PROJECT SEA DRAGON
STAGE 1 LEGUNE GROW-OUT FACILITY
DRAFT ENVIRONMENTAL IMPACT STATEMENT

# VOLUME 1 - PROJECT OVERVIEW
# CHAPTER 5 - WATER BALANCE

# CONTENTS



## LIST OF TABLES



## LIST OF FIGURES

# 1 INTRODUCTION

Section 4.4.2 of the Terms of Reference (ToR) for the Project Sea Dragon Stage 1 Legune Grow-out Facility (the Project) outline the requirement for a water balance for the Project as follows:

- A water balance (all inputs and outputs) based on long-term modelling using rainfall/runoff and evaporation data for a period equivalent to the expected life of the Project should be included in the EIS.

This section outlines the proponent's response to this ToR.

## 1.1 APPROACH

Water balances within the project will be dynamic and are unlikely to be at steady state. Thus a 'single' or static water balance would not capture key attributes of the system. For this reason, to develop a comprehensive understanding of water balances within the project, the proponent commissioned Golder and Associates to develop a project-specific version of GoldSim (see http://www.goldsim.com/Home/). GoldSim is a globally accepted, well documented, water balance modelling software package capable of probabilistic (Monte Carlo) simulation. Salt and salinity levels are determined within the model simulations since this is a key operating constraint for the project. Golders has previously undertaken the work to support the development of the Forsyth Creek Dam.

This approach has several benefits:

- provides insight into the optimal engineering for the project based on water
- enables a solid understanding of water requirements for the project based on a wide range of scenarios
- enables investigations into a wide range of operating assumptions and constraints
- can be used as a tool to understand the dynamics between operational decisions, environmental variations and water balances.

# 2 MODEL SETUP

GoldSim is a daily-time-step model that enables a highly-resolved simulation of water balance. The model was set-up as a **Probabilistic Water Balance and Salt Model** to provide insight into the system within a strict hierarchy:

- For the project as a whole: Figure 1 outlines the main components within the water balance at the project level, defining the inflows and outflows to/from a farm.
- At the farm level: Figure 2 outlines the main components within the water balance at the farm level, defining the inflows and outflows within a farm.
- At the Sub-Farm Level: Figure 3 outlines the main components within the water balance at the sub-farm level, defining the inflows and outflows at a pond level.

For the purpose of this environmental assessment and meeting the ToR, the most relevant point within the hierarchy is that of the project as a whole, as illustrated in Figure 1, Figure 2 and Figure 3 have been included for completeness.

