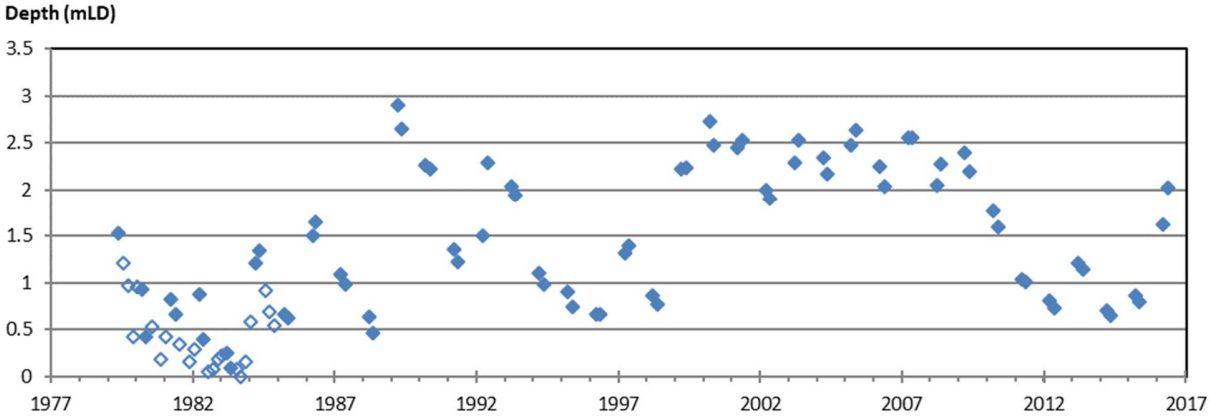
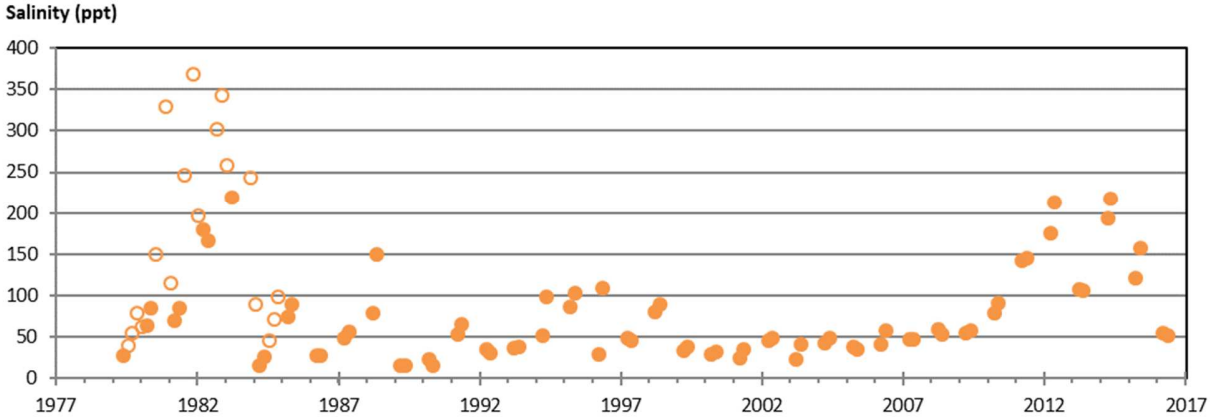
South West Wetlands Monitoring Program
1977 – 2016





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Wetlands Conservation Program
Science and Conservation Division

October 2017

GOVERNMENT OF WESTERN AUSTRALIA

Department of **Biodiversity, Conservation and Attractions**

Cover illustration

Long-term SWWMP monitoring of water levels and salinities of the Lake Warden System Ramsar Site, together with periodic surveys of waterbird populations[1], has provided a sound basis for assessing the effectiveness of recent engineering measures aimed at ending prolonged and excessive inundation.

Recommended Citation

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[1] Higbid, Lizamore & Pinder (2014). *The shorebirds are back in town*. Landscope 30(1):44-49.

CONTENTS

SUMMARY

This report presents 1977–2016 data from SWWMP, the *South West Wetlands Monitoring Program* conducted by the Western Australian Department of Biodiversity, Conservation and Attractions (DBCA). Since 1997, this program has been funded under the WA Salinity Action Plan / Salinity Strategy as updated by the Government's response to the Salinity Taskforce report. In recent times SWWMP has become increasingly significant in the context of climate change. Rainfall is declining over much of the south-west and this is affecting many wetlands.

In this report we present all routinely-collected September and November (mainly) water level, salinity and pH data to 2016. These data are presented in graphical form for 105 currently-monitored SWWMP wetlands. Data concerning nutrients (not monitored beyond 2007) in these wetlands, and concerning water level, salinity, pH and nutrient concentrations in other, historically-monitored wetlands, may be found in Lane *et al.* (2009a). Administrative information concerning all 158 SWWMP wetlands, their map coordinates, the periods during which each has been monitored, their locations in terms of DBCA Regions and Districts and Local Government Authorities (LGAs), and their tenure, is also presented.

This report provides an up-to-date overview of the data that have been collected over the past thirty-nine years and ready-reference lists of the wetlands. This information will be useful for those with a responsibility or interest in these and other wetlands in south-western Australia. Most of the monitored wetlands are within Nature Reserves or National Parks and DBCA and the Conservation and Parks Commission of Western Australia are jointly responsible for their conservation management. Some are 'Ramsar' wetlands of international importance and many are nationally significant. State and national governments are obliged to monitor and report changes or threats to the character of Ramsar sites and the performance of relevant agencies is periodically assessed.

Researchers will also find this report useful as it identifies wetlands that have long periods of systematic monitoring of physico-chemical attributes, knowledge which will assist in the selection of most-suitable wetlands for study. Pronounced year-to-year and longer-term variations or trends are readily apparent in the graphs of some wetlands, as is the absence of pronounced variations or trends in others. The wetlands of SWWMP demonstrate a wide variety of hydrological responses to landscape setting, surface and groundwater catchment characteristics, local climates and, in some cases, management interventions.

Attention is drawn to a number of wetlands with 2016 water level, salinity or pH values close to or outside previously recorded limits. These are Anderson (Tambellup Shire), Bennetts (Lake Grace), Big Boom (Esperance), Byenup (Manjimup), Campion (Nungarin/Merredin), Clifton (Mandurah/Waroona), Coomalbidgup (Esperance), Davies (Augusta – Margaret River). Dulbinning (Wickepin), Eganu (Coorow), Egret (Harvey), Eneminga (Dandaragan), 'Esperance 26410' (Esperance), Goonaping (Beverley), Gore (Esperance), Jasper (Nannup), Jerdacuttup (Ravensthorpe), Kwornicup (Plantagenet), Logue (Carnamah), Mortijinup (Esperance), Mount Le Grand (Esperance), Nine Mile (Murray), Noobijup (Cranbrook), North Parriup (Ravensthorpe), Poorginup (Manjimup), Tordit-Gurrup (Manjimup), Warrinup (Cranbrook), Wheatfield (Esperance) and Yarnup (Cranbrook).

In previous annual reports (to 2014), we have provided short descriptions of noteworthy changes, apparent trends, values at risk, etc., at wetlands of particular interest or concern. In order to reduce preparation time, updated descriptions have been omitted from this report.

Regional, District and specialist branch staff of DBCA are encouraged to examine the data for all wetlands in their respective areas of responsibility as other wetlands may also show changes of interest or management concern.

2016 was a year of above average to very much above average rainfall in southern and eastern parts and below average to very much below average falls in a small area south of Perth. As a consequence, water levels were unusually high in the south-east, but remained low in other areas, particularly south of Perth. Water levels at two SWWMP wetlands on the south-east coast were particularly noteworthy. Jerdacuttup near Hopetoun filled to its highest level since 1989 and 'Esperance 26410' filled to more than 2.5m above its previous (35+ year) record.

Since 2009, continuous water level recorders and tipping-bucket rainfall gauges have been installed on 15 high conservation value SWWMP wetlands between Cataby, 140km north of Perth, and Esperance on the south-east coast. Collection of continuous water level and on-site rainfall data will enable salt and water balance models to be developed for these and other south-western Australian wetlands and will thereby assist in their conservation management. The data will also assist in development of an improved understanding of the likely consequences of predicted climate change, particularly ongoing rainfall decline, on the wetlands of south-western Australia. Since 2013, this work has been focused on the south coast, at key sites of the endangered Australasian Bittern.

This report is the tenth in a series of annual reports aimed at putting most-recent SWWMP data in front of readers as soon as possible after data collection.

1. INTRODUCTION

This report presents 1977–2016 data and other information from SWWMP, the *South West Wetlands Monitoring Program* conducted by the Western Australian Department of Biodiversity, Conservation and Attractions (DBCA)[1] and its predecessors. Since 1997, this program has been funded under the Western Australian Salinity Action Plan (Government of Western Australia 1996a) and State Salinity Strategy (State Salinity Council 2000a,b) as updated by the Government's response (Government of Western Australia 2002) to the Salinity Taskforce report (Frost *et al.* 2001). A history of the program, a description of methods, and trends analyses to 2000 may be found in Lane *et al.* (2004). Reviews of this and other programs under the Salinity Action Plan have also been published (Wallace 2001, Wallace *et al.* 2011, CCWA 2014). The Salinity Taskforce established in 2001 to review salinity management in Western Australia concluded that: '*[DBCA's] wetland monitoring program [SWWMP] provides one of the few sources of information about environmental impacts from salinity over the long term. The Taskforce considers that continuation of [SWWMP] should be a high priority for the State'* (Frost *et al.* 2001).

In this report, we present, in graphical form, all September and November[2] water depth, salinity and pH data routinely collected from 105 currently-monitored[3] SWWMP wetlands. Data concerning nutrient concentrations[4] in most of these wetlands, and concerning water level, salinity, pH and nutrient concentrations in other, historically-monitored SWWMP wetlands, may be found in Lane *et al.* (2009a) and are not repeated here. The locations of all 158 current and historically-monitored SWWMP wetlands are shown in Figure 1. Administrative information concerning these wetlands, their map coordinates, the periods during which each has been monitored, their locations in terms of DBCA Regions and Districts and Local Government Authorities (LGAs), and their tenure, is also presented (Tables 1–3).

The main purposes of this report are to provide an up-to-date visual overview of data that have been collected over the past thirty-nine years and ready-reference lists of the wetlands. This information will be useful for those with a responsibility or interest in the conservation and management of these and other wetlands in south-western Australia. Most of the monitored wetlands are within National Parks and Nature Reserves vested in the Conservation and Parks Commission[5] of Western Australia and the CPC and DBCA are jointly responsible for their conservation management. Some are within current or former Natural Diversity Recovery Catchments (Government of Western Australia 1996a; Wallace & Lloyd 2008). Some are 'Ramsar' Wetlands of International Importance (Government of Western Australia 1990, 2000; Ramsar Secretariat 2013), and many are nationally significant 'Directory' Sites (ANCA 1996; Environment Australia 2001; Elscot *et al.* 2009) (Tables 4 & 5). The state and national governments are obliged to monitor and report changes or threats to the character of Ramsar sites. The performance of DBCA in relation to Ramsar responsibilities is subject to periodic assessment (Auditor General 2006; CCWA 2009, 2014).

Researchers will find this report useful as it identifies wetlands that have long periods of systematic monitoring of physico-chemical attributes, knowledge which will assist in the selection of wetlands most-suitable for study. Pronounced year-to-year and longer-term variations or trends are readily apparent in the graphs of some wetlands, as is the absence of pronounced variations or trends in others. The wetlands of SWWMP demonstrate a wide variety of hydrological responses to landscape setting, surface and groundwater catchment characteristics, local climates and, in some cases, management interventions. Many are also exhibiting pronounced responses to the decline in annual rainfall that has occurred over much of south-western Australia since the 1970s (Hope *et al.* 2015; BoM & CSIRO 2016).

2. RESULTS

In order to make this report available in a timely fashion, statistical trend analyses to 2016 have not been performed on the physico-chemical data presented here. Trends to 2000 of 41 SWWMP wetlands (those monitored for 20 or more years at that time) have previously been reported (Lane *et al.* 2004). A report on depth and rainfall trends of multiple groups of

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[1] DBCA commenced operations on 1 July 2017 with the amalgamation of the former Department of Parks and Wildlife (DPaW) with the Botanic Gardens and Parks Authority, the Zoological Parks Authority and the Rottnest Island Authority. DPaW's predecessors in regard to SWWMP were the Department of Environment and Conservation (DEC; 2006-2013), the Department of Conservation and Land Management (CALM; 1985-2006) and the Department of Fisheries and Wildlife (pre-1985).

[2] And, as in the previous (2015) annual report (Lane *et al.* 2016b), all routinely-collected January, March, May and July water depth, salinity and pH data. Many SWWMP wetlands were routinely monitored at two month intervals from May 1981 to May 1985 and, in some cases, prior to this. Some data have also been collected in the routine January, March, May and July monitoring periods *since* May 1985. See Appendix 5 for dates of September and November routine monitoring periods since 1977.

[3] Currently monitored as at Nov 2016. In 2012 monitoring was initiated at Big Boom and Gingilup Kulunilup was added in 2014, at the request of Birdlife Australia, due to its significance for the threatened Australasian Bittern. Mowen was added in 2015, thereby increasing the number of current SWWMP wetlands to 105 with the number of historical SWWMP wetlands unchanged at 53.

[4] Total nitrogen and total phosphorus, both filtered and unfiltered. These parameters have not been monitored beyond 2007.

[5] Appointed in May 2016 to replace the former Conservation Commission of Western Australia.

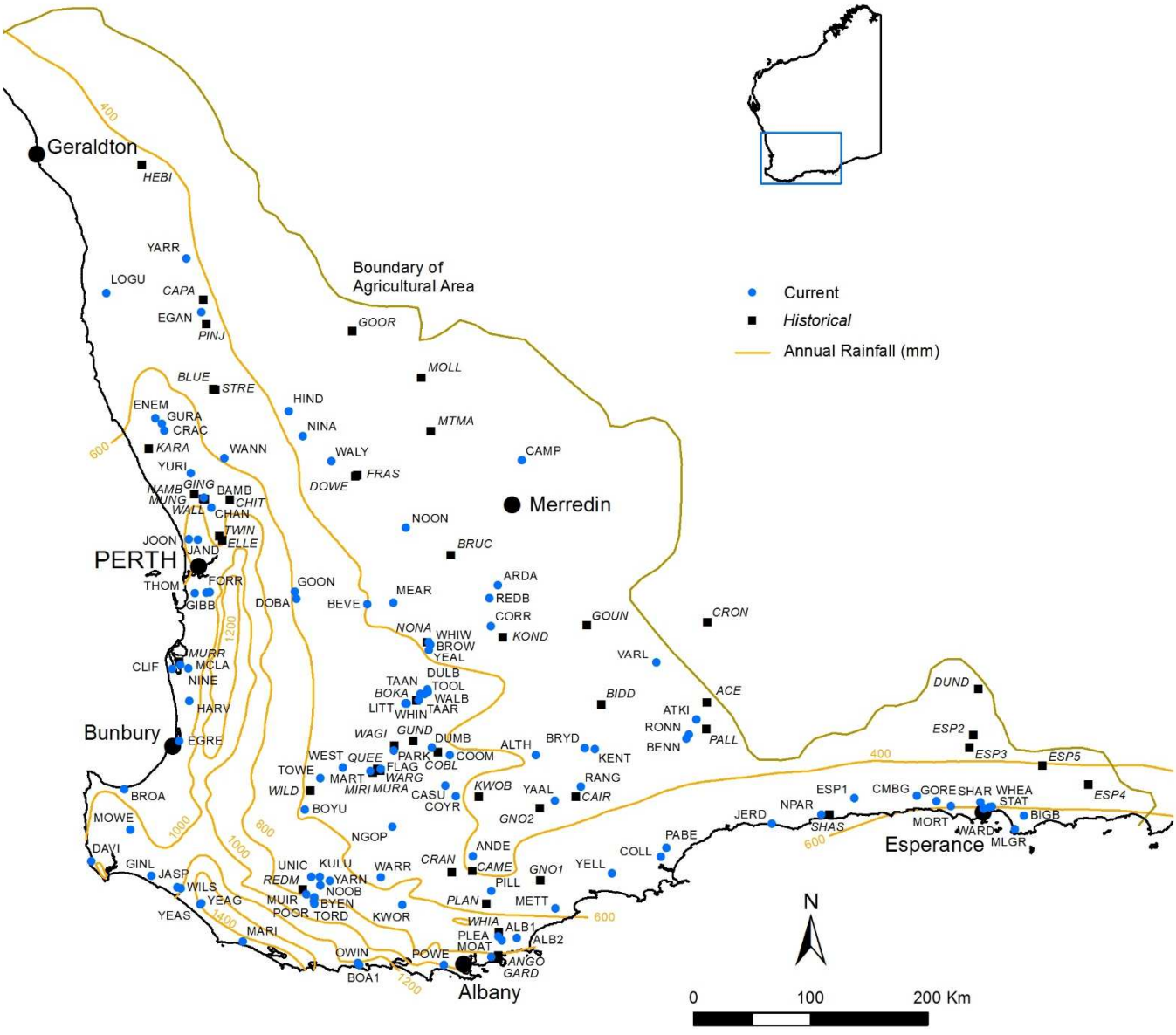

Figure 1. Wetlands currently (2016) and previously monitored under SWWMP.

current and historical SWWMP wetlands over decadal and multi-decadal periods from 1981 to 2010 has recently been prepared (Lane *et al.* 2015c) and an update is proposed.

Without statistical analysis, it would be potentially misleading to present lists of wetlands that appear to show trends, as opposed to those that do not. On the other hand, it is considered useful to draw the reader's attention here to wetlands with 2016 water level, salinity or pH values that are close to or outside previously recorded limits. These are listed below, with the relevant LGAs in brackets. The relevant data are presented graphically in the GRAPHS section of this report, alphabetically by wetland name.

Anderson (Tambellup), Bennetts (Lake Grace), Big Boom (Esperance), Byenup (Manjimup), Campion (Nungarin/Merredin), Clifton (Mandurah/Waroona), Coomalbidgup (Esperance), Davies (Augusta – Margaret River), Dulbinning (Wickepin), Eganu (Coorow), Egret (Harvey), Eneminga (Dandaragan), 'Esperance 26410' (Esperance), Goonaping (Beverley), Gore (Esperance), Jasper (Nannup), Jerdacuttup (Ravensthorpe), Kwornicup (Plantagenet), Logue (Carnamah), Mortijinup (Esperance), Mount Le Grand (Esperance), Nine Mile (Murray), Noobijup (Cranbrook), North Parriup (Ravensthorpe), Poorginup (Manjimup), Tordit-Gurrup (Manjimup), Warrinup (Cranbrook), Wheatfield (Esperance) and Yarnup (Cranbrook).

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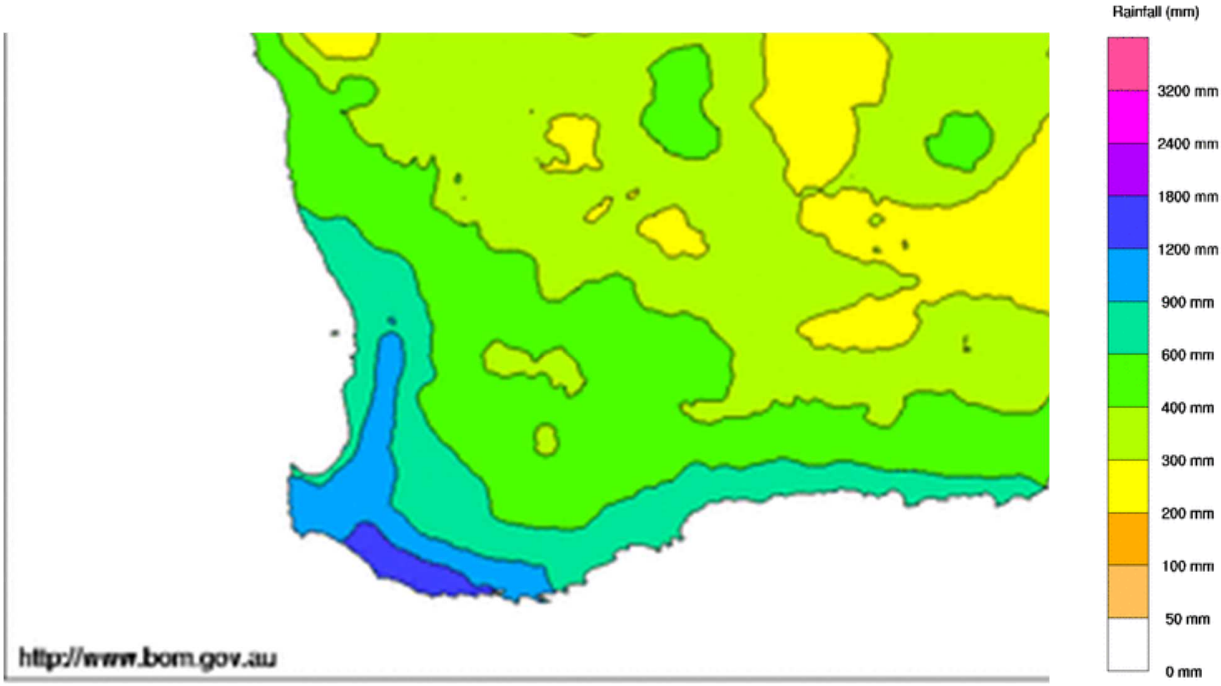

Figure 2. Rainfall (mm) recorded in the 12 month period from 01 Nov 2015 to 31 Oct 2016

Rainfalls in south-western Australia in the 12 months to 31st October 2016 ranged from <400mm to >1200mm, with the highest falls being recorded on the western south coast (Fig. 2). Falls in southern areas were mainly more than 100mm above average and in some parts more than 200mm above average (Fig. 3). However, in a small area south of Perth they were more than 200mm *below* average. In percentage terms, south-eastern and central-eastern parts were more than 125% above average, while the small area south of Perth was more than 20% *below* average (Fig. 4). In decile terms, southern and eastern parts were above average to very much above average and the area south of Perth was below average to very much below average (Fig. 5).

Unseasonally heavy (> 100mm) rainfall occurred in parts of the lower south-west during the third week of January 2016 (Fig. 6), and in a localized area on the south-east coast in late March 2016 (Fig. 7). Duranillin recorded 178mm over 19–21 January and, as a consequence, Towerrinning rose from 2.52m in Nov 2015 to 3.28m with strong outflow through its opened check structure. Ravensthorpe and Munglinup recorded 115mm and 83mm respectively over 22–24 March. These falls no doubt contributed to Jerdacuttup filling to its highest level since 1989 and 'Esperance 26410' filling to more than 2.5m above its previous (35+ year) record).

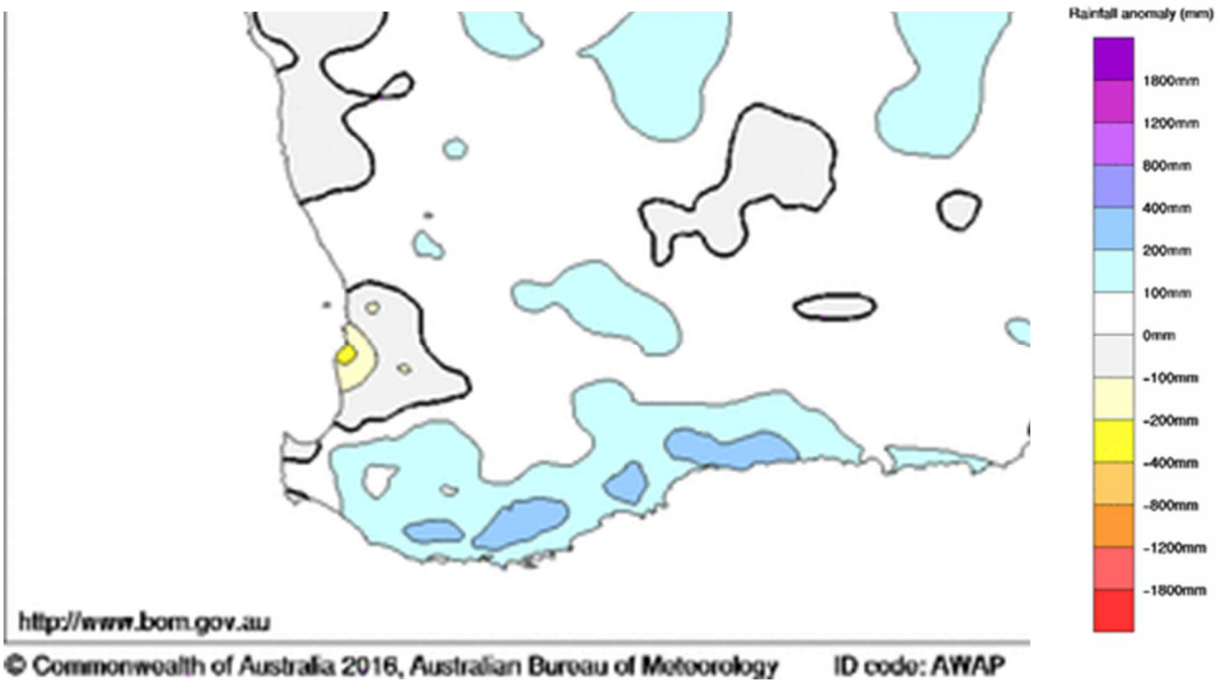

Figure 3. Rainfall anomalies (mm above or below average) in the 12 month period from 01 Nov 2015 to 31 Oct 2016

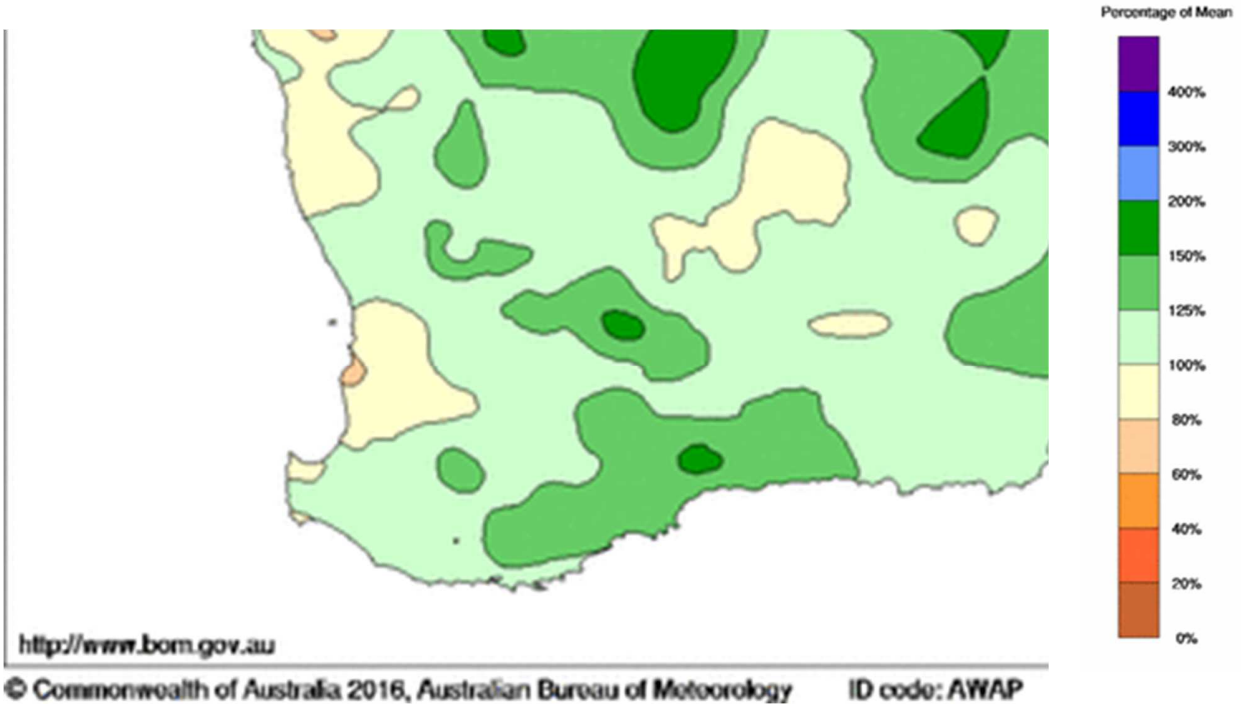

Figure 4. Rainfall percentages for the 12 month period from 01 Nov 2015 to 31 Oct 2016.

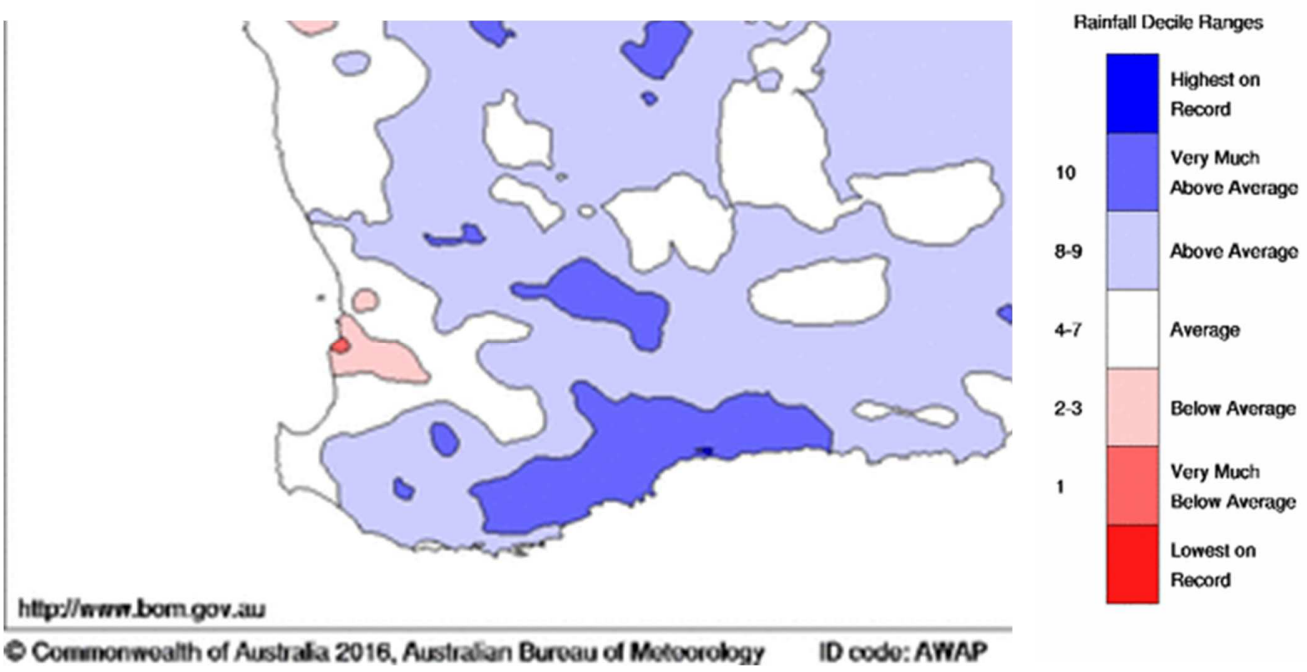

Figure 5. Rainfall deciles for the 12 month period from 01 Nov 2015 to 31 Oct 2016.

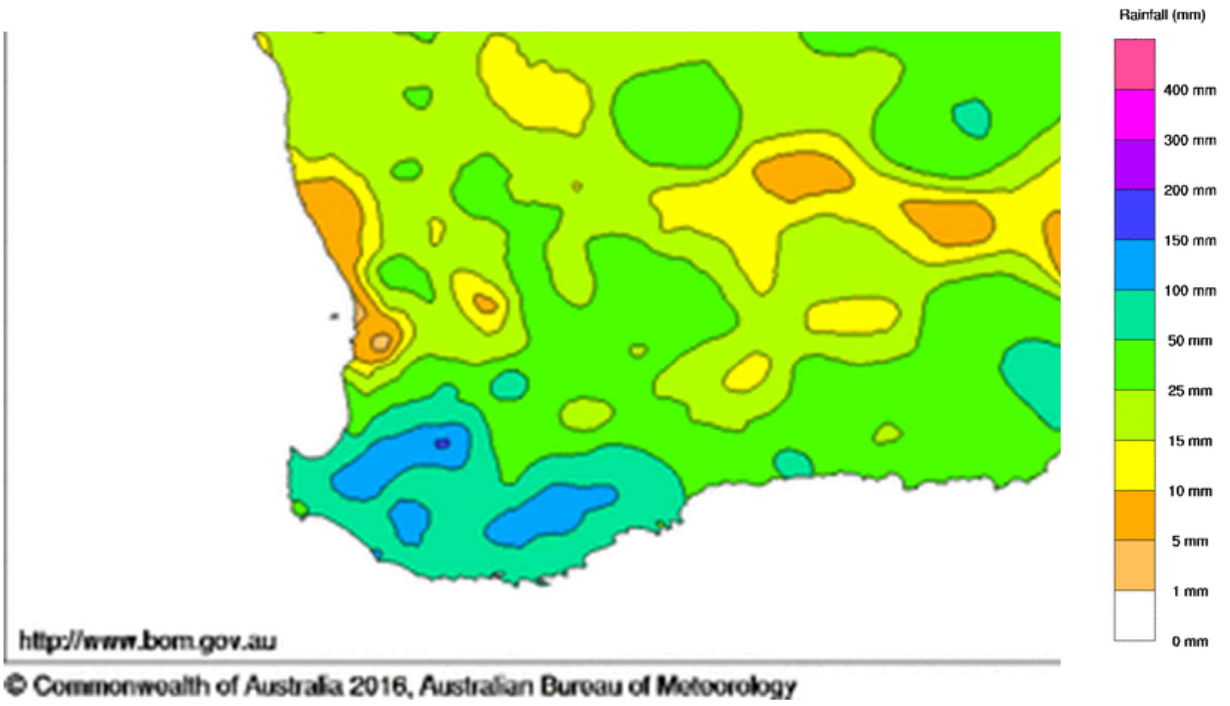

Figure 6. Rainfall (mm) recorded in the week to 21 Jan 2016

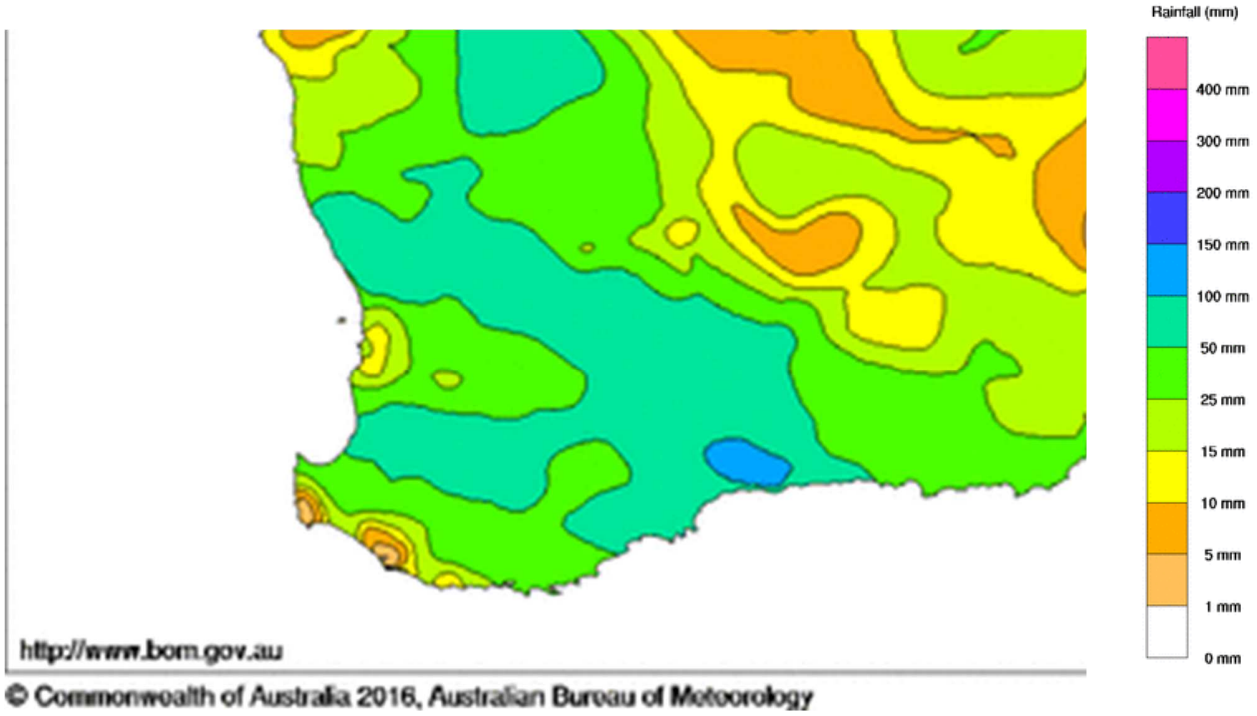

Figure 7. Rainfall (mm) recorded in the week to 27 Mar 2016.

Readers are encouraged to view all Graphs (Albany 26385 to Yurine) of this report for changes of possible interest or concern and perhaps for reassurance that, 39 years since commencement of SWWMP, while many wetlands are being impacted by declining rainfall, some clearly remain in good condition, at least in terms of the monitored key parameters.

Regional, District and specialist branch staff of the Department of Biodiversity, Conservation and Attractions may find it useful to refer to Table 2 in order to readily identify monitored wetlands in their areas of management responsibility. Requests for data should be directed to jim.lane@dbca.wa.gov.au.

3. OTHER MATTERS

Historical SWWMP wetlands

SWWMP depth gauges at the 53 *historically*-monitored wetlands (monitored under SWWMP at some time in the past but not currently; see Tables 1–3) are not maintained and many are now illegible or missing. Readers with a need to undertake monitoring at any of these wetlands are encouraged to contact SWWMP staff for details of the legally-protected Landgate[1] Bench Marks (local survey datums) at each of these wetlands so that monitoring equipment and new depth gauges, if needed, can be installed and calibrated to the same elevations as those previously installed. Water level data 'continuity' can thereby be maintained.

Bathymetric mapping

Between 1997 and 2009, SWWMP staff, working with Landgate and contract surveyors, and with significant funding support from several DBCA Regions and Districts, mapped the bathymetry (lakebed and shoreline contours and inflow and outflow channels) of 19 SWWMP wetlands. In 2014, the beds of two SWWMP wetlands (Yeagarup and Yeagarup South) were mapped by authors AC and YW. These authors also measured depths at multiple locations at Jasper while salinity-profiling this lake in November 2015 (Lane *et al.* 2016c). An additional 18 SWWMP wetlands are known to have been mapped by others, in two cases (Byenup in 2009 and Tordit-Gurrup in 2011) with field assistance from SWWMP staff. A list of all 40 wetlands, together with their years of mapping, methods employed, products and custodians/sources is provided in Table 6.

[1] Formerly known as the Department of Land Information and the Department of Land Administration (DoLA).

Bathymetric mapping enables water surface areas, water volumes and salt loads (tonnes) to be calculated from measured depths and salinities and thereby assists in water balance and salt balance modelling and the assessment of likely impacts on specific wetlands of drainage, diversion, pumping and storage proposals, proposed land use changes and predicted climate change. Requests for bathymetric maps of SWWMP wetlands should be directed in the first instance to jim.lane@dbca.wa.gov.au. Funded requests to map the bathymetry of additional SWWMP wetlands, particularly wetlands of high conservation value under threat, are welcome. SWWMP Senior Technical Officer Alan Clarke has considerable experience in organising, supervising and conducting bathymetric surveys.

Aerial photography

High resolution, low altitude, aerial oblique photography is useful for mapping wetland vegetation, monitoring vegetation condition, planning and conducting biological surveys, planning recreational activities and facilities, and in interpretation and extension. During the period 2008–2012, 152 of the 158 SWWMP wetlands were flown and photographed with specialised camera equipment to obtain photographs suitable for these purposes. A sample of low resolution prints and enlargements has been presented in previous annual SWWMP reports (e.g. Lane *et al*. 2015b: photos 17–24 & 32–50). Digital copies of original, high resolution photographs of any of the 152 wetlands (see Table 8 for a list) may be obtained by directing requests to jim.lane@dbca.wa.gov.au.

Continuous water level and rainfall recording

Commencing in June 2009, author AC, with YW's assistance in recent years, installed continuous water level recorders and tipping-bucket rainfall gauges on 14 SWWMP wetlands ('Albany 27157', Big Boom, Broadwater, Chandala, Crackers, Davies, 'Esperance 26410', Gingilup, Maringup, McLarty, Mettler, Nine Mile, Pillenorup, Pleasant View). This equipment was kept in operation at these locations for several years and then, in some instances, moved to other high conservation value SWWMP wetlands of special interest (e.g. for the specially-protected Australasian Bittern, see Appendix 4 of Lane *et al.* 2015b) and/or under threat. Collection of continuous water level and rainfall data in this manner will enable salt and water balance models[1] to be developed for these and other south-western Australian wetlands and will thereby assist in their conservation management. The data will also assist in development of an improved understanding of the likely consequences of predicted climate change, particularly rainfall decline, on wetlands of south-western Australia. In 2013 the water level recorders and rainfall gauges were removed from the five northern-most (Broadwater, Chandala, Crackers, McLarty and Nine Mile) of the 14 wetlands. In 2015 the water level recorders were removed from Pillenorup (the rainfall recorders remain in place) and water level and rainfall recorders were installed at 'Albany 26386' (South Sister Nature Reserve), another important location for Australasian Bittern. A report on this work has recently been published (Lane *et al.* 2016a).

Trend analyses

This report has been prepared as the tenth in a series of annual reports aimed at putting the most-recent SWWMP data in front of readers in un-analysed form as soon as possible after data collection. Results and interpretations of statistical trend analyses are to be presented in other, less-frequent reports (e.g. Lane *et al.* 2004, 2015c) covering the longer time periods required to assess such trends.

Historical data to be added to SWWMP database

Participants in the 1981-85 assessment of waterbird use of wetland nature reserves (and some other waterbodies) in the south-west (Jaensch *et al.* 1988) and subsequent surveys to c. 1992 occasionally recorded depth gauge readings on their waterbird survey forms. These data could be usefully added to the SWWMP database. The original survey forms are held (not for loan) by the DBCA Library and copies are held by J. Lane.

Biological monitoring, shallow groundwater and detailed water chemistry

Readers' attention is drawn to the numerous reports and publications (see these listed under authors Cale, Gibson, Halse, Lyons, Pinder and Walker in the Reference section and in Appendix 1) concerning the fringing and emergent vegetation, waterbirds, aquatic invertebrates, groundwater and detailed water chemistry of the 25 SWWMP wetlands (shown in bold in Tables 1, 2, 4–8) that have been intensively monitored by other DEC/DPaW/DBCA scientists and collaborators under the State Salinity Strategy. *Inter alia*, these studies have provided a basis for trialling a framework and indicators for wetland extent, distribution and condition in Western Australia (Sim *et al.* 2008).

Natural Diversity Recovery Catchments

Eighteen currently-monitored and one historically-monitored SWWMP wetland are within current or former *Natural Diversity Recovery Catchments* under the State Salinity Strategy (Table 5). Many recent reports and publications concerning

[1] See Peck (2000) for an early example using SWWMP data from Coyrecup Lake.

on-ground works and site-specific investigations in these catchments may be found on or via the DBCA website[1]. They include the following[2]: Bourke (2011), Cale (2013a), Drake *et al.* (2014), Farmer *et al.* (2002), Gibson *et al.* (2005), Hearn *et al.* (2013), Higbid (2012), Hipsey *et al.* (2011), Keighery *et al.* (2002), Lizamore (2015), Metcalf (2013), Pinder *et al.* (2012b), Rutherford *et al.* (2015), Smith, M.G. (2010), Smith, M.J. *et al.* (2016), Vogwill *et al.* (2010) and Wallace (2012).

Recreation and Threatened Species

Readers' attention is also drawn to Appendices 2 & 3 of the 2014 annual SWWMP report (Lane *et al.* 2015b), which relate to recreational use of SWWMP wetlands, and Appendix 4 (also of the 2014 report), concerning threatened vertebrate fauna and SWWMP wetlands.

4. ACKNOWLEDGEMENTS

The authors wish to thank the many people who have participated in SWWMP or assisted this program in other ways over the past 39 years.

Most SWWMP data have been collected by the authors of this report and by G.B. Pearson (retired from DEC in Feb 2008) and D.R. Munro (retired from CALM in May 1991). Bill Muir, Brent Johnson and Sue Elscot each conducted a number of monitoring runs between 2000 and 2007. Keith Morris and Greg Keighery are thanked for making Brent and Bill available for this work. Ian Wheeler assisted with SW sector monitoring runs in 2005, 2007 and 2012–2015 and David Cale conducted the SE run in September 2013. Roger Hearn, Brad Barton and Adrian Pinder are thanked for their assistance. Cherie Kemp (DBCA Busselton) assisted with SW sector monitoring runs in a voluntary capacity in 2015 and 2016 and is also thanked.

In early years, principally the 1970s and 1980s, some data were collected by (in alphabetic order) Laurie Anderson, Margaret Brock, Bob Burking, Barry Carson, P. Conedera, R. Daniels, Ainsley Darcy-Evans, F. Dart-Kelly, G. Davies, G. Drew, M. Ellis, Phil Fuller, A. Goudie, Malcolm Graham, Stuart Halse, Sue Harrington, R. Heathering, Stephen Hopper, David James, Roger Jaensch, Chris Johns, D. Jones, R. Kenney, Peter Lambert, L. Martin, Joan Merrifield, Kingsley Miller, Susan Moore, Ray Motteram, Bill Muir, N. Plowman, Chris Robinson, Leon Silvester, Ray Smith, Andrew Storey, Ken Wallace, A. Watson, Andy Williams, D. Yates and Ken Youngson.

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Roger Schulz and Jenny McGuire of ChemCentre (formerly the Chemistry Centre of Western Australia within the WA Department of Mines and Petroleum) supervised the analysis of many water samples and provided much valuable advice.

Bob McCarthy of Landgate (formerly known as Department of Land Information) provided invaluable advice and assistance concerning surveying of depth gauges, installation of Bench Marks and connection to Australian Height Datum at all but a few SWWMP wetlands. He also provided invaluable advice and assistance in the design and supervision of bathymetric surveys of many of the wetlands listed in Table 6 of this report. Brian Hugessen, Lindsey Schuiling and Doug Hardman of Landgate also made valuable contributions.

Wilfe Lehre, Nick Caputi, Norman Hall, Paul Gioia and Russell Marks (Greenbase Consulting) programmed a multitude of computers for the storage, analysis and reporting of SWWMP data over three decades. Matt Williams of DBCA provided statistical advice concerning trends analysis of SWWMP data to 2000 (reported in Lane *et al.* 2004).

John Lizamore and Grace Patorniti of DPaW/DBCA provided helpful information concerning recent management of Warden and Thomsons lakes respectively. John also provided valuable advice regarding determination of salinity of hypersaline waters at Lake Warden.

Former DEC Director General Keiran McNamara and former DEC/DPaW Natural Resources Branch Manager Ken Wallace had lead roles in securing the funds needed for SWWMP to continue beyond 1996 and for all data collected since commencement of the program to be secured, stored, analysed and reported.

SWWMP has been entirely funded by the Government of Western Australia through the Department of Biodiversity and Attractions (1st July 2017 onwards) and its predecessors the Department of Parks and Wildlife (1st July 2013 to 30th June 2017), the Department of Environment and Conservation (2006 to 30th June 2013), the Department of Conservation and Land Management (1985–2006) and the Department of Fisheries and Wildlife (1977–1985).

The Commonwealth of Australia's Bureau of Meteorology is the source and copyright holder of the rainfall maps presented in this report as Figures 2–7. These maps are presented with permission of the Bureau.

[1] https://www.dpaw.wa.gov.au/management/wetlands/recovery-catchments/210-recovery-catchments-further-information?showall=1 (on 10Feb2017). If this link fails, try emailing library@dbca.wa.gov.au for guidance.

[2] This is a *small sample* of recent reports and publications authored by former and current employees of DPaW and its predecessors DEC and CALM. One citation is provided per principal author, with the aim of introducing the reader to these authors and an example of their NDRC-related work. These are not necessarily the most significant or most recent NDRC-related publications by these authors.

5. REFERENCES[1]

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PHOTOS

Readers are referred to the 2014 annual SWWMP report (Lane *et al.* 2015b) for a selection of photographs concerning most aspects of SWWMP.

TABLES

Table 1. Monitored wetlands, codes, coordinates, tenure, Local Government Authorities and monitoring periods. **This Table includes all wetlands ('current' and *'historical'*) regularly monitored at any time since commencement of the South West Wetlands Monitoring Program in 1977, sorted alphabetically by wetland name.**

Wetland Name[1]	Code	Easting[2]	Northing[2]	Zone	Tenure[4]	Local Government Authority	Period monitored[5,6,7]
Ace[8]	*ACE*	*758029*	*6344741*	*50*	*CPCWA*	*Lake Grace*	*7/80 - 5/85, 4/00*
Albany 26385[9,13]	ALB1	606041	6148594	50	CPCWA	Albany	5/81 - 5/85, 9/98 onwards
Albany 27157[13]	ALB2	618826	6147490	50	CPCWA	Albany	3/80 - 5/85, 9/08, 9/09 onwards
Altham[10]	ALTH	634562	6302593	50	CPCWA	Kent	7/80 - 11/91, 4/00 onwards
Anderson	ANDE	588666	6217158	50	CPCWA	Tambellup	5/81 - 3/92, 9/00 onwards
Angove	*ANGO*	*605850*	*6132590*	*50*	*CPCWA*	*Albany*	*11/79 - 5/85, 9/90, 4/00*
Ardath	ARDA	609068	6448377	50	CPCWA	Bruce Rock	9/99 onwards
Atkins Yate	ATKI	750023	6330530	50	Private	Lake Grace	4/00 onwards
Bambun	BAMB	394880	6522829	50	CPCWA	Gingin	5/79 onwards
Bennetts	BENN	742440	6314572	50	CPCWA	Lake Grace	9/92 onwards
Beverley[11]	BEVE	514297	6432612	50	CPCWA / LGA	Beverley / Brookton / Quairading	6/78 onwards
Biddy	*BIDD*	*682152*	*6344888*	*50*	*CPCWA*	*Lake Grace*	*7/82 - 5/85, 9/91 - 1/93, 4/00, 7/09*
Big Boom[3,13]	BIGB				UCL	Esperance	9/12 onwards
Blue Gum	*BLUE*	*401231*	*6615183*	*50*	*Private*	*Moora*	*11/99 – 11/10*
Boat Harbour 1	BOA1	508245	6124962	50	CPCWA	Denmark	8/91 onwards
Bokan	*BOKA*	*549253*	*6349883*	*50*	*CPCWA*	*Narrogin*	*7/79 - 5/85,11/08*
Boyup Brook 18239[11]	BOYU	469777	6257199	50	CPCWA	Boyup Brook	9/80 onwards
Broadwater[13]	BROA	341176	6273426	50	CPCWA	Busselton	11/85 onwards
Brown	BROW	559606	6397735	50	CPCWA	Corrigin	7/79 - 11/91, 9/97 onwards
Bruce Rock 30969	*BRUC*	*575133*	*6473941*	*50*	*CPCWA*	*Bruce Rock*	*5/82 - 5/85*
Bryde	BRYD	669625	6308051	50	MWR	Kent	6/79 onwards
Byenup	BYEN	476449	6182437	50	CPCWA	Manjimup	6/77 onwards
Cairlocup	*CAIR*	*662520*	*6266817*	*50*	*CPCWA*	*Kent*	*9/80 - 5/85, 4/00, 5/09*
Camel	*CAME*	*588033*	*6204762*	*50*	*CPCWA*	*Cranbrook*	*8/80 - 5/85, 4/00*
Campion	CAMP	627676	6554227	50	CPCWA	Nungarin / Merredin	3/79 - 11/91, 5/99 onwards
Capamaura	*CAPA*	*393132*	*6691441*	*50*	*CPCWA*	*Carnamah*	*7/80 - 5/85, 3/90, 11/09*
Casuarina	CASU	569525	6277315	50	CPCWA	Katanning	5/78 onwards
Chandala[13]	CHAN	400545	6514425	50	CPCWA	Chittering	5/79 onwards
Chittering	*CHIT*	*414089*	*6521328*	*50*	*CPCWA*	*Chittering*	*4/78 - 11/86*
Clifton	CLIF	374037	6376139	50	CPCWA	Mandurah / Waroona	11/85 onwards
Coblinine	*COBL*	*564476*	*6306117*	*50*	*CPCWA*	*Dumbleyung*	*6/79 - 11/91*
Collets Road[3]	COLL			50	CPCWA	Jerramungup	9/01 onwards
Coomalbidgup	CMBG	349163	6267892	51	LGA	Esperance	11/99 onwards
Coomelberrup	COOM	573060	6303130	50	CPCWA	Dumbleyung	5/78 - 5/85, 3/93, 9/97 onwards
Corrigin 12900[11]	CORR	603415	6413294	50	CPCWA	Corrigin	7/82 onwards
Coyrecup	COYR	577072	6268374	50	CPCWA	Katanning	5/78 onwards
Crackers[13]	CRAC	365586	6579519	50	CPCWA	Dandaragan	7/80 onwards
Cranbrook 25812	*CRAN*	*573707*	*6203482*	*50*	*CPCWA*	*Cranbrook*	*8/80 - 8/85, 4/00, 11/08*
Cronin	*CRON*	*760036*	*6413700*	*50*	*CPCWA*	*Kondinin*	*4/81 - 5/85, 11/95, 4/01, 07/09*
Davies[13]	DAVI	318852	6211560	50	CPCWA	Augusta-Margaret River	4/91 onwards
Dobaderry	DOBA	463077	6437224	50	CPCWA	Beverley	9/80 onwards
Dowerin	*DOWE*	*505689*	*6541494*	*50*	*LGA*	*Dowerin*	*6/79 - 5/81, 9/99*
Dulbinning	DULB	557418	6359015	50	CPCWA	Wickepin	7/79 onwards
Dumbleyung	DUMB	560071	6309876	50	CPCWA / LGA	Dumbleyung / Wagin	6/79 onwards

Table 1 continued.

Wetland Name	Code	Easting	Northing	Zone	Tenure	Local Government Authority	Period monitored
Dundas 33113	*DUND*	*391998*	*6359382*	*51*	*CPCWA*	*Dundas*	*11/79 – 11/91, 4/00*
Eganu	EGAN	391567	6680556	50	CPCWA	Coorow	7/78 onwards
Egret	EGRE	379666	6314855	50	CPCWA	Harvey	5/85 onwards
Ellen Brook	*ELLE*	*408758*	*6486521*	*50*	*CPCWA*	*Swan*	*7/79 – 11/84*
Eneminga	ENEM	358697	6590178	50	CPCWA	Dandaragan	7/80 – 11/91, 09/08, 9/11 onwards
Esperance 26410[13]	ESP1	304849	6265010	51	CPCWA	Esperance	11/81 onwards
Esperance 27768	*ESP2*	*388786*	*6319769*	*51*	*CPCWA*	*Esperance*	*6/81 - 5/85, 4/00*
Esperance 27985	*ESP3*	*385963*	*6309342*	*51*	*CPCWA*	*Esperance*	*6/81 – 11/91, 4/00 -11/10*
Esperance 32128	*ESP4*	*471180*	*6278570*	*51*	*CPCWA*	*Esperance*	*7/82 - 5/85*
Esperance 32776	*ESP5*	*438274*	*6294596*	*51*	*CPCWA*	*Esperance*	*6/81 - 5/85, 4/00*
Flagstaff	FLAG	523642	6291467	50	CPCWA	Woodanilling	6/79 – 11/91, 9/97 onwards
Forrestdale	FORR	400062	6442240	50	CPCWA	Armadale	11/77 onwards
Frasers[11]	*FRAS*	*507236*	*6542443*	*50*	*Private*	*Dowerin*	*11/99 – 11/10*
Gardner	*GARD*	*605828*	*6129943*	*50*	*CPCWA*	*Albany*	*5/81 - 5/85, 9/89, 9/90, 4/00, 9/08*
Gibbs	GIBB	397627	6441667	50	CPCWA	Armadale	9/92 onwards
Gingilup[3,13]	GINL				CPCWA	Nannup	9/12 onwards
Gingin 31241	*GING*	*387922*	*6525676*	*50*	*CPCWA*	*Gingin*	*6/79 - 5/85, 9/08*
Gnowangerup 26264	*GNO1*	*636100*	*6196278*	*50*	*CPCWA*	*Gnowangerup*	*3/80 – 11/91, 9/08*
Gnowangerup 26569	*GNO2*	*636830*	*6257497*	*50*	*CPCWA*	*Gnowangerup*	*7/82 - 5/85, 4/00*
Goonaping	GOON	461797	6443309	50	CPCWA	Beverley	11/99 onwards
Goorly	*GOOR*	*503350*	*6664801*	*50*	*UCL*	*Dalwallinu*	*9/00 – 11/09*
Gore	GORE	363166	6263536	51	CPCWA	Esperance	11/79 onwards
Gounter	*GOUN*	*672878*	*6413022*	*50*	*CPCWA*	*Kondinin*	*7/80 – 11/91, 5/98, 7/09*
Gundaring	*GUND*	*546974*	*6315587*	*50*	*CPCWA*	*Wagin*	*5/78 – 11/91*
Guraga	GURA	363476	6585412	50	LGA	Dandaragan	9/82 onwards
Harvey 12632	HARV	386550	6348919	50	CPCWA	Harvey	8/80 onwards
Hebitons	*HEBI*	*345831*	*6806160*	*50*	*Private*	*Mullewa*	*9/00 – 11/09*
Hinds	HIND	456859	6596884	50	CPCWA	Wongan-Ballidu	6/79 – 11/91, 9/97 onwards
Jandabup	JAND	390937	6486982	50	CPCWA	Wanneroo	4/78 onwards
Jasper	JASP	379737	6190394	50	CPCWA	Nannup	11/85 onwards
Jerdacuttup	JERD	246655	6241791	51	CPCWA	Ravensthorpe	11/79 onwards
Joondalup	JOON	384352	6487435	50	CPCWA	Joondalup	4/78 onwards
Karakin	*KARA*	*354428*	*6563848*	*50*	*WRC*	*Gingin*	*5/79 - 5/85, 9/87*
Kent 29020[11]	KENT	676818	6307259	50	CPCWA	Kent	9/80 - 5/85, 4/00 onwards
Kondinin	*KOND*	*612045*	*6404006*	*50*	*CPCWA*	*Kondinin*	*6/79 – 11/91, 4/00*
Kulunilup[3]	KULU				CPCWA	Cranbrook	9/14 onwards
Kwobrup	*KWOB*	*593500*	*6267648*	*50*	*Private*	*Kent*	*6/79 – 11/91, 4/00*
Kwornicup	KWOR	538575	6176168	50	CPCWA	Plantagenet	11/79 onwards
Little White	LITT	541357	6347281	50	CPCWA	Narrogin	7/79 – 11/91, 9/97 onwards
Logue	LOGU	321114	6695888	50	CPCWA	Carnamah	5/79 onwards
Maringup[13]	MARI	426553	6144690	50	CPCWA	Manjimup	6/91 onwards
Martinup	MART	516363	6289934	50	CPCWA	Woodanilling	6/79 – 11/91, 9/97 onwards
McLarty[13]	MCLA	379489	6379596	50	CPCWA	Murray	11/93 - 11/94, 9/96 onwards
Mears	MEAR	533098	6433941	50	CPCWA	Brookton	6/78 – 11/91, 9/97 onwards
Mettler[13]	METT	646369	6172015	50	CPCWA	Albany	9/82 onwards
Miripin	*MIRI*	*518066*	*6288832*	*50*	*CPCWA*	*Woodanilling*	*6/81 - 5/85, 5/92, 9/09*

Table 1 continued.

Wetland Name	Code	Easting	Northing	Zone	Tenure	Local Government Authority	Period monitored
Moates	MOAT	600908	6131536	50	CPCWA	Albany	11/79 onwards
Mollerin	*MOLL*	*554214*	*6625482*	*50*	*CPCWA*	*Koorda*	*7/80 – 5/85*
Mortijinup	MORT	373710	6259469	51	CPCWA	Esperance	4/00 onwards
Mount Le Grand	MLGR	419066	6240163	51	CPCWA	Esperance	9/00 onwards
Mount Marshall 26687[11]	*MTMA*	*560937*	*6579648*	*50*	*CPCWA*	*Mt Marshall*	*7/81 – 11/91, 5/99*
Mowen	MOWE				CPCWA	Augusta-Margaret River	9/15 onwards
Muir	MUIR	471032	6185028	50	CPCWA	Manjimup	11/79 onwards
Mungala	*MUNG*	*395151*	*6521364*	*50*	*CPCWA*	*Gingin*	*6/79 – 5/85*
Murapin	*MURA*	*517681*	*6289397*	*50*	*CPCWA*	*Woodanilling*	*6/81 – 5/85*
Murray 24739	*MURR*	*378784*	*6382052*	*50*	*CPCWA*	*Murray*	*9/80 – 5/85, 8/08*
Nambung	*NAMB*	*394607*	*6521821*	*50*	*CPCWA*	*Gingin*	*6/79 – 5/85*
Ngopitchup	NGOP	531747	6242644	50	WRC	Broomehill	4/00 onwards
Ninan	NINA	467029	6575597	50	CPCWA	Wongan-Ballidu	7/78 – 11/91, 9/97 onwards
Nine Mile[13]	NINE	385536	6376505	50	CPCWA	Murray	6/81 onwards
Nonalling	*NONA*	*557243*	*6400132*	*50*	*CPCWA*	*Corrigin*	*7/79 – 5/85*
Noobijup	NOOB	480867	6192653	50	CPCWA	Cranbrook	9/99 onwards
Noonying	NOON	542507	6497744	50	CPCWA	Tammin	6/79 – 11/91, 9/97 onwards
North Parriup	NPAR	281562	6250268	51	CPCWA	Ravensthorpe	4/00 onwards
Owingup	OWIN	507258	6126756	50	CPCWA	Denmark	7/91 onwards
Pabelup South	PABE	725800	6222286	50	CPCWA	Jerramungup	4/00 onwards
Pallarup	*PALL*	*756890*	*6322416*	*50*	*CPCWA*	*Lake Grace*	*7/80 – 11/91, 4/00, 11/08, 7/09*
Parkeyerring	PARK	533156	6307263	50	CPCWA	Wagin	5/78 – 11/91, 9/97 onwards
Pillenorup[13]	PILL	601412	6187773	50	CPCWA	Plantagenet	4/00 onwards
Pinjarrega	*PINJ*	*395416*	*6670552*	*50*	*CPCWA*	*Coorow*	*5/79 – 11/91*
Plantagenet 25386	*PLAN*	*597710*	*6176617*	*50*	*CPCWA*	*Plantagenet*	*11/79 – 5/85, 11/93 – 11/96, 6/98, 11/08*
Pleasant View[13]	PLEA	608357	6145314	50	CPCWA	Albany	11/79 onwards
Poorginup	POOR	476447	6177128	50	CPCWA	Manjimup	6/77 onwards
Powell	POWE	567497	6125091	50	CPCWA	Albany	6/81 onwards
Queerearrup	*QUEE*	*521251*	*6291518*	*50*	*LGA*	*Woodanilling*	*10/78 – 5/85, 9/88, 11/08*
Range Road Yate	RANG	666083	6275186	50	MWR	Kent	4/00 onwards
Red (Bruce Rock)	REDB	602548	6437065	50	CPCWA	Bruce Rock	7/81 – 5/85, 9/00 onwards
Red (Manjimup)	*REDM*	*468592*	*6189580*	*50*	*UCL*	*Manjimup*	*11/81 – 11/91, 4/00, 9/08*
Ronnerup	RONN	744169	6317786	50	CPCWA	Lake Grace	4/00 onwards
Shark	SHAR	394568	6263073	51	CPCWA	Esperance	11/79 onwards
Shaster	*SHAS*	*287219*	*6250710*	*51*	*CPCWA*	*Ravensthorpe*	*11/79 – 11/91, 5/09*
Station	STAT	402615	6259237	51	CPCWA	Esperance	3/80 onwards
Streets	*STRE*	*402493*	*6614985*	*50*	*Private*	*Moora*	*10/78 – 11/91, 9/08*
Taarblin North[3,12]	TAAN			50	CPCWA	Narrogin	9/04 onwards
Taarblin South[12]	TAAR	551258	6350395	50	CPCWA	Narrogin	5/78 onwards
Thomsons	THOM	389516	6441482	50	CPCWA	Cockburn	11/78 onwards
Toolibin	TOOL	557650	6357248	50	CPCWA	Wickepin	5/78 onwards
Tordit-Gurrup	TORD	476135	6179406	50	CPCWA	Manjimup	6/77 onwards
Towerrinning	TOWE	480708	6283950	50	CPCWA	West Arthur	12/77 onwards
Twin Swamps N-W	*TWIN*	*406579*	*6490175*	*50*	*CPCWA*	*Swan*	*7/79 – 11/84, 7/09*
Unicup	UNIC	474399	6200082	50	CPCWA	Cranbrook	9/80 onwards

Table 1 continued.

