

Forest Protection Survey Program

Survey Guideline - Spotlighting and Call Playback
(V4.1)



Acknowledgements

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Photo credit

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Spotlighting for Arboreal Mammals

Context

This Spotlighting method has been designed to detect presence of selected arboreal mammals, to the levels of abundance required to trigger a management action. The main target species for detection using spotlighting are the Greater Glider and the Yellow-bellied Glider.

Spotlighting for arboreal mammals will be conducted, in most instances, in conjunction with owl call playback at the same coupe. When conducting the two survey methods together, the owl call playback survey will be conducted before the arboreal mammal spotlighting survey.

Objectives

To detect presence and record abundance of arboreal mammals within, and immediately adjacent to, selected coupes.

To obtain estimates of relative abundance appropriate for an assessment of whether specific harvesting prescriptions may be triggered.

Survey effort

Spotlighting will be conducted along pre-identified transects within coupes. Total survey transect length is to be as close to 1 kilometre (km) as possible, as measured by a continuous line on the ground. Transects will preferably be a single 1 kilometre transect (can be straight or curved). In situations where coupes are small or due to orientation of the topography or best available habitat, the transect may consist of multiple segments of varying lengths, straight or curved, totalling 1 km within the coupe. When transects are curved it will be important to ensure animals are not double-counted (i.e. the same animal recorded twice from different points along the transect by the same observer).

Transects are to be established with reflective tape (or similar) during daylight hours.

A maximum of three repeat surveys are to be conducted along the same transect line for each coupe.

The survey must be abandoned if safe access is not possible or if the site lacks suitable habitat for the target species. If unsuitable survey conditions significantly affect surveyors' ability to detect animals (e.g. poor weather or visibility), the survey must be postponed, and the site surveyed when suitable conditions for surveying are present.

Contractors are required to record a track log of the daytime transect establishment effort from the start to the end of their time within or adjacent to each coupe. The track log is to be converted to a Track Log GIS shapefile and submitted with attributes as outlined in the FPSP Standard Operating Procedure (note a shapefile template is provided by FPSP).

If, during the spotlight transect, the abundance threshold for a target species is met after one or two survey nights, then no further spotlight transect surveys are required (see 'Conducting the survey' section for more information). If the contractor determines that there is a high likelihood of the presence of owl roosting and nesting sites e.g. due to a high abundance of large hollow bearing trees, within the coupe, then three nights of owl call playback can be conducted. Further surveys may be conducted if prescription triggers are almost met – this must be discussed and agreed upon with the FPSP Contract Officer.

For spotlight transects targeting arboreal mammals, two observers, 10 minutes apart, will spotlight the same transect(s) at a pace of 10 minutes per 100 m (not including recording time) for a total distance of 1 km. Maintaining the pace of 10 minutes between observers can be difficult, however it is critical that observations are independent, and observers do not influence each other's likelihood of detecting animals. This double-observer technique is particularly effective for increasing detection of Greater Gliders, which tend to sit still and are easy to identify with their bright eyeshine but can be missed by a single observer. Please note below the specific requirements for recording Yellow-bellied Gliders that differ from record keeping requirements for Greater Gliders.

The time required to survey the transect by each observer is approximately one hour and forty minutes (10 minutes per 100 metres). Time spent identifying animals and recording data is additional to the one hour forty minutes. If a 100 m section of transect takes longer than 10 minutes to survey, observers should not 'make up' the time by surveying the remaining transect sections more rapidly. A consistent survey effort is to be applied across the entire transect(s) by both observers.

Where possible, contractors should attempt taking georeferenced photographs of target fauna observations and submit this data with other survey results.

Staff requirements

A field survey team of at least two people.

Ability to visually and audibly identify all arboreal mammals (and owl species) that may be found within the study area.

Experience with applying spotlighting and call playback techniques to detect and identify arboreal mammals.

Ability to use a GPS and hand-held compass to navigate off-tracks through forest at night.