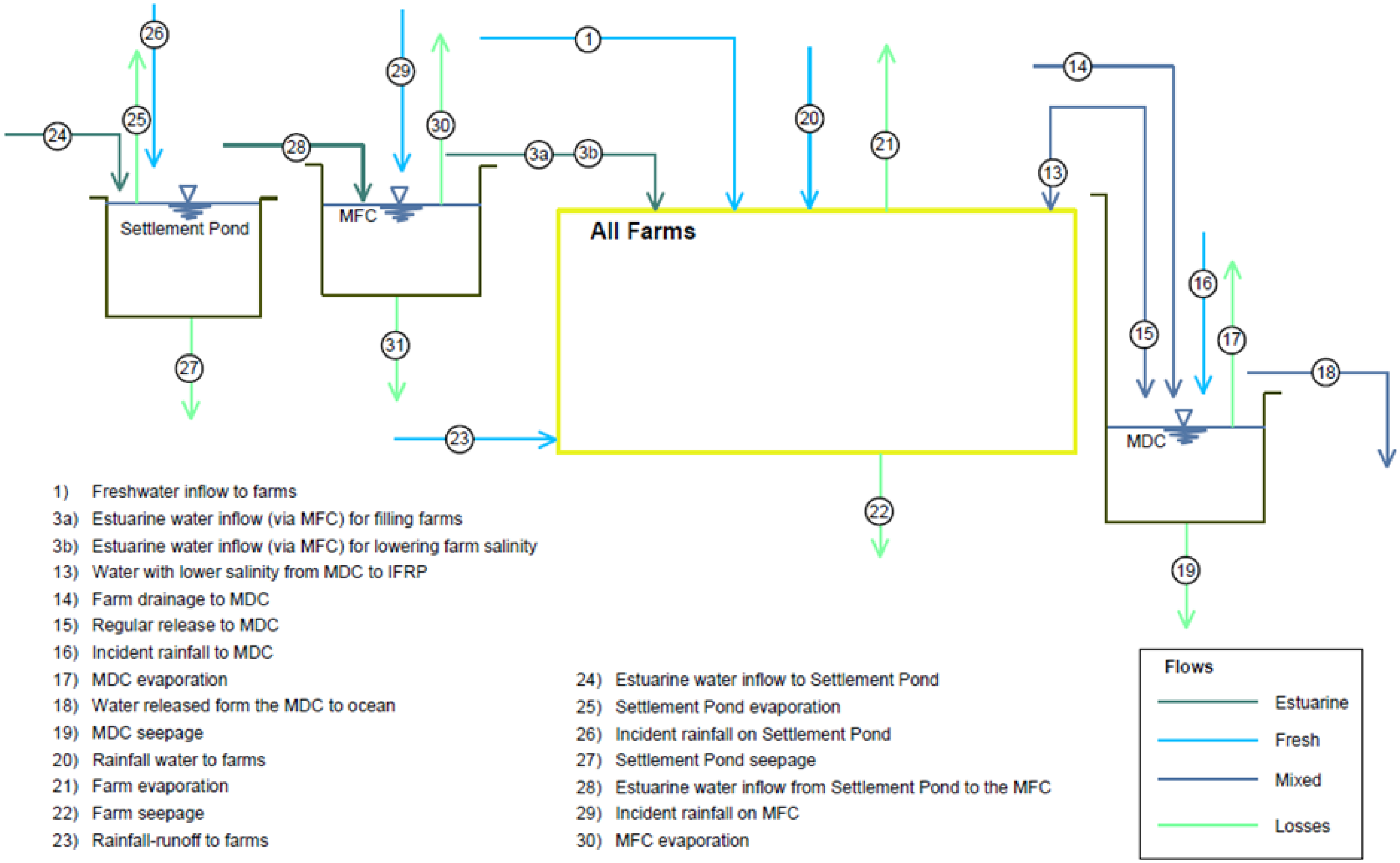


FIGURE 1 WATER INPUTS/OUTPUTS FLOWS, LOSSES AND STORAGES

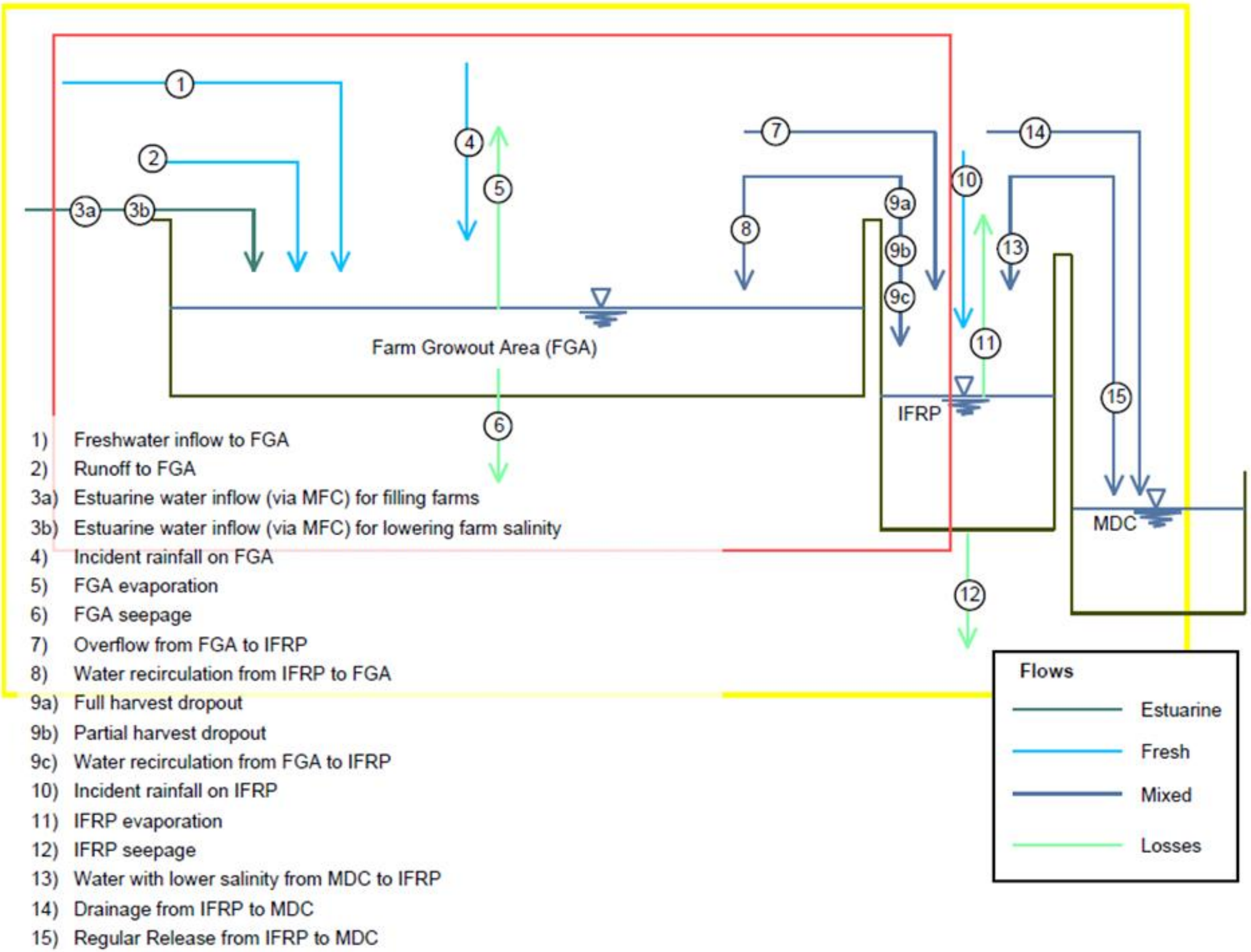


FIGURE 2 WATER INPUTS/OUTPUTS FLOWS AND LOSSES AT THE FARM LEVEL

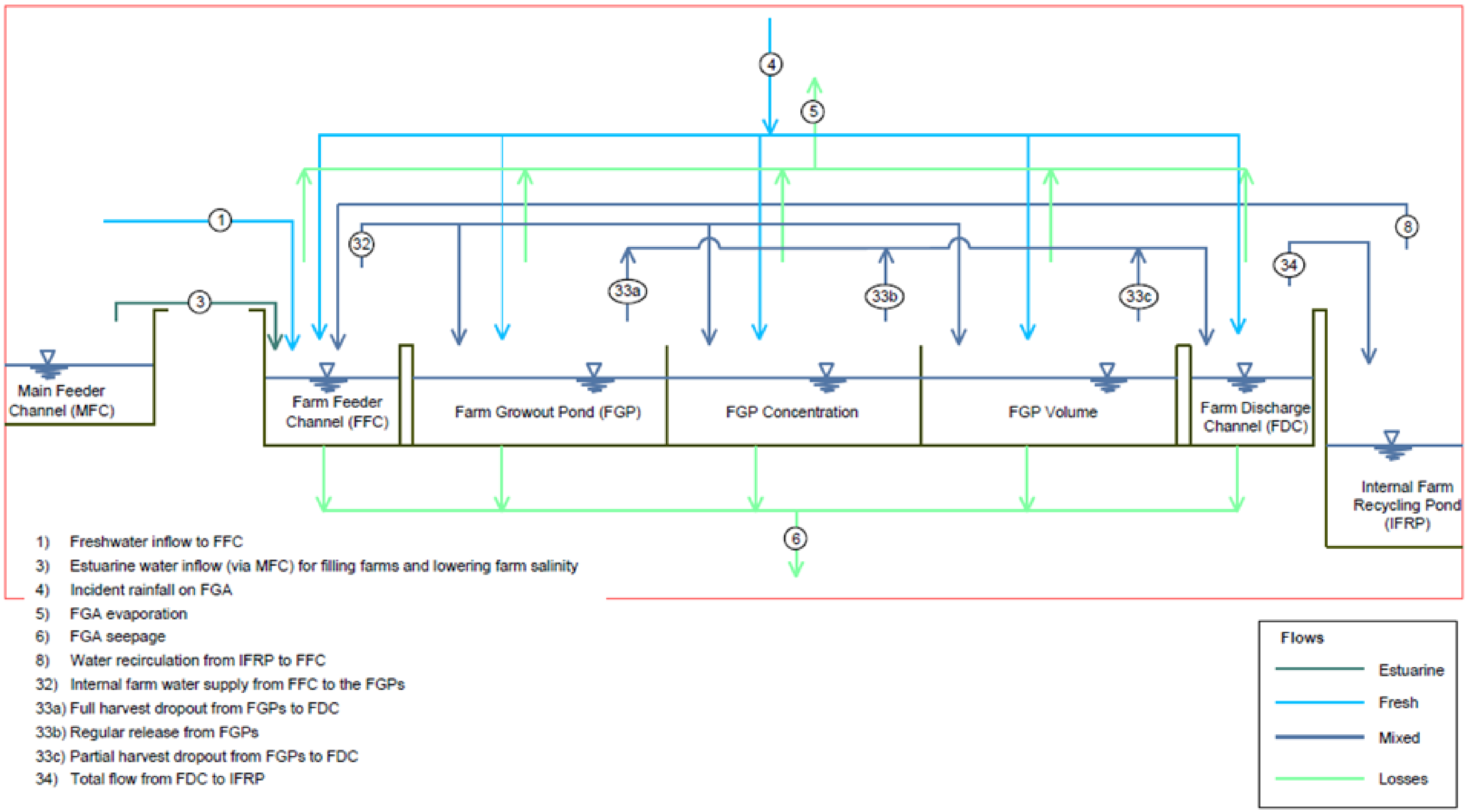


FIGURE 3 KEY FLUXES FOR A POND WATER BALANCE WITHIN A SINGLE FARM

It is essential to note that the model domain does not include the Environmental Protection Zone (EPZ). This was a deliberate choice and is a conservative assumption. Note also that the model has been designed to capture certain fluxes at the farm level or pond level as opposed to system level. Thus assumptions in relation to run-off (flux 2) are tested at the 'farm level' in other cases some fluxes are partitioned according to scale - thus flux 4 in Figure 2, for example is a partitioning of flux 20 in Figure 1.

The model contains a relatively large number of parameters and inputs that can be adjusted or modified. These are:

- Development stages including:
  - number of farms and ponds developed within Stage 1 and the commissioning date of the farms
  - reach of the Main Feeder Channel (MFC) from which estuarine water is abstracted (noting this is used in the hydraulic channel analyses within the model)
  - timing of partial and terminal harvests for each farm
  - durations of farm production and periods required for pond dry-out.
- Storage details including:
  - data to define the available storage volume and surface area for Forsyth Creek Dam
  - maximum storage capacity and minimum abstraction levels for Forsyth Creek Dam.
- Channel characteristics including:
  - Main Feeder Channel (MFC) and Main Discharge Channel (MDC) widths, lengths and slopes
  - interconnection between the channels to be used in the hydraulic analyses within the model (based on farm layout plan).
- Design parameters defining:
  - pond dimensions
  - capacity of Internal Farm Recycling Ponds
  - partial harvest dropout rates
  - capacities of estuarine water inflow per farm
  - freshwater conveyance rate per farm,
  - pumping rate from MDC to Internal Farm Recycling Pond (IFRP), and drainage from IFRP to MDC
  - area of settlement ponds
  - seepage rates from ponds and channels
  - salinity thresholds in farms at which freshwater is provided from the storages.
- Relevant environmental, climatic and streamflow data including:
  - monthly estuarine salinities

- long-term rainfall and evaporation records for the project area, which were analysed and parameters derived to stochastically generate both daily rainfall and evaporation. This was required to allow the model to be operated probabilistically into the future. These generated sequences have the same likelihood of occurrence as those observed as well as retaining comparable seasonal and annual statistics to the historical data sets.
- The Australian Water Balance Model was calibrated to the project site and is applied in the **Probabilistic Water** B**alance and Salt Model** to predict inflows to the proposed reservoirs.