Wetland Name	Code	Easting	Northing	Zone	Tenure	Local Government Authority	Period monitored
Varley	VARL	722520	6379843	50	CPCWA	Kulin	9/81 – 11/91, 4/00 onwards
Wagin 2088	*WAGI*	*533281*	*6311808*	*50*	*CPCWA*	*Wagin*	*7/82 – 5/85*
Walbyring	WALB	555534	6355214	50	CPCWA	Wickepin	7/79 onwards
Wallering	*WALL*	*395706*	*6521624*	*50*	*CPCWA*	*Gingin*	*7/81 – 5/85, 9/08*
Walyormouring	WALY	488021	6554454	50	CPCWA	Goomalling	7/78 – 11/91, 9/97 onwards
Wannamal	WANN	409642	6556691	50	CPCWA	Gingin	7/78 onwards
Warden	WARD	396947	6257428	51	CPCWA	Esperance	11/79 onwards
Wardering	WARG	523381	6290253	50	CPCWA	Woodanilling	5/78 – 11/91
Warrinup	WARR	523495	6199485	50	CPCWA	Cranbrook	3/80 onwards
West Arthur 5456	WEST	496510	6293047	50	CPCWA	West Arthur	8/80 – 11/91, 9/97 onwards
Wheatfield	WHEA	401069	6258818	51	CPCWA	Esperance	11/99 onwards
White (Albany)	*WHIA*	*606407*	*6152434*	*50*	*CPCWA*	*Albany*	*6/81 - 5/85, 9/98, 9/08*
White (Narrogin)	WHIN	542630	6347335	50	CPCWA	Narrogin	6/81 - 5/85, 9/97 onwards
White Water	WHIW	558770	6399914	50	CPCWA	Corrigin	6/81 - 11/91, 9/97 onwards
Wild Horse	*WILD*	*473637*	*6273462*	*50*	*CPCWA*	*West Arthur*	*6/81 - 5/85, 4/00, 9/09*
Wilson	WILS	382325	6189429	50	CPCWA	Manjimup	5/91 onwards
Yaalup	YAAL	647443	6263830	50	CPCWA	Kent	7/82 onwards
Yarnup	YARN	487368	6196543	50	CPCWA	Cranbrook	9/80 onwards
Yarra Yarra	YARR	379957	6726980	50	CPCWA	Carnamah	7/81 - 5/85, 9/97 onwards
Yeagarup[3]	YEAG			50	CPCWA	Manjimup	9/11 onwards
Yeagarup South[3]	YEAS			50	CPCWA	Manjimup	9/11 onwards
Yealering	YEAL	558587	6393389	50	LGA	Wickepin	6/78 onwards
Yellilup	YELL	686899	6201353	50	Private	Jerramungup	11/85 onwards
Yurine	YURI	385171	6543598	50	CPCWA	Gingin	5/79 - 11/91, 5/09 onwards

Notes:

1. Wetlands without official names at the commencement of monitoring are identified by Local Government Authority and Reserve Number (e.g. Albany 26385).
2. Coordinates (eastings and northings) are of depth gauge Bench Marks (local survey datums). These have been installed on higher ground at or near the edge of each monitored wetland, close to the depth gauge or gauge 'cluster' of that wetland. The accuracy of the coordinates of most (all coords except those highlighted in gray) has been improved from approx ±100m to approx ±5m in 2008-09 and subsequent years, principally by re-survey with hand-held GPS units (Garmin GPSmap 60Cx), using the WGS84 world datum, which for practical purposes equates to GDA94.
3. Bench Marks have not yet been installed at Big Boom, Colletts Road, Gingilup, Kulunilup, Mowen, Taarblin North, Yeagarup and Yeagarup South.
4. CPCWA (Conservation and Parks Commission of Western Australia); LGA (Local Government Authority); MWR (Minister for Water Resources); UCL (Unallocated Crown Land); WRC (Water & Rivers Commission). DBCA has management responsibility for wetlands vested in CPCWA.
5. 'Period Monitored' is described by the first and last records, for any parameter, of discrete periods of monitoring.
6. Routine monitoring was conducted every second month (Jan, Mar, May, Jul, Sep, Nov) from May 1981 to May 1985 and twice-yearly (Sept, Nov) prior to and after that four-year period and, in the case of the 105 'current' wetlands (i.e. those not shown in italics above), is ongoing. Some two month interval monitoring was also undertaken prior to May 1981.
7. A few wetlands (e.g. Forrestdale, Clifton) have been monitored more frequently (than at two-month intervals) for varying periods.
8. The 53 SWWMP wetlands shown in *italics* have been monitored under SWWMP at various times in the past, but are not currently monitored, not at least under SWWMP. They are additional to the 105 'current' wetlands.
9. Wetlands not shown in italics are the 105 'current' SWWMP wetlands being routinely monitored by the authors for surface water depth, salinity, pH and (until 2007) nutrients, under the State Salinity Strategy.

Table 1 Notes continued.

10. Wetlands shown in **bold** are the 25 SWWMP wetlands that have been Intensively Monitored under the State Salinity Strategy by other DEC/DPaW/DBCA scientific staff for potential changes in plant and animal communities, shallow groundwater levels and detailed water chemistry.
11. Beverley Lakes is also known as Yenyenning Lakes; Boyup Brook 18239 as Kulicup Swamp; Corrigin 12900 as Paperbark Swamp, Frasers Lake as Maisey's 1 or Maisey's A; Kent 29020 as East Lake Bryde and Mt Marshall 26687 as Wallambin North.
12. Taarblin North and Taarblin South refer to the northern and southern basins respectively of one wetland (Taarblin).
13. Continuous rainfall and water level recorders have been in operation on 15 wetlands ('Albany 26385', 'Albany 27157', Big Boom, Broadwater, Chandala, Crackers, Davies, 'Esperance 26410', Gingilup, Maringup, McLarty, Mettler, Nine Mile, Pillenorup, Pleasant View) for varying periods from June 2009 onwards.

Table 2. Monitored wetlands by DBCA Regions and Districts, with tenure, Reserve No. and Name.

See Table 1 for the coordinates (eastings and northings) and other details of each wetland.

No.	DBCA Region	No.	DBCA District	No.	Wetland[1]	Tenure[2]	Reserve No.[7]	Reserve Name[3, 7]
1	*Midwest*	*1*	*Geraldton*	*1*	*Hebitons*	*Private*	-	-
2	*Midwest*	*2*	*Moora*	*1*	***Blue Gum***[4]	*Private*	-	-
3	*Midwest*	*3*	*Moora*	*2*	*Capamaura*[5]	*CPCWA*	A 24618	Capamauro NR
4	Midwest	4	Moora	3	Crackers	CPCWA	28558	Namming NR
5	Midwest	5	Moora	4	**Eganu**	CPCWA	A 25210	Pinjarrega NR
6	Midwest	6	Moora	5	Eneminga	CPCWA	A 27394	Eneminga NR
7	Midwest	7	Moora	6	Guraga	LGA	31223	-
8	Midwest	8	Moora	7	**Logue**	CPCWA	29073	Lake Logue NR
9	*Midwest*	*9*	*Moora*	*8*	*Pinjarrega*	*CPCWA*	*A 25210*	*Pinjarrega NR*
10	*Midwest*	*10*	*Moora*	*9*	*Streets*	*Private*	-	-
11	Midwest	11	Moora	10	Yarra Yarra	CPCWA	A 26442	Yarra Yarra Lakes NR
12	South Coast	1	Albany	1	Albany 26385	CPCWA	26385	South Sister NR-
13	South Coast	2	Albany	2	Albany 27157	CPCWA	27157	Cheyne Road NR
14	*South Coast*	*3*	*Albany*	*3*	*Angove*	*CPCWA*	*A 27956*	*Two Peoples Bay NR*
15	*South Coast*	*4*	*Albany*	*4*	*Camel*	*CPCWA*	*A 26161*	*Camel Lake NR*
16	South Coast	5	Albany	5	Collets Road	CPCWA	-	Fitzgerald River NP
17	*South Coast*	*6*	*Albany*	*6*	*Cranbrook 25812*	*CPCWA*	*A 25812*	-
18	*South Coast*	*7*	*Albany*	*7*	*Gardner*	*CPCWA*	*A 27956*	*Two Peoples Bay NR*
19	*South Coast*	*8*	*Albany*	*8*	*Gnowangerup 26264*	*CPCWA*	*26264*	*Mailalup NR*
20	South Coast	9	Albany	9	Jerdacuttup	CPCWA	A 40156	Jerdacuttup Lakes NR
21	South Coast	10	Albany	10	Mettler	CPCWA	26894	Mettler Lake NR
22	South Coast	11	Albany	11	Moates	CPCWA	A 27956	Two Peoples Bay NR
23	South Coast	12	Albany	12	Pabelup South	CPCWA	-	Fitzgerald River NP
24	South Coast	13	Albany	13	Pillenorup	CPCWA	-	Stirling Range NP
25	*South Coast*	*14*	*Albany*	*14*	*Plantagenet 25386*	*CPCWA*	*A 25386*	*Chillinup NR*
26	South Coast	15	Albany	15	**Pleasant View**	CPCWA	A 15107	Lake Pleasant View NR
27	South Coast	16	Albany	16	Powell	CPCWA	A 25809	Lake Powell NR
28	*South Coast*	*17*	*Albany*	*17*	*White (Albany)*	*CPCWA*	*A 36550*	*North Sister NR*
29	South Coast	18	Albany	18	Yellilup	Private	-	-
30	South Coast	19	Esperance	1	Big Boom	UCL		
31	South Coast	20	Esperance	2	**Coomalbidgup**	LGA	24633	-
32	*South Coast*	*21*	*Esperance*	*3*	*Dundas 33113*	*CPCWA*	*A 33113*	-
33	South Coast	22	Esperance	4	Esperance 26410	CPCWA	26410	-
34	*South Coast*	*23*	*Esperance*	*5*	*Esperance 27768*	*CPCWA*	*27768*	-
35	*South Coast*	*24*	*Esperance*	*6*	*Esperance 27985*	*CPCWA*	*27985*	-
36	*South Coast*	*25*	*Esperance*	*7*	*Esperance 32128*	*CPCWA*	*A 32128*	-
37	*South Coast*	*26*	*Esperance*	*8*	*Esperance 32776*	*CPCWA*	*A 32776*	-
38	South Coast	27	Esperance	9	Gore	CPCWA	A 32419	Lake Gore NR
39	South Coast	28	Esperance	10	Mortijinup	CPCWA	A 35557	Lake Mortijinup NR
40	South Coast	29	Esperance	1`	Mount Le Grand	CPCWA	A 22795	Cape Le Grand NP
41	South Coast	30	Esperance	12	North Parriup	CPCWA	A 32339	Lake Shaster NR
42	South Coast	31	Esperance	13	Shark	CPCWA	A 31197	Shark Lake NR
43	*South Coast*	*32*	*Esperance*	*14*	*Shaster*	*CPCWA*	*A 32339*	*Lake Shaster NR*
44	South Coast	33	Esperance	15	Station	CPCWA	A 23825	Mullet Lake NR
45	South Coast	34	Esperance	16	Warden	CPCWA	A 32257	Lake Warden NR
46	South Coast	35	Esperance	17	**Wheatfield**	CPCWA	A 15231	Woody Lake NR
47	South West	1	Blackwood	1	**Boyup Brook 18239**[6]	CPCWA	18239	Kulicup NR
48	South West	2	Blackwood	2	Broadwater	CPCWA	27080	
49	South West	3	Blackwood	3	Davies	CPCWA	30826	Leeuwin-Naturaliste NP
50	South West	4	Blackwood	4	Gingilup	CPCWA	30626	Gingilup Swamps NR
51	South West	5	Blackwood	5	Mowen	CPCWA	-	SF 'F32' (proposed NR)
52	South West	6	Wellington	1	Egret	CPCWA	38393	Morangel NR
53	South West	7	Wellington	2	Harvey 12632	CPCWA	12632	Riverdale NR
54	South West	8	Wellington	3	**Towerrinning**	CPCWA	A 24917	Towerrinning NR
55	*South West*	*9*	*Wellington*	*4*	*Wild Horse*	*CPCWA*	*A 1740*	*Wild Horse Swamp NR*

Table 2 continued.

No.	DBCA Region	No.	DBCA District	No.	Wetland	Tenure	Reserve No.	Reserve Name
56	Swan	1	Perth Hills	1	Chandala	CPCWA	A 37060	Chandala NR
57	Swan	2	Perth Hills	2	Chittering	CPCWA	A 29538	Chittering Lakes NR
58	Swan	3	Perth Hills	3	Dobaderry	CPCWA	A 43281	Wandoo Cons. Park
59	Swan	4	Perth Hills	4	Goonaping	CPCWA	A 43281	Wandoo Cons. Park
60	Swan	5	Swan Coastal	1	Bambun	CPCWA	A 26756	Bambanup NR
61	Swan	6	Swan Coastal	2	Clifton	CPCWA		Yalgorup NP
62	*Swan*	*7*	*Swan Coastal*	*3*	*Ellen Brook*	*CPCWA*	*A 27620*	*Ellen Brook NR*
63	Swan	8	Swan Coastal	4	Forrestdale	CPCWA	A 24781	Forrestdale Lake NR
64	Swan	9	Swan Coastal	5	Gibbs	CPCWA	48797	
65	*Swan*	*10*	*Swan Coastal*	*6*	*Gingin 31241*	*CPCWA*	*31241*	
66	Swan	11	Swan Coastal	7	Jandabup	CPCWA	7349	Jandabup NR
67	Swan	12	Swan Coastal	8	Joondalup	CPCWA	A 31048	Lake Joondalup NR
68	*Swan*	*13*	*Swan Coastal*	*9*	*Karakin*	*WRC*	*7504*	-
69	Swan	14	Swan Coastal	10	McLarty	CPCWA	A 39404	Lake McLarty NR
70	*Swan*	*15*	*Swan Coastal*	*11*	*Mungala*	*CPCWA*	A 26756	Bambanup NR
71	*Swan*	*16*	*Swan Coastal*	*12*	*Murray 24739*	*CPCWA*	*A 24739*	
72	*Swan*	*17*	*Swan Coastal*	*13*	*Nambung*	*CPCWA*	A 26756	Bambanup NR
73	Swan	18	Swan Coastal	14	Nine Mile	CPCWA	A 16907	Nine Mile Lake NR
74	Swan	19	Swan Coastal	15	Thomsons	CPCWA	A 15556	Thomsons Lake NR
75	*Swan*	*20*	*Swan Coastal*	*16*	*Twin Swamps N-W*	*CPCWA*	*A 27621*	*Twin Swamps NR*
76	*Swan*	*21*	*Swan Coastal*	*17*	*Wallering*	*CPCWA*	A 26756	Bambanup NR
77	Swan	22	Swan Coastal	18	Wannamal	CPCWA	A 9838	Lake Wannamal NR
78	Swan	23	Swan Coastal	19	Yurine	CPCWA	A 9676	Yurine Swamp NR
79	Warren	1	Donnelly	1	Byenup	CPCWA	A 31880	Lake Muir NR
80	Warren	2	Donnelly	2	Jasper	CPCWA	36996	D'Entrecasteaux NP
81	Warren	3	Donnelly	3	Kulunilup	CPCWA	A 26677	Kulunilup NR
82	Warren	4	Donnelly	4	Maringup	CPCWA	36996	D'Entrecasteaux NP
83	Warren	5	Donnelly	5	Muir	CPCWA	A 31880	Lake Muir NR
84	Warren	6	Donnelly	6	**Noobijup**	CPCWA	A 26680	Noobijup NR
85	Warren	7	Donnelly	7	Poorginup	CPCWA	A 31880	Lake Muir NR
86	*Warren*	*8*	*Donnelly*	*8*	*Red (Manjimup)*	*UCL*		
87	Warren	9	Donnelly	9	Tordit-Gurrup	CPCWA	A 31880	Lake Muir NR
88	Warren	10	Donnelly	10	Unicup	CPCWA	A 25798	Unicup NR
89	Warren	11	Donnelly	11	Wilson	CPCWA	A 36996	D'Entrecasteaux NP
90	Warren	12	Donnelly	12	Yarnup	CPCWA	29601	Yarnup NR
91	Warren	13	Donnelly	13	Yeagarup	CPCWA	A 47878	Greater Hawke NP
92	Warren	14	Donnelly	14	Yeagarup South	CPCWA	A 36996	D'Entrecasteaux NP
93	Warren	15	Frankland	1	Boat Harbour 1	CPCWA	A 41010	Owingup NR
94	Warren	16	Frankland	2	Kwornicup	CPCWA	32284	Kwornicup NR
95	Warren	17	Frankland	3	Owingup	CPCWA	A 41010	Owingup NR
96	Wheatbelt	1	Central	1	**Ardath**	CPCWA	A 25062	Seagroatt NR
97	Wheatbelt	2	Central	2	Beverley[6]	CPCWA / LGA	31837	Yenyenning Lakes NR
98	*Wheatbelt*	*3*	*Central*	*3*	*Bruce Rock 30969*	*CPCWA*	*A 30969*	*Kwolyin NR*
99	Wheatbelt	4	Central	4	**Campion**	CPCWA	24789	Lake Campion NR
100	*Wheatbelt*	*5*	*Central*	*5*	*Cronin*	*CPCWA*	*A 36526*	*Lake Cronin NR*
101	*Wheatbelt*	*6*	*Central*	*6*	*Dowerin*	*LGA*	*4244*	
102	*Wheatbelt*	*7*	*Central*	*7*	***Frasers***[6]	*Private*	-	-
103	*Wheatbelt*	*8*	*Central*	*8*	*Goorly*	*UCL*	-	-
104	Wheatbelt	9	Central	9	Hinds	CPCWA	A 16305	Lake Hinds NR
105	*Wheatbelt*	*10*	*Central*	*10*	*Mollerin*	*CPCWA*	*A 14429*	*Mollerin NR*
106	*Wheatbelt*	*11*	*Central*	*11*	*Mt Marshall 26687*[6]	*CPCWA*	*A 26687*	*North Wallambin NR*
107	Wheatbelt	12	Central	12	Ninan	CPCWA	A 27026	Lake Ninan NR
108	Wheatbelt	13	Central	13	Noonying	CPCWA	A 10313	Noonying NR
109	Wheatbelt	14	Central	14	Red (Bruce Rock)	CPCWA	A 16493	Red Lake NR
110	Wheatbelt	15	Central	15	**Walyormouring**	CPCWA	A 17186	Walyormouring NR

Table 2 continued.

No.	DBCA Region	No.	DBCA District	No.	Wetland	Tenure	Reserve No.	Reserve Name
111	*Wheatbelt*	*16*	*Southern W'belt*[8]	*1*	*Ace*	*CPCWA*	*A 34522*	*Lake Ace NR*
112	Wheatbelt	17	Southern W'belt	2	**Altham**	CPCWA	A 28395	Chinocup NR
113	Wheatbelt	18	Southern W'belt	3	Anderson	CPCWA	A 25914	Anderson Lake NR
114	Wheatbelt	19	Southern W'belt	4	Atkins Yate	Private	-	-
115	Wheatbelt	20	Southern W'belt	5	**Bennetts**	CPCWA	36445	Dunn Rock NR
116	*Wheatbelt*	*21*	*Southern W'belt*	*6*	*Biddy*	*CPCWA*	*17617*	*Lake Biddy NR*
117	*Wheatbelt*	*22*	*Southern W'belt*	*7*	*Bokan*	*CPCWA*	*9628*	*Bokan NR*
118	Wheatbelt	23	Southern W'belt	8	Brown	CPCWA	A 24428	Nonalling NR
119	Wheatbelt	24	Southern W'belt	9	**Bryde**	CPCWA	48436	
120	*Wheatbelt*	*25*	*Southern W'belt*	*10*	*Cairlocup*	*CPCWA*	*28324*	*Cairlocup NR*
121	Wheatbelt	26	Southern W'belt	11	Casuarina	CPCWA	A 25136	Coblinine NR
122	*Wheatbelt*	*27*	*Southern W'belt*	*12*	*Coblinine*	*CPCWA*	*A 25133*	*Coblinine NR*
123	Wheatbelt	28	Southern W'belt	13	**Coomelberrup**	CPCWA	A 10472	Coomelberrup NR
124	Wheatbelt	29	Southern W'belt	14	**Corrigin 12900**[6]	CPCWA	12900	Paperbark NR
125	Wheatbelt	30	Southern W'belt	15	**Coyrecup**	CPCWA	A 28552	Coyrecup NR
126	Wheatbelt	31	Southern W'belt	16	Dulbinning	CPCWA	A 9617	
127	Wheatbelt	32	Southern W'belt	17	**Dumbleyung**	CPCWA / LGA	26664	Dumbleyung Lake NR
128	Wheatbelt	33	Southern W'belt	18	Flagstaff	CPCWA	A 27609	Flagstaff Lake NR
129	*Wheatbelt*	*34*	*Southern W'belt*	*19*	*Gnowangerup 26569*	*CPCWA*	*A 26569*	
130	*Wheatbelt*	*35*	*Southern W'belt*	*20*	*Gounter*	*CPCWA*	*A 21253*	*Lake Gounter NR*
131	*Wheatbelt*	*36*	*Southern W'belt*	*21*	*Gundaring*	*CPCWA*	*A 24373*	*Gundaring Lake NR*
132	Wheatbelt	37	Southern W'belt	22	Kent 29020[6]	CPCWA	A 29020	Lake Bryde NR
133	*Wheatbelt*	*38*	*Southern W'belt*	*23*	*Kondinin*	*CPCWA*	*A 22519*	*Kondinin Lake NR*
134	*Wheatbelt*	*39*	*Southern W'belt*	*24*	*Kwobrup*	*Private*	-	-
135	Wheatbelt	40	Southern W'belt	25	Little White	CPCWA	A 26786	Carmody NR
136	Wheatbelt	41	Southern W'belt	26	Martinup	CPCWA	A 17055	Martinup NR
137	Wheatbelt	42	Southern W'belt	27	Mears	CPCWA	A 12398	Lake Mears NR
138	*Wheatbelt*	*43*	*Southern W'belt*	*28*	*Miripin*	*CPCWA*	*A 24912*	*Miripin NR*
139	*Wheatbelt*	*44*	*Southern W'belt*	*29*	*Murapin*	*CPCWA*	*A 17257*	*Murapin NR*
140	Wheatbelt	45	Southern W'belt	30	Ngopitchup	WRC	2184	
141	*Wheatbelt*	*46*	*Southern W'belt*	*31*	*Nonalling*	*CPCWA*	*A 24428*	*Nonalling NR*
142	*Wheatbelt*	*47*	*Southern W'belt*	*32*	*Pallarup*	*CPCWA*	*A 29860*	*Pallarup NR*
143	Wheatbelt	48	Southern W'belt	33	**Parkeyerring**	CPCWA	A 10733	Parkeyerring NR
144	*Wheatbelt*	*49*	*Southern W'belt*	*34*	*Queerearrup*	*LGA*	*17255*	
145	Wheatbelt	50	Southern W'belt	35	Range Road Yate	MWR	29124	
146	Wheatbelt	51	Southern W'belt	36	**Ronnerup**	CPCWA	A 39422	Lake King NR
147a	Wheatbelt	52a	Southern W'belt	37a	Taarblin North	CPCWA	A 9550	Taarblin Lake NR
147b	Wheatbelt	52b	Southern W'belt	38b	Taarblin South	CPCWA	A 9550	Taarblin Lake NR
148	Wheatbelt	53	Southern W'belt	38	**Toolibin**	CPCWA	A 24556	Toolibin NR
149	Wheatbelt	54	Southern W'belt	39	Varley	CPCWA	A 27928	Lake Varley NR
150	*Wheatbelt*	*55*	*Southern W'belt*	*40*	*Wagin 2088*	*CPCWA*	*A 2088*	*Casuarina NR*
151	Wheatbelt	56	Southern W'belt	41	Walbyring	CPCWA	A 14398	Walbyring NR
152	*Wheatbelt*	*57*	*Southern W'belt*	*42*	*Wardering*	*CPCWA*	*A 17258*	*Wardering Lake NR*
153	Wheatbelt	58	Southern W'belt	43	Warrinup	CPCWA	A 1931	Warrenup NR
154	Wheatbelt	59	Southern W'belt	44	West Arthur 5456	CPCWA	A 5456	Dead Man's Swamp NR
155	Wheatbelt	60	Southern W'belt	45	White (Narrogin)	CPCWA	A 21284	Quongunnerunding NR
156	Wheatbelt	61	Southern W'belt	46	White Water	CPCWA	A 24428	Nonalling NR
157	Wheatbelt	62	Southern W'belt	47	**Yaalup**	CPCWA	A 36967	
158	Wheatbelt	63	Southern W'belt	48	Yealering	LGA	9610	

Notes:

1. Wetlands without official names at the commencement of monitoring are identified by Local Government Authority and Reserve Number, e.g. Albany 26385.
2. CPCWA (Conservation and Parks Commission of Western Australia); LGA (Local Government Authority); MWR (Minister for Water Resources); UCL (Unallocated Crown Land); WRC (Water & Rivers Commission). DBCA has management responsibility for wetlands vested in CPCWA.
3. Entries in the 'Reserve No.' and 'Reserve Name' columns are incomplete and unchecked.

Table 2 Notes continued.

4. Wetlands shown in **bold** are in the group of 25 Intensively Monitored wetlands (see Note 10 of Table 1).
5. In addition to the 105 SWWMP wetlands currently being monitored under the State Salinity Strategy there are 53 SWWMP wetlands that have been monitored at some time in the past, but are not currently being monitored under SWWMP. These 53 are shown above in *italics*.
6. Beverley Lakes is also known as Yenyenning Lakes, Boyup Brook 18239 as Kulicup Swamp; Corrigin 12900 as Paperbark Swamp, Frasers Lake as Maisey's 1 or Maisey's A; Kent 29020 as East Lake Bryde and Mt Marshall 26687 as Wallambin North.
7. Reserves in some instances do not include all of the relevant SWWMP wetland.
8. On 1st July 2015, the Great Southern District *organisational unit* (personnel, etc.) was amalgamated with the Wheatbelt Region organisational unit and therefore no longer exists as a discrete unit. For convenience and clarity, and in keeping with the Wheatbelt theme for the Region, the former Great Southern District *geographical area* is referred to in this report as the Southern Wheatbelt.

Table 3. Number of current and historically-monitored wetlands in each DBCA Region and District.

DBCA Region (Current, *historical*)	DBCA District	Current	*Historical*
Midwest (6, *5*)	Geraldton	0	*1*
	Moora	6	*4*
South Coast (22, *13*)	Albany	11	*7*
	Esperance	11	*6*
South West (8, *1*)	Blackwood	5	*0*
	Wellington	3	*1*
Swan (14, *9*)	Perth Hills	3	*1*
	Swan Coastal	11	*8*
Warren (16, *1*)	Donnelly	13	*1*
	Frankland	3	*0*
Wheatbelt (39, *24*)	Central	8	*7*
	Southern Wheatbelt[1]	31	*17*
Totals (105, *53*)		**105**	***53***

The locations of DBCA Regional and District Headquarters are, in most instances, not obvious from Region or District names and are therefore listed below, for the convenience of readers.

DBCA Region / District	HQ Location
Midwest /	Geraldton
Geraldton	Geraldton
Moora	Jurien Bay
South Coast /	Albany
Albany	Albany
Esperance	Esperance
South West /	Bunbury
Blackwood	Busselton
Wellington	Collie
Swan /	Bentley
Perth Hills	Mundaring
Swan Coastal	Wanneroo
Warren /	Manjimup
Donnelly	Pemberton
Frankland	Walpole
Wheatbelt /	Narrogin
Central	Merredin
Southern Wheatbelt[1]	Narrogin

Notes:

1. On 1st July 2015, the Great Southern District *organisational unit* (personnel, etc.) was amalgamated with the Wheatbelt Region organisational unit and therefore no longer exists as a discrete unit. For convenience and clarity, and in keeping with the Wheatbelt theme for the Region, the former Great Southern District *geographical area* is referred to in this report as the Southern Wheatbelt.

Table 4. Ramsar and Directory Sites of south-western Australia, and their SWWMP wetlands.

A. Ramsar Sites (each contains one or more Directory Site).

Ramsar Site	Directory Site	SWWMP wetland
Becher Point Wetlands	Becher Point Wetlands	-
Forrestdale & Thomsons Lakes	Forrestdale Lake	Forrestdale
	Thomsons Lake	Thomsons
Lake Gore	Lake Gore System	Gore
Muir-Byenup System	(southern part of) Byenup Lagoon System	Byenup, Poorginup, Tordit-Gurrup
	Lake Muir	Muir
Peel-Yalgorup System	Yalgorup Lakes System	Clifton
	Lake McLarty System	McLarty, *Murray 24739*
Toolibin Lake	Toolibin Lake	**Toolibin**
Vasse-Wonnerup System	Vasse-Wonnerup Wetland System	- [1]
Lake Warden System	Lake Warden System	Station, Warden, **Wheatfield**
		13 Current *1 Historical*

B. Other Directory Sites (not within Ramsar Sites).

Directory Site	SWWMP wetland
Balicup Lake System	*Camel*
Barraghup Swamp	-
Benger Swamp	-
Bennetts Lake*	**Bennetts**
Booragoon Lake	-
Brixton Street Swamps	-
Lake Bryde – East Lake Bryde	**Bryde**, Kent 29020
(northern part of) Byenup Lagoon System	**Noobijup**, Kulunilup, Unicup, Yarnup
Cape Leeuwin System	-
Chandala Swamp	Chandala
Chittering-Needonga Lakes	*Chittering*
Coyrecup Lake	**Coyrecup**
Lake Cronin	*Cronin*
Doggerup Creek System	-
Dumbleyung Lake	**Dumbleyung**
Dunn Rock Gnamma Holes*	-
Ellen Brook Swamps System	*Ellen Brook, Twin Swamps NW*
Gibbs Road Swamp System	Gibbs
Gingilup-Jasper Wetland System	Gingilup, Jasper, Wilson
Lake Grace System	**Altham**
Guraga Lake	Guraga
Herdsman Lake	-
Hutt Lagoon System	-
Joondalup Lake	Joondalup
Karakin Lakes	*Karakin*
Kondinin Samphire Marsh*	-
Lancelin Defence Training Area (Cwlth)	-
Lake Logue-Indoon System	**Logue**
Maringup Lake	Maringup

Directory Site	SWWMP wetland
McCarley's Swamp (Ludlow Swamp)	-
Loch McNess System	-
Moates Lake System	Moates, *Angove, Gardner*
Mortijinup Lake System	Mortijinup
Mount Soho Swamps	-
Owingup Swamp System	Boat Harbour 1, Owingup
Palmer Barracks, Guildford (Cwlth)	-
Paperbark Swamp*	**Corrigin 12900**
Perth Airport Woodland Swamps (Cwlth)	-
Pink Lake	-
Lake Pleasant View System	Albany 26385, **Pleasant View**
RAAF Caversham (Cwlth)	-
Rottnest Island Lakes	-
Spectacles Swamp	-
Lake Thetis	-
Wannamal Lakes System	Wannamal
Yealering Lakes System	Brown, White Water, Yealering, *Nonalling*
Yellilup Yate Swamp System	Yellilup
Yorkrakine Rock Pools	-
	31 Current 9 Historical

The 'Directory' is 'A Directory of Important Wetlands in Australia', a cooperative project of the State, Territory and Commonwealth Governments. Three editions have been published, in 1993, 1996 and 2001. The Directory has been added to and updated from time to time (e.g. by Elscot *et al.* 2009*). It is accessible online at http://www.environment.gov.au.

Nine south-west Western Australian Directory Sites are not listed in Tables 4A or 4B, because they are essentially riverine or estuarine and are not monitored under, or as an adjunct to, SWWMP. They are Peel-Harvey Estuary (part of Peel-Yalgorup Ramsar Site), Avon River Valley, Blackwood River (Lower Reaches) and Tributaries, Broke Inlet System, Culham Lake System, Fitzgerald Inlet System, Murchison River (Lower Reaches), Oyster Harbour and Swan-Canning Estuary.

Wetlands shown in *italics* have been monitored in the past under SWWMP, but not currently.

Wetlands shown in **bold** are in the group of 25 Intensively Monitored wetlands (see Note 10 of Table 1).

[1] The authors have maintained continuous water level recorders on the Vasse and Wonnerup estuaries since 1994, as an adjunct to SWWMP. See Appendix 6 for 2004–2016 recordings.

Table 5. Natural Diversity Recovery Catchments[1] and their SWWMP wetlands (as at Nov 2014).

Natural Diversity Recovery Catchment	DBCA Region	DBCA District	SWWMP-monitored wetlands
Lake Bryde	Wheatbelt	Southern Wheatbelt[7]	**Bryde**, Kent 29020[2]
Buntine-Marchagee[1]	Wheatbelt	Central	-
Drummond[1]	Swan	Perth Hills	-
Esperance Lakes[1]	South Coast	Esperance	Shark, Station, Warden, **Wheatfield**
Muir-Unicup[1]	Warren	Donnelly	Byenup, Kulunilup, Muir, **Noobijup**, Poorginup, Tordit-Gurrup, Unicup, Yarnup, *Red (Manjimup)*[4]
Toolibin Lake	Wheatbelt	Southern Wheatbelt[7]	Dulbinning, Taarblin[3], **Toolibin**, Walbyring
			18 Current *1 Historical*

Notes:

1. Since Nov 2013, Buntine-Marchagee, Esperance Lakes and Muir-Unicup have lost NDRC status and the future of the Drummond NDRC is uncertain.
2. Kent 29020 is also known as East Lake Bryde.
3. Taarblin has two basins, north and south. Both are monitored under SWWMP.
4. *Red (Manjimup)* has been monitored in the past under SWWMP, but is not currently.
5. Several of the SWWMP wetlands listed above are also monitored under the Lake Bryde and Toolibin Lake Natural Diversity Recovery Catchment (NDRC) programs. Nonetheless it is considered important to continue their twice-yearly routine monitoring under SWWMP, which in all cases pre-dates the establishment of NDRCs and their programs.
6. Wetlands shown in **bold** are in the group of 25 Intensively Monitored wetlands (see Note 10 of Table 1).
7. On 1st July 2015, the Great Southern District *organisational unit* (personnel, etc.) was amalgamated with the Wheatbelt Region organisational unit and therefore no longer exists as a discrete unit. For convenience and clarity, and in keeping with the Wheatbelt theme for the Region, the former Great Southern District *geographical area* is referred to in this report as the Southern Wheatbelt.

Table 6. Bathymetrically-mapped SWWMP wetlands.

All SWWMP wetlands known by the authors to have been bathymetrically-mapped are listed in the Table below, together with the years of mapping, methods employed, products and custodians / sources.

No.	Wetland	Custodian / Source	Year of Mapping	Products	Methods / Comment
1	**Ardath** [1]	DBCA	2004	Paper map. Digital data. D-V calc. [4]	RTK [5]
2	Beverley [2]	DBCA	2002/3	Paper map. Digital data. D-V calc.	RTK
3	**Bryde**	DBCA	2002	Paper map. Digital data. D-V calc.	RTK
4	Byenup	DBCA	2009	Digital data. Maps in preparation.	RTK by boat, amphibious vehicle (Argo) & walking.
4	Byenup	DBCA	2013	Digital data. D-V calc. D-SA calc.	LIDAR & RTK
5	Clifton	DoW		Not seen.	Mapping referred to by Knott *et al*. (2003). See also Beggs (2014).
6	**Campion**	DBCA	2004/6/7	Paper map. Digital data. D-V calc.	RTK
7	**Coyrecup**	DBCA	2001	Paper map. Digital data. D-V calc. D-SA calc.[4]	RTK at 100m intervals on 9 E-W transects 300m apart.
	Dulbinning	-	-	-	See Water Authority file 00617SW for inflow & outflow channel and some lakebed elevns.
8	**Dumbleyung**	DBCA	1998/01	Paper map. Digital data. D-V calc. D-SA calc.	RTK of bed at 100m intervals on 8 E-W transects 1km apart; Photogrammetry of shore. Correction of outflow elevation in 2002.
9	Forrestdale	DoW		Paper map.	Metropolitan Water Board Special Plan 81C, FB 11318, Stadia Book 11319. Arnold (1990d) pp 356, 357, 359, 360.
10	Gore	DBCA	2003	Paper map. Digital data. D-V calc.	Boat-based RTK and echo-sounding.
11	Hinds	DBCA	2000/1	Paper & PDF maps. Digital data. D-V calc.	
12	Jandabup	DoW		Paper map. 1:5,000.	MWB Special Plan 115, File 763107/74, Stadia L.B. 11650. Arnold (1990a) pp 60, 61, 66.
13	Jasper	–; DBCA	–; 2015	–; Paper map. Digital data (nearest 0.1m)	Depth transects are shown in Dortch (1996) and Lane *et al.* (2016).
14	Joondalup	DoW		Paper map. 1:5,000.	MWB Special Plan 117B, File 763107/74, Stadia L.B. 11651. Arnold (1990b) pp 104, 110-112.
15	Kent 29020 [2]	DBCA	2002	Paper map. Digital data. D-V calc.	RTK
16	McLarty	Friends of Lake McLarty	≤ 2017	Digital map(s).	Various contours by Peter Muirden and JLane (see Table 7), compiled by PM for FoLM.
17	Mears	DBCA	2003	Paper map. Digital data. D-V calc.	RTK
18	*Mollerin* [3]	*DBCA*	*2004*	*Paper map. Digital data*	*Photogrammetry and RTK ground truthing*.
19	*Mt Marshall 26687* [2]	*DBCA*	*2004*	*Paper map. Digital data. D-V calc.*	*RTK*
20	Muir	DBCA	2013	Digital data. D-V calc. D-SA calc.	LIDAR
21	Ninan	DBCA	2000	Paper & PDF maps. Digital data. D-V calc.	Boat-based RTK and echo-sounding.
22	**Noobijup**	DBCA	2013	Digital data. D-V calc.	LIDAR
23	Poorginup	DBCA	2013	Digital data. D-V calc.	LIDAR
24	Powell	DoW	2003?		
25	*Red (Manjimup)*	*DBCA*	*2013*	*Digital data. D-V calc. D-SA calc.*	*LIDAR*
26	Shark	DBCA	2003	Paper map. Digital data. D-V calc.	Boat-based RTK.
27	Station	DBCA	2002	Paper map. Digital data. D-V calc.	RTK
28a	Taarblin North	DBCA	2004	Paper & PDF maps. Digital data. D-V calc.	RTK
29	Thomsons			Paper maps.	See Arnold (1990c) pp 266, 267, 269, 270. Davis *et al.* (2001).
30	**Toolibin**	DoW		Scanned copy of paper map, '609 009 PWD WA 54732', with spot heights and 0.5mAHD contours	Also see Water Authority file 00617SW for inflow & outflow channel and W bank elevns.
31	Tordit-Gurrup	DBCA	2011	Paper map. Digital data.	RTK by amphibious vehicle (Argo) & walking.
31	Tordit-Gurrup	DBCA	2013	Digital data. D-V calc. D-SA calc.	LIDAR & RTK
32	**Towerrinning**	Froend & McComb (1991)	1986	≈ 1:25,000 paper map (<A4); 0.5m contours to –2.5m, shoreline = 0.0m	Weighted graduated rope; ≈ 50m intervals on 7 transects (4 E-W, 3 N-S) ≈ 500m apart.
32	**Towerrinning**	JDA (2012)	2012	Digital & paper maps in JDA (2012).	Spot heights, cross sections & invert levels surveyed by JBA Surveys in Feb 2012.

Table 6 continued.

No.	Wetland	Custodian / Source	Year of Mapping	Products	Methods / Comment
33	Unicup	DBCA	2013	Digital data. D-V calc. D-SA calc.	LIDAR & RTK
34	Walbyring	-	-	-	See DoW (Water Authority) file 00617SW for inflow channel elevations.
35	Warden	DBCA	2002	Paper map. Digital data. D-V calc.	Boat-based RTK and echo-sounding.
36	**Wheatfield**	DBCA	2002	Paper map. Digital data. D-V calc.	Boat-based RTK.
37	Yarnup	DBCA	2013	Digital data. D-V calc.	LIDAR
38	Yeagarup	DBCA	2014	Digital map (rectified orthophoto).	Boat-based survey with weighted, graduated survey line and hand-held GPS.
39	Yeagarup South	DBCA	2014	Digital map (rectified orthophoto).	Boat-based survey with weighted, graduated survey line and hand-held GPS.
40	**Yealering**	JDA (2012)	2012	Digital & paper maps in JDA (2012).	Spot heights, cross sections & invert levels surveyed by JBA Surveys in Feb 2012.

Notes:

1. Wetlands shown in **bold** are in the group of 25 Intensively Monitored wetlands (see Note 10 of Table 1).
2. Beverley Lakes is also known as Yenyenning Lakes, Kent 29020 as East Lake Bryde and Mt Marshall 26687 as Wallambin North.
3. Wetlands shown in *italics* have been monitored in the past under SWWMP, but not currently.
4. 'D-V calc.' and 'D-SA calc.' are Depth to Volume and Depth to Surface Area calculators, derived from the bathymetry.
5. 'RTK' refers to collecting 3-dimensional position (point) data using the Real-Time Kinematic Differential Global Positioning System (RTK DGPS).
6. SWWMP personnel have participated in mapping several non-SWWMP wetlands, these being Bokarup, Brown (connected to Campion), Cowcowing, Quallilup, and other wetlands (in addition to Station, Warden and Wheatfield) in the Lake Warden System, namely Ewans, Mullet, Windabout and Woody.

Source references

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Table 7. SWWMP wetlands being bathymetrically-mapped by walking water edges.

In 2008, SWWMP personnel began opportunistic mapping of the bathymetry of SWWMP wetlands, by walking and logging GPS waypoints along all or part of the surface water edge at a variety of water levels. This work may be undertaken while at wetlands for other reasons such as routine monitoring in September and November, gauge maintenance in autumn and multiple point data collection at any time of the year. Over the long term, the accumulated data could provide rudimentary, low-cost bathymetric maps, depth - volume calculators and depth - surface area calculators for many wetlands. These are a fundamental requirement for water and salt balance investigations and related eco-hydrological studies.

To date, the following contours have been logged.

Wetland	Bathym. Survey No.	Date	Depth gauge reading (m)	% of surface water edge mapped	Who	Comment
Blue Gum [1]	1.1	03 Nov 2008	0.07	100%	JL	
"	1.2	17 Sep 2009	0.275	100%	JL	
Chandala	2.1	31 Jul 2008	1.11	≈ 70%	JL	Logged waypoints along W, N and S edges
"	2.2	11 May 2009	0.15	100%	JL	
"		13 May 2009	-	-	JL	Logged waypoints along NE stream inflow.
"	2.3	13 Nov 2009	0.75	≈ 40%	JL	
"	2.4	18 Dec 2009	0.56	100%	JL	
"	2.5	14 Jan 2010	0.335	100%	JL	Many small islands within mapped contour.
Cronin	3	16 July 2009	TBD	≈ 95%	JL	Logged all of basin water edge but not all of inlet channel.
Esperance 26410	4	17 Jul 2008	0.79	100%	JL	
Frasers	5	19 Sep 2009	0.23	100%	JL	
Guraga	6.1	16 Sep 2008	0.41	≈ 7%	JL	Logged waypoints for 0.5km along E edge.
"	6.2	17 Sep 2009	0.65	100%	JL	
Harvey 12632	7.1	06 Aug 2008	0.94	100%	JL	
"		18 Mar 2008	0.00	-	JL	Lake dry. Logged ≈ 95% of distinct peat edge.
"	7.2	22 Jul 2009	0.26	100%	JL	
"	7.3	17 Nov 2009	0.46	100%	JL	
McLarty	8.1	27 Aug 2008	1.18	100%	JL	
"	8.2	17 Nov 2009	0.56	100%	JL	
"	8.3	20 Dec 2009	0.30	100%	JL	
West Arthur 5456	9	18 Jul 2008	0.15	100%	JL	
Yellilup	10	07 Dec 2009	0.995	100%	AC	
10 Wetlands	**20 Surveys**					

Notes:

1. Wetland shown in **bold** is in the group of 25 Intensively Monitored wetlands (see Note 10 of Table 1).

Table 8. SWWMP wetlands for which aerial oblique photography is available. High-resolution, low altitude, aerial oblique photographs of the following SWWMP wetlands were captured by DEC during 2008-2012. Requests for these photographs should be directed to jim.lane@dbca.wa.gov.au.. A small charge for supply may be required.

No.	Wetland Name[1]		Code	Tenure[2]	Local Government Authority	Date of Photography
1	*Ace*[3]		*ACE*	*CPCWA*	*Lake Grace*	*17 May 2009*
2	Albany 26385[4]		ALB1	CPCWA	Albany	21 May 2008
3	Albany 27157		ALB2	CPCWA	Albany	21 May 2008, 28 May 2011
4	**Altham**[5]		ALTH	CPCWA	Kent	17 May 2009
5	Anderson		ANDE	CPCWA	Tambellup	21 May 2008
6	*Angove*		*ANGO*	*CPCWA*	*Albany*	*21 May 2008*
7	**Ardath**		ARDA	CPCWA	Bruce Rock	07 June 2010
8	Atkins Yate		ATKI	Private	Lake Grace	17 May 2009
9	Bambun		BAMB	CPCWA	Gingin	06 June 2010
10	**Bennetts**		BENN	CPCWA	Lake Grace	17 May 2009
11	Beverley[6]		BEVE	CPCWA / LGA	Beverley / Brookton / Quairading	07 June 2010
12	*Biddy*		*BIDD*	*CPCWA*	*Lake Grace*	*26 May 2010*
13	***Blue Gum***		*BLUE*	*Private*	*Moora*	*07 June 2010*
14	Boat Harbour 1		BOA1	CPCWA	Denmark	26 May 2008, 27 May 2011
15	*Bokan*		*BOKA*	*CPCWA*	*Narrogin*	*26 May 2010*
16	**Boyup Brook 18239**[6]		BOYU	CPCWA	Boyup Brook	19 May 2008
17	Broadwater		BROA	CPCWA	Busselton	6, 11 & 12 May 2011
18	Brown		BROW	CPCWA	Corrigin	07 June 2010
19	*Bruce Rock 30969*		*BRUC*	*CPCWA*	*Bruce Rock*	*26 May 2012*
20	**Bryde**		BRYD	CPCWA	Kent	17 May 2009
21	Byenup		BYEN	CPCWA	Manjimup	24 May 2008, 11 May 2011
22	*Cairlocup*		*CAIR*	*CPCWA*	*Kent*	*17 May 2009*
23	*Camel*		*CAME*	*CPCWA*	*Cranbrook*	*21 May 2008*
24	**Campion**		**CAMP**	**CPCWA**	**Nungarin / Merredin**	**26 May 2012**
25	*Capamaura*		*CAPA*	*CPCWA*	*Carnamah*	*07 June 2010*
26	Casuarina		CASU	CPCWA	Katanning	17 May 2009
27	Chandala		CHAN	CPCWA	Chittering	06 June 2010
28	*Chittering*		*CHIT*	*CPCWA*	*Chittering*	*06 June 2010*
29	Clifton		CLIF	CPCWA	Mandurah / Waroona	29 May 2011
30	*Coblinine*		*COBL*	*CPCWA*	*Dumbleyung*	*17 May 2009*
31	Collets Road		COLL	CPCWA	Jerramungup	16 May 2009
32	**Coomalbidgup**		CMBG	LGA	Esperance	16 May 2009
33	**Coomelberrup**		COOM	CPCWA	Dumbleyung	17 May 2009
34	**Corrigin 12900**[6]		CORR	CPCWA	Corrigin	07 June 2010
35	**Coyrecup**		COYR	CPCWA	Katanning	17 May 2009
36	Crackers		CRAC	CPCWA	Dandaragan	07 June 2010
37	*Cranbrook 25812*		*CRAN*	*CPCWA*	*Cranbrook*	*21 May 2008*
38	*Cronin*		*CRON*	*CPCWA*	*Kondinin*	*26 May 2010*
39	Davies		DAVI	CPCWA	Augusta-Margaret River	19 May 2008, 11 May 2011
40	Dobaderry		DOBA	CPCWA	Beverley	07 June 2010
41	*Dowerin*		*DOWE*	*LGA*	*Dowerin*	*27 May 2012*
42	Dulbinning		DULB	CPCWA	Wickepin	26 May 2010
43	**Dumbleyung**		DUMB	CPCWA / LGA	Dumbleyung / Wagin	17 May 2009, 26 May 2010
44	*Dundas 33113*		*DUND*	*CPCWA*	*Dundas*	*16 May 2009*

Table 8 continued.

No.	Wetland Name[1]	Code	Tenure[2]	Local Government Authority	Date of Photography
45	**Eganu**	EGAN	CPCWA	Coorow	07 June 2010
46	Egret	EGRE	CPCWA	Harvey	19 May 2008
47	*Ellen Brook*	*ELLE*	*CPCWA*	*Swan*	*06 June 2010*
48	Eneminga	ENEM	CPCWA	Dandaragan	07 June 2010
49	Esperance 26410	ESP1	CPCWA	Esperance	16 May 2009
50	*Esperance 27768*	*ESP2*	*CPCWA*	*Esperance*	*16 May 2009*
51	*Esperance 27985*	*ESP3*	*CPCWA*	*Esperance*	*16 May 2009*
52	*Esperance 32128*	*ESP4*	*CPCWA*	*Esperance*	*16 May 2009*
53	*Esperance 32776*	*ESP5*	*CPCWA*	*Esperance*	*16 May 2009*
54	Flagstaff	FLAG	CPCWA	Woodanilling	17 May 2009
55	Forrestdale	FORR	CPCWA	Armadale	06 June 2010
56	***Frasers***	***FRAS***	***Private***	***Dowerin***	***27 May 2012***
57	*Gardner*	*GARD*	*CPCWA*	*Albany*	*21 May 2008*
58	Gibbs	GIBB	CPCWA	Armadale	06 June 2010
59	*Gingin 31241*	*GING*	*CPCWA*	*Gingin*	*06 June 2010*
60	*Gnowangerup 26264*	*GNO1*	*CPCWA*	*Gnowangerup*	*21 May 2008*
61	*Gnowangerup 26569*	*GNO2*	*CPCWA*	*Gnowangerup*	*17 May 2009*
62	**Goonaping**	GOON	CPCWA	Beverley	07 June 2010
63	*Goorly*	*GOOR*	*UCL*	*Dalwallinu*	*27 May 2012*
64	Gore	GORE	CPCWA	Esperance	16 May 2009
65	*Gounter*	*GOUN*	*CPCWA*	*Kondinin*	*26 May 2010*
66	*Gundaring*	*GUND*	*CPCWA*	*Wagin*	*17 May 2009*
67	Guraga	GURA	LGA	Dandaragan	07 June 2010
68	Harvey 12632	HARV	CPCWA	Harvey	19 May 2008
69	*Hebitons*	*HEBI*	*Private*	*Mullewa*	*27 May 2012*
70	Hinds	HIND	CPCWA	Wongan-Ballidu	27 May 2012
71	Jandabup	JAND	CPCWA	Wanneroo	06 June 2010
72	Jasper	JASP	CPCWA	Nannup	20 May 2008
73	Jerdacuttup	JERD	CPCWA	Ravensthorpe	16 May 2009
74	Joondalup	JOON	CPCWA	Joondalup	06 June 2010
75	*Karakin*	*KARA*	*WRC*	*Gingin*	*06 June 2010*
76	Kent 29020[6]	KENT	CPCWA	Kent	17 May 2009
77	*Kondinin*	*KOND*	*CPCWA*	*Kondinin*	*07 June 2010*
78	*Kwobrup*	*KWOB*	*Private*	*Kent*	*17 May 2009*
79	Kwornicup	KWOR	CPCWA	Plantagenet	21 May 2008
80	Little White	LITT	CPCWA	Narrogin	26 May 2010
81	**Logue**	**LOGU**	**CPCWA**	**Carnamah**	**27 May 2012**
82	Maringup	MARI	CPCWA	Manjimup	20 May 2008, 11 & 28 May 2011
83	Martinup	MART	CPCWA	Woodanilling	11 May 2011
84	McLarty	MCLA	CPCWA	Murray	21 May 2008
85	Mears	MEAR	CPCWA	Brookton	07 June 2010, 26 May 2012
86	Mettler	METT	CPCWA	Albany	21 May 2008
87	*Miripin*	*MIRI*	*CPCWA*	*Woodanilling*	*17 May 2009*
88	Moates	MOAT	CPCWA	Albany	21 May 2008
89	*Mollerin*	*MOLL*	*CPCWA*	*Koorda*	*26 May 2012*
90	Mortijinup	MORT	CPCWA	Esperance	16 May 2009

Table 8 continued.

No.	Wetland Name[1]	Code	Tenure[2]	Local Government Authority	Date of Photography
91	Mount Le Grand	MLGR	CPCWA	Esperance	16 May 2009
92	*Mt Marshall 26687*	*MTMA*	*CPCWA*	*Mt Marshall*	*26 May 2012*
93	Muir	MUIR	CPCWA	Manjimup	20 & 24 May 2008
94	*Mungala*	*MUNG*	*CPCWA*	*Gingin*	*06 June 2010*
95	*Murapin*	*MURA*	*CPCWA*	*Woodanilling*	*17 May 2009*
96	*Murray 24739*	*MURR*	*CPCWA*	*Murray*	*21 May 2008*
97	*Nambung*	*NAMB*	*CPCWA*	*Gingin*	*06 June 2010*
98	Ngopitchup	NGOP	WRC	Broomehill	24 May 2008
99	Ninan	NINA	CPCWA	Wongan-Ballidu	27 May 2012
100	Nine Mile	NINE	CPCWA	Murray	19 May 2008
101	*Nonalling*	*NONA*	*CPCWA*	*Corrigin*	*07 June 2010*
102	**Noobijup**	NOOB	CPCWA	Cranbrook	24 May 2008
103	Noonying	NOON	CPCWA	Tammin	27 May 2012
104	North Parriup	NPAR	CPCWA	Ravensthorpe	16 May 2009
105	Owingup	OWIN	CPCWA	Denmark	20 May 2008
106	Pabelup South	PABE	CPCWA	Jerramungup	16 May 2009
107	*Pallarup*	*PALL*	*CPCWA*	*Lake Grace*	*17 May 2009*
108	Parkeyerring	PARK	CPCWA	Wagin	11 May 2011
109	Pillenorup	PILL	CPCWA	Plantagenet	21 May 2008, 28 May 2011
110	*Pinjarrega*	*PINJ*	*CPCWA*	*Coorow*	*07 June 2010*
111	*Plantagenet 25386*	*PLAN*	*CPCWA*	*Plantagenet*	*21 May 2008*
112	**Pleasant View**	PLEA	CPCWA	Albany	21 May 2008, 28 May 2011, 28 May 2012
113	Poorginup	POOR	CPCWA	Manjimup	20 May 2008
114	Powell	POWE	CPCWA	Albany	21 May 2008, 28 May 2011
115	*Queerearrup*	*QUEE*	*LGA*	*Woodanilling*	*17 May 2009*
116	Range Road Yate	RANG	MWR	Kent	17 May 2009
117	Red (Bruce Rock)	REDB	CPCWA	Bruce Rock	07 June 2010
118	*Red (Manjimup)*	*REDM*	*UCL*	*Manjimup*	*24 May 2008*
119	**Ronnerup**	RONN	CPCWA	Lake Grace	17 May 2009
120	Shark	SHAR	CPCWA	Esperance	16 May 2009
121	*Shaster*	*SHAS*	*CPCWA*	*Ravensthorpe*	*16 May 2009*
122	Station	STAT	CPCWA	Esperance	16 May 2009
123	*Streets*	*STRE*	*Private*	*Moora*	*07 June 2010*
124a	Taarblin North[7]	TAAN	CPCWA	Narrogin	26 May 2010
124b	Taarblin South[7]	TAAR	CPCWA	Narrogin	26 May 2010
125	Thomsons	THOM	CPCWA	Cockburn	06 June 2010
126	**Toolibin**	TOOL	CPCWA	Wickepin	26 May 2010, 07 Jun 2010
127	Tordit-Gurrup	TORD	CPCWA	Manjimup	20 May 2008 (limited), 11 (E) & 28 (W) May 2011
128	**Towerrinning**	TOWE	CPCWA	West Arthur	24 May 2008
129	*Twin Swamps N-W*	*TWIN*	*CPCWA*	*Swan*	*06 June 2010*
130	Unicup	UNIC	CPCWA	Cranbrook	11, 27 & 28 May 2011
131	Varley	VARL	CPCWA	Kulin	26 May 2010
132	*Wagin 2088*	*WAGI*	*CPCWA*	*Wagin*	*17 May 2009*
133	Walbyring	WALB	CPCWA	Wickepin	26 May 2010, 07 Jun 2010
134	*Wallering*	*WALL*	*CPCWA*	*Gingin*	*06 June 2010*
135	**Walyormouring**	**WALY**	**CPCWA**	**Goomalling**	**27 May 2012**

Table 8 continued.

No.	Wetland Name[1]	Code	Tenure[2]	Local Government Authority	Date of Photography
136	Wannamal	WANN	CPCWA	Gingin	06 June 2010
137	Warden	WARD	CPCWA	Esperance	16 May 2009
138	*Wardering*	*WARG*	*CPCWA*	*Woodanilling*	*11 May 2011*
139	Warrinup	WARR	CPCWA	Cranbrook	24 May 2008
140	West Arthur 5456	WEST	CPCWA	West Arthur	11 & 27 May 2011
141	**Wheatfield**	WHEA	CPCWA	Esperance	16 May 2009
142	*White (Albany)*	*WHIA*	*CPCWA*	*Albany*	*21 May 2008*
143	White (Narrogin)	WHIN	CPCWA	Narrogin	26 May 2010, 07 Jun 2010
144	White Water	WHIW	CPCWA	Corrigin	07 June 2010
145	*Wild Horse*	*WILD*	*CPCWA*	*West Arthur*	*19 May 2008*
146	Wilson	WILS	CPCWA	Manjimup	20 May 2008
147	**Yaalup**	YAAL	CPCWA	Kent	17 May 2009
148	Yarnup	YARN	CPCWA	Cranbrook	24 May 2008, 27 May 2011
149	Yarra Yarra	YARR	CPCWA	Carnamah	26 May 2012
150	Yealering	YEAL	LGA	Wickepin	07 June 2010
151	Yellilup	YELL	Private	Jerramungup	21 May 2008, 28 May 2011
152	Yurine	YURI	CPCWA	Gingin	06 June 2010

Notes:

1. Wetlands without official names at the commencement of monitoring are identified by Local Government Authority and Reserve Number (e.g. Albany 26385).
2. CPCWA (Conservation and Parks Commission of Western Australia); LGA (Local Government Authority); MWR (Minister for Water Resources); UCL (Unallocated Crown Land), WRC (Water & Rivers Commission). DBCA has management responsibility for wetlands vested in CPCWA.
3. The SWWMP wetlands shown in *italics* have been monitored under SWWMP at various times in the past, but are not currently monitored, not at least under SWWMP.
4. Wetlands not shown in italics are 'current' SWWMP wetlands being routinely monitored by the authors for surface water depth, salinity, pH and (until 2007) nutrients, under the State Salinity Strategy. These include the Intensively Monitored wetlands shown in bold.
5. Wetlands shown in **bold** are SWWMP wetlands that have been Intensively Monitored by other DEC/DPaW/DBCA scientific staff for potential changes in plant and animal communities, shallow groundwater levels and detailed water chemistry under the State Salinity Strategy. They are a subset of the 'current' wetlands.
6. Beverley Lakes is also known as Yenyenning Lakes; Boyup Brook 18239 as Kulicup Swamp; Corrigin 12900 as Paperbark Swamp and Kent 29020 as East Lake Bryde.
7. Taarblin North and Taarblin South refer to the northern and southern basins respectively of one wetland (Taarblin).
8. The only SWWMP wetlands not yet photographed are Big Boom (Esperance), Gingilup (Nannup), Kulunilup (Cranbrook), Mowen (Augusta – Margaret River), Yeagarup (Manjimup) and Yeagarup South (Manjimup). These wetlands have only recently been added to SWWMP (Yeagarup and Yeagarup South in 2011, Big Boom and Gingilup in 2012, Kulunilup in 2014, Mowen in 2015).

Table 9. Number of SWWMP wetlands with 1, 2, 3, etc. years of September and/or[1] November depth, pH and salinity data as at November 2016.

	No. of currently monitored wetlands			No. of historically monitored wetlands		
Number of years of Sep and/or[1] Nov data at Nov 2016	**With Depth data**	**With pH data**	**With Salinity data**	**With Depth data**	**With pH data**	**With Salinity data**
0					2	2
1		1	1		4	2
2	1	1	1	1	4	4
3	1	1	1	5	10	7
4				4	12	5
5	2	2	2	9	4	8
6	2	3	3	10		5
7				4	2	4
8		2	2		3	1
9		1			5	4
10			1	2	4	
11		2		3	1	5
12		1		3	1	2
13		3	1	8		2
14	1	1	2	3		1
15	2	2	1			
16	3	1	4			
17	7	6	7			
18	4	3	2			
19		1	1			
20	1	1			1	
21	2	3	2			1
22	2	5	5	1		
23	2	4	3			
24	4	4	1			
25	3	5	4			
26		3	5			
27	1	3	5			
28	3	2	5			
29	1	3				
30	1	2	2			
31	2	6	4			
32	6	5	3			
33	4	4	4			
34	5	10	1			
35	4	12	3			
36	6	2	8			
37	12		10			
38	16		7			
39	7		4			
Total Wetlands	105	105	105	53	53	53

SUMMARY

	No. of currently monitored wetlands			No. of historically monitored wetlands		
Number of years of Sep and/or[1] Nov data at Nov 2016	**With Depth data**	**With pH data**	**With Salinity data**	**With Depth data**	**With pH data**	**With Salinity data**
≥ 10	99	94	95	20	7	11
≥ 20	82	74	76	1	1	1
≥ 30	63	41	46	0	0	0

1. The objective is to monitor all SWWMP wetlands in both September *and* November each year. However, on occasions, circumstances may prevent data collection at one or a few wetlands in either Sept or Nov (rarely at same wetland in both months) of a particular year.
2. More wetlands have 10+, 20+, 30+ years of depth data than salinity (or pH) data because in most years some wetlands are dry in Sept and/or Nov. Fewer wetlands have 10+, 20+, 30+ years of pH data than salinity data because routine pH monitoring began several years after depth and salinity monitoring.
3. Taarblin North is not included in this Table. It has been monitored for a shorter period than Taarblin South, which is included. They are two connected basins of the same wetland (Lake Taarblin).

APPENDICES

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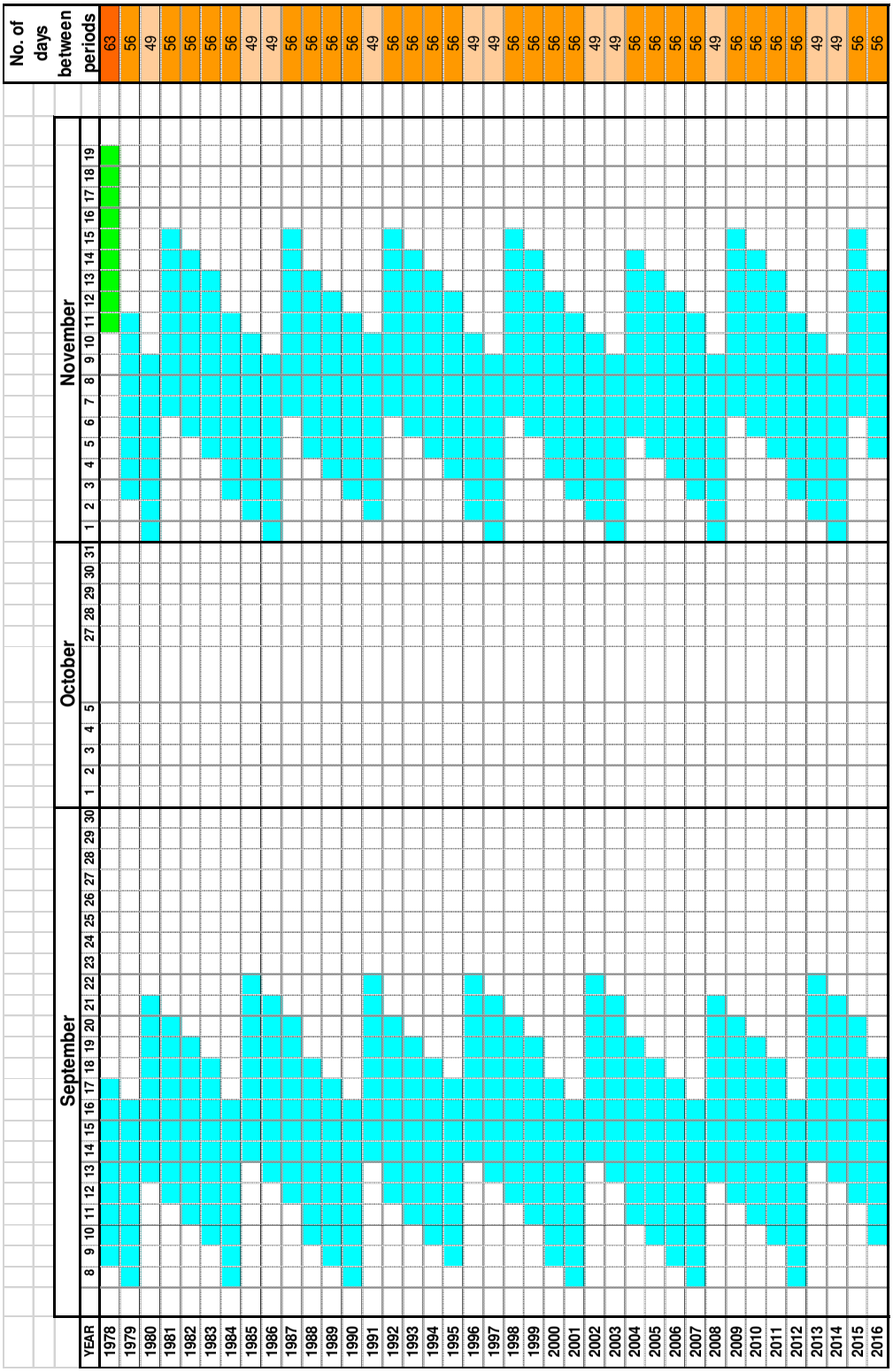
APPENDIX 2. Recreation and SWWMP wetlands.

APPENDIX 3. 'Waterbird Spectaculars'.

APPENDIX 4. Threatened species in SWWMP wetlands

Readers are referred to the 2014 annual SWWMP report (Lane *et al.* 2015b) for these Appendices.

APPENDIX 5. Routine September and November SWWMP monitoring periods, 1978-2016.