Equipment

- 2x spotlights – bright handheld units or high-power headlamps (e.g. LED Lenser) equivalent to 750-1050 Lumens (50-70-watt incandescent bulb equivalent)
- Call playback equipment with speaker/megaphone
- 2x GPS
- 2x range finders
- 2x time-keeping device
- 2x handheld radios
- 2x (e.g. 10x40) binoculars
- 2x hand-held compasses
- Weather meter or thermometer and anemometer
- Appropriate spare batteries for all equipment
- 2x hard or soft copies of the FPSP Arboreal Mammal Spotlighting Datasheets/forms
- 2x back-up hard copies of datasheets/forms on waterproof paper on clipboards

Site selection

Contractors are provided with the detection probabilities of the target species for each survey technique. Contractors are to target their surveys to those species with the highest detection probabilities in each coupe. The species with higher detection probabilities aid in determining the target species most likely to be detected by the survey technique and will thus inform survey parameters such as preferred habitat for survey, arrangement of transects, etc.

The Contractor is responsible, via pre-survey desktop assessment, for identifying which parts of the coupe contain the most likely habitat for the target species. These parts of the coupe will be the priority areas to search, and may include gullies, particular aspects, sharp breaks in slope, tops of embankments, etc. DELWP may conduct desktop assessments to provide some supporting information to identify highest quality habitat, where this information is available. However, contractors are expected to refine the data provided to identify the most likely areas to detect target species, and thus focus survey effort in those areas.

The location of the transect(s) are to be determined in the field during the day, based on the presence of suitable habitat e.g. hollow-bearing trees. Possible survey locations may be pre-determined (e.g. via desktop assessment or using results of other surveys) based on likely presence of old growth forest, areas with high densities of hollow-bearing trees, and tracks and ridgelines (for access). Access permitting, spotlighting transects shall be located and positioned to maximise coverage of the best available habitat, and habitat with the best visibility, within the coupe and its immediate surrounds (note that Yellow-bellied Glider calls can travel up to 300 m in good conditions). Transects should not be installed through very dense forest, where the mid-storey vegetation obscures the observers' view of the surrounding eucalypt canopies. As vegetation thickness and visibility are variable, transects may be established through dense areas of no more than approximately 50 m in length, but should not continue further than this as such areas cannot be considered effectively surveyed when visibility is so low.

If the coupe is too small to allow a single 1 km transect line, either straight or curved, then alternative arrangements can be made such as surveying the entire coupe boundary, or multiple transects within and outside the coupe. Care should be taken with the layout to prevent the same area from being sampled more than once e.g. no tight turns. Multiple transects should be spaced as far apart as possible, with a recommended distance between them of at least 150 m to minimise the risk of duplicate detections from adjacent transects.

Generally, the entire transect should be within the coupe boundary in the best available habitat wherever possible. However, transect start or end points may be up to 100m outside a coupe boundary if these points are within the best available habitat and that habitat is contiguous with best available habitat within the coupe. Transects may also be

parallel to a coupe boundary if they are within the best available habitat and that habitat is contiguous with best available habitat within the coupe boundary but must be within 25m of the coupe boundary.

All transects must be walked during daylight hours and assessed for safety, unless the transect is along a track and the survey team has reliable knowledge that the track is safe (e.g. no collapses on steep slopes, bridges out, or roadside fire-damaged trees yet to be assessed by regional staff, etc.).

If the transect is not on a track, the transect(s) shall be flagged during daytime with reflective flagging tape (or similar) to facilitate easy passage at night. All flagging tape must be removed at the end of the final survey.

Conducting the survey

General Methodology

Surveys may be conducted all-year round, but preferably outside of winter to maximise the number of nights with optimal conditions. Surveyors should avoid windy nights (e.g. average steady wind speed $> \sim 10$ km/hr at ground level and/or $> \sim 30$ km/hr at canopy height - surveyors will need to make their own decision if wind is only occasionally gusty) or when it is raining or foggy. Wind significantly reduces detectability due to noise and visual distraction created by leaf, twig and branch movement.

All spotlight surveys are to commence no earlier than at least one hour after local sunset and conclude no later than one hour prior to sunrise, as animals may be in their dens outside these times and not be available for detection.

The double-observer spotlighting technique requires each observer to survey the transect independently. The aim is for the two observers to survey the transect as close together in space and time as possible so as to have similar chances of observing the same animals, but far enough apart so as not to be influenced by the activities (i.e. spotlighting) of the other. Observers should commence the transect search 10 minutes apart, i.e. the second observer will begin walking the transect and surveying 10 minutes after the first. Observers are to walk at an average pace of 10 minutes / 100 m (This is 0.6 km/hr. Note that normal walking pace on clear, flat ground (i.e. on a track) is about 4 km/hr).

