Technical Report

Guide to the Roadside Vegetation Survey Methodology in South Australia

GIS Data Entry, Editing and Display

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GUIDE TO THE ROADSIDE VEGETATION SURVEY METHODOLOGY IN SOUTH AUSTRALIA

GIS DATA ENTRY, EDITING AND DISPLAY

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ENVIRONMENTAL &
SOCIO-ECONOMIC

DATABASES

CONTENTS

1. INTRODUCTION

This GIS technical manual outlines the method by which the roadside survey data (collected using the methodology outlined in the *Guide to the Roadside Vegetation Survey Methodology for South Australia*, (Stokes, Heard, Reynolds and Carruthers 1998)) is transferred into ARC/INFO, using the dynamic segmentation module. This manual has been written specifically for the GIS technicians inputting the roadside survey data and outlines the methods for GIS input and spatial display of the data collected using the *Roadside Vegetation Survey Methodology* .

The main commands used to convert the surveyed roadside data into ARC/INFO routes and to display them spatially are given. Checking methods to ensure that the spatial data has been verified are also outlined.

The roadside survey methodology is comprised of two aspects of data collection. These are the collection of the attribute data and the collection of the spatial component. The attribute component of the data collection is stored in an Oracle database that has been designed especially for storing data collected using the roadside survey methodology. The spatial component discussed here is the designation of roads, for which survey data has been collected, as routes through which the attribute data from Oracle can be displayed.

Dynamic Segmentation

The GIS methodology uses ARC/INFO's dynamic segmentation module that allows rapid data conversion of large amounts of linear spatial data into GIS format. It provides an outward appearance of the traditional arc/attribute type data storage and display, while not requiring the time and labour intensive GIS data entry that is normally required.

Using tripmeter readings from a vehicle odometer, the segments of information collected during a survey can be linked back to the digital coverage for which they correspond with very little arc editing. Roads surveyed are noted and converted to routes in a route system. The routes are 'fitted' to the digital coverage using a few collected points of distance recorded information, which are referred to here as calibration points.

The two spatial components necessary for the conversion of the survey attribute data to be displayed spatially are:

Routes - these are marked and labelled on the paper maps in the field in the order they are surveyed; and
Calibration Points- these are marked and labelled on the paper maps in the field as their positions and tripmeter measurements are recorded.

Using this manual

This manual is a guide for using the dynamic segmentation module for creating routes and displaying them. A working knowledge of ARC/INFO is considered necessary to be able to use this guide effectively. It is not a complete step by step manual for non expert users. The manual is not a replacement of the ARC/INFO online help on the dynamic segmentation module but a guide to its application for use with the roadside survey methodology developed for South Australia.

2. FIELD DATA COLLECTION

2.1 Routes

During the roadside survey information is marked onto 1:50,000 or 1:10,000 standard topographic base maps showing roads and towns. Separate maps showing landcover and other vegetation information can be provided for reference.

- At the start of a road to be surveyed the car tripmeter is reset to 0 and the corresponding start point is marked on the paper map with an X and with the word Start.
- Each road surveyed is numbered sequentially.
- A route only finishes when the surveyor decides ie. one route can cover many roads.
- As the road is driven along the tripmeter is used to record where each new segment of data occurs such as where the changes in vegetation cover occur that warrant a new segment of data.
- Only one pass of the road is done.
- The left and right segments have the same starting and finishing trimeter readings and are observed and recorded concurrently.
- A change in the segment on either side of the road will mean a new segment must be recorded.
- 100m is the minimum segment length (there are some exceptions to this).
- At end of the route being surveyed the corresponding point on the paper map is marked with an X and with the word END.

An example of a field survey data sheets is provided in Appendix I.

2.2 Calibration Points

The length of the digital arc or road, and the actual length of the road measured using the car tripmeter will rarely match exactly. For example, the length of the digital arc might equal 10.65km where the tripmeter measurement might equal 10.00km. In addition to this, the roadside data collected during the survey needs to be positioned relative to other known land marks. For example, data collected on road bends needs to be displayed on a map as occurring on that bend. If the tripmeter and the arc measures are not synchronised the data that should display as occurring on the bend may be displayed on a different section of road. Hence the arcs need to be calibrated to 'fit' the tripmeter readings collected.

