

## 8 ENVIRONMENTAL MITIGATION AND MONITORING PLAN (EMMP) FOR BIODIVERSITY INFRASTRUCTURE DEVELOPMENTS IN KVNP

Except for design phase mitigation measures and the significant operation phase issue, (as specified below), UWA, specifically the KVNP Ecological Research and Monitoring Unit, has overall responsibility for overseeing and reporting on the Biodiversity Infrastructure Project EMMP. UWA will report directly to the USAID/Contracting Officer’s Representative (COR) in quarterly Progress Reports throughout the Government-to-Government contract period. Once completed, all construction must be evaluated by a certified engineer to ensure safety of new infrastructure.

In addition to the mitigation measures outlined in the table below and in accordance with the FY2020 Appropriations Statement of Managers, the following components are required for activities occurring in Parks and Protected Areas:

1. Develop and execute a community engagement plan for the project and any potential/activities environmental and social impacts, including consultation in accordance with USAID’s [Policy on Promoting the Rights of Indigenous Peoples \(Pro-IP Policy\)](#) when Indigenous Peoples are may likely to be affected;
2. Consistent with international best practices, (a) assess the environmental and social impacts of the proposed project (consider IAIA social impact assessment guidance, [https://www.iaia.org/uploads/pdf/SIA\\_Guidance\\_Document\\_IAIA.pdf](https://www.iaia.org/uploads/pdf/SIA_Guidance_Document_IAIA.pdf)), (b) avoid, mitigate or address negative impacts as appropriate, and (c) monitor the impacts of its proposal, particularly potential project impacts on land or resource rights claimed by affected local communities;
3. Train and monitor any eco-guards, park rangers, and other protected area law enforcement personnel regarding the professional and ethical execution of their duties, **including upholding human rights, and document compliance with this requirement**, as appropriate;
4. USAID will ensure that Leahy Vetting has occurred.
5. Establish and maintain a Grievance and Redress Mechanism, allowing members of the affected community to share environmental and social grievances (including potential human rights violations) with the offeror, and how such grievances will be reported to the USAID COR within 72 hours.

Table 10. EMMP for Biodiversity Infrastructure Developments in KVNP

Activity	Impact	Mitigation Measure	Monitoring Indicator/ Method	Frequency & Timing of Monitoring
<b>MEASURES FOR POTENTIALLY SIGNIFICANT IMPACTS</b>				
<b>Design Phase</b>				
Design of RPs	Effects of climate change, mainly a hotter, drier climate could have adverse	1) MBW/Cardno shall ensure that the measures already part of RP design are successfully integrated into construction: self- ventilating overall design,	1 & 2) Climate change measures are integrated into final design/	1 & 2) Monitor once when construction contracts are issued

	impacts on RPs and the rangers posted at them.	with placement of RPs so that they avoid direct sun to the extent possible and capture wind with optimal placement of windows and doorways; ceilings that trap heat; and retention of tree cover.  2) MBW/Cardno shall ensure that RWH tanks are sized in accordance with the hydrological assessment and are based on: <ul style="list-style-type: none"> <li>● Rainfall data</li> <li>● Catchment (roof) area</li> <li>● Daily water demand (number of people using the tank daily per capita consumption) with per capita water consumption based on the WHO recommendation of 20 liters per capita per day</li> <li>● Length of dry spell</li> </ul>	construction contracts	
<b>MEASURES FOR MODERATE RISK IMPACTS</b>				
<b>Design Phase</b>				
Design of WCs (Alternative 1)	The design of the WCs could increase drowning risk for animals, especially for buffalo, if slopes are too steep.	1) Cardno/MBW shall collaborate with a member of the KVNP Ecological Monitoring & Research Unit in the design phase of WCs (if Alternative 1 is selected) to ensure that adequate access and egress points and gradual slopes are incorporated into design.	1) UWA collaboration occurs, and access and egress points and slope of WC take the needs of wildlife users into account.	1) Monitor one time during WC design
<b>MEASURES FOR MODERATE RISK IMPACTS</b>				
<b>Pre-Construction (Preparation)</b>				
Prior to start-up of construction	Without required permits, LWSC and WC construction will not be in compliance with GOU environmental requirements.	1) UWA shall ensure that contractors obtain relevant permits from the WRMD before constructing structures across rivers and streams within the project area; a dredging license to dredge in rivers; and other required permits, licenses, and approvals.	1) Review permits obtained	1) Monitor before each LWSC construction activity begins
<b>MEASURES FOR POTENTIALLY SIGNIFICANT IMPACTS</b>				
<b>Construction Phase</b>				
Construction of RPs & LWSCs (&	Construction activities could result in the	1) UWA shall conduct a preliminary monitoring and awareness raising visit prior to	1) Preliminary visit held	1) Monitor once at each construction

