Stream Environment and Water

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PROJECT: LOT 6 AND 8 OLD COAST ROAD
CLIENT/PROJECT # 190607
DATE: 6/04/2020

[redacted]

As requested, Stream Environment and Water Pty Ltd (Stream Environment and Water) carried out a desktop and structural vegetation survey of Lot 6 and Lot 8 Old Coast Road Myalup.

The main aims of the survey were to:

- Undertake a desktop survey to determine the potential for Threatened Ecological Communities (TECs) or Priority Ecological Communities (PECs) within the study area.
- Map structural vegetation units within the study area and assess their condition.
- Determine if any of the vegetation units on site are representative of TECs or PECs. In particular to determine if the presence of the patches of *Eucalyptus gomphocephala* known to be present on site are representative of the TEC *Tuart Woodlands and Forests of the Swan Coastal Plain* based on patch size and features identified in the condition categories and thresholds in the Conservation Advice (Commonwealth of Australia 2019).

Background

Threatened Ecological Communities (TECs) are naturally occurring biological assemblages that occur in a particular type of habitat, which are subject to processes that threaten to destroy or significantly modify the assemblage across its range (DEC 2007). TECs in WA are protected under the *Biodiversity Conservation Act 2016* (BC Act) and some are also protected under the Commonwealth *Environmental Protection and Biodiversity Conservation* Act (EPBC Act).

Additional to TECs, ecological communities that are considered potentially of conservation significance (and potentially TECs), that do not currently meet survey criteria or that are not adequately defined, are rare but not threatened, have been recently removed from the TEC list or require regular monitoring, are considered to be Priority Ecological Communities (PECs) (DEC 2013) and are required to be taken into consideration during environmental impact assessments (EPA 2016).

Based on advice provided prior to our survey we understood that Tuarts (*Eucalyptus gomphocephala*) are present on the site and may be representative of a Nationally significant Threatened Ecological Community (TEC) *Tuart Woodlands and Forests of the Swan Coastal Plain*, listed under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

There are several key diagnostic characteristics of this particular TEC outlined in the Conservation Advice for the Tuart Woodlands and Forest TEC, published by the Federal Government (Commonwealth of Australia 2019). The primary defining feature is the presence of at least two living *Eucalyptus gomphocephala* trees in the uppermost canopy layer with a gap of no more than 60m between the outer edges of the Tuart trees. Once a patch is identified as the Tuart Woodlands and Forests ecological community then the patch is assessed according to conditions and thresholds. In summary:

- If the patch is less than 0.5ha then it is not part of the ecological community.
- If the patch is at least 0.5 and up to 5ha in size then on ground surveys are conducted to determine which condition category applies.
- All patches of 5ha or greater are part of the nationally protected ecological community regardless of its condition.

More information is available in the Approved Conservation Advice (Commonwealth of Australia 2019).

Desktop Assessment

Prior to the field survey, a search of the Department of Biodiversity Conservation and Attractions (DBCA) Communities Database and EPBC Protected Matters Seach Tool was conducted. Nine TEC/PEC communities were listed as potentially occurring and found within 10km of the site. A description of these communities, their conservation significance and the likelihood of occurrence is summarised in Table 1. Likelihood of occurrence was based on the whether typical soils and landforms occurred at the site, previous mapped occurrences and the known occurrence of *Eucalyptus gomphocephala* on the site. The following communities are known to occur within the site and/or considered highly likely to occur:

- Banksia Woodland of the Swan Coastal Plain (federally listed TEC)/Banksia dominated woodland of the Swan Coastal Plain IBRA region (State listed PEC);
- Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain ecological community (listed as a TEC at federal level and PEC at the state level).
- Southern *Eucalyptus gomphocephala - Agonis flexuosa* woodlands PEC (can be a component of the Endangered Banksia Woodlands of the Swan Coastal Plain EPBC listed TEC, or the Tuart woodlands of the Swan Coastal Plain PEC)

Stream Environment and Water received surveyed tree mapping of the site from SW Environmental which indicated the presence of *E. gomphocephala* on the site and may be representative of the Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain ecological community. Prior to going into the field the mapped Tuarts were grouped into patches in accordance with patch definition as outlined in Commonwealth of Australia (2019). Refer to Figure 1 below.