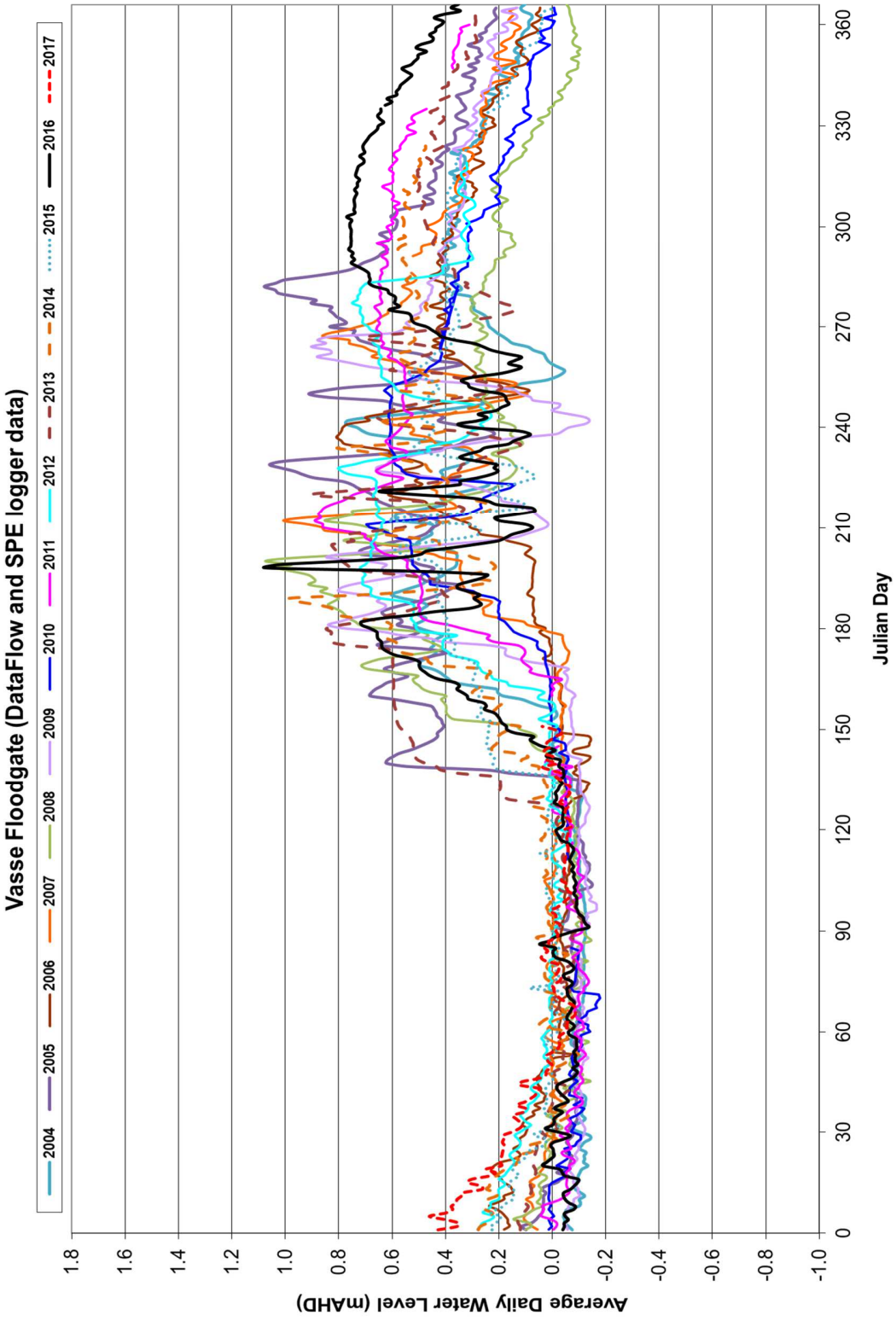
Notes:

1. While SWWMP monitoring began (at only four wetlands) in 1977, routine September and November monitoring periods were not adopted until 1978.
2. The routine September monitoring period is the nine day period commencing on the *second* Saturday of the month.
2. The routine November monitoring period is the nine day period commencing on the *first* Saturday of the month.
3. *In 1978 only*, the routine November monitoring period began on the *second* Saturday of the month (*not* on the first Saturday as in all subsequent Novembers).
4. 'No. of days between periods' is number of days from start of routine September monitoring period until start of routine November monitoring period each year.
5. The day (1-9) of monitoring of *individual wetlands* was variable within monitoring periods. For example, a wetland could have been monitored on the first day of a monitoring period on one occasion and the last day of the monitoring period on another.

This is an updated version of Appendix 93 of Lane *et al.* (2015c).

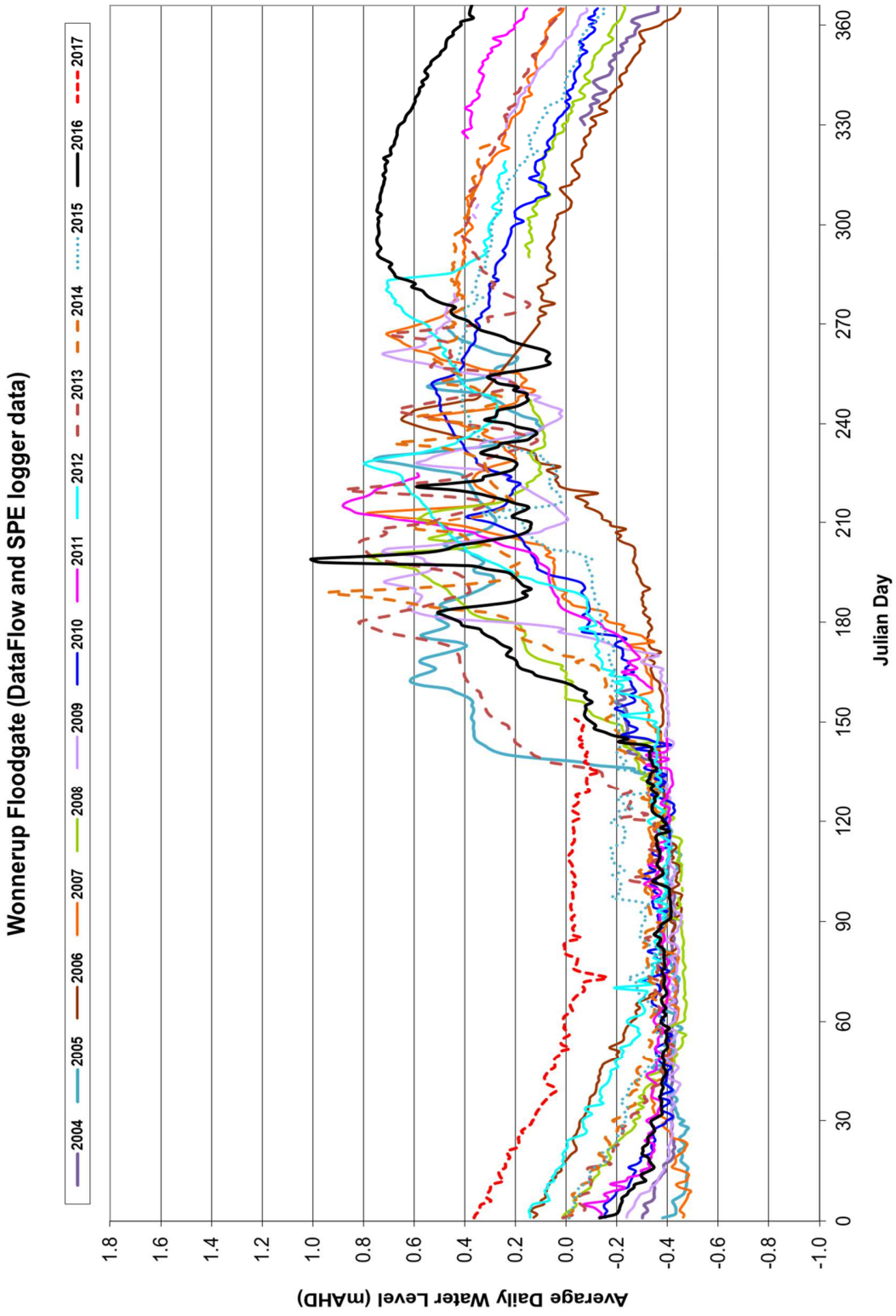
APPENDIX 6a. Vasse estuary water levels, 2004–2016.

Water levels of Vasse estuary, a key component of the Vasse Wonnerup Ramsar Site, are managed by operation of floodgates on its exit channel (Lane *et al.* 1997). SWWMP personnel maintain continuous water level monitoring equipment on Vasse estuary as an adjunct to SWWMP. Water level management is a critical factor in maintenance of Vasse-Wonnerup's internationally significant waterbird populations (Government of Western Australia 1990, 2000; Lane 1990; Lane *et al.* 2007).



APPENDIX 6b. Wonnerup estuary water levels, 2004–2016.

Water levels of Wonnerup estuary, a key component of the Vasse-Wonnerup Ramsar Site, are managed by operation of floodgates on its exit channel (Lane *et al.* 1997). SWWMP personnel maintain continuous water level monitoring equipment on Wonnerup estuary as an adjunct to SWWMP. Water level management is a critical factor in maintenance of Vasse-Wonnerup's internationally significant waterbird populations (Government of Western Australia 1990, 2000; Lane 1990; Lane *et al.* 2007).



GRAPHS

Depth, salinity and pH graphs are presented on the following pages for all 105 currently monitored SWWMP wetlands.

Graphs are arranged in the same order (alphabetical by wetland name) as in Table 1, where coordinates, tenure and location (by Local Government Authority) are provided.

Filled symbols indicate data collected during the September and November routine monitoring periods.

Empty symbols indicate data collected during the January, March, May and July routine monitoring periods. Monitoring in these four periods was conducted routinely until May 1985 (the end of a four-year assessment of waterbird use of South West Wetland Nature Reserves; Jaensch *et al*. 1988) and has been occasional and opportunistic since that time.

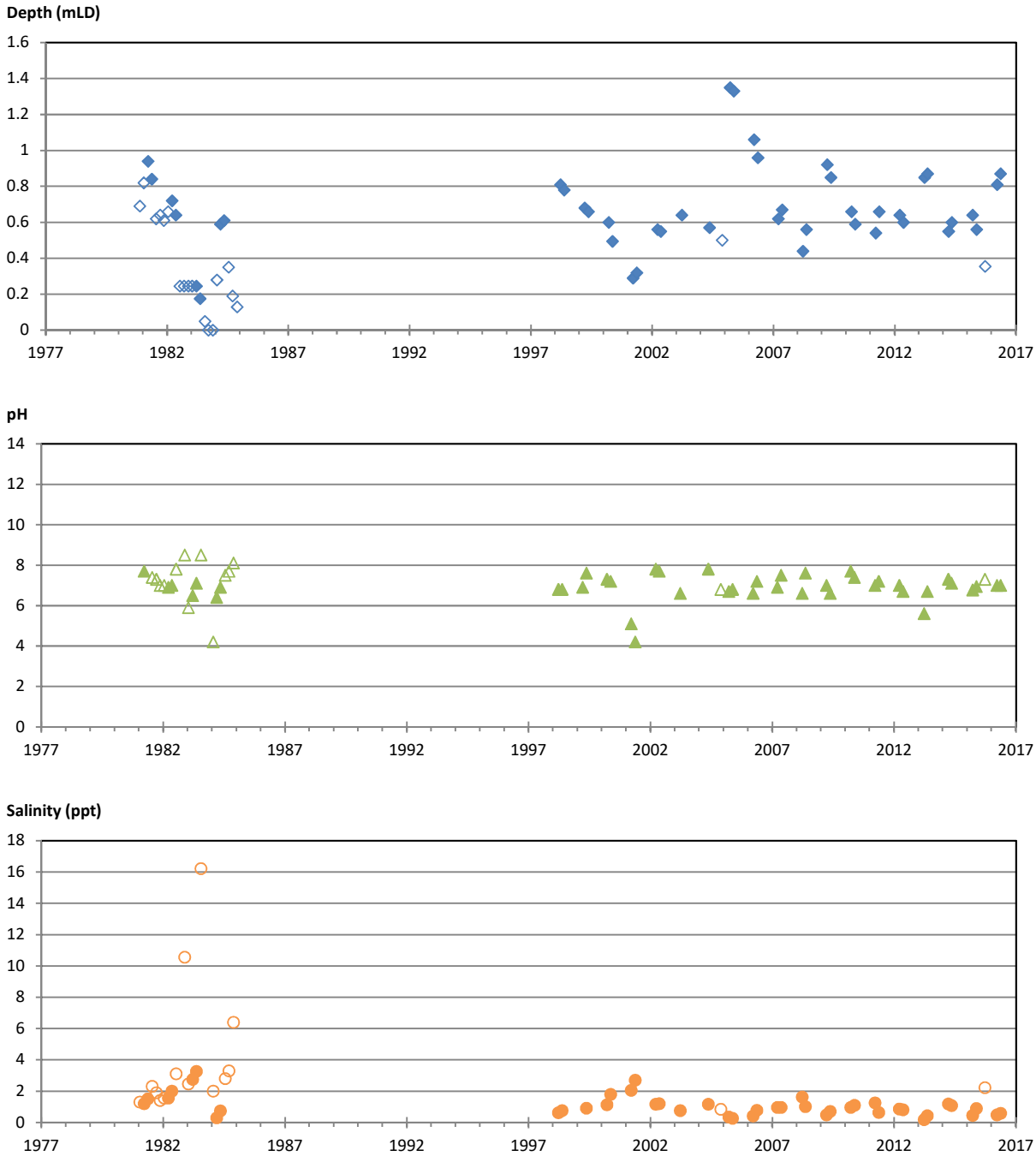
Notes beneath graphs indicate:

- The 25 wetlands Intensively Monitored by DEC/DPaW/DBCA scientific staff for additional biological and physico-chemical attributes (see second-last paragraph of Section 3 and Note 10 of Table 1).
- Listing as a Wetland of International Importance under the 'Ramsar' *Convention on Wetlands* (Government of Western Australia 1990, 2000; Ramsar Secretariat 2013) and listing in '*A Directory of Important Wetlands in Australia'* (ANCA 1996; Environment Australia 2001; Elscot *et al.* 2009).
- Inclusion in a current or former Natural Diversity Recovery Catchment (Government of Western Australia 1996a; Wallace & Lloyd 2008).

Data collected (mainly opportunistically) *outside* the six routine (nine-day) monitoring periods of September, November, January, March, May and July each year are not shown.

Nutrient (Total N & P) data from most currently-monitored wetlands, and water level, salinity, pH and nutrient data from historically-monitored SWWMP wetlands, may be found in Lane *et al.* (2009a).

ALBANY 26385

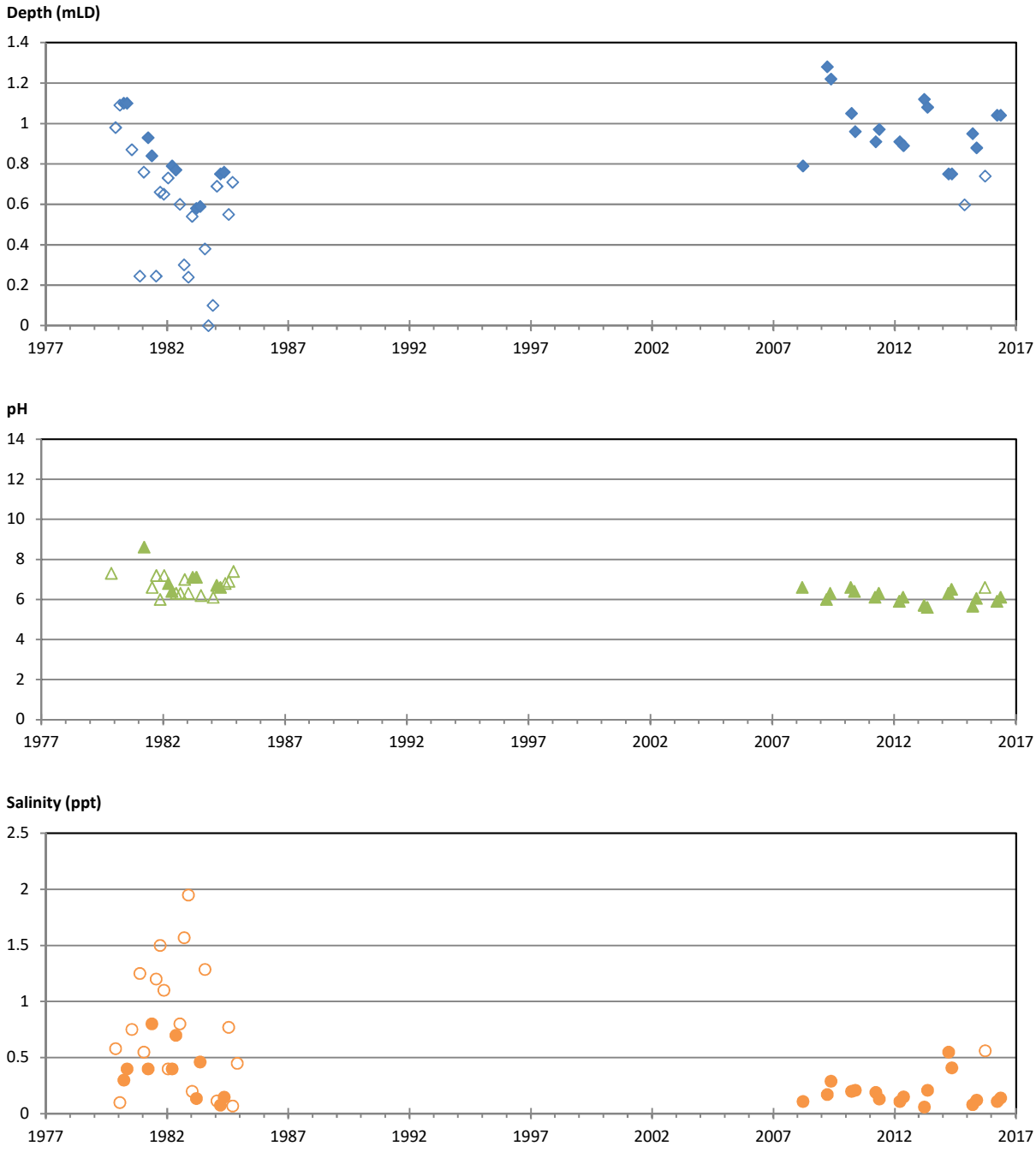


Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Albany 26385 is a component of the 'Lake Pleasant View System', which is listed in the 'Directory of Important Wetlands in Australia'.

Albany 26385 is in the Albany District of the South Coast DBCA Region.

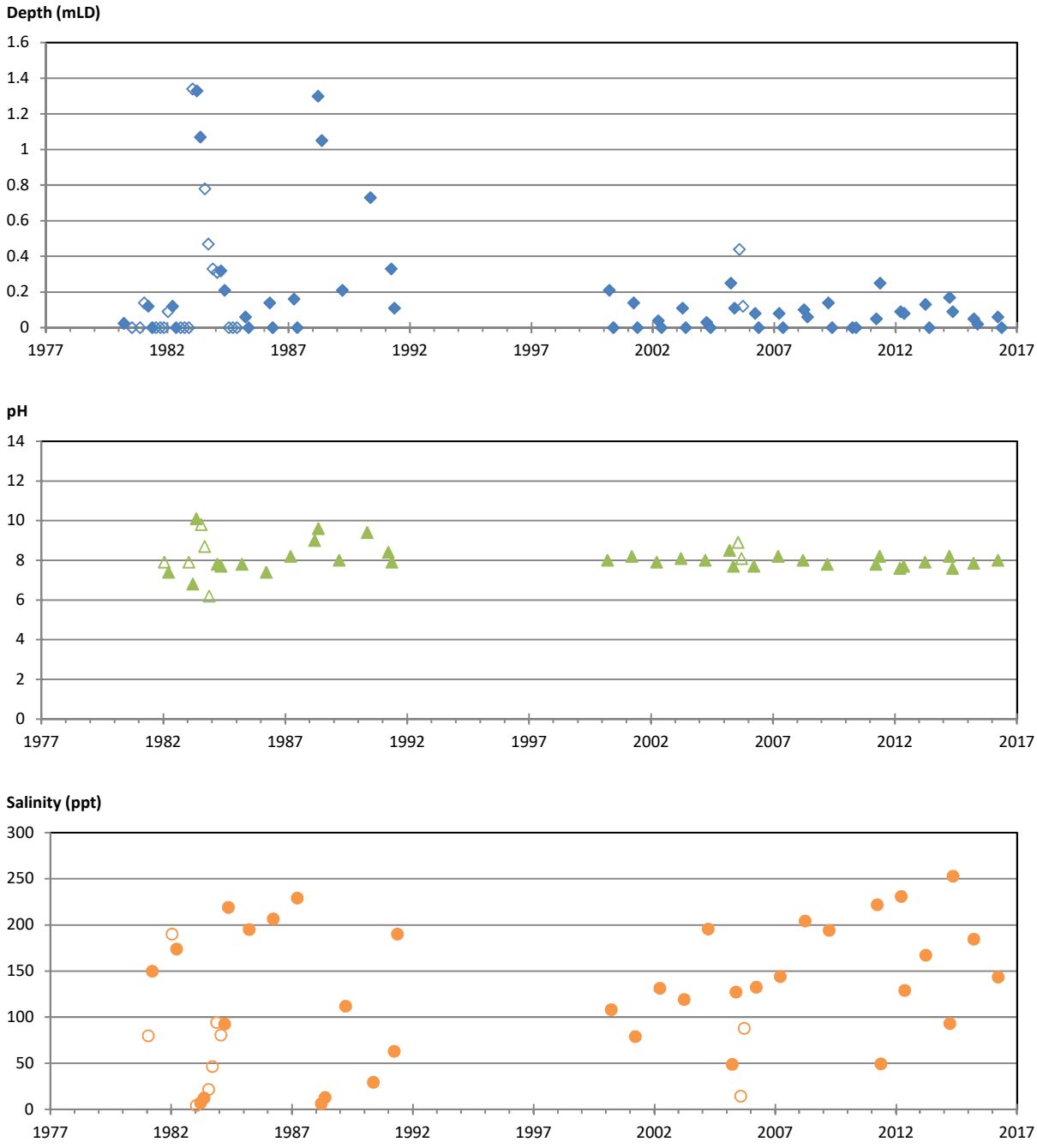
ALBANY 27157



Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Albany 27157 is in the Albany District of the South Coast DBCA Region.

ALTHAM [IM]



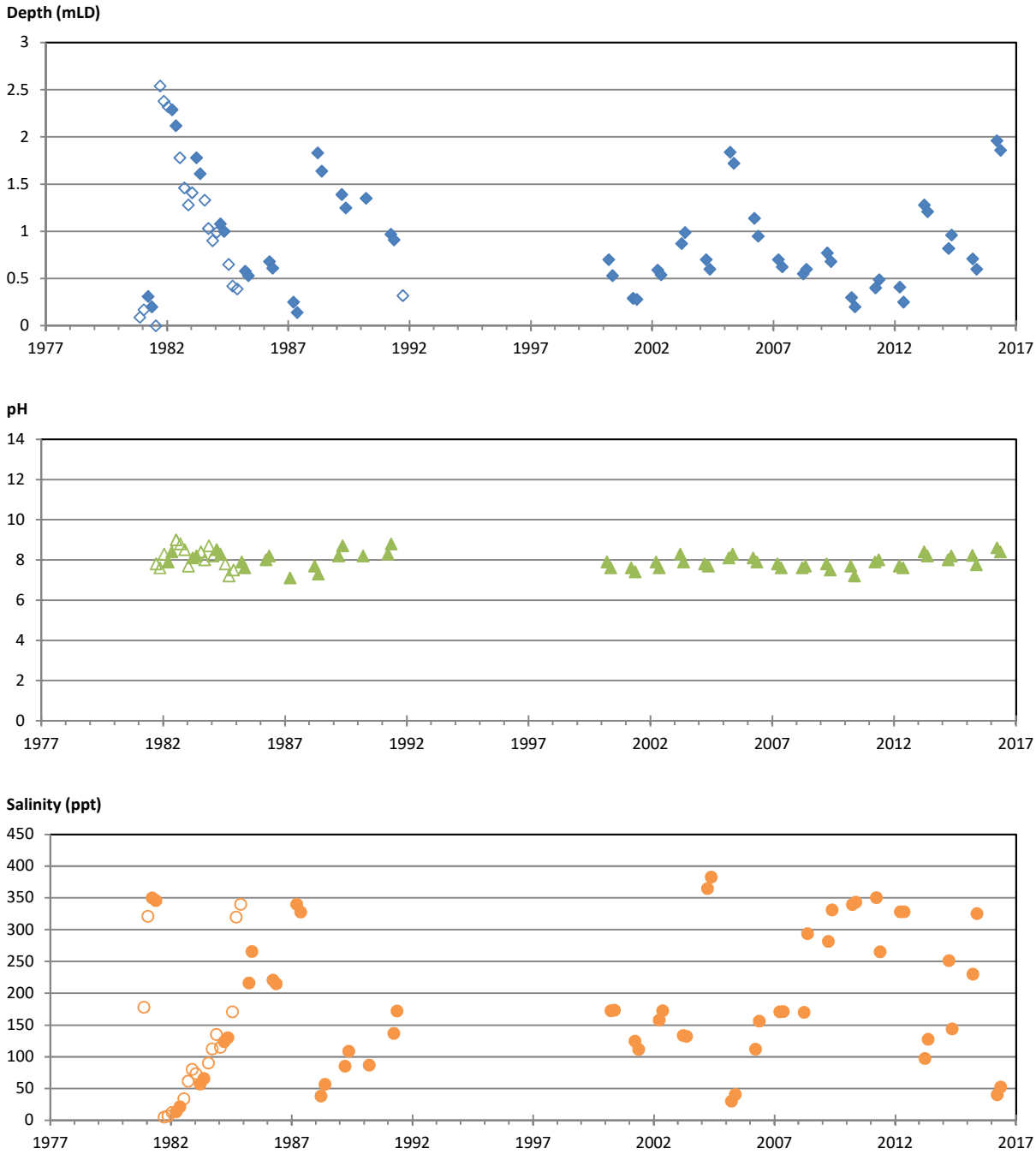
Notes:

1. [IM] indicates this is one of 25 wetlands Intensively Monitored for additional biological and physico-chemical attributes.
2. Year labels are positioned at 1st July each year.
3. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Altham is a component of the 'Lake Grace System', which is listed in the 'Directory of Important Wetlands in Australia'.

Altham is in the Southern Wheatbelt geographical area (headquartered in Narrogin) of the Wheatbelt DBCA Region.

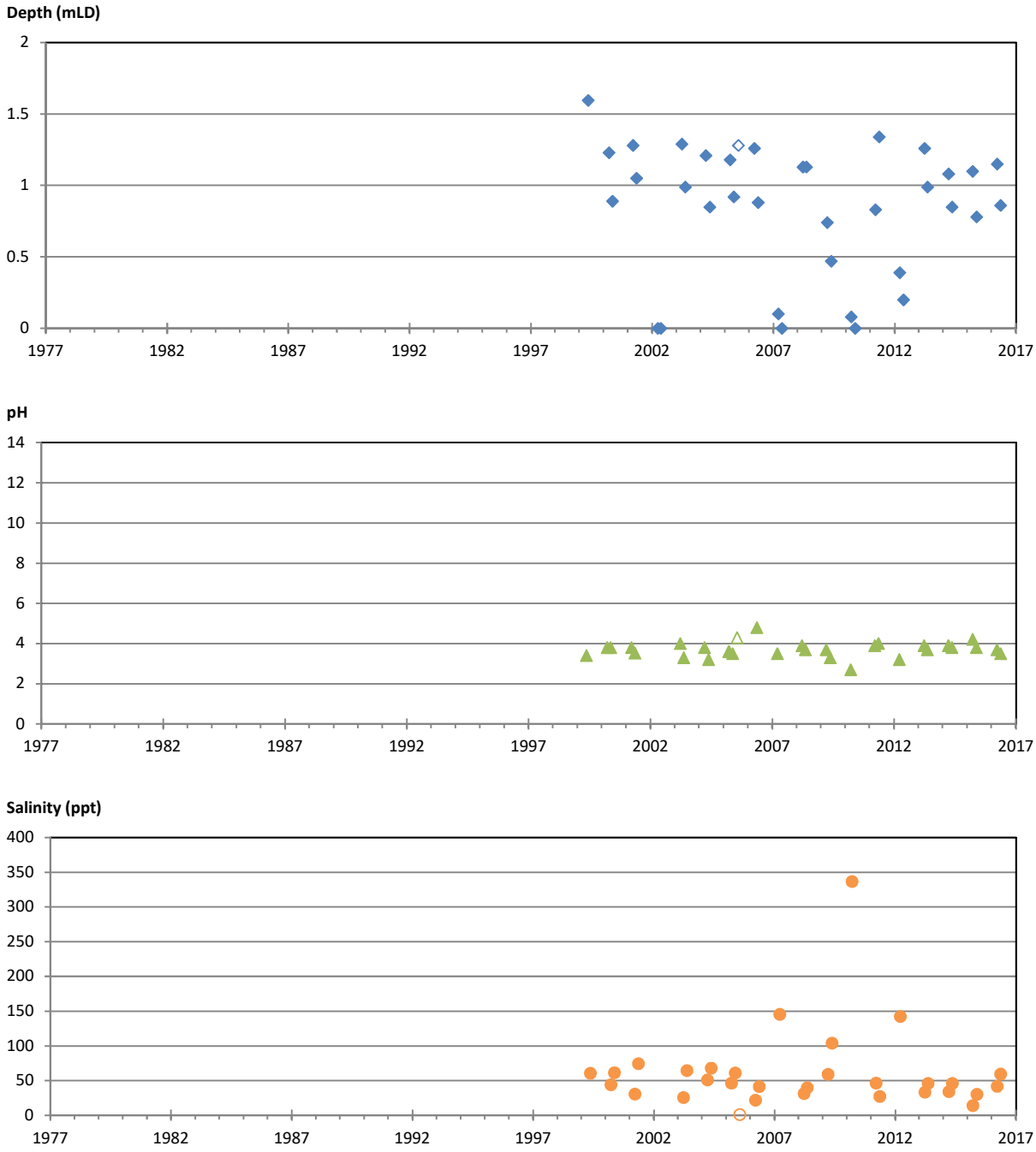
ANDERSON



Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Anderson is in the Southern Wheatbelt geographical area (headquartered in Narrogin) of the Wheatbelt DBCA Region.

ARDATH [IM]

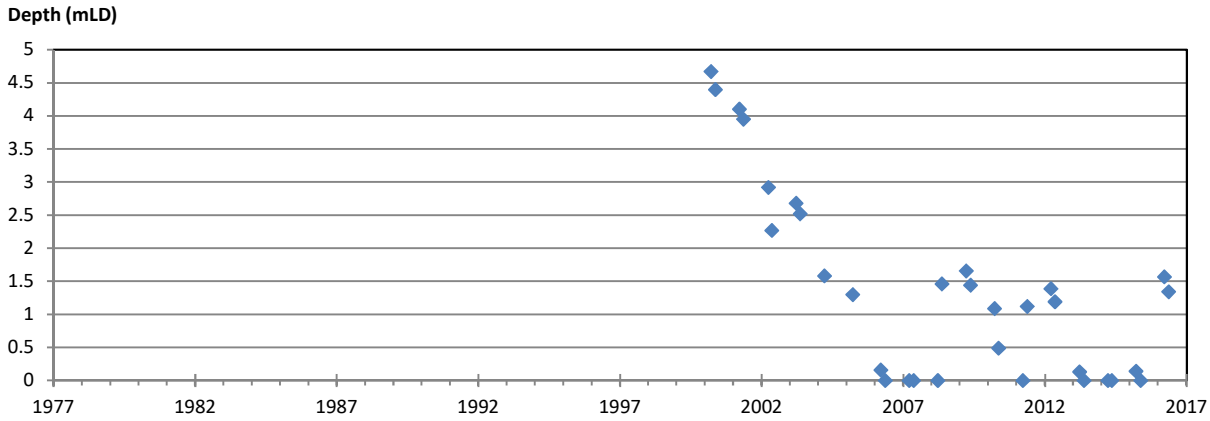


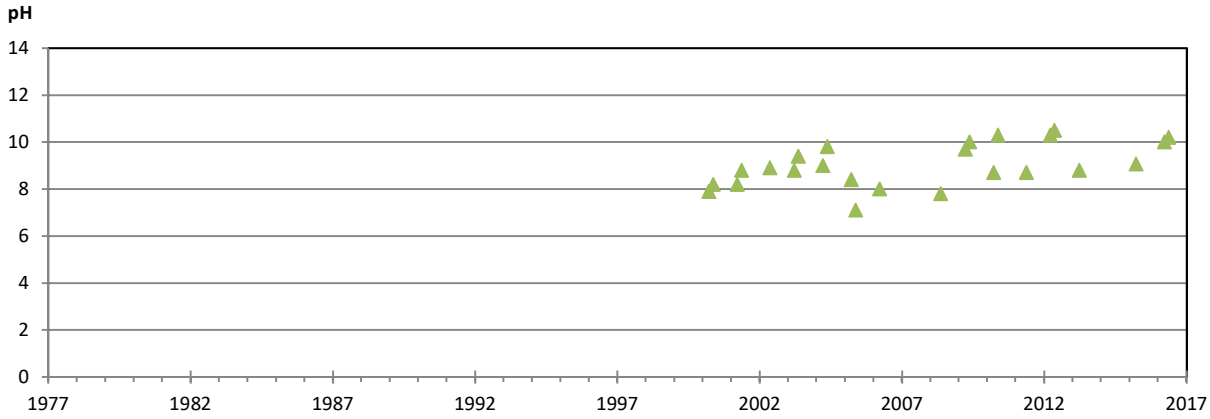
Notes:

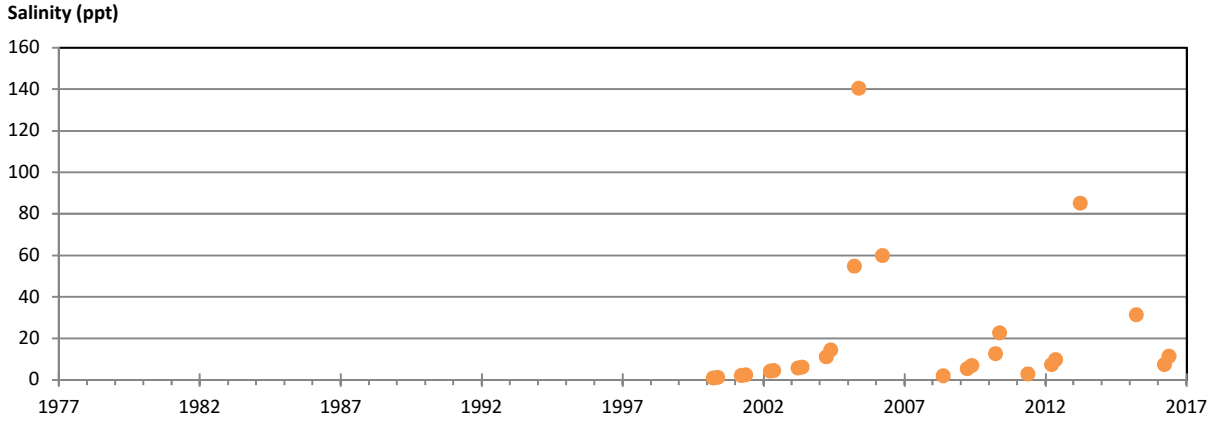
1. [IM] indicates this is one of 25 wetlands Intensively Monitored for additional biological and physico-chemical attributes.
2. Year labels are positioned at 1st July each year.
3. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Ardath is in the Central District (headquartered in Merredin) of the Wheatbelt DBCA Region.

ATKINS YATE



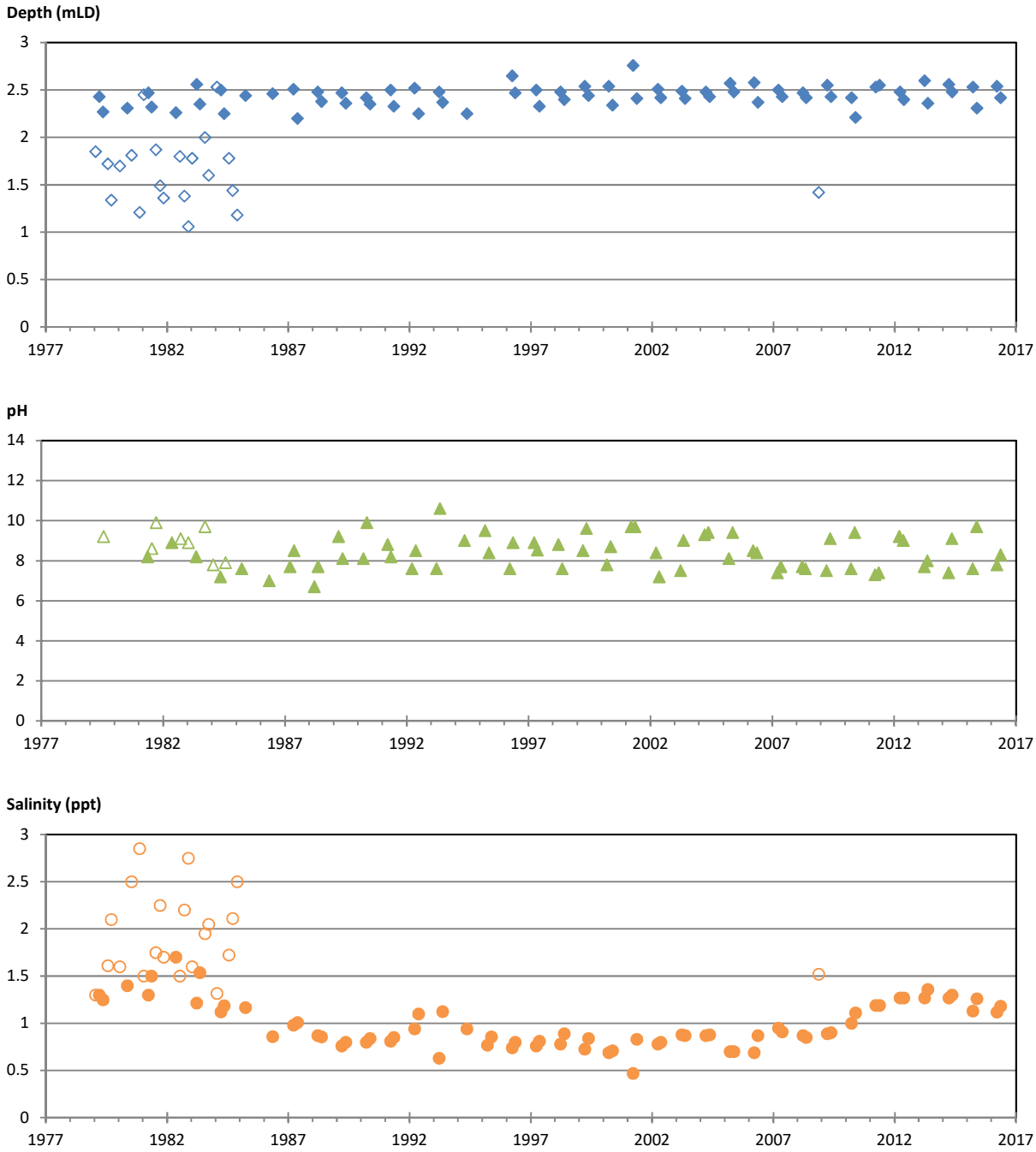




Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from September and November routine monitoring periods only.

Atkins Yate is in the Southern Wheatbelt geographical area (headquartered in Narrogin) of the Wheatbelt DBCA Region.

BAMBUN

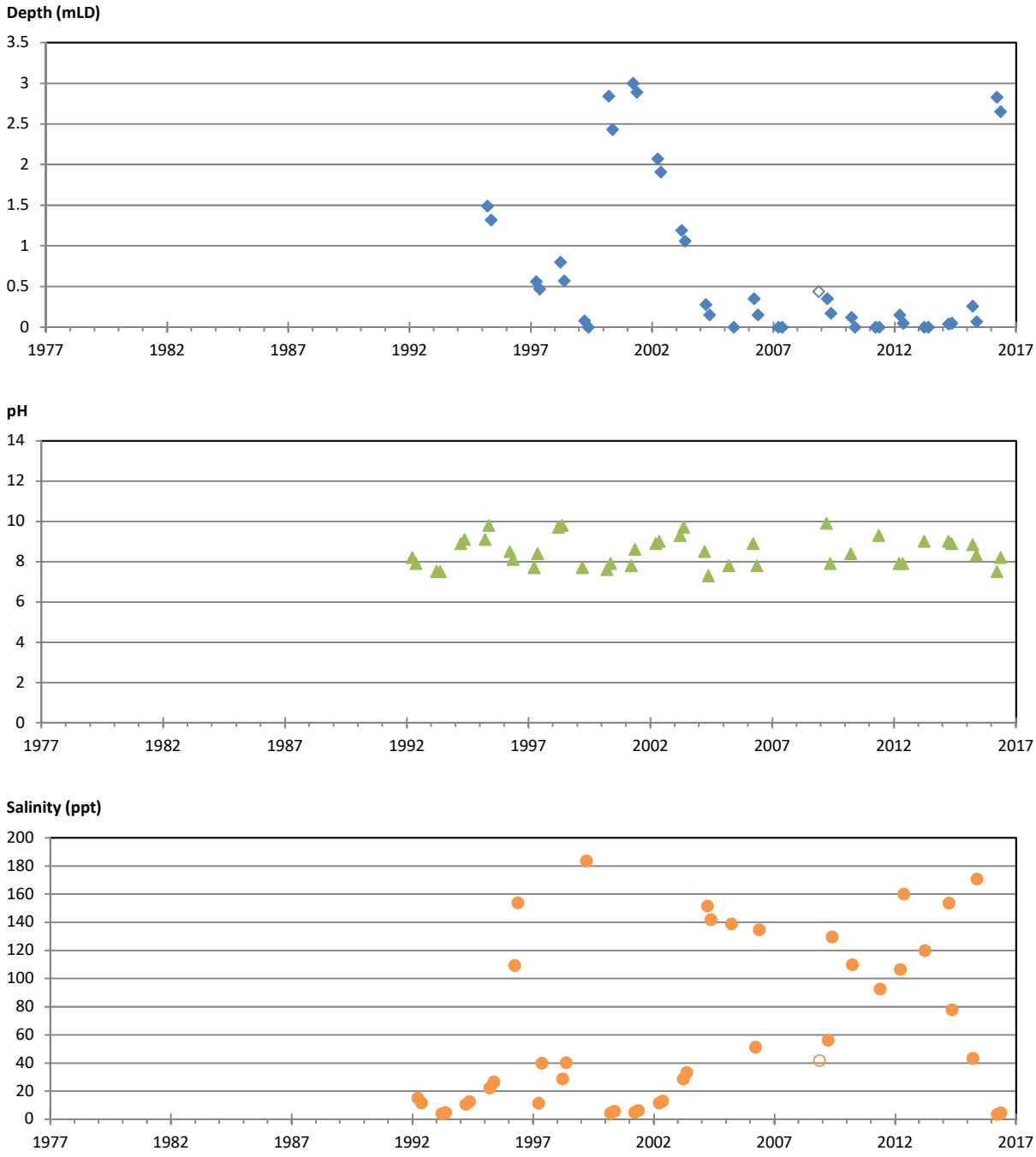


Notes:

1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Bambun is in the Swan Coastal District (headquartered in Wanneroo) of the Swan DBCA Region.

BENNETTS [IM]



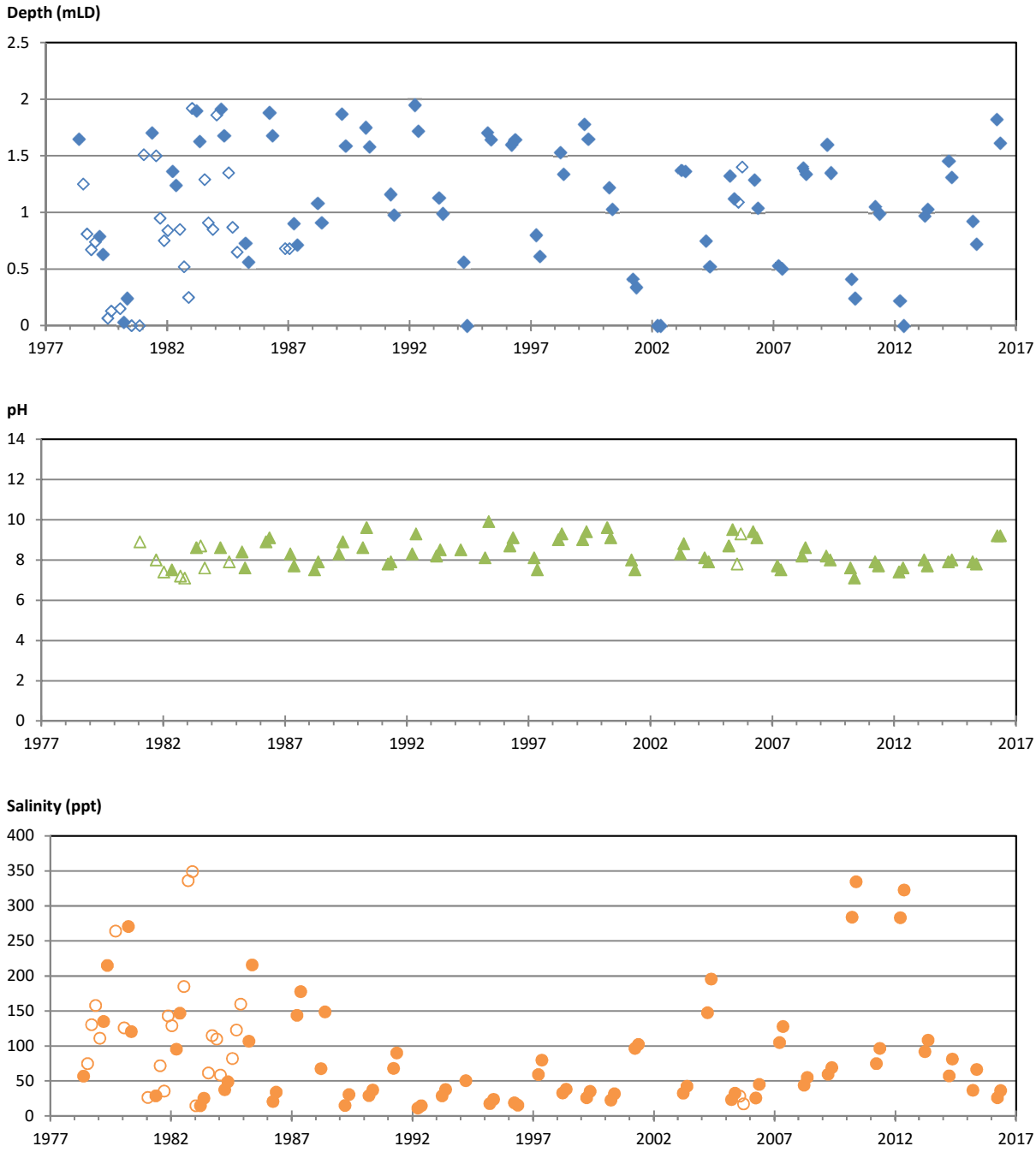
Notes:

1. [IM] indicates this is one of 25 wetlands Intensively Monitored for additional biological and physico-chemical attributes.
2. Year labels are positioned at 1st July each year.
3. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Bennetts Lake has been nominated for listing in the 'Directory of Important Wetlands in Australia' (Elscot *et al.* 2009).

Bennetts is in the Southern Wheatbelt geographical area (headquartered in Narrogin) of the Wheatbelt DBCA Region.

BEVERLEY



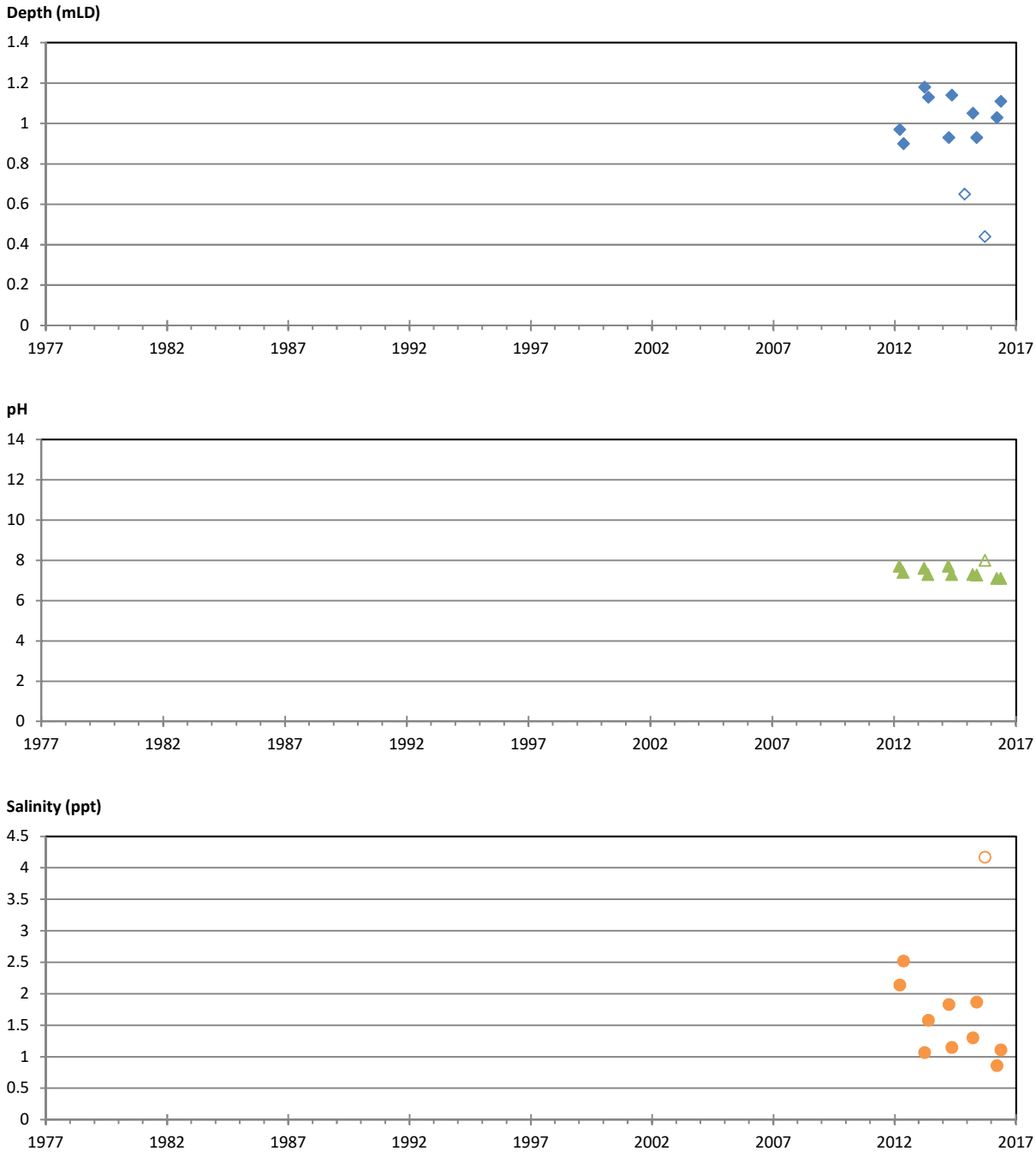
Notes:

1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.
3. Deduct 8.16m from Department of Water gauge readings to convert to SWWMP depths.

Beverley Lakes is also known as Yenyenning Lakes.

Beverley is in the Central District (headquartered in Merredin) of the Wheatbelt DBCA Region.

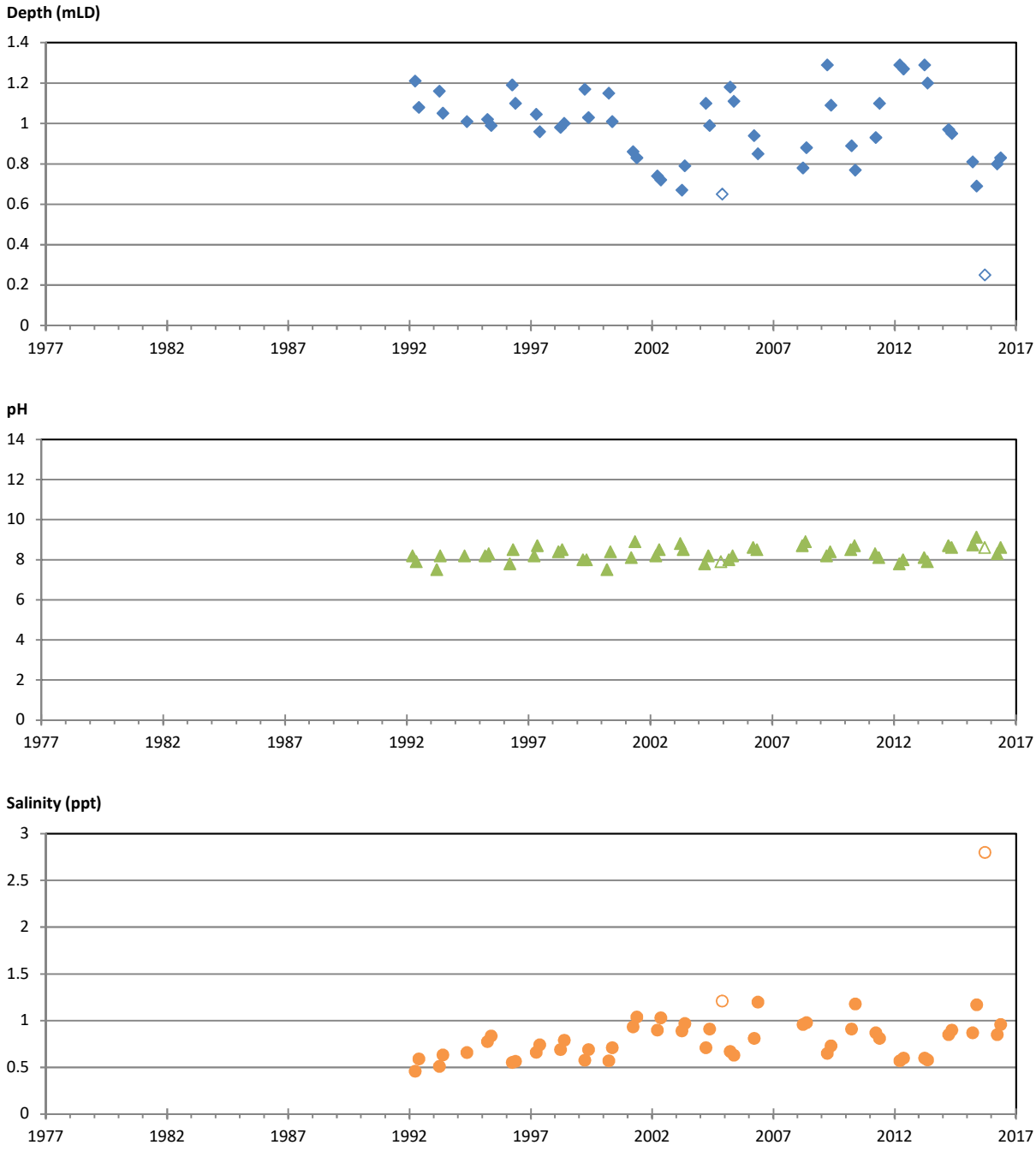
BIG BOOM



Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Big Boom is in the Esperance District of the South Coast DBCA Region.

BOAT HARBOUR 1

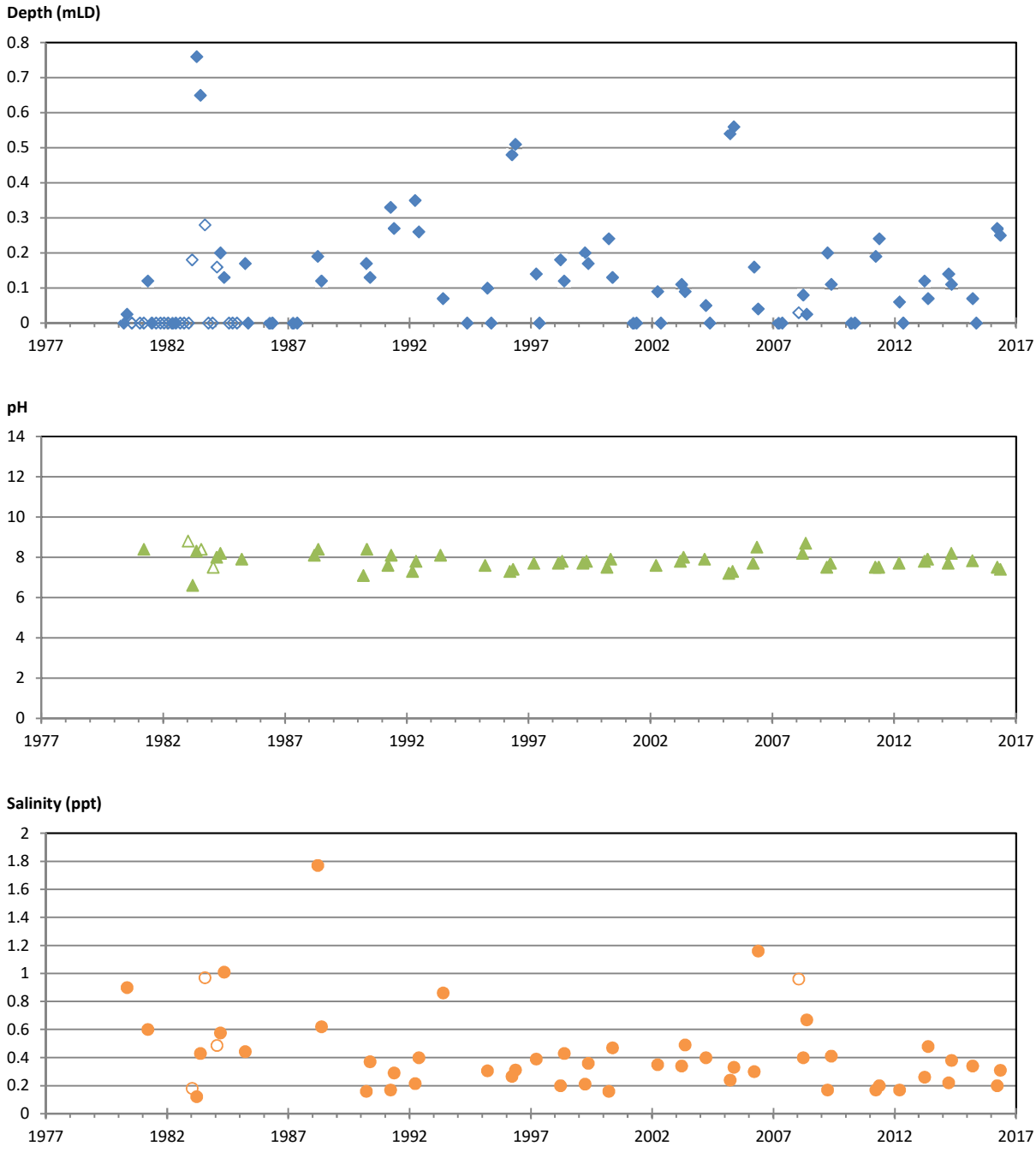


Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Boat Harbour 1 is a component of the 'Owingup Swamp System', which is listed in the 'Directory of Important Wetlands in Australia'.

Boat Harbour 1 is in the Frankland District (headquartered in Walpole) of the Warren DBCA Region.

BOYUP BROOK 18239 IM



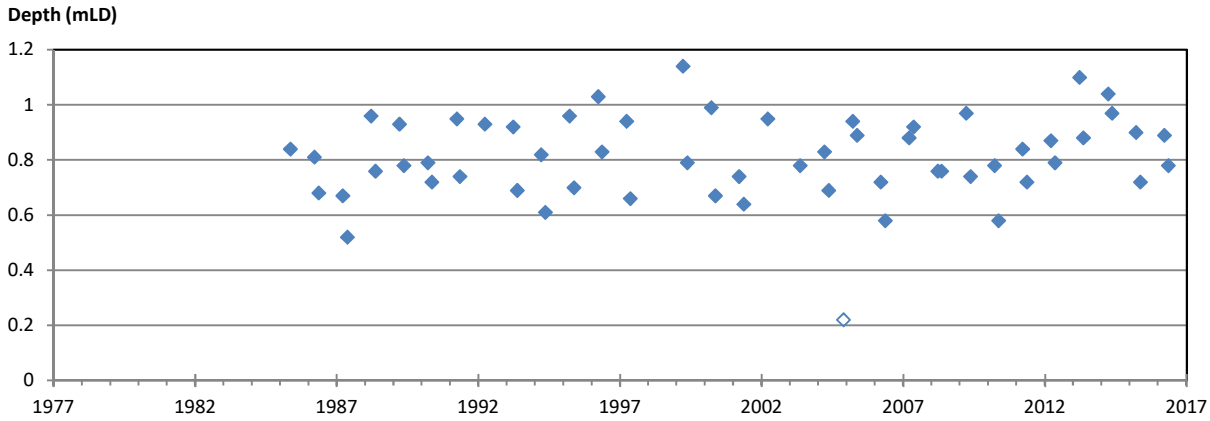
Notes:

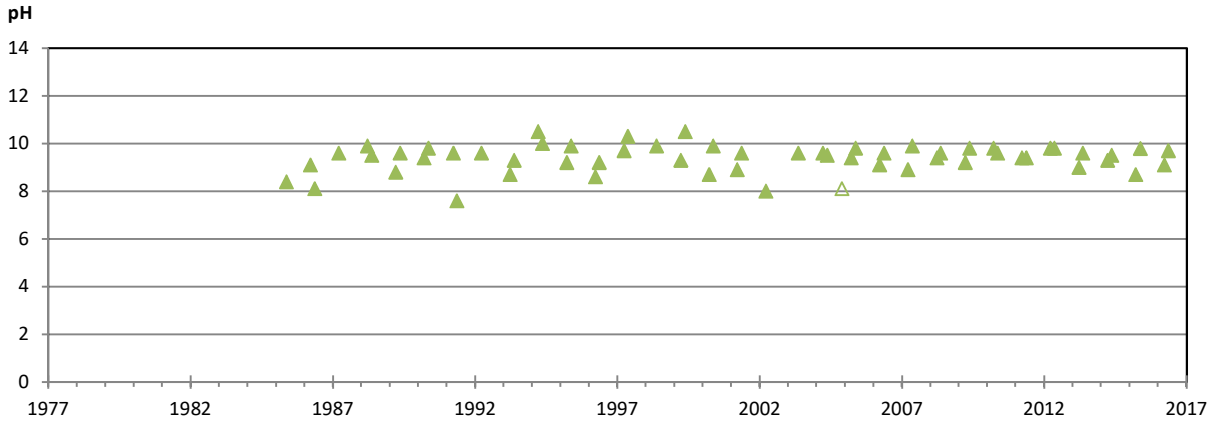
1. IM indicates this is one of 25 wetlands Intensively Monitored for additional biological and physico-chemical attributes.
2. Year labels are positioned at 1st July each year.
3. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

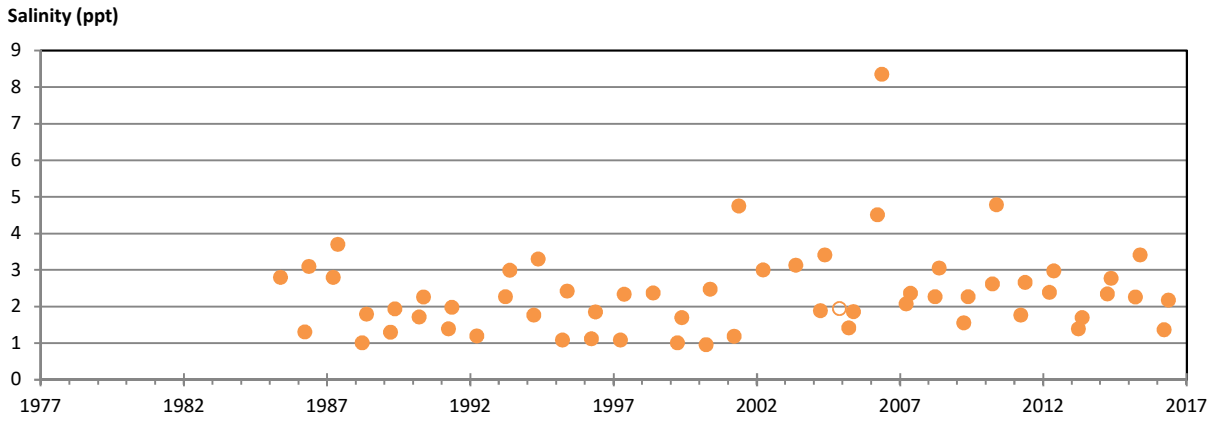
Boyup Brook 18239 is also known as Kulicup Swamp.

Boyup Brook 18239 is in the Blackwood District (headquartered in Busselton) of the South West DBCA Region.

BROADWATER



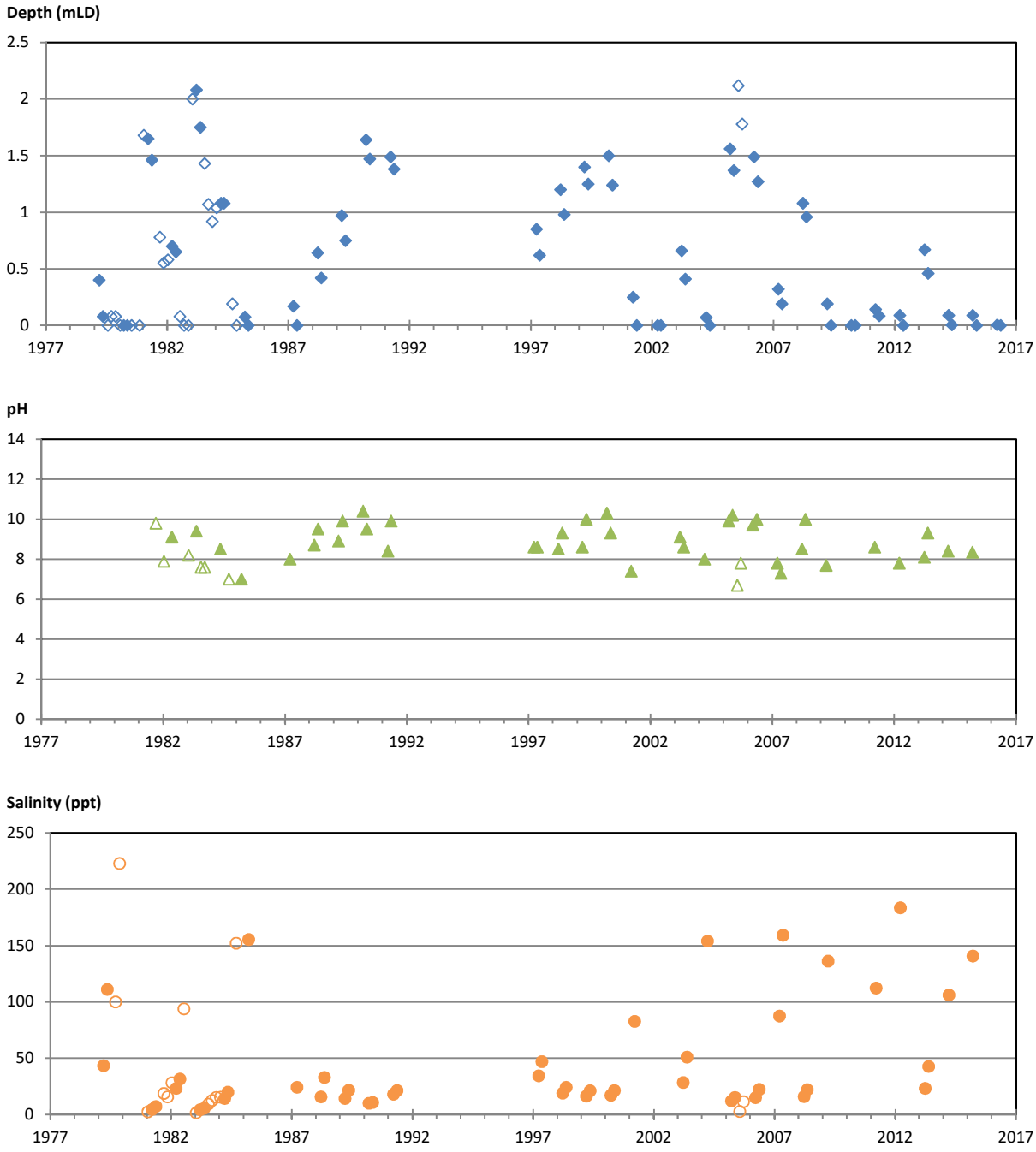




Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Broadwater is in the Blackwood District (headquartered in Busselton) of the South West DBCA Region.

