APPENDIX I: ANNOTATED PAPER DATA SHEETS

Desert Tortoise Distance Sampling **Training Transect Form**

Trial Number		Transect Bearing	35 °	215 °		Group:	Kiva GBI IWS	
Team Number		Transect Segment Num:						
Training line color	Red Yellow Magenta	Training Date:		2012		Lead:		
	White Orange Green	Train Start Time:				Follow:		
Starting Post	A B C D E F	Training End Time:						
	G H I J K L	Comments:						
Observation Time:		Original observation	from line		Azimuth:	°	Tortoise Size:	Adult
Observer Name:			while at another model		Radial Dist:	m		Immature
Observer Position:	Lead Follow	Local Bearing:	°		Perpendicular Dist:	m	Tortoise ID:	
Comments:								

Comments (include Tortoise ID):

If more than 10 detections occur on a segment, use a new data sheet and indicate page 2 of 2 at the bottom. Copy header information and record stop time on all sheets.

Page of

Data Recorded By: Data Proofed By:

Trial number

It usually takes 2 days to complete a trial (walk 16 transects).
The first 2 days walked on training lines is "Trial 1". Likewise, the second pair of days is "Trial 2".

Date

To avoid data entry errors, dates are reported as DD MMM YYYY, with months indicated by 3-letter abbreviations.
For instance, "20 Mar 2012"

Start Post

Each starting post identifies a new "transect" and a new form must be started on paper and in the Juno

Transect Segment Num

This is calculated in the Juno. If the number is incorrect or does not display, recheck your LineColor, StartingPost, and TransectBearing

Observation time

Write the time in the same format (12- or 24-hour) that it appears on the RDA.

Original observation

If this particular model was first seen using the distance search technique from the centerline, circle "from line".
If the model was seen while working at the previous model, circle "while at another model".

Radial Distance

Enter only to one decimal place (tenths of a meter).

Perpendicular Distance

The former is entered; the latter is calculated automatically. Consider the resulting "perpendicular distance from the line". Does it match your eyeball estimate? If not, recheck your bearing, azimuth, and radial distance entries.
Partial calculations may appear in the box when only a portion of the necessary data has been entered.
Touch the box for Perpendicular Distance to recalculate before writing the value on your paper sheet.
The RDA will not round the Perpendicular distance calculation at all. On the paper sheet you must enter only to one decimal place.
Rules for rounding to one decimal place: if there is a 0, 1, 2, 3, or 4 in the second decimal place, do not change the first decimal place. If there is a 5, 6, 7, 8, or 9 in the second decimal place, round the first decimal place up.

Data proofed by

This field should record the name of the first reviewer who was not involved in collecting the data.
On monitoring transects, data are proofed by the member of a different team, the crew leader, or QAQC specialist.
On training lines, proofing is done by the QAQC specialist.

Desert Tortoise Distance Sampling G_0 Start and Obs Form

Group:	GBI IWS Kiva / JOTR	Date:	2012
Site:		Observer:	

Photo 1:	Yes No	Photo 1 comments:	
Photo 2:	Yes No	Photo 2 comments:	
Photo 3:	Yes No	Photo 3 comments:	
Photo 4:	Yes No	Photo 4 comments:	

Comments:

Tortoise Num:		Tortoise location:	Burrow Pallet Open Vegetation Rock	Behavior:	GPS Location
Time:				Unk AtRest Active	Easting:
Burned?:	N/A Yes No	Burrow Visibility:	High Med Low Not	Moving Basking	Northing:
Tort Visible?:	Yes No	Tort in Burrow Visibility:	High Med Low Not	Eating Mating	
Dist to burrow (m)		Tortoise visibility	High Med Low Not	Agonistic Digging	GPS grab valid?: Yes No

Comments:

Photo 1

Photo 1 comments

The Yes/No field is to indicate whether each of the 4 possible site photos were taken.

Use photos to illustrate the landscape of the site and/or to show burrows used by the tortoises here. Comments provide helpful information to interpret the photo.

Time

The first observation of each day at a site determines the "start time" for telemetry observations that day. This time should not be later than the transect start time designated for that day, so telemetry observers must be careful to start early enough to locate their first tortoise by the designated start time.

Burned?

This entry is not applicable except in Coyote Springs and Halfway. At these sites, it is important to identify on each occasion whether the tortoise was encountered in a burned or unburned area.