Calibration points and their tripmeter readings are therefore need to be collected along the roads being surveyed in order to provide relative accuracy for the positioning of the collected segment data.

This is done by marking any points on the paper map that the can be positively identified, both on the ground and on the maps, such as cross roads, driveway etc and recording their tripmeter readings on a data sheet. These points are noted on the map by using an X and are numbered sequentially to correspond with the information recorded on the data sheet. An example of a calibration point data sheet with survey data is given in Table 1. An example of the actual field data collection sheet is provided in Appendix I.

Table 1: Example of calibration point data sheet with survey data

Road No.	Calibration Point No.	Tripmeter
1	0	0
1	1	1.48
1	2	6.99
1	3	7.69
1	4	10.80
1	5	21.90
1	6	30.6
END		

3. GIS CONVERSION OF SURVEY DATA

The main steps are:
1. Create a routes coverage from an existing road coverage for the roads surveyed.
2. Create a points coverage showing the calibration points collected in the field.
3. Check the routes for correct route name and direction.
4. Calibrate the routes.
5. Check the calibrated routes.
6. Convert the routestats table measure to kilometres.
7. Display the attribute data stored in ORACLE spatially.

3.1 Creating The Routes

An existing roads coverage is used as a source for the routes coverage.

Clip the roads coverage to the extent of the survey, select out the arcs representing the roads surveyed to create a line coverage called rsv. This line coverage is used to create the routes.

On completion the route system for the survey is appended to the coverage containing route systems from previous surveys.

Create a route system

A route system is created in which all the route information is stored.

In order to do this an item ROADNO is added to the line coverage RSV.

ROADNO is the item which stores the survey and road number information .

The items on the line coverage RSV, which is to be used to create the route system, should look something like the items listed below.

Arc: items RSV.AAT

COLUMN	ITEM NAME	WIDTH INPUT	WIDTH OUTPUT	TYPE	N.DEC
1	FNODE#	4	5	B	
5	TNODE#	4	5	B	
9	LPOLY#	4	5	B	
13	RPOLY#	4	5	B	
17	LENGTH	4	12	F	3
21	RSV#	4	5	B	
25	RSV-ID	4	5	B	
29	AS2482	5	5	I	
34	ROADNO	8	8	C	
29	STANDARD	4	4	I	

The arcs that are to be grouped together to form a route need to be checked to ensure that they have no breaks between them. This can be done in Arcedit by using the de arc node dangle command in Arcedit. Join arcs where there are unwanted breaks. Using the Arcedit SEL PATH command is useful to make sure small arcs aren't missed when selecting the arcs that make up a particular route.

The arcs corresponding to the roads surveyed need to be coded. For example the first road surveyed in survey R1 will have arcs coded as R1-1 for the ROADNO item, the second road will have arcs coded as R2-2 etc. Where the end of a route does not correspond to the end of an arc ie where the end of the route has no corresponding node point, the arc will need to be split prior to coding the arc with the appropriate ROADNO code.

To create the route system and the routes the **ARCROUTE** command is used.

This command groups arcs into individual routes based on a specified AAT item which in this case is the ROADNO item. For example ROADNO item will contain the coding R1-1, R1-2 where R1 refers to the survey number and -1 refers to the road survey order. Once all the surveyed roads have been coded with the appropriate information the ARCROUTE command can be used. In this example *rsv* is the name of the line coverage the routes are created on and *rsveg* is the name of the route system that the routes will be stored within.

ARCROUTE <in cover> <out route system> {in route item} {route measure item}
route item = roadno
eg.
ARCROUTE rsv rsveg roadno # # LL noblank

3.2 Checking The Routes

Check arcs in ARCEDIT for direction and breaks.

Arcedit: ec rsv

Arcedit: ef route.rsveg
Arcedit: de route.rsveg arrow
Arcedit: draw

There should be only one route for each *ROADNO* value. If there are multiples of any particular route it means that there is a break in the arcs selected for that route. This will require editing in arcedit. Routes will then need to be recreated once the breaks have been removed.

Before recreating the routes it is necessary to use the dropfeatures command to clear routes from the RAT and SEC.

