

Tura Star-hair *Astrotricha* sp. community mapping project

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1. Summary

Astrotricha sp. 5 (syn. *Astrotricha* sp. *Wallagaraugh River*) (Australian National Botanic Gardens, 2013) is an endangered single- or multi-stemmed shrub with a restricted geographic distribution. To enhance the awareness of this species in the south coast area, *Astrotricha* sp. 5 is commonly referred to as 'Tura Star-hair' as the largest population of the species occurs at Tura Beach. There are three known populations in south-east NSW, one in the upper catchment of Wallagaraugh River within the Forest NSW exclusion zones of the Yambulla and Timbillica State Forests and one at Middle Beach (Long Point) east of the Merimbula township. The third and largest population is located along the Sapphire Coast Drive road verge in close proximity to Tura Beach and Bournda National Park (Figure 1). Despite its size, this population is more vulnerable to extinction from vegetation clearing, nutrient enrichment and vehicle damage associated with roadside maintenance and urban development (Scientific Committee, 2007). The number of Tura Star-hair on private property at Tura Beach has been previously estimated for six streets, as 365 individuals (EnviroKey 2012). However, the current extent of the Tura Star-hair population on council and crown tenure has not been determined.

The aim of this study was to map the distribution, relative density and height of Tura Star-hair plants on council and crown tenure in the vicinity of Tura Beach. A simple and rapid method was developed for surveying Tura Star-hair by categorising patches into count classes and height classes using the human body as a height index. Densities of Tura Star-hair were recorded to identify locations that may be considered for protection and conservation of this species. Height was recorded as a proxy for estimating the relative age of Tura Star-hair. The survey method also included an assessment of overstorey canopy cover and recent disturbance history to suggest how these attributes may be related to the occurrence and height of Tura Star-hair. The survey method developed is to be implemented by local residents to increase awareness and promote conservation of this species by residents.

Surveys by the Office of Environment and Heritage South East Region were conducted for five days through September and October, 2013. The result of this survey confirmed the occurrence of Tura Star-hair in low densities at the south end of Bournda National Park, from Widgeram Rd to the coastal escarpment in some instances (Figure 1). Previously undocumented occurrences of Tura Star-hair were recorded in medium densities on council reserve between Golf Circuit and north of the golf course, and in high densities on crown reserve adjacent to the Department of Education land, north of Mirador Drive. Additional observations of Tura Star-hair were recorded in low densities on crown reserve west of Sapphire Coast Drive between the intersection with Red Hill Road and Mandini private property. The occurrence of Tura Star-hair extended up to approximately 700m west of Sapphire Coast Drive (see Figure 11 for further details). No Tura Star-hair plants were recorded on coastal dunes or in areas with high overstorey canopy cover, particularly the high cover associated with tea tree thickets. Tura Star-hair occurred mostly in low densities of approximately 1-10 and 10-50 individuals. A population estimate (density per unit area) was not possible because the survey method did not include a fix area. The most commonly occurring height class was a mixed height (ankle to head height). There was a general trend towards taller height class in the absence of disturbance.

The first community survey day on November 14th, 2013 revealed high densities of Tura Star-hair on a crown reserve between Sapphire Coast Drive and Elizabeth Parade and Golf Circuit. Adjoining easements to the east of this crown reserve also supported moderate densities of Tura Star-hair. Ongoing surveys for Tura Star-hair will be initiated by the community Landcare group and their results will be incorporated with the current data. The outcome of this project will inform Bega Valley Shire Council on the distribution, relative density and relative height (age) of this species for conservation planning in the future.

