HISTORY OF DREDGING THE ENTRANCE TO GIPPSLAND LAKES

A permanent entrance (**the Entrance**) to the port of Gippsland Lakes from Bass Strait was completed in 1889. Since its construction, there has been continual ingress of oceanic sand into the Inner Channels. In addition, an offshore bar (**the Bar**) has formed outside the Entrance (refer Figure 1). This sand on the Bar creates navigation hazards requiring almost continual maintenance dredging. Safe access cannot always be assured.

Figure 1: Location of elements of the entrance and sand management activities.

Successive Victorian Governments have determined that dredging be performed to maintain reliable navigable access to, and within, the port.

This dredging has been performed by Gippsland Ports and its predecessors on behalf of the State of Victoria.

For over thirty years to 2008, the side-casting dredge *April Hamer* maintained a channel through the Bar to allow vessels access to and from Bass Strait. During this period, The Bar continued to grow until it comprised of a shallow area (cut by the dredged navigation channel) containing several million cubic metres of sand.

From 2008, Trailing Suction Hopper Dredge (TSHD) technology has been used to successfully maintain the Bar and Entrance Channel.

The ingress of sand through the Entrance creates shallow waters and navigation hazards in the Inner Channels. For many decades, and still now, Gippsland Ports and its predecessors have used a Cutter Suction Dredge (**CSD**) to maintain the navigability of the Inner Channels at Lakes Entrance.

Initially material from dredging the Inner Channels was pumped onto adjacent land or water, but since 2001 the CSD has connected to the Sand Transfer Station (**STS**) and the sand has been pumped into the surf zone at one of two beach outfalls located approximately one kilometre east and west of the Entrance.

With two outfalls, and depending on prevailing weather, sand can be pumped in either direction that assists in its dispersal along the shoreline and reduces the amount that moves back into the entrance channel.

Figure 2: Kalimna CSD and Tommy Norton TSHD operating in the Inner Channels

Table 1: Summary of historic dredging activities at Lakes Entrance

DREDGE NAME	PERIOD OF USE	TYPE OF DREDGE
Wombat	1879 to 1928	Bucket Dredge
Priestman	1896 to 1963	Grab Dredge
Pioneer	1906 to unknown	Suction Dredge
W.H. Edgar	1922 to 1936	Side Suction Dredge
Paynesville	1936 to 1963	Suction Dredge
Sandpiper	1963 to 2005	Cutter Suction Dredge
Mathew Flinders	Circa 1970	Trailing Suction Hopper Dredge
April Hamer	1979 to 2011	Side-casting Dredge
Melbourne	2006 to 2007	Cutter Suction Dredge
Kalimna	2007 to present	Cutter Suction Dredge
Pelican	2008 to 2016	Trailing Suction Hopper Dredge
Tommy Norton	2017 to present	Trailing Suction Hopper Dredge

Table 2: Summary of dredging and sand management quantities at Lakes Entrance

FINANCIAL YEAR	SIDE-CASTING DREDGE	CUTTER SUCTION DREDGE			SAND SHIFTER	TRAILING SUCTION HOPPER DREDGE	
	APRIL HAMER	*SANDPIPER*	*MELBOURNE*	*KALIMNA*		*PELICAN*	*TOMMY NORTON*
1996/1997	304,625	95,484					
1997/1998	266,656	110,310					
1998/1999	458,888	93,069					
1999/2000	1,002,214	143,294					
2000/2001	828,678	97,980					
2001/2002	774,911	98,664					
2002/2003	801,700	111,636					
2003/2004	Not available	Not available					
2004/2005	306,078	173,811					
2005/2006	290,634	Not available					
2006/2007	440,532		241,063[a]				
2007/2008	229,040			210,366			
2008/2009	25,770			120,359	141,789[b]	557,710	
2009/2010	1,783			130,963	0	240,541	
2010/2011				89,960	0	164,739	
2011/2012				89,920	0	379,175	
2012/2013				110,380	0	244,566	
2013/2014				103,375	0	173,892	
2014/2015				121,597	0	180,932	
2015/2016				94,801	0	156,789	
[c]2016 CY				158,004	0	200,768	
2017 CY				165,233	0		45,598
2018 CY				122,456	0		184,401
2019 CY				88,261 [d]	0		172,271
2020 CY				108,073	0		210,787
2021 CY				30,860	0		312,956
[d]2022 CY				87,422	0		413,838
2023 CY				97,597	0		313,259