Arc: DROPFEATURES rsveg route.rsveg geometry
Arc: DROPFEATURES rsv section.rsveg geometry
Arc: BUILD rsv line
Arc: ARCROUTE rsv rsveg roadno # # LL noblank
If only one route needs to be fixed use the MAKEROUTE command.

Route Direction

If route arrows indicate the routes are starting from the wrong end then routes need to be flipped.

Use FLIP to change the routes in Arcedit to be facing in the same direction as the data was collected.

Arcedit: ef route.rsveg
Arcedit: de route.rsveg arrow
Arcedit: SEL
Arcedit FLIP
Arcedit: draw

3.3 Calibrating Routes

Create the point coverage from the field calibration points

Digitise the calibration points from the field maps and attach the tripmeter information.

Create an empty point coverage with the survey name as unique name eg R1 or R2 etc.
Arc: create calib_pts rsv
Arc: additems : ROADNO 8 8 C (the road no eg R1-1)
             POINTNO 2 2 I   (order of the calibration points collected)
           ODOM-KM 8 8 F 2   (the distance reading in kms)
           ODOM-METERS 6 6 I (the distance in metres)

Add the points in ARCEDIT using the rsv cover as a background snap cover (snapfeature label to node)

Example of the pat file of the calib_pts coverage
Arc: list calib_pts.pat

```
                        1
        AREA          =    0.000
        PERIMETER     =    0.000
        CALIB_PTS#    =    1
        CALIB_PTS-ID  =    6
        ROADNO        =    R1-1
        POINTNO       =    0
        ODOM-KM       =    0.00
        ODOM-METERS   =    0
                        2
        AREA          =    0.000
        PERIMETER     =    0.000
        CALIB_PTS#    =    2
        CALIB_PTS-ID  =    8
        ROADNO        =    R1-1
        POINTNO       =    1
        ODOM-KM       =    1.48
        ODOM-METERS   =    1480
```

Once the tripmeter information has been added to the calib_pts coverage calculate the readings to be in metres for use in the CALIBRATEROUTES command.

CALIBRATEROUTES - creates an internal table that records the adjustments made by the CALIBRATEROUTES command.

The arcs are calibrated to 'fit' the tripmeter readings collected ie data collected on road bends will then display on the road bends.

In order to check that the calibration occurs correctly create a routestats table for the non calibrated arcs before cdalibrating the routes..

arc: ROUTESTATS rsv rsveg origrsveg.routestats

ROUTESTATS - can be used to check that there are no obvious errors in the calibration points

ROUTESTATS - provides information on the routes regarding start distance and end distance (in metres).

Original routestats (pre calibration)

ARC: ROUTESTATS <cover> <route_system> <routestats_file_name>
Arc: ROUTESTATS rsv rsveg origrsveg.routestats

Arc: list origrsveg.routestats

Rsveg#	ARCLENGTH	MEASURELENGH	LOWMEASURE	HIGHMEASURE
1	47,425.410	47,425.410	0.000	47,425.410
2	19,376.950	19,376.950	0.000	19,376.950
3	22,056.360	22,056.360	0.000	22,056.360
4	7,827.050	7,827.050	0.000	7,827.050
5	35,486.960	35,486.950	0.000	35,486.950
6	19,228.230	19,228.230	0.000	19,228.230
7	21,146.740	21,146.740	0.000	21,146.740
8	49,858.860	49,858.870	0.000	49,858.870
9	43,118.320	43,118.320	0.000	43,118.320
10	25,227.890	25,227.900	0.000	25,227.900
11	9,974.821	9,974.822	0.000	9,974.822

Check that routes (not the arcs) are facing in correct direction and have correct roadnames assigned to the routes.

arc: CALIBRATEROUTES <cover> <route_system> <calibrate_cover> {route_item} {measure_item} {tolerance} {NOSPLIT | SPLIT} { FULL | PARTIAL}
arc: CALIBRATEROUTES rsv rsveg calib_pts roadno odom-meters 5 nosplit full
   (note: the 5 in the calibrateroutes command is a tolerance of 5 meters in case calibration points are not snapped exactly to nodes in the routes coverage rsv. This distance can be varied as needed)

Redo the ROUTESTATS for the newly calibrated routes
eg
Arc: ROUTESTATS rsv rsveg rsveg.routestats

The routestats tables for the routes before and after calibration are shown below. Note the difference between the original measurelengths of the arcs before and after calibration. Table 2 shows the calibration point survey sheet filled out in the field. Note the tripmeter recordings for the ends of the surveyed roads and how these compare with the calibrated routestats table.

