



# Principles of Re-establishment Guidance Note 6

## Ambulatory Boundaries and the Doctrine of Accretion

### Overview

This guidance note refers to cadastral boundaries that are subject to movement over time – or boundaries that are ambulatory in nature.

Such boundaries are those defined by rivers or streams, and the shorelines of lakes and the sea.

All boundaries in this guidance note are Crown boundaries.

### What is a Crown boundary?

A Crown boundary can be defined as the surveyed boundaries of any Crown section, portion, allotment or other parcel of land marked on the ground at the time of the Crown survey.

### Surveyor-General's responsibility

*'The Surveyor-General is responsible for the correct positioning of Crown boundaries, whether or not the land has been alienated from the Crown or subdivided.'*

*Surveying Act 2004, s. 42(1)(e)*

### Crown boundary

Parish Plans, which were meticulously prepared by staff of the Department of Crown Lands and Survey for about 150 years until September 2001, when the digital cadastral mapbase was introduced, define the original subdivision of the state into Crown allotments, reserves and roads into 2005 Parishes. The boundaries shown on these plans are Crown boundaries and were (predominantly) defined by survey. The original plans are lodged in the Central Plan Office, which is Victoria's online virtual storeroom for State Government surveys and plans available through the Department of Sustainability and Environment website.

When conducting investigations on land status, or when undertaking surveys of Crown boundaries, you should always endeavour to obtain a copy of the current record plan and if necessary any Put Away Plans, or preceding Parish plans. This is because there is relevant information unavailable on the digital mapbase or LASSI, such as Lands Department file references, purpose of reserves and gazettal dates, grantee names, grant dates, identification of government roads, allotment dimensions and other valuable information.

There are occasions when surveyors who survey a Crown boundary are required to obtain the consent of the Surveyor-General about its re-established position.

### Obtaining the Surveyor-General's consent

The Surveyor-General's consent should be sought by surveyors undertaking surveys to be lodged with Land Victoria that involve the re-establishment of government road alignments and Crown boundaries defined by watercourses, or the shorelines of lakes or seas. It also includes situations when:

- it is difficult to determine the original road alignments
- the course of the stream or the shoreline of a sea or lake appears to have moved from the position shown in the original Crown survey.

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The request can be made directly to the office of the Surveyor-General prior to lodging plans for registration or by Land Registry examiners prior to registration.

Information to support adoptions should include (but not be limited to):

- a comprehensive report detailing the reasons for making adoptions and other options that may have been considered but rejected
- comparative plots derived from original field records and/or historical aerial photography
- abstract of field records
- digital photos of significant features located in the survey to support adoptions, which may include old survey marks, old fence posts, old buildings etc.

The consent of the Surveyor-General must be sought when determining the position of Victorian state borders with NSW, South Australia or Tasmania.

## The Doctrine of Accretion

*'The process where the boundary between land and water alters so slowly that the change is not readily noticeable.'*

### Common law

In early days of settlement in Victoria, Crown land was usually sold to the edges of lakes, rivers or streams, and also to the shoreline of a sea unless there was a particular need for a reservation along the frontage.

This doctrine explains, in general terms, the effect that alterations in boundaries between land and water can have on land ownership of both freehold and Crown land.

Gradual accretions of the land from water becomes the property of the abutting owner and conversely, land encroached upon by water is lost to the abutting owner.

The important factor is that the alteration must be 'gradual and imperceptible' so that the change 'cannot be seen actually going on, though a visible increase or decrease is observable every year' – Common law.

The Doctrine may also apply despite the fact that the gradual and imperceptible change was caused by artificial means, such as the construction of a jetty.

### Accretion

Accretion can be:

- alluvion, where sand and soil washed up to make an addition to existing land
- dereliction, where land is left dry by lake or sea shrinkage, or a river changing its bed.

### Diluvion

Diluvion is the opposite of accretion: it is loss of land by encroachment of water. Land may also be lost by erosion.

## Boundaries between land and water

### Order In Council, 23 May 1881 (*Government Gazette 1881*)

To protect, preserve and enhance the corridors of public land along the state's waterways, land that forms the beds and is nominated distances from the banks of approximately 280 water courses in Victoria was set aside for Public Purposes Reserves (Permt.) by the Order In Council, 23 May 1881 (*Government Gazette 1881*).

It is recommended that no matter what notation appears on the Parish plan regarding the reservation relating to a particular river, the actual reservation details need to be confirmed by reference to the 1881 *Government Gazette*, or the summary in the *Parish Guide*.