Notes:

a hired during build of Kalimna CSD
b Installed and trialled 2008/09
c change to calendar year reporting
d Major slipping and maintenance

EMMS January 2024

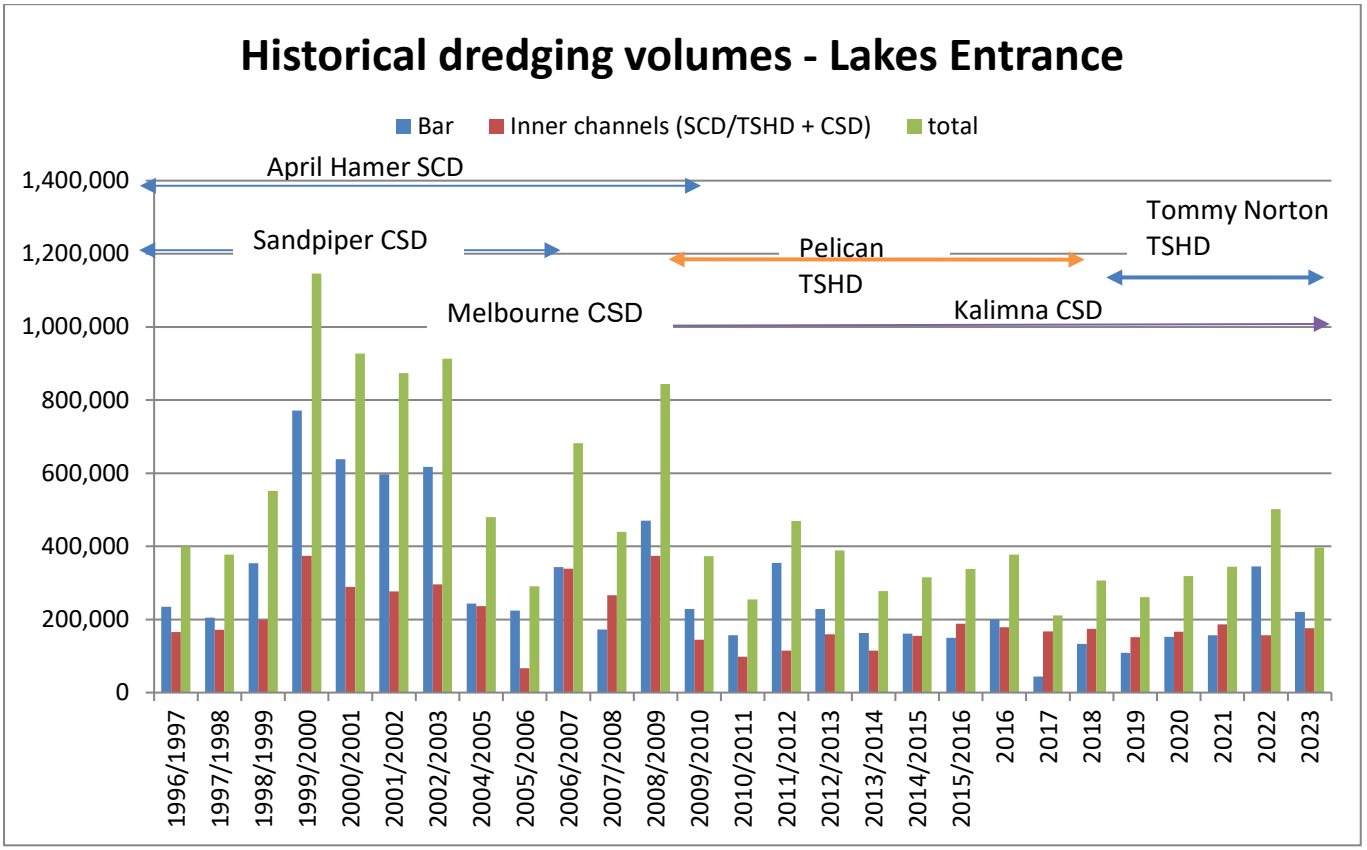


Figure 3: Historical dredging volumes

Channel Maintenance

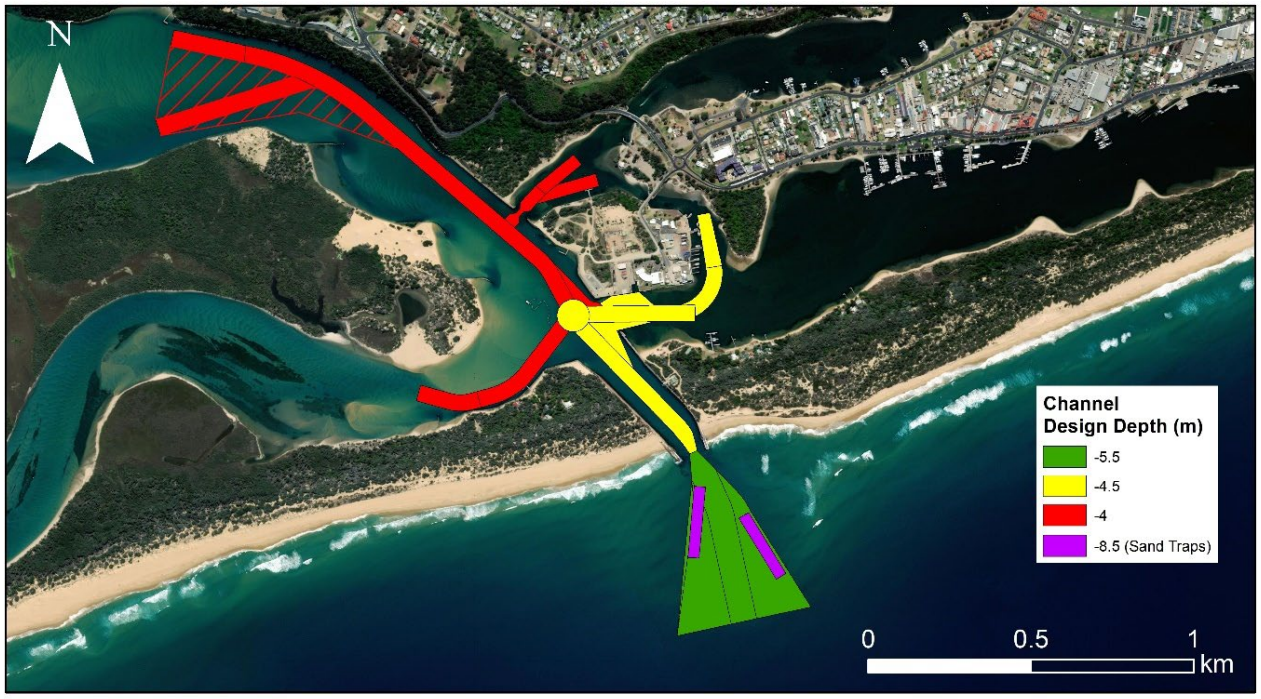
Gippsland Ports' dredging strategy is to maintain the various channels at historic levels of navigability by dredging to target depths below chart datum as set out below:

Table 3: Gippsland Lakes Ocean Access channel design target levels

Channel	Target Depth	Over-dredging tolerance[1]
Bar Channel	-5.5m CD	1.0m
Wedge Channel[2]	-5.5m CD	1.0m
Entrance Channel	-4.5m CD	1.0m
Swing Basin	-4.5m CD	1.0m
The Narrows & Reeve Channel	-4.0m CD	1.0m
Cunninghame Arm	-4.5m CD	1.0m
Hopetoun Channel	-4.0m CD	1.0m
North Arm	-4.0m CD	1.0m

1. "Over-dredging tolerance" is to allow for accuracy of dredger operation and slumping and settlement immediately after dredging. Not routinely used.
2. Two sand traps up to 220m length and up to 35m width may be dredged on both the western and eastern boundary of wedge. Exact location is dependent on location of Bar formation. Dredging to -8.5m CD (plus tolerance) if required. Sand traps only make up 10% of Bar dredge design footprint. Sand traps are included to improve safety of TSHD vessel operating on the Bar. Only used in exceptional circumstances.