BROWN

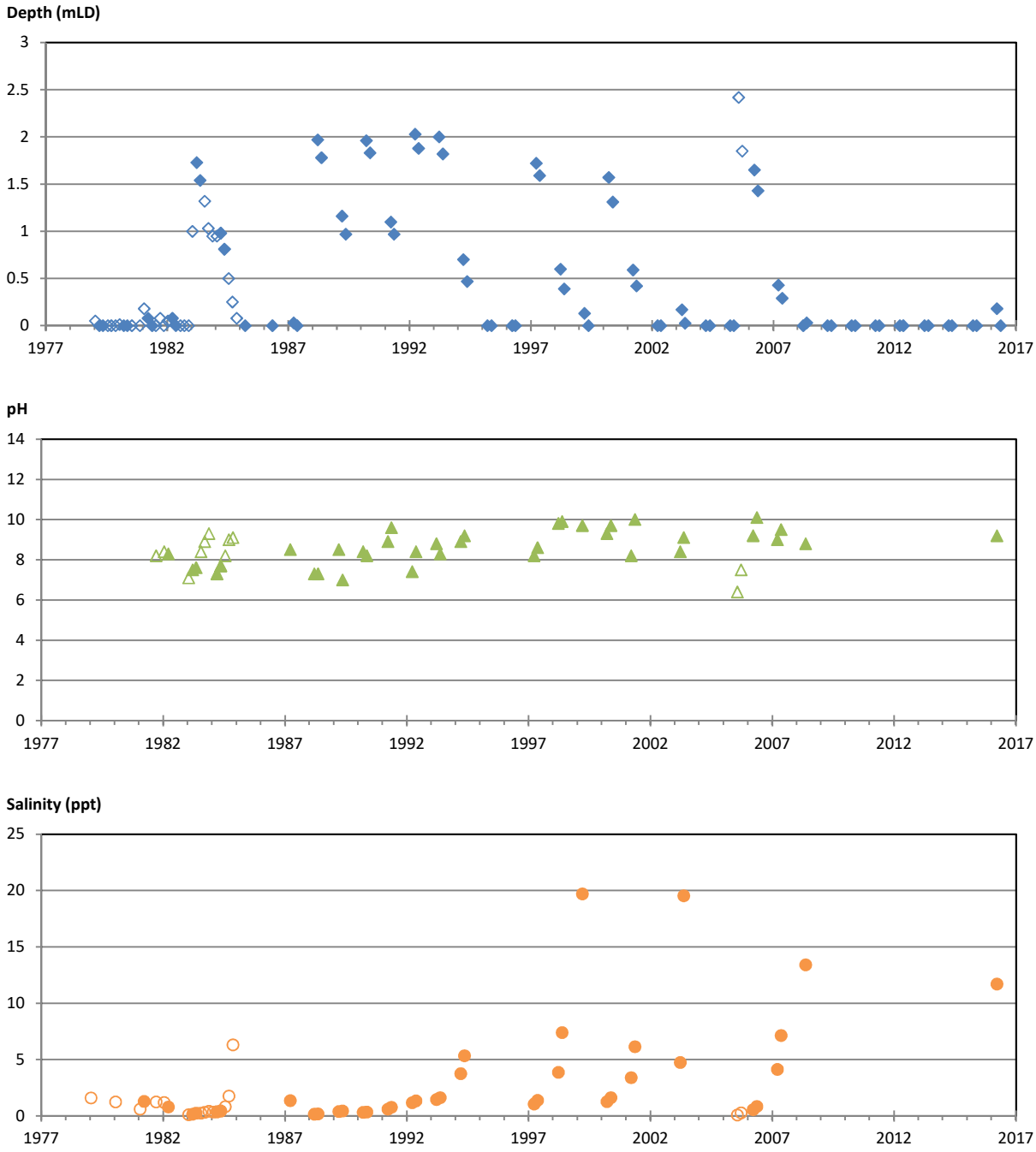


Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Brown is a component of the 'Yealering Lakes System', which is listed in the 'Directory of Important Wetlands in Australia'.

Brown is in the Southern Wheatbelt geographical area (headquartered in Narrogin) of the Wheatbelt DBCA Region.

BRYDE [IM]

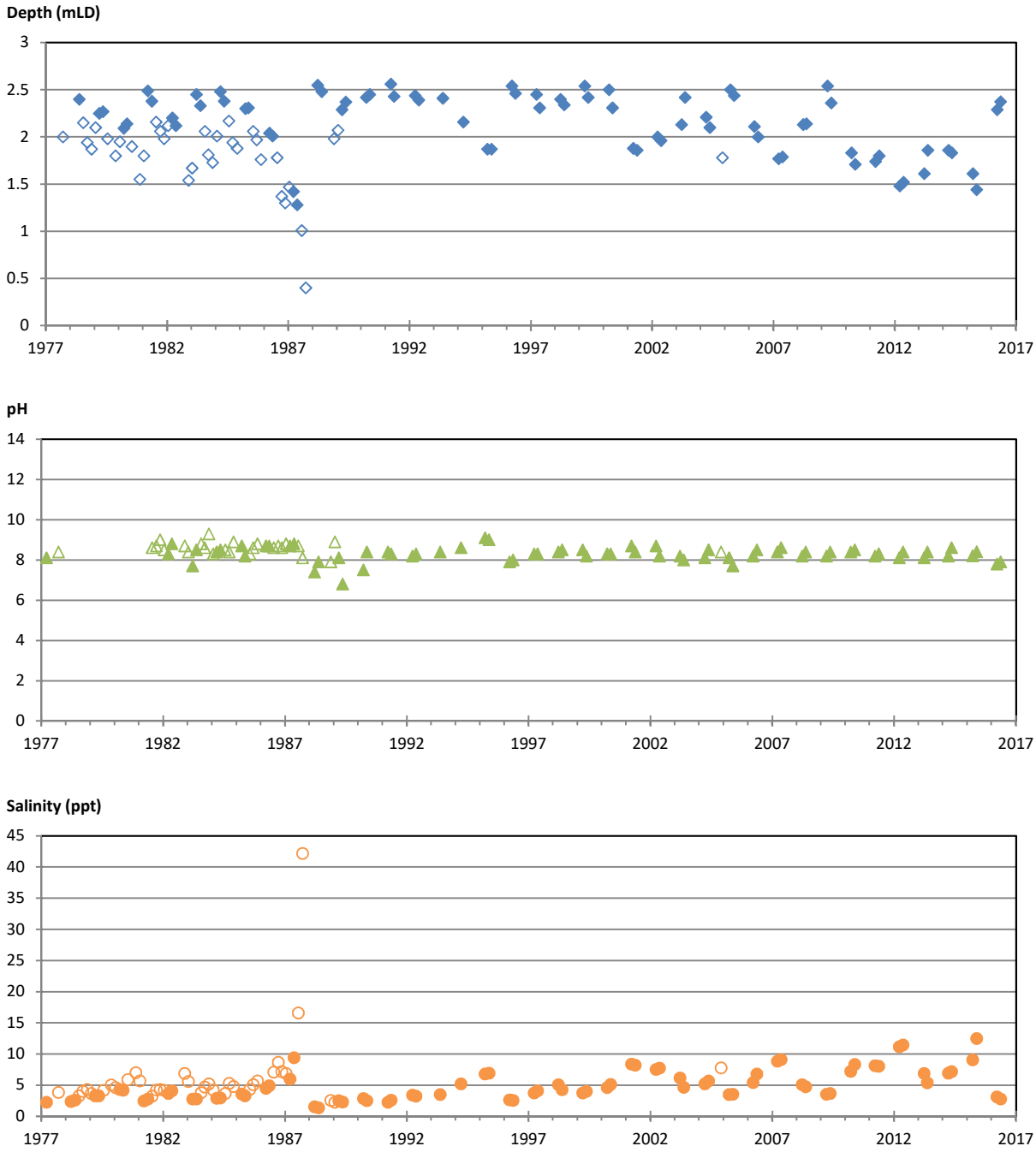


Notes:
1. [IM] indicates this is one of 25 wetlands Intensively Monitored for additional biological and physico-chemical attributes.
2. Year labels are positioned at 1st July each year.
3. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Bryde is part of the 'Lake Bryde – East Lake Bryde System' listed in the 'Directory of Important Wetlands in Australia'.

Bryde is within the Lake Bryde Natural Diversity Recovery Catchment and is in the Southern Wheatbelt geographical area (headquartered in Narrogin) of the Wheatbelt DBCA Region.

BYENUP (with Salinity axis 0–45 ppt)



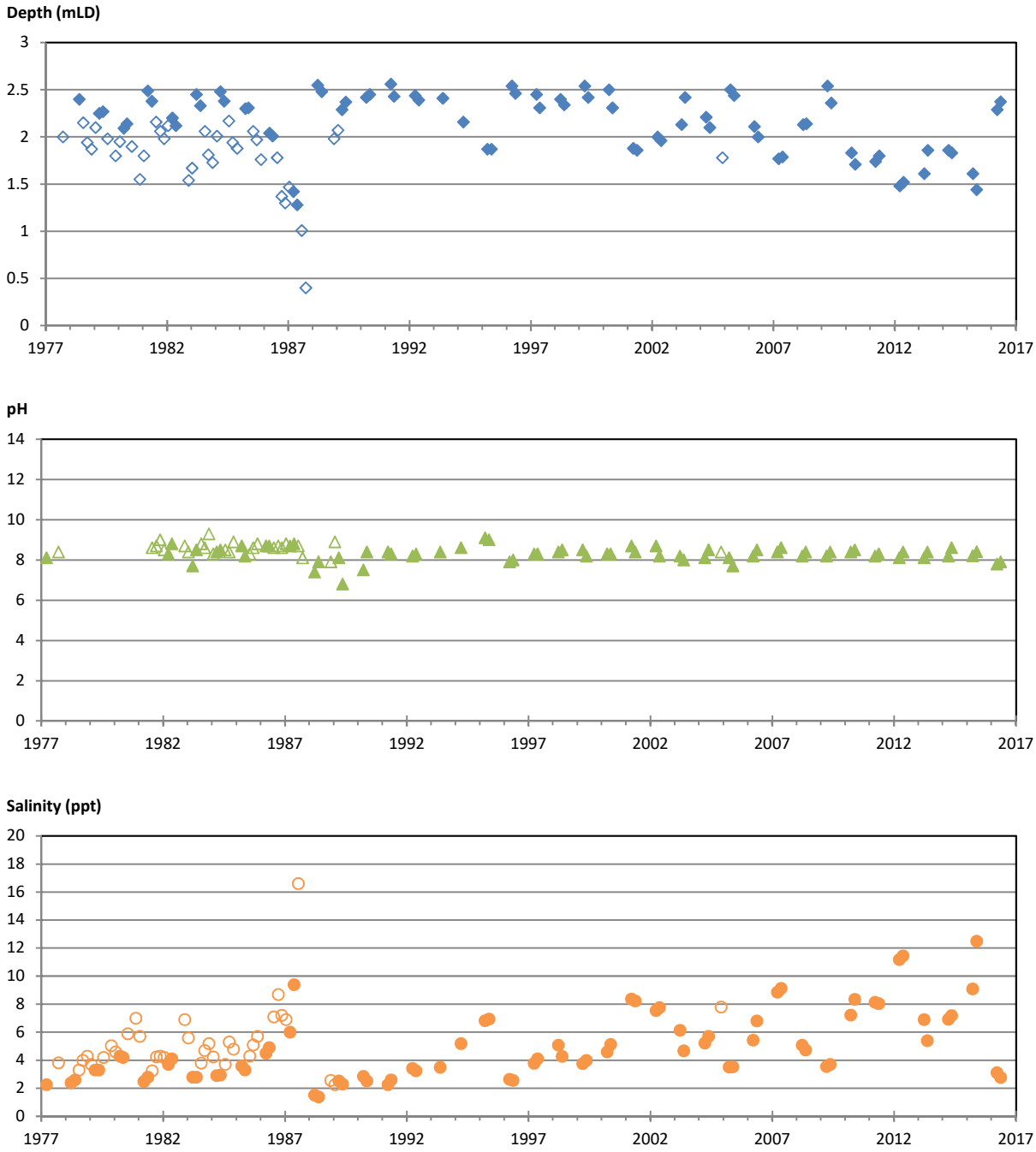
Notes:

1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Byenup is a component of the 'Muir-Byenup System', which is listed as a Wetland of International Importance under the 'Ramsar' Convention on Wetlands, and is also part of the 'Byenup Lagoon System' listed in the 'Directory of Important Wetlands in Australia'.

Byenup is within the former Muir-Unicup Natural Diversity Recovery Catchment and is in the Donnelly District (headquartered in Pemberton) of the Warren DBCA Region.

BYENUP (with Salinity axis 0–20 ppt)



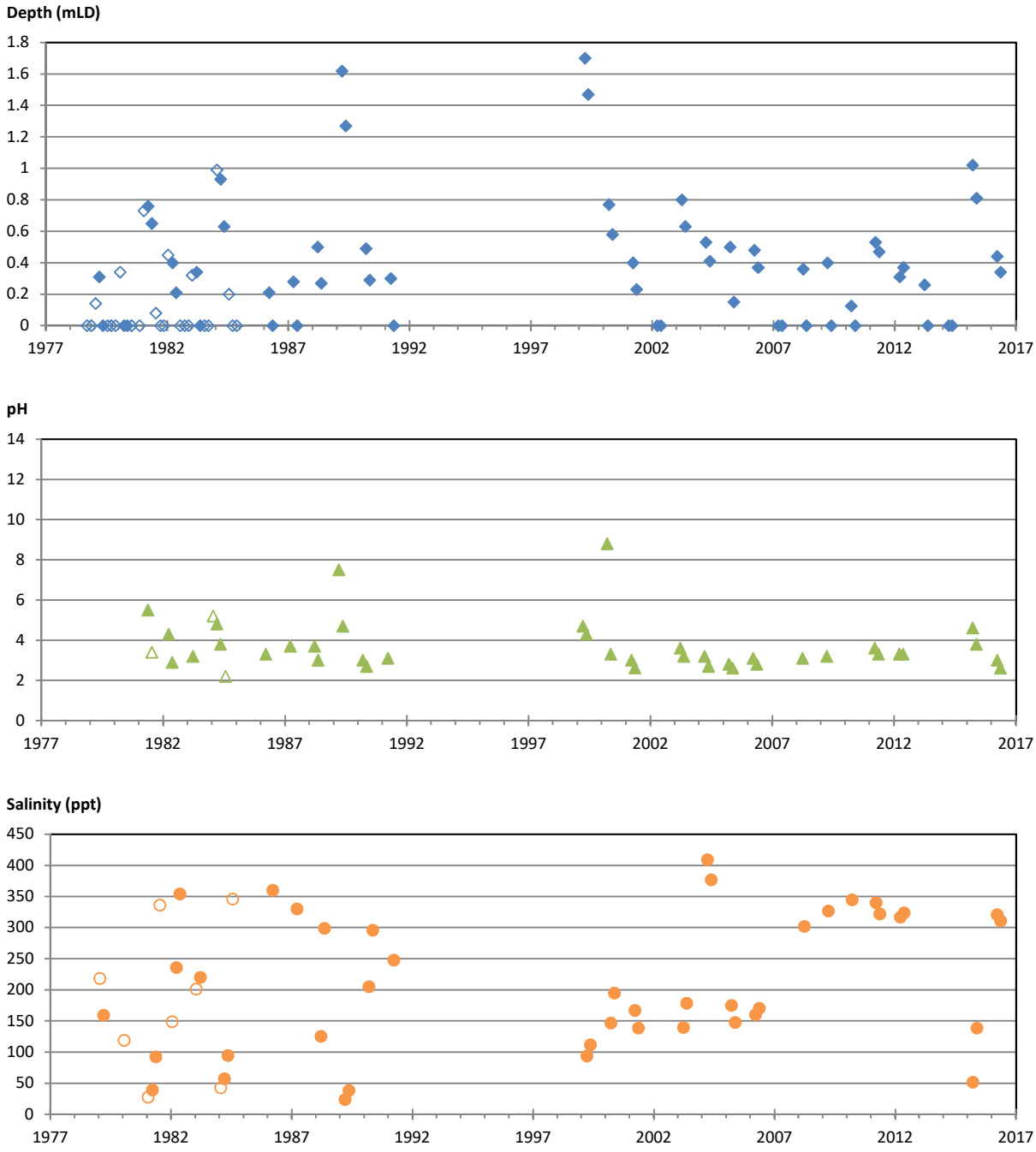
Notes:

1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Byenup is a component of the 'Muir-Byenup System', which is listed as a Wetland of International Importance under the 'Ramsar' Convention on Wetlands, and is also part of the 'Byenup Lagoon System' listed in the 'Directory of Important Wetlands in Australia'.

Byenup is within the former Muir-Unicup Natural Diversity Recovery Catchment and is in the Donnelly District (headquartered in Pemberton) of the Warren DBCA Region.

CAMPION [IM]

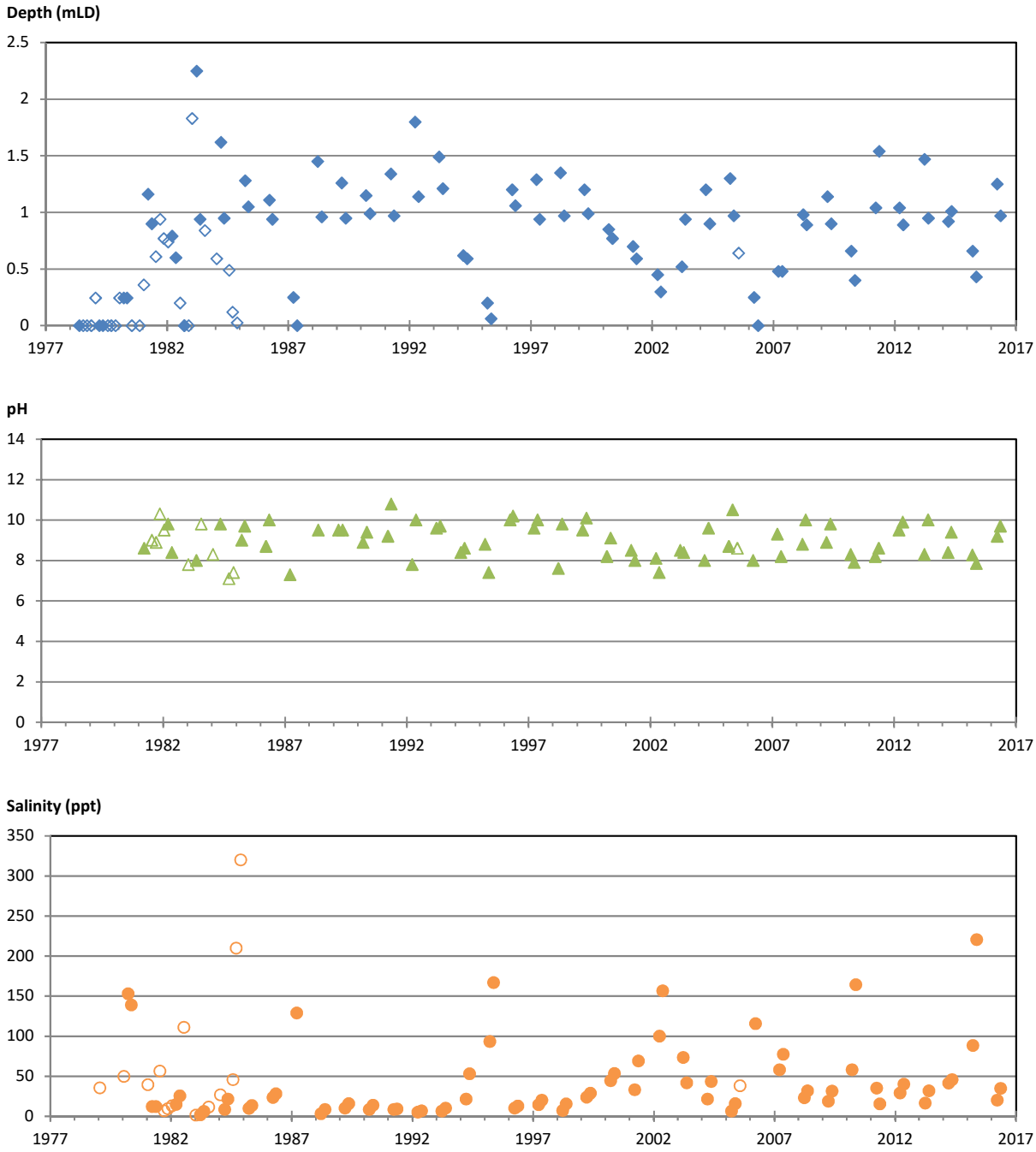


Notes:

1. [IM] indicates this is one of 25 wetlands Intensively Monitored for additional biological and physico-chemical attributes.
2. Year labels are positioned at 1st July each year.
3. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Campion is in the Central District (headquartered in Merredin) of the Wheatbelt DBCA Region.

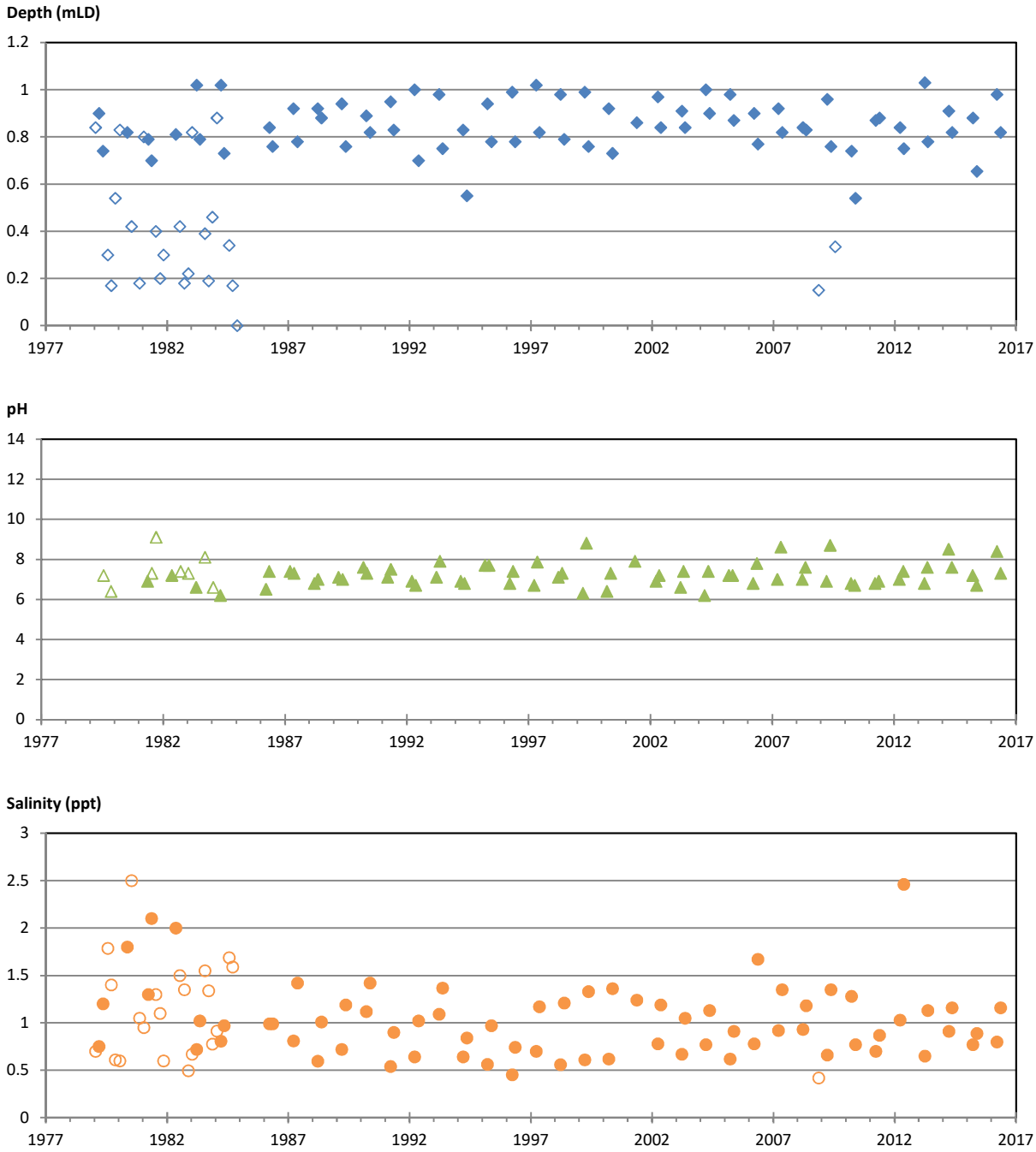
CASUARINA



Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Casuarina is in the Southern Wheatbelt geographical area (headquartered in Narrogin) of the Wheatbelt DBCA Region.

CHANDALA

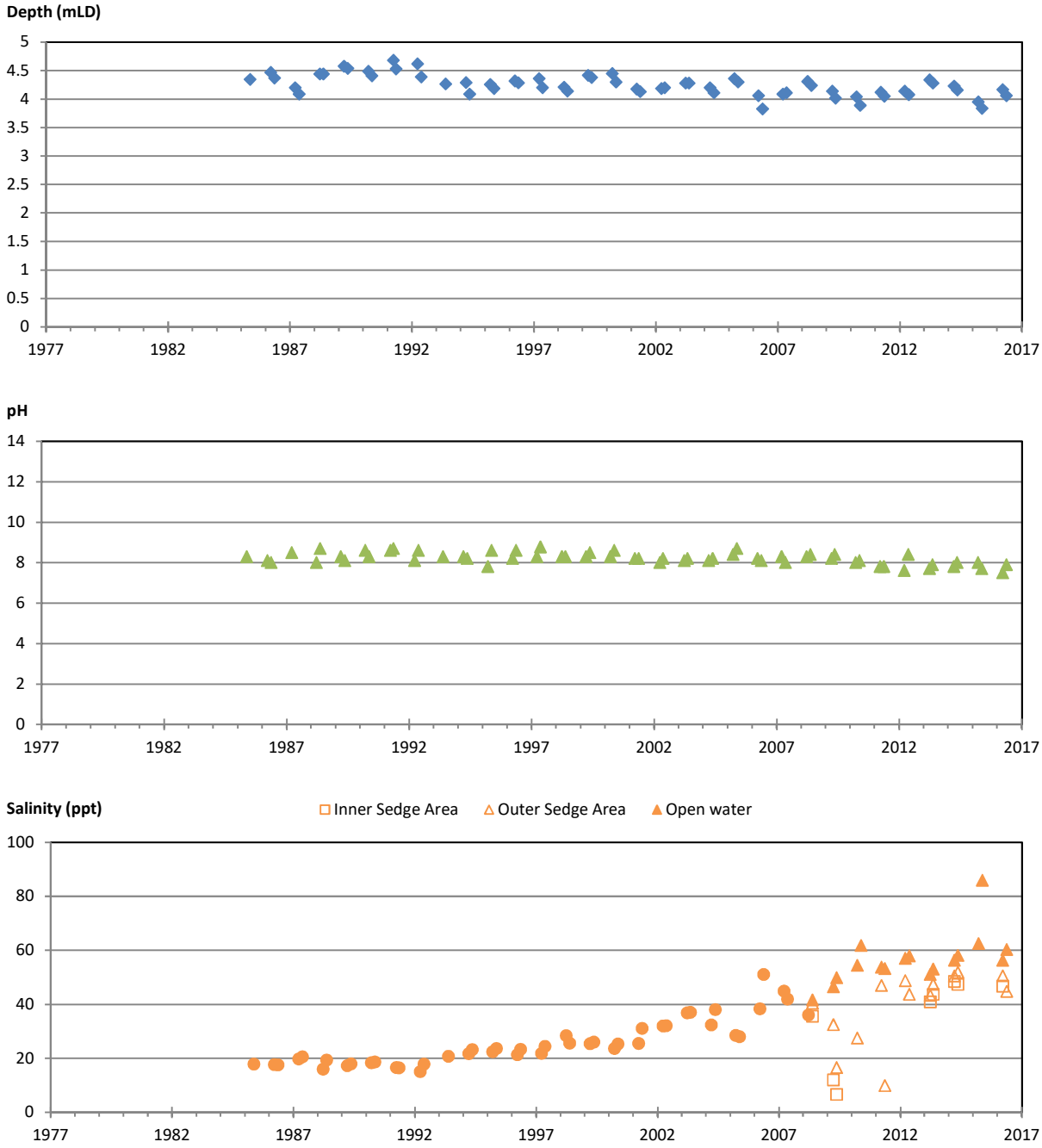


Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Chandala Swamp is listed in the 'Directory of Important Wetlands in Australia'.

Chandala is in the Perth Hills District (headquartered in Mundaring) of the Swan DBCA Region.

CLIFTON (with Depth axis 0-5m)



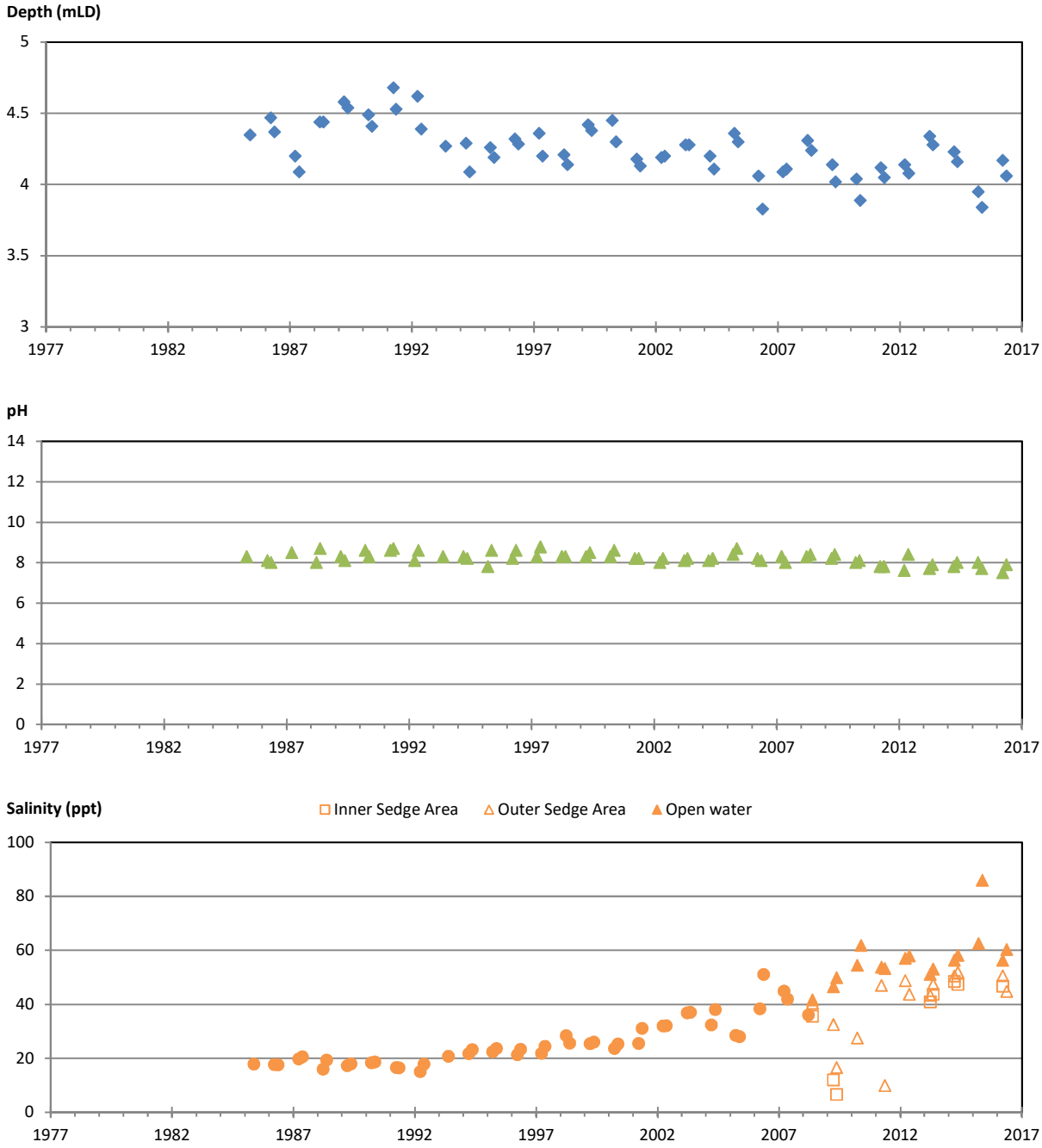
Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from September and November routine monitoring periods only.

Clifton is a component of the 'Peel-Yalgorup System', which is listed as a Wetland of International Importance under the 'Ramsar' Convention on Wetlands.

Clifton is also a component of the 'Yalgorup Lakes System', which is listed in the 'Directory of Important Wetlands in Australia'.

Clifton is in the Swan Coastal District (headquartered in Wanneroo) of the Swan DBCA Region.

CLIFTON (with Depth axis 3-5m)



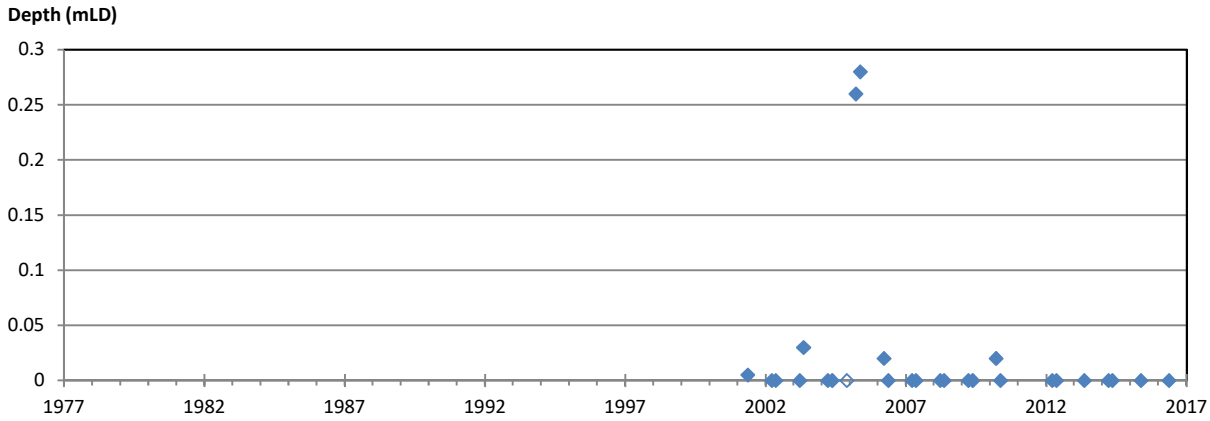
Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from September and November routine monitoring periods only.

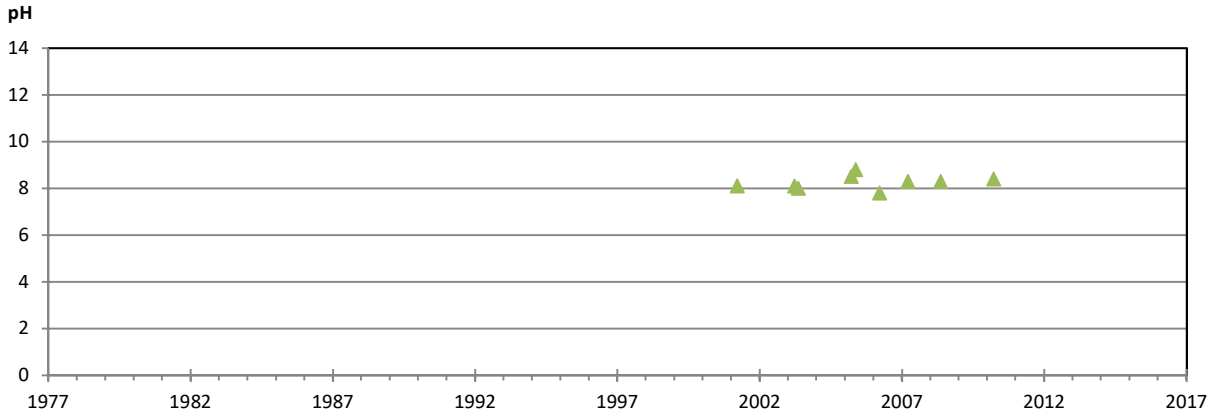
Clifton is a component of the 'Peel-Yalgorup System', which is listed as a Wetland of International Importance under the 'Ramsar' Convention on Wetlands.

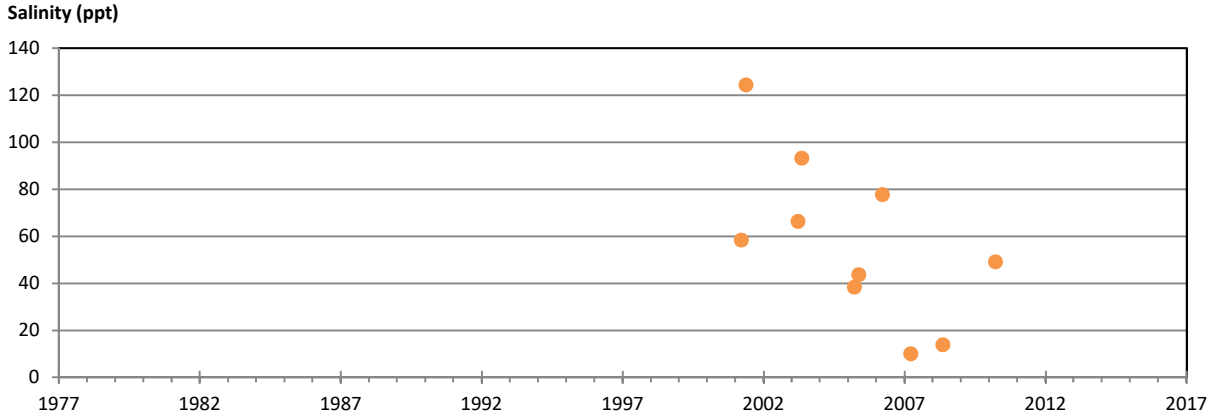
Clifton is also a component of the 'Yalgorup Lakes System', which is listed in the 'Directory of Important Wetlands in Australia'.

Clifton is in the Swan Coastal District (headquartered in Wanneroo) of the Swan DBCA Region.

COLLETS ROAD



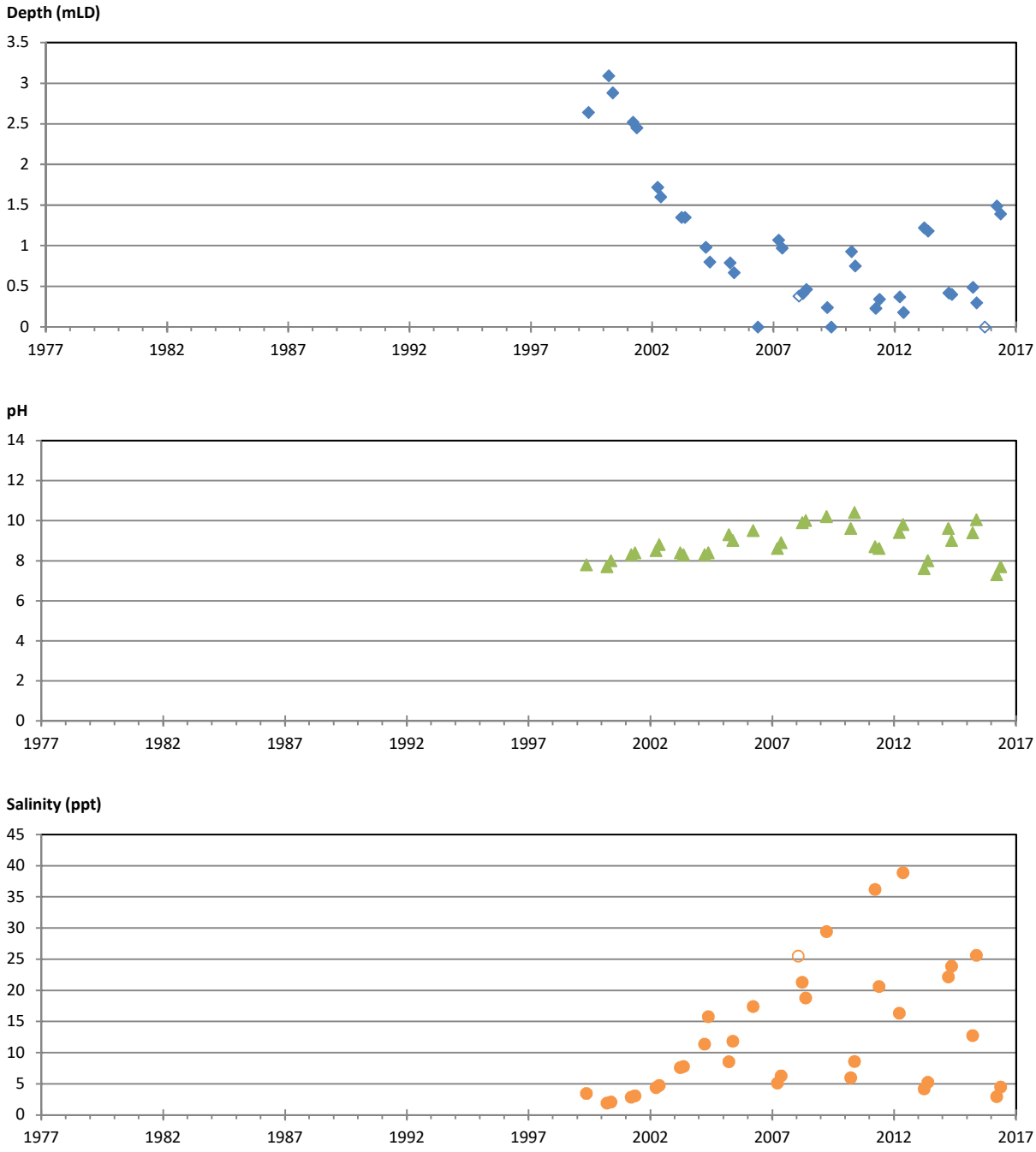




Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from September and November routine monitoring periods only.

Colletts Road Swamp is in the Albany District of the South Coast DBCA Region

COOMALBIDGUP [IM]

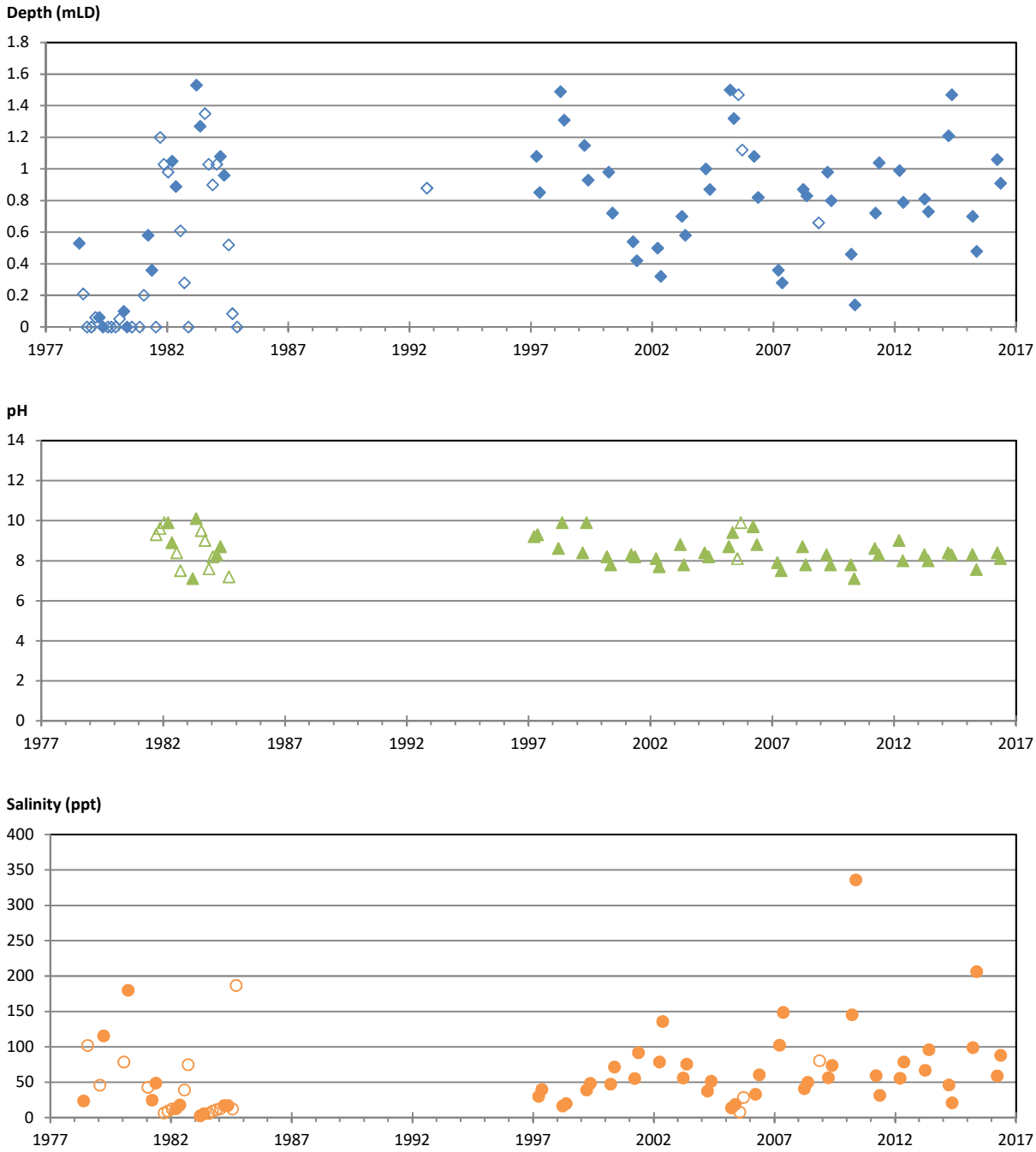


Notes:

1. [IM] indicates this is one of 25 wetlands Intensively Monitored for additional biological and physico-chemical attributes.
2. Year labels are positioned at 1st July each year.
3. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Coomalbidgup is in the Esperance District of the South Coast DBCA Region.

COOMELBERRUP [IM]

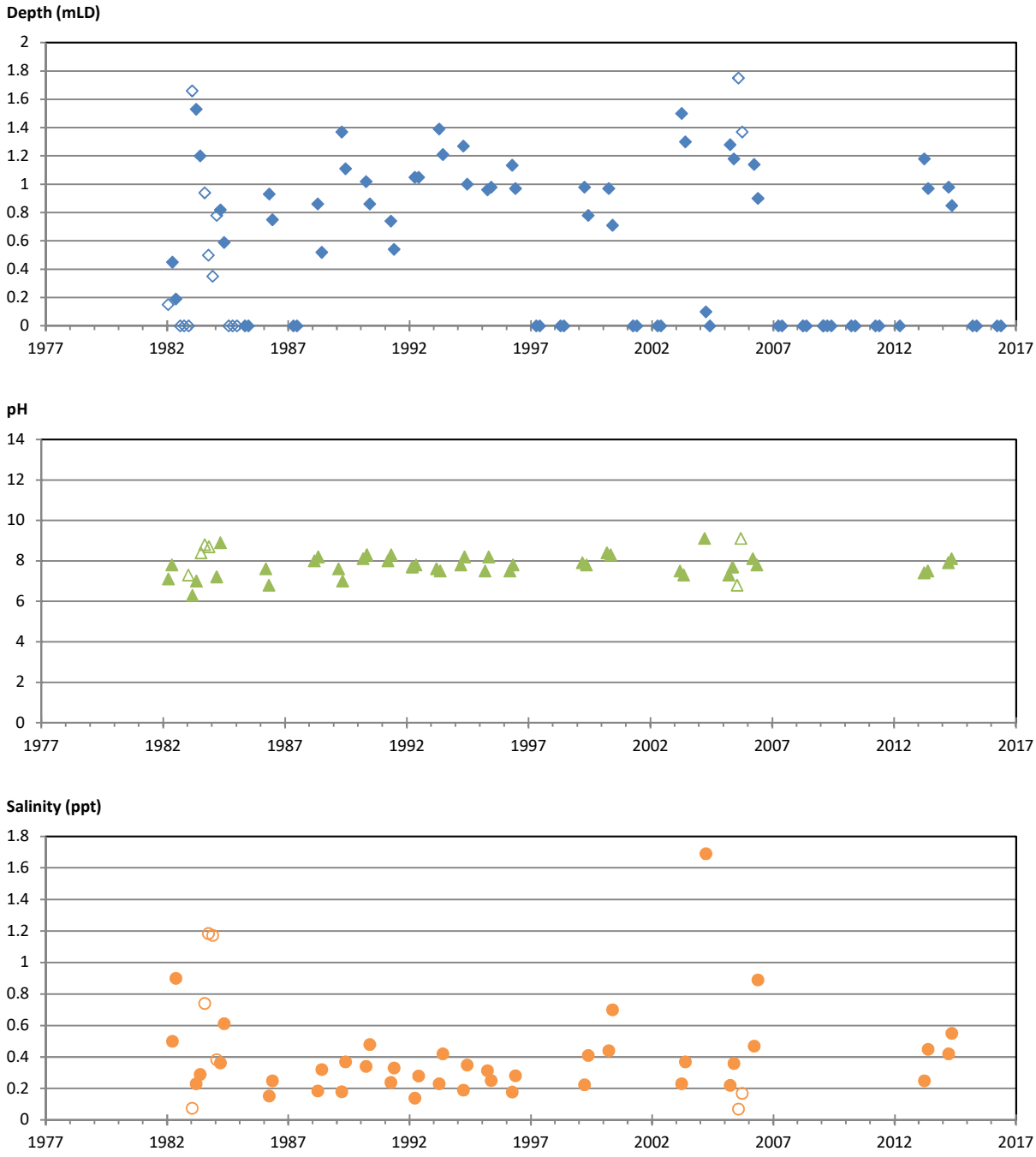


Notes:

1. [IM] indicates this is one of 25 wetlands Intensively Monitored for additional biological and physico-chemical attributes.
2. Year labels are positioned at 1st July each year.
3. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Coomelberrup is in the Southern Wheatbelt geographical area (headquartered in Narrogin) of the Wheatbelt DBCA Region.

CORRIGIN 12900 IM



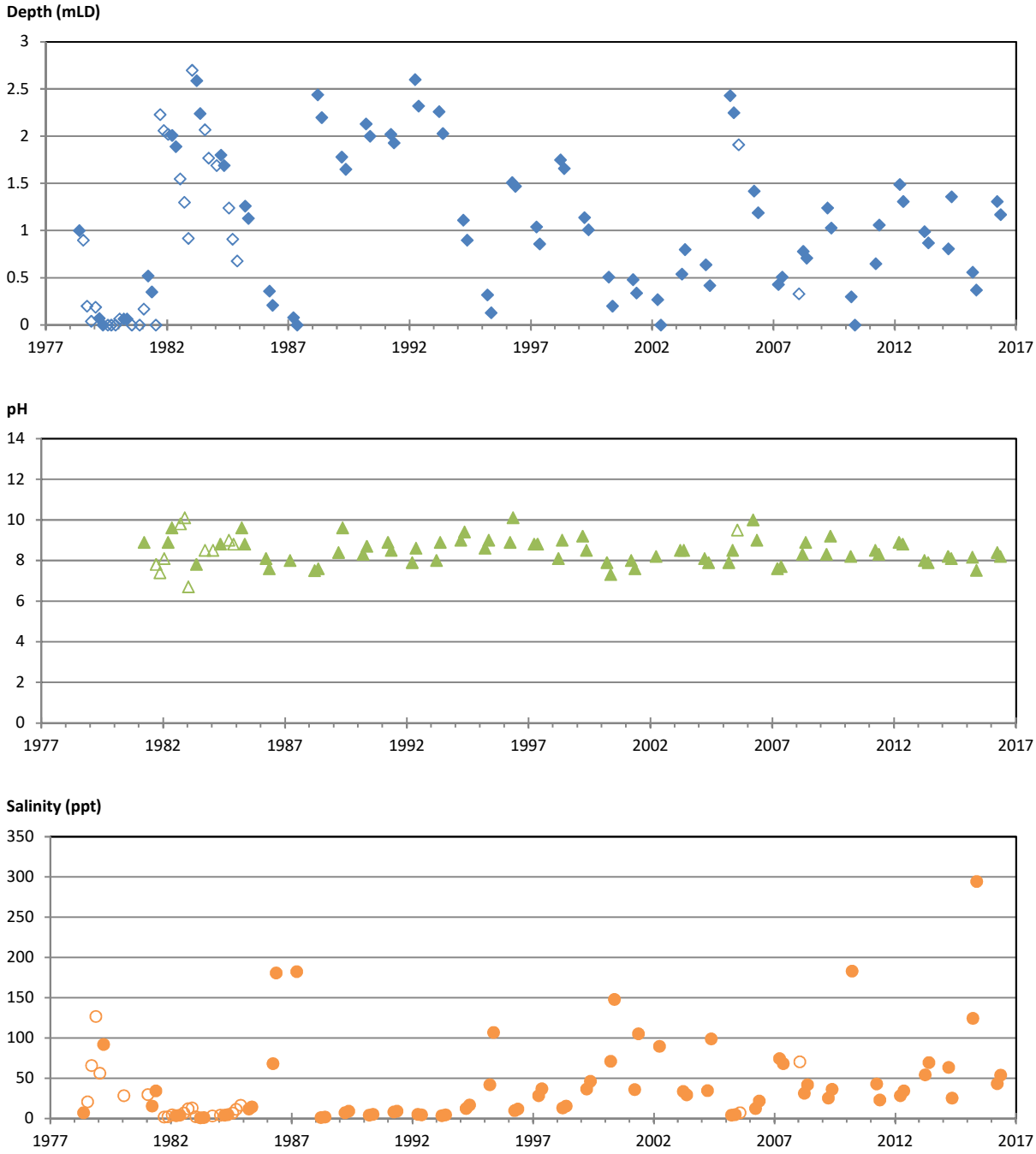
Notes:

1. IM indicates this is one of 25 wetlands Intensively Monitored for additional biological and physico-chemical attributes.
2. Year labels are positioned at 1st July each year.
3. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Corrigin 12900 (also known as Paperbark Swamp) has been nominated for listing in the 'Directory of Important Wetlands in Australia' (Elscot *et al.* 2009).

Corrigin 12900 is in the Southern Wheatbelt geographical area (headquartered in Narrogin) of the Wheatbelt DBCA Region.

COYRECUP [IM]



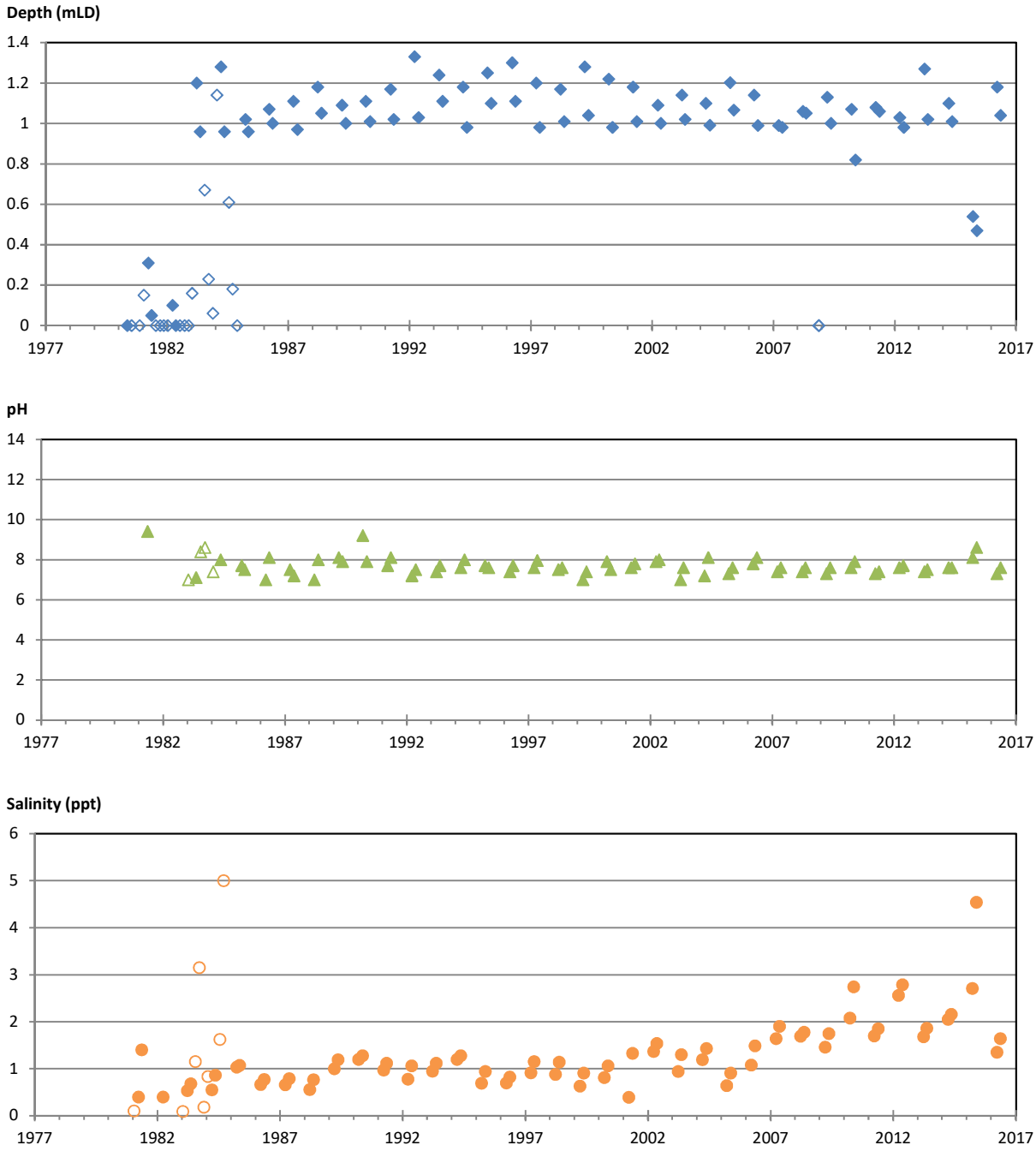
Notes:

1. [IM] indicates this is one of 25 wetlands Intensively Monitored for additional biological and physico-chemical attributes.
2. Year labels are positioned at 1st July each year.
3. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Coyrecup Lake is listed in the 'Directory of Important Wetlands in Australia'.

Coyrecup is in the Southern Wheatbelt geographical area (headquartered in Narrogin) of the Wheatbelt DBCA Region.

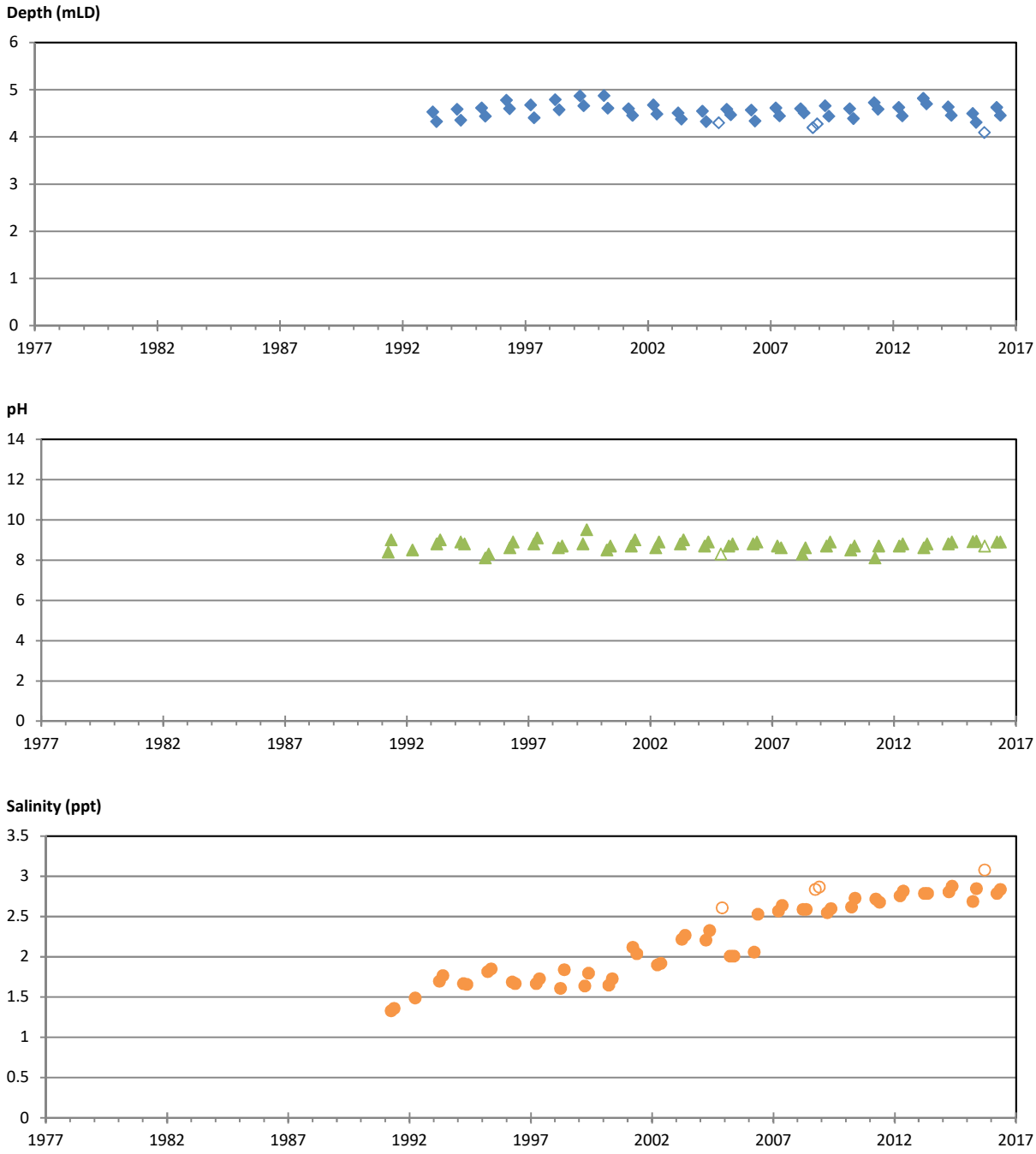
CRACKERS



Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Crackers is in the Moora District (headquartered in Jurien Bay) of the Midwest DBCA Region.

DAVIES (with Depth axis 0-6m)

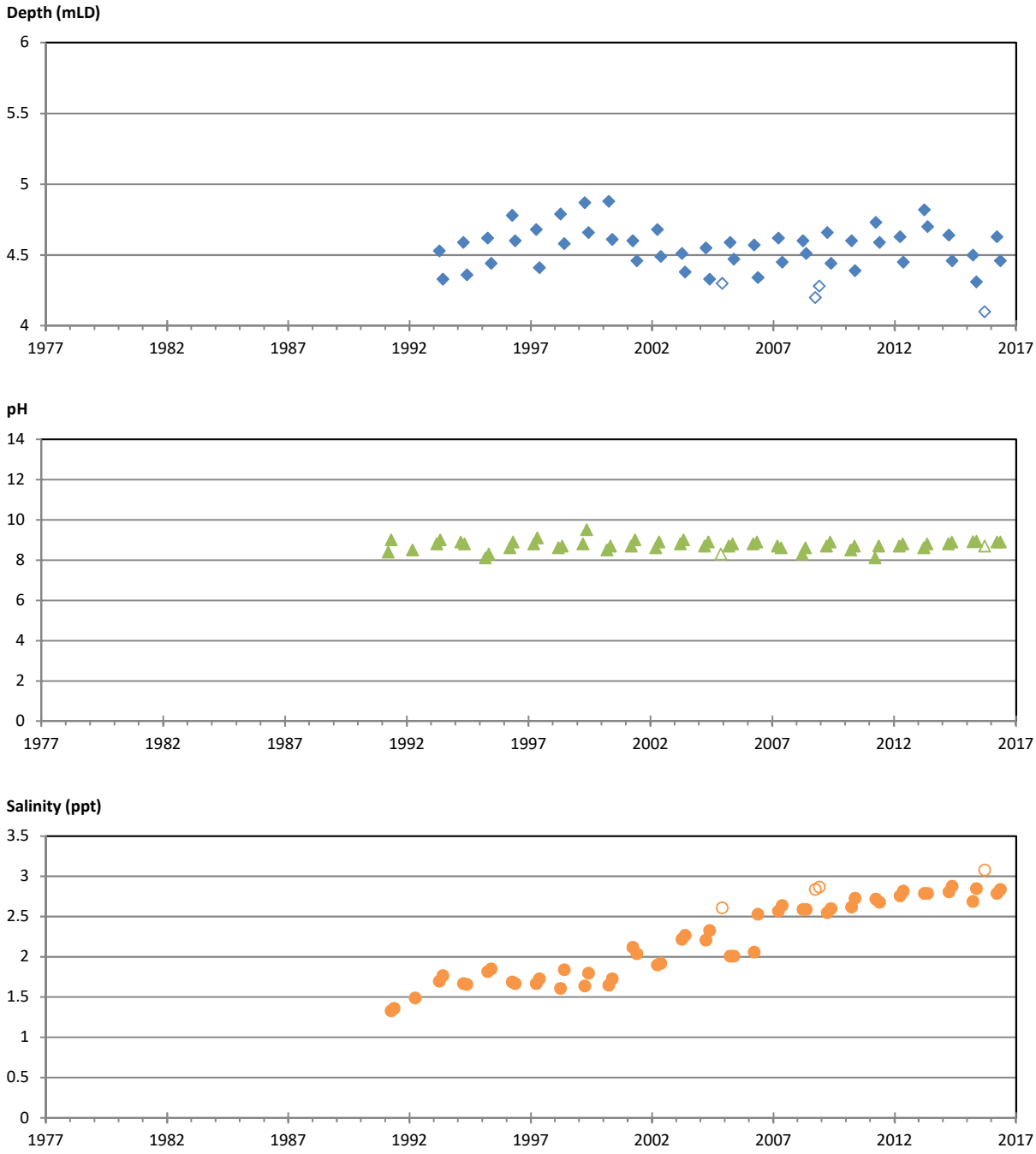


Notes:

1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Davies is in the Blackwood District (headquartered in Busselton) of the South West DBCA Region.