<p>Alternative 1, WCs &amp; Alternative 2, watering holes)</p>	<p>movement of large and medium-sized mammals away from preferred habitat and possibly into communities (especially a concern for large grazing mammals that might compete with livestock and where disease transmission could take place, and for predators). Concerns include movement of construction machinery and other vehicles; excessive noise; use of fire during construction activities; and construction works during wet season and after daylight hours.</p>	<p>the start of construction at each site to identify animal use at the time construction works take place, and shall, prior to the start of construction:</p> <p>2) Establish areas that are off-limits for human and vehicular use to protect mammals using areas in the vicinity of construction sites, as well as to protect construction workers;</p> <p>3) Establish times of day that are off-limits for construction activities so that animals are not chased off-site and to protect construction workers from attack;</p> <p>4) Establish and enforce speed limits for vehicles transporting materials or people for construction works;</p> <p>5) Establish that noise levels will be acceptable and establish measures to limit excessive noise.</p> <p>6) Establish that use of fire must only be for required purposes and in the presence of an UWA ranger with training in fire management.</p> <p>7) UWA shall advise and ensure that construction takes place during the dry season, especially for LWSCs and Alternatives 1 or 2, when animal use of LWSCs and dry WCs are not in use.</p> <p>8) UWA shall conduct regular (at least weekly) awareness raising talks for construction workers about the correct behaviors around wildlife, including avoiding excessive noise; prohibitions against the use of fire; prohibitions against harassing wildlife; limiting work areas to the footprint and respecting off-limits areas; and speed limit requirements.</p>	<p>2) No-go areas delineated to protect mammals and workers</p> <p>3) Off-limit work hours established to protect mammals and workers</p> <p>4) Speed limits established and enforced</p> <p>5) Noise limits-noise control measures established and enforced</p> <p>6) Fire protocols established</p> <p>7) Dry season construction period emphasized to protect mammals using on-site water</p> <p>8) Awareness raising at least weekly on these topics</p> <p>9) Consultations held as necessary</p>	<p>site that preliminary visit was held</p> <p>2 &amp; 3) Monitor once prior to start of construction and thereafter, daily</p> <p>4) Monitor once prior to start of construction and daily as vehicles move around KVNP</p> <p>5) Monitor once prior to start of construction and thereafter, daily</p> <p>6) Monitor once prior to start of construction and thereafter, daily</p> <p>7) Monitor timing (dry/rainy) of construction at intervals during construction at each site</p> <p>8) Monitor weekly</p> <p>9) Monitor weekly whether wildlife is migrating to communities, if human-wildlife conflict is occurring, and results of consultations</p>
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		9) UWA shall hold regular consultations with communities nearest to construction sites to monitor and take measures to alleviate animal migration out of KVNP and human-wildlife conflict.		
Construction activities could indirectly result in the death of the critically endangered white-headed vulture if trash is left on-site and accessible to vultures or if material that could be toxic to vultures is used at construction sites.	UWA shall ensure that: 1) Trash receptacles are provided for workers and for waste construction material and that they are tightly closed when not in use. These must be available from day 1 at each construction site; and 2) Trash is removed from site to an environmentally sound final destination on a timely basis (to be determined based on the construction activities and UWA's input).  3) UWA shall raise awareness (at least weekly) among construction workers of the required protection measures for white-headed vultures, including proper disposal of trash, minimizing use of plastics on-site; and prohibitions against the use of poison (e.g., for rodent control) or any material that could be toxic to vultures.	1) Trash receptacles available at each site at the start of construction works, and are closed completely when not in use each day. 2) Trash receptacles emptied on a regular basis (not overflowing during monitoring visits)  3) Awareness raising at least weekly on these topics	1) Monitor availability at the start of construction and daily thereafter  2) Monitor when emptied, if not sufficient, remedial action is required  3) Monitor weekly	
Construction activities could adversely affect nesting birds, including the hamerkop (of tourist interest), especially those nesting in the vicinity of construction works. Excessive noise, cutting down trees with nests, and general	1) UWA shall conduct a preliminary monitoring and awareness raising visit prior to the start of construction at each site to identify hamerkop nests and other nests of birds of ecological importance/concern in the vicinity of the proposed work and to establish: 2) Trees with nests that should not be cut or damaged; 3) Areas that are off-limits for human and vehicular use to protect nesting birds; and 4) Times of day that are off-limits for construction activities.	1) Preliminary visit held  2) Trees & nests identified  3) No-go areas delineated to protect birds and nests  4) Off-limit work hours established to protect birds and nests	1) Monitor once at each construction site that preliminary visit was held  2-4) Monitor once prior to start of construction, and thereafter, daily  5) Monitor weekly	

