



# Lake Warden & Lake Gore - Catchments for Protection Project

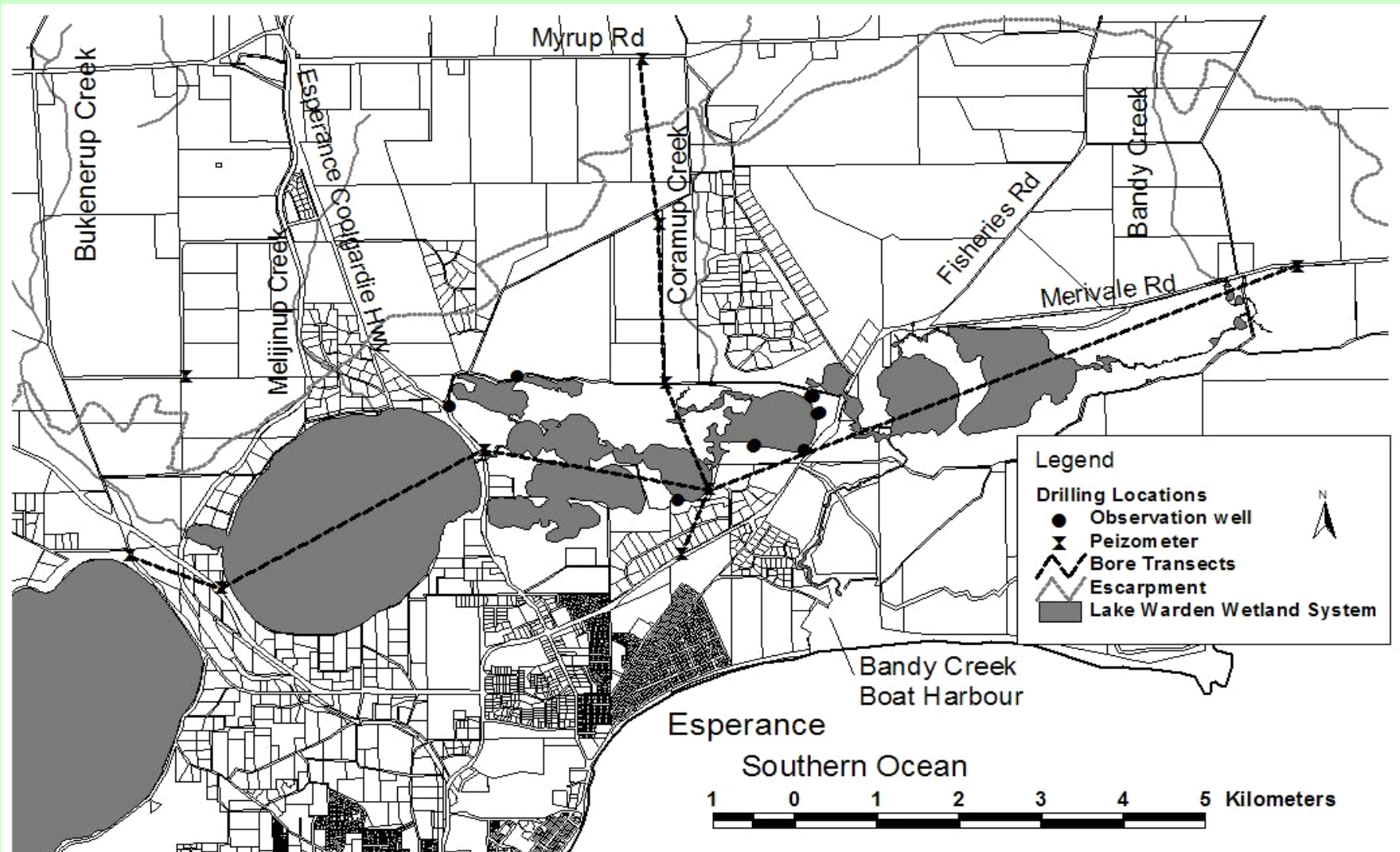
*Ted English, Executive Officer - South East Forest Foundation  
Private Forestry Development Committee, Esperance WA*

- **Funding provided through Western Australian NRM group SCRIPT**
- **Project funded for three years (ends June 2008)**
- **Employed Farm Forestry NRM Officer –**  
Three year funding for wages and on-costs including vehicle.
- **Establish Monitoring bores in catchments**  
Additional funding provided in first year for establishment of bores and equipping with monitoring equipment.