The second observer is not to receive any information about the first observer's observations during their survey. For example, the second observer shall avoid watching the behaviour of the first observer ahead, especially when the lead observer has just started, and the second observer is waiting to start. For the observers to remain independent, they need to be purposefully avoiding receiving 'clues' as to the whereabouts of animals detected by the other observer. If the second observer is becoming too close to the first, they may need to stop, turn off their torch and wait until sufficient distance is again created between the two observers.

Each observer is to record all animals seen or heard where the observer is confident that the observation is a unique record and not a duplicate. When an animal is seen (e.g. positively identified with binoculars) or heard, the observer is to record the species, the time the animal was seen or heard, the location of the observer on the transect, the magnetic bearing to the animal from the observer, the distance to the animal (using a range finder for animals that are seen, or an estimated distance for animals that are heard), and the distance from the start of the transect, using the GPS. You do not need to spend as much time obtaining measurements for species that are obviously non-target/non-threatened (to maintain the specified average walking pace).

One survey transect polyline shapefile (with one set of start and end times) is required to be submitted for each night of spotlight survey, i.e. there is no requirement to submit individual tracklogs of each observer for every night of spotlighting. This will result in submission of three polylines per coupe where three spotlight nights have been completed. Each transect line is required to have a unique ID linking the shapefile to the observation datasheet/form (TransectID field in Data Entry SLCP spreadsheet).

Record the colour morph of each Greater Glider seen i.e. grey/white, black/white, all white, all black, all grey when it is observed as this will assist with determining which observations were seen by only one observer, or by both observers, at the completion of the survey.

All Feather-tailed glider detections should be reported as *Feather-tailed glider species* (VBA code 903793), as they cannot be reliably identified to species unless you have the animal in the hand.

Any animals detected more than 50 m beyond the ends of the transect shall be recorded as incidental observations. Such records may still contribute to potential triggers for prescriptions based on density calculations.

Upon completion of the survey, the first observer shall wait quietly with the spotlight off, for the second observer. If more than one transect is surveyed, the first observer shall wait until both can move to the next transect together.

After the first night of survey has been completed at the coupe, the resulting abundance measures determine whether more surveys are required at that coupe. If detections of 5 or more Greater Gliders anywhere in Victoria (other than East Gippsland FMA) or 6 or more Yellow-bellied Gliders (in East Gippsland FMA only) are made on the first or

second night of survey, whichever is the earlier, then no further spotlight survey is required. Further survey night(s) may be conducted in East Gippsland for Greater Glider until >10 observations of Greater Gliders are made in one spotlight night survey.

The date of a survey shall be recorded as the date the survey started.

If a spotlight survey starts before midnight and finishes after midnight, the date of observation to be recorded in the datasheet/form shall always be the date the observation is recorded.

Each spotlight survey will be allocated a unique survey number in the datasheet. This will ensure any observations per day are counted and reported together and not spread over two days (which may result in a trigger not being met).

Reporting for observations of Greater Gliders only

At the end of the survey the total number of unique individuals detected shall be calculated by the observers. Compare observations to determine which have been detected by both observers and which were unique to each observer. This is typically done by walking back along the transect(s) together and comparing observations at each location where an animal was observed. It is important that observers make decisions in the field as to whether each person's observations are unique (different animal observed) or a shared observation (same animal seen by both), and that this is recorded. If after retracing steps along the transect and comparing data, it is still unclear whether an observation is unique or seen by both, then a conservative approach is required and only one observation is to be recorded. A high degree of certainty is required when reporting whether a Greater Glider was seen by observer one only, observer two only, or by both.

Reporting for observations of Yellow-bellied Gliders only

For Yellow-bellied Gliders that were heard only, it may be very difficult to determine which detections are duplicate observations of the same animal. Plotting the approximate locations of each individual heard (using the location of the observer on the transect, the approximate magnetic bearing to the animal from the observer and the estimated distance), together with the time of each observation, can help to determine unique observations. In those cases where it is not possible to separate likely duplicates, then a conservative approach is required, and the minimum number of Yellow-bellied Gliders present is to be recorded. In cases where there are multiple duplicates that cannot be separated between observers, the records from one observer only, who detected the **highest** number of (unique) individuals, are to be reported. Both observers may record unique records when there is high confidence that no records are duplicates.