DAVIES (with Depth axis 4-6m)

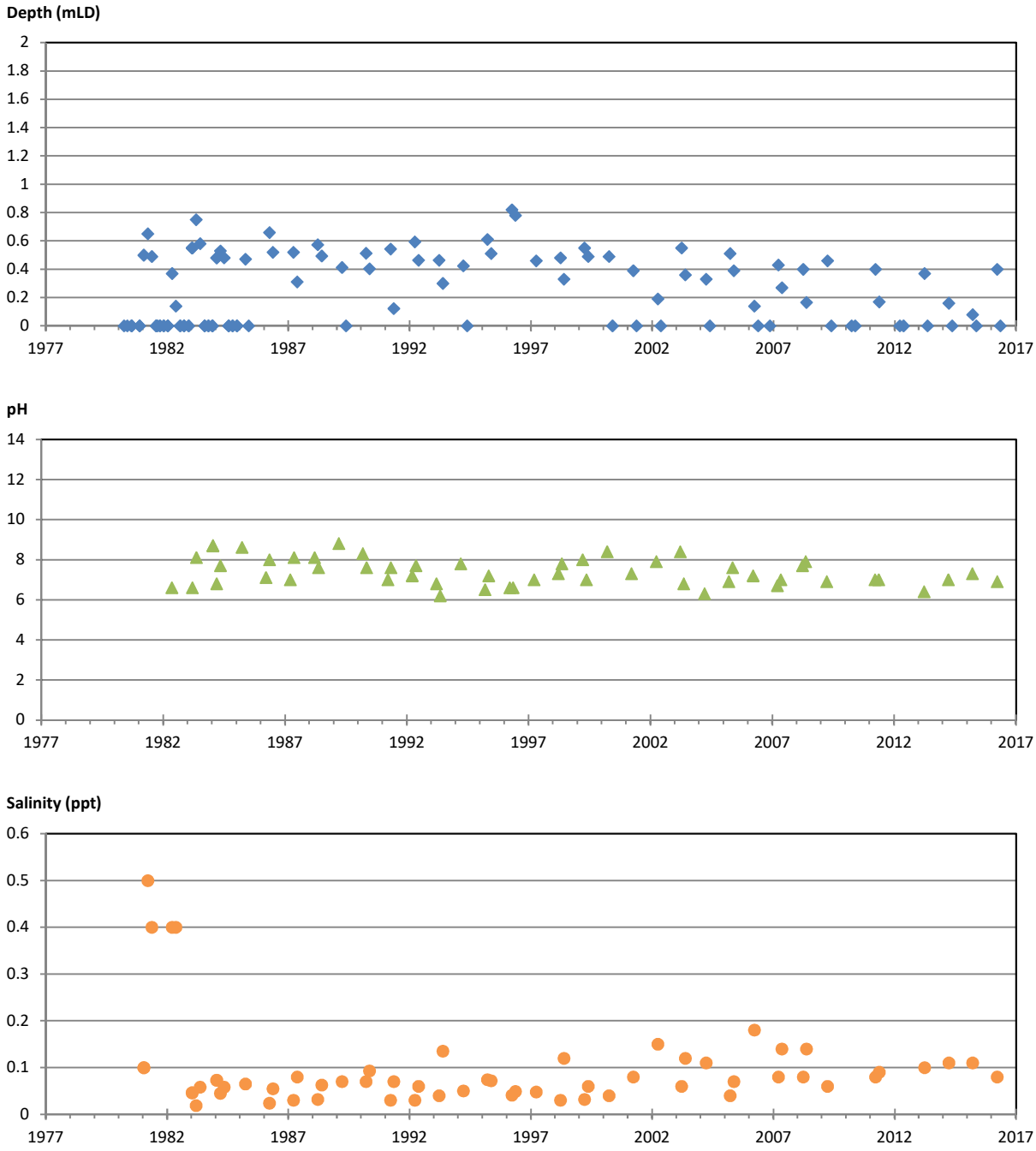


Notes:

1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Davies is in the Blackwood District (headquartered in Busselton) of the South West DBCA Region.

DOBADERRY

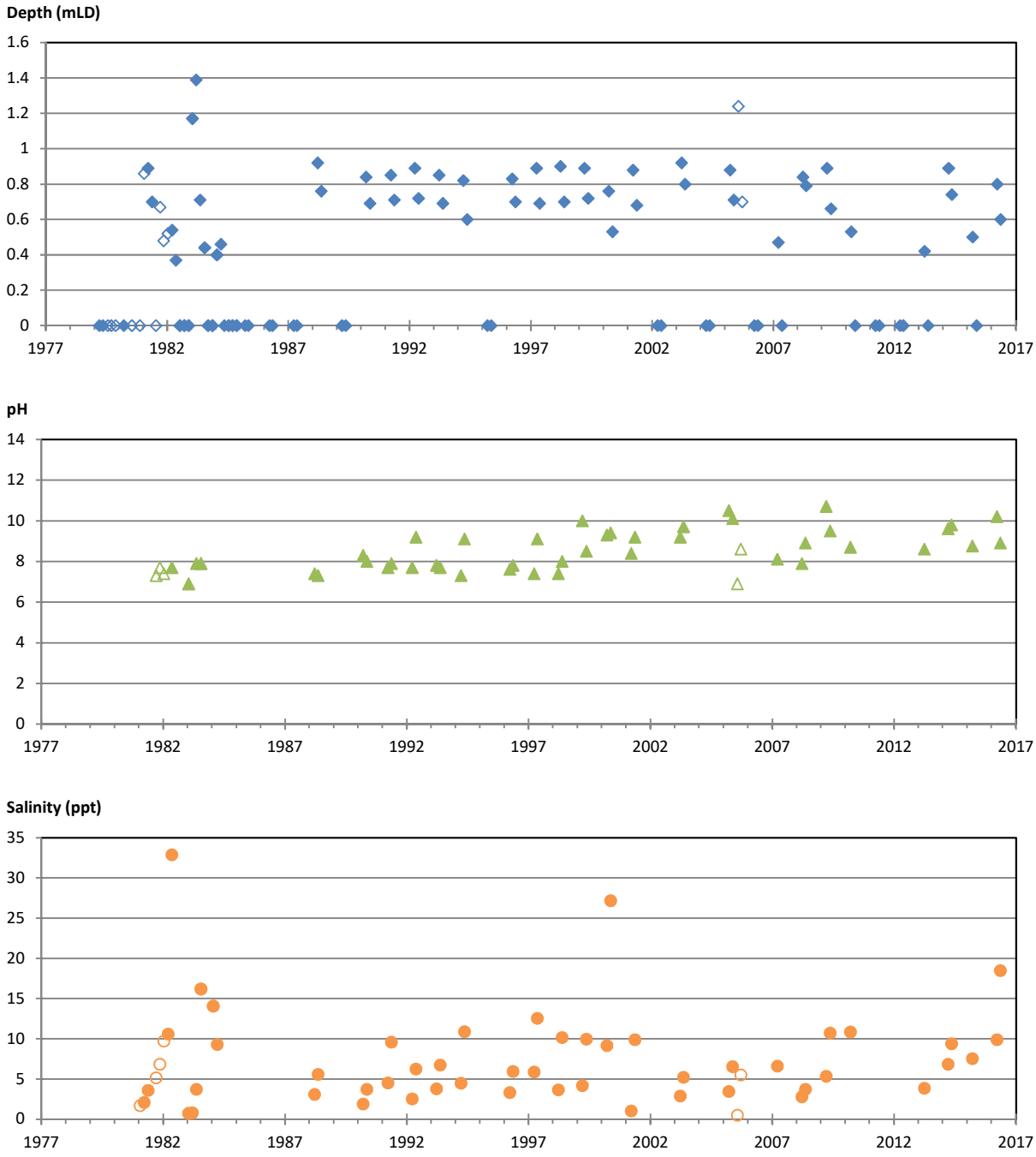


Notes:

1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Dobaderry is in the Perth Hills District (headquartered in Mundaring) of the Swan DBCA Region.

DULBINNING

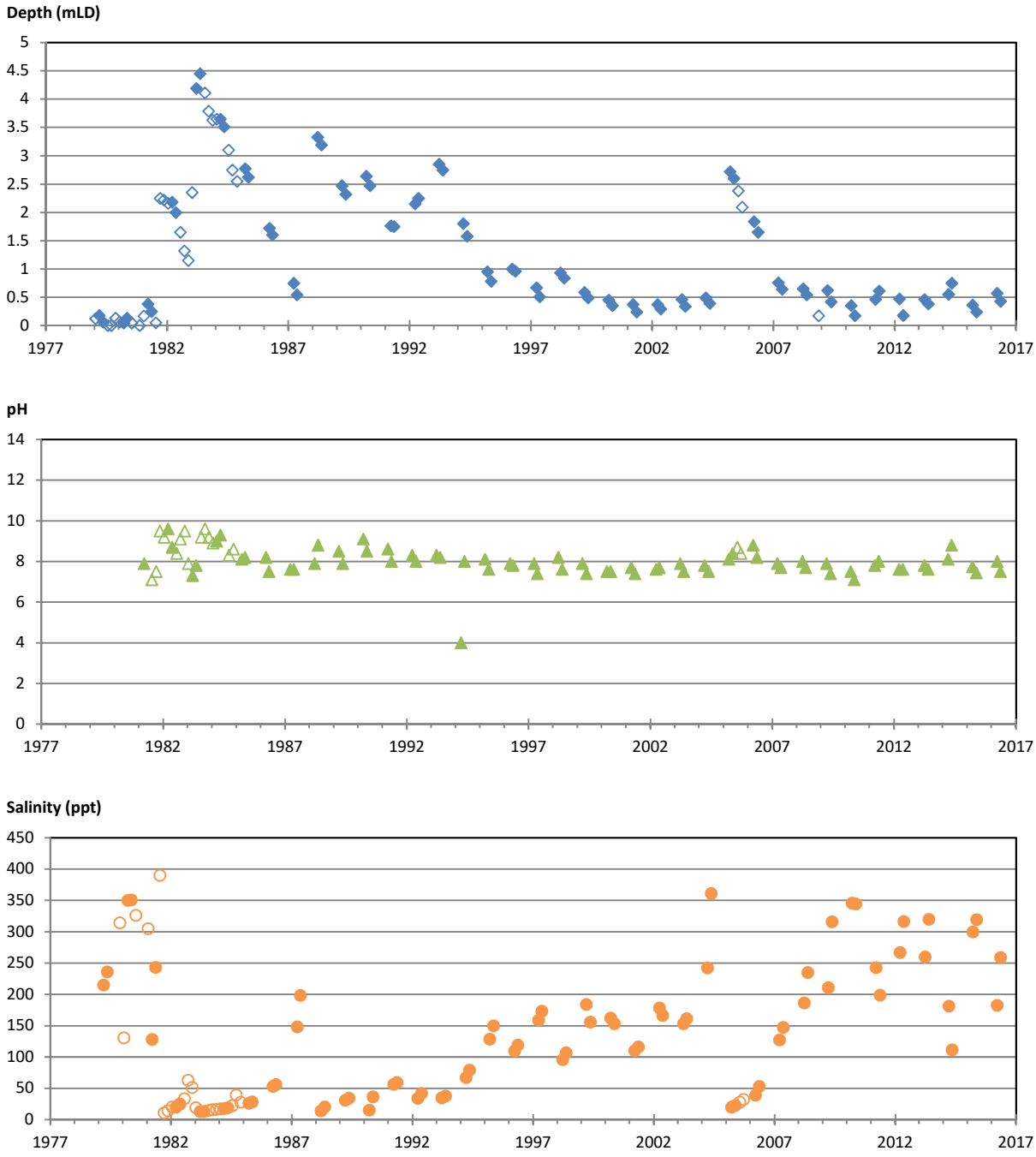


Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Dulbinning is within the Toolibin Lake Natural Diversity Recovery Catchment.

Dulbinning is in the Southern Wheatbelt geographical area (headquartered in Narrogin) of the Wheatbelt DBCA Region.

DUMBLEYUNG [IM]

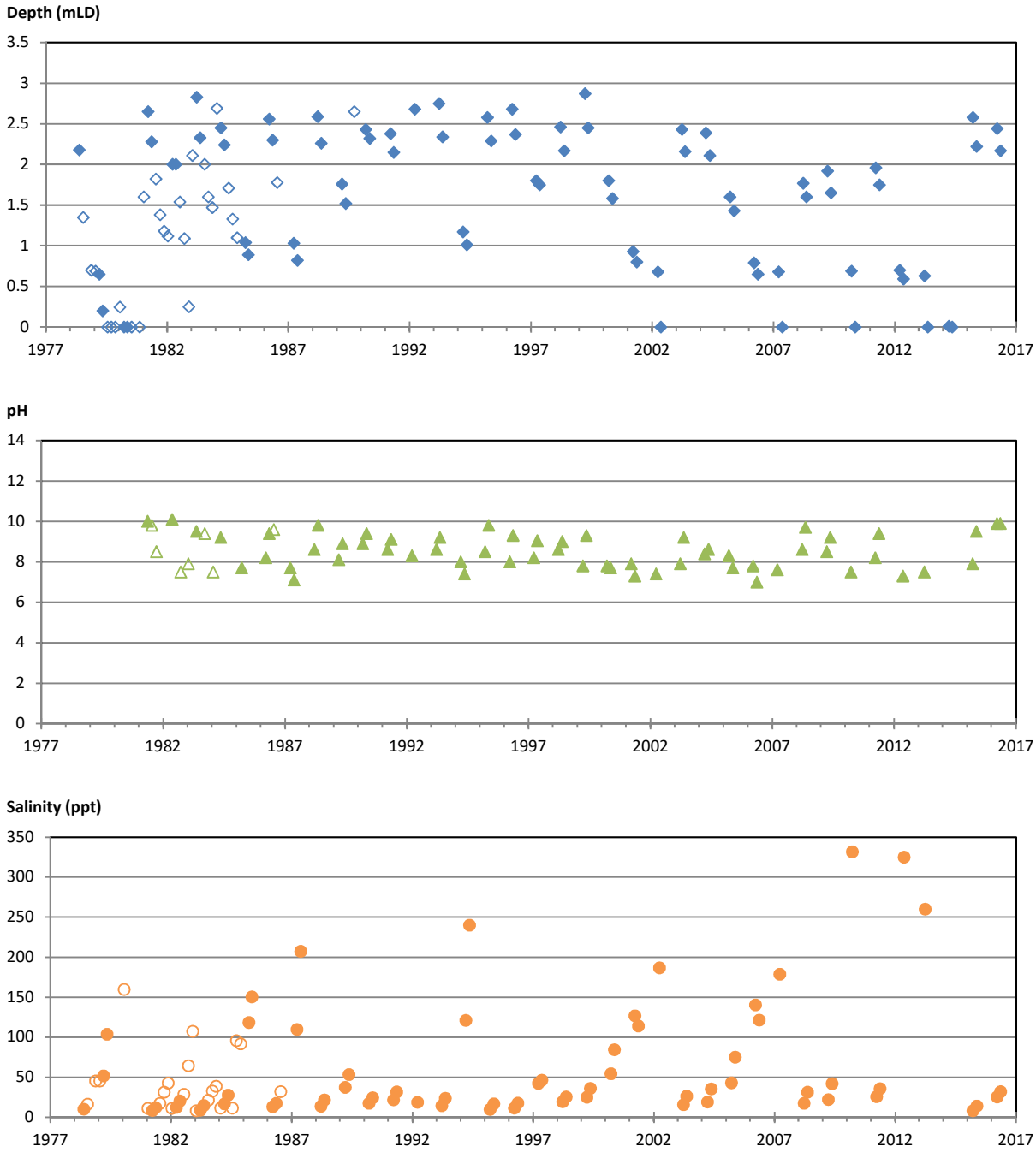


Notes:
1. [IM] indicates this is one of 25 wetlands Intensively Monitored for additional biological and physico-chemical attributes.
2. Year labels are positioned at 1st July each year.
3. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Dumbleyung Lake is listed in the 'Directory of Important Wetlands in Australia'.

Dumbleyung is in the Southern Wheatbelt geographical area (headquartered in Narrogin) of the Wheatbelt DBCA Region.

EGANU [IM]

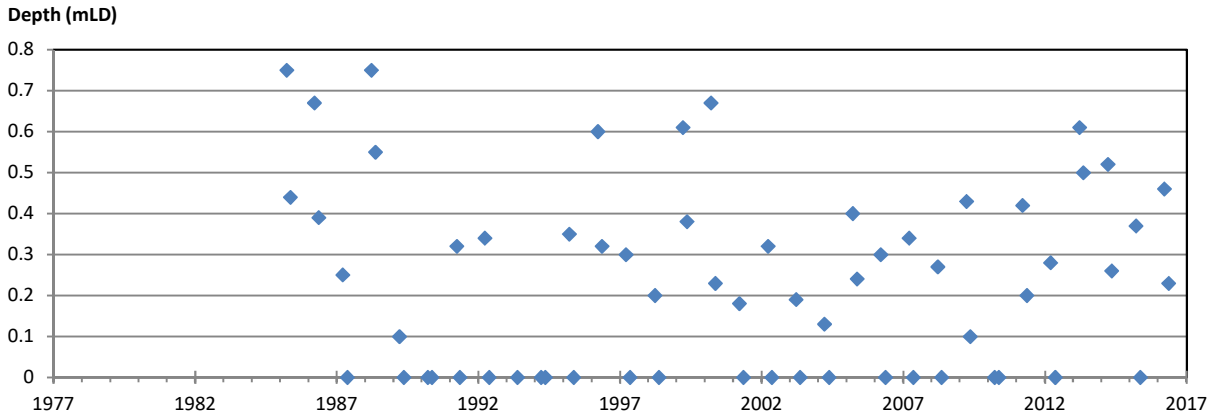


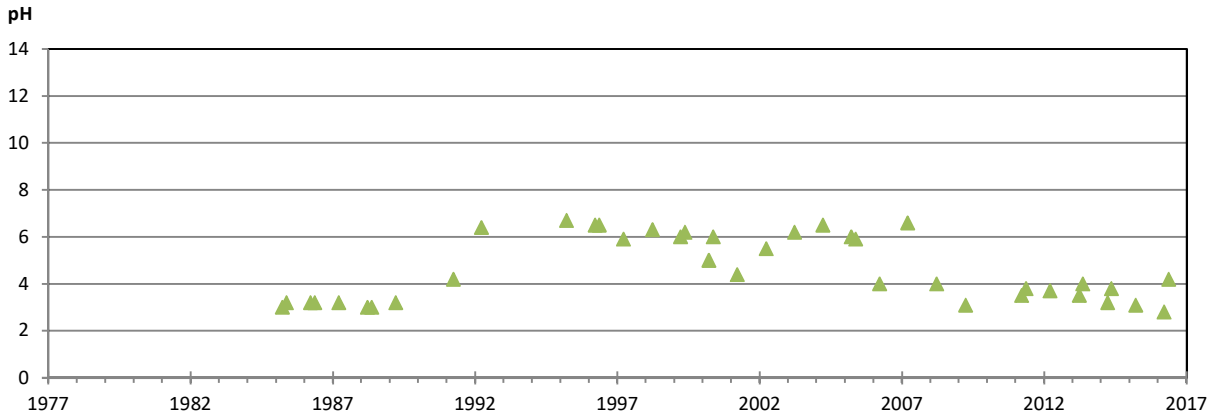
Notes:

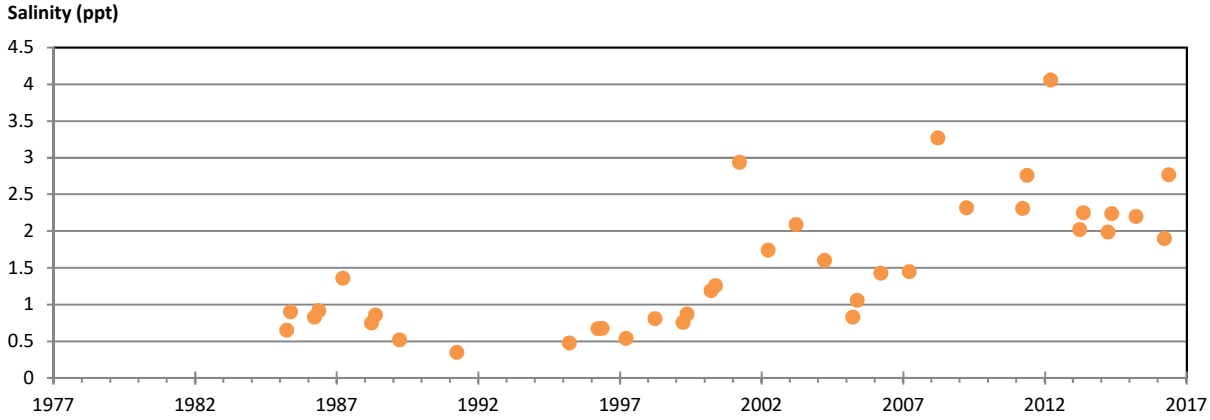
1. [IM] indicates this is one of 25 wetlands Intensively Monitored for additional biological and physico-chemical attributes.
2. Year labels are positioned at 1st July each year.
3. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Eganu is in the Moora District (headquartered in Jurien Bay) of the Midwest DBCA Region.

EGRET



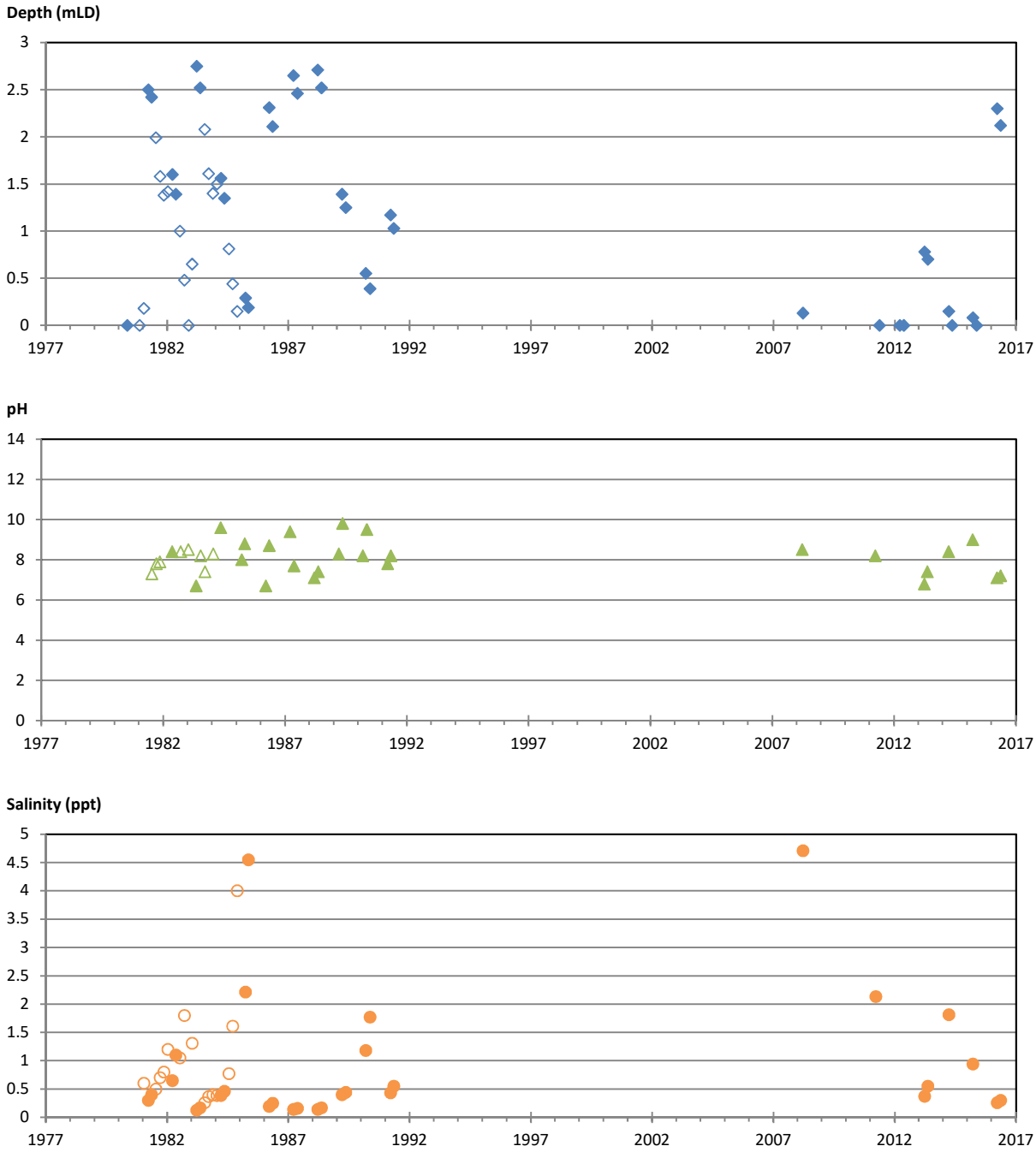




Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from September and November routine monitoring periods only.

Egret is in the Wellington District (headquartered in Collie) of the South West DBCA Region.

ENEMINGA

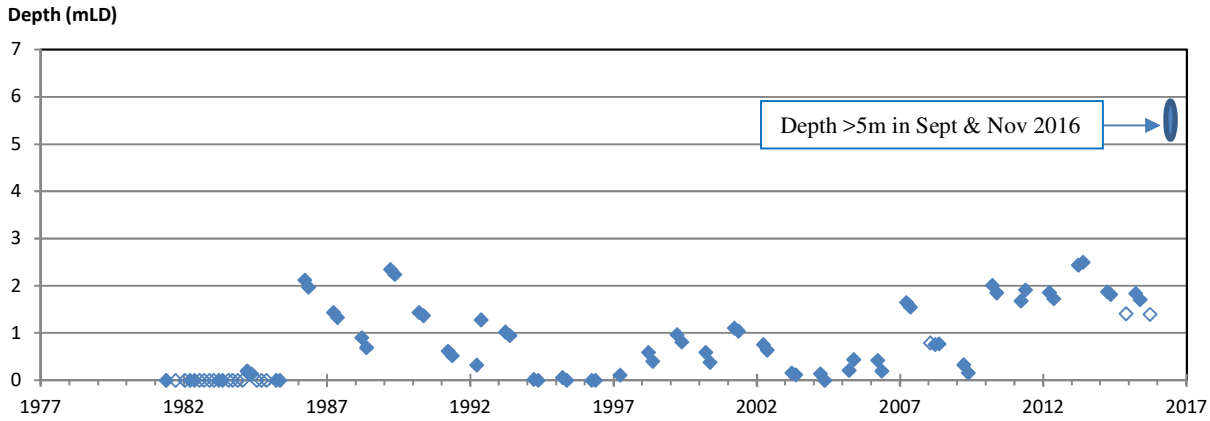


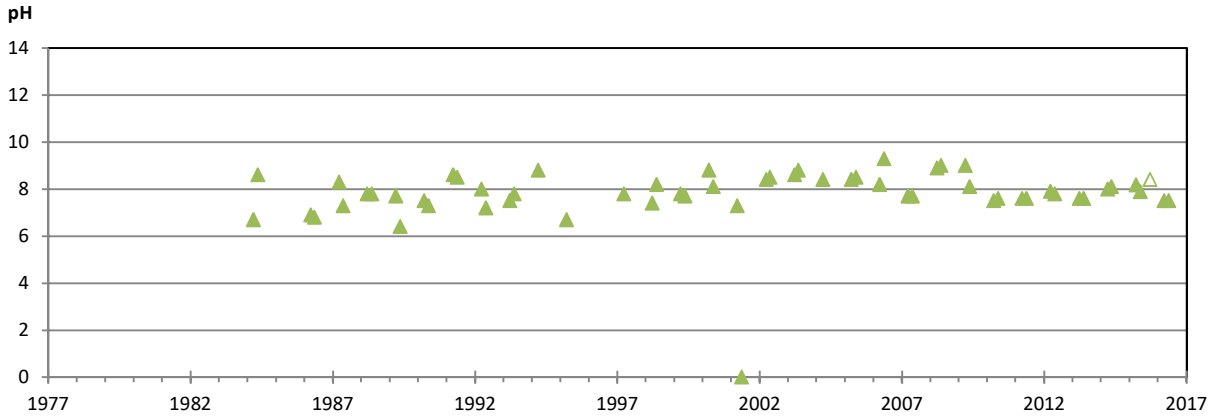
Notes:

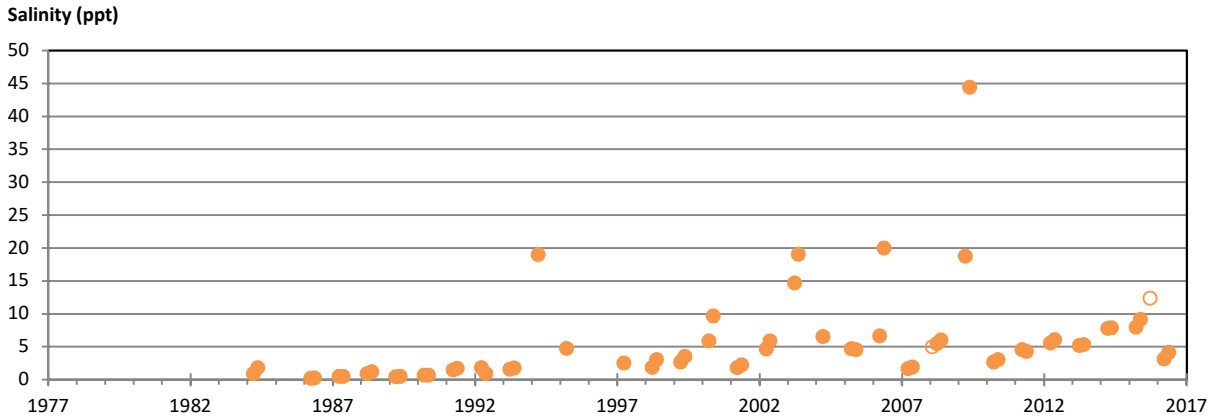
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Eneminga is in the Moora District (headquartered in Jurien Bay) of the Midwest DBCA Region.

ESPERANCE 26410



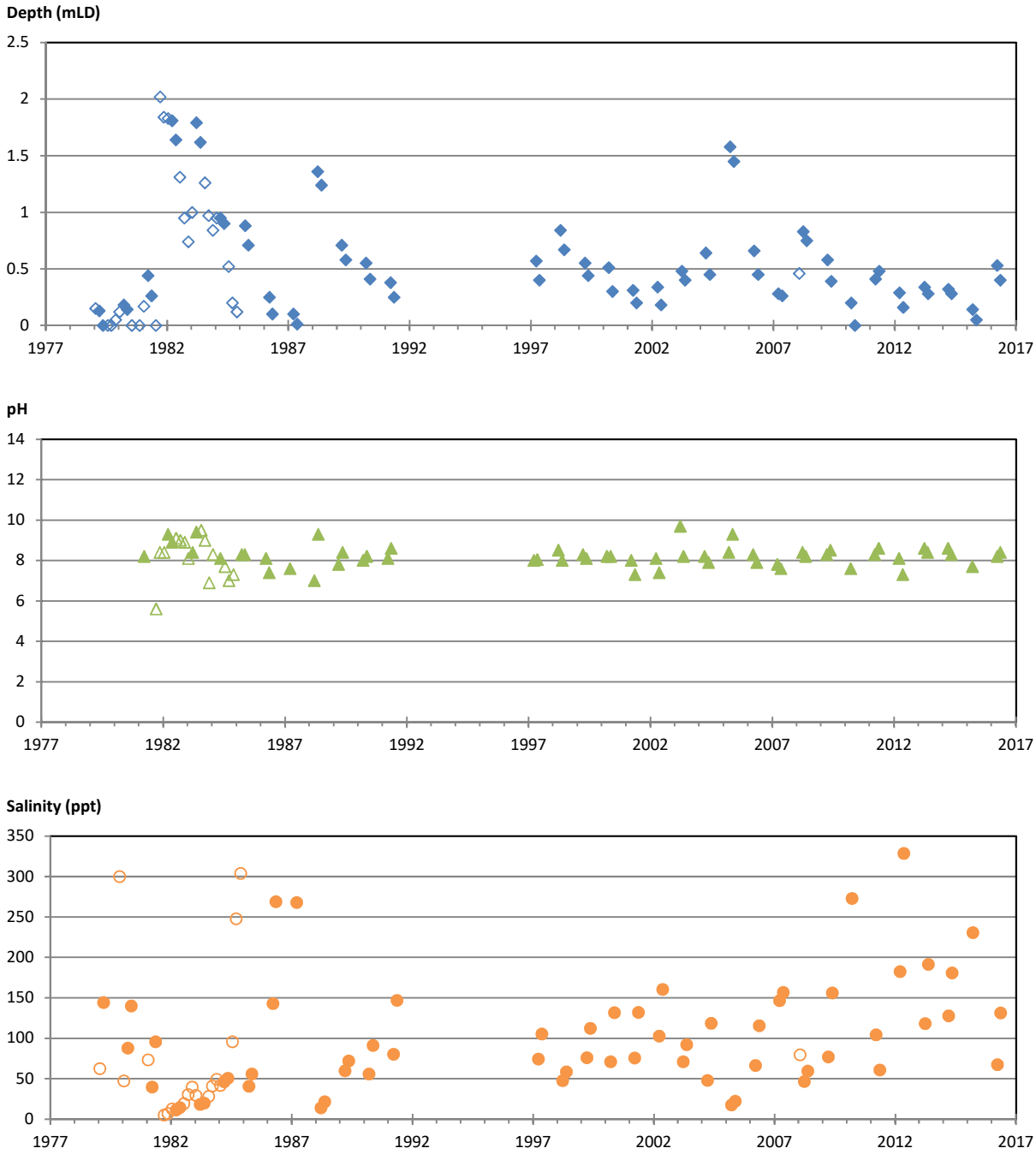




Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Esperance 26410 is in the Esperance District of the South Coast DBCA Region.

FLAGSTAFF

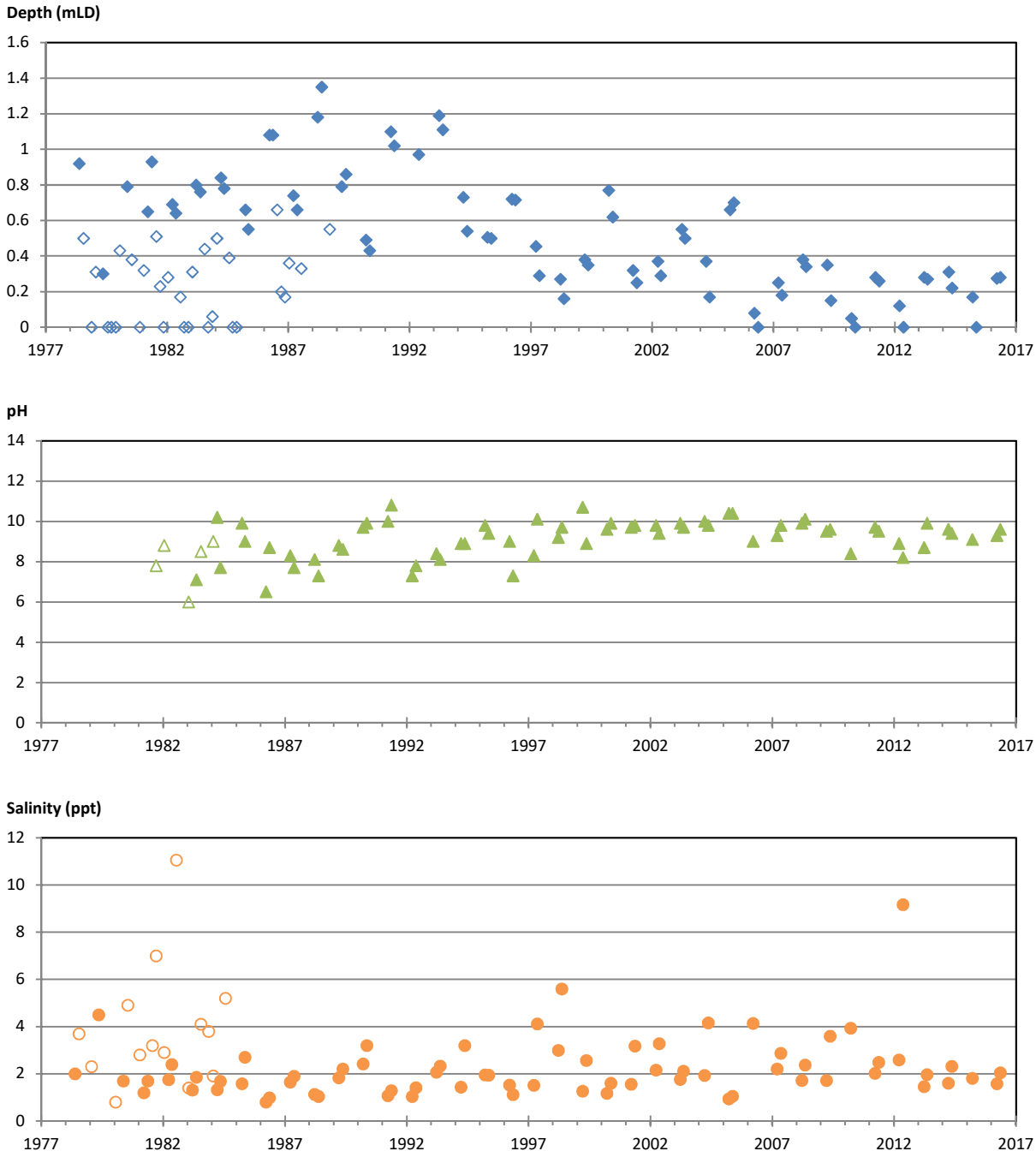


Notes:

1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Flagstaff is in the Southern Wheatbelt geographical area (headquartered in Narrogin) of the Wheatbelt DBCA Region.

FORRESTDALE



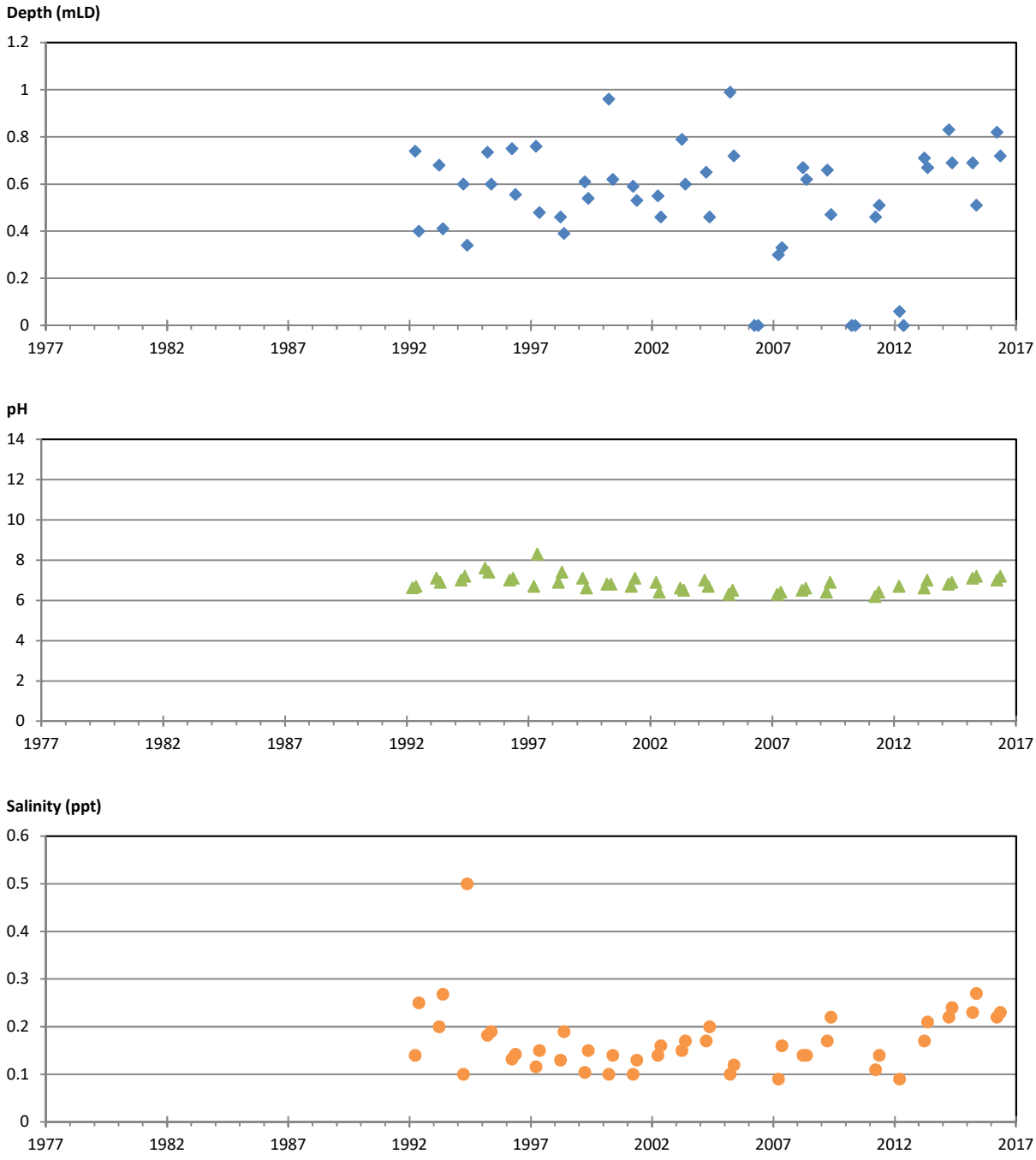
Notes:

1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.
3. Deduct 21.63m from Department of Water gauge readings to convert to SWWMP depths.

Forrestdale Lake is a component of the 'Forrestdale and Thomsons Lakes' system, which is listed as a Wetland of International Importance under the 'Ramsar' Convention on Wetlands, and is also listed in the 'Directory of Important Wetlands in Australia'.

Forrestdale is in the Swan Coastal District (headquartered in Wanneroo) of the Swan DBCA Region.

GIBBS

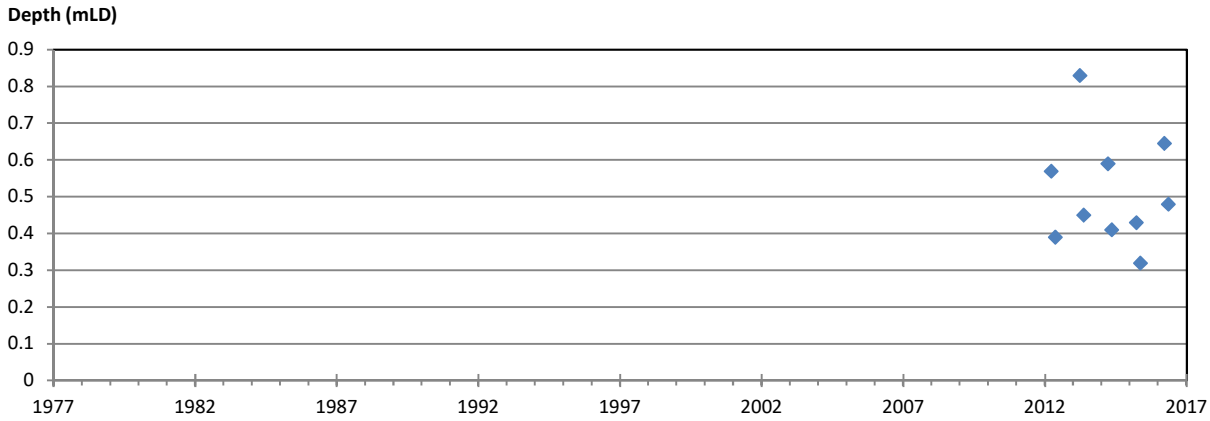


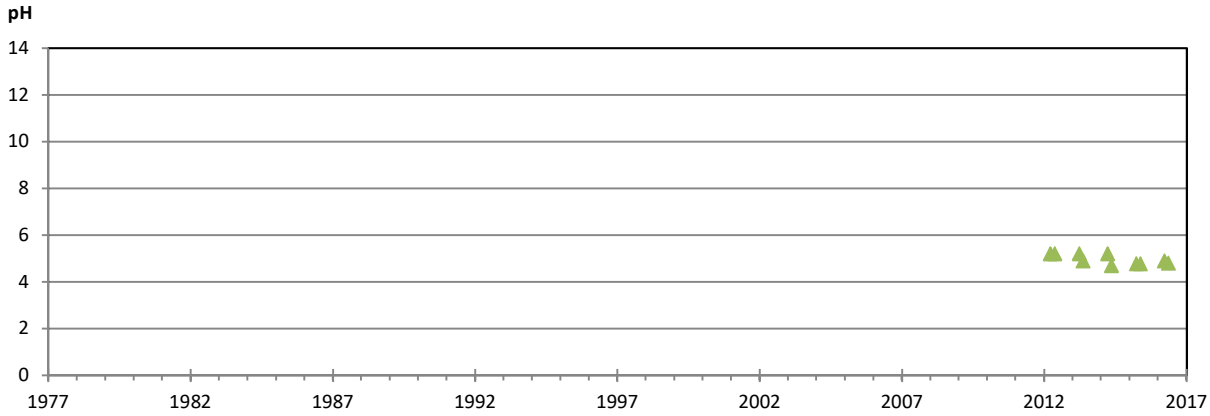
Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from September and November routine monitoring periods only.
3. Deduct 23.84m from Department of Water gauge readings to convert to SWWMP depths.

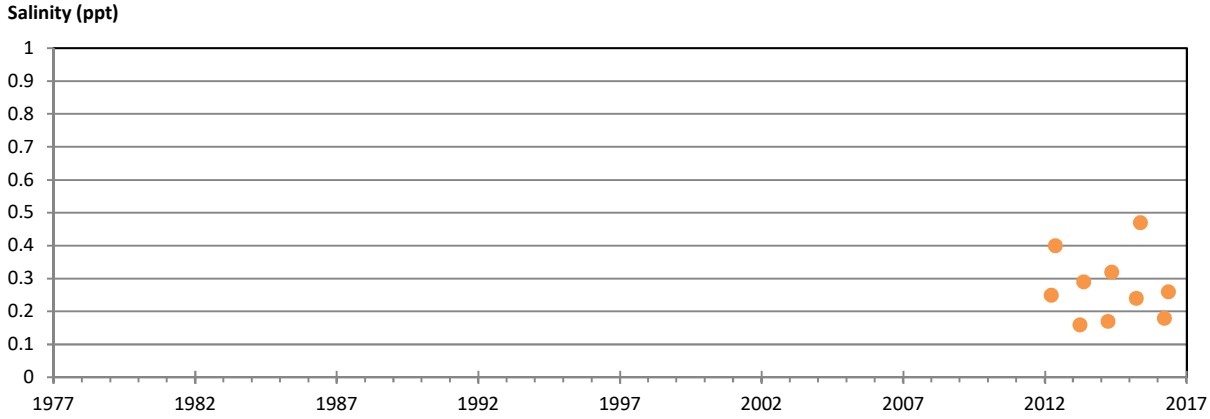
Gibbs is a component of the 'Gibbs Road Swamp System', which is listed in the 'Directory of Important Wetlands in Australia'.

Gibbs is in the Swan Coastal District (headquartered in Wanneroo) of the Swan DBCA Region.

GINGILUP





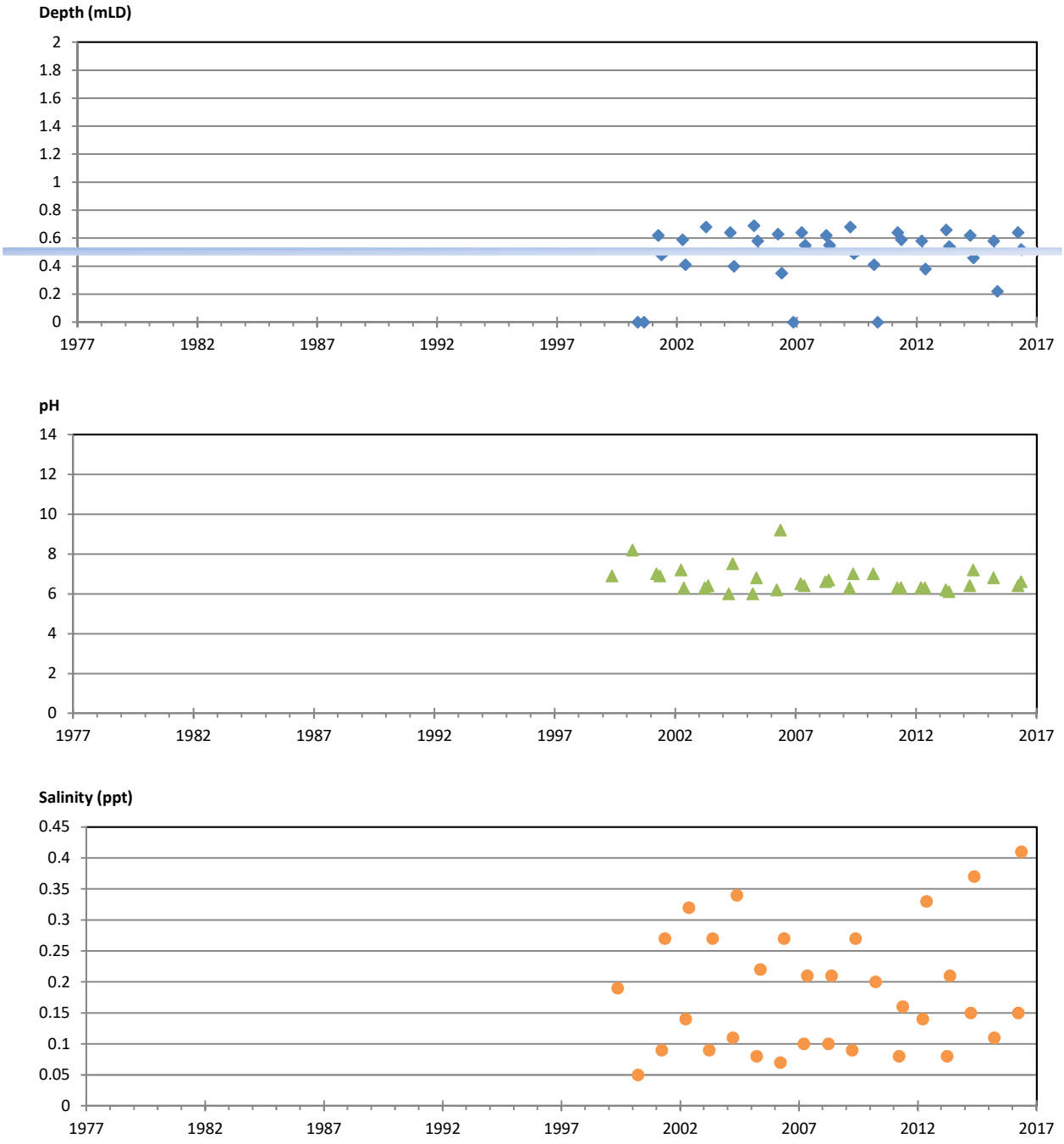


Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from September and November routine monitoring periods only.

Gingilup is a component of the 'Gingilup-Jasper Wetland System', which is listed in the 'Directory of Important Wetlands in Australia'.

Gingilup is in the Blackwood District (headquartered in Busselton) of the South West DBCA Region.

GOONAPING [IM]

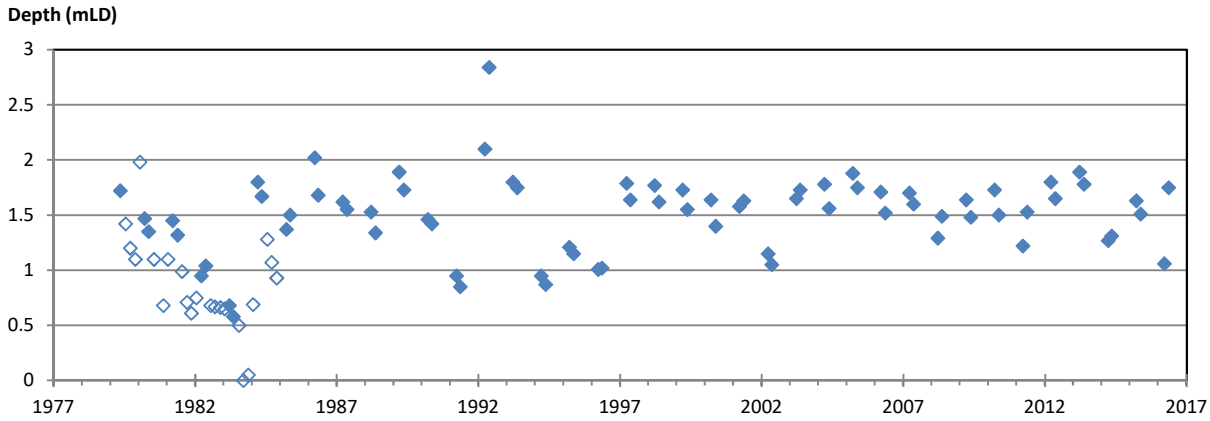


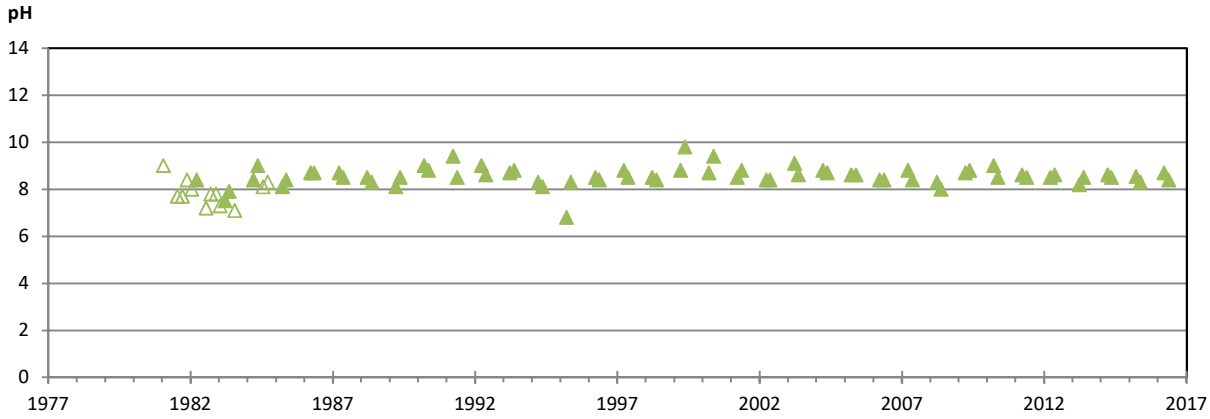
Notes:

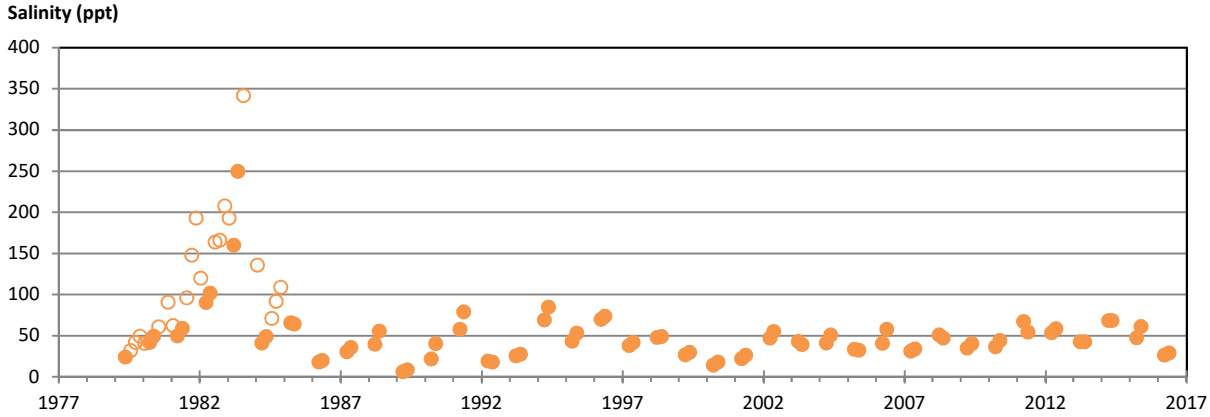
1. [IM] indicates this is one of 25 wetlands Intensively Monitored for additional biological and physico-chemical attributes.
2. Year labels are positioned at 1st July each year.
3. Data are from September and November routine monitoring periods only.
4. The Goonaping depth gauge is located in a small, and occasionally pig-populated, ≈0.50 m deep depression near the centre of the wetland. Inundation of Goonaping's extensive bed does not commence until a gauge reading of ≥ ≈ 0.50m is achieved (level determined by observation and measurement by JL on 09Nov2013).

Goonaping is in the Perth Hills District (headquartered in Mundaring) of the Swan DBCA Region.

GORE







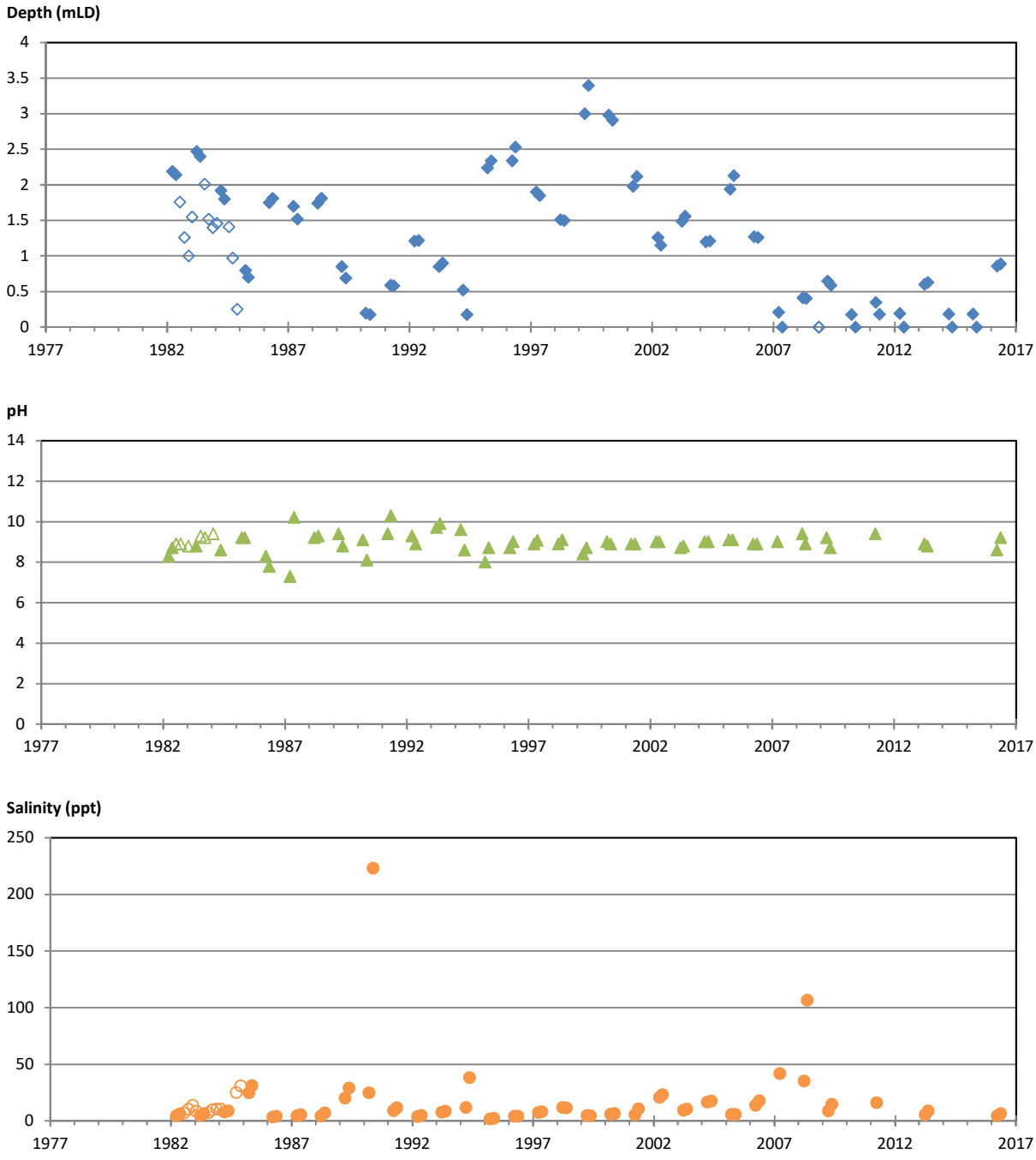
Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Lake Gore is listed as a Wetland of International Importance under the 'Ramsar' Convention on Wetlands.

Lake Gore is also a component of the 'Lake Gore System', which is listed in the 'Directory of Important Wetlands in Australia'.

Gore is in the Esperance District of the South Coast DBCA Region.

GURAGA (with Salinity axis 0–250 ppt)

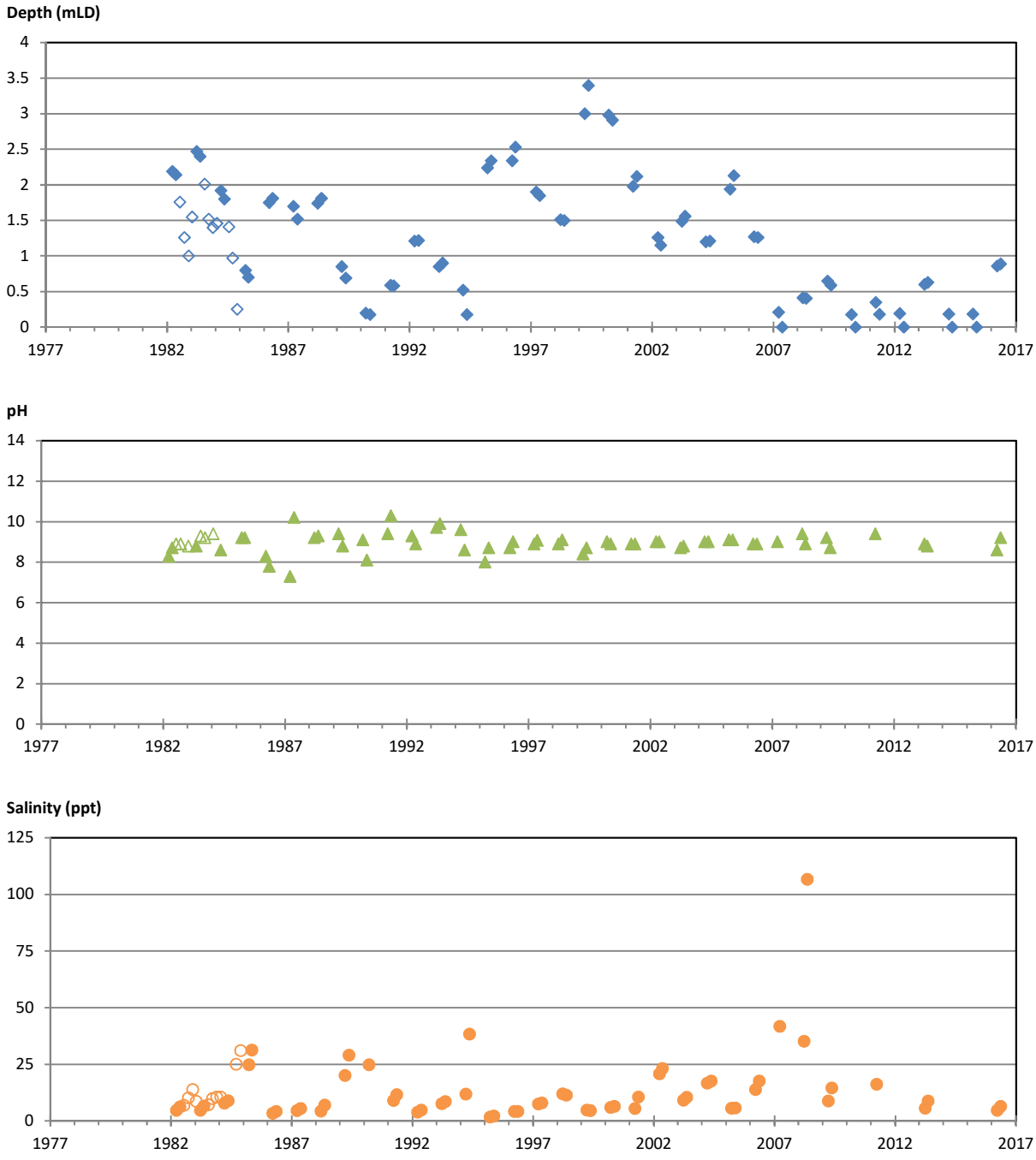


Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Guraga Lake is listed in the 'Directory of Important Wetlands in Australia'.

Guraga is in the Moora District (headquartered in Jurien Bay) of the Midwest DBCA Region.