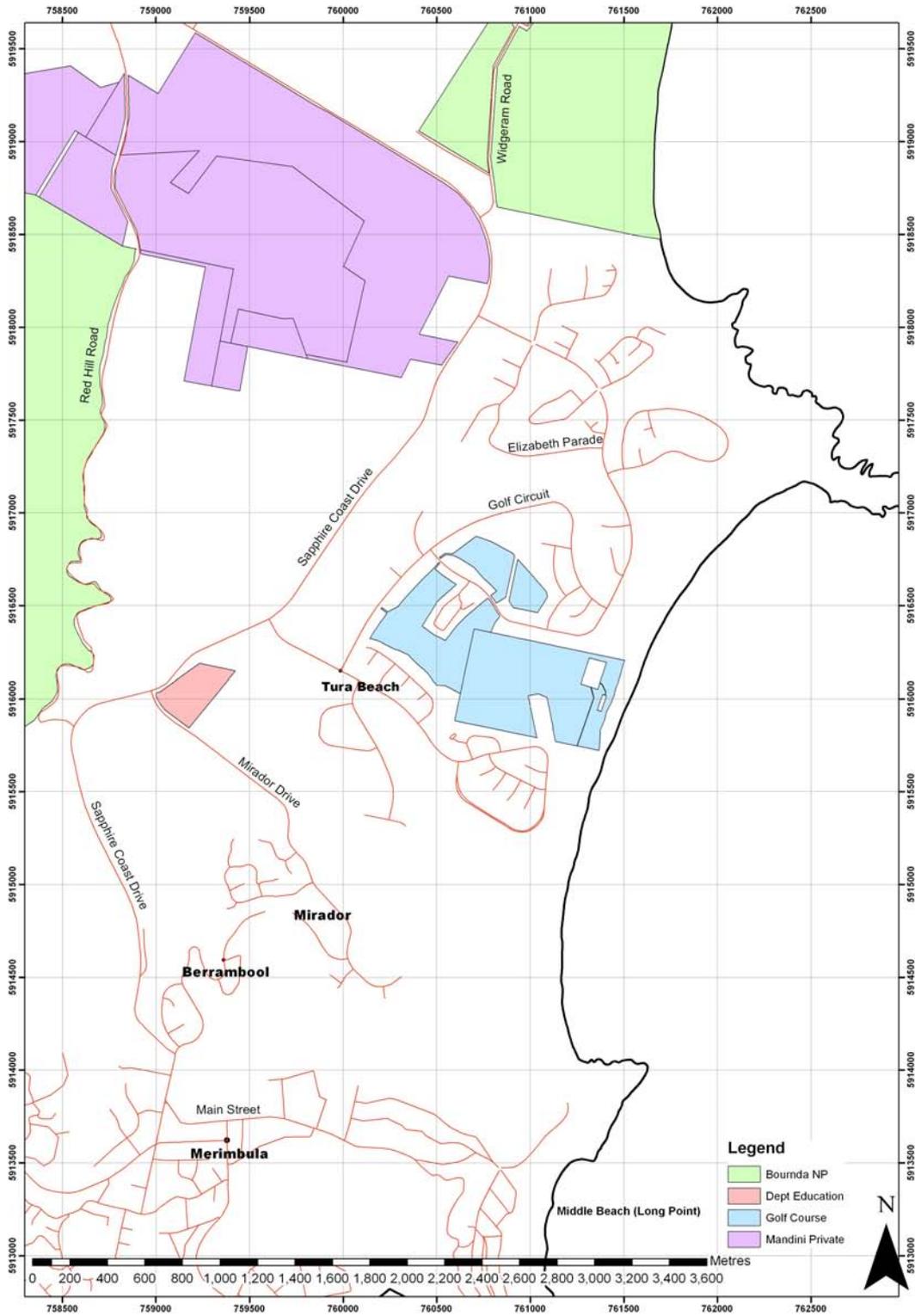


Figure 1 Map of Tura Beach, New South Wales south coast.

2. Method

1. Survey

The boundaries of the land parcel to be surveyed were first established. The number of transects for the time available was determined by the size of the land parcel. Transects covered a representation of the total land parcel area. For small areas (<30ha), transects were spaced at 100 m apart, for large (>30 ha) areas they were placed 500 m apart.