Post-spotlight transect call playback

Call playback can also be used to detect some arboreal species (e.g. Yellow-bellied Gliders, Koalas). In coupes **where Yellow-bellied Gliders have not been seen or heard on a transect**, a post-spotlight transect call playback is to be carried out after spotlighting surveys are finished. Koalas will be included in call playback surveys during spring and summer. If Yellow-bellied Gliders have been recorded on a transect but Koalas have not, then no post-transect call playback will be conducted. Post-spotlight transect call playback, if required, should be conducted at the location of the beginning of the spotlight transect if possible and at least within the coupe boundary.

The 10-minute call playback sequence (at approximately 110-120% of natural volume) for Yellow-bellied Gliders and Koalas is given below.

Yellow-bellied Glider call	– 3 minutes
Silence	– 2 minutes
Powerful Owl call	– 3 minutes
Silence	– 2 minutes
Koala call	– 3 minutes
Silence	– 2 minutes

The playback device should be raised as far off the ground as practicable to facilitate call broadcast.

If a response call is heard and the easting and northing of the observed individual is unable to be obtained with accuracy, record the species, the easting and northing of the observer, the estimated distance, and the approximate magnetic bearing to the source. Observers may separate by 100-200 m to triangulate calls to obtain higher quality estimates of animal position. Separating by 100-200 m will decrease the risk of observers recording the same individuals twice.

During call playback, keep spotlights turned off unless an unidentified animal is seen or heard close by and it is likely to be well within illumination and identification range of the spotlight.

At the end of the call playback, listen quietly for another 2 minutes.

Observations obtained in the post spotlight transect call playback are to be included in the transect abundance calculations.

Data reporting requirements

Data requirements are outlined throughout this guideline and in the datasheet/form. Complete all required fields on the datasheet/form for each target observation.

- Please enter the survey details (e.g. times and locations of the survey taking place) into the SurveyDetails page. Use the DataFieldsExplained page to help you enter the correct details.
- Ensure the CoupelID is entered correctly according to the survey package and in the format of xxx-xxx-xxxx
- Only one record of each observation is to be submitted, one observation per row in submitted spreadsheets. The second record of a duplicate observation (where the same animal has been seen and recorded twice by separate observers) may be retained by the contractor if preferred but it is not required to be submitted.
- Where two observers record the same animal on a transect then the data field “Seen by both” is required to have “yes” entered.
- Where two observers hear the same animal on a transect then the data field “Seen by both” is required to have “N/A” as they are not seen.
- Enter a separate record for each Greater Glider (GG) observed to enable recording of colour form for each individual GG observed. Therefore the count field for Greater Gliders will always be = 1
- Record any further site identifying information that may assist in relocating the observation in the future
- A polyline track log shapefile for each day of reconnaissance setting up the transect(s)
- One polyline shapefile of each transect record for each night of survey
- Each spotlight transect per night is to be assigned a unique transect ID in the datasheet/form.
- If survey night is abandoned, enter the reason for abandoning the survey in the Comments field.
- If spotlight and call playback survey is not conducted on 2nd and/or 3rd night, enter the reason for not continuing these surveys after previous survey night in the Comments field.
- Ensure all mandatory fields are completed and in the correct format, failure to do so will result in submitted data being returned for review.
- Ensure the CommonName field in ObsAttributes page is entered correctly according to the TaxalDLookup page. If you have made errors in the CommonName field, the TaxonID column will not be automatically populated.
- **Please Note: As per the standard operating procedure, contractors are expected to submit highest quality data. Please ensure you double check your data entry before submitting data. Submitting incorrect or incomplete information will result in a delay to reporting and may impact on the program outcomes.**

Owl Call Playback

Context

This survey technique is designed to detect direct evidence of owls via a call playback survey.

Owl call playback will be conducted, in most instances, in conjunction with spotlighting for arboreal mammals at the same coupe. When conducting the two survey methods together, the owl call playback survey will be conducted before the arboreal mammal spotlighting survey, preferably at or just after dusk.

Data obtained may lead to further survey effort, e.g. dawn/dusk watch or diurnal tree searches to search for recently-and/or frequently used nesting or roosting sites for these owl species. Decisions related to any requirement for further survey will be determined by DELWP.