Original routestats - Before calibration

Arc: list origrsveg.routestats

Rsveg#	ARCLENGTH	MEASURELENGTH	LOWMEASURE	HIGHMEASURE
1	47,425.410	47,425.410	0.000	47,425.410
2	19,376.950	19,376.950	0.000	19,376.950
3	22,056.360	22,056.360	0.000	22,056.360
4	7,827.050	7,827.050	0.000	7,827.050
5	35,486.960	35,486.950	0.000	35,486.950
6	19,228.230	19,228.230	0.000	19,228.230
7	21,146.740	21,146.740	0.000	21,146.740
8	49,858.860	49,858.870	0.000	49,858.870
9	43,118.320	43,118.320	0.000	43,118.320
10	25,227.890	25,227.900	0.000	25,227.900
11	9,974.821	9,974.822	0.000	9,974.822

After Callibration

Arc list rsveg.routestats

Rsveg#	ARCLENGTH	MEASURELENGH	LOWMEASURE	HIGHMEASURE
1	47,425.410	48,350.000	0.000	48,350.000
2	19,376.950	19,780.000	0.000	19,780.000
3	22,056.360	22,570.000	0.000	22,570.000
4	7,827.050	7,890.000	0.000	7,890.000
5	35,486.960	36,300.000	0.000	36,300.000
6	19,228.230	19,680.000	0.000	19,680.000
7	21,146.740	21,580.000	0.000	21,580.000
8	49,858.860	51,100.000	0.000	51,100.000
9	43,118.320	44,140.000	0.000	44,140.000
10	25,227.890	25,910.000	0.000	25,910.000
11	9,974.821	10,180.000	0.000	10,180.000

When dealing with a large number of routes use the arc JOINITEM command to add the ROADNO item to the routestats to make it easier to check for errors in the routes.

Arc: joinitem rsveg.routestats rsveg.ratrsveg rsveg.routestats rsveg#

Table 2: Example of completed callibration point data sheet

Matching Rsveg# no from routestats table	Road No.	Point No.	Tripmeter	
1	1	1	0	
1	1	2	1.48	
1	1	3	6.99	
1	1	4	7.69	
1	1	5	10.80	
1	etc	etc		
1	etc	etc		
1	1	10	38.90	
1	1	11	48.35	**note the measurelength for this arc before and after calibration**
	END			
5	3	1	0	
5	3	2	0.56	
5	3	3	2.31	
5	3	4	5.6	
5	3	5	9.99	
5	3	6	11.55	
5	3	7	12.86	
5	3	8	19.55	
5	etc	etc	etc	
5	etc	etc	etc	
5	3	11	25.9	
5	3	12	36.3	**note the measurelength for this arc before and after calibration**
	END			

Compare the calibrated routestats measurelength readings to the original calibration point distance recordings to check for errors. Errors will be obvious where the startmeasure are no longer 0 or where the measurelengths don't match the final road length as defined by the tripmeter.

Problems with the calibration for individual routes

Some common calibration problems are shown in the routestats table below;

Rsveg#	ARCLENGTH	MEASURELENGH	LOWMEASURE	HIGHMEASURE
1	47,425.410	48,350.000	0.000	48,350.000
2	19,376.950	19,780.000	0.000	19,780.000
3	22,056.360	22,570.000	**-12.250**	22,570.000
4	7,827.050	7,890.000	0.000	7,890.000
5	35,486.960	36,300.000	0.000	36,300.000
6	19,228.230	19,680.000	0.000	19,680.000
7	21,146.740	**21575.753**	0.000	**21,575.753**
8	49,858.860	51,100.000	0.000	51,100.000
9	43,118.320	44,140.000	0.000	44,140.000
10	25,227.890	25,910.000	0.000	25,910.000
11	9,974.821	10,180.000	0.000	10,180.000

If LOWMEASURE doesn't read 0.000 it probably means that the calibration point isn't positioned close enough to the node at the start of the route (or that the wrong number has been entered in the item odom-meters in the coverage calib_pts).