From the edge of the land parcel, a compass bearing of east (90°) or west (270°) was taken for each transect, depending on the start location. Waypoints were taken along the compass bearing every 50 paces or 50 m. A distance of 50 m was beyond the extent that could be seen from the last waypoint. For odd-shaped land parcels, waypoints were spaced about 50 m apart if trending east-west or at the transect width (100 m) if trending mostly north-south (Figure 2).

At each waypoint the surrounding area was surveyed for Tura Star-hair. The survey area was not fixed to allow for rapid assessment. This was done by slowly rotating or pacing in a circular manner around the waypoint (Figure 3). At every waypoint the following information was recorded on the datasheets (Appendix A):

- waypoint northing and easting;
- presence/absence of Tura Star-hair (see 2.2);
- count estimate for the number of individuals in class of 1-10, 10-50, 50-100, >100;
- height estimate of ankle, knee, waist, head, mixed height (Figure 4);
- estimate of overstorey canopy cover above the waypoint (Appendix B); and
- signs of recent fire (burnt tree trunks and regeneration) (Figure 5), easement clearing (reduced biomass, mowing, location on map) or no disturbance.

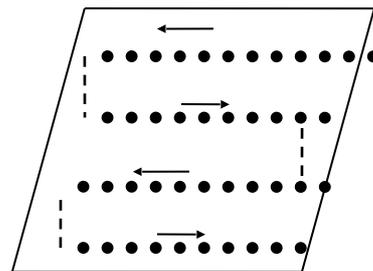


Figure 2 Illustration of transect layout for differing land parcel shapes.

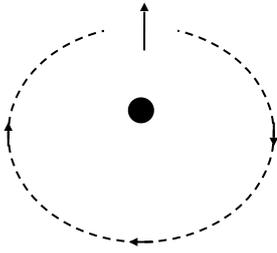
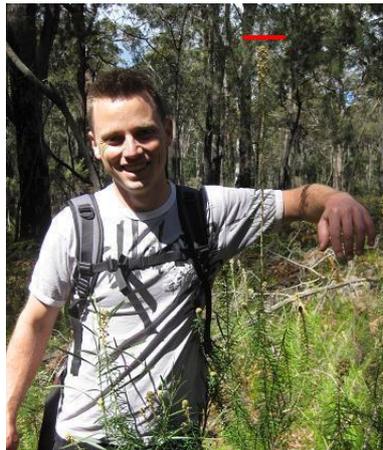


Figure 3 Illustration of survey method for Tura Star-hair at a waypoint.



a)



b)

Figure 4 Tura Star-hair at a) ankle height and b) head height.



Figure 5 Example of recent fire showing burnt trunks and understorey regeneration.

2. Tura Star-hair identification (*The Royal Botanic Gardens and Domain Trust, 2013*)

Astrotricha sp. 5 (syn *Astrotricha* sp. Wallagaraugh River)

Description: single- or multi-stemmed shrub up to 1 m (rarely to 1.8 m) tall, stems more or less erect; branchlets, leaf undersurfaces, and inflorescence axes covered with small stellate hairs (Figure 6).

Leaves: spreading, linear or sometimes broadening a little near the rounded tip, 20–40 mm long (to 60 mm in juveniles) and 1.5–2 mm wide; leaf upper surface convex with conspicuous short wrinkles, these often capped with a small asperity, leaf margin recurved; leaf lower surface densely packed with stellate hairs.

Inflorescence: a loose compound panicle 30–100 (rarely 200) mm long, made up of pedunculate (stalked) umbels; petals 5, pale green those of the terminal umbel slightly darker; stamens 5, stamens caducous.

Fruit: a laterally compressed obovoid schizocarp 3–3.5 mm long, c. 3 mm wide.

Flowering: October–December.



Figure 6 Image of Tura Star-hair with flower buds (S. Goldin).

3. Survey dates and location summaries

On September 23-25th 2013, surveys by Office of Environment and Heritage focused on a broad range of vegetation types that had not been previously surveyed for Tura Star-hair and that would be difficult for the community to survey. The first survey on council reserve between Golf Circuit and north of the golf course presented an opportunity to refine the sampling methodology. Surveys continued on crown reserve west of Sapphire Coast Drive between the intersection with Red Hill Road and Mandini private property.