# Internationally recognised Wetlands

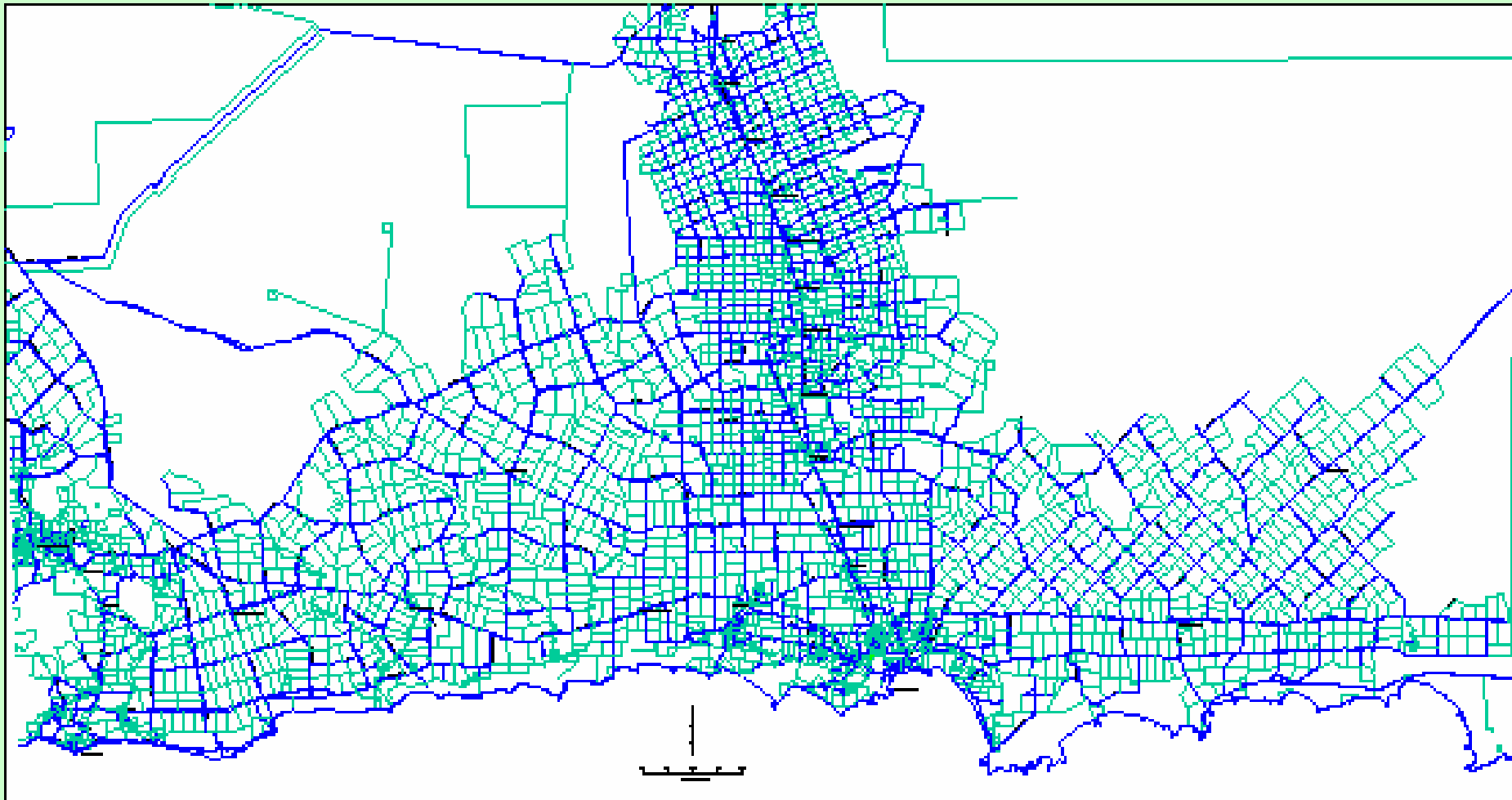


# Esperance townsite surrounded by Lake Warden Wetland System



# Esperance Agricultural area

approx. 300 km x 120 km

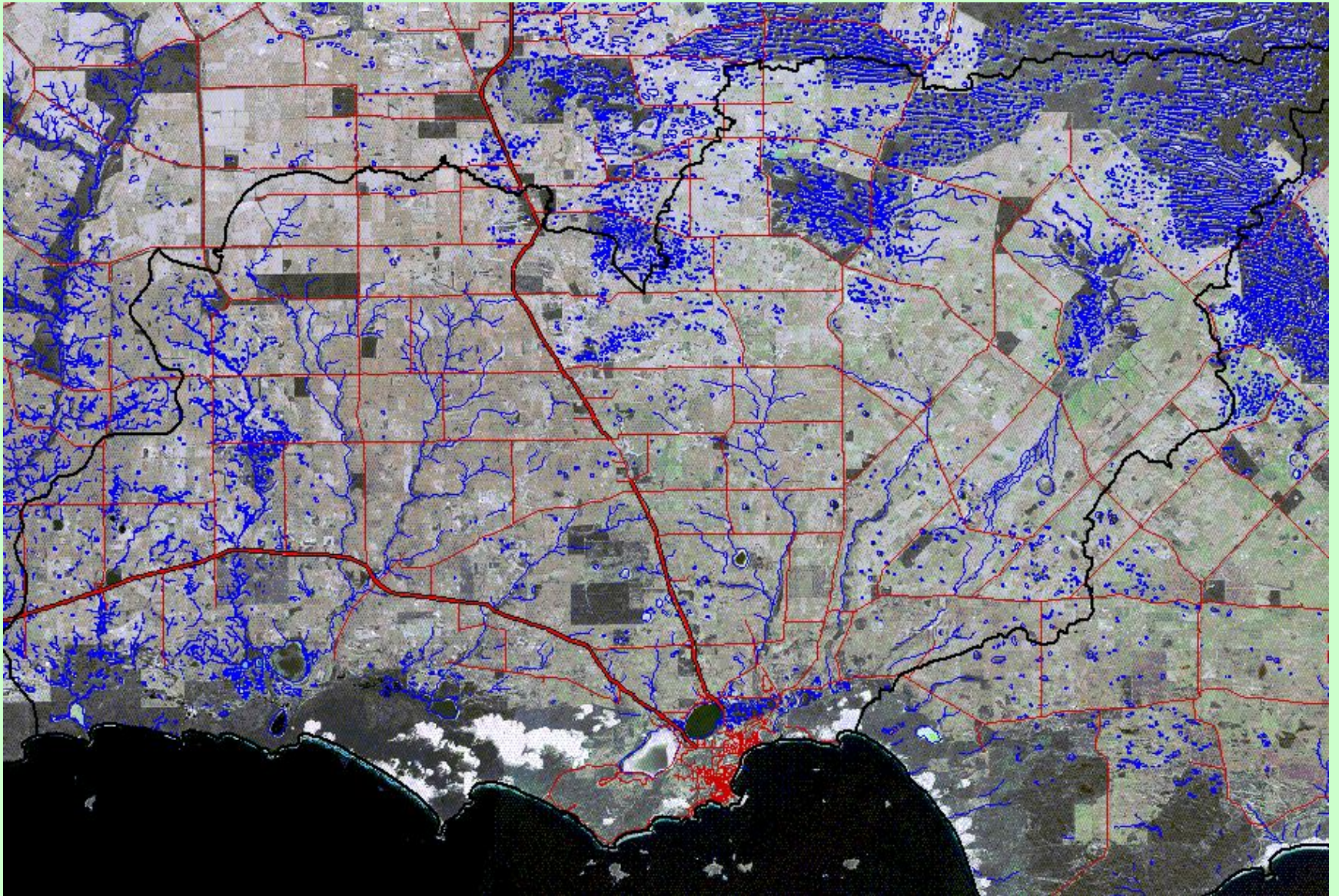


## Esperance agricultural area



Esperance townsite & wetlands

# Lake Warden & Lake Gore Catchments



# Lake Warden Wetland System

The Lake Warden Catchment contains the internationally significant, Ramsar-listed LWWS, which surround the Esperance townsite.

Eighty per cent of the 212,000 ha Lake Warden catchment is agricultural land and 95 per cent of this area is cleared.

*Note: Data for the Lake Gore catchment is still being collected.*

# Lake Warden Wetland System

## (cont'd)

There are eight major lakes and about 90 overflow satellite lakes that make up the floodplain system.