Objectives

To detect threatened owl species (Powerful, Sooty, Masked and Barking Owls) within, and adjacent to selected coupes.

Survey effort

Owl call playback may be conducted from roads and tracks within or adjacent to selected coupes, or preferably from within a coupe. Adjacent to a coupe means within 200m of the coupe boundary noting that the survey technique is from a point with a small spotlight effort 100m either side from that point to see if any animals have been called in.

Two observers are to spend a total of about 40 minutes conducting the owl call playback with a spotlighting component, not including walking time to and from the site.

Playback and listening will take about 30 minutes.

After call playback, each observer will spend 10 minutes spotlighting, walking in opposite directions up to 100 m away from the call playback location.

Three repeat surveys are to be conducted over three separate nights. Records of owls (including estimated distance and bearing from the observer to the observed) will be used to inform whether further survey effort is required to search specifically for nesting and regular roost trees.

If owl call playback is conducted on the same night as a spotlighting transect(s) for arboreal mammals, then call playback can be conducted, from a road, at least 200 m away from the transect, within or adjacent to the coupe, e.g. on a ridge. If it is not possible to conduct Owl Call Playback both within 200m of a coupe boundary and > 200m from the transect location, then the priority is to conduct the call playback within 200m of the coupe boundary or within the coupe and <200m from the transect. The intent is to get these surveys within coupes or as close as possible to coupes where prescriptions apply or where it may indicate further survey effort required e.g. owl roosting and nesting sites in the coupe.

If Yellow-bellied Gliders are seen or heard during owl call playback and then seen or heard during the spotlighting transect, they are to be recorded as observations as part of the spotlight transect, and not part of the owl call playback. If there is any doubt as to the number of Yellow-bellied Gliders heard, a conservative approach is required, and the suspected duplicate records are not to be recorded.

For each night of owl call playback, contractors are required to record a single-track log of the survey effort from the start to the end of surveying within or adjacent to each coupe. The track log is to be converted to a GIS shapefile and submitted with attributes as outlined in the FPSP Standard Operating Procedure (note a shapefile template is provided by FPSP).

Where possible, contractors should attempt taking georeferenced photographs of target fauna observations and submit this data with other survey results.

The date of a survey shall be recorded as the date the survey started.

If a spotlight survey starts before midnight and finishes after midnight, the date of observation to be recorded in the datasheet/form shall always be the date the observation is recorded.

Staff requirements

A survey team of at least two people.

Observers must be able to visually and audibly identify all the owl species (and arboreal mammals) that could be found within the study area.

Observers must be experienced with applying call playback and spotlighting techniques to detect and identify owls (and arboreal mammals).

Observers must be able to use a GPS and hand-held compass to navigate off tracks through the bush at night.

Equipment for the technique

- | | |
|--|--|
| <input type="checkbox"/> Call playback equipment with speaker/megaphone | <input type="checkbox"/> 2x binoculars |
| <input type="checkbox"/> Audio recording of owl calls | <input type="checkbox"/> 2x hand-held compasses |
| <input type="checkbox"/> 2x spotlights – bright handheld units or high-power headlamps (e.g. LED Lenser) | <input type="checkbox"/> 2x hard or soft copies of the FPSP Arboreal Mammal Spotlighting Datasheets/forms |
| <input type="checkbox"/> 2x GPS | <input type="checkbox"/> Digital or other camera (with carry case, spare batteries, spare storage card) capable of including georeferencing data with each photo (not essential) |
| <input type="checkbox"/> 2x range finders | <input type="checkbox"/> 2x back-up hard copies of datasheets/forms on waterproof paper on clipboards |
| <input type="checkbox"/> 2x time-keeping device | |

Upon arrival at site

Select an owl call playback location that is at least 200 m away from any part of the arboreal mammal spotlight transect location.

Select and mark out the owl call playback location in daytime.

Conduct the owl call playback survey as specified. If not surveying from a track, mark the owl call playback location in advance with enough reflective flagging tape (or similar) to facilitate easy passage along it at night.

Conducting the survey

Owl call playback sites shall not be within 3 km of each other if being surveyed on the same night. Some owls can be heard up to 2 km away and care shall be taken not to double-count the same animal from different sites. If call playback locations are within 3 km of each other, then call playback can be conducted on alternate nights.