This reservation referred specifically to land being the property of the state and, as such, did not include land that was alienated prior to 1881.

It should also be pointed out that if land on both sides of a river was sold prior to 1881 then no Permanent Public Purposes Reserve encumbers the bed of the river between the sold parcels because there was no Crown land available to reserve (explanation to follow).

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## **Water Act 1905 (Land Act 1958, s.385)**

Prior to 1905, when land was granted to the edge of a river or stream, common law principles were that, notwithstanding specific descriptions, measurements, delineations or colourings on a Crown Grant, the grantee owned to the centre of the abutting water course (*ad medium filum aquae*).

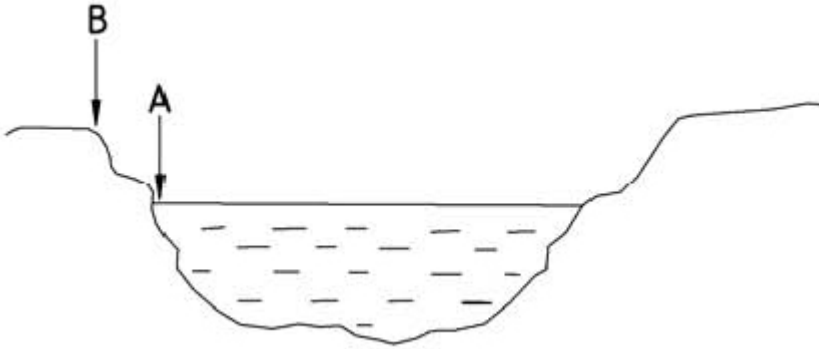
The common law applied until 1 May 1906 when, under s.5 of the *Water Act 1905* the bed and banks were 'deemed to have remained the property of the Crown and not to have passed with the land so alienated'. This is providing that:

- the water course formed the Crown boundary
- the water course was the same as when the land was granted, or in a position that could be attributed to gradual and imperceptible movement from the grant position.

This provision was retrospective and is now incorporated into s.385 of the *Land Act 1958*.

The definition of bed and banks in relation to a watercourse include the land over which the water in the watercourse normally flows and the land normally covered by water.

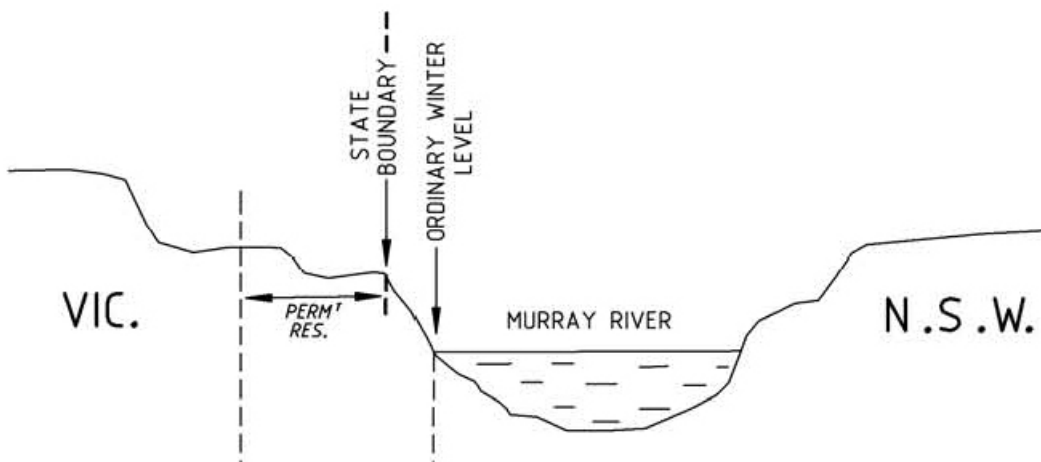
In the diagram this bank is labelled A.



The high bank labelled B was the bank adopted by Crown surveyors when setting out Crown reserves in the alienation surveys of the majority of Crown allotments. However, be aware that there are exceptions for many rivers where specific water levels such as summer or winter flows are referred to in the reservation descriptions.

One exception is the Murray River.

## **The Murray River – a special case**



## **The Permanent Public Purposes Reserve along the Murray River**

The Order in Council on 23 May 1881 permanently reserved for public purposes all land that was the property of the state within a distance of 3 chains from the ordinary winter level of the Murray River, as confined from the left bank.