In considering the above it becomes clear that the parameters can be further grouped into three classes: (i) design parameters; (ii) operational parameters; and (iii) environmental parameters.

The water balance model has been used iteratively to assist in the design of the facility, and the design parameters have been varied as part of this process. However, once the facility is constructed (or final detailed engineering design 'locked in') the design parameters within the model become fixed. By contrast operational and environmental parameters will vary once the project is operating.

Examples of design parameters within the model are:

- channel dimensions
- pond dimensions
- pump and conveyance plant and equipment.

Examples of operational parameters:

- number of ponds in production
- scheduling of ponds in production
- harvest strategy within ponds (e.g. partial, or full harvest; growth of the crop; ability of processing plant to accommodate incoming product)
- amount of water being re-used (quality of water in recycling ponds, quality of water in production ponds)
- amount of water being exchanged (taken into the system and discharged from the system)
- pumping of estuarine water
- pumping of freshwater
- release of water.

Examples of environmental variables:

- precipitation
- evaporation
- freshwater availability (storage)
- temperature
- estuarine salinity.

From a water-salt balance perspective the two key operational parameters that constrain the system are:

- a requirement to maintain salinity within the biological tolerances of the animals (salinity must be maintained at 10 to 45 g/L [10-45 parts per thousand])
- availability of freshwater.

Freshwater is 'controllable' via rates and timing of water release from the dam, the design of channels, pumping rates and the operation of the facility within the design. Other factors driving water flow requirements are climatically-driven: precipitation, evaporation and to a smaller extent temperature.

Some of the parameters in the GoldSim model have been implemented for engineering design as opposed to environmental assessment purposes. Thus in the list above it is possible to test the minimum abstraction of the Forsyth Creek Dam for reliability purposes, but also in order to test whether engineering modifications to the dam might be effective. In broad terms a decision was made to include as many conceivable parameters in the model prior to engineering design. As discussed below the model allows for rainfall run-off into farms to test whether this might be a desirable design attribute.

## 2.1 DEFINING WATER EXCHANGE

To support pond biota, water quality within the system needs to be managed. Water quality management includes the exchange of water through the system by pumping water in (estuarine water and freshwater), and regularly releasing water from the system. Water exchange can thus be defined as water released from the system in ‘exchange’ for new water. This is the most relevant definition for the purposes of environmental assessment.

However, it is important to note that water exchange actually occurs within the model at each level of the system hierarchy as described in Figure 1, Figure 2 and Figure 3. Thus, in order of scale, water exchange can be considered, and occurs:

- between 'the system' and the environment (that is, from water acquisition through to water release).
- between farms (that is, between the IFRP and the MDC).
- between ponds and the farm.

From an environmental perspective, exchange between farms and between ponds can be considered as 'recirculation' and therefore water exchange in this water balance is considered to be between the entire grow-out operations and the environment (e.g. Figure 1). At a seasonal scale, water exchange can be considered as the percentage of the water held within the system that is exchanged with the environment over the course of an 'average' season.

## 2.2 GENERATION OF LONG TERM CLIMATE SEQUENCES TO ENABLE PROBABILISTIC MODELLING

During simulations the period of modelling was selected to reflect the duration of operations, which for the purposes of this Environmental Impact Statement (EIS) is a period notionally for 30 years. However, depending on the phenomenon being investigated (for example harvesting) the simulation can be made shorter. The key point is that a single simulation therefore provides one set of model outputs.

When considering how the facility will operate over a number of years it is necessary to account for climatic variability, in particular precipitation and evaporation. In order to do this it is necessary to generate climate scenarios in which daily patterns of rainfall and evaporation differ (vary), but the seasonal trends (or statistics) are comparable to those which have been observed. Given that these are generated at a minimum of daily time-steps; the synthetic data sequences are also known as weather sequences. In this way it is possible to undertake comparable simulations, in which there are multiple realisations of climatic parameters.

This is a more robust approach than simply applying time-series of 'observed' data in a geography that is either data-sparse or where the length of the time-series might be limited.

The water balance and salt model was therefore operated probabilistically to enable the full range of variability in model outputs (based on multiple stochastically generated model runs) to be assessed.

Golders developed a synthetic data-set based on stochastic generation of both daily rainfalls and evaporations. The sequences were derived using the stochastic generator developed by the Catchment Research Centre (CRC) for Catchment Hydrology (Boughton 2005).

The generator uses a transitional probability matrix to provide a representation of the probabilities of the historic daily rainfall (or evaporation) falling within defined ranges. This approach also takes into consideration the magnitude of the preceding day’s rainfall and therefore preserves the historic daily climatic patterns as well as the frequency and magnitude of the daily values including the more extreme observations.

The benefits of the stochastic generator are:

- Stochastically generated data are able to reproduce observed statistics (monthly and annual means and standard deviations) and therefore provides alternative yet statistically equally likely sequences.
- Stochastic generation for rainfall results in more extreme high values than have been recorded, if the sequences to be generated are longer than the observed record. This approach allows for future planning based on more extreme rainfall events than have occurred in the observed record.

The inclusion of 'more extreme' values being included via this approach increases confidence that the design of the system can operate within the envelope of extremes likely to be encountered, even if such extremes have not been historically observed.

By undertaking the modelling for a large number of realisations (typically 30 - 100) the combined set of output results can be evaluated to define probabilities of exceedance, and hence the probability that various parameter estimates will be exceeded. This could include parameters such as salinities within the farms, storage volumes with the various freshwater storages, and any shortfalls in freshwater supply.

A further benefit of this approach is that the risks associated with various operating strategies and design criteria during the feasibility study such as: salinity threshold levels in the farms for release of freshwater; conveyance capacities for transfer of freshwater from the storages; and timing of the introduction of new freshwater storages and their associated capacities, can be evaluated.

## 2.3 ASSESSING FRESHWATER RELIABILITY

Project Sea Dragon has used three lines of evidence to assess the reliability of freshwater storage at Forsyth Creek Dam. These are:

i. anecdotal information

ii. historic satellite imagery

iii. rainfall-runoff modelling.

Anecdotally the Legune Station Manager reported that the dam has overflowed (via the spillway) on 8 out of the 10 years of operation.

A review of satellite imagery (Landsat) over the past ten years was undertaken for the period January 2005 to December 2015. Recognised limitations with Landsat imagery include:

- scenes are limited to about 16 days between images
- the utility of scenes may be compromised by image clarity, resolution constraints, or excessive cloud cover
- Landsat has a 30 m spatial resolution, as a result storage volumes inferred from the images were limited to a resolution of 0.5 m storage.

Nonetheless satellite images were able to be used to assess past reliability of inflows into the dam.

The Australian Water Balance Model is one of several available rainfall-runoff models commonly used in Australia (Sacremento and Simhyd are others, see Boughton 2005 for a review).