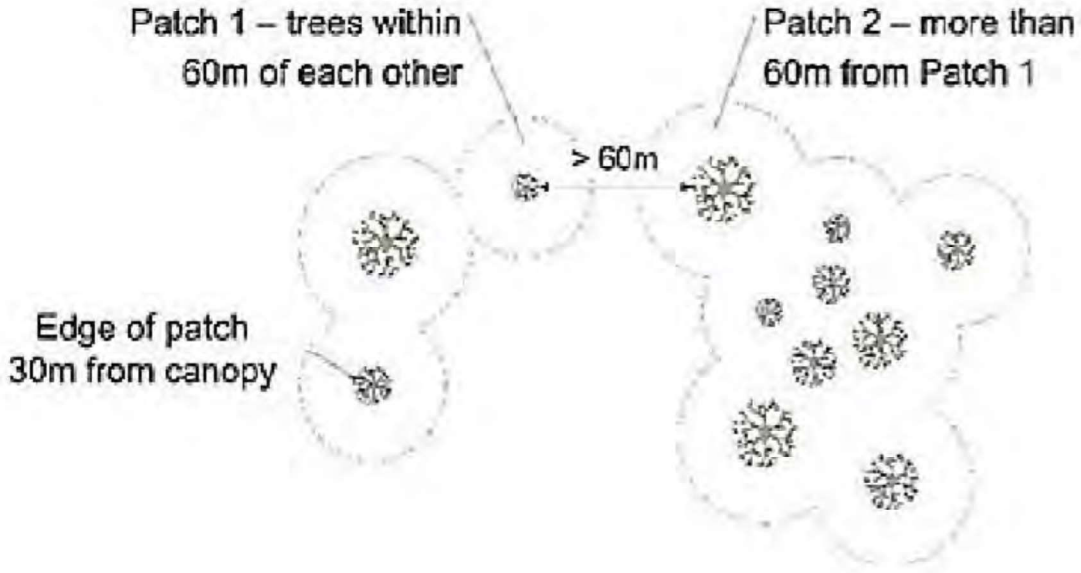


Figure 1. Establishing Patch boundaries. Patches of the ecological community extend to 30m beyond the outermost canopy of the Tuart trees (Source: Commonwealth of Australia 2019).

Table 1 Threatened and Priority Ecological Communities potentially occurring at the site.