As with all permanent reserves along rivers, the land boundary of the reserve remains unaltered from the time of the gazettal, irrespective of the movement of the river – whether by sudden or slow and imperceptible movement.

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In other words, the location of the boundary between the permanent reserve and the adjoining freehold is not affected if the location of the left bank of the river changes gradually and imperceptibly. However, should the left bank move in this way to the extent of crossing the southern boundary of the permanent reserve then the freehold land is lost by Victoria to NSW by diluvion.

Alternatively, if the left bank moves north in this way the Doctrine of Accretion applies and land is gained by Victoria, with the width of the permanent reserve being increased.

From the diagram it can easily be seen that unless the left bank is vertical, the width of the permanent reserve will always be less than 3 chains (assuming no accretion).

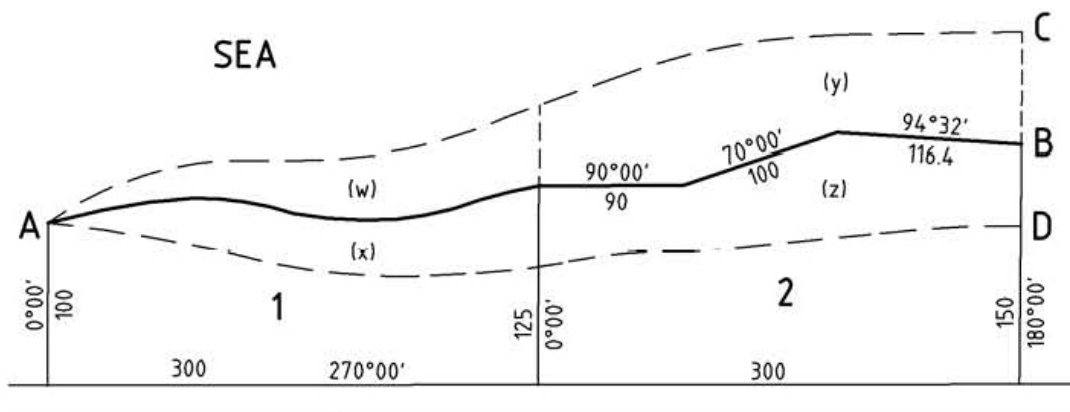
Therefore, when undertaking a survey of the border, collation of existing SI is vital.

In 1869–70, the Harbours and Rivers Branch of NSW Public Works Department surveyed the course of the river between Albury and the SA border. This is the best evidence of the course as it was at the time of separation in 1850. This series of 49 plans is available at the office of the Surveyor-General.

The land between the border and the mean winter level – the Trans Murray Strip – is technically NSW territory. Therefore, any dealings on this land from the Victorian side requires permission from NSW authorities.

Now that the Doctrine of Accretion, the 1881 Order in Council and the provisions of the *Water Act 1905* are understood, following are illustrations of how these principles relate to freehold and Crown lands, and streams and shorelines.

## Freehold land – shorelines of seas or lakes



From this diagram, it can be clearly established by reference to titles that the boundary marked A-B is the common boundary between the sea and freehold properties 1 and 2, the doctrine will apply as the abuttal is the sea.

A gradual and imperceptible movement of the sea boundary from A-B to A-C would result in the accretion of areas (w) and (y) to properties 1 and 2 respectively.

A movement to A-D would result in the loss by the properties 1 and 2 to the Crown of the areas shown (x) and (z) by diluvion.

The doctrine applies whether or not the title boundary is defined by metes and bounds so long as the intended boundary can be shown to be the sea (or lake). That is, shown as an abuttal on the title.

