

## VASSE AND WONNERUP ESTUARIES

### GUIDANCE NOTES FOR FISH GATE OPERATIONS

These Guidance Notes should be read in conjunction with the Water Corporation's 1990 Operational Guidelines (copy attached) for the Vasse estuary and Wonnerup estuary floodgates and sand bar.

#### OPERATIONS REQUIRED

##### **Vasse estuary floodgates (Layman Rd)**

1. During summer-autumn (Dec-May) keep the Fish Gate (but not the Fish Gate Penstock) fully (100%) open.
2. During summer-autumn, open the Fish Gate Penstock as necessary to:
  - 2.1. allow two-way flow when the water level in the estuary is approximately mid-way<sup>1</sup> between high and low tide levels<sup>2</sup> in Wonnerup Inlet,
  - 2.2. allow fish gathering<sup>3</sup> in large numbers (hundreds or thousands) on the estuary side of the floodgates to swim into Wonnerup Inlet,
  - 2.3. prevent the Vasse estuary water level falling below  $-0.1\text{mAHD}^4$ ,
  - 2.4. allow water to flow into the estuary for a maximum of 8hrs<sup>5</sup> if fish on the estuary side of the floodgates appear stressed but the estuary water level is already at the summer-autumn target level of  $-0.1\text{mAHD}$ .

##### **Wonnerup estuary floodgates (Forrest Beach Rd)**

1. During summer-autumn, open the Fish Gate and FG Penstock as necessary to:
  - 1.1. prevent the Wonnerup estuary water level falling below  $-0.4\text{mAHD}^6$ ,
  - 1.2. allow fish gathering<sup>3</sup> in large numbers (thousands) on the estuary side of the floodgates to swim into Wonnerup Inlet,
  - 1.3. allow water to flow into the estuary for a maximum of 8hrs<sup>7</sup> if fish on the estuary side of the floodgates appear stressed but the estuary water level is already at the summer-autumn target level of  $-0.4\text{mAHD}$ .

#### NOTES

1. When the water level in Vasse estuary in summer is approximately mid-way between high and low tide levels in Wonnerup Inlet (this is most likely to be some time/s in Dec-Jan), consider opening the Fish Gate Penstock 10%-100% to allow 2-way water flow. If outflow and inflow rates are similar, the FG Penstock may be left open for some or many days without significantly affecting the Vasse estuary water level. Ideally salinity measurements would be taken between the floodgates and the mouth of Malbup Creek to ensure that saline water entering the estuary does not reach farmland. Note that the Water Corporation's water level recorders on both sides (estuary and Inlet) of the floodgates need to be working for this operation to be performed satisfactorily.
2. The sand bar at the mouth of Wonnerup Inlet must be open throughout a wide tidal range for this operation to be performed satisfactorily.
3. If large numbers of fish are milling against the floodgates on the upstream side the Fish Gate Penstock should definitely be opened to allow their release. If they are not milling against the floodgates a judgement needs to be made.

4. The water level in Vasse estuary normally declines due to evaporation during summer and autumn. Under the 1990 Operational Guidelines, when the water level has declined to  $-0.1\text{mAHD}$ , seawater should be allowed to enter the Vasse estuary to maintain the estuary water level at  $-0.1\text{mAHD}$ . Note that in practice the estuary water level as recorded at the floodgates may vary by up to 5cm due to winds and perhaps other forces. An acceptable range for the level of  $-0.1\text{mAHD}$  is considered to be  $-0.14\text{mAHD}$  to  $-0.06\text{mAHD}$ .
5. The 8hr limit is intended to prevent the Vasse estuary water level rising above  $-0.1\text{mAHD}$ . Further experience might indicate that this figure (8hrs) could or should be usefully modified.
6. Prior to replacement of the Wonnerup estuary floodgates in 2004, the water level in Wonnerup estuary declined to approximately  $-0.4\text{mAHD}$  each summer-autumn due to evaporation. Since 2004 it has been found necessary to at times open the Wonnerup estuary Fish Gate and Fish Gate Penstock in order to maintain this level. This is because the replacement floodgates do not leak as much as the former gates. Note that agreement of potentially-affected land owners and key stakeholders would need to be obtained to maintain a summer-autumn level above  $-0.4\text{mAHD}$  in Wonnerup estuary.
7. The 8hr limit is intended to prevent the Wonnerup estuary water level rising above  $-0.4\text{mAHD}$ . Further experience might indicate that this figure (8hrs) could or should be usefully modified.