Community	Typical soil and landform	EPBC	State	Likelihood of occurrence
Banksia Woodland of the Swan Coastal Plain /Banksia Woodlands of the Swan Coastal Plain IBRA Region	Well drained sands; Typically Bassendean and Spearwood, occasionally Quindalup sands; Swan Coastal Plain (Commonwealth of Australia 2016)	EN	PEC (P3)	Possible
Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain ecological community.	Mostly confined to Quindalup Dunes and Spearwood Dunes from Jurien Bay to the Sabina River, with outliers along some rivers. Tuart is the key dominant canopy species however Tuart communities comprise a variety of flora and fauna assemblages (DBCA 2019)	CE	PEC (P3)	Very likely
Living Microbial mats in hypersaline ponds	Extant hypersaline pond stromatolitic 'Conophyton' like unlithified communities formed with little sediment incorporation by (?) Phormidium hypersalinum (Pamelup Pond, Lake Preston, Yalgorup).(DBCA 2019)	-	PEC (P2)	Unlikely
Subtropical and Temperate Coastal Saltmarsh	The habitat is coastal areas under tidal influence. In southern latitudes saltmarsh are the dominant habitat in the intertidal zone and often occur in association with estuaries. (DBCA 2019)	VU	PEC (P3)	Unlikely
Northern Spearwood shrublands and woodlands (can be a component of the Endangered Banksia Woodlands of the Swan Coastal Plain EPBC listed TEC)	Heaths with scattered *Eucalyptus gomphocephala* occurring on deeper soils north from Woodman Point. Most sites occur on the Cottesloe unit of the Spearwood system. (DBCA 2019)	-	PEC (P3)	Possible
Shrublands and woodlands on Muchea Limestone of the Swan Coastal Plain	The community occurs on the heavy soils of the eastern side of the Swan Coastal Plain. Where the best developed limestone occurs, near Gingin, the plant community is located on shallow black clay or sandy clay soils on limestone (English and Blyth 2000).	EN	TEC (EN)	Possible
Dense shrublands on clay flats (floristic community type 9 as originally described in Gibson et al. (1994))	These communities comprise the 'Clay pans of the Swan Coastal Plain' that is listed as a critically endangered TEC under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) The clay pan communities occur where clay substrate is low in the landscape and forms an impermeable layer close to the surface. These wetlands that rely on rainfall and local surface drainage to fill are considered unlikely to be connected to groundwater. The clay pans then dry out to form a relatively impervious substrate in summer (DPaW 2015).	CE	TEC (VU)	Possible
Herb rich shrublands in clay pans (floristic community type 8 as originally described in Gibson et al. (1994))		CE	TEC (VU)	Possible
Southern *Eucalyptus gomphocephala-Agonis flexuosa* woodlands (can be a component of the Endangered Banksia Woodlands of the Swan Coastal Plain EPBC listed TEC/Tuart woodlands of the Swan Coastal Plain PEC)	Woodlands of *Eucalyptus gomphocephala - Agonis flexuosa* south of Woodman Point. Recorded from the Karrakatta, Cottesloe and Vasse units. (DBCA 2019)	-	PEC (P3)	Likely

Field Assessment

On the 28th February 2020, [redacted], Ecologists and Directors of Stream Environment and Water, conducted a field survey to map vegetation units, assess their condition. The field survey also assessed vegetation to establish the presence or absence of TECs/PECs listed as potentially occurring (Table 1) on the site and whether the known occurrence of Tuarts on the site represented the *Woodlands and Forests of the Swan Coastal Plain ecological community* TEC or the *Southern Eucalyptus gomphocephala - Agonis flexuosa* woodlands PEC.

Structural Vegetation Mapping and Condition Assessment

A description of vegetation communities was completed using unmarked relevé sampling. At each location the following information was recorded using standardised field sheets:

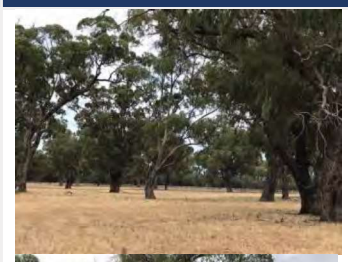
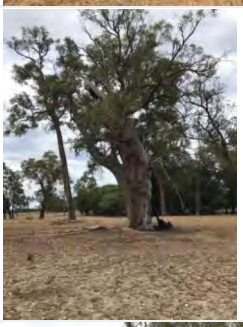
- Location and coordinates
- Soil description and landforms
- Vegetation structure and community description in accordance with the National Vegetation Information System (NVIS) structure and floristics
- Dominant vascular plant species (denoting native and introduced species)
- Vegetation condition (according to Keighery 1994)

The scope of the study did not include multi variate analysis of survey data to determine floristic community types (FCT). The identification of TEC and PEC has therefore been undertaken on the basis of inferred communities based on species composition and vegetation structural community descriptions and was informed by the guidance in the Approved Conservation Advice for the Tuart Woodlands and Forest TEC (Commonwealth of Australia 2019).

