and dispose in the landfill or incinerator. Record the above information in a standard data sheet. Add any

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	mortalities recorded by other OT teams (but keep these records dis-aggregated in reporting and analysis, as the effort is not standardised).	
Analysis	Preliminary data analysis will be done by OT biodiversity team. Data will be transferred from the data sheets into MS Excel. The number of carcasses found will be a sample of the total carcasses present, and will be extrapolated to an estimated absolute number by applying a correction factor for removal by scavengers and observer detectability. The number of mortalities of each species per month and per year will be analysed.	
NPI Goal	Orange Threshold	Red Threshold
Zero Short-toed Snake-eagle; <5 Houbara Bustards (before correction factor) per year.	Any Short-toed Snake-eagle collision; >4 Houbara Bustard collisions in any year.	>1 Short-toed Snake-eagle collision; >6 Houbara Bustard collisions in any year.
Assumptions		

Indicator	Number of active nests in Khanbogd survey area	
Biodiversity feature	Short-toed snake-eagle	
Lead organization	OT Fauna Team	
Threat	Electrocutions on electrified power infrastructure; collisions with power lines; habitat loss; predation on eggs from scavenger birds	
Geographic scope	Khanbogd soum	
Frequency	Annual	
Method	Map occurrence by searching for nests in every valley with elm trees. Inspect nests and record activity. A sub-sample of occupied nests should be re-visited during the breeding season to determine the fate of the nest at the end of breeding season. See SWP.	
Analysis	Map of nests, determine breeding success	
NPI Goal	Orange Threshold	Red Threshold
No decline from 2013-2015 average baseline number	<7 active nests	<4 active nests
Assumptions		

Indicator	% bird flight diverters along OT powerline infrastructure
Biodiversity feature	Short-toed Snake-eagle, Houbara Bustard

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Lead organization	OT Biodiversity Team	
Threat	Collisions with power lines	
Geographic scope	All OT power lines	
Frequency	One-off / as necessary	
Method	A driver and an observer drive along power line access roads in good weather with a light wind (enough wind to make the flappers flap, but not too much wind to make the flappers stick up). There are three sample sites each containing 50 flapping bird flight diverters in each of 220kV, OT-GH 35kV, GH 6kV, and on-site 35kV power lines (i.e. 3 * 50 * 4 diverters), but the sample size will be reviewed. Record GPS coordinates of start and end points of each sample line. Measure the direction of sampled line using a sighting compass. Measure the distance of each diverter to the nearest pole or pylon using a laser rangefinder. Stand under each diverter and take a photo of the next diverter during each visit (ignore the non-flapping spiral bird flight diverters). Observe each diverter and record whether the flapper is flapping or up, and record whether the grounder is pointing down or up. If any diverter is missing or fallen down to the ground, record whether only the flapper or the whole diverter (flapper + grounder) is missing. Record the above information in a standard data sheet.	
Analysis	Analyse % of diverters functioning correctly and factors affecting their proper function	
NPI Goal	Orange Threshold	Red Threshold
Not applicable	Not applicable	Not applicable
Assumptions		

Indicator	Effectiveness of installed insulators on targeted power poles.	
Biodiversity feature	Short-toed Snake-eagle, Houbara Bustard	
Lead organization	OT Biodiversity Team and OT Infrastructure Department	
Threat	Electrocution on power infrastructure	
Geographic scope	All OT electrified power infrastructure	
Frequency	Monthly	
Method	All powerpoles with insulator installed are checked during powerline collision survey.	
Analysis		
NPI Goal	Orange Threshold	Red Threshold
80% reduction	<80%	<60%
Assumptions		

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Indicator	Rangeland quality (across established rangeland monitoring sites)	
Biodiversity feature	Natural habitat / rangeland	
Lead organization	WCS	
Threat	Loss under project infrastructure, increased (legal and illegal) collecting	
Geographic scope	Study area defined around Asiatic Wild Ass subpopulation range	
Frequency	Annual	
Method	<p>A set of 114, 20 m x 20 m vegetation plots were located across a large variety of habitats across the projected OT offset area. At each site, a pair of fenced enclosures was built with fencing 1.5 m high, to exclude all grazers. One enclosure from each pair was located with 100 meters of a source of heavy livestock concentration such as a winter livestock shelter or a herder well. The other enclosure was placed 1 km away in an area with less influence from livestock. At each of the 12 enclosures, one vegetation monitoring plot was located inside the enclosure and another plot was located outside the enclosure nearby. At each location, 10m x 10m quadrat will be sampled, making it compatible with other survey data in the south Gobi (Figure 2). In addition, four 1m x 1m plots were sampled in 2015 at each corner for biomass estimation. The biomass plots will occasionally be re-sampled.</p> <p>Long-term rangeland monitoring plots have been established for the Sustainable Cashmere Project and the CBMP (~150 plots). These monitoring programs were merged into a single rangeland monitoring program in 2017. In addition, work to develop a Rangeland Metric was conducted in 2017. The Rangeland Metric will be used, starting in 2017, to monitor rangeland condition and assess changes in condition.</p>	
Analysis	See Rangeland metric report.	
NPI Goal	Orange Threshold	Red Threshold
10% gain across 350,000 ha within the SCP offset area (compared to controls)	No gain after 5 years of monitoring (based on rangeland metric survey)	No gain after 10 years of monitoring (based on rangeland metric survey)
Assumptions		