If HIGHMEASURE doesn't read the final odometer reading for the particular route then the problem will again probably be incorrect placement of the calibration point.

To correct these problems check and edit the coverage calib_pts with rsv as a back coverage, then redo the routestats.

If there are still problems with calibration of some routes they can be individually recalibrated using the REMEASURE command in ARCEDIT. Make sure the remeasure is always done between consecutive calibration points.

Arcedit : ef route.rsveg
Arcedit : sel (select section for which the measures are to be recalculated).
Then use remeasure command along with the start and end measure.
Arcedit: REMEASURE <start_measure_item> <end_measure_item> {MEASURE | LENGTH}
eg. Arcedit remeasure 0 1300 (where 0 is the odometer reading in meters at the first calibration point and 1300 is the odometer reading at the next calibration point.)

Converting the routestats table measures from metres to kilometres

Add two items FIRST and LAST to the routestats table and then calculate the values in kilometres.

```
eg
INFO
ARC
SEL RSVEG.ROUTESTATS
CALC FIRST = LOWMEASURE
CALC LAST = HIGMEASURE / 1000
Q STOP
```

Map 1 shows an example of the routes, route names (ROADNO) start end and calibration points for some survey data that has been collected and entered using the method described above.

3.4 Attribute Data - Oracle

The attribute information is stored in an Oracle database that has been designed for this survey methodology.

There are a series of tables and views which store or point to the data in Oracle.

The data stored in oracle is copied into INFO tables using the dbmstool commands.

Various information can be taken out from the views and tables in Oracle
eg.

DBMSINFO ORÁCLE RVVSURVEY RVSURVEY.DAT DEFINE
where
RVVSURVEY is the name of the view in Oracle
RVSURVEY.DAT is the name of the INFO file that the data from the Oracle view is being copied to
DEFINE indicates that each attribute item will be defined for storage in INFO.

ROADNO ROADNO 8 8 C
ODOMETERSTART ODOMETERSTART 6 6 I
ODOMETERFINISH ODOMETERFINISH 6 6 I
SIDE SIDE 1 1 C

Optional items (data) eg.

DOMINANTSP DOMINANTSP 25 25 C
STRTYPE STRTYPE 2 2 C

All attribute data is displayed using the **ROADNO, ODOMETERSTART, ODOMETERFINISH** and **SIDE** items as the minimum required items for any table or view retrieved from Oracle.

The item ROADNO extracted from the Oracle database has been derived from the Oracle items SURVEYNO and ROADORDER data. Eg SURVEYNO = R1, ROADORDER = 1 therefore ROADNO = R1-1, this then corresponds to the route names in ARC/INFO.

3.5 Plotting

Plotting Route Data

To plot the actual route data use the arcplot commands of routelines, routetext and routehatch.

Plot routes with ROADNO (eg R1-1) as text and 0 and end distances for checking along with arrow showing direction of the routes.

ARCPLOT commands for drawing routes and associated text and direction
ROUTELINES
ROUTETEXT
ROUTEHATCH
An example of some of the Arcplot commands is given in Table 3.

Table 3: Part of an ARCPLOT routine for plotting routes with 0 and end distances and direction

```
Arcplot
/**setup relate for general plotting between the routestats table and coverage
relate add
R1
<path>/rsveg.routestats
info
RSVEG#
RSVEG#
ordered
rw
:
:
relate save R1

/*******
/*place a 0 at beginning of routes to indicate the start
/*eg route system is rsveg
/* cover is rsv

/*relate for plotting text
relate restore R1

/* 0 and end measures
routeendtext rsv rsveg R1//last # -0.15 # # # end
/* start text
routeendtext rsv rsveg R1//first # # # # # start

/*place routename along the arc
routelines rsv rsveg
routetext rsv rsveg roadno

/*arrows
markerset usgs.mrk
routehatch rsv rsveg  .2 2500 0 101 # .02 #### center # # marker
```

Plotting Associated Attribute Data

Set up a relate environment between the info file from Oracle and the Route system and its coverage. For routes this is done using the **EVENTSOURCE** command.