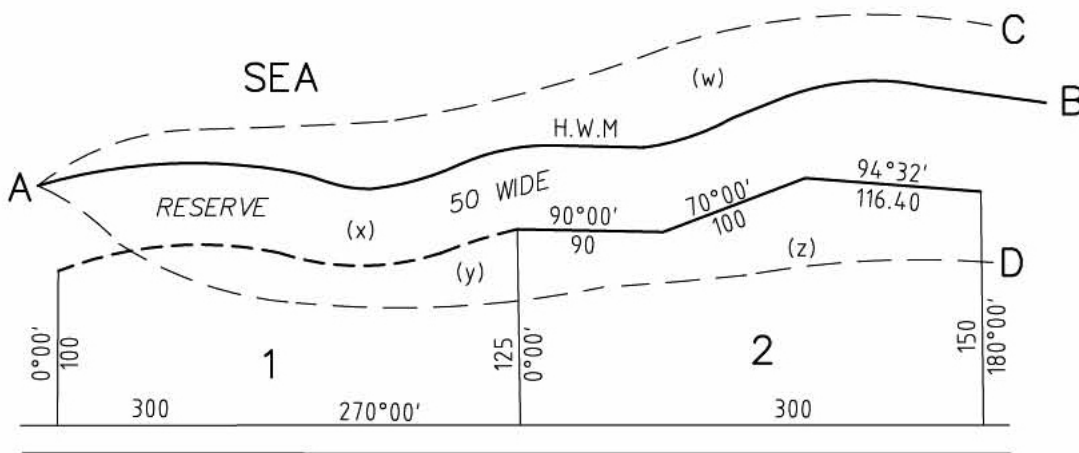
It is Departmental policy that "Abuttals always take precedence over dimensions"

It is the Surveyor-General's opinion that if the waters of a lake recede in times of drought, it is doubtful that the Doctrine of Accretion would apply.

For the same reason, a suddenly inundation of freehold due to unusually wet weather will not result in a diluvion to which the doctrine would apply.

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## Crown land – shorelines of seas or lakes



If, as shown in the diagram above, boundary A-B between the sea and the reserve retreats to A-C, the boundaries of properties 1 and 2 would not be affected but the reserve would be increased by the area marked (w).

If the sea boundary encroaches to A-D, the reserve would be reduced or even lost completely to the extent of the area marked (x); although, it would remain vested in the Crown.

Similarly, areas (y) and (z) would be lost to the owners and become unreserved Crown land.

If a road on Crown land (government road) along the coast is lost by diluvion and the doctrine is applicable, the road loses its status and becomes unreserved Crown land.

## Defining a sea boundary

In Victoria, the shoreline of the sea is defined by the common law line known as Mean High Tide (MHT), which is the average of all high tides.

The way to determine MHT would be to install a tide gauge for a month and assign an Australian Height datum (AHD) value to the mean of the high tide readings.

In Victoria, the sea rises and falls twice a day with a general tidal range of 1 metre. However, in bays open to the sea such as Western Port, Andersons Inlet and Waratah Bay the tidal range is greater – up to 2.5 metres – due to the effect of resonance or forced oscillations. MHT at Frankston cannot be transferred by levels to get MHT at Hastings.

The height of the tide varies according to the phases of the moon – maximum limit at full moon with the new moon called springtide; minimum limit is at first and last quarters and is called neap tide. Springtide is about 30cm higher than MHT for Victoria generally and about 1 metre higher in bays open to the sea.

Some identifying features that indicate MHT:

- white mangrove grows below MHT and saltmarsh between MHT and springtide
- on beaches – textural differences between wet sand and occasionally wet sand as seen on aerial photos
- deposits of sea grass along the beach
- wet rocks and occasionally wet rocks that have different coloration.

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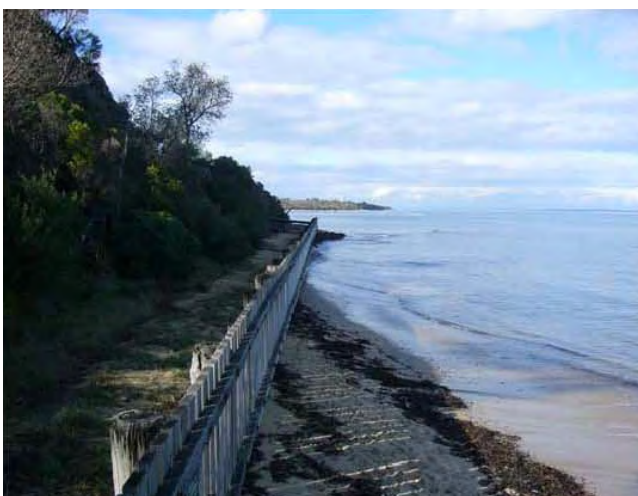
## Case Study – Investigation of Somers shoreline, June 2007



*Somers 1974 – when land was cheap, LP 85188 (circa 1969)*



*Aerial photo – November 2006*



*Sea wall at approx MHT (June 2007)*

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*Eastern end of sea wall at approx MHT (June 2007)*



*Erosion beyond eastern end of sea wall*

Public Land Management Section, Port Phillip Region requested that the Surveyor-General investigate the position of current MHT and, as a consequence, determine the land status at the eastern end of the beach at Somers in the vicinity of Kelburn Court and the '100 steps'.