Indicator	Quality of rehabilitated rangeland
Biodiversity feature	Natural habitat/rangeland
Lead organization	OT Biodiversity Team
Threat	Loss under project infrastructure

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Geographic scope	All OT rehabilitation areas	
Frequency	Every year	
Method	Rangeland metric approach	
Analysis	Rangeland metric approach	
NPI Goal	Orange Threshold	Red Threshold
Meet completion criteria	n/a	n/a
Assumptions		

Indicator	Area of rehabilitated rangeland	
Biodiversity feature	Natural habitat/rangeland	
Lead organization	OT Biodiversity Team	
Threat	Loss under project infrastructure	
Geographic scope	All OT rehabilitation areas	
Frequency	Every year	
Method	Rangeland metric approach	
Analysis	Rangeland metric approach	
NPI Goal	Orange Threshold	Red Threshold
Rehabilitate all disturbed area that are available for rehabilitation	If not rehabilitated within 1 year	If not rehabilitated within 5 years
Assumptions		

Indicator	Area lost under OT-associated infrastructure	
Biodiversity feature	Natural habitat / rangeland	
Lead organization	OT Biodiversity Team	
Threat	Loss under project infrastructure	
Geographic scope	All OT infrastructure	
Frequency	Annual	
Method	<p>Calculate area of natural habitat lost directly under the footprint of OT infrastructure in GIS by overlapping habitat layers with:</p> <ul style="list-style-type: none"> (i) infrastructure polygons supplied by OT (including, precautionarily, the entire area within the main site fence, temporary construction camps and airport); (ii) linear infrastructure supplied as polylines by OT, expanded by defined widths to calculate impact areas (12 m for the paved 19.4 km spur of the OT-GS road (the rest of the OT- 	

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	GS road is an upgrade and not considered to be direct habitat loss), 12 m for the OT-GS temporary diversion road, 6.5 m for the pipeline maintenance road, 10 m for the pipeline trench), (iii) (iii) <1 ha footprint area for pylons (6 m*4.3 m every 250 m along the 220 kV OT-GS transmission line); and (iv) (iv) the footprint of Khanbogd 'town' (built to accommodate OT workers).	
Analysis	Calculate area of habitat lost under OT infrastructure. Multiply by quality (obtained from other methods, notably rangeland quality monitoring) to give Quality Hectares lost. Give results to two significant figures.	
NPI Goal	Orange Threshold	Red Threshold
Not more than the predicted impact of 8500 QA	>500 QH in addition to the map used for the NPI forecast	n/a
Assumptions		

Indicator	Overall mean grazing effect, measured as change between plots inside and outside exclosures	
Biodiversity feature	Natural habitat / rangeland	
Lead organization	WCS	
Threat	Over-grazing by induced in-migration	
Geographic scope	12 sites, widely spaced in proposed offsets region	
Frequency	3 years	
Method	Standardised rangeland quality monitoring methods will be used inside and outside fenced exclosures.	
Analysis	Standardised rangeland quality analytical methods.	
NPI Goal	Orange Threshold	Red Threshold
Not applicable	Not applicable	Not applicable
Assumptions		

Indicator	Density of goats (and other livestock) in cashmere project area (Pending)	
Biodiversity feature	Natural habitat / rangeland	
Lead organization	WCS	
Threat	Not applicable (offset response indicator)	
Geographic scope	Sustainable Cashmere Project offset area	

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Frequency	Annual	
Method	WCS will obtain livestock numbers directly from the cashmere offset herder cooperatives. WCS will request official government data from government or OT.	
Analysis	Annual census data will be transcribed into MS Excel. Government data will be reconciled with self-reported data.	
NPI Goal	Orange Threshold	Red Threshold
% reduction in goat numbers in cashmere offset area to be set in 2020	To be set in 2020	To be set in 2020
Assumptions		