On October 3-4th, 2013 surveys by the Office of Environment and Heritage focused on Bournda National Park to the north of Tura Beach and crown reserve located adjacent to the Department of Education land, north of Miradoor Drive.

On November 14th, 2013 surveys by local residents with assistance from Office of Environment and Heritage targeted the crown reserve between Sapphire Coast Drive and Elizabeth Parade and Golf Circuit. Surveys continued on two adjoining easements, to the east, north and south of Elizabeth Parade.

The results from all surveys were combined for the following data analysis and mapping.

3. Results

1. Frequency of occurrence, size and density classes

Tura Star-hair plants were recorded at 100 out of all 288 waypoints (35%). The frequency of these records by count class is summarised in Figure 7. Count classes of 1-10 and 10-50 individuals had the greatest number of records. It was not possible to calculate a population estimate per unit area because the sampling method did not include a fixed survey area.

The relationship of the proportion of Tura Star-hair present to the overstorey canopy cover class is given in Figure 8. The proportion of Tura Star-hair was greatest with low and medium overstorey canopy cover. Tura Star-hair did not occur with overstorey canopy cover of 80 to 95 percent, as observed for tea tree thickets.

The frequency of the height classes of Tura Star-hair is given in Figure 9. The mixed class had the greatest number of records suggesting multiple ages of Star-hair. The height class by recent disturbance history (Figure 10) showed a general trend towards taller Tura Star-hair with the absence of disturbance. More accurate fire history data may improve the accuracy of relating Tura Star-hair height and occurrence to recent fire.

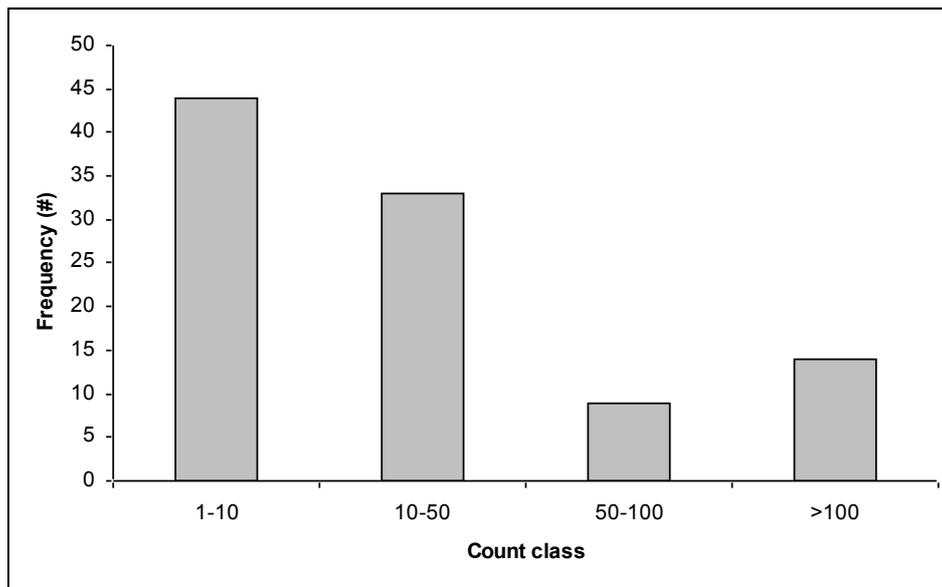


Figure 7 Frequency of Tura Star-hair by count class.