Tort visible?

Is the tortoise visible at all? Other fields on the form are directed at describing how visible the tortoise is.

Dist to burrow?

Without using a tape measure, estimate the distance in meters from this tortoise to the nearest burrow. If in the burrow, the distance is "0". Use "100" if you do not see a burrow within 15m of the tortoise.

Tortoise location:

Burrows include both dirt constructed holes and caliche caves. A tortoise in a burrow is at the mouth of the burrow, deep inside, or anywhere in between.

Vegetation - tortoise is under the drip line, or in the shade of vegetation.

Rock - tortoise is under or in the shade of a rock.

Pallet - tortoise is in a similar configuration to the mouth of a burrow, but the shelter is unconstructed and is undeveloped such that it is shorter than one tortoise length.

Open - tortoise is in the open and not under vegetation or rock.

Burrow visibility:

This field must be populated if "Tortoise location = burrow". Consider the burrow as the center of a circle. Visibility will be estimated by the degrees of approach through which the burrow would be openly visible.

High

Distinguishing characteristics of a burrow (opening, mound, or apron) would be visible from more than 75% of the angles of approach. High visibility includes a burrow out in the open and facing you, or very obvious under sparse vegetation.

Medium

The expectation is that most burrows detected on a transect will be “medium” visibility. The approach will be to expect “medium” and then for a given tortoise to decide if use of the other categories is warranted in case this is an unusual situation for a burrow. Medium-visibility burrows are blocked through more than 25% but less than 75% of the angles of approach. Medium visibility includes a burrow visible under vegetation, but where vegetation obscures tell-tale shapes of the mouth, mound, or apron.

Low

The burrow is blocked from view through more than 75% but less than 100% of the angles of approach. Low visibility does not include burrows obscured completely by vegetation.

Not Visible

The burrow is completely blocked from view. This will be the case if you plunge into vegetation (usually a shrub) to follow a signal, but nothing is visible from the outside, and the "not visible" tortoise is actually in a "not visible" burrow.

Tortoise-in-burrow-visibility
This field must be populated if "Tortoise location = burrow". Consider the burrow as the center of a circle. Visibility will be estimated by how much of the tortoise can be seen and is related to how deep the tortoise is in the burrow.

High
: High visibility tortoises include those at the mouth of the burrow, and easily seen without bending over and no need for use of a mirror or flashlight.

Medium
: Medium visibility tortoises include those that require bending over or getting down on your knees and the use of a mirror or flashlight.

Low
: Low visibility tortoises include those so deep within a burrow that you are required to lay flat on the ground, searching the depths of the burrow with a mirror or flashlight. Your confirmation of the tortoise may include only an arm or leg, or small portion of the shell.

Not Visible
: No part of the tortoise is visible when you look inside with a mirror or flashlight. If the tortoise is in a burrow, and "tort visible? = No", then the burrow and/or the tortoise in the burrow are concealed. If you have indicated that "burrow_visibility = not visible", then the tort_in_burrow_visibility may be high, medium, low, or not visible. However, if the burrow_visibility" is "high", "medium", or "low", then "tort_in_burrow_visibility = not visible".

Tortoise visibility
This field is only used for tortoises not associated with a burrow. Consider the tortoise as the center of a circle. Visibility will be estimated by the degrees of approach through which the tortoise would be openly visible.

Medium
: The expectation is that most tortoises detected on a transect will be “medium” visibility. The approach will be to expect “medium” and then for a given tortoise to decide if use of the other categories is warranted. Is it an unusual situation for a transect tortoise? Medium-visibility tortoises are blocked through more than 25% but less than 75% of the angles of approach. Medium visibility includes tortoises slightly obscured by vegetation, including in the open but behind vegetation because of your angle of approach, in a pallet, or under rocks (not burrows or caves).

High
: The tortoise would be visible from more than 75% of the angles of approach. Typically, high visibility includes tortoises out in the open, but they could be under vegetation or rocks but not obscured by them, or they could be in a pallet.

Low
: The tortoise is blocked from view through more than 75% of the angles of approach. This might be the case if you investigate because it looks like there should be a tortoise there, but it isn’t immediately visible. Low visibility includes tortoises completely obscured by vegetation or rocks, including obscured in a pallet.

Not Visible
: The tortoise is completely blocked from view, usually deep in a shrub or high forbs/grasses. Since you will have indicated "Tort visible? = No", this option is redundant, but we maintain it for consistency in the visibility fields.