Indicator	Density of Houbara Bustard	
Biodiversity feature	Houbara Bustard	
Lead organization	Wildlife Science and Conservation Center	
Threat	Collisions with power lines; habitat loss; avoidance of infrastructure	
Geographic scope	KB soum	
Frequency	Not set	
Method	To be reviewed annually based on results of monitoring pressure. Previous line-transect and point-count methods could be replicated but give very low encounter rates and confidence in results.	
Analysis	If sample size allows correlate density to distance from infrastructure	
NPI Goal	Orange Threshold	Red Threshold
Not applicable	To be set when baseline data are available	To be set when baseline data are available
Assumptions	WSCC is undertaking a non-OT funded multi-year study of the Mongolian bustard population starting in 2018. This project will help to develop a greater understanding of the population numbers and nesting location, in Mongolia and near OT. OT will support this project as requested by WSCC with in-kind contributions (e.g., data, support logistics in OT area, field staff, etc.) and WSCC will be able to share the data when the project is finished in 2021.	

Indicator	Number of OT-related construction and maintenance activities in the Galba Gobi IBA during the bustard lekking season
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Biodiversity feature	Houbara Bustard	
Lead organization	OT Biodiversity Team	
Threat	Disturbance by OT operations	
Geographic scope	Galba Gobi IBA	
Frequency	Ongoing.	
Method	OT Biodiversity Team to (geospatially) set permitting requirements for any construction and maintenance activities in the Galba Gobi IBA during the bustard lekking season (15 April – 30 June). This exempts emergency and other time-sensitive maintenance activities, and takes into consideration ant identified sensitive areas (none identified as of 1 January 2016).	
Analysis	Number of activities, and justification for each activity, collated and reported.	
NPI Goal	Orange Threshold	Red Threshold
Not applicable	Any activity	>1 activity in same area in same year
Assumptions		

Indicator	Kilometers of non-OT power line built in Mongolia following a new national standard	
Biodiversity feature	Short-toed Snake-eagle; Saker Falcon; Houbara Bustard	
Lead organization	OT Biodiversity Team	
Threat	Electrocution by electrified power infrastructure; collision with power lines	
Geographic scope	Mongolia	
Frequency	Ongoing, with annual review	
Method	To be determined when the powerline standard is agreed	
Analysis	To be determined when the powerline standard is agreed	
NPI Goal	Orange Threshold	Red Threshold
To be determined when the powerline standard is agreed	0 kms by 2025.	0 kms by 2030.
Assumptions		

Indicator	Number of scavenger birds at the compost area.	
Biodiversity feature	Houbara Bustard	
Lead organization	OT Biodiversity Team	

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Threat	Predation by increased numbers of predators	
Geographic scope	Waste Management Center	
Frequency	Monthly for first year, then assess results and consider changing to quarterly	
Method	A scavenger birds census at the compost area should be undertaken monthly. A driver and one observer drive to the compost area and park the vehicle in designated parking area. Observers will observe as wide an area as possible in and around the compost area for ravens and other scavenging birds (including Daurian Jackdaw and raptors). When any of the target species is sighted, record the species and number on a standard data sheet, taking care not to count any individual birds more than once.	
Analysis	Collate numbers in Excel.	
NPI Goal	Orange Threshold	Red Threshold
Daily cover	To be set when baseline data are available	To be set when baseline data are available
Assumptions	Scavenger birds number in compost area drastically reduced comparing to WMC. Probably it is caused by immediate processing of food waste, which is being mixed with scrap wood, tooth picks and carton papers.	
Note	As food waste is not being sent to the WMC and being processed at the compost area focus of this monitoring is shifted to the compost area.	

Indicator	Hydrological flows near springs and trees
Biodiversity feature	Riverine elm trees
Lead organization	OT Biodiversity Team
Threat	Risk of water level drop
Geographic scope	20 km radius from OT
Frequency	OT Biodiversity Team to obtain data from OT Water Team and/or Aquaterra quarterly.
Method	OT Water Team will conduct water level and water quality monitoring monthly from currently installed piezometers and rain gauges (mapped in the Appendix) using standard toolkits. OT Water Team will install ten more rain gauges in KB soum with a data logger to measure rain events to collect more precise precipitation data. OT Water Team will also monitor the surface flow rate from the overflow at the end of the Undai river diversion pipe using a V-notch