There are five major inflows, seven major throughflows and one major outflow to the Southern Ocean.

The extensive clearing for agriculture and current farming practices along with other activities have placed the LWWS at risk from salinity, inundation, sedimentation and eutrophication.

\* Reference Massenbauer and Robertson - WA Dept of Environment and Conservation



# Wetland values

These include local, state, national & International stakeholders:

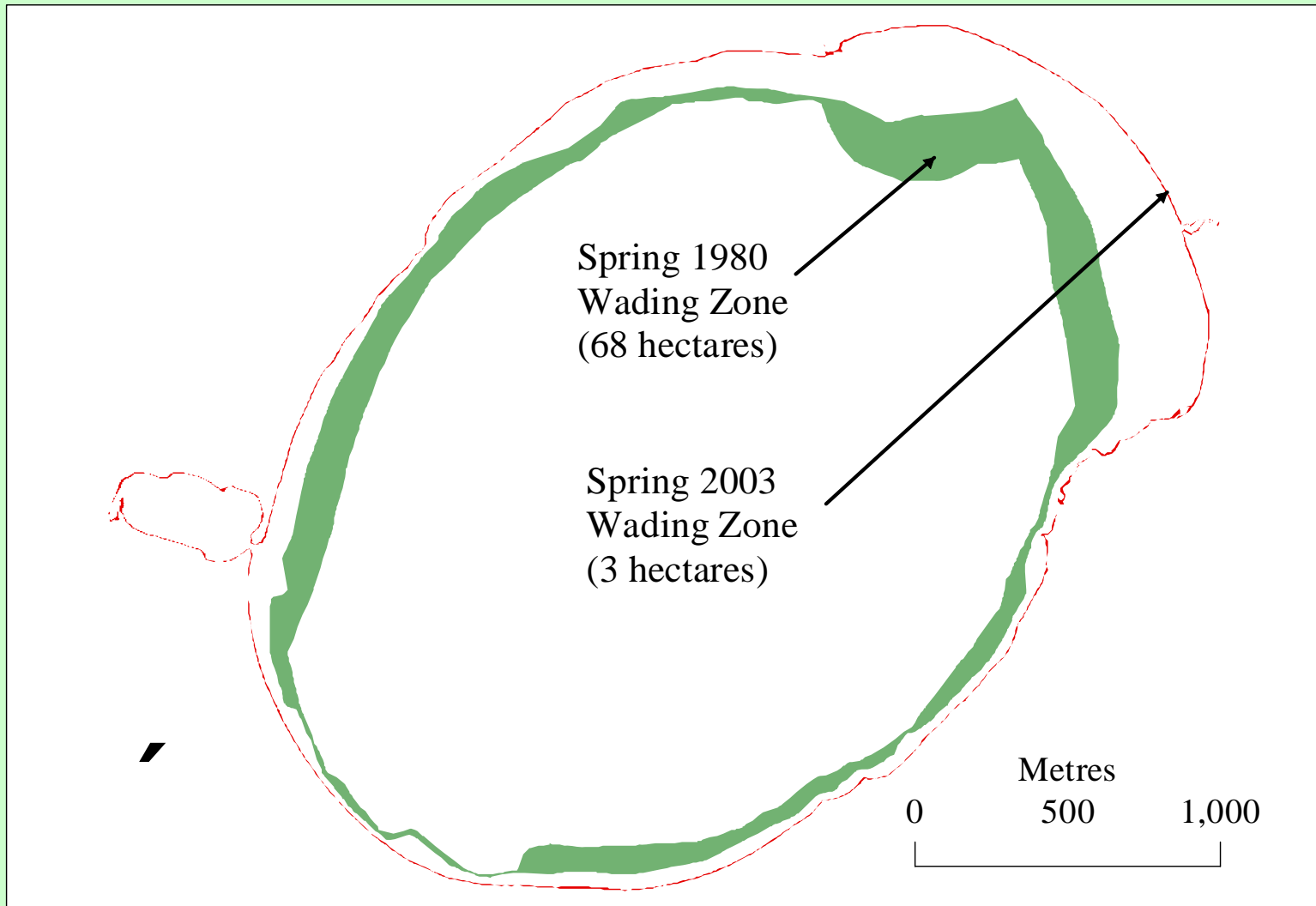
- Internationally recognised wetland of significance i.e. Ramsar listed
- Chinese & Japanese Australian Migratory Bird Agreements (CAMBA & JAMBA)
- Biological values, such as migratory waterbirds and macro-corridor linkages
- Water quality ecosystem functions and infrastructure protection values provided by the LWWS during flood events
- Production values from salt mining on Pink Lake