	harassment are concerns.	5) UWA shall hold awareness raising talks (at least weekly) for construction workers so that they are aware of proper behavior around nesting birds, including not to cut branches and to minimize excessive noise and activities.	5) Awareness raising at least weekly on these topics	
Construction of LWSCs (& Alternative 1, WCs & Alternative 2, watering holes)	Impacts to Nile monitors and Nile crocodiles (both of tourist interest), frogs, and turtles from construction works such as movement of heavy machinery resulting in direct kills and excavation and filling resulting in nests being destroyed and possibly adults being killed.	<p>1) UWA shall conduct a preliminary monitoring and awareness raising visit prior to the start of construction at each site and shall establish:</p> <p>2) The presence of nesting sites of Nile crocodiles and Nile monitors, and nesting sites of turtles that shall not be disturbed or damaged;</p> <p>3) The presence of adult Nile monitors, crocodiles, and turtles and measures to ensure they are not disturbed;</p> <p>4) Off-limits areas for foot and vehicular traffic and for construction machinery, including areas that should not be excavated or filled, and areas where fill material may and may not be stored to ensure protection of nests and adults (crocodiles, monitors, turtles, and frogs).</p> <p>5) UWA shall advise and ensure that construction takes place during the dry season (not during egg laying months of November through January)</p> <p>6) UWA shall hold awareness raising talks (at least weekly) for construction workers so that they are aware of proper behavior around Nile monitors and crocodiles, and the measures required to preserve nests and adults of these animals, as well as of frogs and turtles.</p>	<p>1) Preliminary visit held</p> <p>2) Nesting sites identified &amp; protected</p> <p>3) Adults identified &amp; protected</p> <p>4) No-go areas delineated to protect these species</p> <p>5) Dry season construction period emphasized to protect nests</p> <p>6) Awareness raising at least weekly</p>	<p>1) Monitor once at each construction site that preliminary visit was held</p> <p>2 &amp; 3) Monitor once prior to start of construction, thereafter, ongoing monitoring</p> <p>5) Monitor timing (dry/rainy) of construction at intervals during construction at each site</p> <p>6) Monitor weekly</p>
Construction of RPs &	Discharge of waste could	UWA shall ensure that all waste is handled and disposed of in	1) Trash receptacles	21) Monitor availability at