GURAGA (with Salinity axis 0–125 ppt)

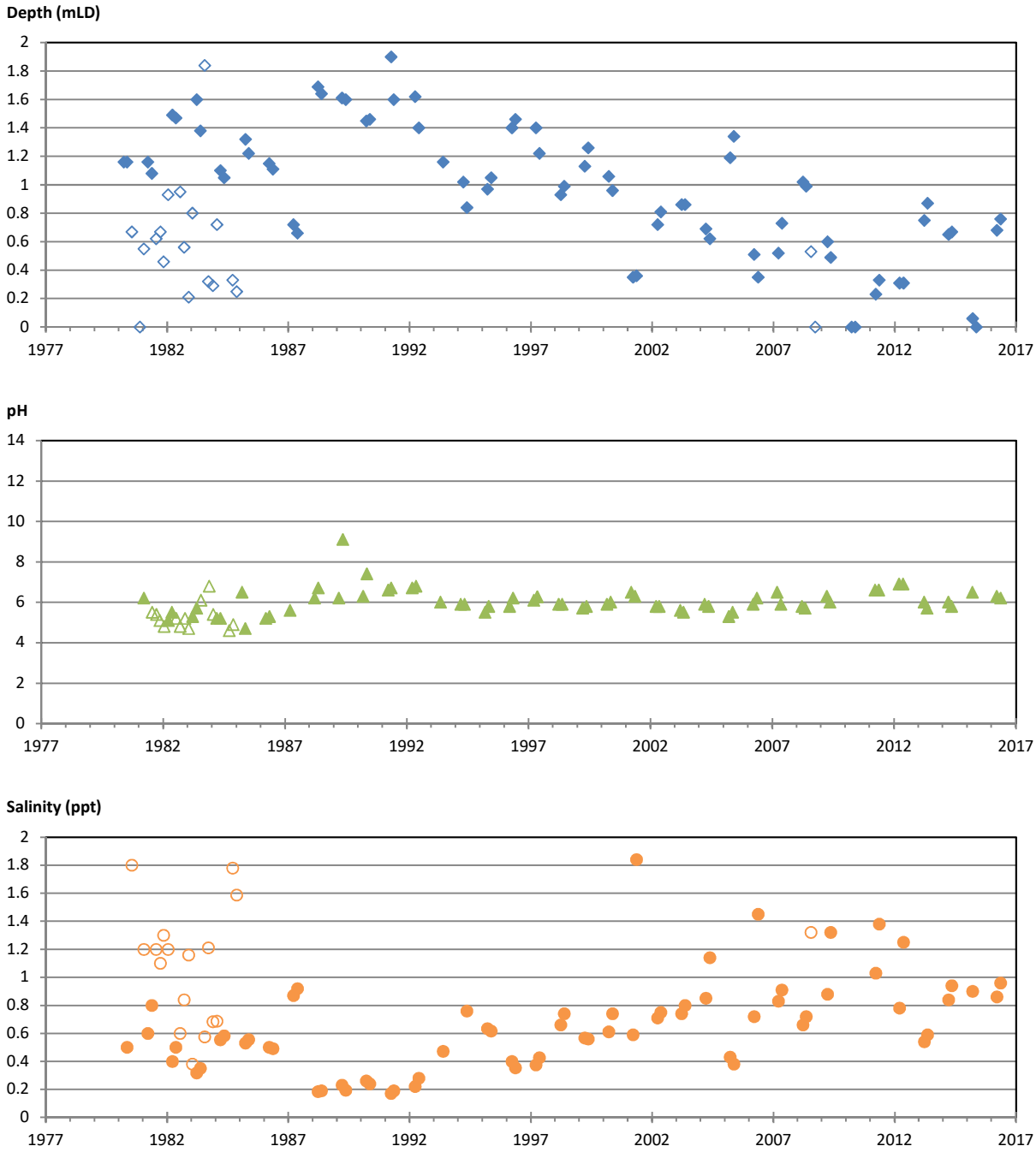


Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Guraga Lake is listed in the 'Directory of Important Wetlands in Australia'.

Guraga is in the Moora District (headquartered in Jurien Bay) of the Midwest DBCA Region.

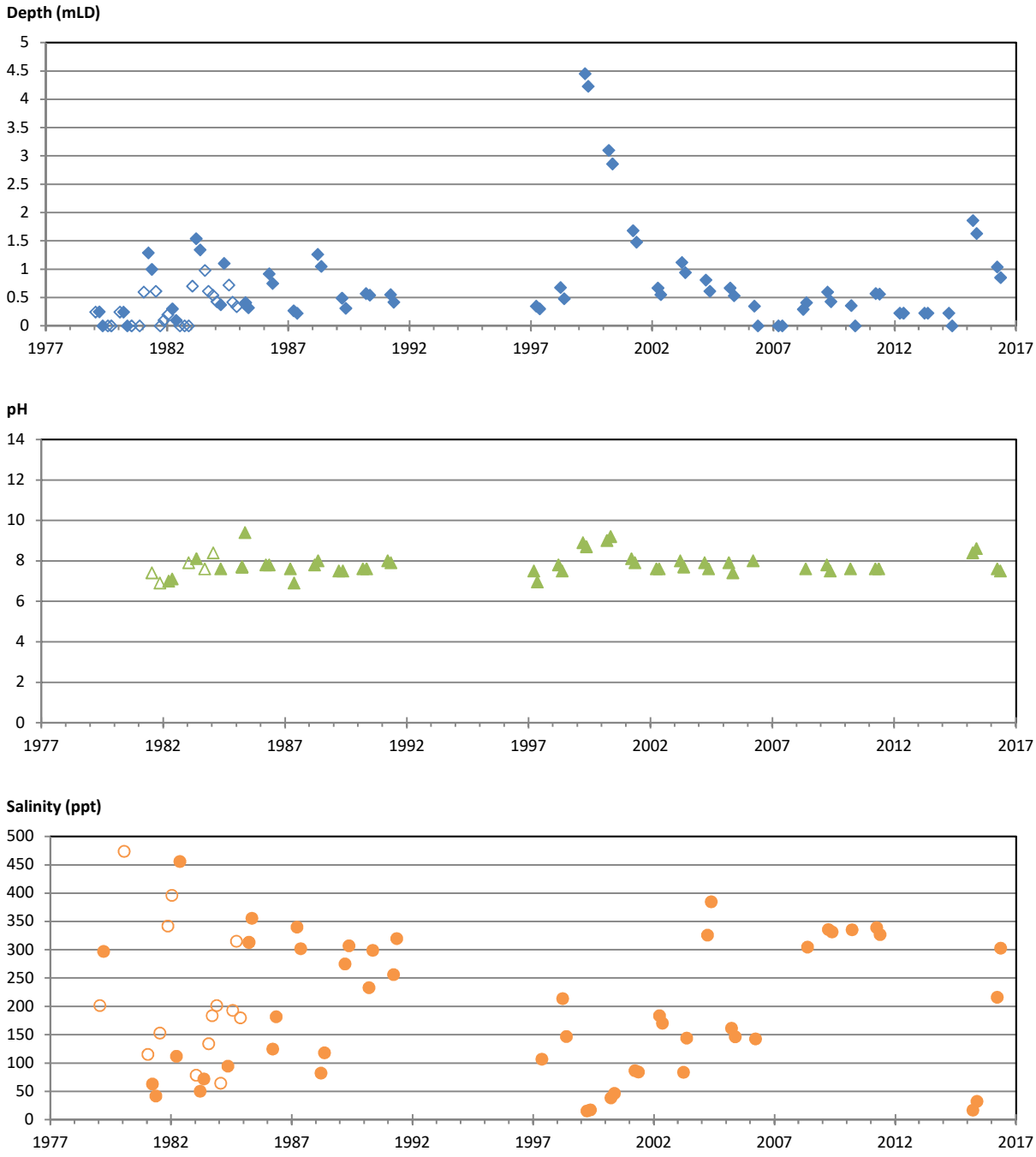
HARVEY 12632



Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Harvey 12632 is in the Wellington District (headquartered in Collie) of the South West DBCA Region.

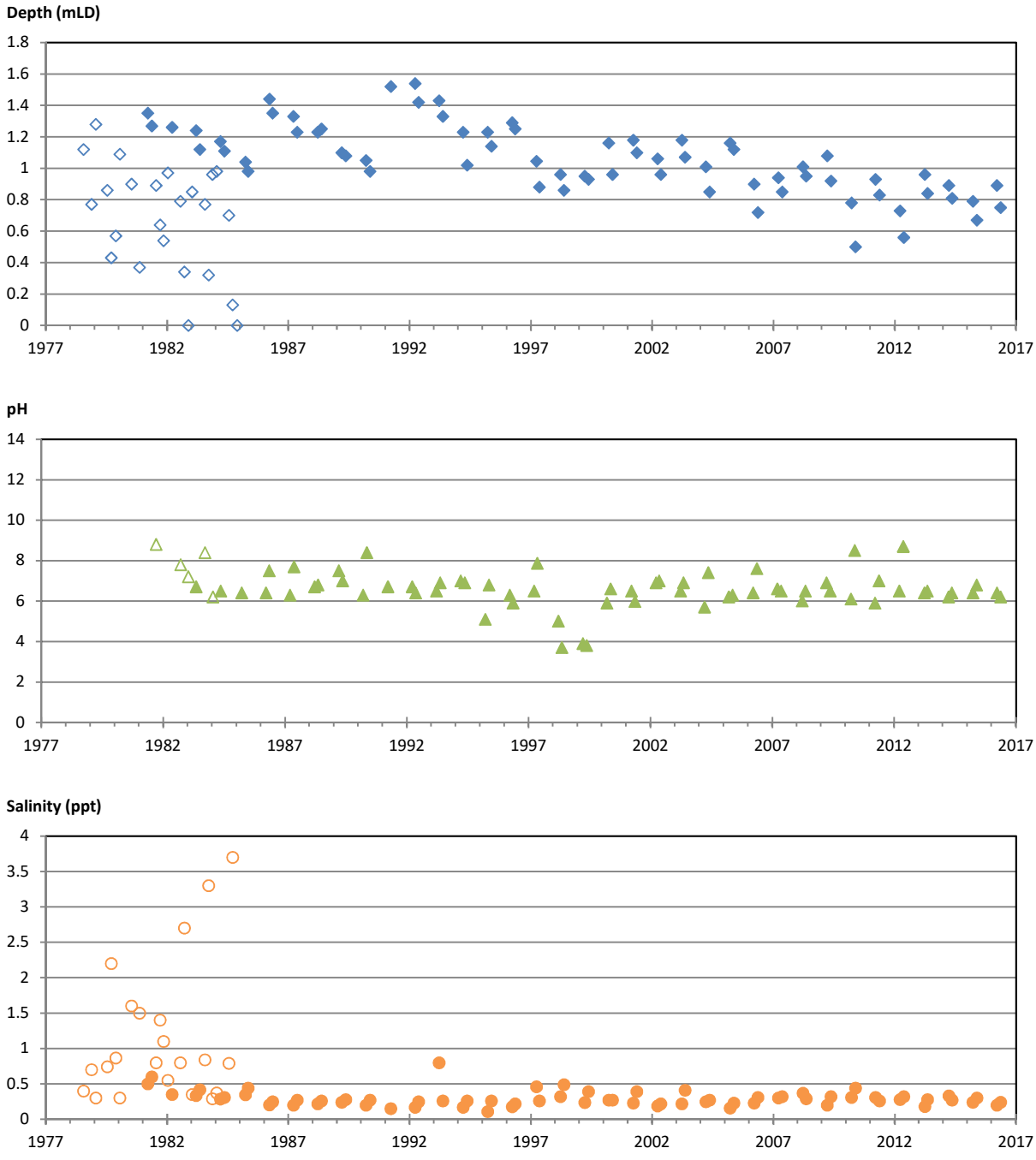
HINDS



Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Hinds is in the Central District (headquartered in Merredin) of the Wheatbelt DBCA Region.

JANDABUP (with salinity axis 0–4 ppt)

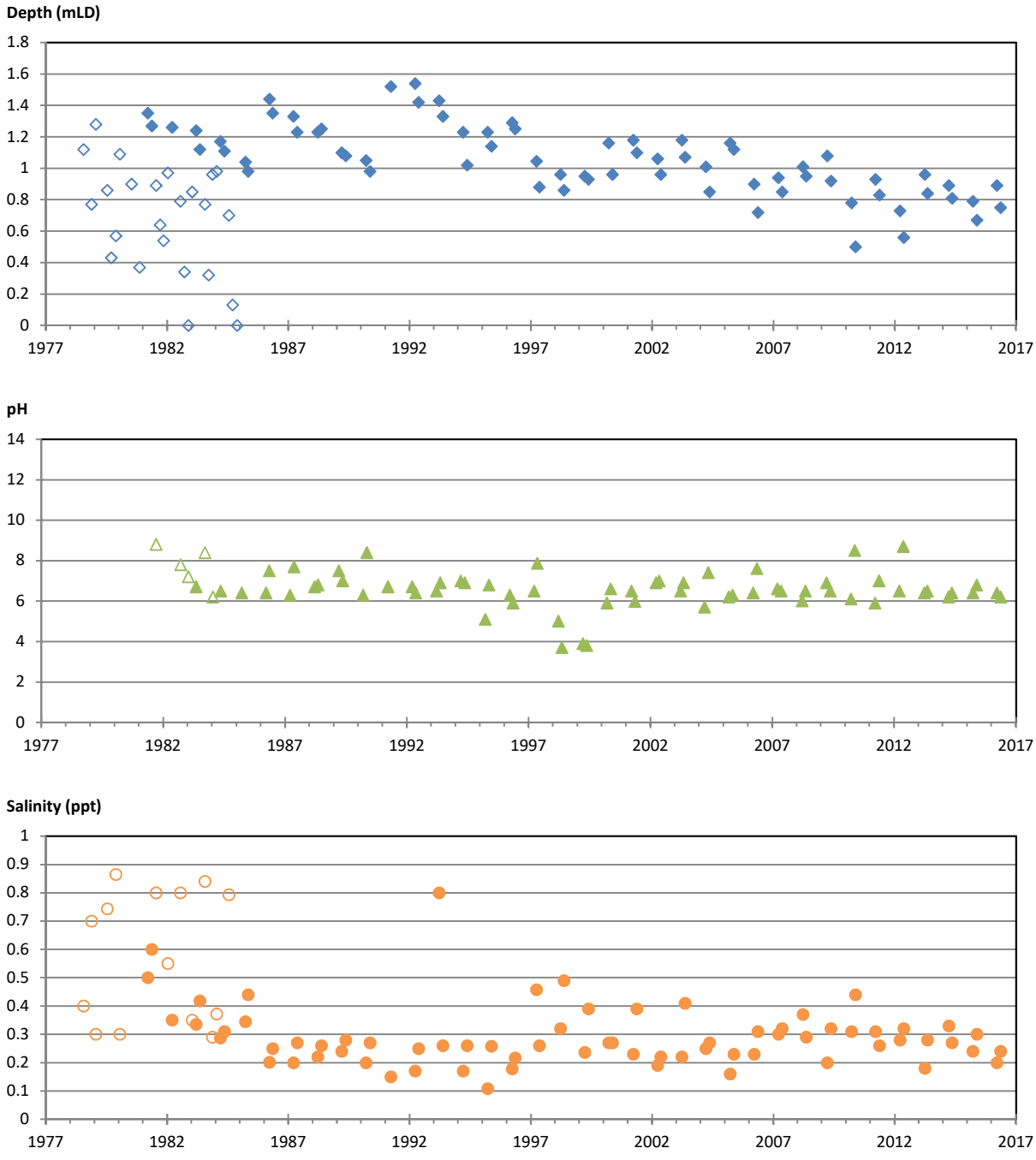


Notes:

1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.
3. Deduct 43.76m from Department of Water gauge readings to convert to SWWMP depths.

Jandabup is in the Swan Coastal District (headquartered in Wanneroo) of the Swan DBCA Region.

JANDABUP (with salinity axis 0–1 ppt)

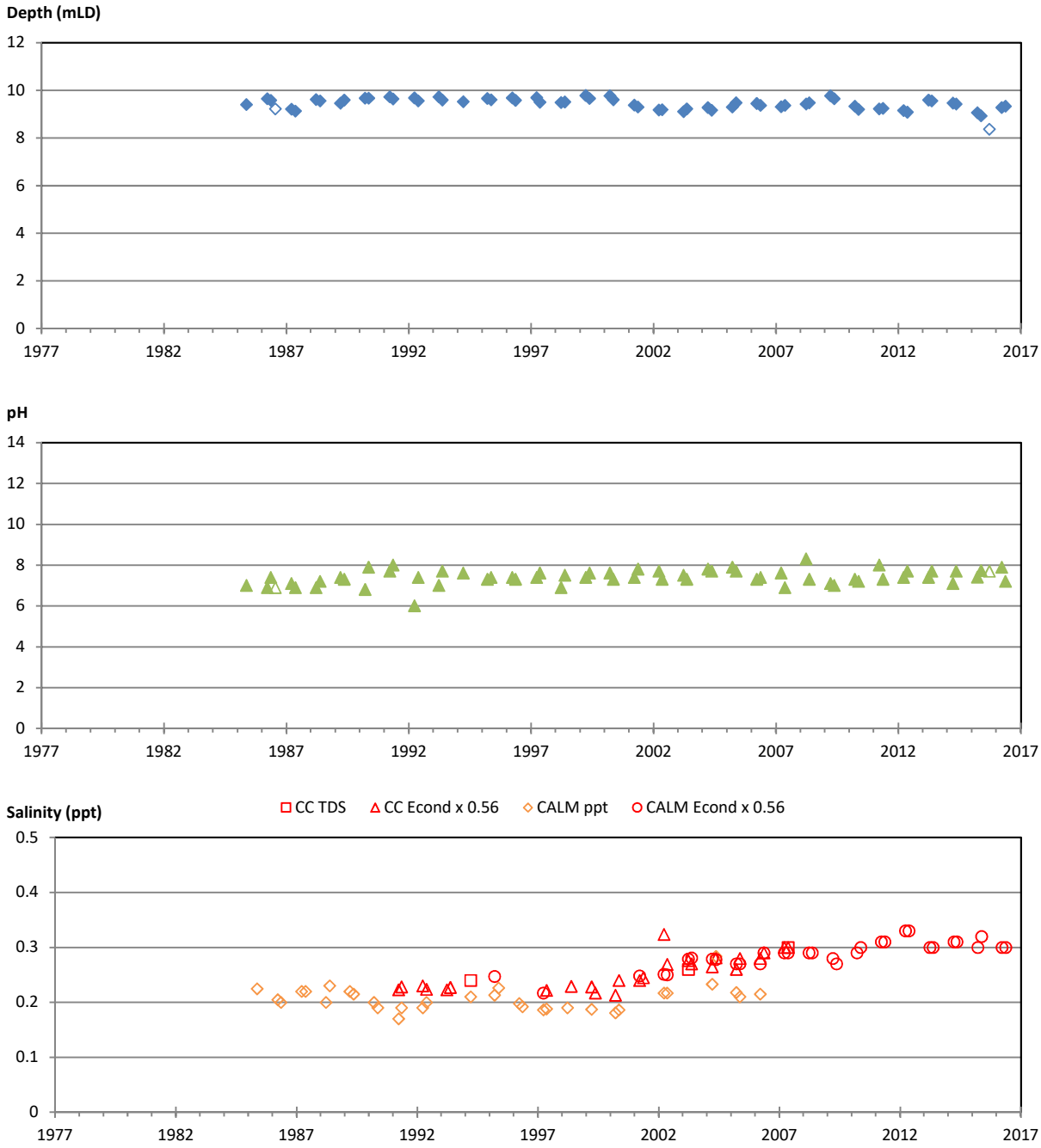


Notes:

1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.
3. Deduct 43.76m from Department of Water gauge readings to convert to SWWMP depths.

Jandabup is in the Swan Coastal District (headquartered in Wanneroo) of the Swan DBCA Region.

JASPER (with Depth axis 0–12m)



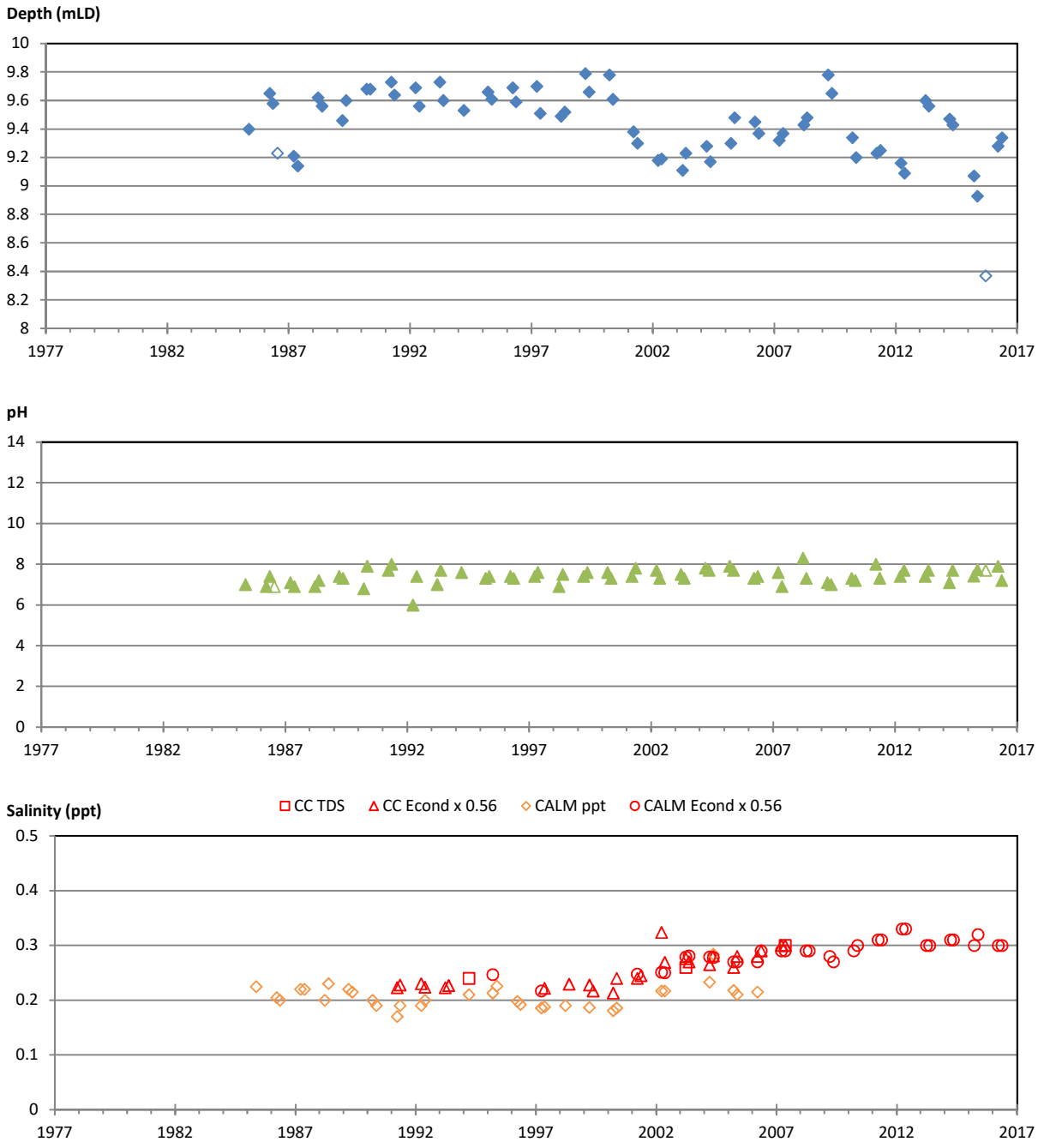
Notes:

1. Year labels are positioned at 1st July each year.
2. Depth and pH data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.
3. Salinity data are from September and November routine monitoring periods only.

Jasper is a component of the 'Gingilup-Jasper Wetland System', which is listed in the 'Directory of Important Wetlands in Australia'.

Jasper is in the Donnelly District (headquartered in Pemberton) of the Warren DBCA Region.

JASPER (with Depth axis 8-10m)



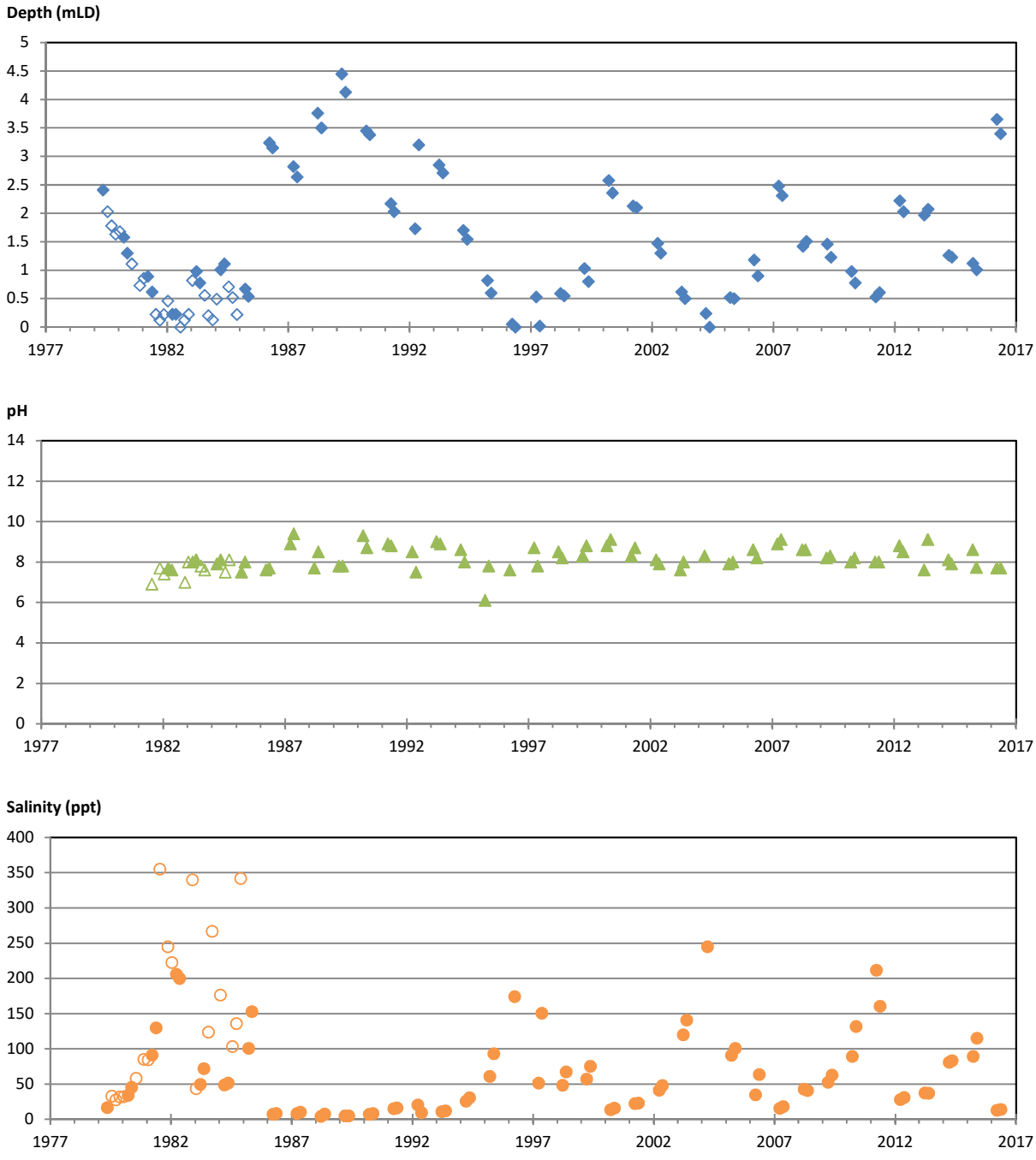
Notes:

1. Year labels are positioned at 1st July each year.
2. Depth and pH data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.
3. Salinity data are from September and November routine monitoring periods only.

Jasper is a component of the 'Gingilup-Jasper Wetland System', which is listed in the 'Directory of Important Wetlands in Australia'.

Jasper is in the Donnelly District (headquartered in Pemberton) of the Warren DBCA Region.

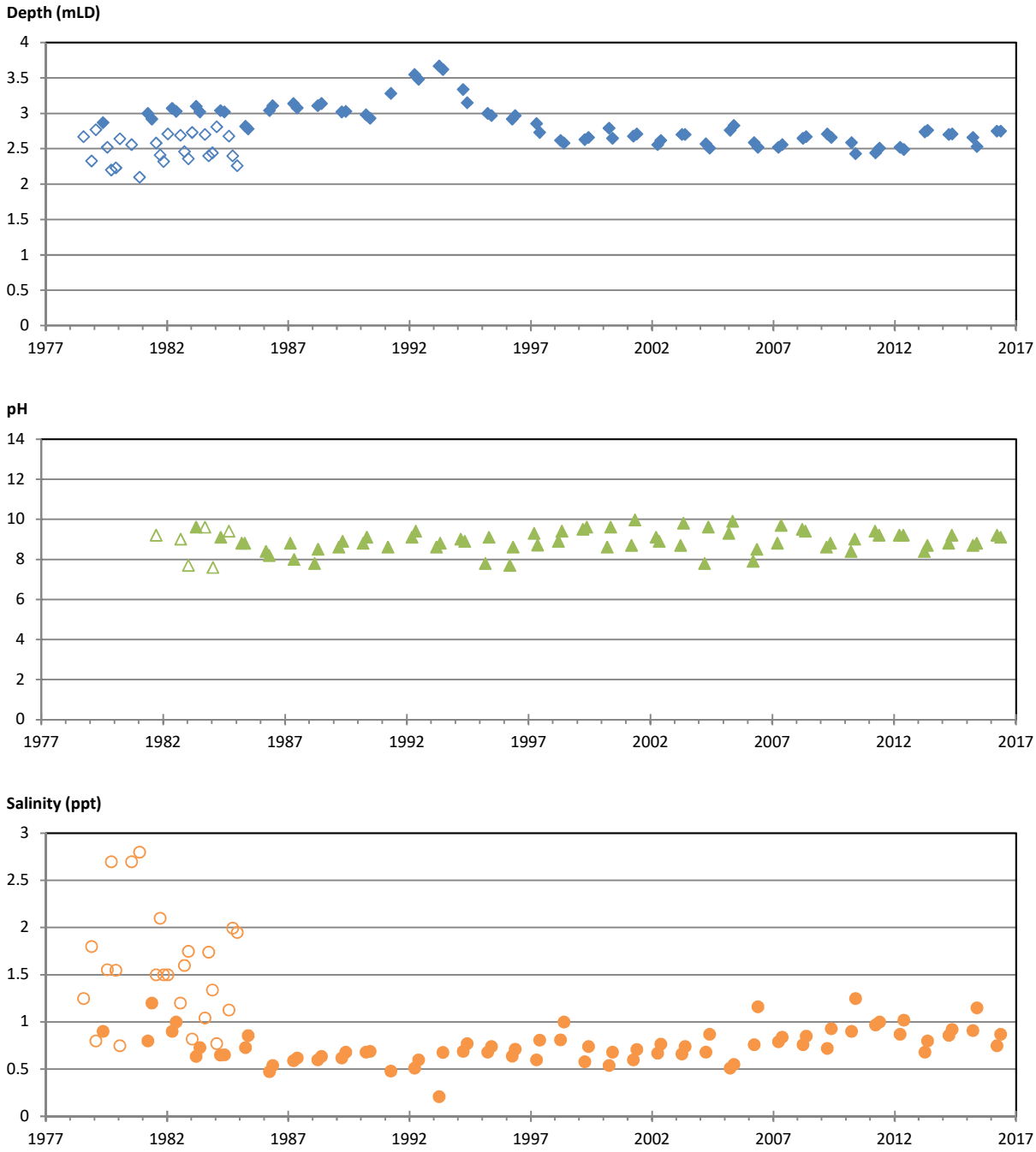
JERDACUTTUP



Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Jerdacuttup is in the Albany District of the South Coast DBCA Region

JOONDALUP



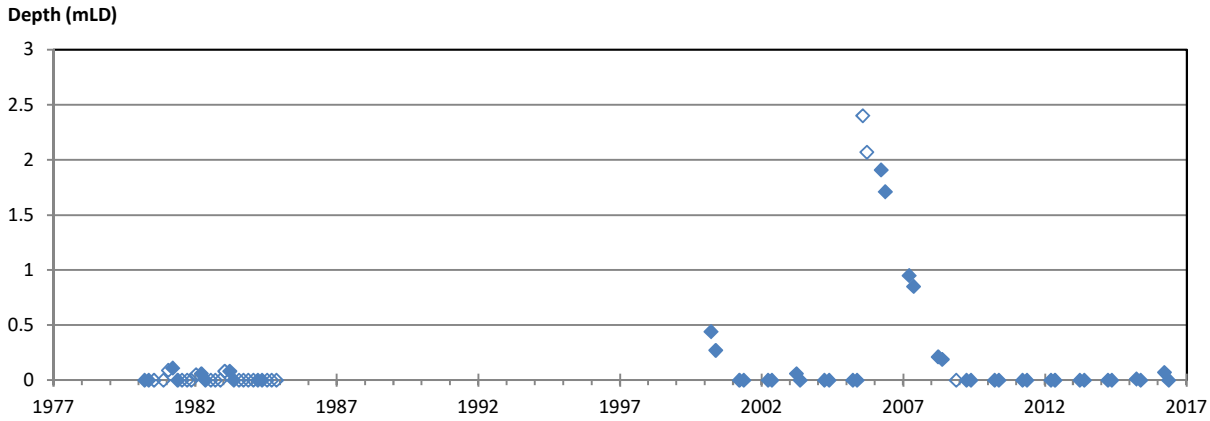
Notes:

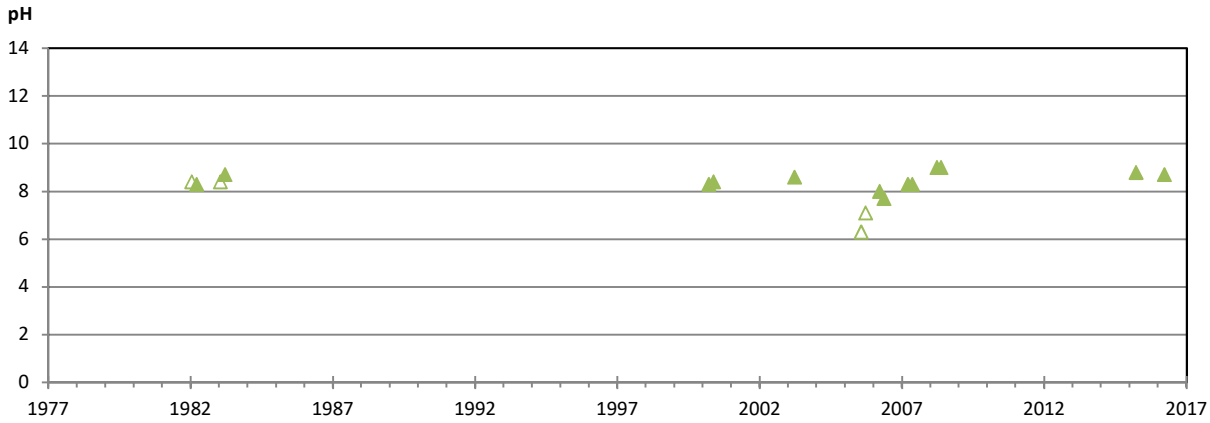
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.
3. Deduct 14.25m from Department of Water gauge readings to convert to SWWMP depths.

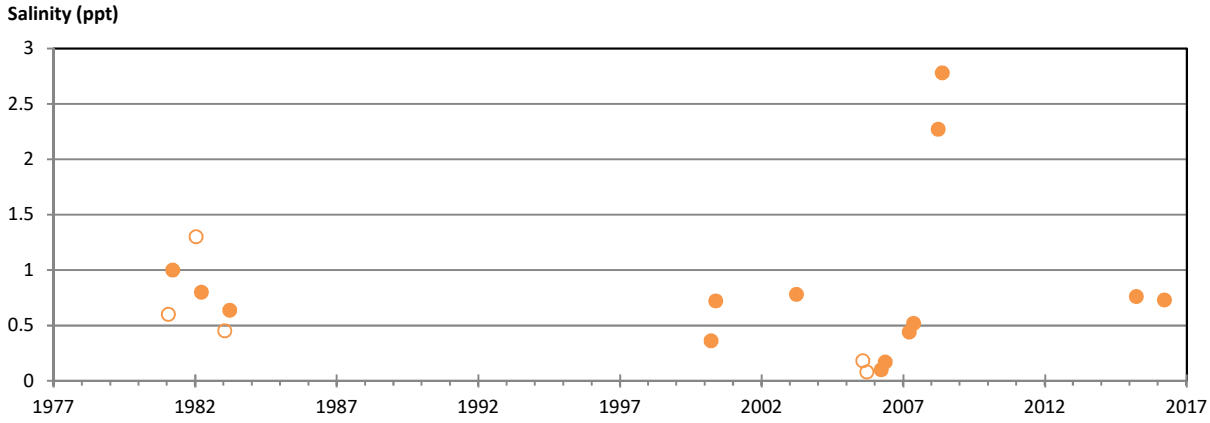
Joondalup Lake is listed in the 'Directory of Important Wetlands in Australia'.

Joondalup is in the Swan Coastal District (headquartered in Wanneroo) of the Swan DBCA Region.

KENT 29020





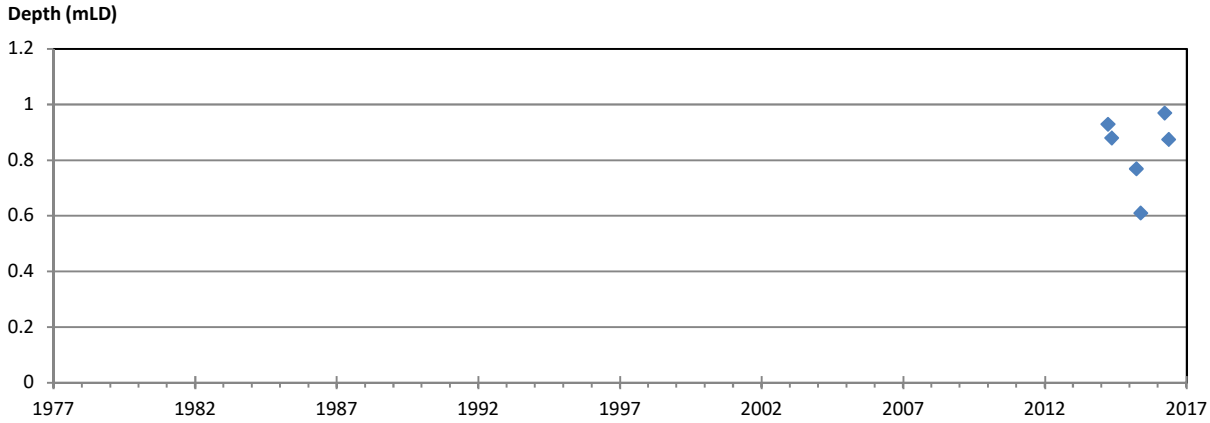


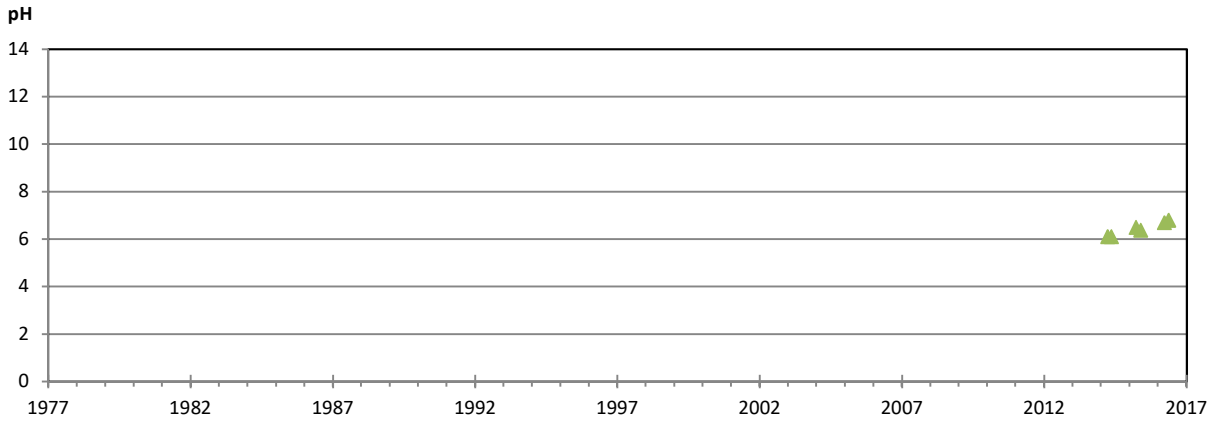
Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

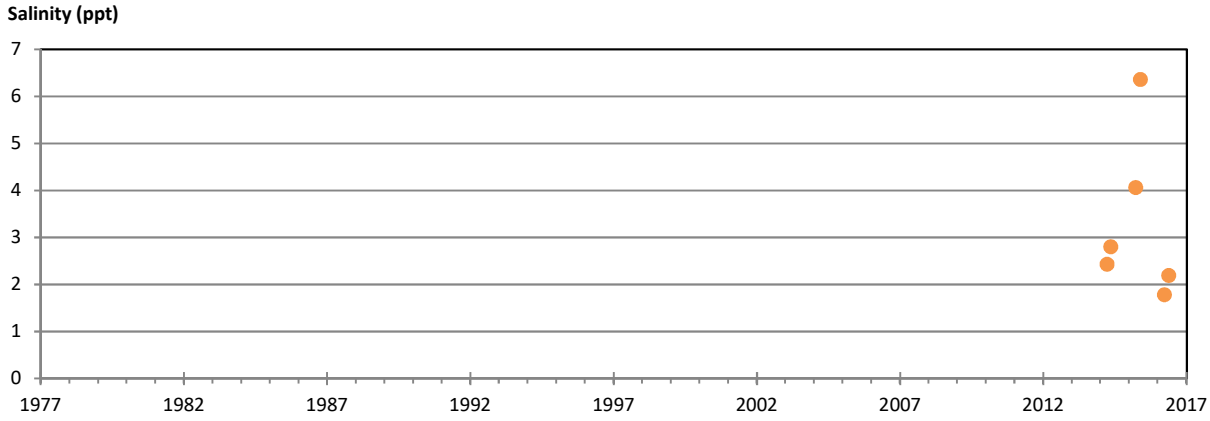
Kent 29020 (also known as East Lake Bryde) is a component of the 'Lake Bryde – East Lake Bryde System', which is listed in the 'Directory of Important Wetlands in Australia'.

Kent 29020 is within the Lake Bryde Natural Diversity Recovery Catchment and is in the Southern Wheatbelt geographical area (headquartered in Narrogin) of the Wheatbelt DBCA Region.

KULUNILUP







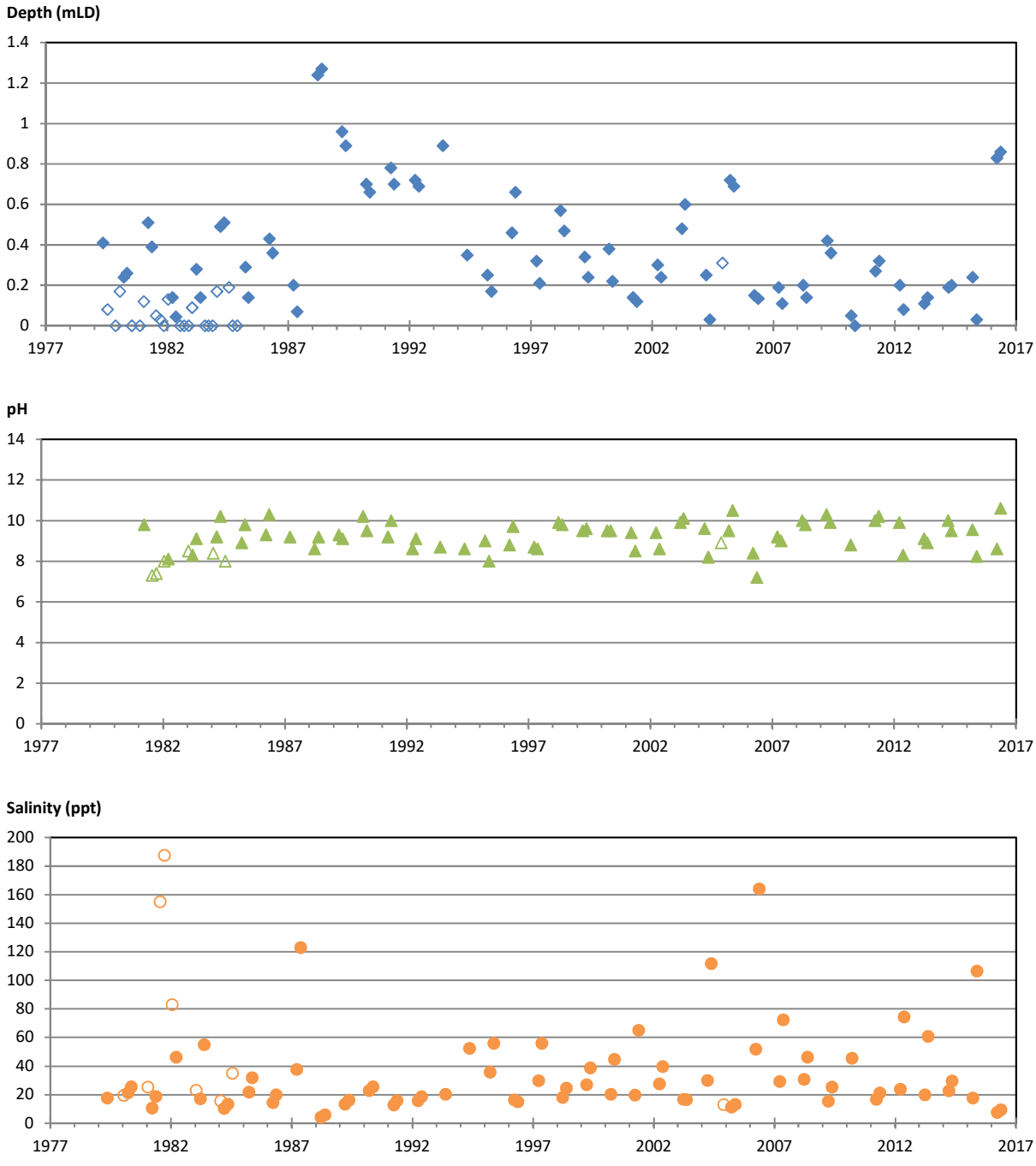
Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from September and November routine monitoring periods only.
3. The depth gauge at Kulunilup is 'uncalibrated', as it has yet to be surveyed to the deepest point in this wetland.

Kulunilup is a component of the 'Byenup Lagoon System', which is listed in the 'Directory of Important Wetlands in Australia'.

Kulunilup is within the former Muir-Unicup Natural Diversity Recovery Catchment.

Kulunilup is in the Donnelly District (headquartered in Pemberton) of the Warren DBCA Region.

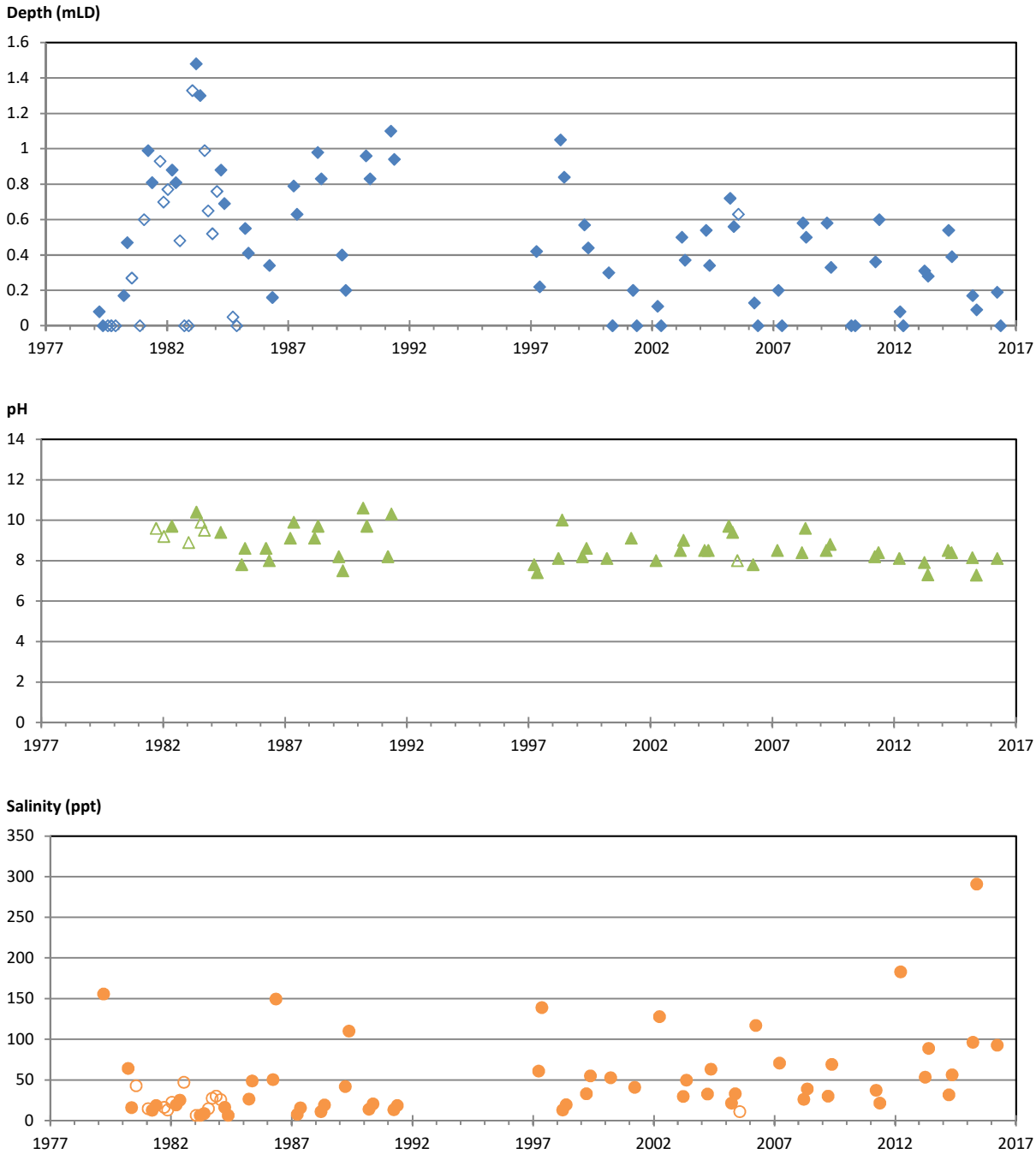
KWORNICUP



Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Kwornicup is in the Frankland District (headquartered in Walpole) of the Warren DBCA Region.

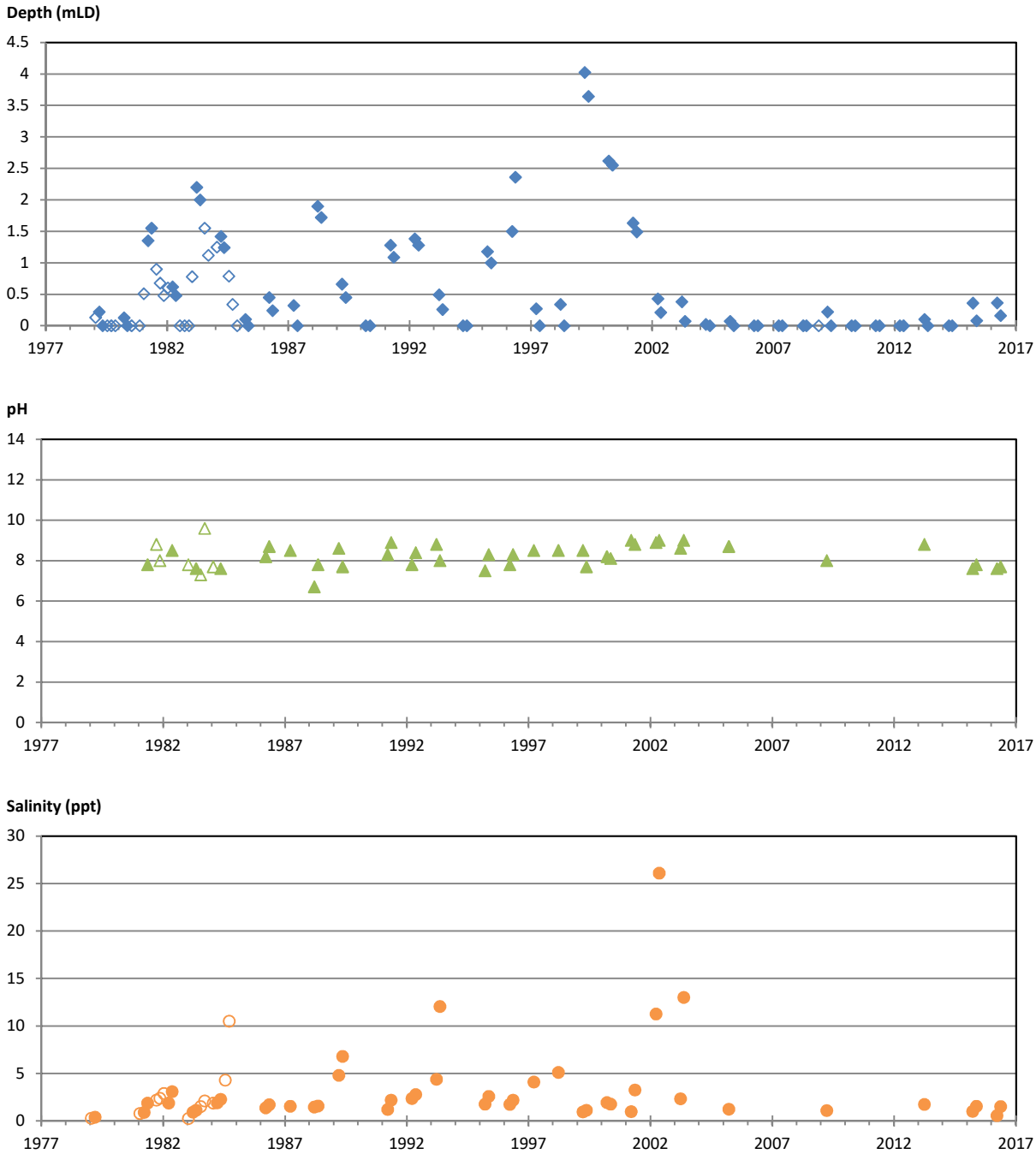
LITTLE WHITE



Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Little White is in the Southern Wheatbelt geographical area (headquartered in Narrogin) of the Wheatbelt DBCA Region.

LOGUE [IM]



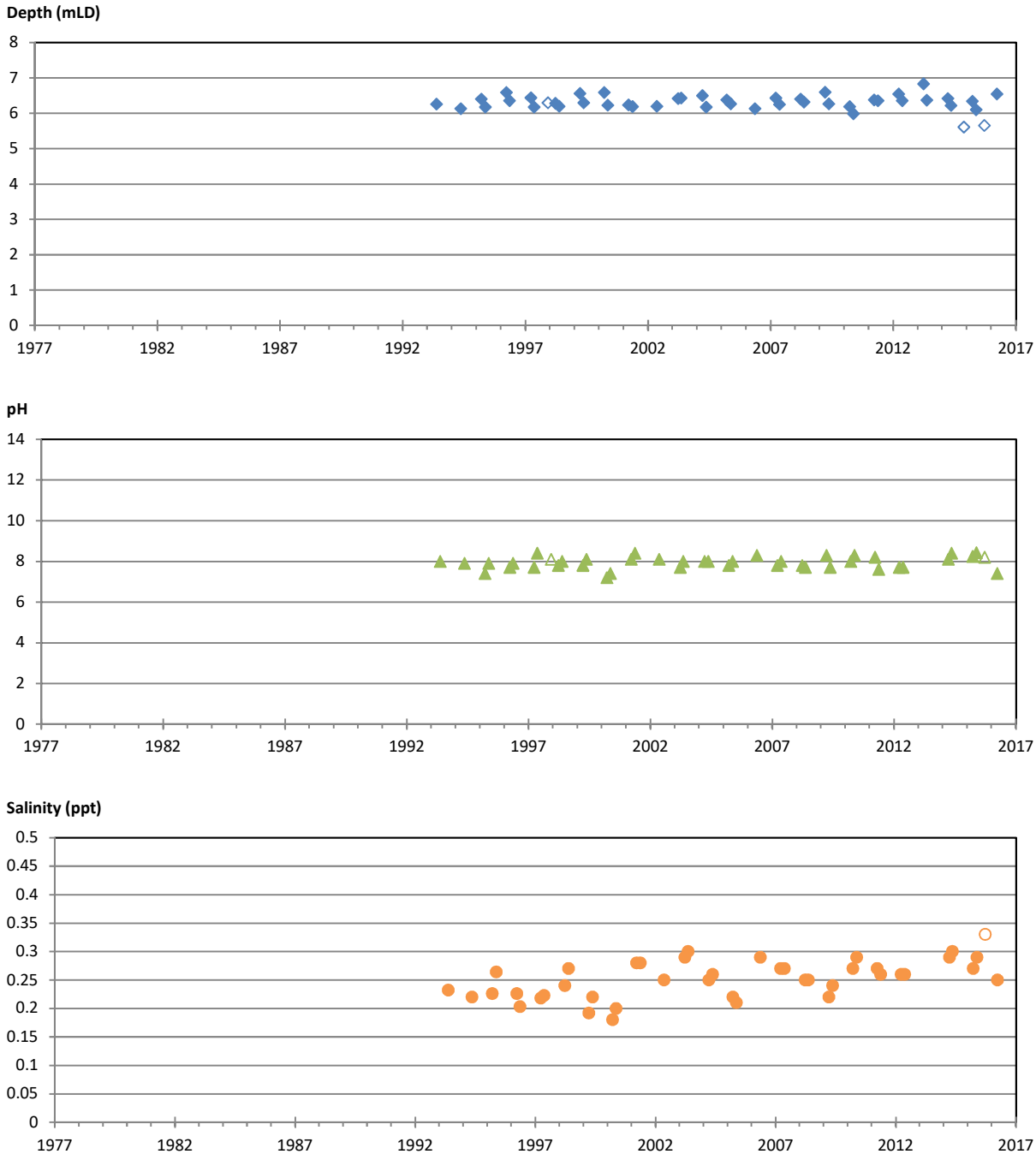
Notes:

1. [IM] indicates this is one of 25 wetlands Intensively Monitored for additional biological and physico-chemical attributes.
2. Year labels are positioned at 1st July each year.
3. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Logue is a component of the 'Lake Logue-Indoon System', which is listed in the 'Directory of Important Wetlands in Australia'.

Logue is in the Moora District (headquartered in Jurien Bay) of the Midwest DBCA Region.

MARINGUP (with Depth axis 0–8m)

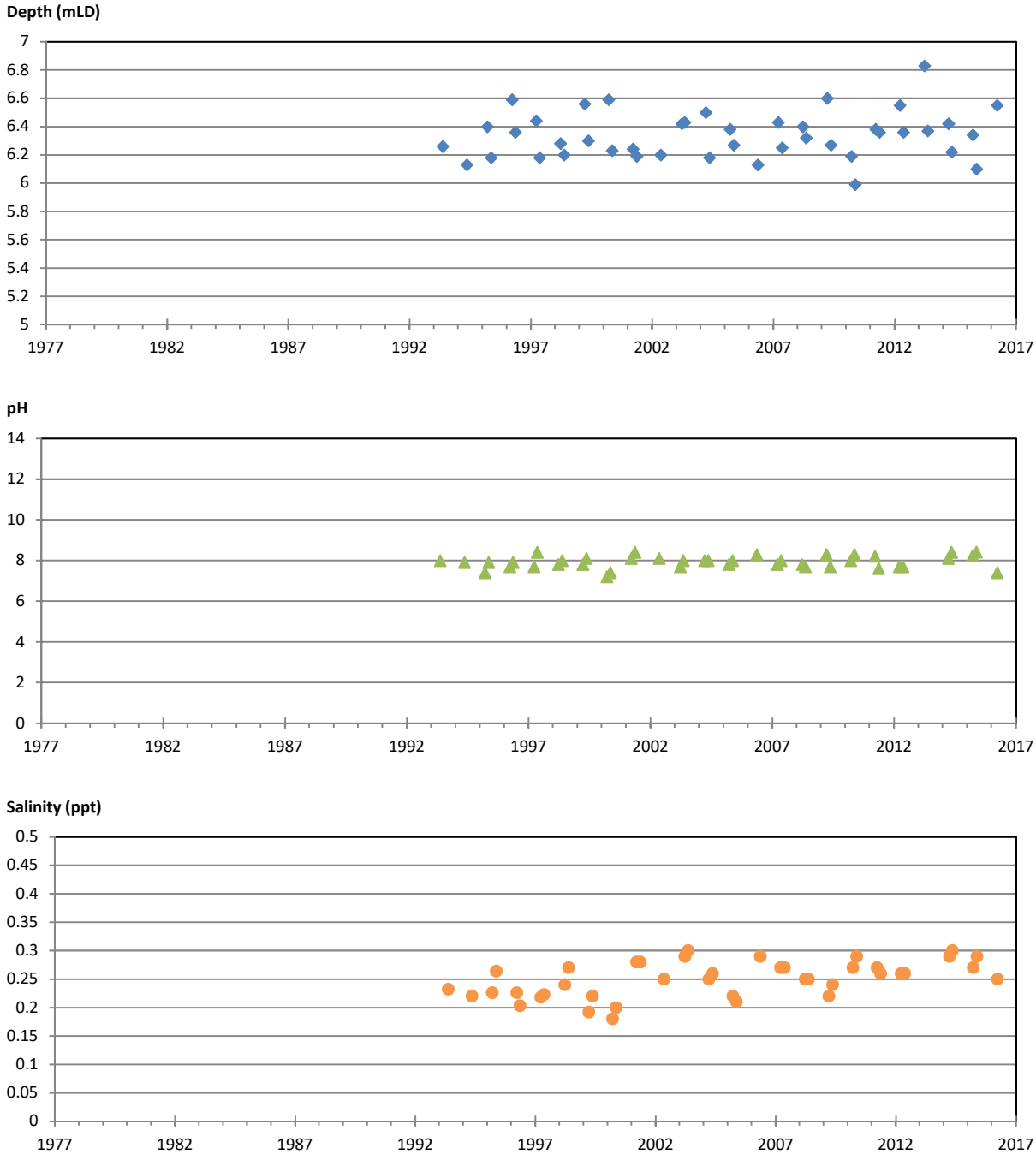


Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Maringup Lake is listed in the 'Directory of Important Wetlands in Australia'.

Maringup is in the Donnelly District (headquartered in Pemberton) of the Warren DBCA Region.

MARINGUP (with Depth axis 5–7m)

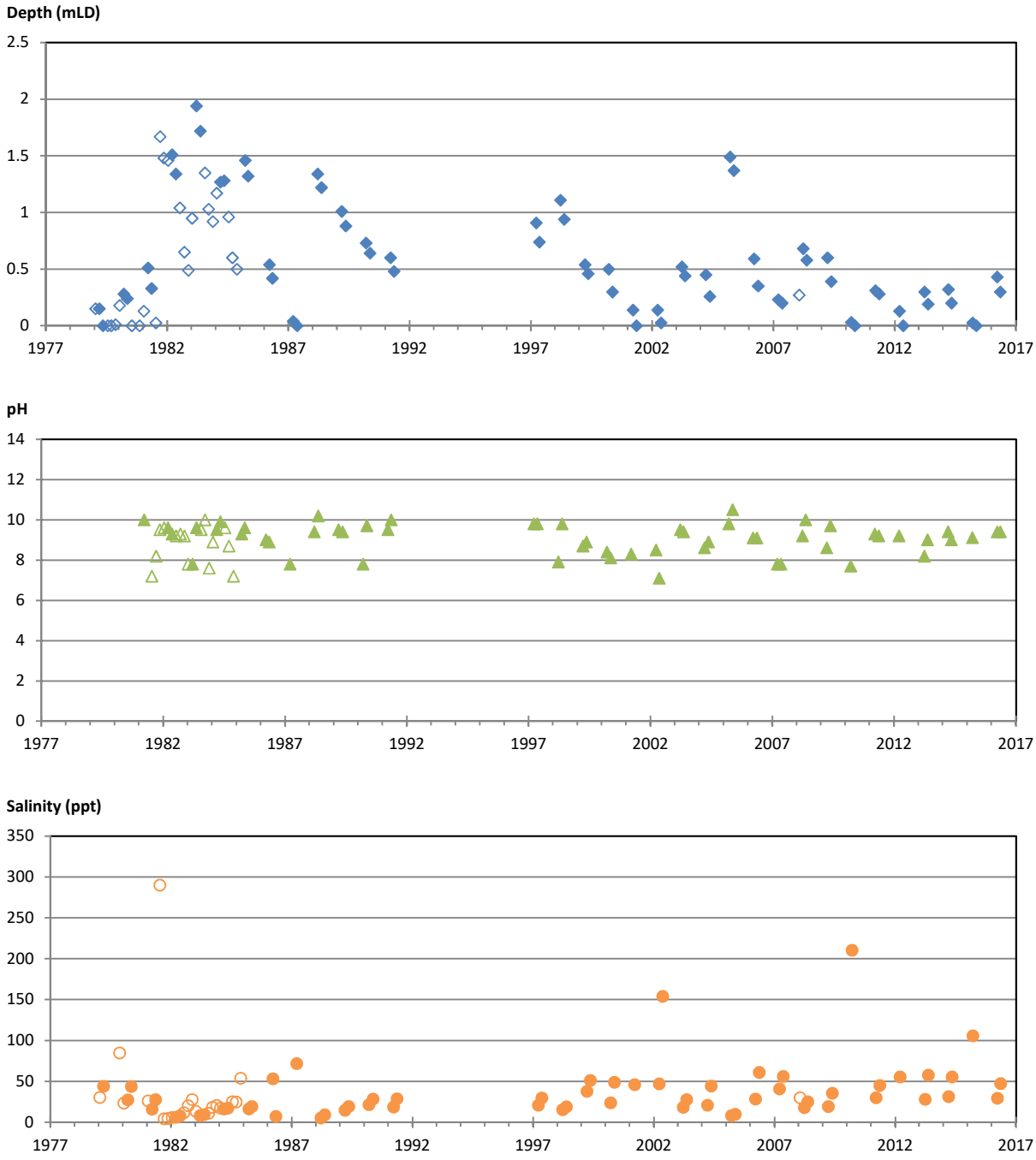


Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from September and November routine monitoring periods only.

Maringup Lake is listed in the 'Directory of Important Wetlands in Australia'.

Maringup is in the Donnelly District (headquartered in Pemberton) of the Warren DBCA Region.