Behavior

Unknown
: The tortoise is not visible, and the behavior cannot be discerned.

AtRestActive
: The tortoise is visible, appears to be awake, but does not appear to be doing anything.

Moving
: This typically involves the tortoise walking, with the plastron off the ground. However, if you hear what you believe to be the tortoise moving in the back of a burrow, record behavior as moving. Because observers frequently startle the animal, when possible observe behavior before approaching.

Basking
: Shell on ground, legs sprawled out to maximum skin exposure posterior or broadside to sun orientation.

Eating
: The tortoise appears to be biting vegetation or other possible food items.

Mating
: The tortoise is engaged in mating activity with another tortoise (courtship behavior or copulation).

Agonistic
: The tortoise is fighting with another tortoise.

Digging
: The tortoise is modifying a burrow or pallet by digging, or possibly nesting. This can be with all four feet. Sometimes you can discern digging when the tortoise is not visible, (i.e. dirt flying out of the back of a burrow).

If the tortoise is not visible behavior can only be unknown, digging, or moving. Probably 99% of the time it will be unknown.

Desert Tortoise Distance Sampling G_0 Form (OppLiveObs)

Site: | Date: 2012 | Observer:

Opp Live #		Sex:	M F Unk	Existing Tag:	Y N U/R Unk	GPS grab valid?:	Yes No
Time:		Tortoise Voided?	No Urine Feces Both	ET Number:		Easting:	
Temperature:	ºC	Tort_not_handled because:		ET Color:	Blue White Green	Northing:	
Temp > 35?:	Yes No			Other Color:		Photo_tort:	Yes No
MCL≥180?	Yes No Unk			New Tag Attached?	Yes No	**Photo comment:**	
MCL (mm):				New Tag Number:	FW		

Comments:

Opp Live #

This count starts at "1" for each observer on each new day.

MCL≥180?

MCL (mm)

For all visible tortoises, the first field will have an entry. The second field will only have an entry if the tortoise was handled - this field should not be estimated.

Sex

If there is any uncertainty about the sex of the tortoise, record "unknown."

Tortoise_not_handled because

If any fields are left blank, your QAQC specialist will interview you to attempt to fill in information. If you can instead use one of the pick list provided here, or can clearly describe a different situation that prevented handling of the tortoise, then the extra follow-up work will be avoided.

deep in burrow	Tortoises should only be extracted from burrows if the animal does not struggle or
scutes too small	This situation would preclude affixing a tag
social interaction	Tortoises that are courting, mating, in combat, or other social interactions should not be
research area	Transmittered animals or others under behavioral observation in designated areas
temperature	
no permit	If handling permits for a given state or protected area have not been received, do not ha
other	Use this option to describe another situation, or to retract an entry under this field

Desert Tortoise Distance Sampling **Transect Form (Waypoints 1)**

Group: | Stratum: | Tran Number:

Team Number: | Observer 1:

Date: 2012 | Observer 2:

Waypoint 0 Time: am / pm | Easting: | Northing: | UTM Zone: 11 12 | GPS grab valid? Y N

Comments:

Waypoint 1 Time: am / pm | Easting: | Northing: | UTM Zone: 11 12 | GPS grab valid? Y N | Photo to previous waypt? Yes No | Photo comment: | Photo to next waypt? Yes No | Photo comment: | Lead (to next): Observer 1 / Observer 2

Comments:

Waypoint 2 Time: am / pm | Burrow ct (from previous): | Transect interrupted? Y N | Lead (to next): Observer 1 / Observer 2 | Easting: | Northing: | UTM Zone: 11 12 | GPS grab valid? Y N | Photo to previous waypt? Yes No | Photo comment: | Photo to next waypt? Yes No | Photo comment:

Comments:

(many other waypoints here…)

Waypoint 24 Time: am / pm | Burrow ct (from previous): | Transect interrupted? Y N | Lead (to next): Observer 1 / Observer 2 | Easting: | Northing: | UTM Zone: 11 12 | GPS grab valid? Y N | Photo to previous waypt? Yes No | Photo comment: | Photo to next waypt? Yes No | Photo comment:

Comments:

Waypoint 99 Time: am / pm | Burrow ct (from previous): | Transect interrupted? Y N | Lead (to next): Observer 1 / Observer 2 | Easting: | Northing: | UTM Zone: 11 12 | GPS grab valid? Y N | Photo to previous waypt? Yes No | Photo comment: | Photo to next waypt? Yes No | Photo comment:

Comments:

Waypoint 100 Time: am / pm | Easting: | Northing: | UTM Zone: 11 12 | GPS grab valid? Yes No

Comments:

Comments (include waypoint number):

Data recorded by:

Data proofed by:

Page 3 of

Desert Tortoise Distance Sampling **Transect Form (Waypoints 4)**

Team: | Date: 2012 | Stratum: | Transect Num:

Transect Summary

Transect Standard?	Y	N				
Interrupted_tran:	Y	N				
Unplanned modification?	Y	N				
Terrain Obstacles:	Mountainous	Cliff	Deep Washes	Prohibited Access	Major Road	Boundary
Substrate Obstacles:	Rock	Gravel	Tallus	Sand		

Other Obstacles?:

Other relevant information (military reservation, wilderness area, etc.):

Directions to transect (include UTM coordinates and/or names of nearest major roads, description of notable intersections, steep/challenging road conditions):

Tran num
The transect number a whole number assigned before arriving at the transect. There is one exception: if an obstacle must be navigated so that there is a break

Stratum
This should be written long-hand on the Waypoints1 transect form. On the continuation pages, the appropriate abbreviation can be used.

Date
The RDA reads 3/31/2012. The paper entry should be written 31 Mar 2012.

Waypoint 0
The location where the crew left their vehicle. These data are taken when leaving for Waypoint 1, not when you arrive at the site (not the night before...). For interrupted transects, Waypoint 0 is entered only on the base segment, not in the continuation records.

Waypoint 1
The start point on the transect. If you arrive at this point early, time should not be recorded until you are about to leave for Waypoint 2.

Waypoints 2 through 24
Subsequent waypoints on the transect.

Waypoints 25 through 40
These will only be used on non-standard transects, if additional turns or interruptions are made in the transect.

Waypoint 99
The final location on the transect. On a standard transect, this would correspond to the return to the original start point, and in sequence would have been "Waypoint 25." For transects that are interrupted and resumed after navigating an obstacle, new electronic records are started, but "99" is used only for the last waypoint on the last segment of the transect.

Waypoint 100
Where the crew returns to their vehicle. May differ from Waypoint 0. For interrupted transects, After completing Waypoint 99 for the final segment of an interrupted transect, record Waypoint 100 with this electronic record, the last one for the transect.

Burrow ct
While walking from Waypoint 1 to Waypoint 2 (for example), use tick-marks to keep track of the number of burrows you examine for tortoises. Only record burrows that could have held tortoises greater than 180mm MCL, and only if they are not blocked or collapsed. When you arrive at Waypoint 2, while entering relevant data, also enter the count of these tick marks.

Transect interrupted?
Are you taking this waypoint as a prelude to navigating around an obstacle (without using the distance searching protocol)? If so, indicate "Y" here so it is understood that the path to the next waypoint was not searched. Once you interrupt a transect, you should continue collecting data on the same paper datasheet, but need to start a new electronic record, using decimal increments to link all parts of the same transect in the correct order.

Lead
Indicate the observer who will lead from this waypoint to the next one. You should switch leaders at each corner, so if you are taking the coordinates for waypoint 4 and are at a corner, record the new leader under waypoint 4, not waiting until waypoint 5.

Easting
Northing

On the paper sheet, these fields are recorded from the navigational (handheld) GPS unit.
In the Juno, if the BT GPS grab fails or is more than 20 meters from the navigational coordinates,
use the manual easting and northing fields to record the navigational coordinates.
In this case, always record both the easting and the northing.

GPS grab valid?

If the BT differs from the navigational GPS by more than 20m, try regrabbing; otherwise, indicate the grab was invalid and enter the navigational (manual) GPS coordinates. Compare the Bluetooth and navigational GPS units if
The Bluetooth has been off for more than an hour
the HDOP is greater than six
There are fewer than five available satellites
There was anything unusual, such as an unusually long grab

UTM Zone

Only entered by hand in the RDA if a manual GPS grab was required

Data recorded by
Data proofed by

The recorder participated in collecting the data. The proofer must be someone other than one of the data collectors. Candidates are other field personnel, crew leaders, or the QAQC specialist.

Transect standard?