This sets up a relate between the info file containing the attribute data from Oracle and the coverage containing the routes.

EVENTSOURCE add <LINEAR | CONTINUOUS | POINT> <source_name> <table_name>
{database} {relate_type} {route_key_item} {event_key_item} {measure_item} {measure_item}

Arc: EVENTSOURCE drop $all
Arc: EVENTSOURCE add linear alldat rvsurvey.dat info ordered roadno survey odometerstart odometerfinish
Arc: EVENTSOURCE list

where
alldat is the name of the EVENTSOURCE.
rvsurvey.dat is the name of the info file containing the oracle data.
roadno is the name of the route name.
odometerstart is the name of the start distance reading for each segment.
odometerfinish is the name of the finish distance reading for each segment.

ARCPLOT
ROUTELINES - to plot the routes
EVENTLINES - to plot the data from the attribute tables

In the following example these commands in ARCPLOT are reselecting from the rvsurvey.dat info file the information for the right side of the road and then reselecting for the species *Eucalyptus leucoxylon* and then drawing up the segments of the routes that fit this reselect statement.
Note the use of the EVENTSOURCE alldat in the EVENTLINES command to relate the info file containing the oracle data with the coverage containing the routes.

Arcplot: reselect rvsurvey.dat info side = 'R'
Arcplot: reselect rvsurvey.dat info DOMINANTSP cn 'Euc leu'
Arcplot: EVENTLINES rs_veg rsveg alldat 302 # -0.06

Map 1

ROADS SURVEYED
Upper South East Roadside Vegetation Survey

KEITH

D C TATIARA

BORDERTOWN

R1-7

R1-3

R1-6

R1-1

R1-4

PADTHAWAY

R1-5

R1-11

R1-8

R1-10

R1-9

NARACOORTE

LUCINDALE

0.00

22.57

SOUTH AUSTRALIA

Scale 1:150000
0   10km

Government of South Australia

DATABASES

3.6 ARC Map Library

Routes

The coverage with the routes is stored in the Arc Library as a map library coverage. All routes and associated attribute information can be viewed spatially using the appropriate ARCPLOT commands for library layers.

The library layer containing the routes is called *RSV* and has the following item definition

ROADNO 8 8 C

The layer is a routes coverage consisting only of roads surveyed ie. it is not part of an existing roads layer. As more surveys are completed the *RSV* layer will contain more routes.

As new roadside surveys are completed the route coverage can be extracted from the library, the new routes appended to the existing layer and the updated layer then replaces the existing library layer.

Calibration Points

The points coverages used to calibrate the routes are stored in a separate library layer called *CALIB_PTS*. This layer has the following item definitions

ROADNO 8 8 C
POINTNO 2 2 I
ODOM-KM 8 8 F 2
ODOM-METERS 6 6 I

As new roadside surveys are completed the calibration coverage can be extracted from the library, the new calibration points are added and the updated layer then replaces the existing library layer.

3.7 Conversion for ArcView

It is possible to convert the info file containing the attribute data from Oracle and the route system and routes into an arc/attribute coverage. This creates a GIS coverage where every segment of data is represented by an arc. Each arc has coded items for each item existing in the event table that the coverage. This is done using the EVENTARC command at the arc prompt. An EVENTSOURCE must first be established.

EVENTARC - converts segments into arcs with all attribute information.

Arc: EVENTARC <in_cover> <in_route_system> <event_source> <out_cover> # # #
Arc: EVENTARC rsv rsveg alldat roads
This coverage 'roads' is now an arc attribute cover with all the information for each left and right segment converted to arcs. It can also be viewed in ArcView.

4. NEXT SURVEY

The method for creating new routes is the same as for the initial route system creation.

The additional routes are then appended to existing routes coverage in the ARC/INFO map library.

VERY IMPORTANT - the ids for all routes must be unique for the append to work correctly ! The ids for each new survey need to be recalculated so that they are different from route ids that already exist in the library layer.