The rainfall-runoff model was calibrated using Bureau of Meteorological data validated against meteorological observations taken at Legune and hydrologic data from the Elizabeth River Catchment. The Elizabeth River Catchment was selected as being the most appropriate surrogate for the Forsyth Creek catchment. The Forsyth Creek catchment is not instrumented and therefore could not provide any data for this modelling. The parameters in the rainfall-runoff model were set to simulate observed run-off in the Elizabeth River catchment over a period of 10 years. The capacity of water storage parameters were then adjusted to reflect the size and conditions of Forsyth Creek assuming a similar catchment yield of approximately 40%.

# 3 SIMULATIONS

A very large number of simulations has been undertaken with the water balance model. The simulations have explored important key elements of the system as follows:

- System sensitivities to water exchange (up to 1.4% of maximum dry-season total system volume).
- Time taken to fill farms (3 days and 18 days) and days between farm fills (56 days and 70 days).
- Freshwater demand and supply (see Table 1).
- Implications for volumes of water leaving the system (see Volume 2, Chapter 2).

Table 1 shows the matrix of simulations conducted to determine freshwater demand and supply. The trigger salinity refers to the point at which a farm would demand freshwater input and the conveyance capacity refers to the rate at which that demand can be met. The simulations enable an understanding of the drawdown of and demand from the water storage.

TABLE 1 SIMULATION MATRIX FOR TESTING FRESHWATER SUPPLY

| | Trigger salinity (g/L) | Conveyance capacity (L/s) |
|---|---|---|
| Scenario 1 | 36 | 200 |
| Scenario 2 | 36 | 300 |
| Scenario 3 | 36 | 400 |

| | Trigger salinity (g/L) | Conveyance capacity (L/s) |
|---|---|---|
| Scenario 4 | 40 | 200 |
| Scenario 5 | 40 | 300 |
| Scenario 6 | 40 | 400 |

# 4 RESULTS

## 4.1 WATER HOLDING CAPACITY OF THE SYSTEM

As described previously the model was used iteratively to assist in the design of the facilities. Table 2 summarises the design capacities of the water storages as shown in Figure 1. The second column of the table shows the standard design volume of each reservoir. Freeboard indicates the additional water that each reservoir could hold prior to over-topping. The final column is the total of these two. Thus Table 2 shows the water-holding capacity of the system.

TABLE 2 DESIGN CAPACITY

| Capacities | Design ($m^3$) | Freeboard (allowance) ($m^3$) | Total ($m^3$) |
|---|---|---|---|
| Incoming settlement ponds | 6,000,000 | 2,300,000 | 8,300,000 |
| Main Feeder Channel | 1,600,000 | 600,000 | 2,200,000 |
| All farms | 21,500,000 | 10,000,000 | 31,500,000 |
| Main Discharge Channel | 1,200,000 | 840,000 | 2,040,000 |
| Environmental Protection Zone | 3,750,000 | 2,600,000 | 6,350,000 |

## 4.2 STEADY-STATE WATER BALANCE SCENARIO

We have previously noted that the Stage 1 Legune Grow-out Facility will be a dynamic system, driven in no small part by the environment. However, it is useful to conceptualise a steady-state condition where inflows and outflows are balanced across a period of time. Most usefully a steady-state across an 'average' dry season and an 'average wet' season can be considered; noting that in reality such conditions do not occur.

Table 3 shows the flux values for such a steady-state with the fluxes or flows ordered to follow the passage of water through the system. Each of the numbers in column 2 corresponds to the numbers (fluxes) defined in Figure 1. For this analysis we have selected dry season to be the six months (April to September) and the wet season to be other six months (October to March). This is a standard climatological approach.

The 410 ML/day in Table 3 is the result of a water exchange of 1.4% of maximum dry season total system volume.

## TABLE 3 WATER FLUX VALUES FOR A THEORETICAL STEADY-STATE CASE

| Flux | Figure Reference | Dry Season (ML/day) | Wet Season (ML/day) | Design limit (ML/day) |
|---|---|---|---|---|
| Estuarine water into settlement pond | 24 | 575 | 530 | 600 |
| Estuarine water into Main Feeder Channel | 28 | 575 | 530 | 575 |
| Estuarine flow for farm filling / salinity | 3a, 3b | 450 | 430 | 450 |
| Freshwater inflow to farms | 1 | 35 | 1 | 75 |
| Farm drainage to Main Discharge Channel | 14 | 80 | 90 | 650 |
| Regular release to Main Discharge Channel | 15 | 330 | 340 | 600 |
| Water from Internal Farm Recycling Ponds to Farm Ponds (recirculation) | 13 | 930 | 960 | 960 |
| Water released from Main Discharge Channel to Alligator Creek* | 18 | 410 | 410 | 1,000 |
| Evaporation | 25, 30, 21, 17 | 136 | 77 | - |
| Seepage | 27, 31, 22, 19 | 6 | 5 | - |
| Precipitation | 26, 29, 20, 16 | 180 ML/month | 3,500 ML/month | ≤6,000 ML/month |

* As a conservative assumption the model does not include the effect of the EPZ on the release of water to the environment.

The entries in each of the seasonal columns represent the modelled average condition. The design limit represents the limits imposed by the engineering design. For example, the intake of estuarine water into the settlement ponds is limited by the intake pumps and their design (intake rates and any limits to the hours of pumping) and by how quickly the settlement pond can be emptied, again limited by the engineering of the settlement pond.

Table 3 also provides insight into the steady-state constraints on the system. Assuming a zero net-exchange with the atmosphere across a period of time (that is assume that evaporation and precipitation are equal), the maximum water inflows to the system based on the design limit will total 650 ML/day (575 ML/day estuarine water plus 75 ML/day freshwater). This is limited by the pumping of water into the system at the estuary and by pumping from the dam into the system (freshwater pumping). Therefore at steady state the maximum amount of water entering and therefore leaving the system would be 650 ML/day. However, the design limit for discharge is 1,000 ML per day. Thus the system is designed to be able to manage an additional 350 ML/day of water leaving the system due to precipitation, even in the implausible case that both freshwater and estuarine pump systems are operating at full capacity.

Two of the fluxes, evaporation and seepage, cannot be limited by engineering design. Thus Table 3 shows the seasonal averages for evaporation (time series realisations for evaporation are shown below in Figure 5 and Figure 6) and the parameter setting for seepage. Note that the statistical average for wet season precipitation is 3,500 ML/month (a precipitation time series is shown in Figure 4) and the design 'allowance' is 6,000 ML/month. Note that although the model allows for rainfall run-off into farms, the setting of this parameter at zero shows that the design enables rainfall run-off to occur across the floodplain without incursion into the system. As described above the inclusion of this parameter within the model allows different design scenarios to be tested.

## 4.3 GRAPHICAL REPRESENTATION OF A STEADY-STATE CASE

The figures presented below relate to the dry season steady-state scenario described in Table 3 which represents a water exchange of 1.4% of maximum dry season total system volume. The key outputs are shown below.

Figure 4 shows the modelled incident rainfall at Legune Station. Figure 5 shows the modelled evaporation at Legune Station. Figure 6 shows the output from the model for evaporation at the MDC.

Figure 7 shows the estimated freshwater demand from Forsyth Creek Dam, based on an assumption that the demand for freshwater is triggered when the salinity within farm hits 36 g/L and that the engineering conveyance permits a draw-down of 300 L/s.

Figure 8 shows the total amount of water from the estuary pumped into the system on an annual average basis assuming a farm being filled every 70 days. The corresponding daily pumping from the estuary is shown in Figure 9. Note that pumping is not continuous and the pumps are designed to pump only at mid-tide and higher.

In order to achieve the water exchange, Figure 10 shows the regular release of water from the farms to the MDC.

Figure 11 shows the release of water associated with the harvest from the farms to the MDC.

Finally, Figure 12 shows the simulated release of water back to Alligator Creek. The figure is plotted as an annual average in ML/day.