## Wetland values cont.

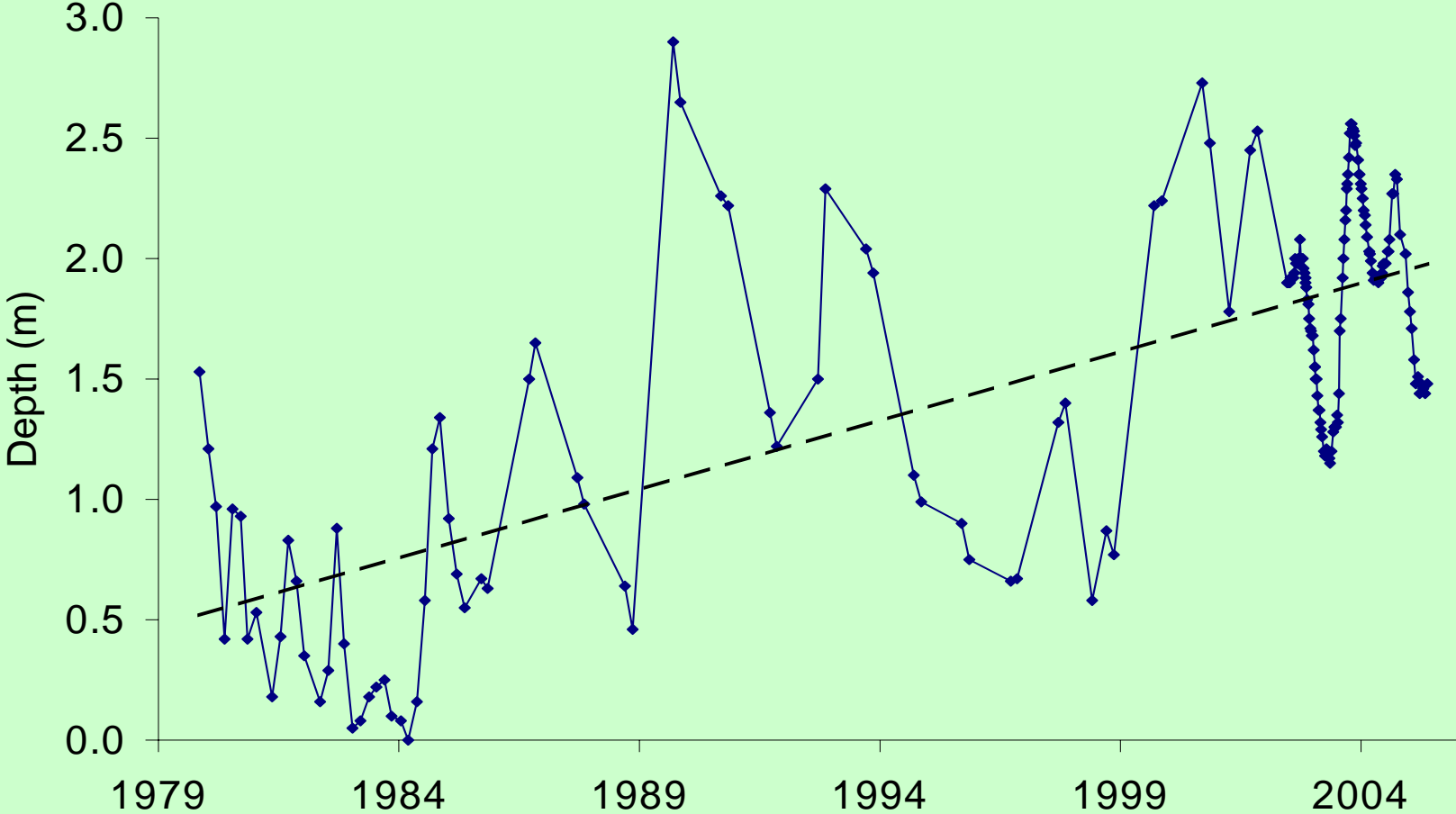
- Indigenous and European heritage
- Recreational and tourism values with walk trails, bird watching, and water sports
- Educational values supported by interpretative trails and a student curriculum package
- Aesthetic landscape values of the LWWS associated with the Southern Ocean, Recherche Archipelago, pristine white sandy beaches and granite headlands.