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Analysis	OT Biodiversity Team to seek help from OT Water Team and/or Aquaterra to determine whether there have been any long-term changes in hydrological flows not related to precipitation.	
NPI Goal	Orange Threshold	Red Threshold
No significant change in areas potentially impacted by OT compared to control sites	A sustained groundwater level change (either rising or falling) over >2 measurement periods	A sustained groundwater level change (either rising or falling) over >4 measurement periods
Assumptions		

Indicator	Number of trees (density and area of saxaul) lost under infrastructure
Biodiversity feature	Riverine elm and poplar trees; tall saxaul forest
Lead organization	OT Biodiversity Team
Threat	Loss under project infrastructure
Geographic scope	All OT infrastructure
Frequency	Trees will be counted for each Land Disturbance Permit request. Preliminary data about tree counts will be reported weekly and detailed analysis quarterly.
Method	After any receiving Land Disturbance Permit request form, the OT Biodiversity Team botanist or flora team officers will check and count if trees (and tall bushes including tamarisk and almond) exist inside of the requested area of disturbance. If any exist, the team will develop a plan to apply the mitigation hierarchy of avoidance, minimization and rehabilitation. Larger bush mounds (multiple stems from one mound of roots of immature elm and poplar – and also, but beyond the scope of this core monitoring plan, tamarisk and almond) will be counted as one individual tree. Dead, fallen trees and one year old saplings will not be counted. Every tree inside the area to be disturbed will be counted and measured. Measurements include tree height, circumference, age class (simple classification of age group), GPS location and photo. Tree height will be measured using a clinometer and geometric calculation. Circumference will be measured at one meter height from ground level for mature elm and poplar trees; maximum circumference will be measured for mature saxaul trees, young trees and bushes. When there are patches of forest (small saxaul forest and larger bushes), trees will be counted using a belt transect count over a 2m x 50m sample area, then extrapolating to the remaining forest area.
Analysis	Analysis: Data will be copied from Land Disturbance Permit pre-disturbance checklist form and compiled in MS Excel. Point localities will be integrated into the OT Environmental Department GIS database. The number of trees lost under infrastructure and

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	number of trees avoided from land disturbances will be reported every quarter.	
NPI Goal	Orange Threshold	Red Threshold
Zero additional loss	Any adult tree lost (elm or poplar).	Any two adult trees lost (elm or poplar).
Assumptions		

Indicator	% of elm canopies dead	
Biodiversity feature	Riverine elm trees	
Lead organization	WCS	
Threat	Risk of water level drop	
Geographic scope	Nine sites across Khanbogd soum	
Frequency	3 years	
Method	Standardised photographs will be taken	
Analysis	R code for canopy analysis' software used to generate a % figure	
NPI Goal	Orange Threshold	Red Threshold
No significant change in areas potentially impacted by OT compared to control sites	>5% mean increase in % of canopy dead in areas potentially impacted by OT compared to control sites in any year.	>20% mean increase in % of canopy dead in areas potentially impacted by OT compared to control sites in any year.
Assumptions	This indicator is being reassessed as part of the CBMP as the 2017 surveys revealed that local herders may be influencing the result by selectively removing dead branches. Also testing Minimum Convex Polygon as means of assessing population health of elm trees. Will be establishing elm tree exclosure sites in 2018 to assess responses to grazing pressure. This work may also yield other indicators.	

Indicator	Number and survival of elm trees planted
Biodiversity feature	Riverine elm trees
Lead organization	OT Biodiversity Team
Threat	Loss under project infrastructure
Geographic scope	OT rehabilitation area
Frequency	Annual
Method	Under internal review

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Analysis	Under internal review	
NPI Goal	Orange Threshold	Red Threshold
More than number of trees lost in and around OT mine site	Equal to the number and survival of impacted individuals	Less than the number of impacted individuals
Assumptions		

Indicator	Area and quality of saxaul	
Biodiversity feature	Saxaul forest	
Lead organization	OT Biodiversity Team	
Threat	Illegal harvesting by induced in-migration	
Geographic scope	Khanbogd soum	
Frequency	Once every three years	
Method	Under review	
Analysis	Under review	
NPI Goal	Orange Threshold	Red Threshold
Under review	Under review	Under review
Assumptions		

Indicator	Area and quality of saxaul planted	
Biodiversity feature	Saxaul forest	
Lead organization	OT Biodiversity Team	
Threat	Loss under project infrastructure	
Geographic scope	OT rehabilitation area	
Frequency	Annual	
Method	Rangeland metric	
Analysis	Rangeland metric	
NPI Goal	Orange Threshold	Red Threshold
More QH than were lost	<75% of the QH that was lost regained by 2026	<50% of the QH that was lost regained by 2026
Assumptions		