As indicated on the aerial photos with cadastral overlay, the shoreline has eroded markedly over the past 33 years. The land between the subdivision lots and Western Port is freehold in the name of the council. The timber sea wall has been constructed on this land. The freehold land encroached on by the sea is lost to the former owner.

It is also evident from the most recent aerial photography and digital site photos taken at high tide on 2 June 2007 that the current MHT does not extend beyond the wall – although in places it is close.

In this particular investigation, the owner of one of the freehold parcels adjacent to the sea wall is demanding that the Department of Sustainability and Environment (DSE) repair the wall or undertake additional works to prevent further erosion of the coastline. His reasoning is based on a legal opinion from council that, subject to the "Doctrine (sic) of Accretion" the land occupied by the sea wall and rock gabion reverts to the government and therefore is DSE's responsibility.

The issues DSE is required to address include:

- does the current MHT extend to or beyond the timber sea wall?
- if the current MHT does extend to or beyond the timber sea wall, is the DSE responsible for repairing the wall just because part or all of it is within Crown land due to the Doctrine of Accretion principles applying?
- should it be the responsibility of property owners to protect their land?

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## Case Study – Tambo Bay, Lake King

This is an example of the survey techniques adopted to re-establish the boundaries of Crown Allotment 71, Parish of Bumberrah.

The purpose of the survey was to support a plan of subdivision and it was therefore necessary to re-establish the boundaries of the allotment as it was originally surveyed in 1865.

In 1885, Crown allotment 71 was alienated and bounded on the south by a 30.18 metre wide temporary public purposes reserve vide GG 1879-215 and a permanent public purposes reserve pursuant to the 1881 Order In Council.

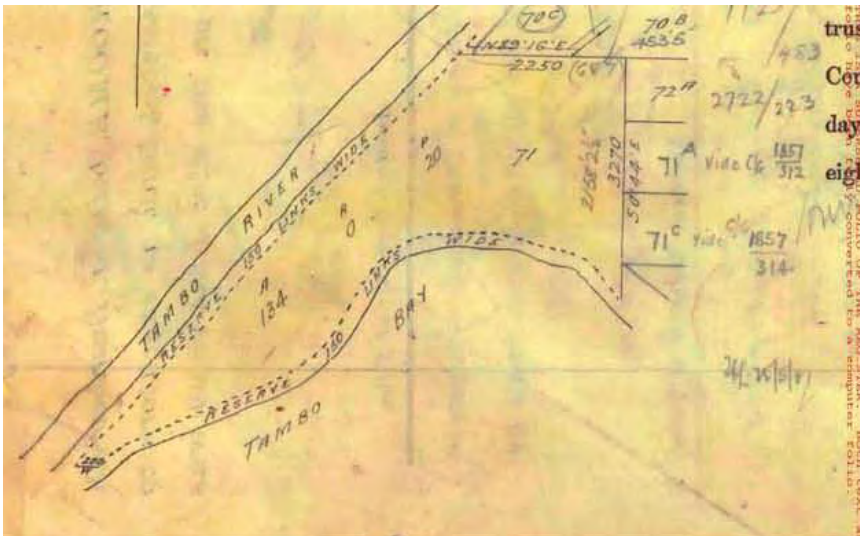
Fortunately in this case, the field book of District Surveyor Wilmott, who undertook the original Crown survey, was available and thus the original position of the shoreline of Lake King and hence the reserve/allotment boundary could be accurately plotted.

This was then compared with the current position and it was found that the waters of Lake King had encroached not just over the permanent reserve, but had also invaded the freehold land.

This was supported by a previous consent case by the Surveyor-General in 1960, which is contained on departmental file PO 6608.

The following documents were used to re-establish the position of the shoreline of Lake King at the time of the original Crown survey in 1865. All documents are lodged in Land Victoria.

### Original Crown grant diagram – Crown Grant Vol: 1710-881 (1885)



*Crown allotment 71 Parish of Bumberrah*

Reminder – do not use this diagram to derive a plot of the original boundaries of the allotment where it abuts the reserve along Tambo Bay (Lake King).