# Rising water levels in Lake Warden and impact on bird wading zone

Source - T. Massenbauer and D. Robertson Dept of CALM, WA



# Lake Warden depth gauge readings



Source - T. Massenbauer Department of Conservation and Land Management, Esperance, WA and D. Robertson Department of Conservation and Land Management, Perth, WA

# Project aims

- Coordinate the design and installation of a monitoring system to determine the environmental service benefits of tree farming in the Lake Warden & Lake Gore Catchments.
- Determine the potential for tree farming to:
  - Reduce the salinity and volume of water flowing from the catchments into Lake Warden and Lake Gore.
  - Reduce sedimentation and eutrophication of the Lake Warden and Lake Gore Wetlands
- Encourage the development of more profitable and sustainable rural industries within the catchments and the region
- Contribute to the development of integrated, sustainable tree cropping industries that deliver environmental, economic and social benefits to regional areas.

# Farm Forestry NRM Officer's role

- Negotiate with farmers for access to land within the target catchments with suitable adjoining soil types and land uses
- In conjunction with the Dept of Agriculture & Food WA regional hydrologist, design and install a bore monitoring system.
- Quantify the environmental, social and economic benefits of strategically located tree plantations
- Stimulate the adoption of commercial farm forestry
- Increase the landholders awareness of the benefits of integrated, sustainable farm forestry systems
- Present field days that increase the confidence of landholders to adopt farm forestry
- Encourage other sustainable, water use farming options e.g. perennial pastures
- Develop fact sheets and press releases on the project

# 3 Sites selected to monitor

Two northern sites located in the 350 mm – 400 mm rainfall zone and one southern site in the 550 mm rainfall zone

1. In the upper catchment of Coramup Creek – Lake Warden
2. In the upper catchment of West Dalyup River – Lake Gore
3. In southern catchment i.e. (property's runoff flows directly into Bandy Creek and then Lake Warden wetlands).

## Site requirements:

Located on perched, recharge dune systems in situations with low relief.

Established within three adjoining land use systems:

1. Tree plantations (pinus pinaster)
2. Agricultural land (for stock and / or grain cropping).
3. Remnant vegetation.

# The hydrological process:

- A series of bores have been drilled at each site, in transect formation, to determine relative levels of local and intermediate groundwater systems consisting of:
- 22 Bore sites – 64 bores over the three properties.
- Total depth of bores – 893 metres
  - 47 Monitoring wells – either on the sand / clay interface (just below the yellow sands) or at the top of the aquifer.
  - 17 Piezometers –
  - 3 different depths were attempted at each bore site;
    - Deep to bedrock - deepest 45 metres,
    - Intermediate
    - Shallow - just below the watertable.





## Monitoring:

- Bores will be monitored monthly for changes in salinity, nutrient and groundwater levels.
- Neutron moisture meter measurements will be taken of soil water storage.
- University of WA, soil biologists, interested in parallel monitoring programs for soil carbon and soil nutrient analysis to establish baseline data and long term comparative analysis between the different activities.
- An invertebrate study within plantations is also proposed.
- Dept of Agriculture & Food WA (DAFWA) and WA Dept. of Environment & Conservation (DEC) are assisting in processing recharge reduction data for the wetlands catchment and helping with interpretation and processing of data.

# Perceived constraints of the project prior to start

- Availability of a suitable drilling rig, due to high demand from the mining sector.
- Access constraints for drilling rig to all sites e.g. deep sands, native vegetation etc.
- Drilling conditions e.g. deep and / or dry flowing sands, potential for water logged conditions etc.
- Landholder approval for access to their properties.