Extract entire map library routes coverage
Use the Frequency command at the ARC prompt to determine the last used –id

```
ARC:
frequency rsv.ratrsveg rsveg.frq
rsveg-id
end
end
```

ARC: list rsveg.frq rsveg-id

eg last rsveg-id number = 100 then

add 10 to the last used –id number (in this case 100) and add this total to all the –id of the routes coverage to be appended to this existing library layer. This will ensure all surveys have unique ids.
 eg   100 + 10 = 110

```
In arcedit,
ef route.rsveg
select all the routes for survey 6 and
CALC $ID = $RECNO + 110
```

The survey numbers differentiate with which survey the routes are associated.   For example, R1 roads contain information about survey R1, R2 roads contain information about survey R2. The ROADNO values for these roads will be R1-1, R1-2 etc and R2-1, R2-2 etc respectively.

Once all the route checking and calibrating has been done and routes are complete and correct the last step is to extract the layers RSV and CALIB_PTS for previous surveys from the library and append the new survey, making sure the ids are unique as noted above.

Arc: append rsv line,route.rsveg all

 Enter the 1st coverage: rsv   (the coverage extracted from the library)
 Enter the 2nd coverage: /r6/rsv   (the new coverage for survey 6)

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Arc: append calib_pts point all

Enter the 1st coverage: calib_pts   (the coverage extracted from the library)
Enter the 2nd coverage: /r6/calib_pts (the new coverage for survey 6)

5. BUGS

The following are ARC/INFO bugs found in the course of using the dynamic segmentation module. These have been submitted to ESRI.

GROUPBY

The GROUPBY command doesn't work on routes being plotted using ARCPLOT from the ARC map library.
This affects the drawing of route names alongside routes that cover more than one library tile boundary.

PLOTTING OF EVENT INFO FROM THE APPENDED COVERAGE

Once the routes have been appended into one coverage, the event items being displayed from ARCPLOT appear to be generalised in some cases ie. they no longer 'fit' the display the way they did prior to being appended to this coverage. Changing the weed tolerance has no affect on this plotting command. This is particularly evident in routes that contain lots of curves or corners

eg. eventlines <coverage> <routes> <eventsource> # offset
eg. eventlines rsv rsveg alldat associatnr # -0.05

6. REFERENCES

Stokes, A.L., Heard L.M.B., Reynolds T., and Carruthers S. (1998). *Guide to the Roadside Vegetation Survey Methodology for South Australia.* Information and Data Analysis Branch, Planning SA and Environmental Unit, Planning SA. Department for Transport Urban Planning and the Arts.

APPENDIX I

Source of Appendix:
Stokes, A.L., Heard L.M.B., Reynolds T., and Carruthers S. (1998). *Guide to the Roadside Vegetation Survey Methodology for South Australia.*

ROADSIDE VEGETATION SURVEY - CALIBRATION SHEET

Survey No. [ ][ ][ ]　　Sheet [ ] of [ ]　　Observers [ ][ ][ ][ ][ ][ ][ ][ ][ ]
(3 initials)

Road No.	Point No.	Tripmeter	Location Description (optional)

Road No.	Point No.	Tripmeter	Location Description (optional)

ROADSIDE VEGETATION SURVEY

Survey No. ☐☐☐   Road Order ☐☐☐☐

Date ☐☐ ☐☐ ☐☐☐   Observers (3 initials) ☐☐☐ ☐☐☐☐ ☐☐☐   Sheet ☐ of ☐   Data Entrant (3 initials) (Office use only) ☐☐☐
DD MM YY

Road Name ☐   Road Type ☐☐☐☐   TSA Road No. RN ☐☐☐☐☐☐

Segment	Tripmeter (end of segment reading only)	Surface	Side	Width *WID-	Vegetation Association Description							Understorey species (Optional) *UND-					Condition of Understorey *CON-			Major alien species *ALI-					Disturbances *DIS-			*BUS- *REF- *REH- *REV- *RSS- Potential Site	*EME- Emergent species	Comments (use appropriate code prefixes for datasheet items, for additional comments use codes on Definition sheet) eg *DIS-
					*DOM- Overstorey			*STR-		*UND-																				
					Dominant species 1	Dominant Species 2	Dominant Species 3	Structural type	Density/ Distribution	Understorey type 1	Understorey type 2	Species 1	Species 2	Species 3	Species 4	Species 5	Overview	Minimum	Maximum	Species 1	Species 2	Species 3	Species 4	Species 5	Disturbance 1	Disturbance 2	Disturbance 3			
1			L																											
			R																											
2			L																											
			R																											
3			L																											
			R																											
4			L																											
			R																											
5			L																											
			R																											
6			L																											
			R																											
7			L																											
			R																											
8			L																											
			R																											
9			L																											
			R																											