The figures comprise statistics from a Monte Carlo simulation of 30 realisations, and plot the results for a notional period 2019 - 2029. The red line plots daily average values. Reading across the legend, the colour bands represent the statistics of the realisations as follows:

- Light blue labelled 'Min..1% /99%..Max' represents the range of results ≥1% and ≤99%, thus the shading shown excludes the lowest 1% and highest 1% of results. This represents the 98% confidence interval for both low and high events.
- The next label '1%..5% /95%..99%' represents the range of results ≥5% and ≤95% (that is the plot excludes the lowest 5% and highest 5% of results), and so on.

In terms of considering the probability of exceeding an upper threshold, there is a less than 1% probability that upper values will exceed the range shown.

An alternate way of thinking about the presentation of these plots is as a range:

- mean ±5% (a 10% range)
- mean ±10% (a 20% range)
- mean ±15% (a 30% range)
- mean ±25% (a 50% range)
- mean ±35% (a 70% range)
- mean ±45% (a 90% range)
- mean ±49% (a 98% range).

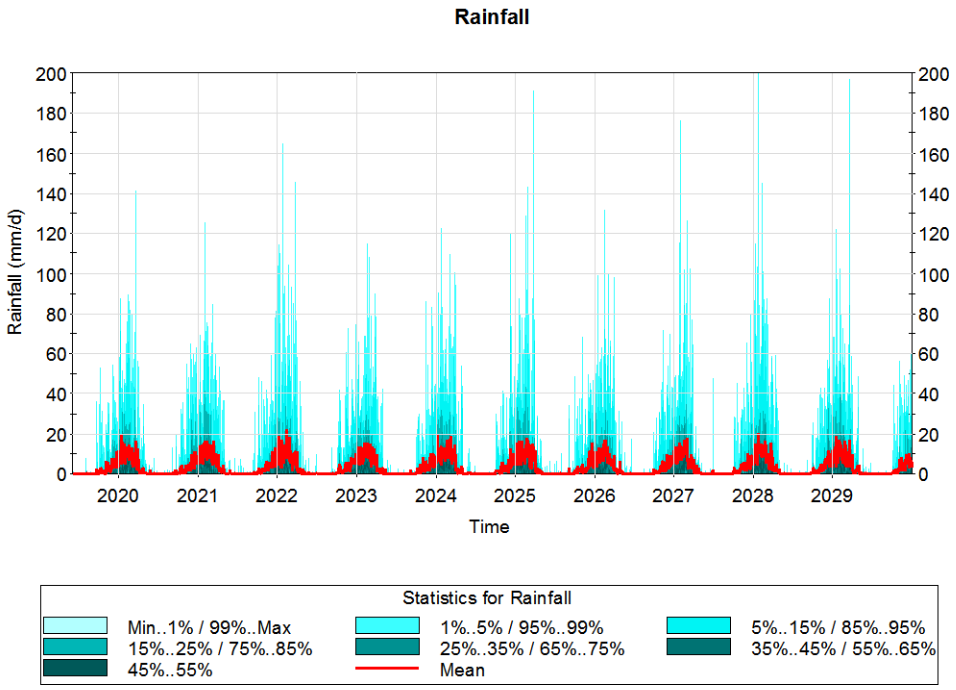


FIGURE 4 MODELLED RAINFALL AT LEGUNE

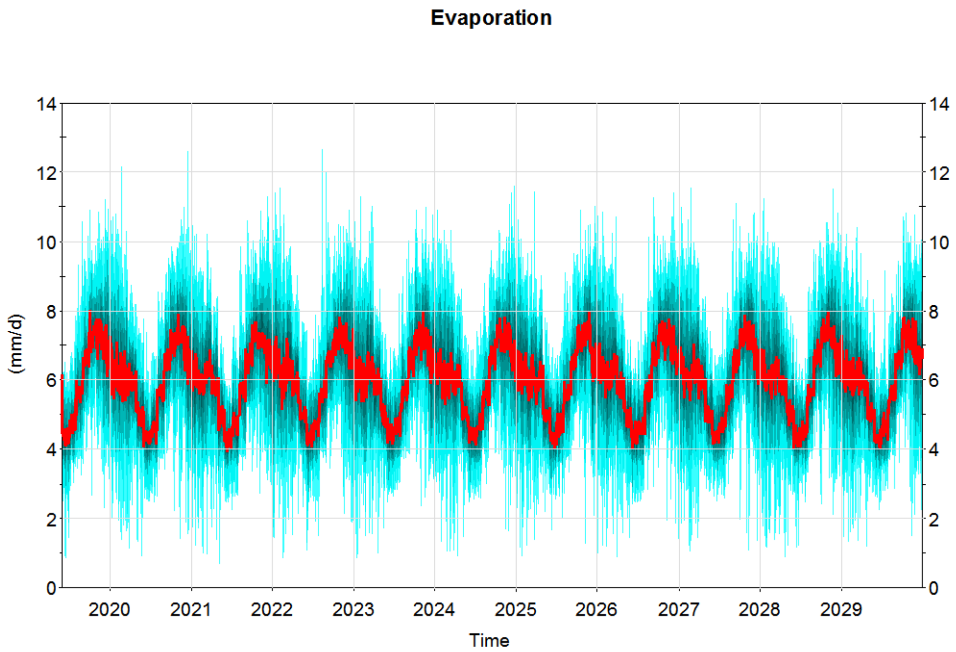


FIGURE 5 MODELLED EVAPORATION AT LEGUNE

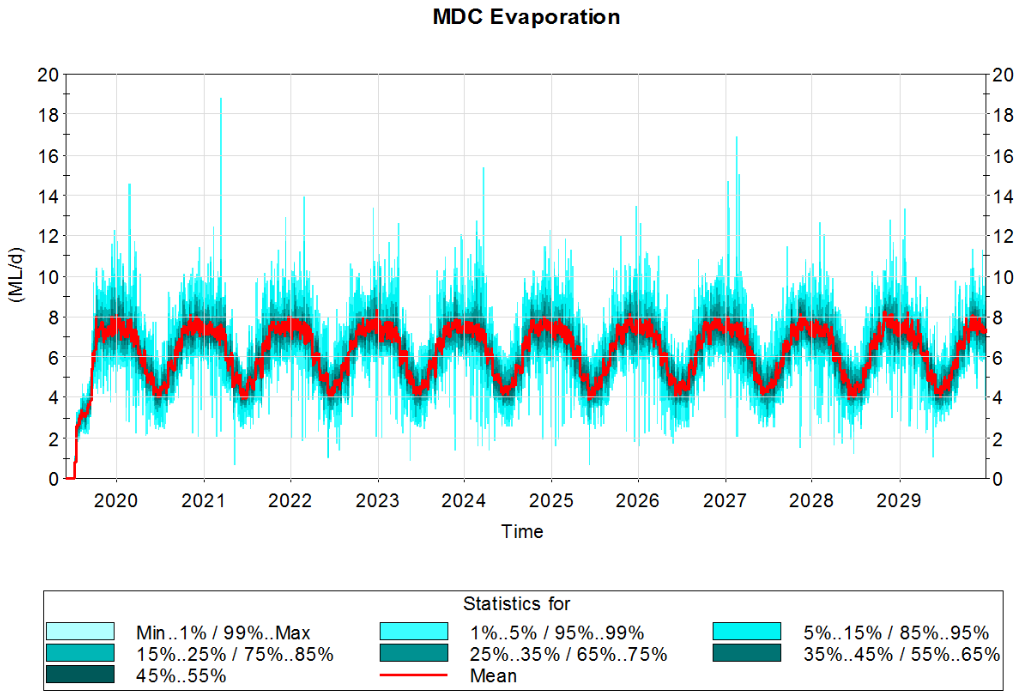


FIGURE 6 SIMULATED EVAPORATION AT THE MAIN DISCHARGE CHANNEL

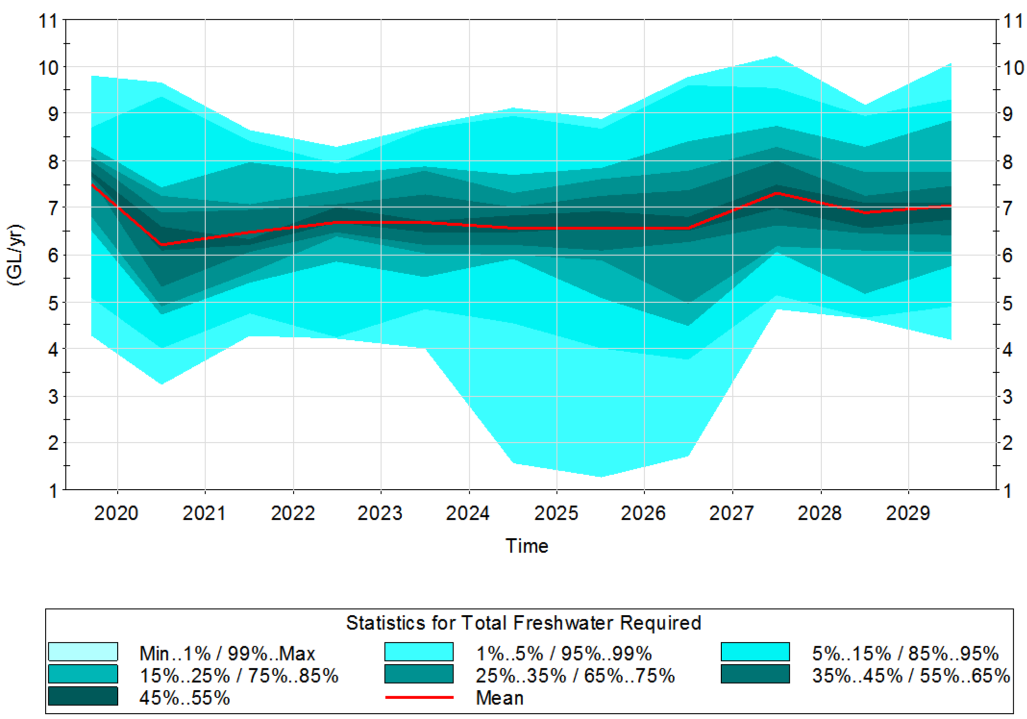


FIGURE 7 SIMULATED FRESHWATER DEMAND FROM FORSYTH CREEK DAM

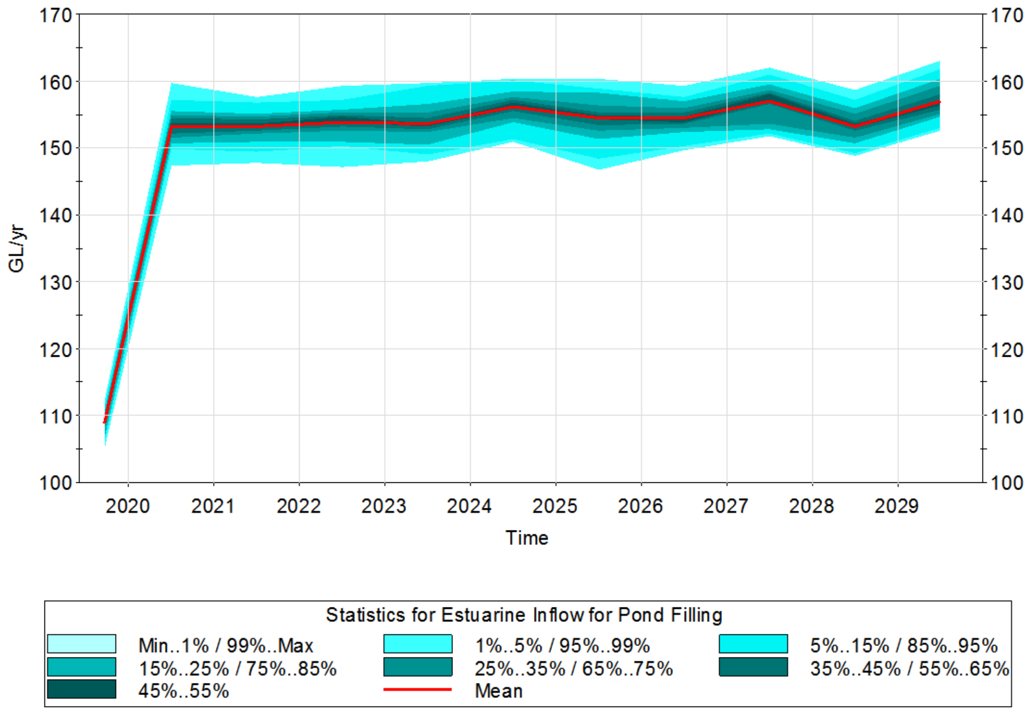


FIGURE 8 TOTAL ESTUARINE WATER PUMPED ANNUALLY

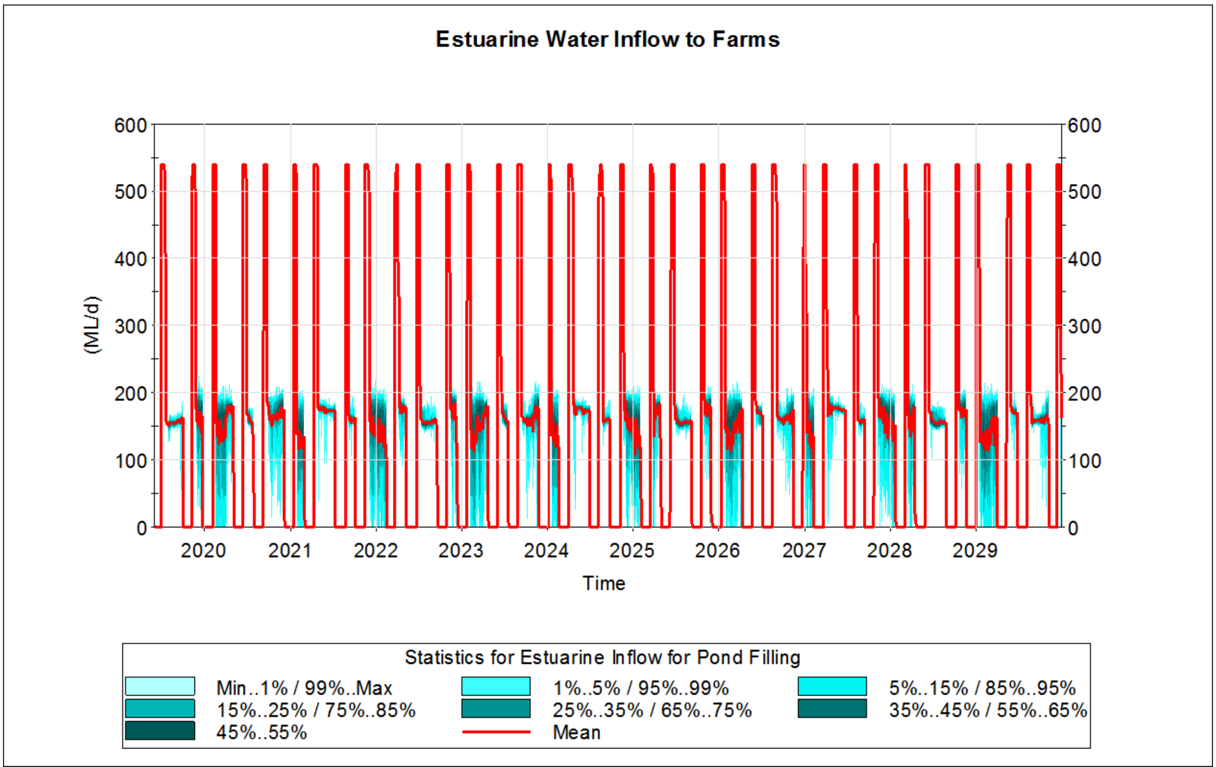