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## CPO Record Plan – B99(6), Parish of Bumberrah



### Note:

1. Reference to reservations:
  - a. Public Purposes Res. (temp) 150 links wide vide GG 1879-215
  - b. Permanent Public Purposes Reserve vide 1881 Order In Council
2. Reference to departmental file PO 6608. These files are held in the Office of Surveyor-General and generally relate to S-G consent to Crown boundaries.
3. Reference to Grantee and date of Crown Grant (John Howlett, 27/4/1885).

## Original Crown Plan B99, circa 1865



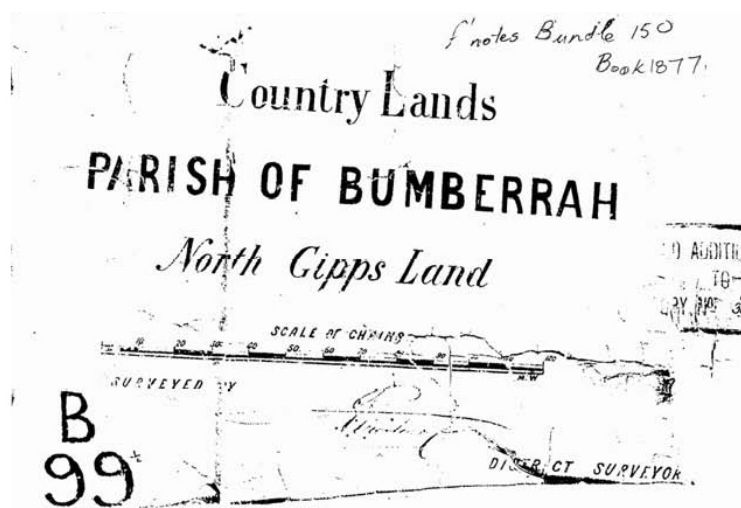
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This is an extract from the original Crown survey plan, B99, showing an enlargement of the subject allotment.

This plan was prepared from the original survey by District Surveyor Wilmott (as indicated on the next map).

Such plans are stored on microfilm in the Central Plan Office and should always be requested when undertaking surveys of Crown boundaries, especially those related to riparian boundaries.

## Valuable information shown on the original Crown survey plan



Although difficult to read on this particular plan the name of the surveyor (District Surveyor Wilmott) who effected the original Crown survey is shown.

In this case, the field book number and bundle have also been added by someone in pencil ( f'notes Bundle 150, Book 1877).

These field books are held by Land Victoria and viewing can be arranged through the Central Plan Office.

For later surveys, say after the mid-1870s, reference to yearly field notes is shown on the original Crown survey plan and, in turn, these were later superseded by the numerical series of OPs (Original Plan) in the 1920s. These dates are approximate only as both systems overlap.

## O1 Book

If the field book information had not been so conveniently provided on the plan, all is not lost.

Name of Surveyor	Date	Locality	Number of	Bundle
Wilmott		Knuckholt Bendock, Dec 1870	1409	153
	6/7 224	Crooked River + Long Wellbottle	1879	150
	6/7	Leuko + Malt. R. Ch. n. Bendi	1875	9
	6/7 399	9, 1, + Melkora R. + Jacabo	1878	9
	7	Ruse + Quao Kipkara	9	9
	6/7 263	Leuko + Melkora R. Bumberrah	1877	9
	7/7	Mississippi + ...		
Weyburn	5/7	Wyldeu	625	45
	"	"	626	"

Extract from O1 Book relating to District Surveyor Wilmott

By knowing the Crown surveyor's name and date of survey, his field book can be tracked by searching the index known as the O1 Book, which contains the names, dates, localities, field book numbers and bundle numbers for many Crown surveyors dating back to long before any of us can remember.

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## The moving shoreline of Tambo Bay, Lake King



This aerial photo with cadastral overlay was prepared from the information referred to in the previous pages.

The red and yellow lines indicate the boundaries of Lake King and the boundaries of CA 71 at the time of the original survey in 1865. The white line is the current surveyed location of mean HWM and matches well with the aerial photography (circa 2004).

It is evident that not only have the waters of Tambo Bay (Lake King) completely inundated the permanent reserve, but they have also invaded the freehold land that has now been lost to the owner by diluvion. The former reserve and freehold that has been inundated is now unreserved Crown land.

With the availability of relatively current rectified aerial photography and by overlaying the Vicmap Digital Property mapbase and the original Crown survey information, such an investigation is possible prior to undertaking survey of the shoreline. This is assuming that the original survey can be related to grid.