Figure 4: Dredging areas



Influences on Future Dredging:

- Ongoing ingress of sand into the inner channels and the accretion of sand on the Bar resulting in compromised navigability.
- Continuing Victorian Government policy commitment to maintaining ocean access to the Gippsland Lakes.
- Available funding to maintain ocean access through dredging and related sand management activities.
- The acquisition of requisite permits and consents from various regulatory agencies to allow maintenance dredging and sand disposal to continue.

Dredging Schedule

From 2008 to 2016 dredging of the bar and entrance channel was conducted using a contracted Trailing Suction Hopper Dredge (TSHD) with dredging programs undertaken annually through interventions of four to eight weeks duration (the actual time required influenced by the extent of sand accretion and availability of the contracted dredge).

With the acquisition of *Tommy Norton* TSHD in 2017, dredging of the bar and entrance channel is now performed on a year round basis.

Dredging of the inner channels near Lakes Entrance will also be on a year-round basis, with the exception that no dredging will be undertaken within the defined Rigby Island Buffer Zone during periods of exclusion for migratory bird breeding.

Sand disposal from Trailing Suction Hopper Dredging

Gippsland Ports places sand in two Dredged Material Grounds (DMGs) in accordance with the permission granted by the Commonwealth regulator.

Each DMG comprises a rectangle of dimensions 2,000m long by 400m wide as illustrated below:

Figure 5: Dredged Material Grounds

Sand by-passing

The future operation of sand shifters will be determined on the basis of need.

Sand disposal:

All disposal of material from Cutter Suction Dredging and from the Sand Shifters is through the Sand Transfer System via Sand Transfer (pumping) Station. There are two outfalls on the beach each located about one kilometre east and west of the Entrance.

Figure 6: Layout of the Sand Transfer System

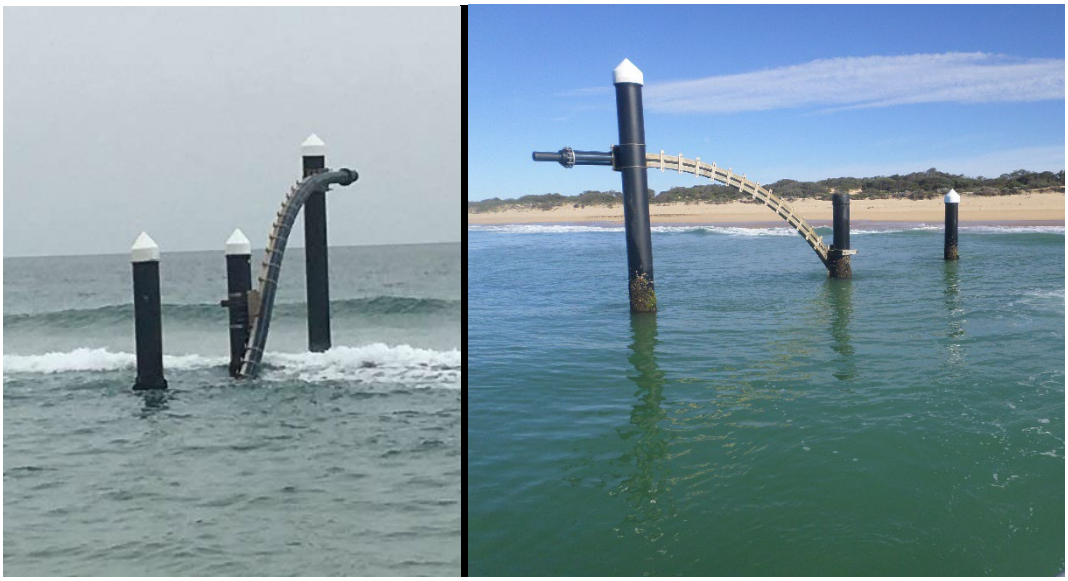


Figure 7: East outfall **West outfall**