FIGURE 9 FLOW OF ESTUARINE WATER INTO FARMS

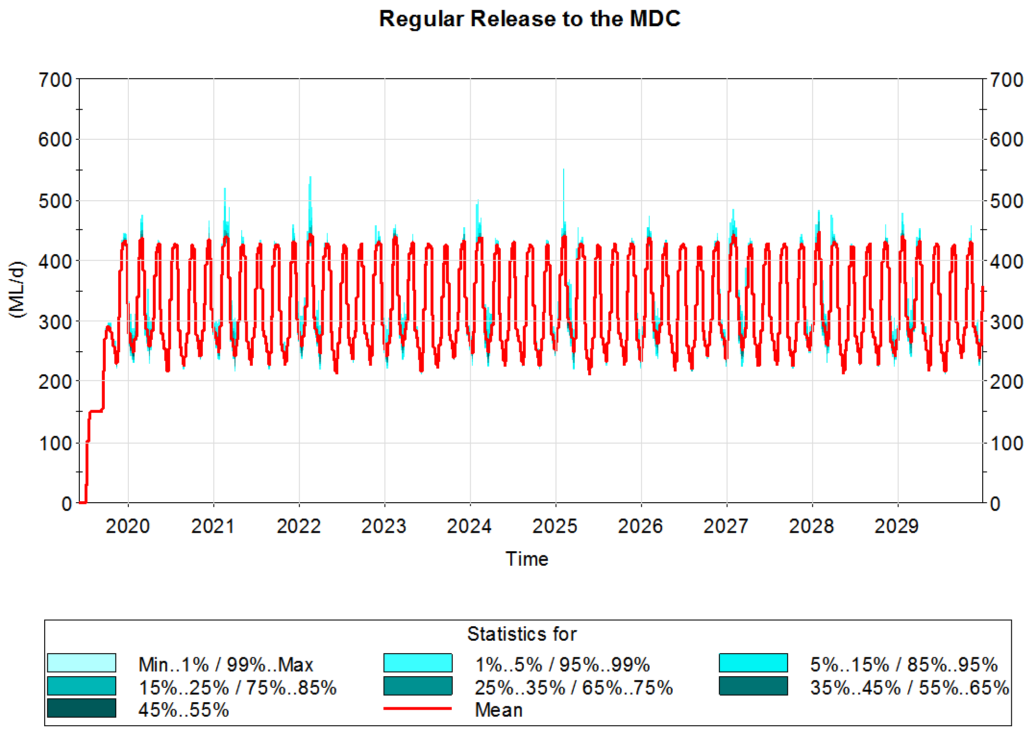


FIGURE 10 REGULAR RELEASE OF WATER INTO THE MAIN DISCHARGE CHANNEL

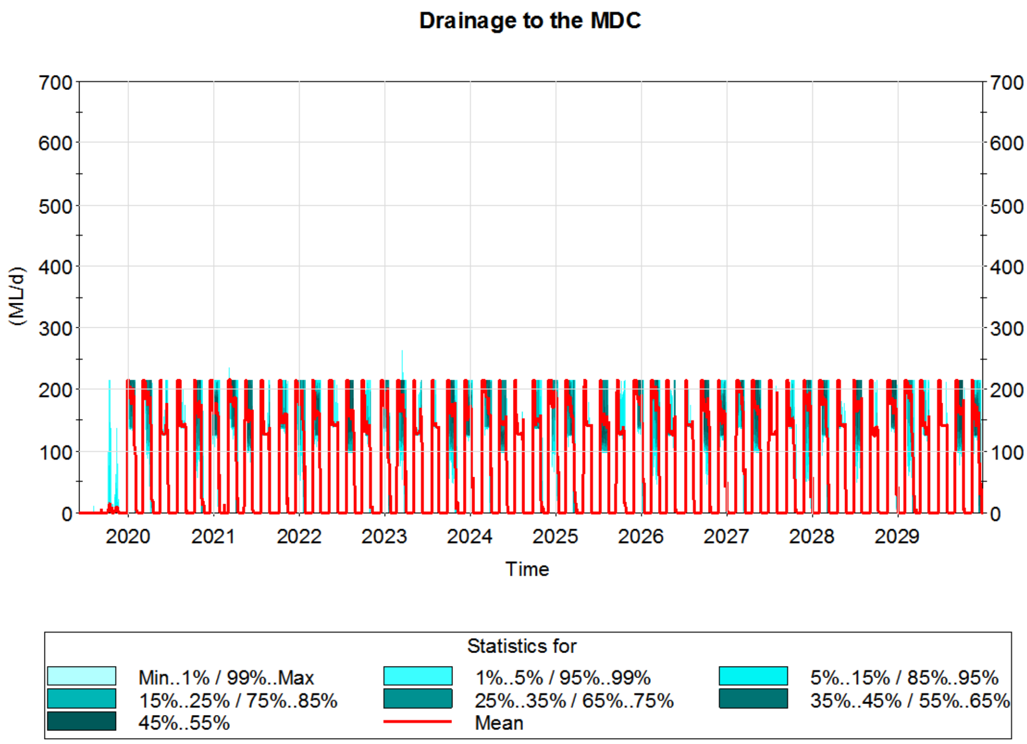


FIGURE 11 RELEASE OF HARVEST WATER INTO THE MAIN DISCHARGE CHANNEL

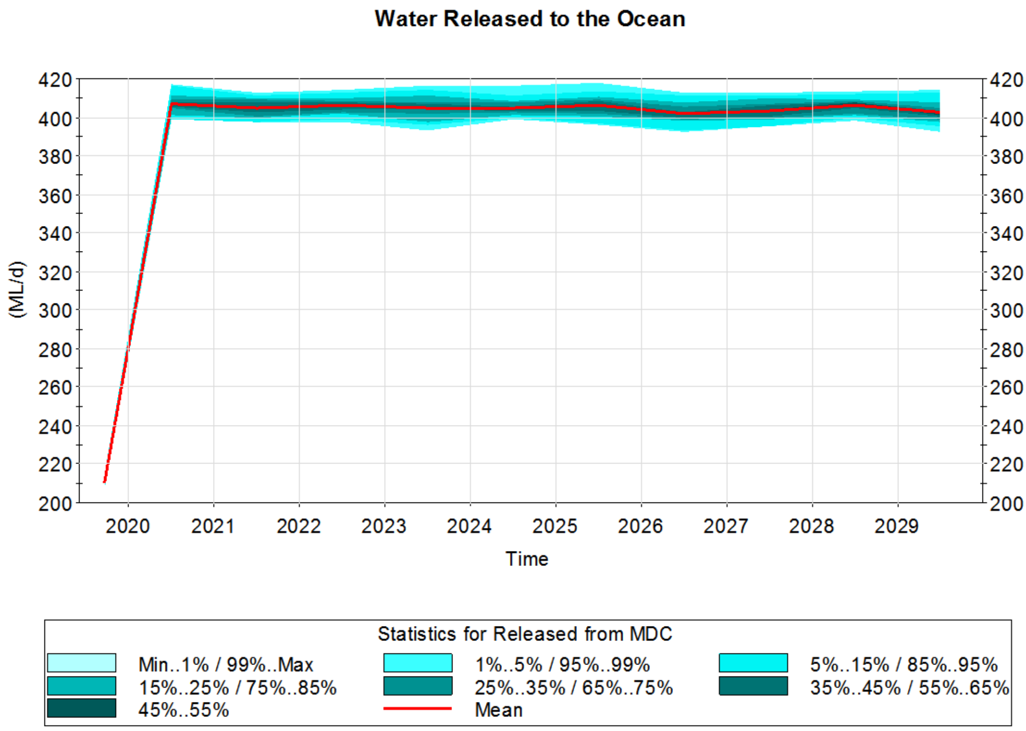


FIGURE 12 WATER RELEASED INTO ALLIGATOR CREEK (ML/DAY)

## 4.4 RELIABILTY OF FRESHWATER SUPPLY

We present results in relation to reliability of freshwater supply to round-out the presentation of results in relation to water balance. It is important to note that a severe drought or lack of freshwater can be managed through stocking procedures. Akin to any other 'farming' operation, in times of severe limitation, operators can make a decision not to stock. This is a project (production) risk, not an environmental risk.