LWSCs (& Alternative 1, WCs & Alternative 2, watering holes)	contaminate KVNP ecosystems and could affect KVNP fish, wildlife, and birds. The waste disposal concern includes food and food containers brought in by workers, waste material from construction activities (fuel, oil, excess construction material), and human waste, collected in latrines or temporary toilets for day time workers and if workers will remain overnight.	<p>an environmentally sound manner as follows:</p> <p>1) As above, waste receptacles are provided for construction worker use, are covered when not in use, and are emptied at sufficient intervals (based on the number of workers and use of waste receptacles);</p> <p>2) Construction material is stored properly by placing waste and stored supplies away from sensitive habitat, species, and aquatic areas, including wetlands, and is removed from construction sites on an adequate schedule to minimize waste left on-site; and</p> <p>3) Leaks or spills of fuel or oil are reported and cleaned up immediately; services involving fuel and oil are not undertaken on-site; and no fuel or oil is stored on-site, rather, waste fuel and oils will be collected and stored in a facility licensed by NEMA and transport will be by a NEMA-licensed contractor only.</p> <p>4) UWA shall hold awareness raising talks (at least weekly) for construction workers so that they are aware of the proper waste disposal measures and vehicle servicing measures.</p>	<p>available at each site at the start of construction works; closed completely when not in use each day; and emptied on a regular basis (not overflowing during monitoring visits)</p> <p>2) Construction material stored away from sensitive areas and removed on an agreed schedule</p> <p>3) Fuel/oil leaks or spills reported &amp; cleaned up; no fuel or oil services provided, no storage on-sites; compliance with NEMA</p> <p>24) Awareness raising at least weekly on these topics</p>	<p>the start of construction and daily thereafter; and monitor when emptied, if not sufficient, remedial action is required</p> <p>2) Proper storage monitored daily; removal monitored, as needed</p> <p>3) Monitor spills if/when they occur; compliance with prohibitions regarding fuel and oil monitored weekly</p> <p>4) Monitor weekly</p>
	Diseases can be transmitted between humans and wildlife from poor waste management practices.	1) UWA shall ensure that temporary toilets or latrines are available at each site at the start of construction works; that waste from temporary toilets and latrines is emptied on an adequate basis so that no spills/overflow result; and at the end of construction, toilets and latrines are removed and the areas are returned to pre-construction conditions.	1) Latrines or toilets available on day 1 at each site; emptied on a regular basis (not overflowing during monitoring visits); and removed and returned to	1) Monitor availability at the start of construction and daily thereafter; and monitor when emptied, if not sufficient, remedial action is required

		<p>2) UWA shall ensure that construction workers are monitored (temperature and other aspects) to ensure they are not carrying diseases that can be transmitted to animals.</p> <p>3) UWA shall hold awareness raising talks (at least weekly) for construction workers so that they are aware of the above disease control measures.</p>	<p>original conditions</p> <p>2) A health monitoring protocol is in place</p> <p>3) Awareness raising at least weekly on these topics</p>	<p>2) Monitor implementation and results weekly</p> <p>3) Monitor weekly</p>
	Workers may poach animals, fish, or poach other park resources for their own use or for income generation	<p>1) UWA shall hold awareness raising talks (at least weekly) for construction workers so that they are aware of the prohibitions and penalties against poaching.</p> <p>2) UWA shall conduct spot checks at construction sites to ensure that poaching is not taking place.</p>	<p>1) Awareness raising at least weekly on these topics</p> <p>2) Spot checks occurring</p>	<p>1) Monitor weekly</p> <p>2) As needed</p>

**MEASURES FOR MODERATE RISK IMPACTS**

**Construction Phase**

Construction of RPs & LWSCs (& Alternative 1, WCs & Alternative 2, watering holes)	Construction phase activities (machinery and workers) could introduce invasive species that outcompete native species; of particular concern is that invasives provide little wildlife benefit.	1) At all construction sites (but most importantly at WCs if Alternative 1 is selected), UWA shall implement their alien invasive species protocol, including regular monitoring for germination of alien invasive species and if found, removal manually or by machine; as practicable, washing equipment that is brought in; and being mindful of where murrum is obtained and placed since it will likely carry seeds from outside the PA which could be invasive.	1) Alien invasive plant protocol monitoring and removal implemented	1) Monitor weekly
	Use of construction equipment resulting in increased air pollution and dust creating health risks for workers.	1) UWA shall ensure that contractors provide personal protective equipment (PPE) to workers to protect against contaminants carried by air (mainly diesel and at RPs, paint); that PPE is well-maintained; and that	<p>1) PPE provided, well-maintained, training takes place</p> <p>2) Appropriate servicing and use of fuels</p>	<p>1) Monitor weekly</p> <p>2) Monitor weekly</p>