TRANSPORT SA   BIOLOGICAL SURVEY SOUTH AUSTRALIA   DATA BASES

CODES & DEFINITION SHEET FOR THE ROADSIDE VEGETATION SURVEY

Roadtype

AVE	Avenue
CRES	Crescent
CT	Court
DR	Drive
HWY	Highway
LANE	Lane
PDE	Parade
RD	Road
ST	Street
TCE	Terrace
TRAC	Track

Width

A	0-6m
B	6-15m
C	>15m

Structural type

F	Forest
W	Woodland
K	Mallee
S	Shrubland
P	Mat plants
H	Hummock grassland
G	Grassland
V	Sedgeland
J	Herbland
X	Fernland
PL	Plantation
BU	Built up
BG	Bare ground

Density/Distribution

C	Continuous	
F	Fragmented	
S	Scattered	

Understorey type

LT	Low Trees
SC	Shrubs - chenopod / semi succulent
SH	Shrubs - heath
SO	Shrubs - other native
SE	Shrubs - exotic (alien)
PN	Mat plants - native
PE	Mat plants - exotic (alien)
H	Hummock grasses
GN	Grasses - native (tussock)
GE	Grasses - exotic (alien)
VN	Sedges - native
VE	Sedges - exotic (alien)
JE	Herbs - exotic (alien)
JN	Herbs - native
X	Ferns
CN	Vines/Climbers/creepers - native
CE	Vines/Climbers/creepers - exotic (alien)
B	Bare ground/litter
XX	Other

Condition of understorey

1	Excellent	Very little or no sign of alien vegetation in the understorey*; resembles probable pre-European condition.
2	Good	High proportion of native species and native cover in the understorey*; reasonable representation of probable pre-European vegetation.
3	Moderate	Substantial invasion of aliens, but native understorey* persists; for example, may be a low proportion of native species and a high native cover, or high proportion of native species and low native cover.
4	Poor	The understorey* consists predominantly of alien species, although a small number of natives persist.
5	Very Poor	The understorey* consists only of alien species.

*Or all strata if upper and lower strata difficult to distinguish

Disturbances

AT	Access track through vegetation	PF	Property frontage
BH	Bee Hives	PI	Pipeline
BN	Burning of vegetation	PL	Plantings
BQ	Borrow /Quarry Pit	PW	Power line
CA	Campsite	RA	Active rabbit warren
CL	Clearing (human influence)	RD	Rubbish Dumping
CR	Coppice regrowth	SL	Slashing
DR	Drains	SP	Stockpile
EA	Earthmoving / earthworks	SR	Spraying
FP	Firebreak-ploughed	TE	Telecommunications easement
FS	Firebreak-slashed	WS	Wayside stop
LP	Lopping		

Potential Site

BUS	Bushcare Site	REV	Revegetation Site
REF	Reference Site	RSS	Roadside Significant site
REH	Rehabilitation Area		

Comment type

ADJ	Adjacent land use
ADM	Administration road issues
ALI	Dominant alien species
BUS	Bushcare site (potential)
CON	Condition of understorey
DIE	Presence of dieback
DIS	Disturbances to roadside corridor
DOM	Dominant species
EME	Emergent species
MIS	Mistletoe infestation
NSP	Noteworthy native plant species
REF	Reference site
REH	Rehabilitation area (potential)
REG	Regenerating native plant species
REV	Revegetation site (potential)
RSD	Roadside and road conditions
RSS	Roadside Significant site (potential)
SED	Seed source
SIG	Plants of conservation significance
STR	Structural type
UND	Understorey structure or species
WID	Roadside width

ROADSIDE VEGETATION SURVEY - SPECIES CODE SHEET

Survey No. ☐☐☐   Sheet ☐ of ☐   Observers ☐☐☐ ☐☐☐ ☐☐☐
(3 initials)

Native Species		Alien Species	
Code	Common name / Scientific name / Voucher number plus field name	Code	Common name / Scientific name / Voucher number plus field name