Two further key considerations emerge from the analysis of freshwater reliability. The first is that unlike the current operation of the dam, the operations will not be simply to annually release all the water in the reservoir over a short period near the start of August. This means that it is likely that there will be year-to-year (carry-over) storage of water within the reservoir. The second consideration is that demand will occur over a relatively short period of the year (that is part of the dry season only). This will enable operators to adjust demand according to seasonal conditions.

Figure 13 shows the results of the historic storage investigation under the current cattle operation, showing simulated (blue-shaded) and satellite-derived (dots) estimates. The tan bars show assumed dam release. Note that the difference between the satellite-derived estimate in 2005-06 and the simulation is due to construction, that is, the dam had not been fully constructed to capture wet season flows that year. It is essential to understand that the purpose of Figure 13 is to show the calibration information for the rainfall-runoff modelling - it is inaccurate to assume that this can be used to show the reliability statistics (see Figure 13 for this). As an anecdote it does demonstrate the potential significance of being able to 'carry-over' water from year-to-year. Given that both 2012 and 2013 appear (at least in a storage sense) to be relatively dry years the consequence of releasing all the water from the reservoir in 2013 was to increase the apparent water deficit in the subsequent year.

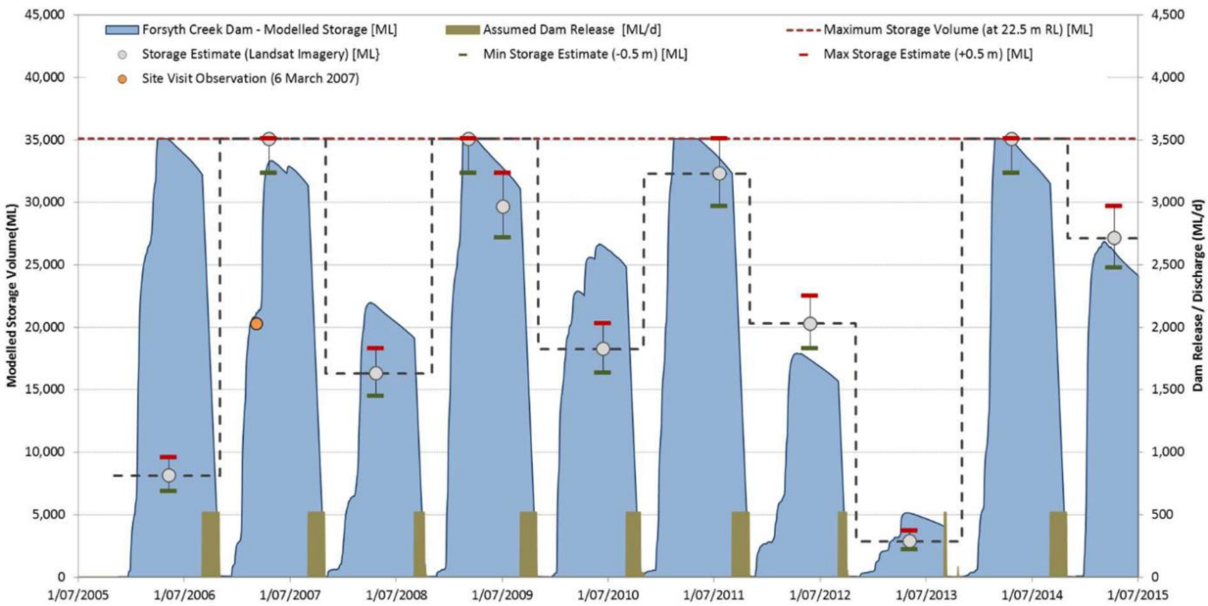


FIGURE 13 SIMULATED FORSYTH CREEK DAM STORAGE AND ESTIMATES FROM SATELLITE IMAGERY

Figure 14 shows the simulated range of volumes in Forsyth Creek Dam for Stage 1 of the Project, under scenario 5 from Table 1. Figure 14 is based on 100 realisations such that the statistics are suitable for an assessment of reliability for the assessed life of project. As described previously the 1% probabilities of exceedance are captured in the figure. Thus, in terms is assessing 'reliability' Figure 13 shows the key output. As can be seen on the figure given 100 realisations of a notional 5 year sequence of the Project operations there appears to be about 2 % chance that over the 5 years the level of the reservoir would fall below a 10 GL threshold. Note that the dam will have the construction period to refill. These statistics show the need to conserve and properly use freshwater within the system.

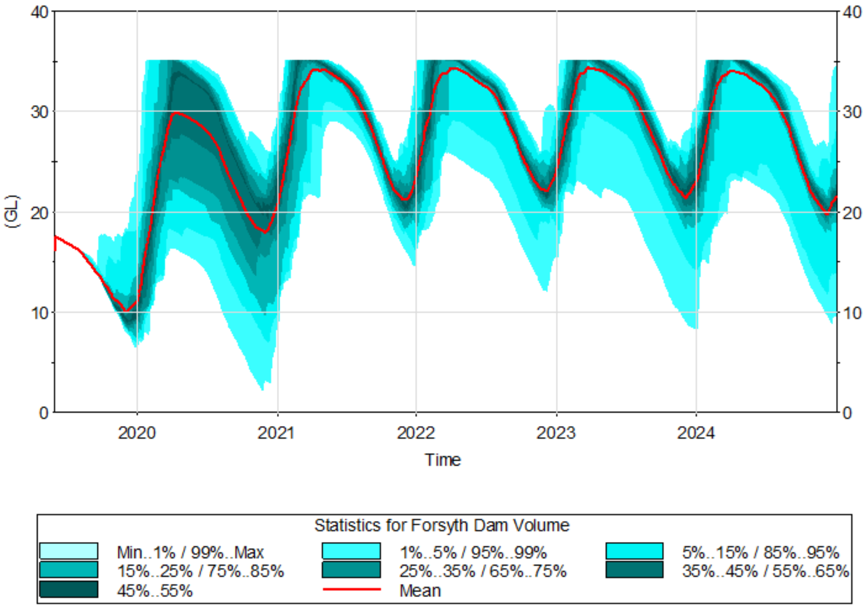


FIGURE 14 SIMULATED RANGE OF FORSYTH CREEK DAM VOLUMES FOR STAGE 1

# 5 CONCLUSIONS

Water salinity within farms varies through the year in response to the inflow of estuarine water, incident rainfall and evaporation, farm operations involving the recirculation of water between the farm grow-out ponds and IFRP, operational discharge of more saline or excess water volumes to the MDC, and inflow of fresh water from the storages. It is feasible to manage and reduce in-farm salinity to acceptable levels with more freshwater conveyance to the farms.

Maintaining salinity within the biological tolerances of the animals (at 10 to 45 g/L) is critical to the successful operation of the Project. Operational flexibility will be required to maintain these levels and hence water balances within the Project will be dynamic and are unlikely to be at steady state.

While the system can be operated across a wide range of conditions and tolerances, we have presented here a steady-state case with a water exchange of 1.4% of maximum dry season total system volume, which represents an average 410 ML/day discharge into Alligator Creek.

We have also assessed the reliability of the storage at the Forsyth Creek Dam, finding that the reliability of storage is adequate to support the assumptions made in the overall project water balance.