So, prior to undertaking survey, we know that:

- the shoreline has moved considerably since the original survey in 1865
- the permanent reserve has been extinguished in part
- land has been lost to the owner, and the freehold now has abuttal to Lake King.

This would not have been evident from a field inspection and, without this evidence, it may have been assumed that the permanent reserve and the rights that apply still existed.

## Shoreline of Tambo Bay

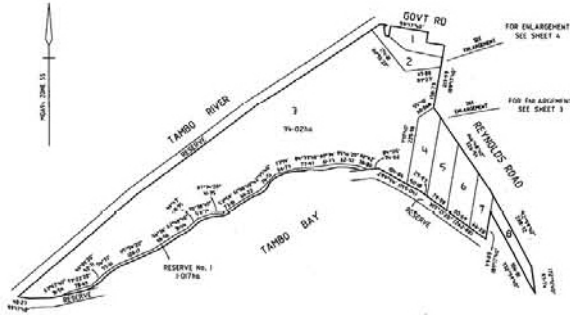


*Shoreline in 2006 – eroding before your eyes*

Rock beaching has been placed along much of the shoreline to arrest the erosion; however, it is evident that where there is no rock beaching, the erosion is continuing at an alarming rate.

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## Plan of Subdivision (circa 2006)



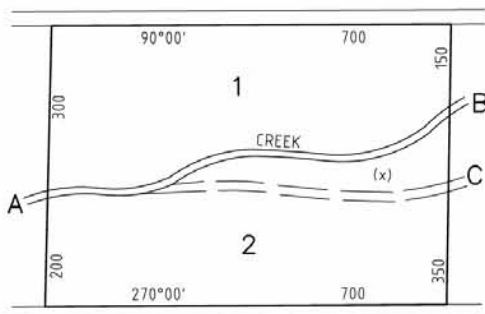
Lot 3 on this subdivision now only abuts the 1881 Permanent Public Purposes reserve at the south-west and south-east corners.

The Reserve Number 1 shown on the plan is a 10 metre wide strip of freehold land and was appropriated at the request of DSE to allow public access along the shore of the lake.

However, unless the current rate of erosion is halted, it is likely that this reserve, and possibly freehold, will also be lost by diluvion as the land is still bounded by Tambo Bay and therefore the doctrine is applicable.

## Boundaries between land and water

### Freehold land – river or stream

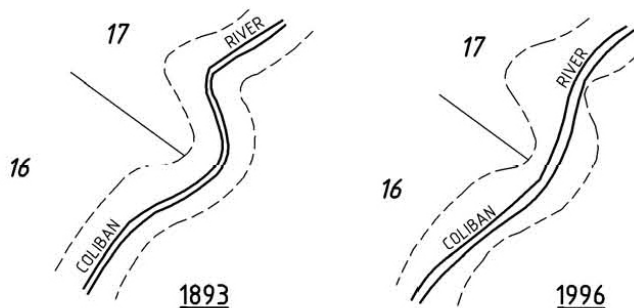


Watercourse with freehold land to the edge of the water on both banks

In this situation, if the watercourse changes slowly and imperceptibly from A-B to A-C, property 1 would gain by accretion the area shown (x) together with the land formerly forming the bed and banks of the watercourse.

Conversely, property 2 would lose by diluvion area (x) and the area occupied by the relocated bed and banks of the watercourse.

### Crown land – river or stream



Permanent Public Purposes Reserve along the Coliban River

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In this example, it has been determined that the course of the Coliban River has moved gradually and imperceptibly between 1893 and 1996.

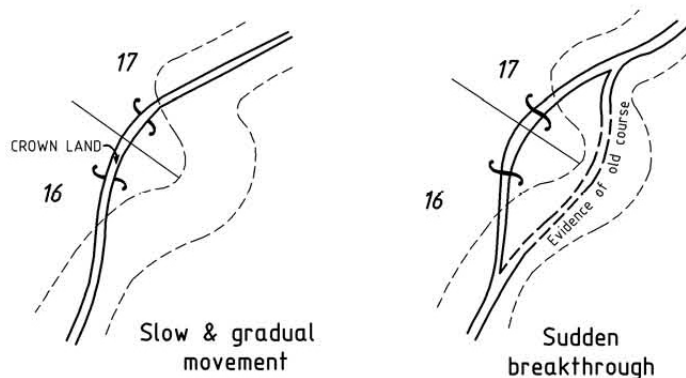
The bed and 20.12 metres from each bank were permanently reserved for public purposes in 1881.