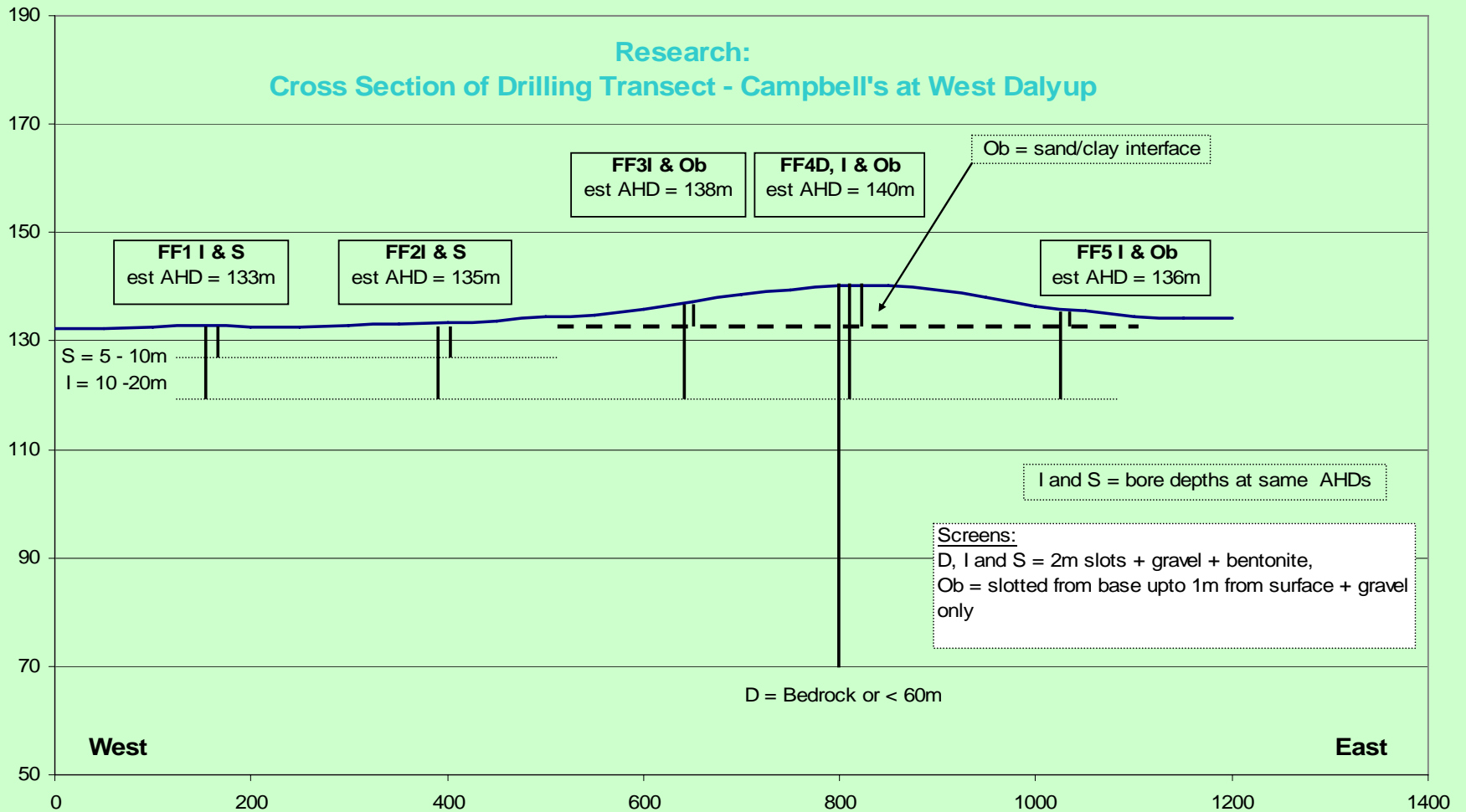
*Note: SEFF has received full support from all landholders invited to participate in project.*

*All issues have been resolved, the project is running on time and within budget*

# Rotary mud sampling - Lake Warden / Lake Gore project



# Cross section of drilling transect



# Timeframe and Outcomes

- Project funded for three years – planning for extension
- Commitment by DAFWA to maintain monitoring of the bores, if future funding is not secured by SEFF
- Results are not expected for several years and we are hopeful that monitoring will continue in some form for at least 10 – 15 years.
- Support to FPC in creating sufficient local resource to develop a processing industry
- Projections are that a minimum of 70,000 ha's will be required to justify expenditure for the establishment of a local LVL plant (or similar).
- Within a 150 km radius of Esperance there is in excess of 200,000 ha's of deep sand, suitable for pine plantations.
- Alternatives are for whole log exports or smaller processing plant.

*Thankyou*