# MARINE RESERVE IMPLEMENTATION PROGRAMME: JURIEN BAY AND ADJACENT WATERS

**CALM MARINE CONSERVATION BRANCH**

## Temperature logger deployments in Jurien Bay and adjacent waters during winter 1997

**Field Program Report: MRIP/MW/J-08/97**

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## SUMMARY

This report presents the details of a proposed field program for the deployment of fixed point temperature loggers in Jurien Bay and adjacent waters during July 1997. The aim of the exercise is to gather temperature logger data in Jurien Bay and adjacent waters to assist in the understanding of the characteristics of vertical density stratification, vertical mixing and horizontal water movements during typical winter meteorological and hydrological conditions. An assessment of the results of these deployments will be made at the end of the winter period with a view to possibly extending the exercise into spring.

This field program been motivated by the results of the initial temperature logger deployments conducted in January/February 1997 (D'Adamo and Monty, 1997). The circulation and stratification data and associated mixing analyses from that study pointed to the importance of considering the influence of vertical stratification and re-circulating flows on the mixing and flushing capacity of lagoonal waters in marine reserve zoning for multiple-uses and as part of impact assessments of proposed activities that could potentially add contaminants (e.g., nutrients) to the water column. It was concluded that future assessments of such activities may require a more detailed understanding of the hydrodynamics as could be attainable through modelling and field studies. The present proposal is a contribution to that objective.

The Field Team Leader for this survey is Nick D'Adamo, Marine Conservation Branch.

**ACKNOWLEDGMENTS**

***Direction***

- Keiran McNamara - Director, Nature Conservation Division, CALM
- Dr Chris Simpson - Manager, Marine Conservation Branch (MCB), Nature Conservation Division, CALM

***GIS***

- Ray Lawrie - Marine Information Officer, Marine Conservation Branch, CALM

***Field survey***

- Tim Daly - Marine Conservation Branch (MCB), CALM
- Mike Lapwood - Marine Conservation Branch (MCB), CALM

***CALM volunteer***

- Sonia Anderton

***Field team Leader***

- Nick D'Adamo, Oceanographer, Marine Conservation Branch.

***Funding***

- This survey is being conducted as part of the Marine Conservation Branch's Marine Reserve Implementation Program

## 1 AIM

The aim of this study is to gather temperature logger data in Jurien Bay and adjacent waters to assist in the understanding of the characteristics of vertical density stratification, vertical mixing and horizontal water movements during typical winter meteorological and hydrological conditions.

## 2 RELEVANCE AND LINKS TO OTHER PROGRAMS

The data will contribute to the development of annual time series of water temperature for Jurien Bay and adjacent waters. This information is fundamental to developing a better understanding of the physical and biological characteristics of nearshore semi-enclosed coastal embayments such a Jurien Bay.

The deployment follows from a recommendation arising from the initial oceanographic study of the Jurien marine reserve implementation program (D'Adamo and Monty, 1997).

A recent Fisheries Action Program (Natural Heritage Trust) proposal, submitted by the Marine Conservation Branch, includes long-term temperature recordings as an important aspect of baseline studies for the water quality of the area. Hence, this deployment would link in with that study, if funded, and provide an important preliminary time series from which to plan further deployments and assist in the assessment of the results.

The data to be acquired will also be of relevance to the aquaculture industry in terms of providing a better technical basis from which to assess the environmental considerations relating to the siting and performance of aquaculture in the region. In addition, any future modelling of the oceanography and/or water quality of the region may be able to utilise the data for model calibration and validation. A better understanding of the seasonal characteristics of vertical density stratification will assist in choosing appropriate models for the water quality and/or hydrodynamics of the bay (ie., to determine whether a model needs to include density gradient effects).

An invitation for science teachers and/or students of the Jurien High School (JHS) to participate in the deployment has been extended as a contribution to promoting better communication of the activities associated with the resource assessment phase of the Jurien marine reserve implementation program. This proposal will be sent to the JHS for their consideration.

The Department of Transport have recently deployed a non-directional wave rider buoy west of the main reef zone off Jurien Bay and these data can be used with the vertical temperature array data to investigate the influence of swell and sea waves on vertical stratification, mixing and horizontal water movements in Jurien Bay. Tide data is also collected by the Department of Transport within the Jurien Boat Harbour.