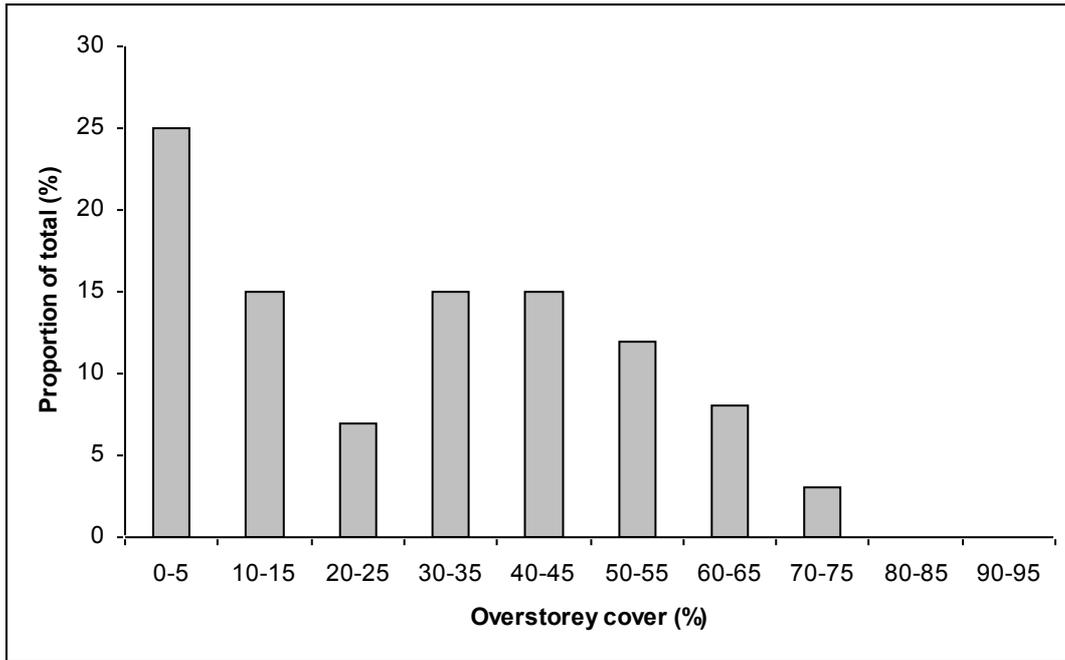


Figure 8 Proportion of Tura Star-hair present by overstorey canopy cover.

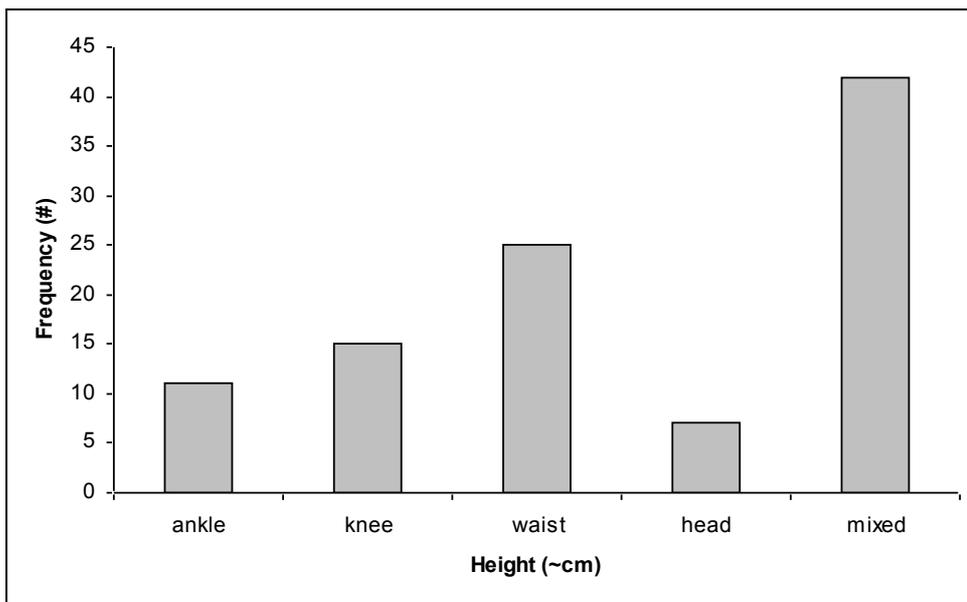


Figure 9 Frequency of Tura Star-hair by height class.