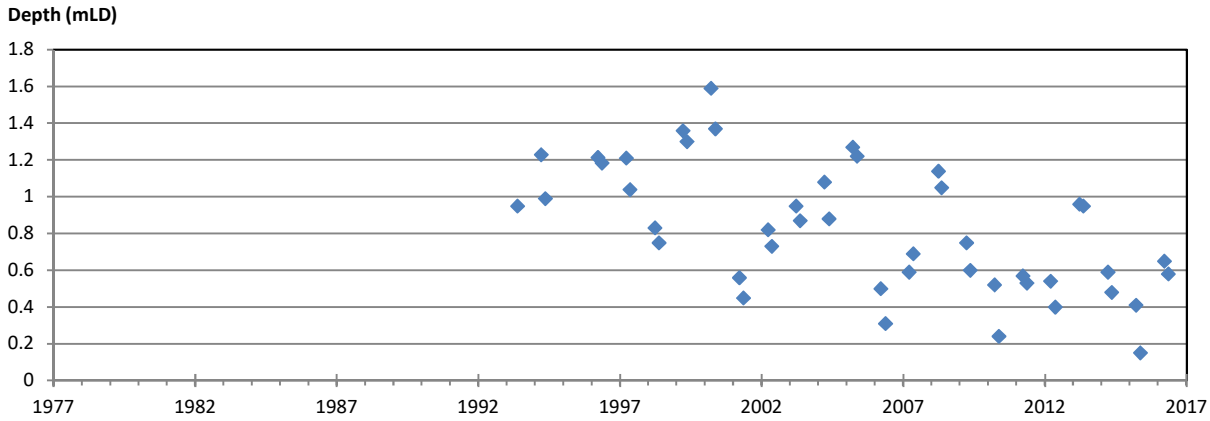
MARTINUP

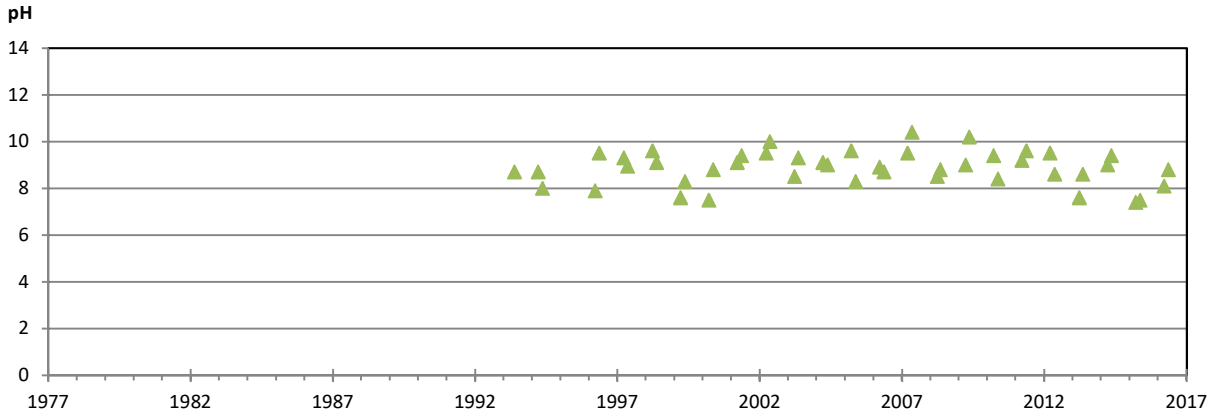


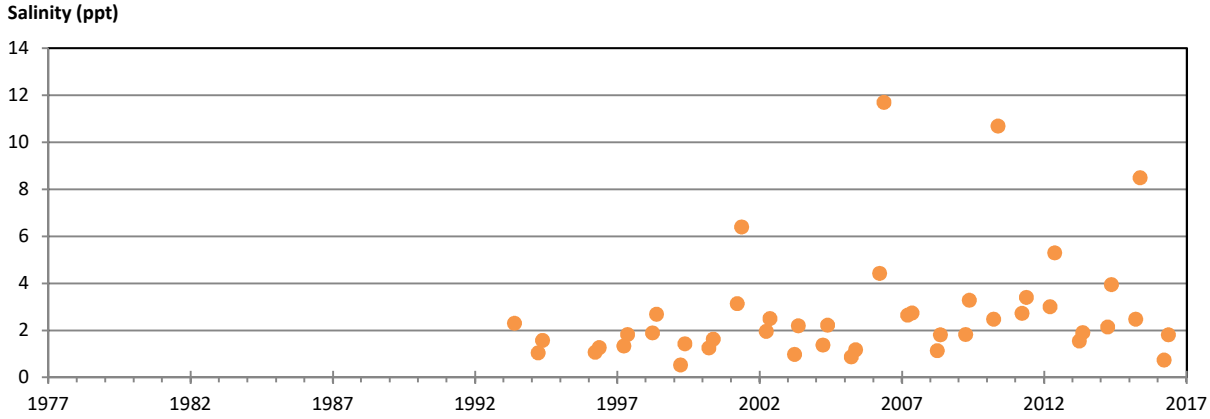
Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Martinup is in the Southern Wheatbelt geographical area (headquartered in Narrogin) of the Wheatbelt DBCA Region.

McLARTY





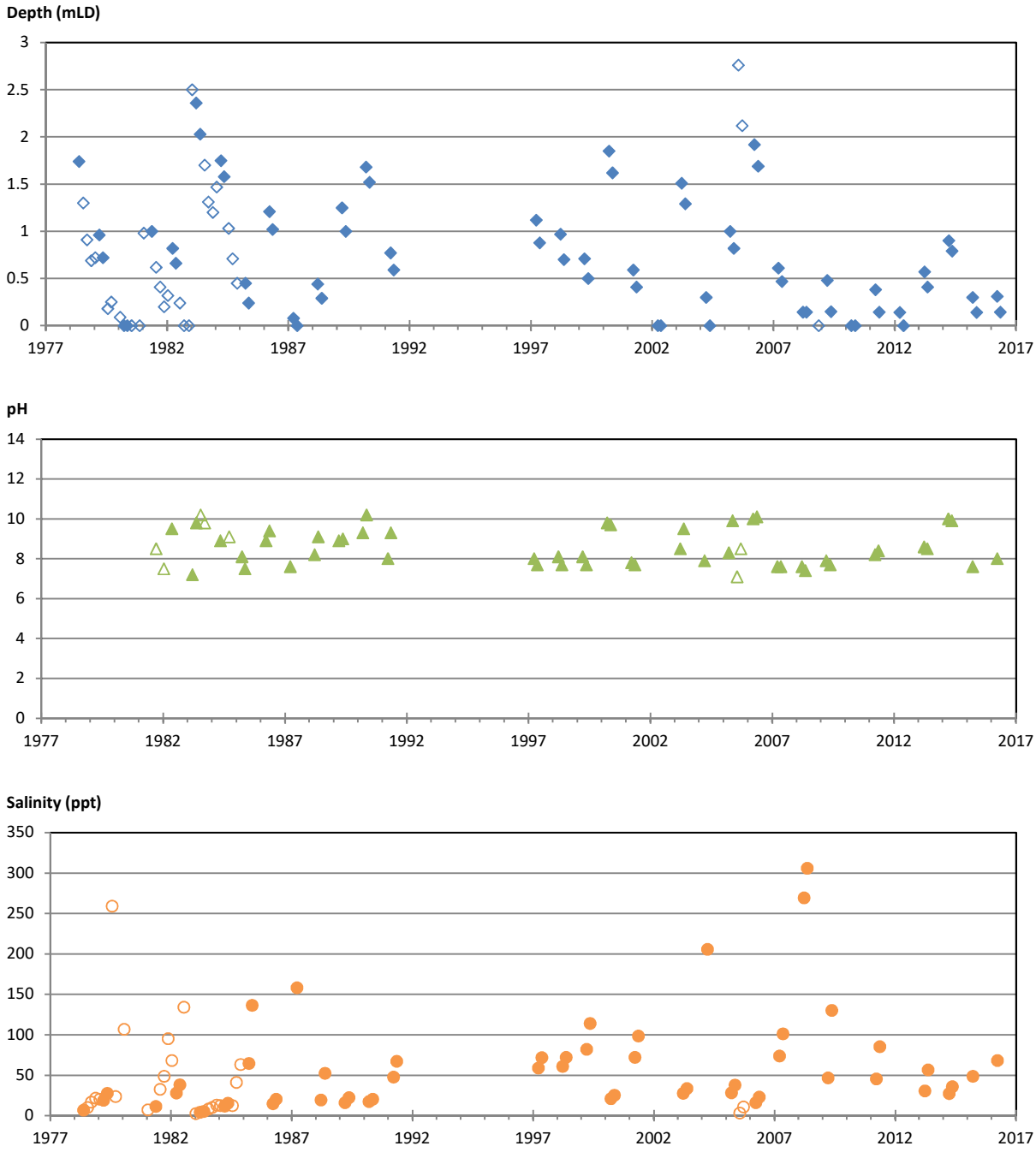


Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from September and November routine monitoring periods only.

McLarty is a component of the 'Peel-Yalgorup System', which is listed as a Wetland of International Importance under the 'Ramsar' Convention on Wetlands, and is also a component of the 'Lake McLarty System' listed in the 'Directory of Important Wetlands in Australia'.

McLarty is in the Swan Coastal District (headquartered in Wanneroo) of the Swan DBCA Region.

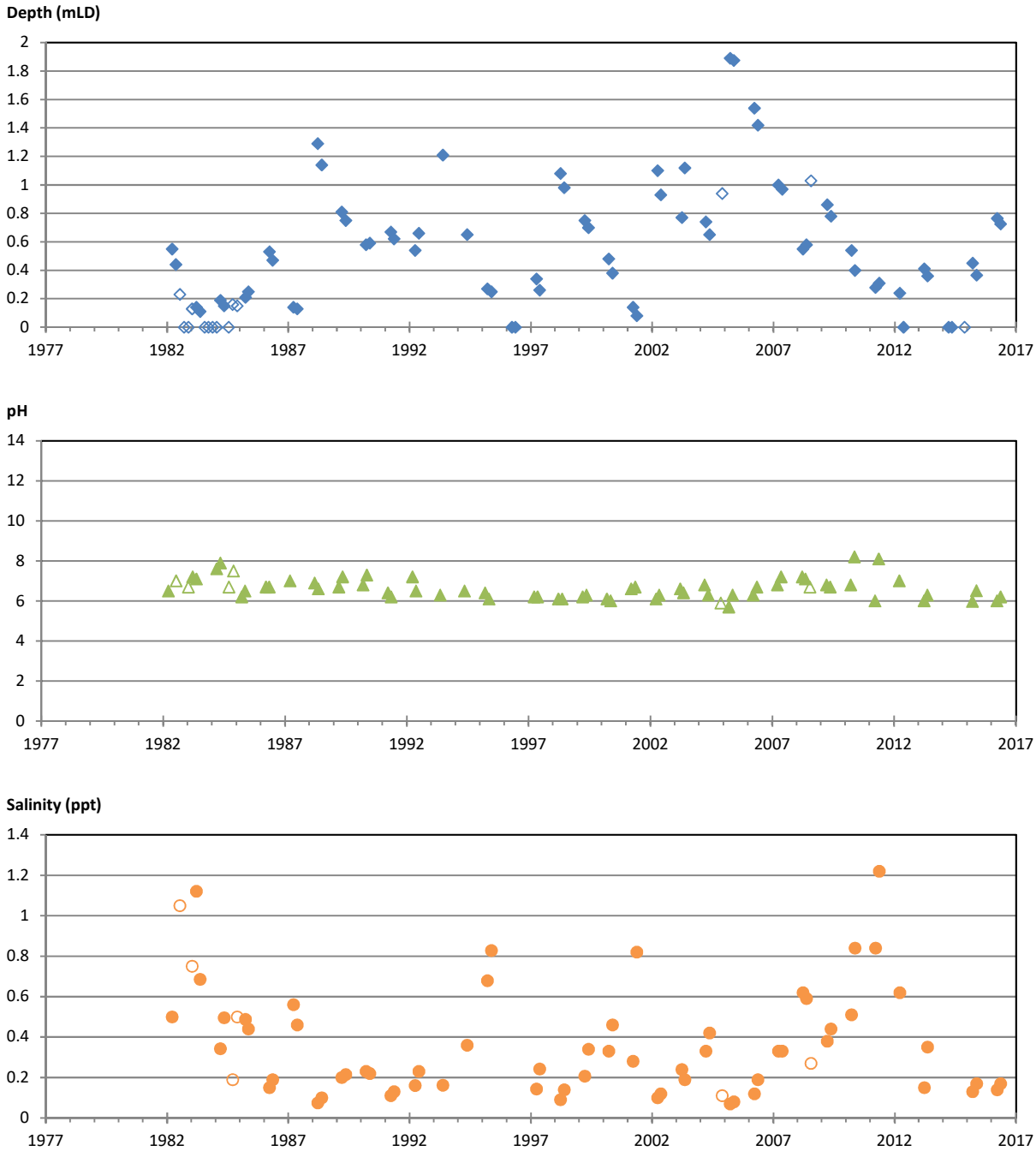
MEARS



Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Mears is in the Southern Wheatbelt geographical area (headquartered in Narrogin) of the Wheatbelt DBCA Region.

METTLER

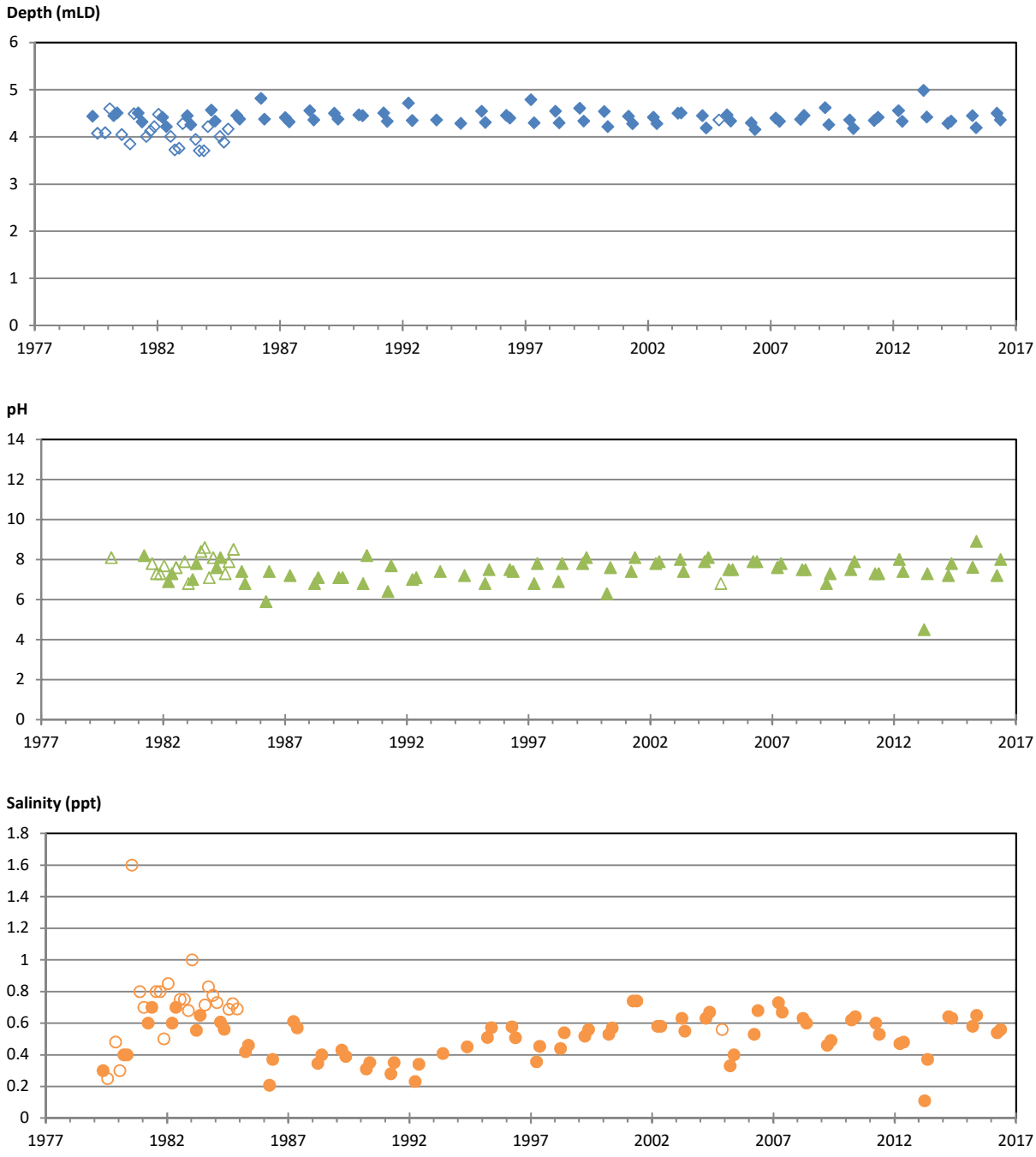


Notes:

1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Mettler is in the Albany District of the South Coast DBCA Region

MOATES (with Depth axis 0–6m)



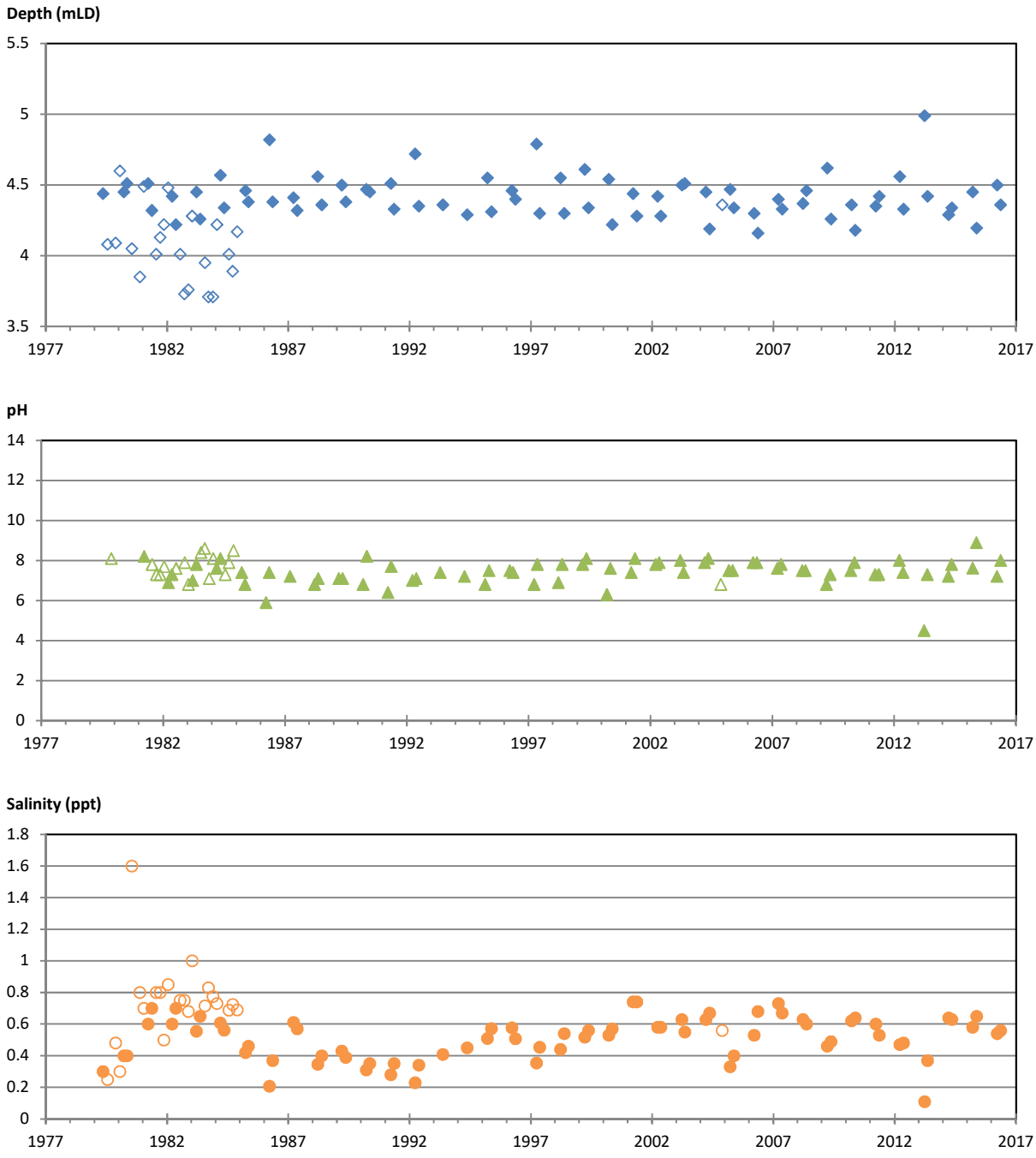
Notes:

1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Moates is a component of the 'Moates Lake System', which is listed in the 'Directory of Important Wetlands in Australia'.

Moates is in the Albany District of the South Coast DBCA Region

MOATES (with Depth axis 3.5–5.5m)

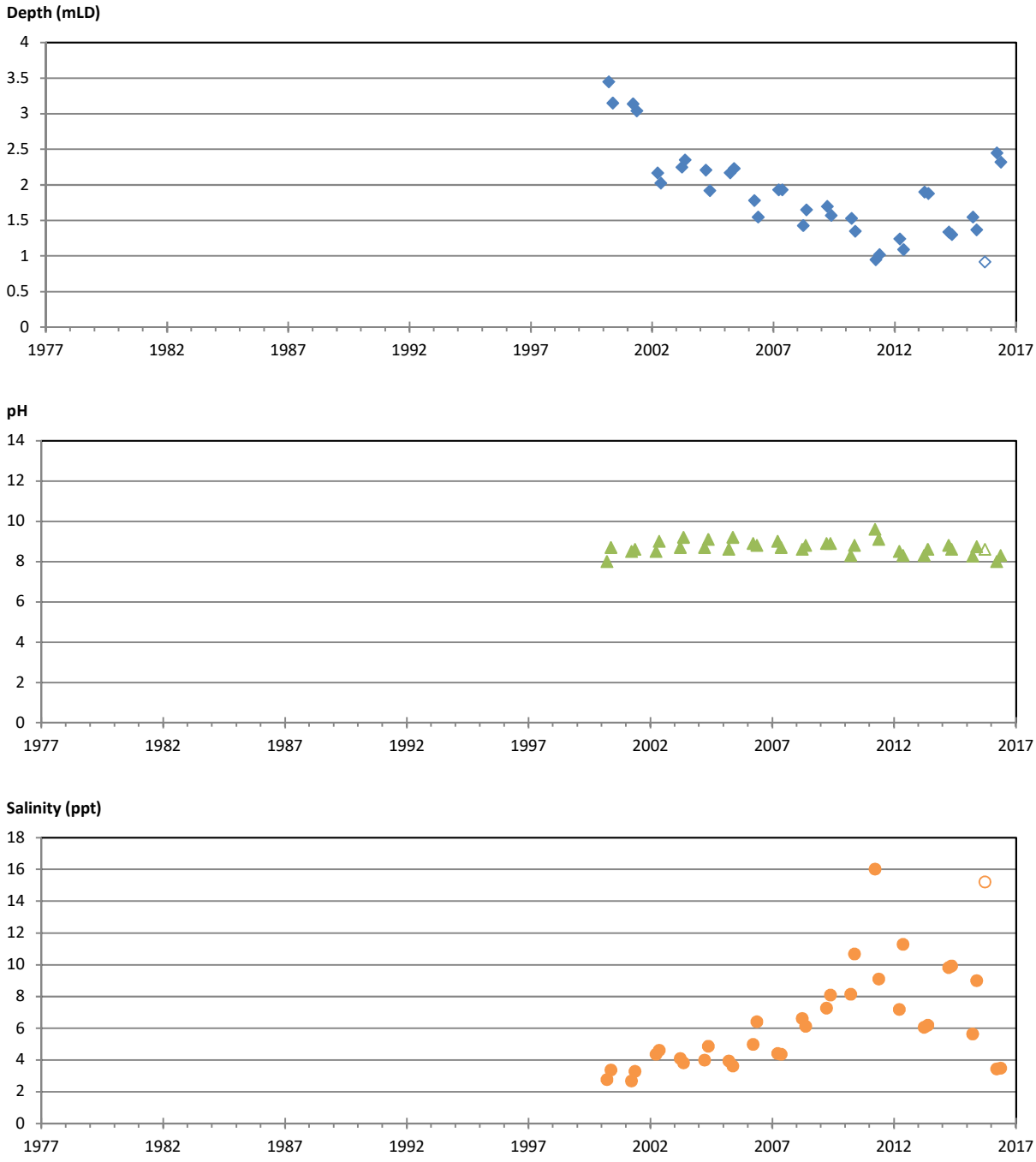


Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Moates is a component of the 'Moates Lake System', which is listed in the 'Directory of Important Wetlands in Australia'.

Moates is in the Albany District of the South Coast DBCA Region

MORTIJINUP

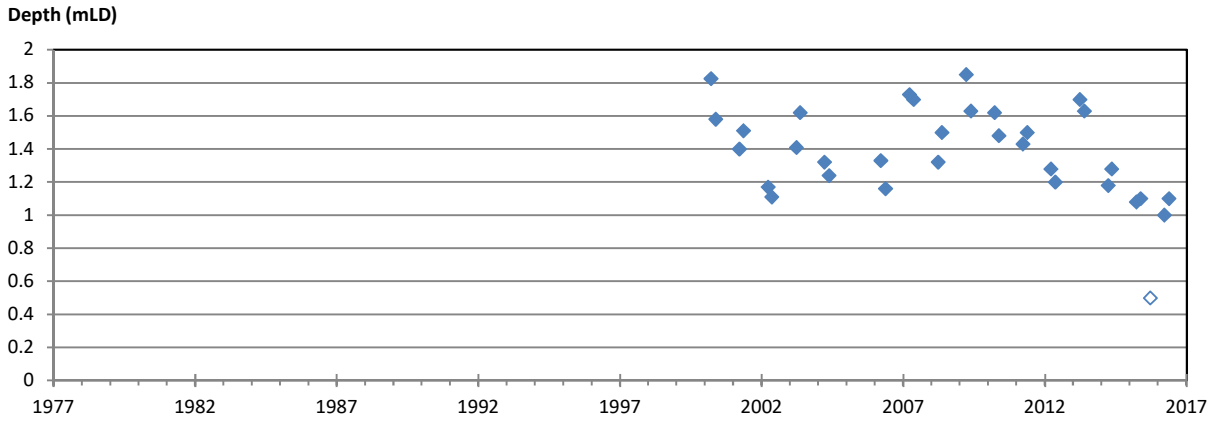


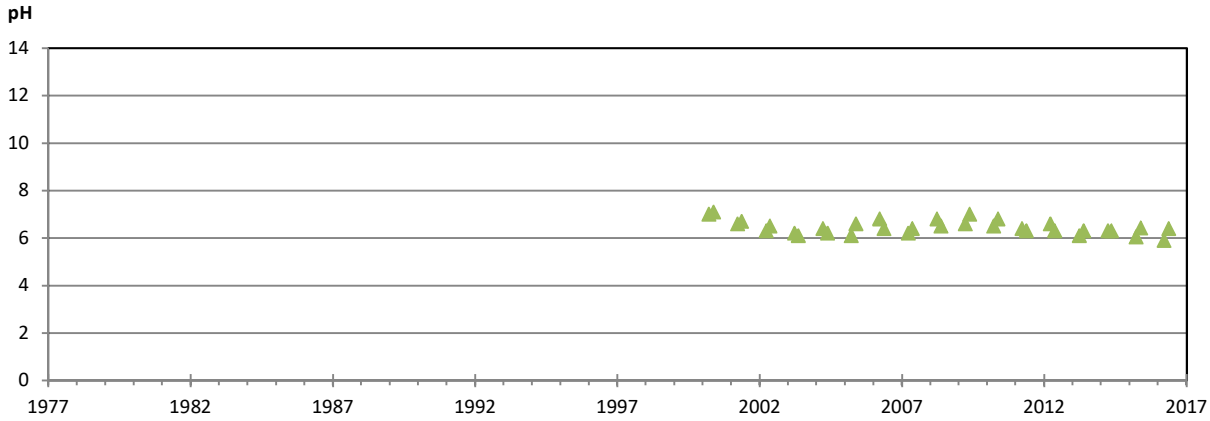
Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

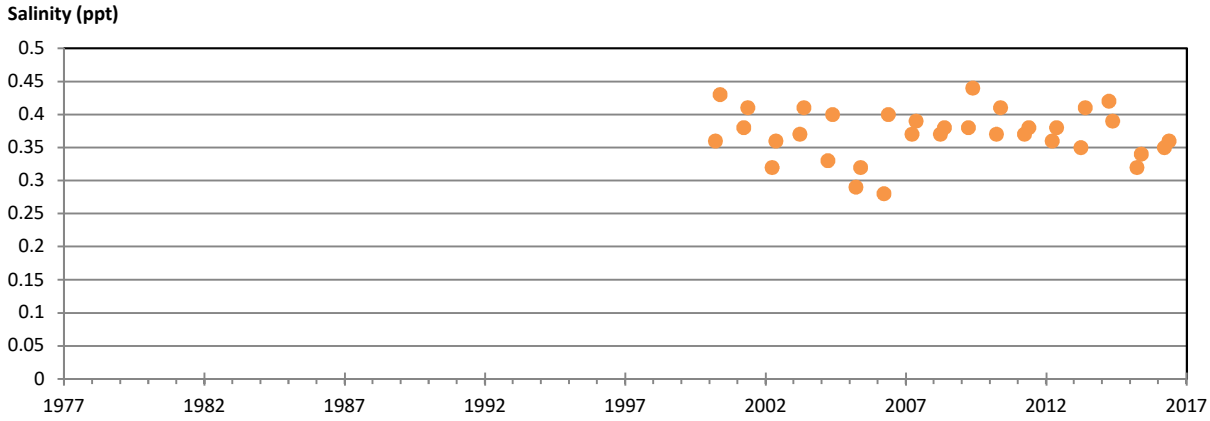
Mortijinup is a component of the 'Mortijinup Lake System', which is listed in the 'Directory of Important Wetlands in Australia'.

Mortijinup is in the Esperance District of the South Coast DBCA Region.

MOUNT LE GRAND



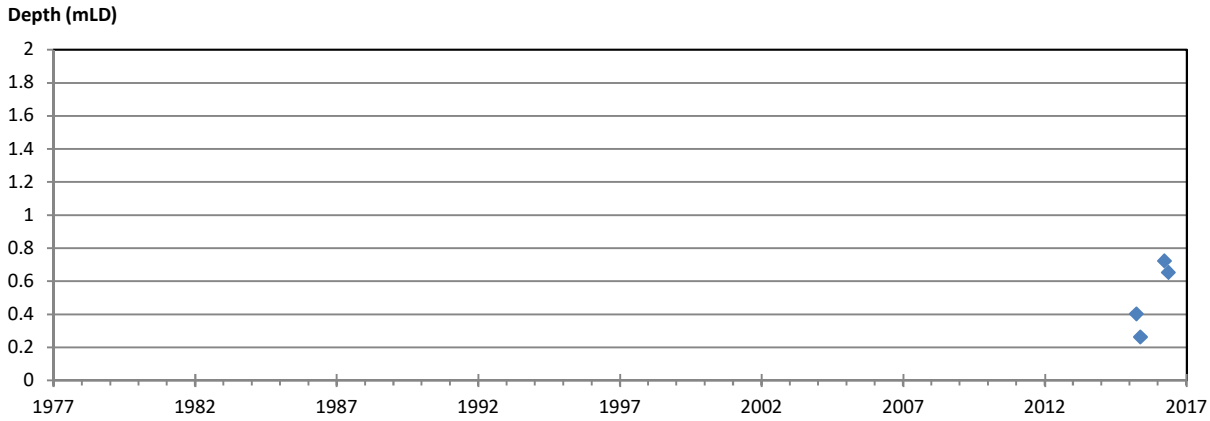


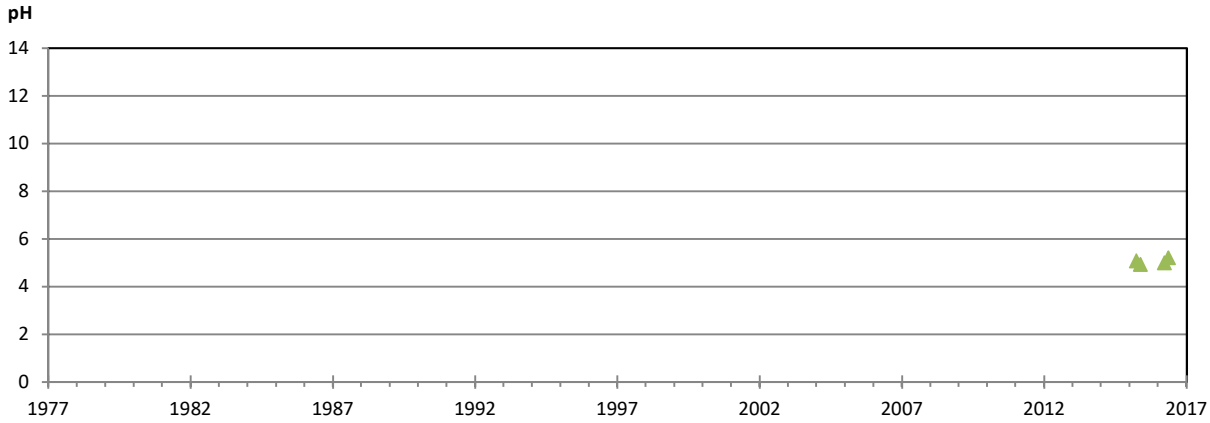


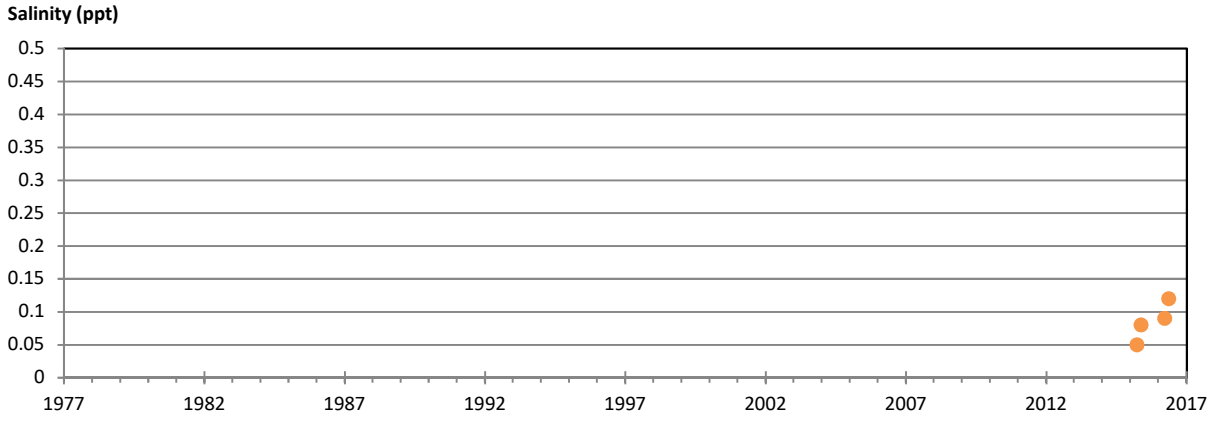
Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Mount Le Grand is in the Esperance District of the South Coast DBCA Region.

MOWEN



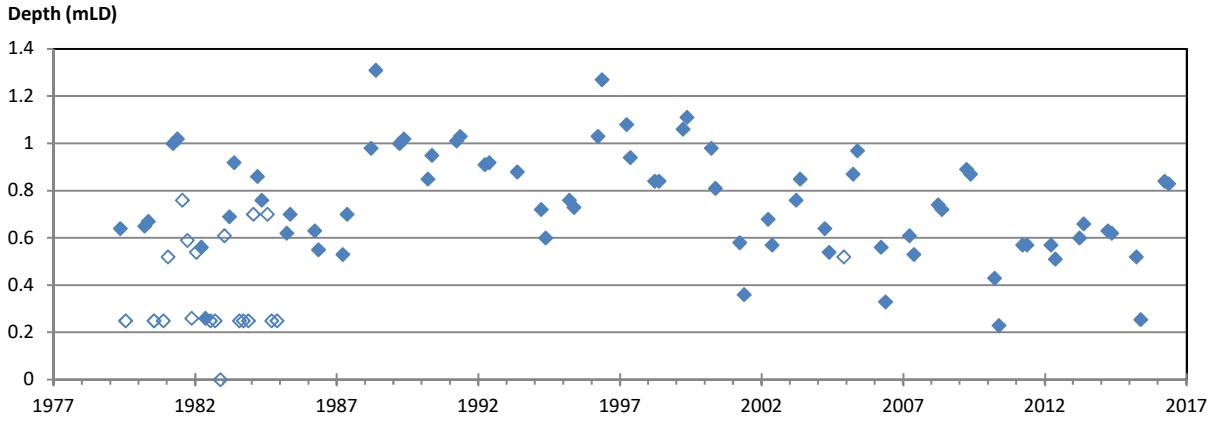


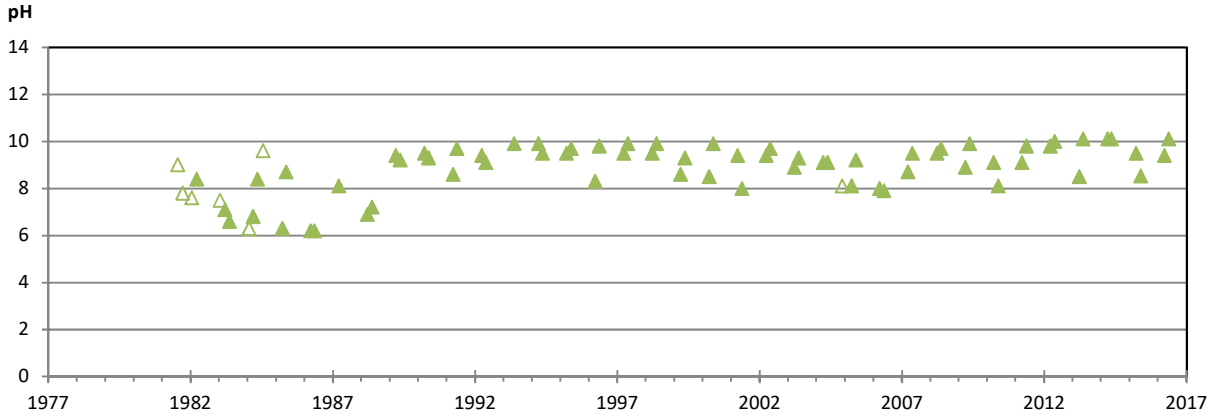


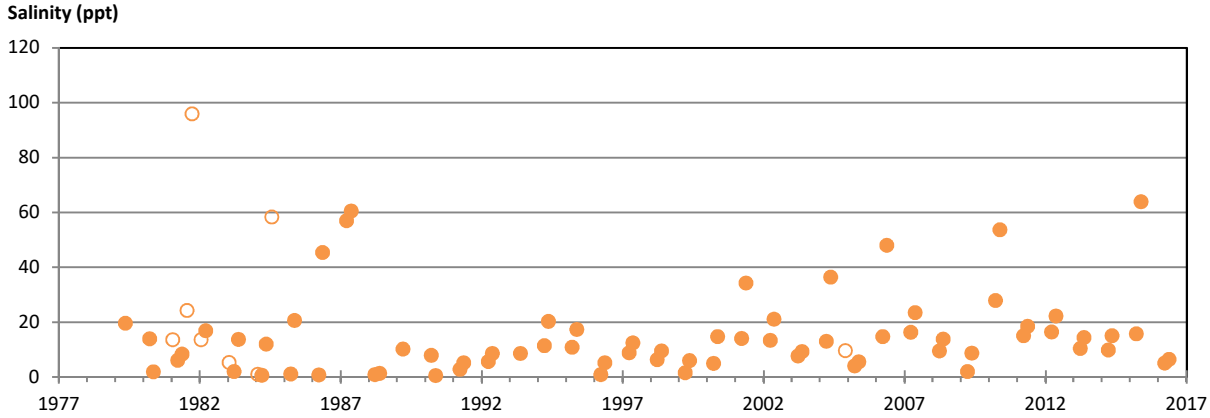
Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from September and November routine monitoring periods only.

Mowen is in the Blackwood District of the South West DBCA Region.

MUIR







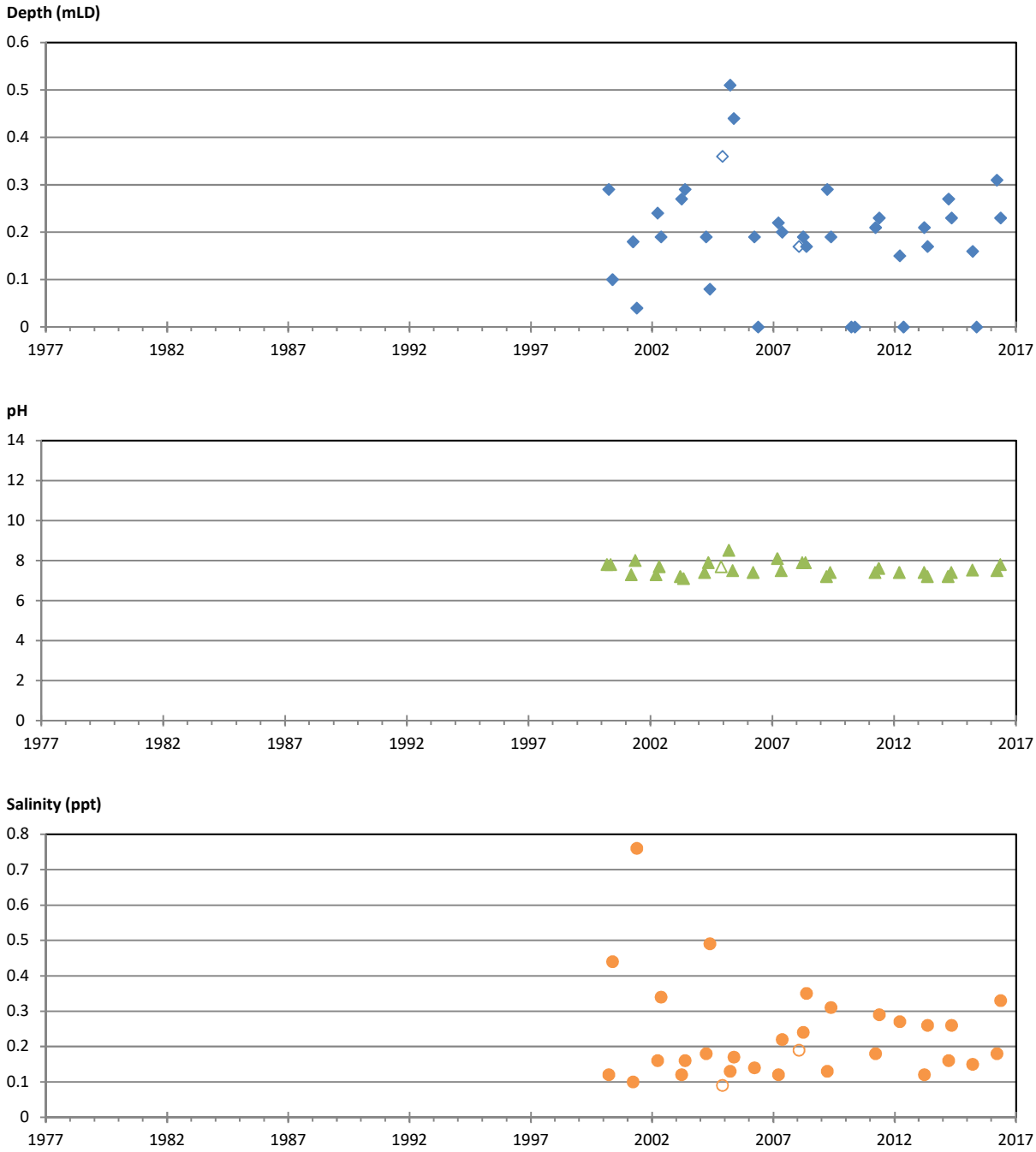
Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Lake Muir is a component of the 'Muir-Byenup System', which is listed as a Wetland of International Importance under the 'Ramsar' Convention on Wetlands.

Lake Muir is also listed in the 'Directory of Important Wetlands in Australia'.

Muir is within the former Muir-Unicup Natural Diversity Recovery Catchment and is in the Donnelly District (headquartered in Pemberton) of the Warren DBCA Region.

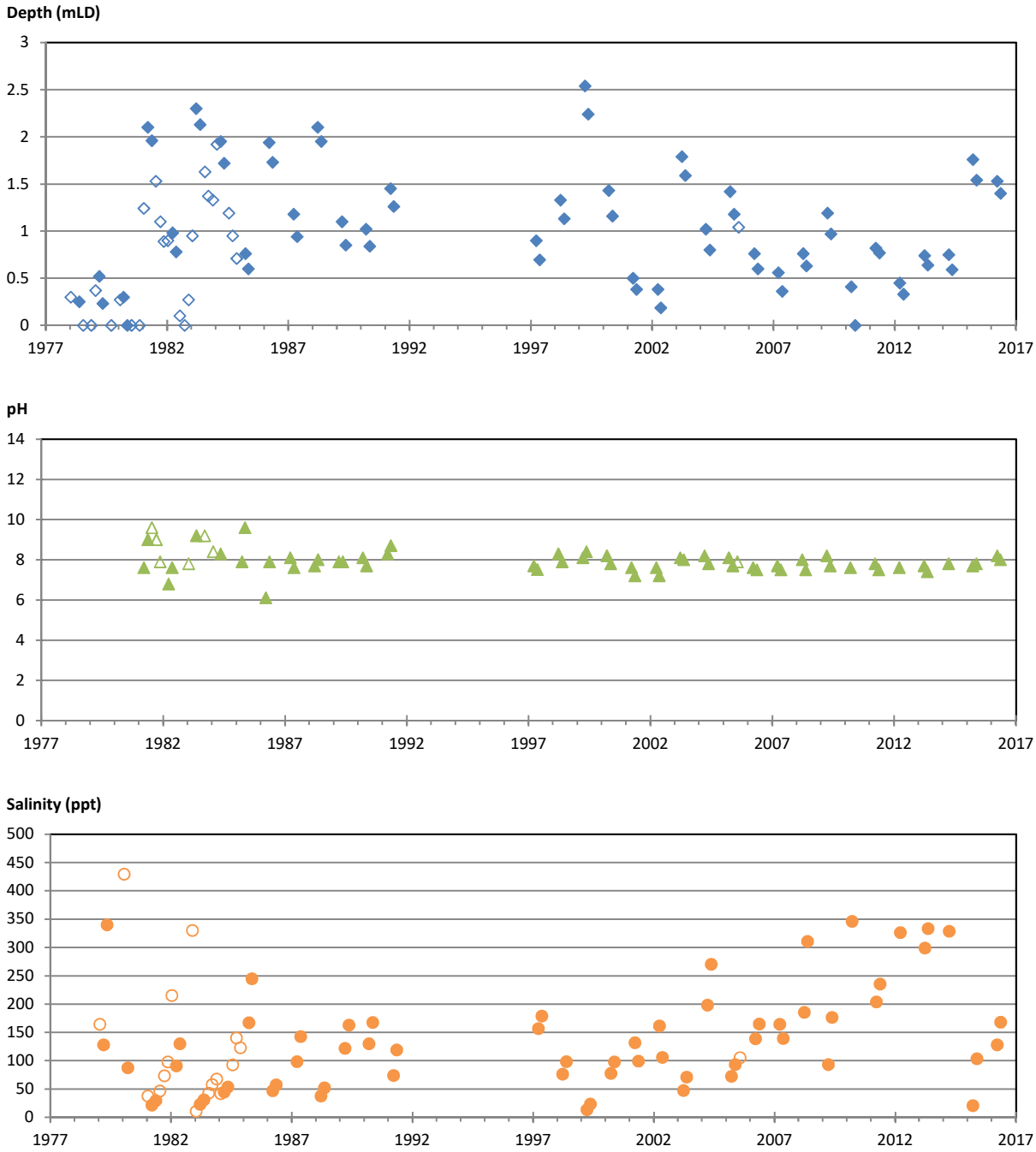
NGOPITCHUP



Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Ngopitchup is in the Southern Wheatbelt geographical area (headquartered in Narrogin) of the Wheatbelt DBCA Region.

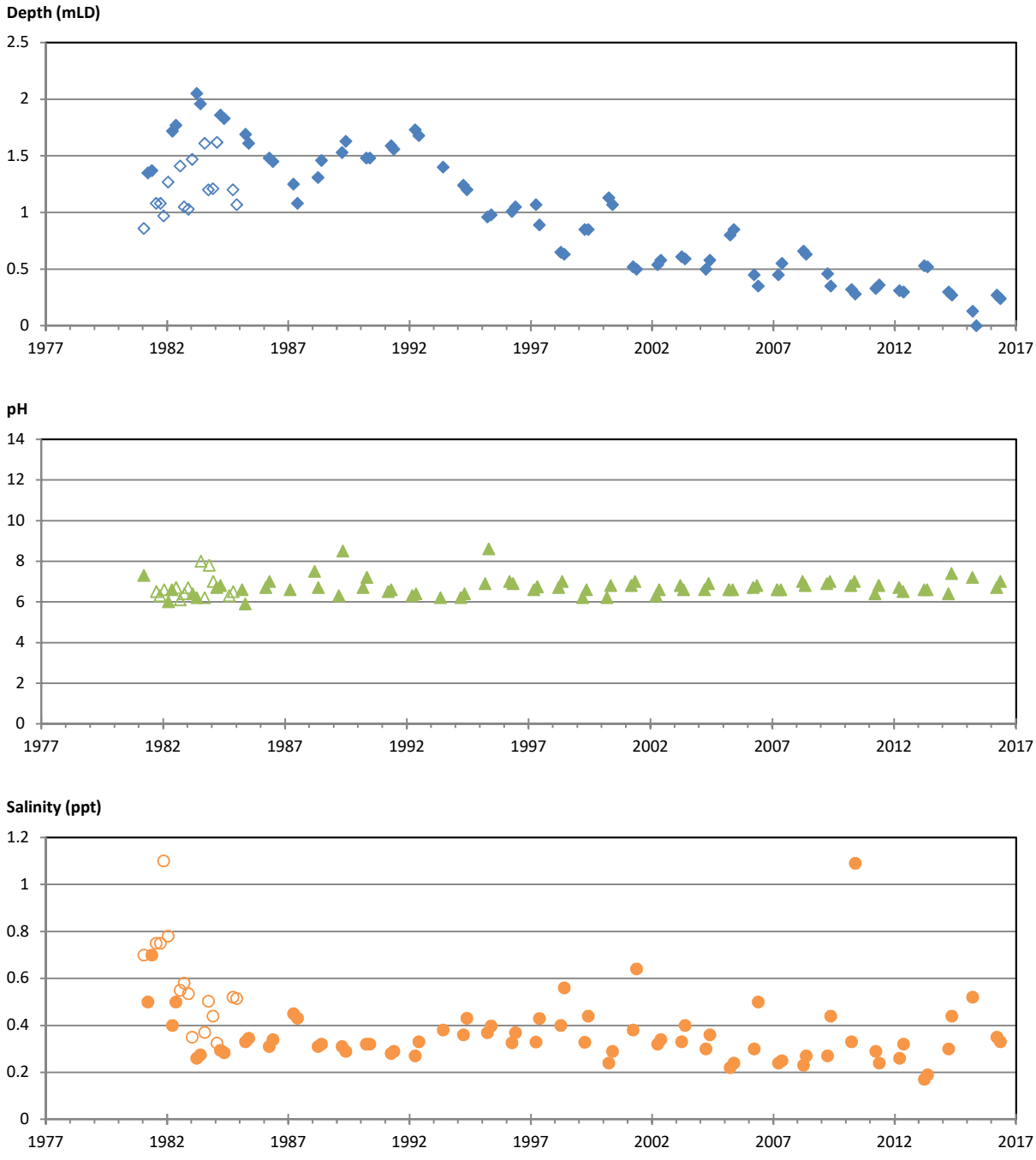
NINAN



Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Ninan is in the Central District (headquartered in Merredin) of the Wheatbelt DBCA Region.

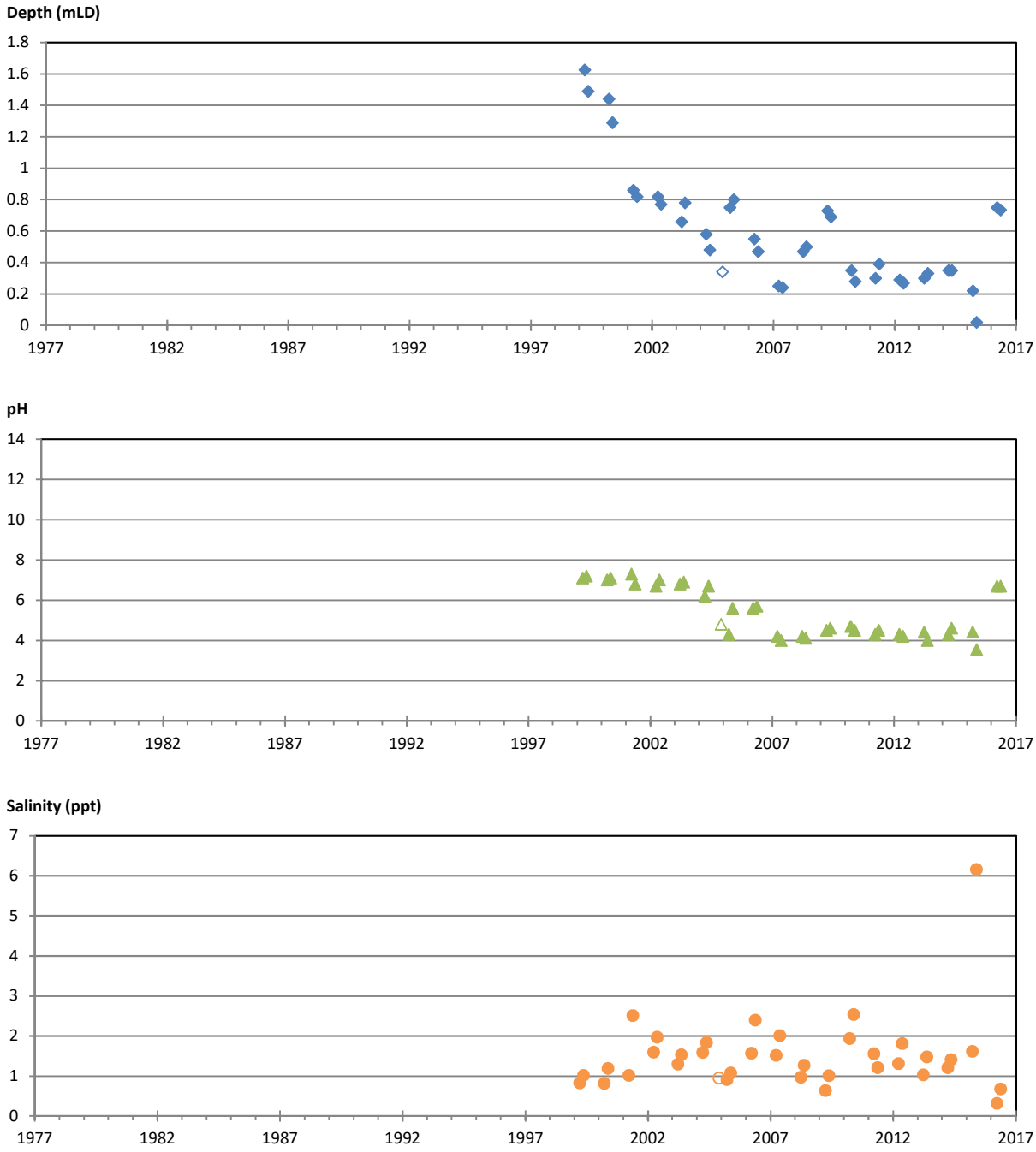
NINE MILE



Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Nine Mile is in the Swan Coastal District (headquartered in Wanneroo) of the Swan DBCA Region.

NOOBIJUP [IM]



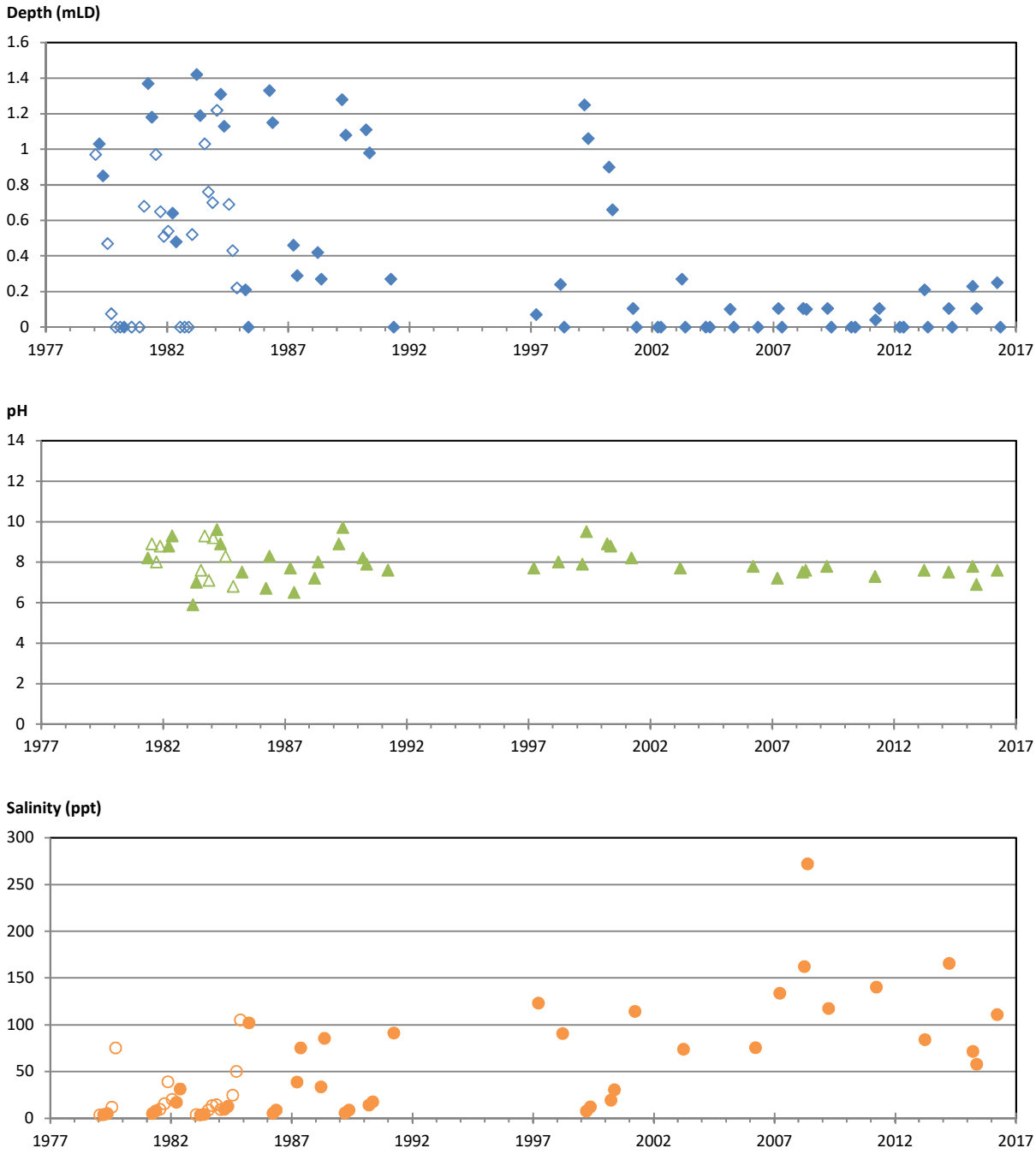
Notes:

1. [IM] indicates this is one of 25 wetlands Intensively Monitored for additional biological and physico-chemical attributes.
2. Year labels are positioned at 1st July each year.
3. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Noobijup is a component of the 'Byenup Lagoon System', which is listed in the 'Directory of Important Wetlands in Australia'.

Noobijup is within the former Muir-Unicup Natural Diversity Recovery Catchment and is in the Donnelly District (headquartered in Pemberton) of the Warren DBCA Region.

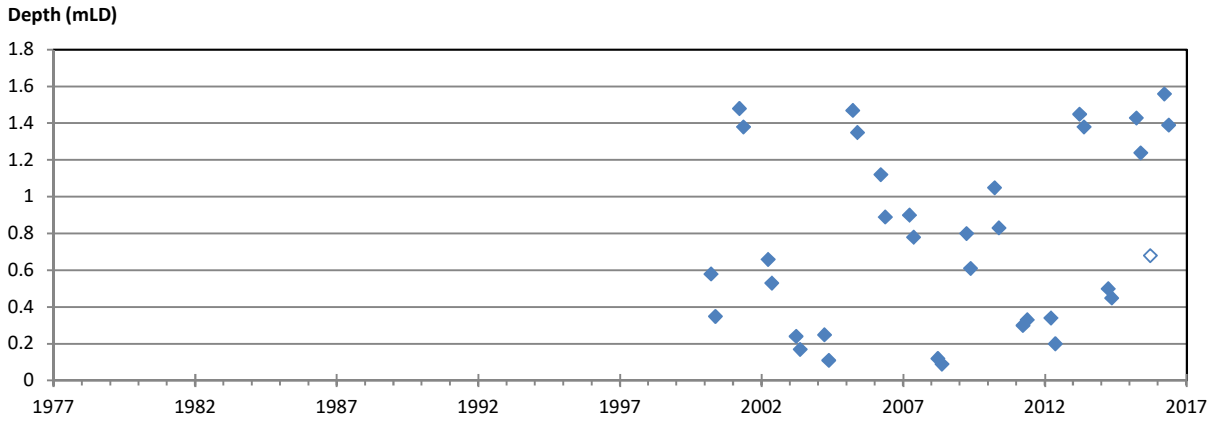
NOONYING

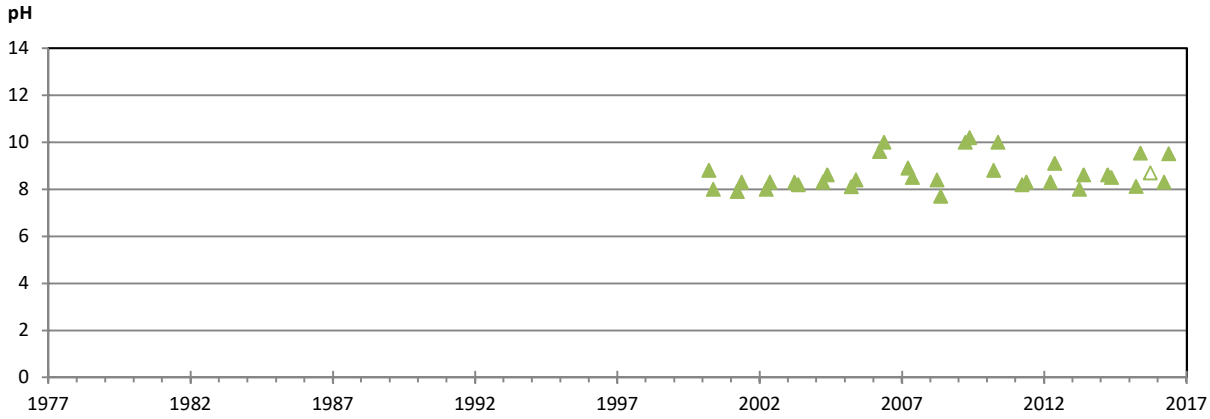


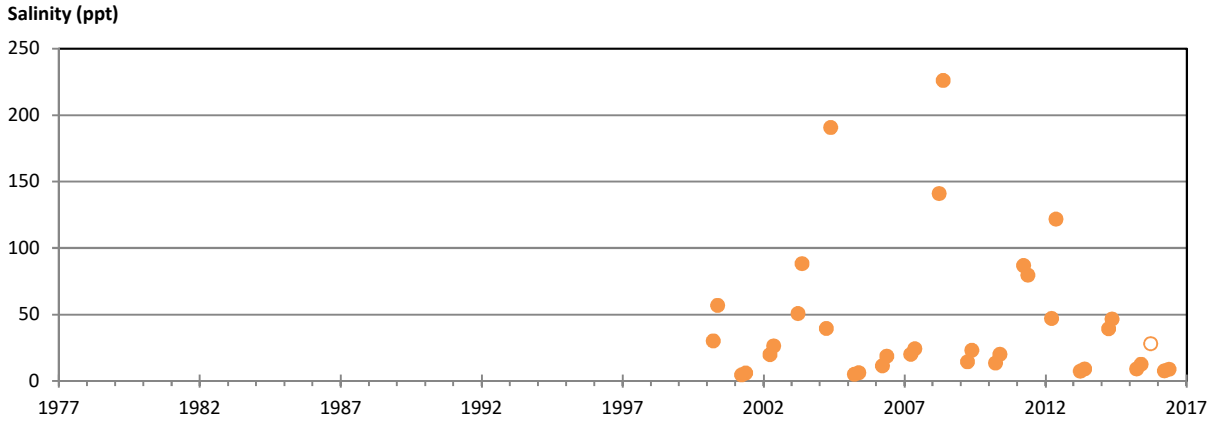
Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Noonying is in the Central District (headquartered in Merredin) of the Wheatbelt DBCA Region.