		<p>construction workers are trained how and why to use PPE.</p> <p>2) UWA shall ensure that vehicles and machinery are serviced regularly and that high quality fuels and lubricants are used to minimize toxic emissions.</p>		
	<p>Obtaining sand for construction from inside KVNP (sand, rock, murrum) could degrade habitats/ ecosystems from areas where it is removed.</p>	<p>1) UWA shall ensure that contractors comply with the park's requirements for obtaining sand: a park ranger will always be on-site to monitor mining of sand; the geographical position will be reported; and the number of trips will be recorded; mining from the road on the upper side of the river will not be allowed to decrease erosion; and sand will only be removed from the UWA designated location.</p>	<p>1) Sand mining protocol implemented</p>	<p>1) Monitor when sand mining is taking place</p>
	<p>Obtaining construction material from outside the park (borrow pits, etc.) could degrade habitats/ ecosystems when material is removed.</p>	<p>1) UWA shall ensure that contractors consult with district authorities and comply with their requirements, including any borrow pit grading and closure requirements.</p>	<p>1) Borrow pit requirements are followed</p>	<p>1) Monitor if/when borrow pits are used</p>
	<p>Soil erosion and siltation of streams, rivers, and ponds could degrade habitat, mainly of aquatic species and species that rely on aquatics for food.</p>	<p>UWA shall ensure that:</p> <p>1) Prior to construction, areas prone to erosion are demarcated and measures to stabilize them are put in place and remain in place throughout the construction period. This is especially critical for river embankments; and that foot and vehicular traffic are minimized in these areas;</p> <p>2) By the end of the construction phase, erosion-prone areas are permanently stabilized against erosion before decommissioning.</p>	<p>1) Erosion-prone areas demarcated and stabilized throughout construction period; traffic in these areas minimized</p> <p>2) All erosion-prone areas permanently stabilized prior to decommissioning</p>	<p>1) Monitor prior to start of construction that erosion-prone areas are demarcated; weekly throughout construction period that measures are successfully controlling erosion</p> <p>2) Monitor prior to completion that all areas</p>



				are permanently stabilized against erosion
	Construction activities could damage cultural and historical heritage resources or sites	1) Most critically at RPs and WCs, UWA shall ensure that chance finds procedures are developed and implemented during the project construction phase; that watch briefs (on-site rapid assessment or observation during site clearances and earth works) by qualified personnel (cultural heritage specialist) is put in place to help locate possible chance finds; and that workers are aware of how to handle finds.	1) Chance finds procedures are developed, implemented, and awareness is raised among workers.	1) Monitor that procedures are developed at the start of construction period; monitor whether artifacts are found and their handling.
	Workers brought in from outside could spread contagious diseases, bring in unfamiliar, unwanted customs and activities	1) UWA shall require that contractors hire as many workers as possible from local communities; that regular briefings take place for laborers coming from outside to raise awareness of issues, customs, and UWA requirements; and that there is an HIV/AIDS and covid-19 awareness program in place for the workers.	1) % of workers from local communities; briefings occur on these topics; HIV/AIDS and covid-19 awareness raising in place	1) Monitor at least once at the start of each construction project
	The effects of a more erratic climate (hotter, unpredictable flood events) may impact construction activities and construction workers.	1) UWA shall ensure that contractors take precautions to minimize the risk to workers of heat-related issues, flash floods, and landslides. Potable water, shade, rest periods, safety briefings, and provision of food (if that is part of the contract) to eliminate the risks should be considered.	1) Precautions in place	1) Monitor weekly that contractors are taking precautions (note specific measures being taken)
Construction of LWSCs	Construction phase activities could affect visitor experience: machinery and construction works can disrupt tourist and ranger access and recreational	1) UWA shall ensure that the contractor plans activities so that they do not infringe on tourism activities, ranger activities, and rights of other road users; that the contractor consults and plans with park management and tour operators on the schedule of site activities so they are not inconveniencing; that proper	1) Coordination and safety measures in place as specified	1) Monitor weekly