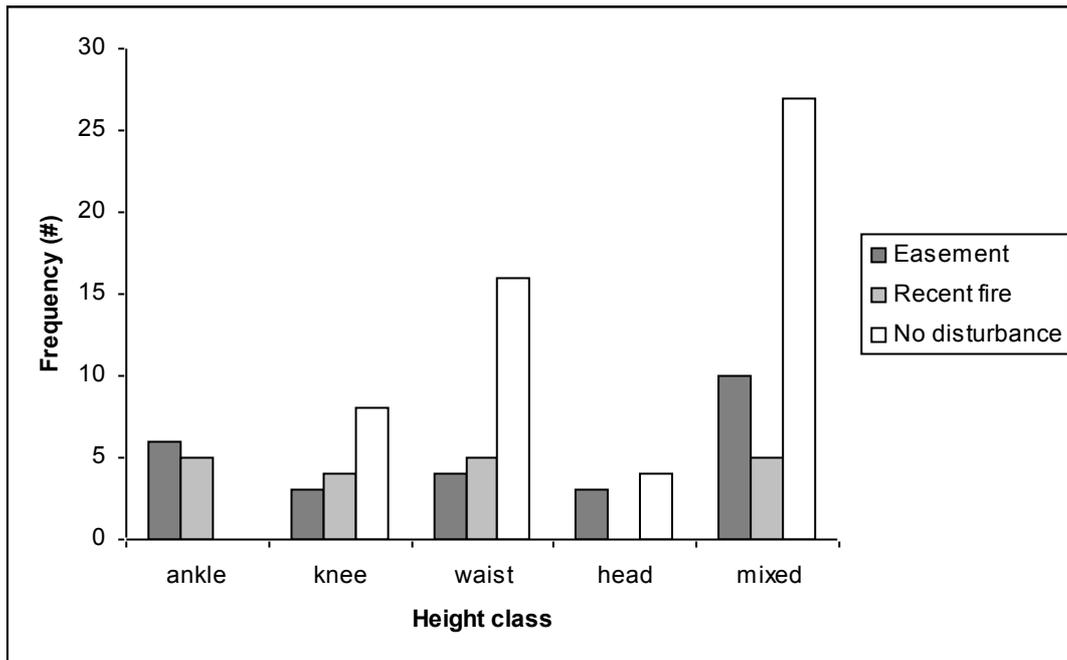


Figure 10 Tura Star-hair height class by recent disturbance history.

2. Density map

All current survey waypoints within approximately three kilometres of the Tura Beach township are presented in Figure 11. Waypoints are colour coded to approximate Tura Star-hair count classes. Current land tenure and entries for Tura Star-hair in the Atlas of NSW Wildlife are also included.

Surveys by the Office of Environment and Heritage found:

- low densities of Tura Star-hair at Bournda National Park on either side of Widgeram Rd, reaching as far east as the coastal escarpment;
- medium densities of Tura Star-hair on council reserve south of Golf Circuit and north of the golf course;
- high densities of Tura Star-hair on crown reserve adjacent to the Department of Education land, north of Mirador Drive;
- low densities of Tura Star-hair on crown reserve up to approximately 700 m west of Sapphire Coast Drive between the intersection with Red Hill Road and Mandini private property; and
- no Tura Star-hair along coastal dunes or near Red Hill Rd west of Sapphire Coast Drive.

Surveys by the community found:

- high densities of Tura Star-hair on crown reserve between Sapphire Coast Drive and Elizabeth Parade and Golf Circuit; and
- medium densities of Tura Star-hair at adjoining easements to east of this crown reserve.