The results of the structural vegetation mapping are presented in Table 2 and Figure 2. The vegetation condition assessment is presented in Figure 3. A total of seven vegetation units were identified, one of which was predominantly cleared pasture with scattered trees (mapped as **C**). An artificial wetland occurred at the eastern end of the study area where vegetation was observed to be a mosaic of native and planted species in a completely degraded condition (vegetation unit mapped as **ErCcMr**). One area of Good condition vegetation occurred at the eastern end of the study area (mapped as **CcAg**). The remainder of the study area was predominantly open woodland with a native overstorey and a few small patches of low lying shrubland.

Table 2 Vegetation communities described for the study area.

Community Code	Structural Description	FCT (inferred)	Condition	Example photos of community
CP	Cleared with occasional native trees	-	Completely Degraded	

Community Code	Structural Description	FCT (inferred)	Condition	Example photos of community
EgCcEmAg	*Eucalyptus gomphocephala* open woodland with occasional *Corymbia calophylla, Eucalyptus marginata, Agonis flexuosa* over weeds/pasture grass	Potential TEC - Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain ecological community TEC One patch may be considered *Eucalyptus gomphocephala - Agonis flexuosa* woodlands PEC.	Completely Degraded	 
CcEmAg	*Corymbia calophylla*,open woodland with occasional *Eucalyptus marginata* and *Agonis flexousa*	-	Completely Degraded	
CcAgMr	*Agonis flexuosa Melaleuca rhaphiophylla* shubland with occasional *Corymbia calophylla* trees.			
Mr	*Melaleuca rhaphiophylla* shrubland and planted species		Completely Degraded	
ErCcMr woodland	*Eucalyptus rudis, Corymbia calophylla* and planted *Eucalyptus* sp. over *Melaleuca rhaphiophylla* and *Acacia saligna* over weeds/pasture grass	-	Completely Degraded	
CcAg	*Corymbia calophyla* and *Agonis flexousa* open woodland over *Pteridium esculentum, Macrozamia riedlei* and *Hibbertia cuneiformis*	-	Good	

Based on comparison of structural vegetation units described and their species composition with descriptions of FCT on the Swan Coastal Plain from previous regional studies (e.g. Gibson et al. 1994), available reports for nearby occurrences (Naturemap 2020) one state listed PEC and one state and federally listed TEC were identified within the study area. These were:

- Tuart (*Eucalyptus gomphocephala*) *Woodlands and Forests of the Swan Coastal Plain ecological community* TEC (mapped as **EgCcEmAg**)
- Southern *Eucalyptus gomphocephala - Agonis flexuosa* woodlands PEC (mapped as **EgCcEmAg**)

An assessment of whether community **EgCcEmAg** is defined as the Federally listed TEC is assessed below, based on patch size and features identified in the condition categories and thresholds in the Conservation Advice (Commonwealth of Australia 2019). Patch 3 of the **EgCcEmg** (Figure 4) has affinities to the Southern *Eucalyptus gomphocephala - Agonis flexuosa* woodlands PEC. For the purposes of this assessment PEC is considered part of the *Woodlands and Forests of the Swan Coastal Plain ecological community* TEC.

TEC Assessment

For each patch of potential Tuart (*Eucalyptus gomphocephala*) *Woodlands and Forests of the Swan Coastal Plain ecological community* TEC defined during the desktop survey (using tree survey shapefile provided by SW Environmental) the following was undertaken:

- Tree identifications and potential TEC "patches" (as defined by Commonwealth of Australia 2019) were verified by ground truthing during the vegetation survey.
- Several mis-identified trees were corrected and patches re-drawn. In total three patches of Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain ecological community TEC were defined (Figure 3).
- Patches were given an identification number and assessed in accordance with Commonwealth of Australia (2019). This is presented in Table 3 below.