A transect is only "standard" if it was 12km long, with 4-3km sides at right angles to one another. Any other shapes or lengths, or the use of interruptions is

Interrupted tran?

Record whether you have interrupted the transect so that you used more than one electronic transect record to collect the data for this transect.

Unplanned modification?

Record whether you have interrupted the transect so that you used more than one electronic transect record to collect the data for this transect.

Terrain obstacles

Only complete this field if you identified a non-standard transect. What obstacles to forward progress caused you to shorten or otherwise alter your transect

Substrate obstacles

Only complete this field if you identified a non-standard transect. Only substrates that affected ability to complete the transect should be noted here. Loose or

Other obstacles

Only complete this field if you identified a non-standard transect. This field should be used to identify human-built obstacles. "Prohibited access" is a category

Directions to transect

This information is only on the paper sheet, not on the RDA.

Drawing of transect

Draw this free-hand. This is not on the RDA, but provides information that is often referenced during data verification.

Desert Tortoise Distance Sampling Transect Form (TranCarcObs)

Tran Num: | Stratum: | Team Num: | Date: 2012

Tran Carc #:		Radial Distance:	m	Other Tag Color:	
Observer:	1 2	Perpendicular Dist:	m		
Obs Position:	Lead Follow	Carcass Condition:	Intact D/A	Easting:	
Last Waypoint:		MCL ≥ 180?	Yes No Unk	Northing:	
Observation Time:		MCL (mm):		UTM Zone:	11 12
Transect Bearing:	0º 90º 180º 270º	Sex:	M F Unk	GPS grab valid?	Yes No
Other Tran Bearing:	º	Existing Tag:	Yes No U/R		
Local Bearing:	º	ET Number:		Photo taken?	Yes No
Azimuth:	º	ET Color:	B W G	Comments:	

Comments:

Opp Carc #
Remains of a tortoise are recorded as a carcass only if at least half of the shell (plastron and carapace) are present.

Carcass Condition
These definitions are project specific. You may have used other definitions, but for us, if the MCL can be measured, the tortoise is "intact," regardless of how much has fallen off or whether carapace and plastron are attached. Otherwise it is "disarticulated."

MCL≥180?
MCL (mm)
For all carcasses, the first field will have an entry. The second field will only have an entry if the carcass was intact - this field should not be estimated.

Sex
If there is any uncertainty about the sex of the tortoise, record "unknown."

Existing Tag
For carcasses, the possibilities are that it definitely has an existing tag ("Y"), or that you know it definitely does not have an existing tag ("N"), or the tag exists but is unreadable ("U/R"; ultraviolet can for instance darken tags). In the case of live tortoises, there is a fourth possibility that is not a concern with carcasses. Whereas it is inappropriate to remove a tortoise from a burrow, carcasses can always be removed and examined completely. Live tortoises, therefore, may be "Unk" to have a tag, but if you can't find a tag with a carcass now, you won't find one at a later date.

Existing Tag Color
Other Tag Color
If any tag is present, it is likely to be blue, white, or green. Otherwise, use "Other tag color" and spell it out!

Photo taken
Photo file name
If you take a photo of the carcass, whether taken as part of this subform or no, indicate "Yes."
Use the photo to capture pictures if you want think the carcass is informative, for instance if you think it indicates a particular cause of death. In this case, use the comment field to communicate your intent to the viewer. If the photo was not taken as part of this subform, provide the label assigned by the Juno in the comment. Alternatively, if the photo was integrated in the subform, you will not be provided with a photo name and should not fill in the latter field.

Desert Tortoise Distance Sampling Transect Form (TranLiveObs)

Tran Num: | Stratum: | Team Num: | Date: 2012

Tran Live #:		Burrow Visibility:	High Med Low
Observer:	1 2	Tort in Burrow Visibility:	High Med Low
Observer Position:	Lead Follow	Tortoise visibility:	High Med Low
Time:	am / pm	Distance to burrow:	m
Last Waypoint:		Temperature:	ºC
Observation Time:		Temp > 35?:	Yes No
Transect Bearing:	º	MCL ≥ 180:	Yes No Unk
Local Bearing:	º	MCL:	mm
Azimuth:	º	Sex:	M F Unk
Radial Distance:	m	Ticks:	0 1-10 >10 Unk
Perpendicular Dist:	m		