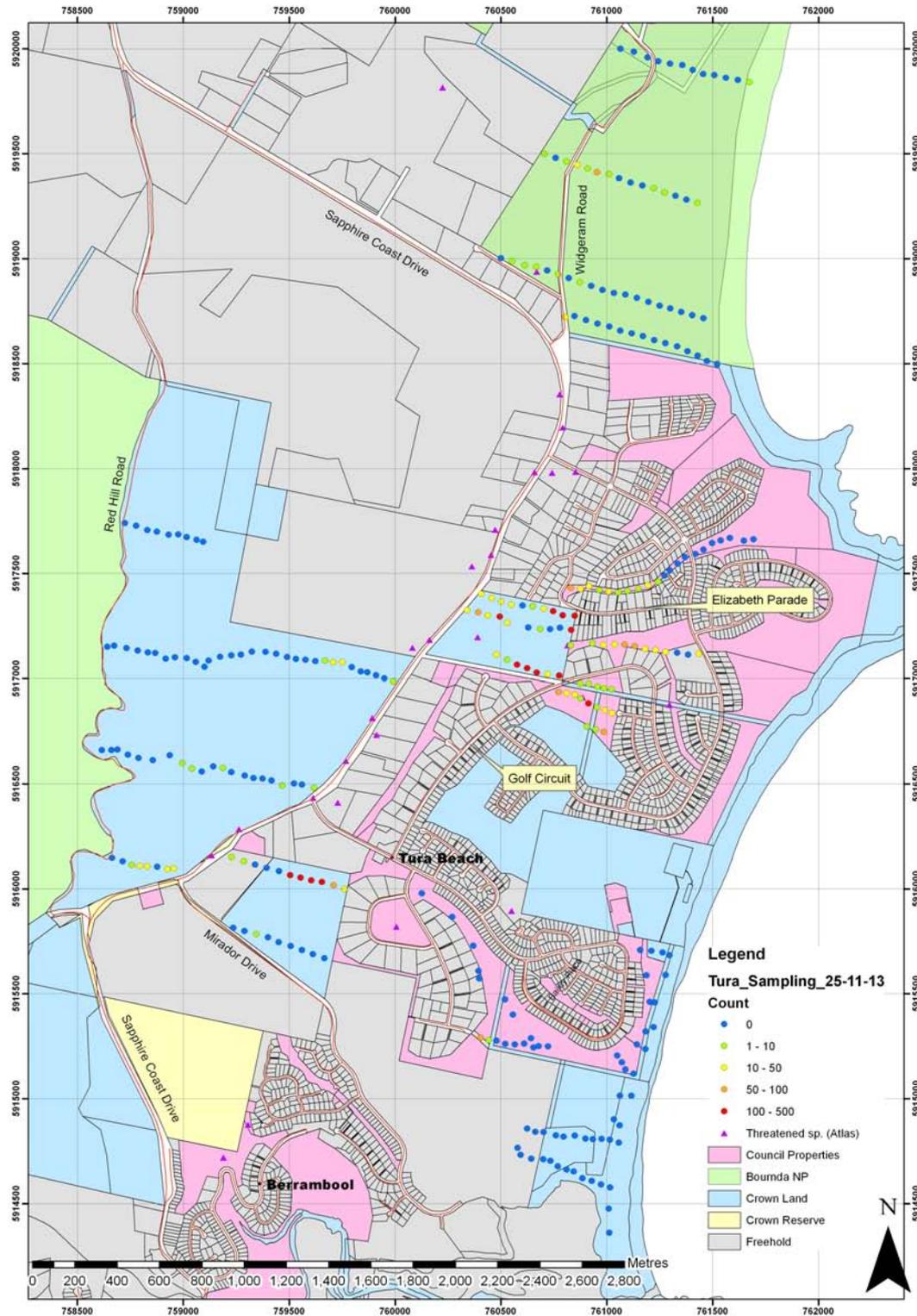


Figure 11 All survey waypoints and density classes for Tura Star-hair within three kilometres from Tura Beach.