Prepared by JLane (DPaW, July 2013).

## **APPENDIX 2<sup>1</sup>. The 1990 guidelines for operating the floodgates and managing the sand bar.**

The Water Authority's "Update to Hand Book of Basic Data" (August 1990) reads as follows with respect to operation of the floodgates and management of the sand bar at the mouth of Wonnerup Inlet.

### **2.9 Vasse and Wonnerup Floodgates**

#### 2.9.1 General

"The Vasse and Wonnerup floodgates protect the low lying agricultural land surrounding the Vasse and Wonnerup Estuaries from flooding with sea water".

"They also have a check board facility on each flood-gate to allow fresh water to be retained at the end of winter to control the drop in water table on these flats. This is done to maintain water in the estuary system for as long as possible and to hold back any summer run-off".

"Due to high temperatures and low levels in the estuaries, there is a strong possibility that fish fatalities will occur in the Vasse estuary and between the floodgates if the bar is closed, with resultant criticism of the Authority".

"The Authority's major obligation is the interest of the drainage ratepayers and this will be the overriding consideration. It will however, be necessary to take action to facilitate better environmental management where the interest of the ratepayers can be protected".

#### 2.9.2 Maintenance

"The gates must be lifted each year and scraped clear of marine growth and any corrosion on steel work protected. The structures should be annually sprayed for protection against white ants and fire".

#### 2.9.3 Operation

##### 2.9.3.1 WINTER

"Immediately after the first rains produce run-off, the boards can be removed. To prevent vandalism, these boards should be stored in the Depot."

"Due to the fact that the ocean outlet for these two structures will block easily, it may be necessary to open this bar by mechanical means on several occasions throughout the winter. Experience has shown that to attempt to open the bar without sufficient head is a waste of time, and the gauge board at the Vasse Floodgate should attain a reading of at least 0.7m AHD, or the attempt will probably fail (unless the sea is extremely quiet with low tides. This is unlikely at times when the bar is blocked and the Estuaries are between 0.4m and 0.7m AHD in height)".

"Before the run-off has finished for the season, it is necessary to fix the stopboards to a height of 0.40m AHD so that the fresh water is retained, to facilitate the breeding of waterfowl. (It is desirable - but difficult - to keep the water at 0.40m AHD)".

##### 2.9.3.2 SUMMER

"The water levels should be monitored at the Vasse Floodgates on a minimum monthly basis until the level reaches 0.1m AHD and then on a minimum weekly basis. If three consecutive

---

<sup>1</sup> Appendix 2 of *Management of the Vasse-Wonnerup Wetland System in relation to sudden, mass fish deaths*. Technical report prepared by Lane, J. (CALM), Hardcastle, K. (WRC), Tregonning, R. (DoF) and Holtfreter, G. (Water Corporation) on behalf of the Vasse Estuary Technical Working Group, December 1997.

days of temperatures in excess of 30 degrees occur, preparation should be made to allow fish to pass through the gates if they show any signs of stress (swimming on surface)".

"When the level reaches -0.1m AHD, farmers on the Vasse estuary should be notified and the gates opened to maintain the level at -0.1m AHD".

"Under no circumstances should salt water be allowed to come back behind the gates to allow the levels to become higher than -0.1m AHD"

"The level of -0.1m AHD has been found to be acceptable by farmers in the area and appears to be satisfactory to relieve stress on the fish. It should be reviewed periodically with interested parties. Tests have also shown that at this level the salt is diluted to acceptable levels when the Vasse estuary fills with run-off water so that no damage is done to surrounding pastures"

"In the event of the sand bar being closed and no water available to come back, a decision to open the sand bar must be made in conjunction with the Regional Operations Engineer as a matter of urgency".

-----