*Table 3. Assessment of **EgCcEmAg** patches within the study area*

Patch	Meets diagnostics for TEC	Actual Size of patch *	Patch Size Classification	Condition Threshold	Condition Threshold Results	TEC?
1	Yes	9.9ha	>5ha	Not required	Not required	Confirmed TEC
2	Yes	1.6ha	>0.5 – 2ha	Required	Poor condition (0% of understorey is native)	Not a TEC
3	Yes	1.55ha	>0.5 – 2ha	Required	It was established in the field that patch 4 was part of a larger area of *Eucalyptus gomphocephala* on the property adjacent to the patch (approximately 10.28ha) raising the patch size classification up to >5ha. Condition thresholds no longer apply to this large patch size >10ha.	Confirmed TEC This patch also has affinities with *Southern Eucalyptus gomphocephala - Agonis flexuosa* woodlands PEC (see vegetation mapping above).

[1]A patch boundary is 30m beyond the boundary of established tuart trees (>15cm Diameter at Breast Height) including Dead tuart trees (stags)

The results of the assessment were as follows:

- Patch 1 was immediately confirmed as the TEC as this patch met diagnostic characteristics for the TEC (Commonwealth of Australia 2019) and was over 5ha in size. A patch of >5ha is considered part of the TEC regardless of understorey condition.
- Patches 2 and 3 met diagnostic characteristics (DBCA 2019) for the TEC however were under 5ha. These patches were therefore further assessed using condition thresholds and categories defined in Commonwealth of Australia (2019) recording:
    - The % of vegetation cover containing native species.
    - Whether native vegetation of 1ha or more occurred within 100m of the patch.
    - The presence of very large trees of any native species.
    - Evidence of regeneration of native Eucalypts.
- Patch 2 failed to meet condition requirements for national protection so therefore is not considered the TEC
- Patch 3 was found to be connected (by less than 60m between two Tuart canopies) to intact native vegetation on adjacent land of >10ha (featuring *E. gomphacephala* as a dominant species). This patch therefore considered >5ha in size and a TEC.

The mapped TECs are presented in Figure 4. The Commonwealth Guidelines also recommend a minimum of a 30m buffer to be added to the mapped community. This buffer is not itself part of the ecological community however it is strongly recommended to protect the integrity of the community (Commonwealth of Australia 2019).

Summary and Recommendations

In total 11.45ha of the TEC Tuart (*Eucalyptus gomphocephala*) *Woodlands and Forests of the Swan Coastal Plain* occurs within the study area. Approximately 1.55ha of this vegetation community has affinities with the Southern *Eucalyptus gomphocephala - Agonis flexuosa* woodlands PEC. Impacts to these vegetation communities should be avoided or further advice on additional environmental approvals sought.

If you have any questions regarding the results of this survey please contact [redacted]

[redacted]

References

Commonwealth of Australia (2016). Approved Conservation Advice (incorporating listing advice) for the Banksia Woodlands of the Swan Coastal Plain Ecological Community.

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0 100 200 m

Projection: GDA zone 50

Source: Base map © ESRI and its data suppliers, DPIRD (2019). Landgate (2019)

Vegetation Units
- Cleared
- CcAgMr
- CcEmAg
- EgCcEmAg
- ErCcMr
- CcAg
- Mr

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Figure 2: Structural vegetation units

Old Coast Road - Myalup

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0 100 200 m

Projection: GDA zone 50

Source: Base map © ESRI and its data suppliers, DPIRD (2019). Landgate (2019)