4. Conclusion

This study provides the first systematic survey for Tura Star-hair on crown and council tenure lands. The results suggest that Tura Star-hair is well represented in the vicinity of Tura Beach in low densities of 1-10 and 10-50 individuals. However, Tura Star-hair only occurs in high densities in two locations, on crown reserve, between Sapphire Coast Drive and Elizabeth Parade and Golf Circuit and on crown reserve adjacent to the Department of Education land, north of Mirador Drive. At both locations, densities of Tura Star-hair of more than 100 individuals were repeatedly recorded and these locations were composed of mixed heights, suggesting multiple ages. The Golf Circuit and Mirador Drive crown reserve sites would therefore be the best locations to conserve this species, particularly given that they provide a link between the eastern and western occurrences of Tura Star-hair. In addition, the Golf Circuit and Mirador Drive crown reserve sites may be subject to development pressure in the future.

The survey method and the mapping platform developed here provide a means for recording the occurrence of Tura Star-hair in the wider area. Further surveys for Tura Star-hair should consider the northern extent in Bournda National Park and areas that may be under development pressure in the future such as freehold land along Mirador Drive, the crown reserve at the southern end of Sapphire Coast Drive and Middle Beach (Long Point), Merimbula. On-going community surveys should focus on easily accessible council reserve adjacent to private property in the vicinity of Tura Beach. This would help define the coastal occurrence of Tura Star-hair and improve awareness and protection of this species within the local area. Further research would be required to estimate the population per unit area and the relationship of Tura Star-hair to disturbance.

5. Acknowledgments

I gratefully acknowledge the Tura Beach Landcare community and Andrew Morrison who helped with the surveys. I would also like to thank Tom Reid, Gareth Evans and Dr Keith McDougall for methodology and fieldwork support.

6. References

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7. Appendices

Appendix A – datasheet

Date												
Site Location												
Surveyors												
Total # of transects at location		Page# _____										

Waypoint		Absent/Present										
Easting		Count class	1-10	10-50	50-100	>100						
Northing		Height class	ankle	knee	waist	head	mixed					
		Overstorey cover	0-5	10-15	20-25	30-35	40-45	50-55	60-65	70-75	80-85	90-95
		Disturbance	recent fire / easement / none									

Waypoint		Absent/Present										
Easting		Count class	1-10	10-50	50-100	>100						
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		Disturbance	recent fire / easement / none									

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		Disturbance	recent fire / easement / none									

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Northing		Height class	ankle	knee	waist	head	mixed					
		Overstorey cover	0-5	10-15	20-25	30-35	40-45	50-55	60-65	70-75	80-85	90-95
		Disturbance	recent fire / easement / none									

Vegetation

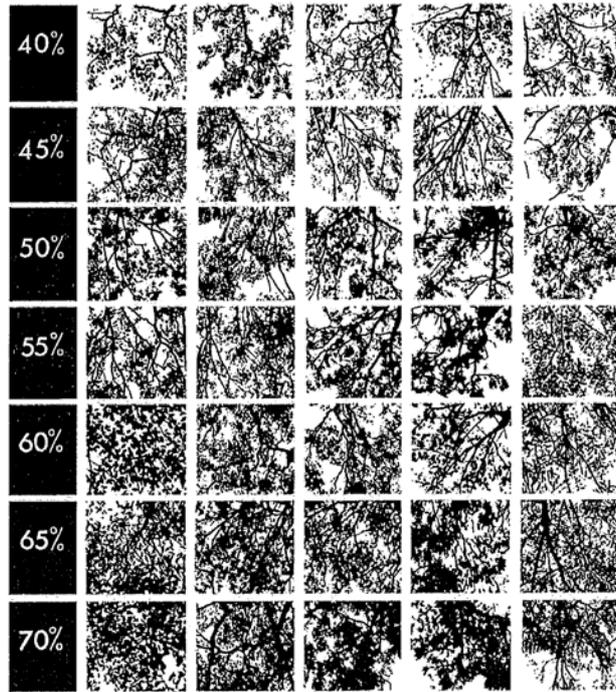


Figure 6 Crown types. Estimate the openness of individual tree or shrub crowns by matching the crown with a photograph. The rows show similar crown types for different leaf size (large to small, left to right). Acacia phyllodes are in the right-hand column. Most Australian woody plants are in the range 40–70%.