Existing Tag:	Yes No U/R Unk
Existing Tag Number:	
Existing Tag Color:	Blue White Green
Other Tag Color:	
New Tag Attached?	Yes No
New Tag Number:	FW
Tortoise Void	None Urine Feces Both
Tort not handled b/c:	

GPS Location

Easting:	
Northing:	
UTM Zone:	11 12
GPS grab valid?:	Yes No

Cue to tortoise: SearchedVeg
BodyPart Movement Burrow BurrowApron

Tort heading relative to line when detected:
Profile HeadOn TailOn PulledIntoShell
HeadIntoBurrow HeadOutOfBurrow

Tortoise location:
Burrow Pallet Open Vegetation Rock

Body condition score:
Under: 1 2 3
Acceptable: 4 5 6 7
Over: 8 9
Unk

Nares appearance:
Normal Asymmetrical Eroded Occluded Unk

Nares discharge:
None Serous 1 2 3 Mucous 1 2 3 Unk

Photo_tort1: Yes No
Comment:

Photo_tort2: Yes No
Comment:

Comments:

Observer Position
It is extremely important to record whether the tortoise was first seen by the person in the "lead" or "follow" position.

Radial Distance
Enter only to one decimal place (tenths of a meter).

Perpendicular Distance
The former is entered; the latter is calculated automatically. Consider the resulting "perpendicular distance from the line". Does it match your eyeball estimate? If not, recheck your bearing, azimuth, and radial distance entries.
Partial calculations may appear in the box when only a portion of the necessary data have been entered. Touch the box for Perpendicular Distance to recalculate before writing the value on your paper sheet.
The RDA will not round the Perpendicular distance calculation at all. On the paper sheet you must enter only to one decimal place.
Rules for rounding to one decimal place: if there is a 0, 1, 2, 3, or 4 in the second decimal place, do not change the first decimal place. If there is a 5, 6, 7, 8, or 9 in the second decimal place, round the first decimal place up.

Cue to tortoise:
SearchedVeg - Your attention from the transect centerline was captured by a promising shrub, with no glimmer of a tortoise
BodyPart - Although the tortoise was not completely visible, you identified part of the tortoise and went to investigate
Movement - Your attention was captured by motion [of the tortoise]
Burrow - You found the tortoise after going to investigate a burrow. The tortoise might have been in the burrow, or you noticed it in the open after going to investigate the burrow itself.
BurrowApron - You didn't seen the mouth of the burrow initially, but went to investigate what you thought was excavation from a burrow. The tortoise might have been in the burrow or on the apron, or you noticed it in the open after going to investigate the excavation itself.

Tortoise location:
Burrows include both dirt constructed holes and caliche caves. The plane at the burrow opening shows the boundary of the burrow; at least part of a tortoise in a burrow is inside the boundary. Tortoises in a burrow under a plant are in a "Burrow," not under "Vegetation"
Vegetation - tortoise is under the drip line, or in the shade of vegetation.
Rock - tortoise is under or in the shade of a rock.
Pallet - tortoise is in a similar configuration to the mouth of a burrow, but the shelter is shorter than one tortoise length.
Open - tortoise is in the open and not under vegetation or rock.

Tort heading relative to line when detected:
This question is about the orientation of the tortoise when you first saw it. Indicate all applicable descriptions.
Profile - The tortoise was approximately perpendicular to the transect line when detected.
HeadOn - The tortoise was facing toward the transect
TailOn - The tortoise was facing away from the transect path
PulledIntoShell - The tortoise's legs and head were retracted
HeadInBurrow - the tortoise was facing into the burrow and at least part of its body had crossed the opening of the burrow
HeadOutOfBurrow - At least part of the tortoise's body is inside the opening of the burrow, and the tortoise Is facing out from the burrow.

Burrow visibility:

Consider the burrow as the center of a circle. Visibility will be estimated by the degrees of approach through which the burrow would be openly visible.

Medium

The expectation is that most burrows detected on a transect will be “medium” visibility. The approach will be to expect “medium” and then for a given tortoise to decide if use of the other categories is warranted in case this is an unusual situation for a burrow. Medium-visibility burrows are not visible through more than 25% but less than 75% of the angles of approach. Medium visibility includes a burrow visible under vegetation, but where vegetation obscures tell-tale shapes of the mouth or apron.

High

Distinguishing characteristics of a burrow would be visible from more than 75% of the angles of approach. High visibility includes a burrow out in the open and facing you, or very obvious under sparse vegetation.