	activities for tourists. Safety of other road users is a concern, as well.	signage is placed on both sides of roads for approaching vehicles; and that pillars are placed along the concrete to show extent of the bridge for safety of all road users.		
<b>MEASURES FOR MODERATE RISK IMPACTS</b>				
<b>Construction Camp</b>				
Design, Construction, Operation of Construction Camp (UWA responsibility for handling construction camps or alternatives for housing workers)	Although not yet determined if construction camps will be needed, impacts could result from construction and operation, similar to small-scale construction projects (construction phase- destruction of vegetation, erosion; operation issues- waste disposal, water use; and closure issues)	1) If worker camps will be constructed, UWA will be responsible for the proper siting, design, construction, and operation.	1) Monitor siting, design, construction, operation activities	1) Monitor weekly
<b>MEASURES FOR MODERATE IMPACTS</b>				
<b>Closure/Decommissioning of Construction Phase</b>				
Completion of construction at LWSCs, RPs, and WCs (Alternative 1) or watering holes (Alternative 2)	If excess construction material and trash are not removed, and if vegetation, slopes, and pre-construction conditions are not restored, long-term damage could result.	1) UWA shall ensure that before contractor decommissions each site that the area is restored to pre-construction conditions or improved conditions and shall certify that the area has been well restored.	1) Monitor conditions at completion of work at each site	1) Monitor when construction is complete at each site
<b>MEASURES FOR POTENTIAL SIGNIFICANT IMPACTS</b>				
<b>Operation Phase</b>				
Lack of water provision in the dry season for wildlife (Proposed)	The lack of water for wildlife in the dry season will affect overall sustainability of the Biodiversity	1) USAID/Uganda shall explore options to assist UWA to obtain funding to construct WCs or watering holes.	1) Efforts made to obtain funding	1) Monitor as efforts take place

Action Alternative)	Infrastructure interventions.			
<b>MEASURES FOR MODERATE RISK IMPACTS</b>				
<b>Operations Phase</b>				
Maintenance issues could affect the longevity of the new infrastructure	Climate change and general wear and tear can shorten the life of infrastructure unless good maintenance practices are planned and budgeted.	1) UWA shall coordinate the development of a Maintenance Plan, which, among other things, will include safeguards to be taken to protect infrastructure from the effects of climate change, including extreme events.	1) Maintenance Plan prepared with climate change safeguards in place	1) Monitor once before end of contract
Climate change may have unforeseen impacts on the operation of the infrastructure interventions				
Water quality impacts and potential risks to human health	The quality of water obtained from boreholes may not be satisfactory for human use and may pose a risk to human health.	1) UWA shall ensure that contractors drilling boreholes for potable water implement the USAID required Water Quality Assurance Plan (WQAP, see Annex H for the WQAP template), which will require USAID approval; that the requirement to use only laboratories certified by Ministry of Water and Environment (MWE) is included in the WQAP; that an initial test is conducted prior to opening the borehole for human use and that it complies with water quality standards; and that the contractor provides training to UWA on water quality testing.  2) UWA shall conduct water quality testing in compliance with the WQAP over the life of the contract.	1) WQAP completed (includes requirement regarding MWE certified labs); USAID approval obtained; initial testing completed, results in compliance with standards; training is conducted and UWA has the needed capacity.  2) Testing conducted	1) Monitor once when WQAP is completed (specifies MWE-certified labs) and approved; review initial test results prior to water provision; monitor when training is conducted.  2) Monitoring reports to USAID in accordance with the schedule that will be stipulated in the WQAP.