Meteorological data (wind speed and direction, relative humidity and air temperature) will be obtained from the Bureau of Meteorology.

## 3 METHODS

Eight DATAFLOW loggers will be deployed at four sites at the approximate locations shown in Figure 1. The details of the deployments are given in Table 1.

**Table 1 Logger deployment details**

| Site number | Latitude and longitude | Approximate water depth (m) | Logger recorder/sensor serial numbers and associated depth of logger above bottom (m) |
|---|---|---|---|
| **JB900** | **30 ° 15.2' 115 ° 56.80'** | **30** | **41597B/905179 20 m above bottom** |
| **JB910** | **30 ° 14.9' 115 ° 00.1'** | **16.5** | **41598B/905180 1 m above bottom**<br>**20353/1534 7.5 m above bottom**<br>**41610B/905182 14 m above bottom** |
| **JB920** | **30 ° 17.682' 115 ° 01.366'** | **12.5** | **39002/39002 2 m above bottom**<br>**41599B/905181 9 m above bottom** |
| **JB930** | **30 ° 22.3' 115 ° 01.0'** | **15** | **20355/20355 2 m above bottom**<br>**20359/20359 11.5 m above bottom** |

The temperature loggers record data at a specified accuracy of ± 0.1 $^{o}$C. Calibrations will be performed against checks conducted with a scientific thermometer that has a specified accuracy of ± 0.05 $^{o}$C. Hence, the recorded data should be accurate to ± 0.15 $^{o}$C.

The deployments will be conducted from the Marine Conservation Branch research vessel *Bidthangara*.

The loggers will be inspected and data downloaded at approximately monthly intervals.

The field itinerary for the survey is given in Table 2.

**Table 2 Field itinerary**

| Date/time | Activity |
|---|---|
| Monday 21-7-97 | Tim Daly - Logger calibration and preparation<br>Mike Lapwood - Preparation of logger moorings, strings and DGPS. Coordination of logistics and transport.<br>Nick D'Adamo - Preparation of Field Program Report. |
| Tuesday 22-7-97 | 0700 hrs - Sonia Anderton, Nick D'Adamo, Time Daly and Mike Lapwood depart from Mike Lapwood's residence for Jurien. |
| Tuesday 22-7-97 | 0930 hrs (approx.) - Arrive Jurien. Nick checks DGPS unit. Tim checks loggers. Mike prepares vessel. |
| Tuesday 22-7-97 | 1000 hrs - Mike meets teacher and student(s) from Jurien High School. Vessel loaded. |
| Tuesday 22-7-97 | 1030 -1230 hrs (approx.) - Loggers deployed (crew: Mike, Tim, Sonia, student(s), teacher). Nick remains in Jurien to meet with local stakeholders. |
| Tuesday 22-7-97 | 1300 hrs (approx.) - Vessel returns to Jurien Boat Harbour. Student(s) and teacher leave crew. |
| Tuesday 22-7-97 | 1330 hrs (approx.) - Crew return to Perth, arriving approx. 1630 hrs. |

## 4 SAFETY

All safety procedures relating to navigation and associated onboard procedures will be responsibility of the skipper of the vessel. Alterations to field procedures based on safety considerations, weather and sea conditions are the primary responsibility of the skipper and will be made in consultation between the skipper (Mike Lapwood or Tim Daly) and the Field Team Leader (Nick D'Adamo).

The Field Team Leader is responsible for ensuring that all field work undertaken by CALM staff, including volunteers and invited crew, is conducted in accordance with CALM's departmental safety procedures.

## 5 COMMUNICATIONS

Note that the Bidthangara's call sign is VHW6001.

The skipper will inform Jurien Sea Rescue of the day's activities, including the estimated return time, on departure.

Jurien Sea Rescue, Jurien. Ph 096-521290, Fax 096-521337

Calling channel: Marine VHF Channel 16

CALM - CALM communications: CALM VHF Channel 16

Jurien Bay Marina (Department of Transport) can be contacted by phone on Ph; 096-521323

The Marine Conservation Branch office in Fremantle can be reached by Ph: 08-94325100 or by Fax: 08-94305408.