Owl call playback is best done in the early hours of darkness. Commencing the survey on dusk can facilitate the location of owl nest or roost trees as animals responding at this time are likely to be near the roost or nest.

Owl call playback can elicit a response from Yellow-bellied Gliders, particularly on dusk as family groups are emerging from their den trees. To reduce the risk of observers recording the same individuals twice, observers may separate by 100-200 m to triangulate calls to obtain higher quality estimates of glider position.

To commence the survey, record the start time and listen quietly for 5-10 minutes.

Raise the playback device as far off the ground as practicable and then play the audio recordings at about 110-120% of natural volume.

Allow for a 2 minute listening period between played calls. Owl call playback sequence:

1. Powerful Owl – 2 minutes
2. Silence – 2 minutes
3. Barking Owl – 2 minutes
4. Silence – 2 minutes
5. Sooty Owl – 2 minutes (6 territorial screams at 30 sec intervals)
6. Silence – 2 minutes
7. Sooty Owl – 1 minute (trilling)

- | | |
|----------------|---|
| 8. Silence | – 2 minutes |
| 9. Masked Owl | – 2 minutes (6 territorial screams at 30 sec intervals) |
| 10. Silence | – 2 minutes |
| 11. Masked Owl | – 1 minute (chattering) |

Note that Masked Owl calls must be last in the sequence since they often only respond with a single shriek which may go unnoticed during the playback of the other species if it is played earlier, especially if it is distant.

Be alert for glimpses of animals flying in quietly, especially silhouetted against the night sky.

During call playback keep spotlights turned off unless an unidentified animal is seen or heard, and it is likely to be well within illumination and identification range of the spotlight.

At the end of the call playback listen quietly for another 2 minutes.

Then commence a spotlighting session with observers moving in opposite directions away from the playback point.

Spotlight for 10 minutes, walking up to 100 m each from the playback point (combined total of 20 minutes and 200 m) targeting perched owls but recording all target species seen and heard.

When an animal is heard or seen (identified with binoculars if possible), record the species, the location of the observer on the transect, the magnetic bearing from the observer, and the distance to the animal (using the range finder). It is recognised that estimating exact distance is not possible for animals that are heard only, so an estimated distance is acceptable for these records.

Record the end time of the survey.

Record the easting and northing of the call playback broadcast point.

If no more surveys are to be conducted at the site, then all flagging tape is to be removed.

If one of the target owl species is detected, then the call of that species should not be played on subsequent surveys at that site to avoid disturbing that animal within its territory.

Data reporting requirements

Data requirements are outlined throughout this guideline and in the datasheet/form. Complete all required fields on the datasheet/form for each target observation.

- Please enter the survey details (e.g. times and locations of the survey taking place) into the SurveyDetails page. Use the DataFieldsExplained page to help you enter the correct details.
- Ensure the CoupelID is entered correctly according to the survey package and in the format of xxx-xxx-xxxx
- When an animal is heard or seen, record the species, the location of the observer, the magnetic bearing from the observer, and the estimated distance to the animal.
- Only one record of each observation is to be submitted, one observation per row in submitted spreadsheets. The second record of a duplicate observation (where the same animal has been detected and recorded twice by separate observers) may be retained by the contractor if preferred but it is not required to be submitted.
- Record the start and end times of the survey.
- Record the easting and northing of the call playback broadcast point.
- Record a GPS track log for each call playback survey and submit as a polyline shapefile.
- Record and submit georeferenced photos of fauna observations, where possible.
- If spotlight and call playback survey is not conducted on 2nd and/or 3rd night, enter the reason for not continuing these surveys after previous survey night in the Comments field.
- Ensure all mandatory fields are completed and in the correct format, failure to do so will result in submitted data being returned for review.
- A comprehensive list explaining the data entry fields and whether they are mandatory or optional can be found in the DataFieldsExplained page.

- Ensure the CommonName field in ObsAttributes page is entered correctly according to the TaxaIDLookup page. If you have made errors in the CommonName field, the TaxonID column will not be automatically populated.
- **Please Note: As per the standard operating procedure, contractors are expected to submit highest quality data. Please ensure you double check your data entry before submitting data. Submitting incorrect or incomplete information will result in a delay to reporting and may impact on the program outcomes.**