Low

The burrow is blocked from view through more than 75% of the angles of approach. This might be the case if you investigate because it looks like there should be a burrow there, but it isn't immediately visible. Low visibility includes burrows obscured completely or nearly completely by vegetation.

Tortoise-in-burrow-visibility

High

High visibility tortoises include those at the mouth of the burrow, and easily seen without bending over and no need for use of a mirror or flashlight.

Medium

Medium visibility tortoises include those that require bending over or getting down on your knees and the use of a mirror or flashlight.

Low

Low visibility tortoises include those so deep within a burrow that you are required to lay flat on the ground, searching the depths of the burrow with a mirror or flashlight. Your confirmation of the tortoise may include only an arm or leg, or small portion of the shell.

Tortoise visibility

This field is only used for tortoises not associated with a burrow or caliche cave. Consider the tortoise as the center of a circle. Visibility will be estimated by the degrees of approach through which the tortoise would be openly visible.

Medium

The expectation is that most tortoises detected on a transect will be “medium” visibility. The approach will be to expect “medium” and then for a given tortoise to decide if use of the other categories is warranted. Is it an unusual situation for a transect tortoise? Medium-visibility tortoises are blocked through more than 25% but less than 75% of the angles of approach. Medium visibility includes tortoises slightly obscured by vegetation, including in the open but behind vegetation because of your angle of approach, in a pallet, or under rocks (not burrows or caves).

High

The tortoise would be visible from more than 75% of the angles of approach. Typically, high visibility includes tortoises out in the open, but they could be under vegetation or rocks but not obscured by them, or they could be in a pallet.

Low

The tortoise is blocked from view through more than 75% of the angles of approach. This might be the case if you investigate because it looks like there should be a tortoise there, but it isn’t immediately visible. Low visibility includes tortoises completely obscured by vegetation or rocks, including obscured in a pallet.

Distance to burrow

Without using a tape measure, estimate the distance in meters from this tortoise to the nearest burrow. If in the burrow, the distance is "0". Use "100" if you do not see a burrow within 15m of the tortoise.

MCL≥180?

MCL (mm)

For all visible tortoises, the first field will have an entry. Although "Unknown" is an option, indicate "Yes" or "No" if at all possible. If the tortoise is the size of a measurable burrow opening, for instance, use this to evaluate whether it is larger than 180mm. The second field will only have an entry if the tortoise was handled - this field should not be estimated.

Sex of tort

If there is any uncertainty about the sex of the tortoise, record "unknown."

It is more difficult to identify the sex of smaller tortoises. In particular, those under 180mm are often considered juveniles.

Body condition score

Please reference the handbook for pictures to illustrate muscle development and fat deposition evidence to match each score

Nares appearance

If any fields are left blank, even if you are able to conclude the transect form, your QAQC specialist will have to interview you to attempt to fill in information. If you can instead use one of the pick list provided here, or can clearly describe a different situation that prevented handling of the tortoise, then the extra follow-up work will be avoided.

Normal - Usual shape and/or size.

Asymmetrical - One naris is larger and/or wider than the other.

Eroded - Loss of scales and skin around naris opening.

Occluded – Plugged or reduced size of naris opening.

Unknown - If the tortoise's behavior prevents you from examining the nares, continue processing and collecting data. Attempt to score the nares one more time before leaving the location, but do not manipulate the tortoise to attempt the examination.

Nares discharge

None - No discharge from either naris

Serous - Clear, watery discharge. Must simultaneously score the severity (1, 2, or 3). Scoring is based on the naris with the most severe level of discharge.

Mucous - Thick, cloudy discharge. Must simultaneously score the amount (1, 2, or 3). Scoring is based on the naris with the most severe level of discharge.

1 - Moisture present around one or both nares.

2 - Discharge coming out of at least one of the nares, but not running far from the nares themselves.

3 - Discharge coming from at least one naris that is running down the beak.

Unknown - If the tortoise's behavior prevents you from examining the nares, continue processing and collecting data. Attempt to score the nares one more time before leaving the location, but do not manipulate the tortoise to attempt the examination.

Existing Tag

For live tortoises, the possibilities are that the tortoise definitely has an existing tag (you have been able to handle the tortoise, see it in the open, or have a clear view of the tag on the tortoise in a burrow), or that you know the tortoise definitely does not have an existing tag (you have been able to handle the tortoise or see it in the open), or the tag exists but is unreadable ("U/R"; ultraviolet can for instance darken tags), or you can't see the entire tortoise, cannot handle it, and you can't confirm that the invisible portions are tag-less.