Vegetation condition
- Completely Degraded
- Good

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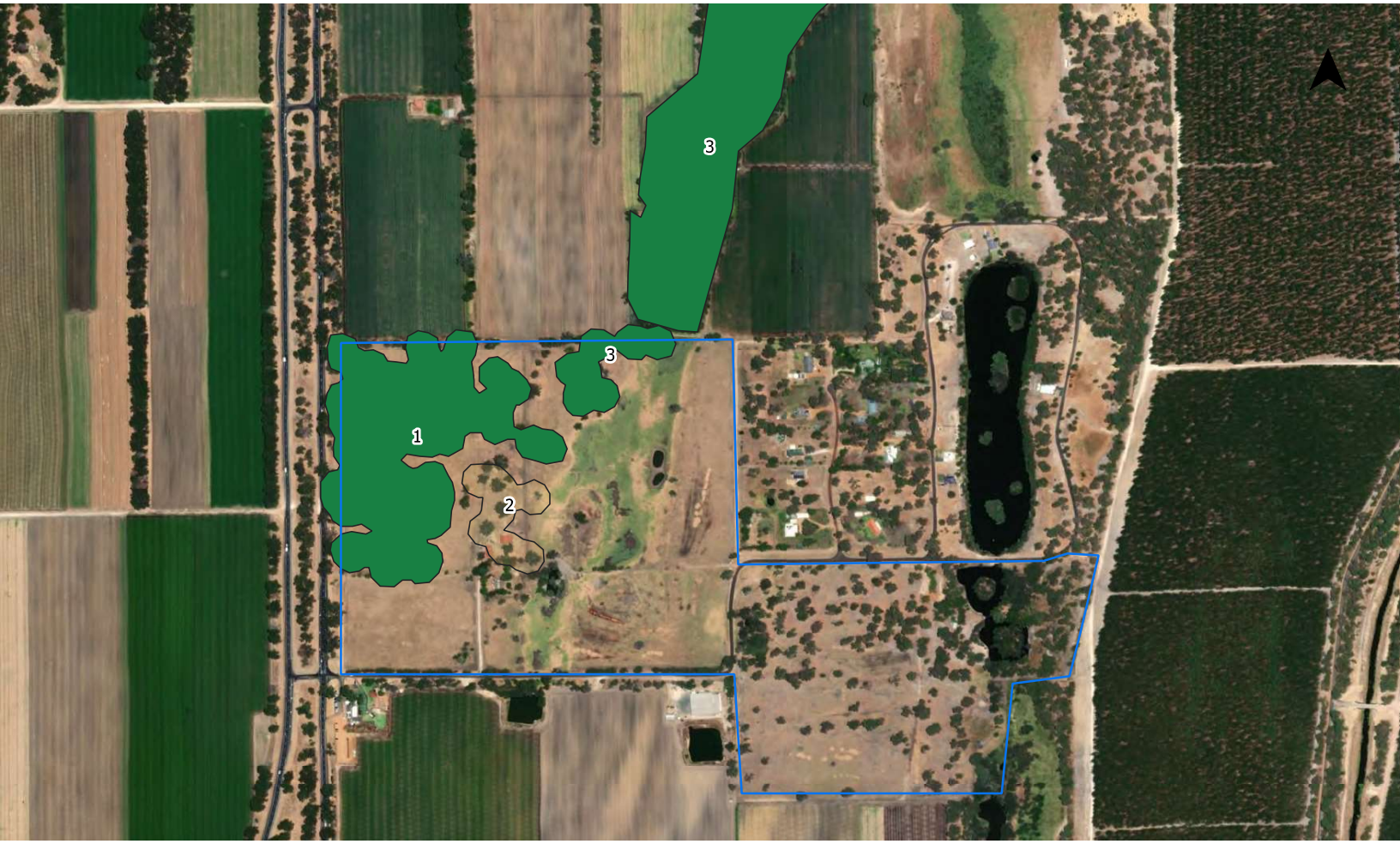
Figure 3: Vegetation condition

Old Coast Road - Myalup

Job: 190607
Date: 02/04/2020 Author: MB



0 100 200 m

Projection: GDA zone 50

Source: Base map © ESRI and its data suppliers, DPIRD (2019). Landgate (2019)

Survey Boundary

Tuart TEC patch extent

Patch TEC

Patch does not meet criteria

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Figure 4: Tuart TEC patch extents

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