## REFERENCES

D'Adamo N and Monty D G (1997). Model simulations and field data (28 January - 6 February 1997) of wind-driven circulation and salinity-temperature fields in the proposed Jurien marine reserve region. Data Report: MRIP/MW/J-05/1997. (Marine Conservation Branch, Department of Conservation and Land Management, 47 Henry St., Fremantle, Western Australia, 6160). Unpublished Report.

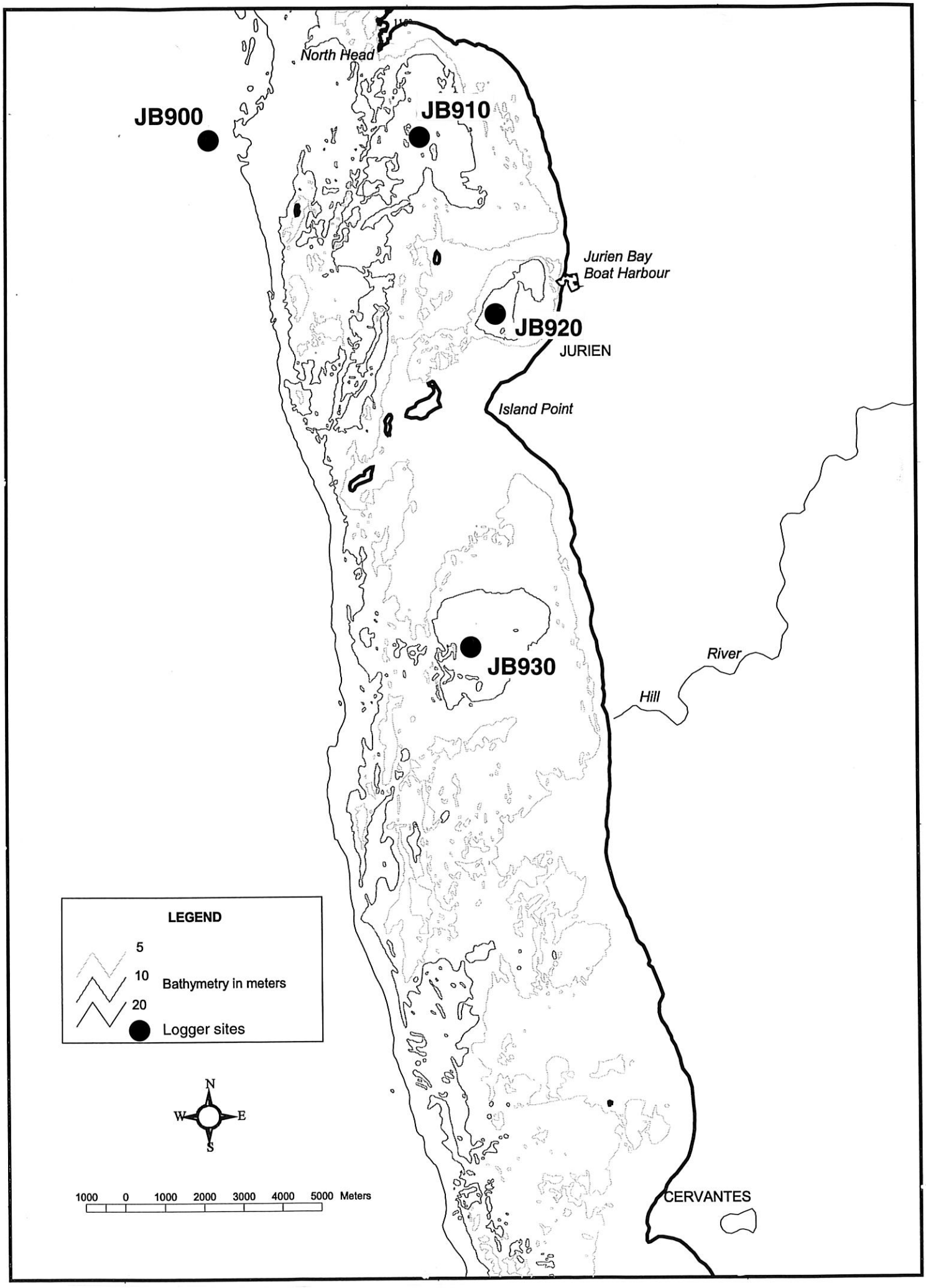


Figure 1 Approximate locations of logger deployment sites