FW- tag numbers are recorded without hyphens. All other tag numbers are recorded as they appear.

Existing Tag Color

Other Tag Color

If any tag is present, it is likely to be blue, white, or green. Otherwise, use "Other tag color" and spell it out!

Tortoise_not_handled because

If any fields are left blank, your QAQC specialist will interview you to attempt to fill in information. If you can instead use one of the pick list provided here, or can clearly describe a different situation that prevented handling of the tortoise, then the extra follow-up work will be avoided.

deep in burrow	Tortoises should only be extracted from burrows if the animal does not struggle or become agitated
scutes too small	This situation would preclude affixing a tag
social interaction	Tortoises that are courting, mating, in combat, or other social interactions should not be disturbed
research area	Transmittered animals or others under behavioral observation in designated areas should not be approached
temperature	
no permit	If handling permits for a given state or protected area have not been received, do not handle animals there
other	Use this option to describe another situation, or to retract an entry under this field

Photo_tort

Photo comment

If you take a photo of the tortoise, whether taken as part of this subform or no, indicate "Yes."

Use the photo to capture pictures of cooperative tortoises if desired, or of nares or body condition features to clarify scoring. In the latter cases, use the comment field to communicate your intent to the viewer. If the photo was not taken as part of this subform, provide the label assigned by the Juno in the comment. If the photo instead was integrated in the subform, you will not be provided with a photo name and should not fill in the latter field.

Desert Tortoise Distance Sampling **Transect Form (OppCarcObs)**

Tran Num:		Stratum:		Team Num:		Date:	2012

Opp Carc #		Sex:	M F Unk	Other Tag Color:		Photo_Carc:	Yes	No	
		Existing Tag:	Yes No U/R	Easting:		*Comments*:			
Carc Condition:	Intact D/A	ET Number:		Northing:					
MCL>180?	Yes No Unk	Existing Tag Color:	Blue White Green	UTM Zone:	11 12				
MCL (mm):		Other Tag Color:		GPS grab valid?	Yes No				

Comments:

Tran Num

Opportunistic carcasses must be associated with a transect. Once you have closed out your transects (for instance when camping later that day), you may process the tortoise, but will have to reopen the corresponding transect record and add the data to the appropriate paper and electronic forms.

Opp Carc #

Remains of a tortoise are recorded as a carcass if at least half of the shell (plastron and carapace) are present. For each transect, restart numbering sequentially from 1.

Carcass condition

These definitions are project specific. You may have used other definitions, but for us, if the MCL can be measured, the tortoise is "intact," regardless of how much has fallen off or whether carapace and plastron are attached. Otherwise it is "disarticulated."

Desert Tortoise Distance Sampling Transect Form (OppLiveObs)

Team Num: | Date: 2012 | Stratum: | Trans Num:

Opp Live #		Sex:	M F Unk	Ticks:	0 1-10 >10 Unk	Easting:	
Time:	am / pm	MCL≥180?	Y N Unk	Tortoise Void	None Urine Feces Both	Northing:	
Tortoise location:		MCL (mm):		Tort not handled b/c:		UTM Zone:	11 12
Burrow Pallet Open Vegetation Rock		**Body condition score:**					
Burrow Visibility:	H M L	Under Acceptable Over		Existing Tag:	Y N U/R Unk	GPS grab valid?:	Yes No
Tort in Burrow Visibility:	H M L	2 3 4 5 6 7 8 9 Ur		ET Number:			
Tortoise visibility	H M L	**Nares appearance:**		Existing Tag Color:	Blue White Green	**Photo taken:**	Yes No
Temperature:	°C	Normal Asymmetrical Eroded Occluded Unk		Other Tag Color:		*Comment:*	
Temp > 35?:	Yes No	**Nares discharge:**		New Tag Attached?	Yes No		
		None Serous 1 2 3 Mucous 1 2 3 Unk		New Tag Number:	FW		

Comments:

Trans Num

Opportunistic tortoises must be associated with a transect. Once you have closed out your transects (for instance when camping later that day), you may process the tortoise, but will have to reopen the corresponding transect record and add the data to the appropriate paper and electronic forms.

Opp Live #

For each transect, restart numbering sequentially from 1.