In this case, accretion or diluvion on either bank does not affect the outer boundary of the reserve. The boundaries of freehold allotments 16 and 17 are unaffected even though the distance from the current bank to the boundary of the reserve is no longer a consistent 20.12 metres.

So, it is important that when re-establishing the boundaries of freehold land that abut such a reserve, every endeavour is made to determine the course of the river at the time of reservation.

In effecting such a re-establishment:

- re-establish the reserve boundary from the field notes or field book of the original Crown alienation survey
- use the plot of the original Crown survey plan if field notes not available
- plot from the Parish plan if neither field notes nor the plan are available
- never use the plot shown on the Crown Grant diagram or C/T.



## Slow and gradual movement from reserve to freehold

In the situation where the river moves gradually and imperceptibly to such an extent that it crosses the 20.12 metre wide reserve corridor and invades into the freehold, the registered proprietor forfeits the land occupied by the new bed of the river, which becomes Crown land.

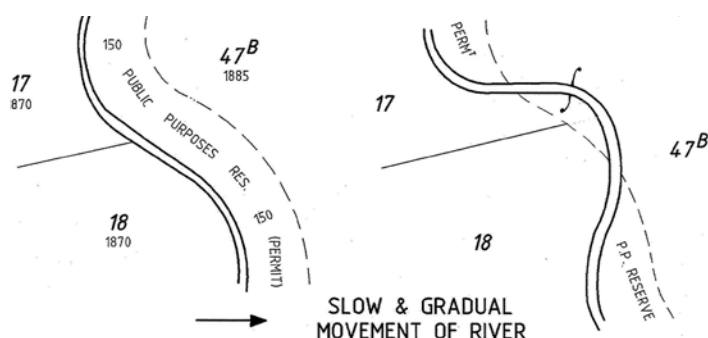
The freehold land is now severed by the new course of the river.

## Sudden breakthrough

If the river changes course by a sudden or man-made influence and invades onto the freehold land, the allotment boundaries remain in their original position and the bed and banks of the new course become part of the freehold title.

Sudden breakthroughs can be recognised if the original course of the river is still evident on the ground, or indeed if water flows in both channels – the new and the old.

## Doctrine of Accretion



*Reserve one side, freehold the other*

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## Slow and gradual movement across the permanent reserve and into freehold

The eastern boundaries of CAs 17 and 18, alienated in 1870, abut the river.

Under common law the grant was to the centre of the river; however, pursuant to provisions of the *Water Act 1905*, the bed and banks now vest in the Crown. Crown allotment 47B (alienated in 1885) on the opposite side of the river has abuttal to the boundary of the 1881 permanent reserve.

In this hypothetical situation the river has moved gradually and imperceptibly to such an extent that it crosses the 30.18 metre wide reserve corridor and invades into the freehold CA47B.

The consequences are that:

- owners of CA 17 and 18 have gained land to the permanent reserve boundary
- part of the permanent reserve has been extinguished
- Title to CA47B is severed (2 parts)
- the bed and banks of the river remain the property of the Crown.

## References and further reading

### 1. Further reading including links to:

- The Doctrine of Accretion
- Rivers and their Impact on Cadastral Boundaries
- Guidelines for the Determination of the State Border between NSW and Victoria along the Murray River.

### 2. Permanent Reservations on Rivers, Creeks, Lakes etc

[1881 Order-in-Council](#) (PDF - 1.8 MB)

### 3. At the Seaside (J D Sherwood, August 1976) is an article in the [Surveyor General Newsletter May 2008](#) (PDF - 24 KB)

### 4. Department of Sustainability and Environment website go to Property, Titles and Maps > Surveying > Government surveying services > [Practice Directives](#)

*The Doctrine of Accretion* is an essential document for all surveyors undertaking a survey to define boundaries that are based upon or dependant upon the course of a stream or the shoreline of a lake or sea. It was prepared in 1993 by DSE's Public Land Policy Section as a departmental guideline and is available on the website (see link, Further reading, above).

*Rivers and their Impact on Cadastral Boundaries* is essential for surveyors undertaking surveys of Crown boundaries related to the banks of rivers and streams in Victoria (see link, Further reading, above).

*Guidelines for the Determination of the State Border between NSW and Victoria along the Murray River* – although re-establishment of this border was not covered in this presentation, it is a boundary that requires the consent of the Surveyors General of both States and is therefore relevant to the topic (see link, Further reading, above).