NORTH PARRIUP



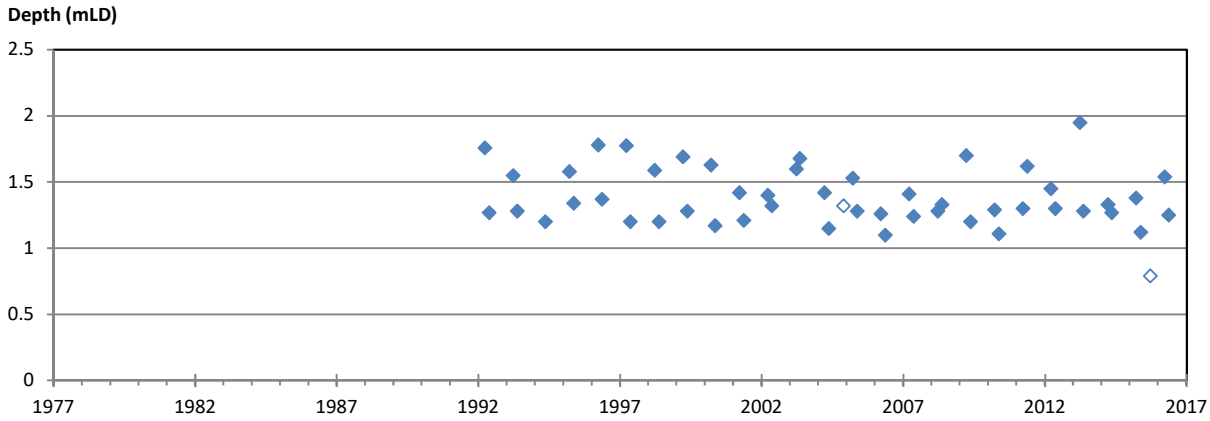


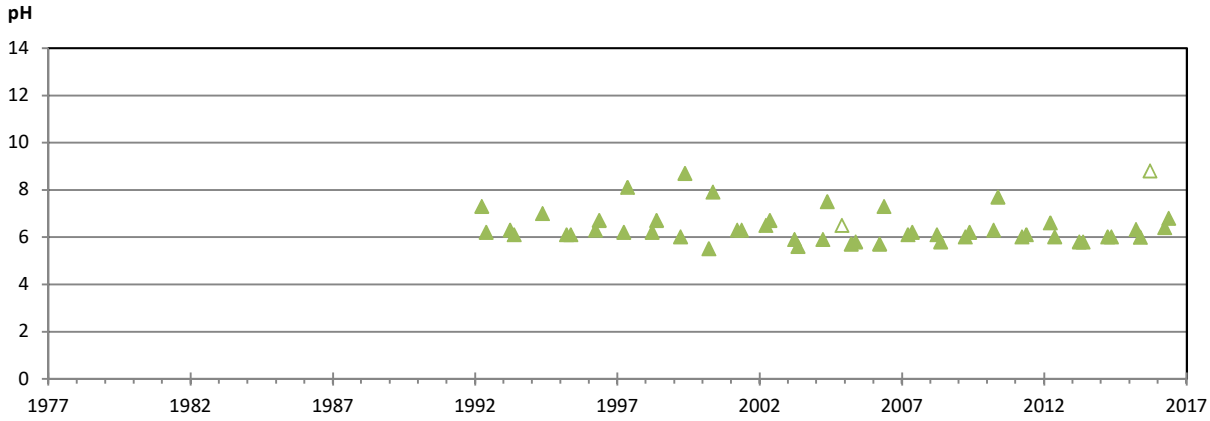


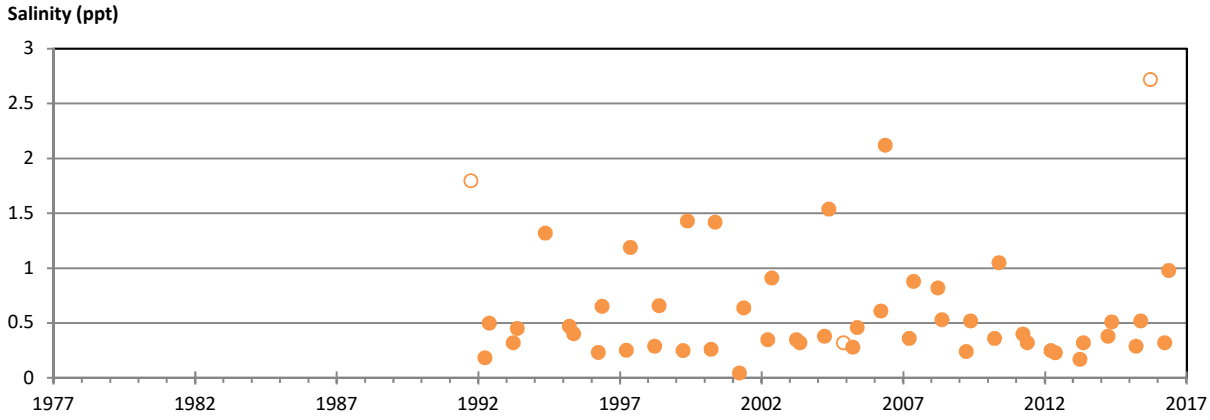
Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

North Parriup is in the Esperance District of the South Coast DBCA Region.

OWINGUP





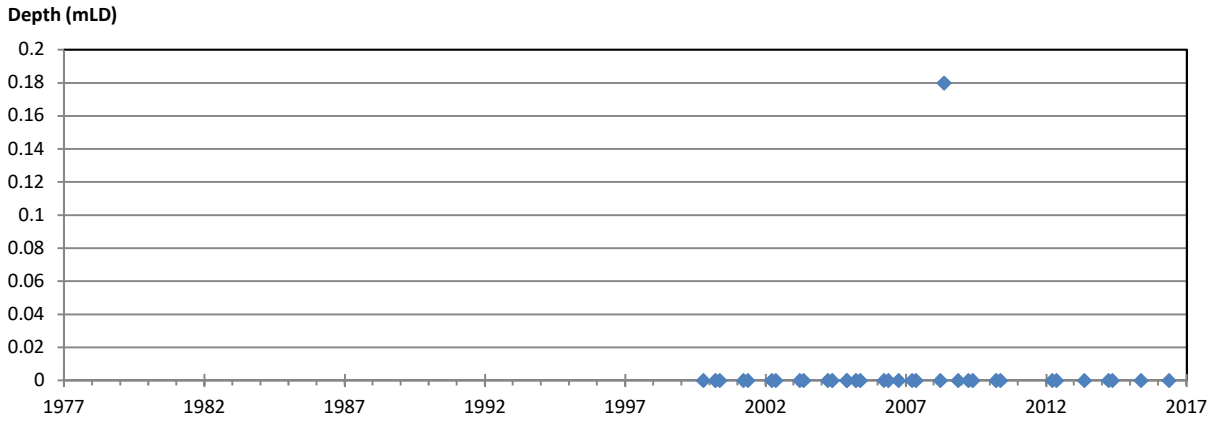


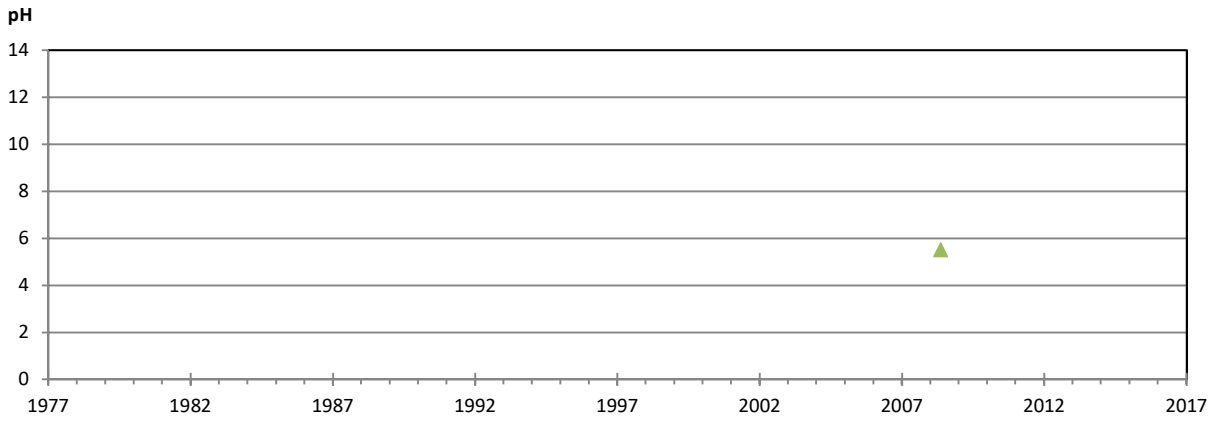
Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

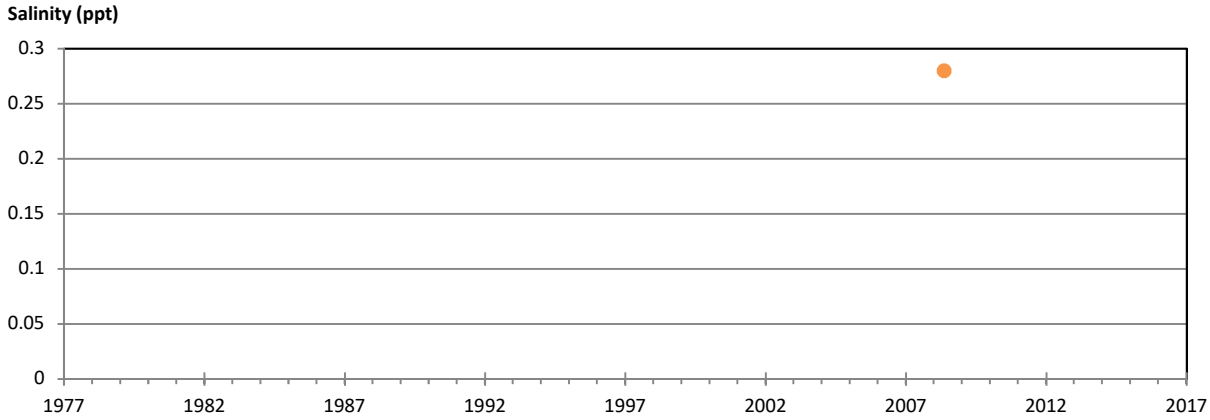
Owingup is a component of the 'Owingup Swamp System', which is listed in the 'Directory of Important Wetlands in Australia'.

Owingup is in the Frankland District (headquartered in Walpole) of the Warren DBCA Region.

PABELUP SOUTH



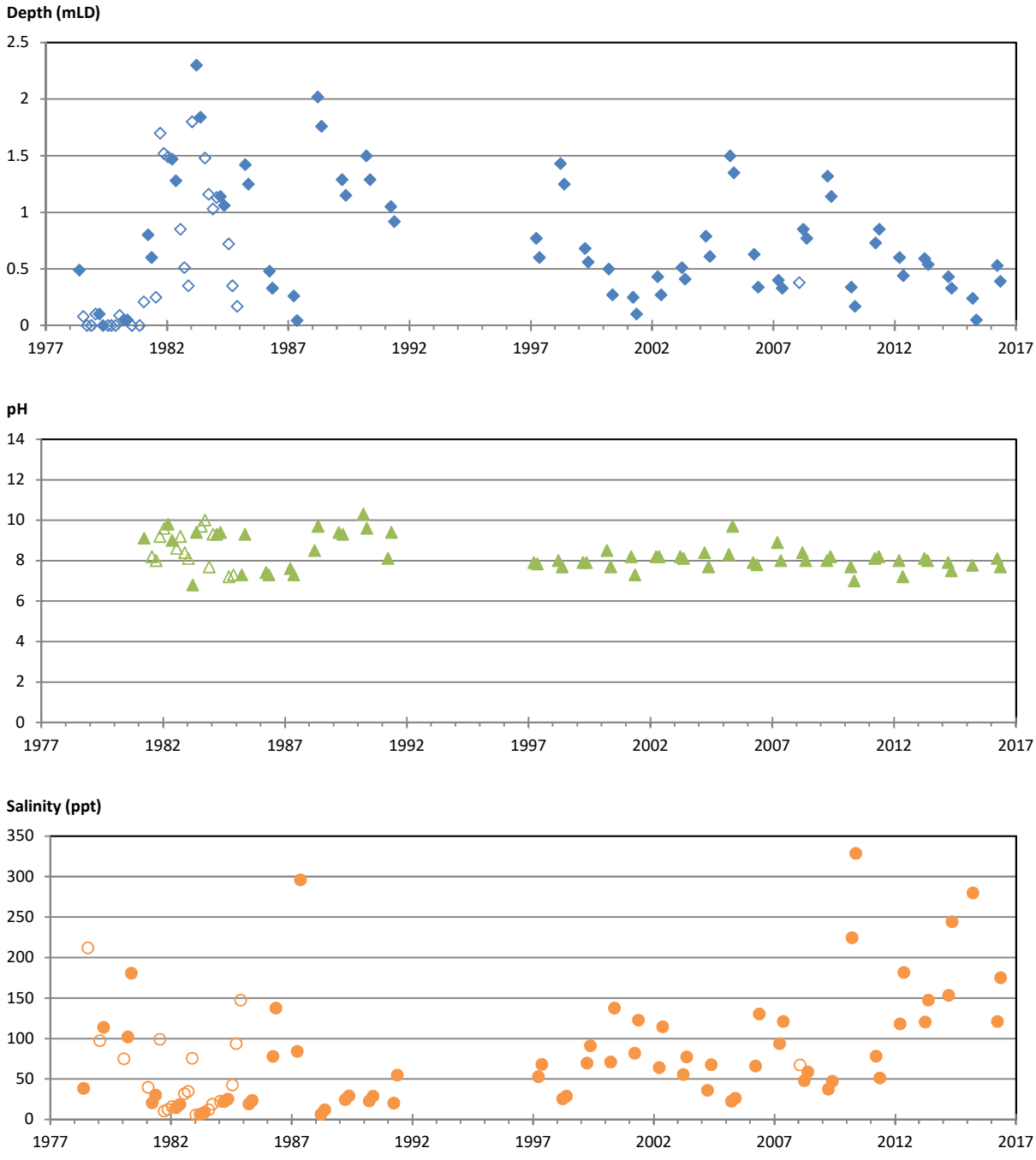




Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from September and November routine monitoring periods only.

Pabelup South is in the Albany District of the South Coast DBCA Region

PARKEYERRING [IM]

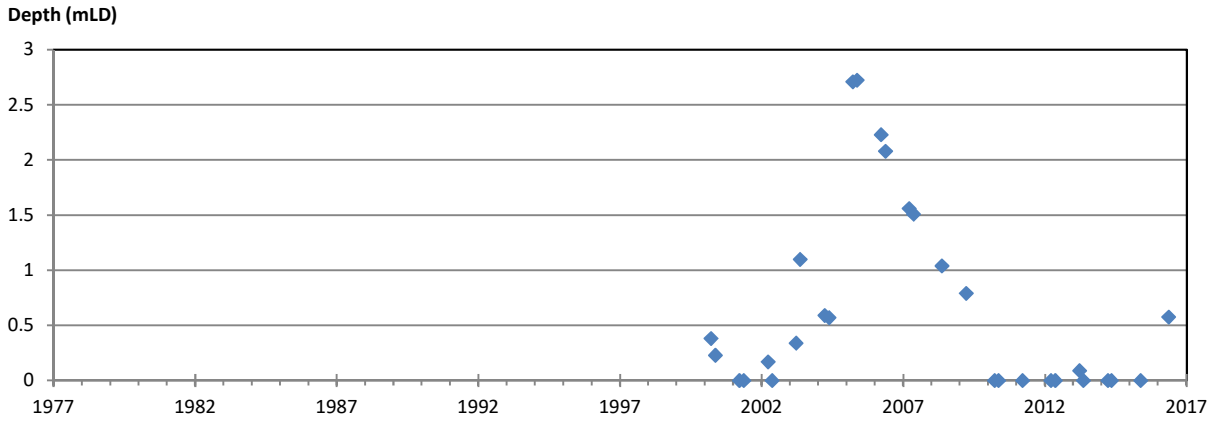


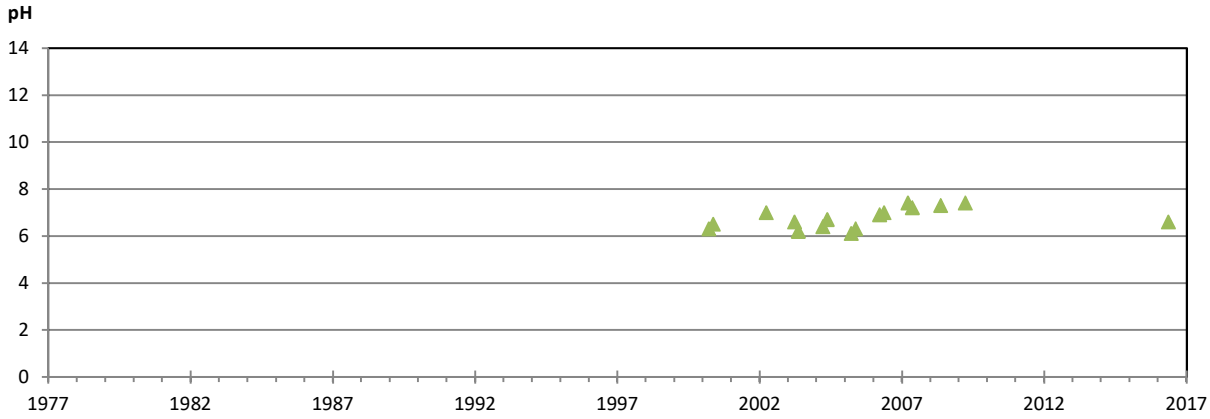
Notes:

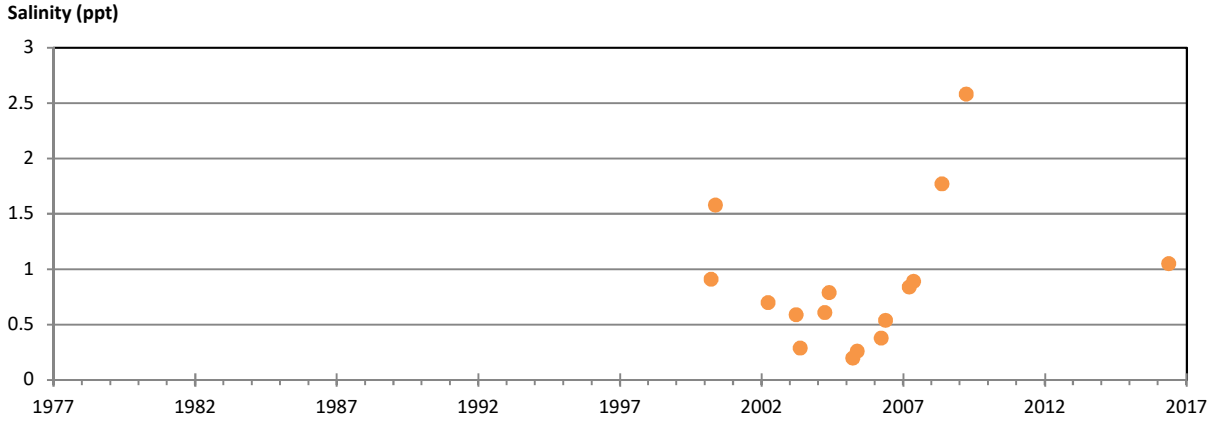
1. [IM] indicates this is one of 25 wetlands Intensively Monitored for additional biological and physico-chemical attributes.
2. Year labels are positioned at 1st July each year.
3. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Parkeyerring is in the Southern Wheatbelt geographical area (headquartered in Narrogin) of the Wheatbelt DBCA Region.

PILLENORUP



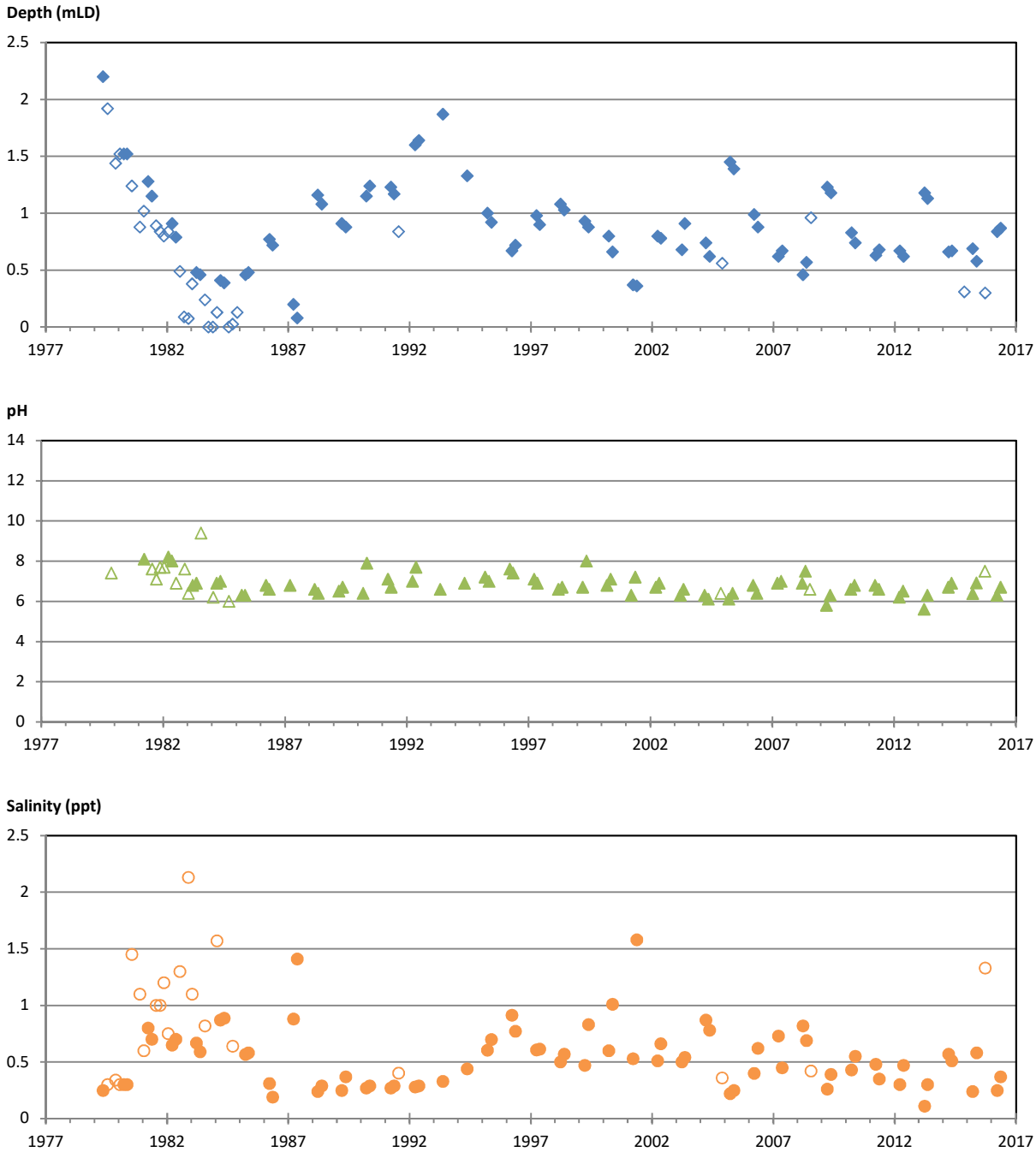




Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from September and November routine monitoring periods only.

Pillenorup is in the Albany District of the South Coast DBCA Region

PLEASANT VIEW [IM]



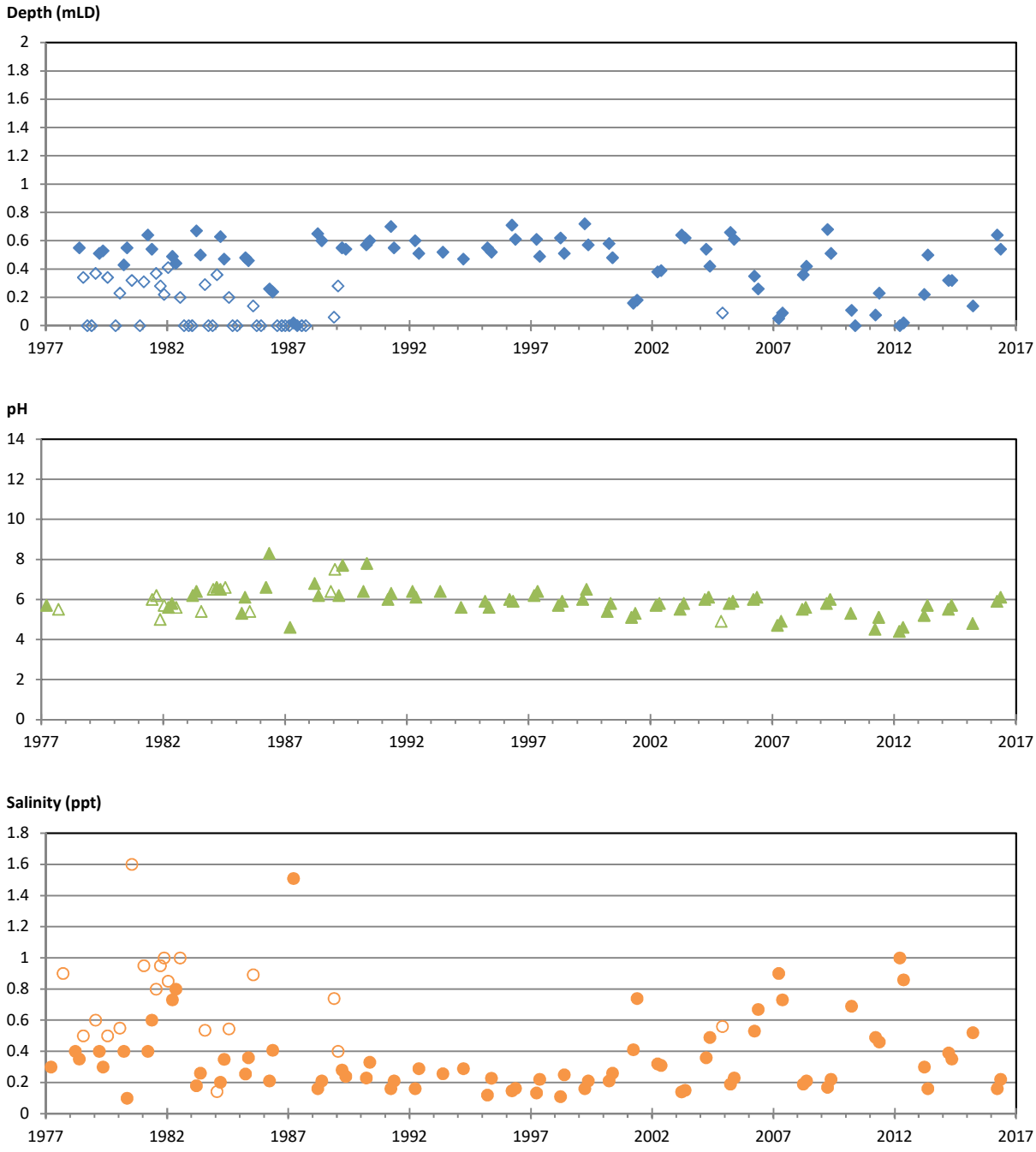
Notes:

1. [IM] indicates this is one of 25 wetlands Intensively Monitored for additional biological and physico-chemical attributes.
2. Year labels are positioned at 1st July each year.
3. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Pleasant View is a component of the 'Lake Pleasant View System', which is listed in the 'Directory of Important Wetlands in Australia'.

Pleasant View is in the Albany District of the South Coast DBCA Region

POORGINUP

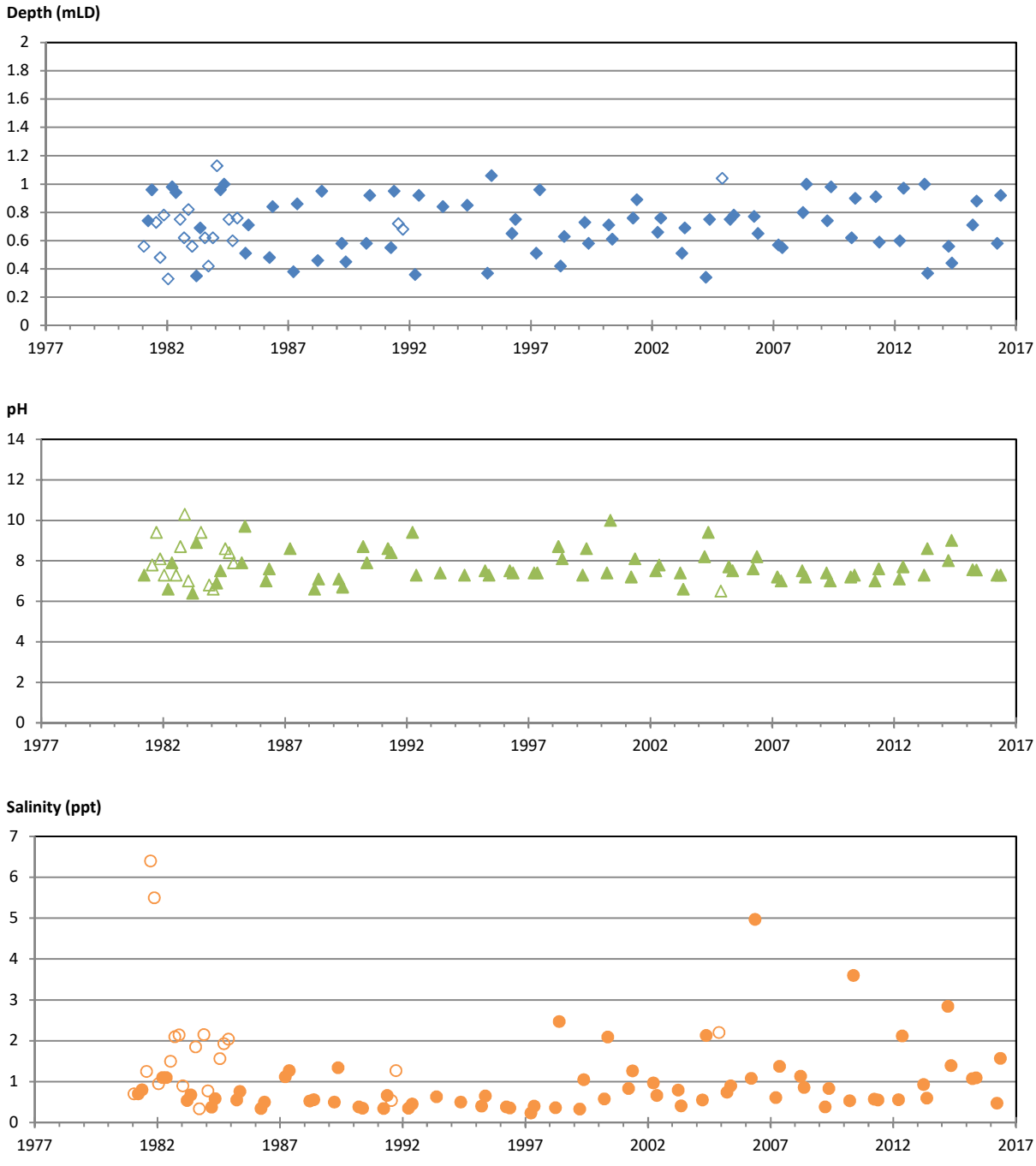


Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Poorginup is a component of the 'Muir-Byenup System', which is listed as a Wetland of International Importance under the 'Ramsar' Convention on Wetlands, and is also a component of the 'Byenup Lagoon System', which is listed in the 'Directory of Important Wetlands in Australia'.

Poorginup is within the former Muir-Unicup Natural Diversity Recovery Catchment and is in the Donnelly District (headquartered in Pemberton) of the Warren DBCA Region.

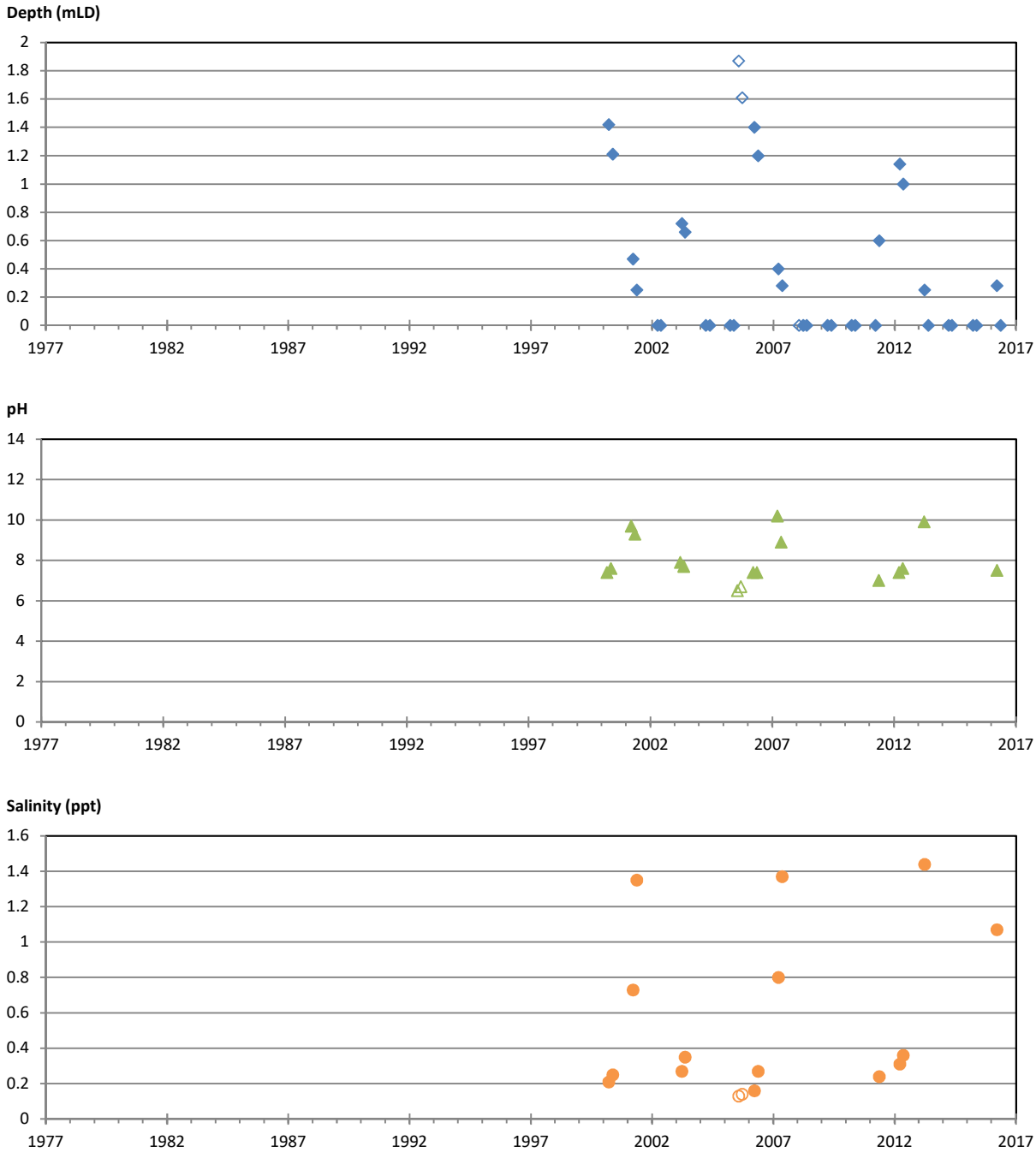
POWELL



Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Powell is in the Albany District of the South Coast DBCA Region

RANGE ROAD YATE

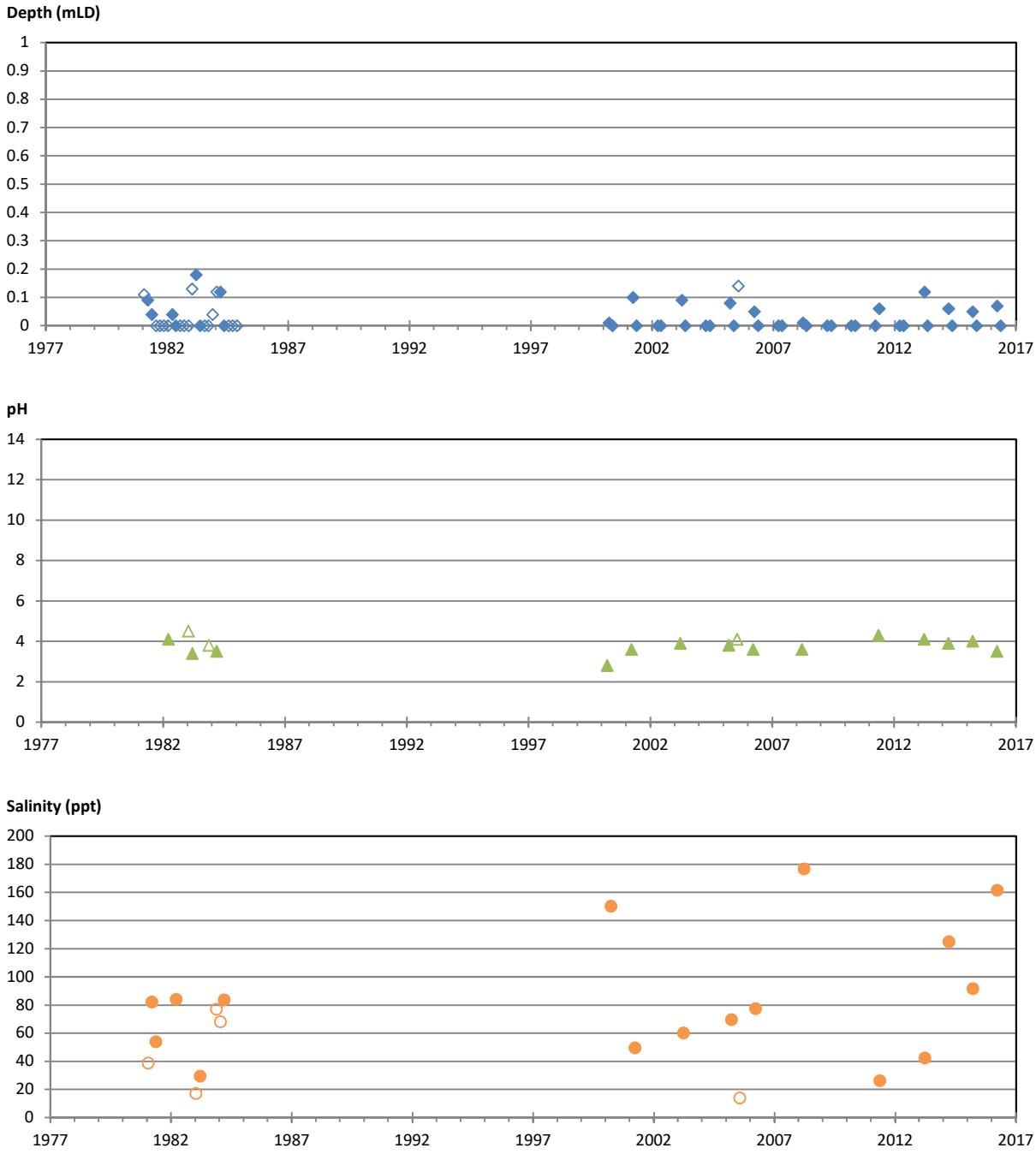


Notes:

1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Range Road Yate is in the Southern Wheatbelt geographical area (headquartered in Narrogin) of the Wheatbelt DBCA Region.

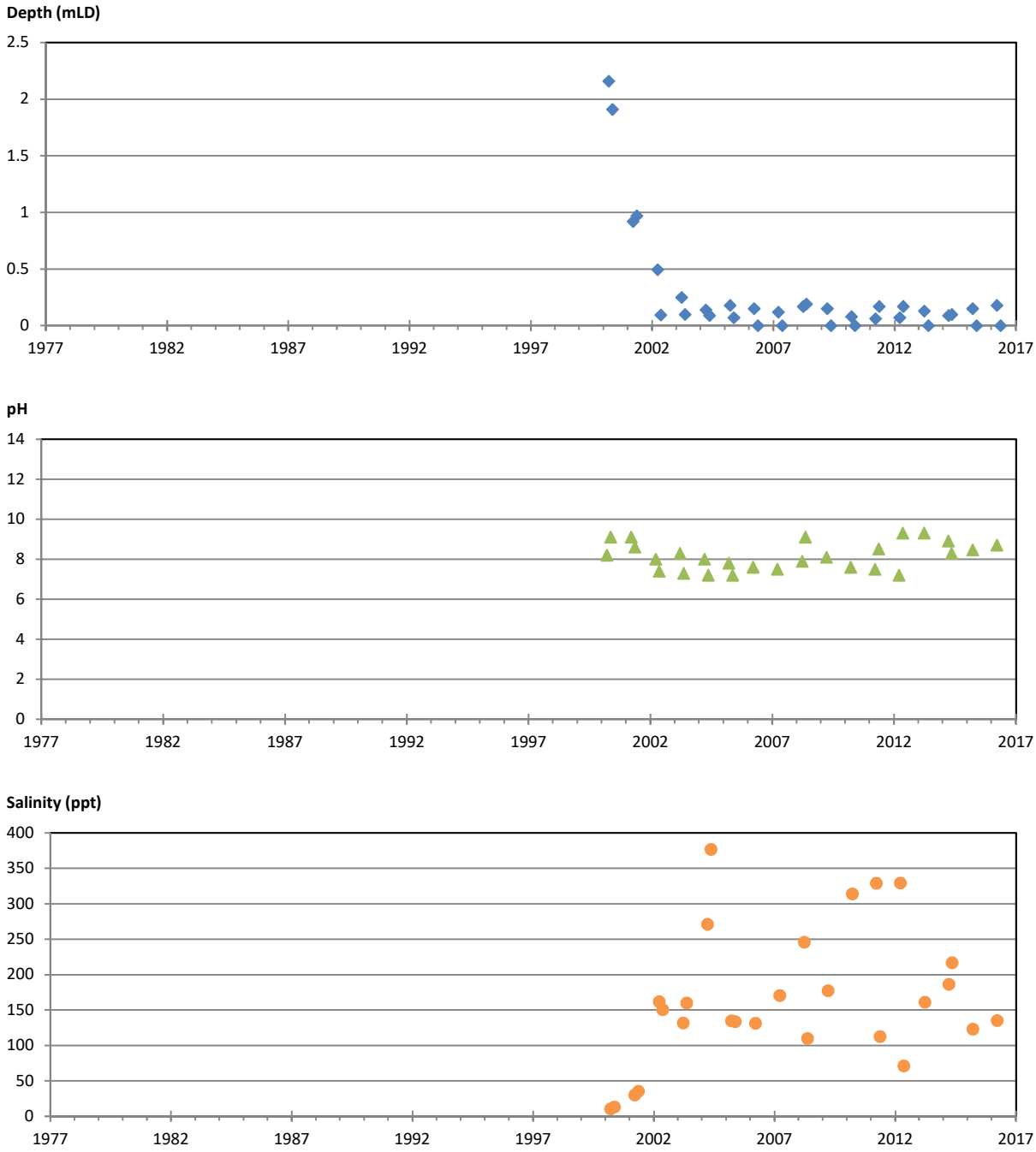
RED (BRUCE ROCK)



Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Red (Bruce Rock) is in the Central District (headquartered in Merredin) of the Wheatbelt DBCA Region.

RONNERUP [IM]

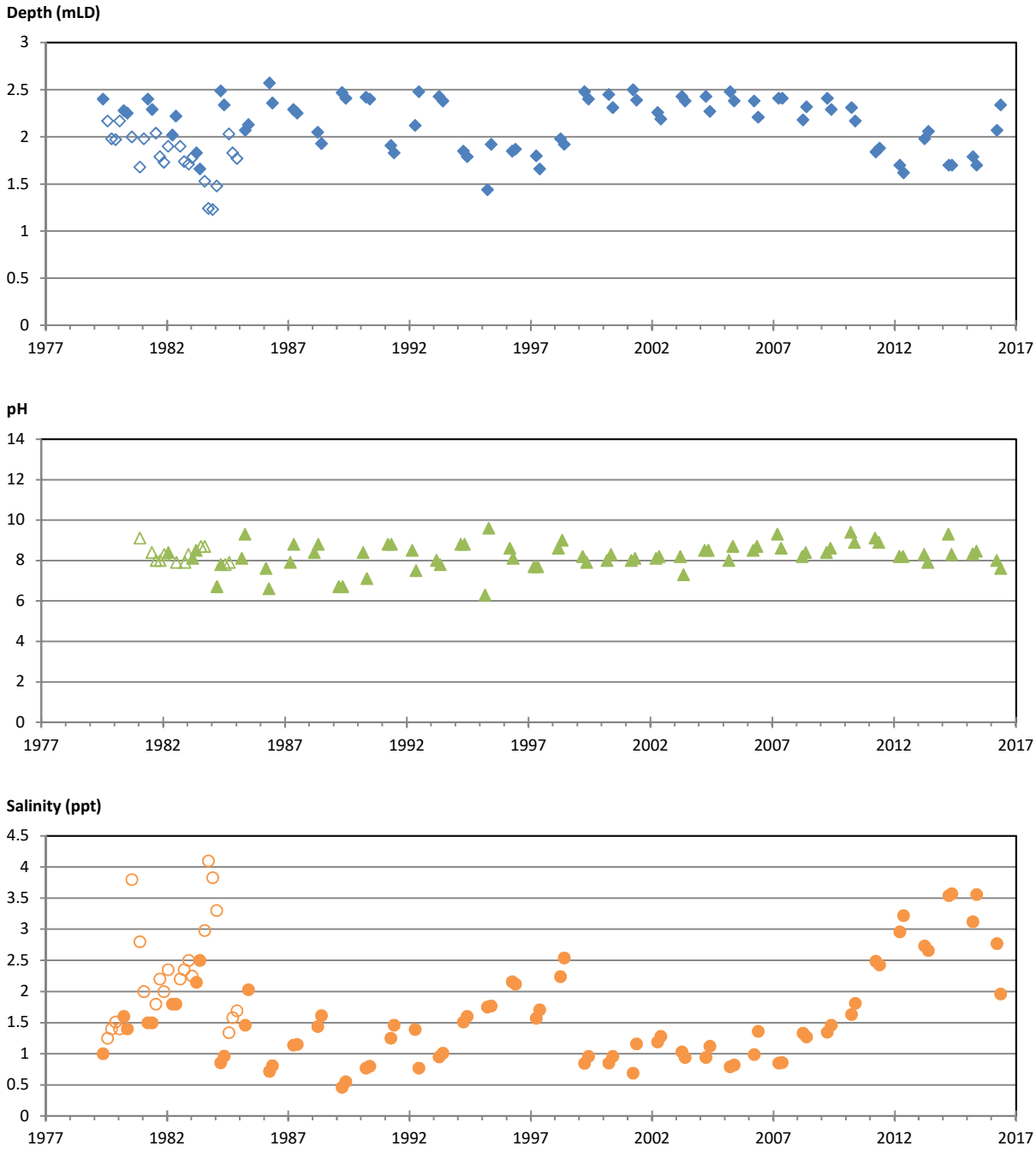


Notes:

1. [IM] indicates this is one of 25 wetlands Intensively Monitored for additional biological and physico-chemical attributes.
2. Year labels are positioned at 1st July each year.
3. Data are from September and November routine monitoring periods only.

Ronnerup is in the Southern Wheatbelt geographical area (headquartered in Narrogin) of the Wheatbelt DBCA Region.

SHARK

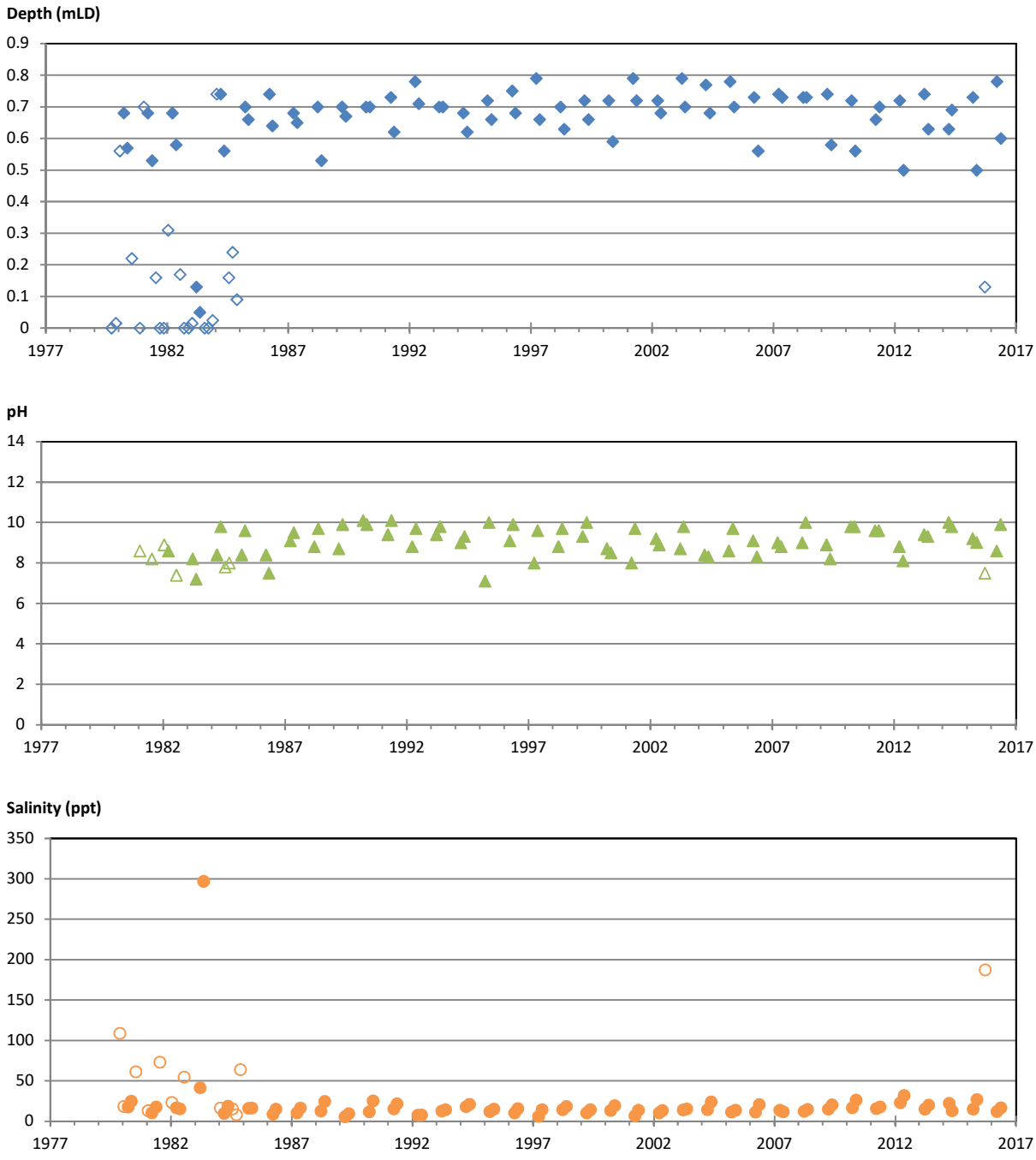


Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Shark is within the former Esperance Lakes Natural Diversity Recovery Catchment.

Shark is in the Esperance District of the South Coast DBCA Region.

STATION (with Salinity axis 0–350 ppt)



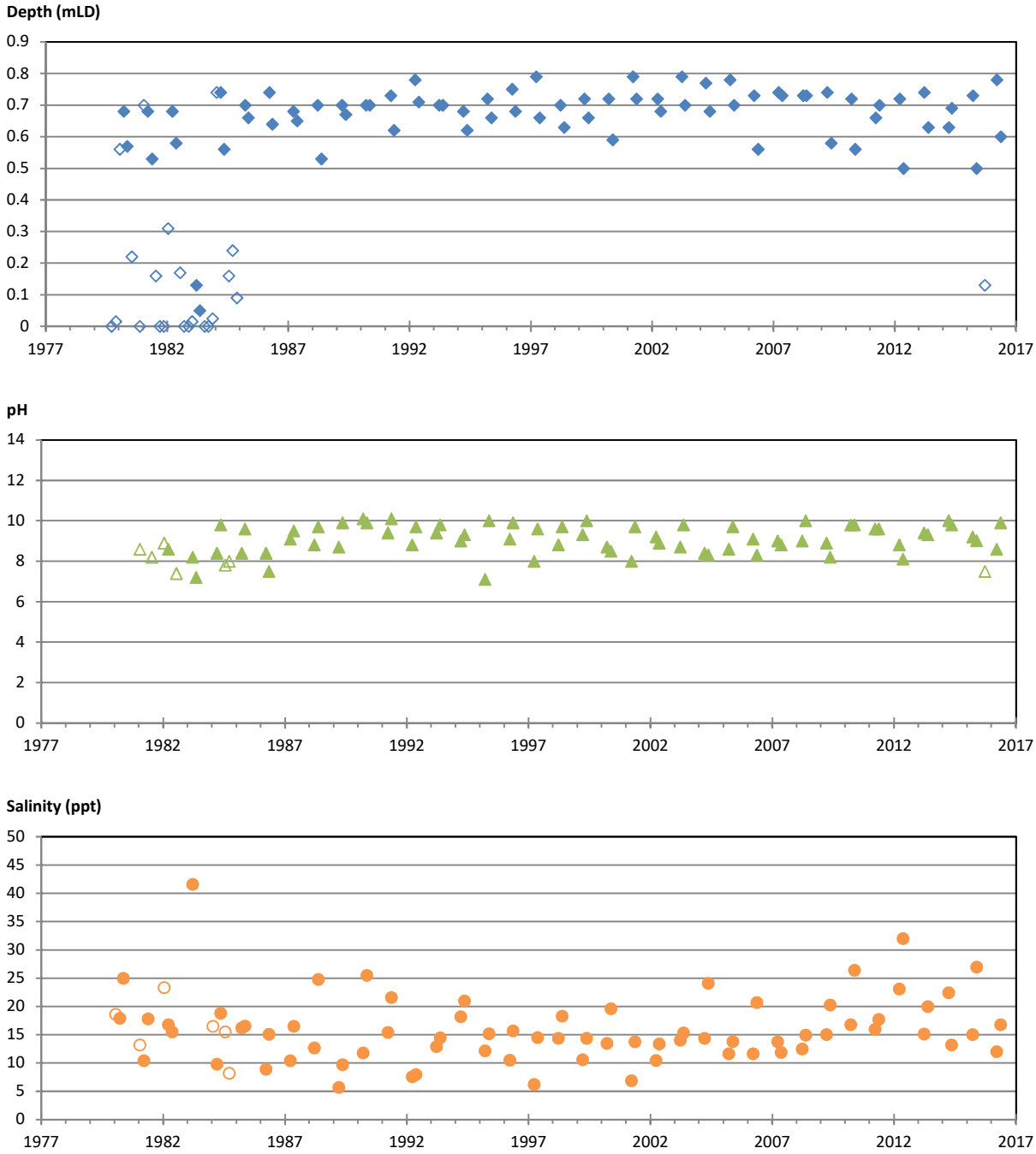
Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Station is a component of the 'Lake Warden System', which is listed as a Wetland of International Importance under the 'Ramsar' Convention on Wetlands.

Station is also a component of the 'Lake Warden System' listed in the 'Directory of Important Wetlands in Australia'.

Station is within the former Esperance Lakes Natural Diversity Recovery Catchment and is in the Esperance District of the South Coast DBCA Region.

STATION (with Salinity axis 0–50 ppt)



Notes:

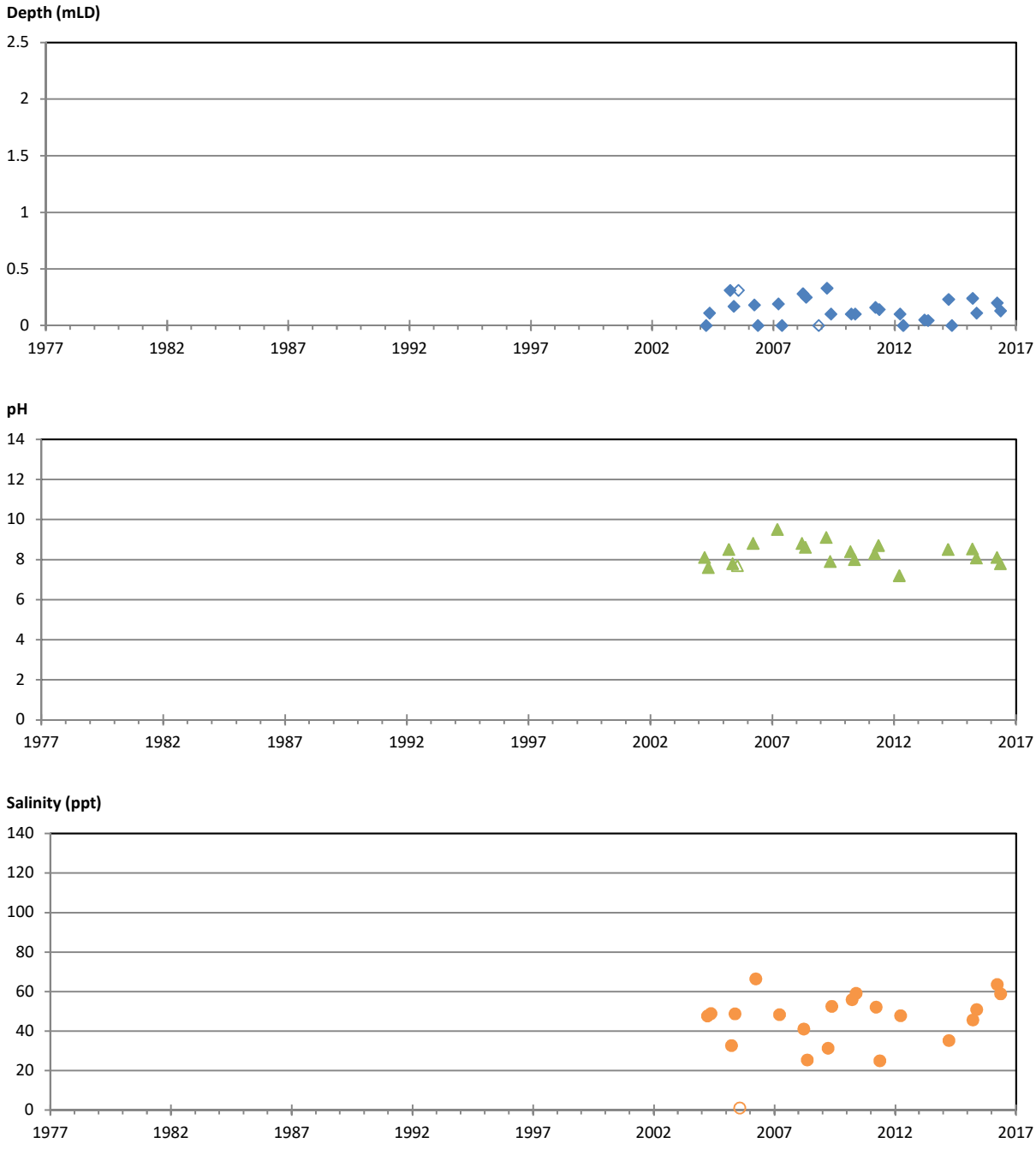
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Station is a component of the 'Lake Warden System', which is listed as a Wetland of International Importance under the 'Ramsar' Convention on Wetlands.

Station is also a component of the 'Lake Warden System' listed in the 'Directory of Important Wetlands in Australia'.

Station is within the former Esperance Lakes Natural Diversity Recovery Catchment and is in the Esperance District of the South Coast DBCA Region.

TAARBLIN (NORTH)

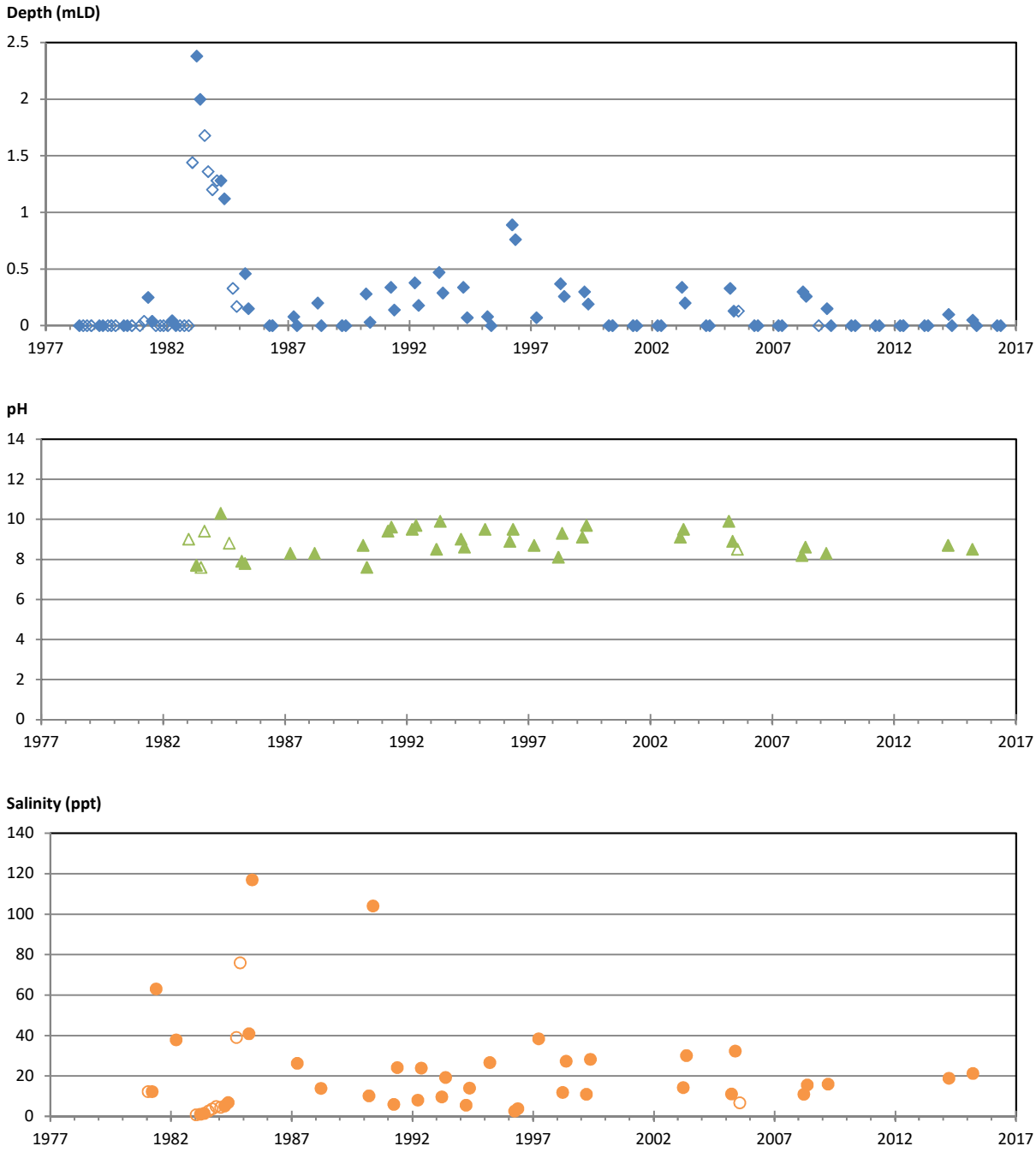


Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Taarblin (North) is a short distance downstream from, and receives pumped, bypassed and potentially overflow water from, the Toolibin Lake Natural Diversity Recovery Catchment.

Taarblin (North) is in the Southern Wheatbelt geographical area (headquartered in Narrogin) of the Wheatbelt DBCA Region.

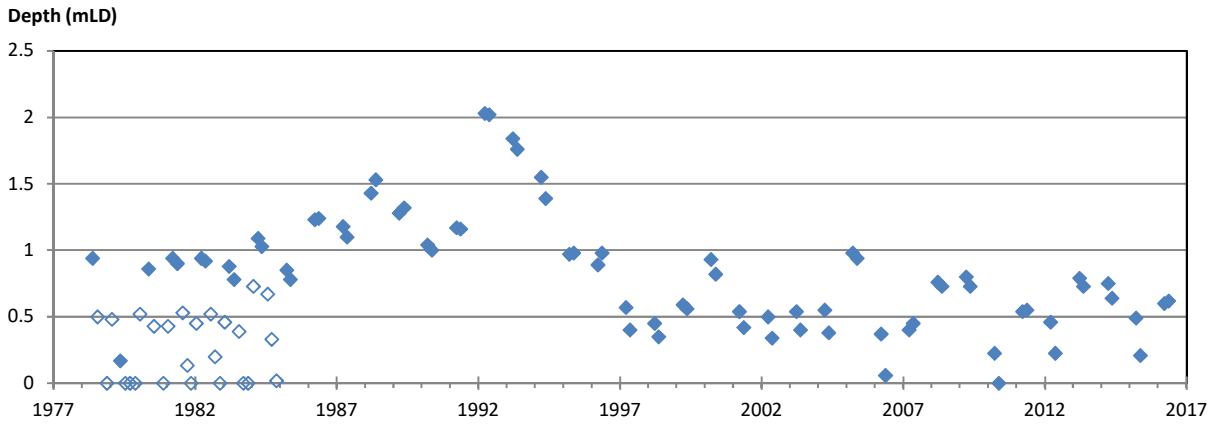
TAARBLIN (SOUTH)

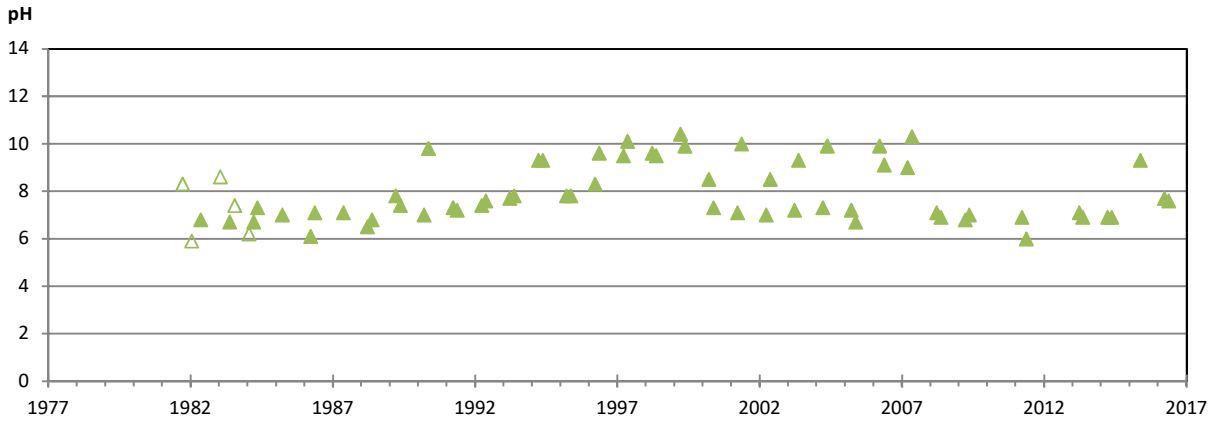


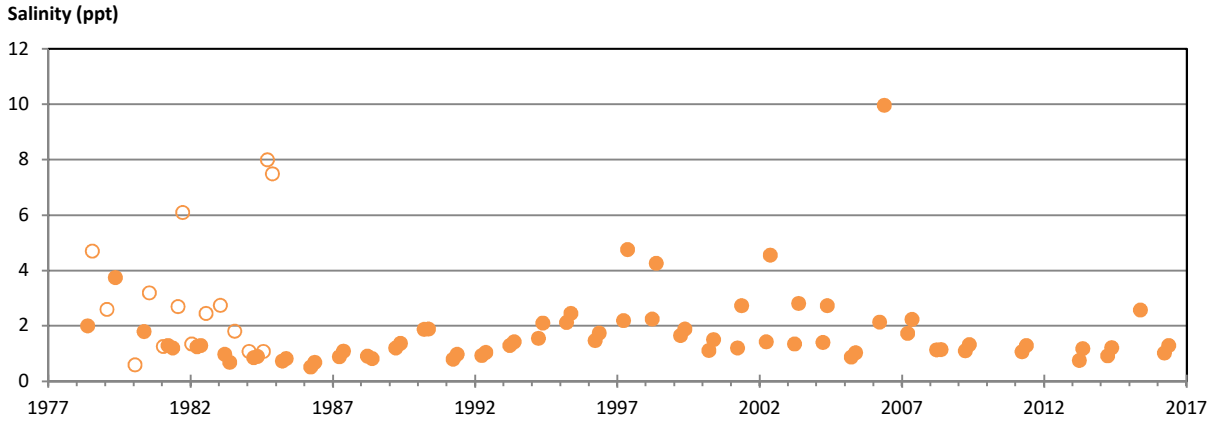
Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Taarblin (South) is in the Southern Wheatbelt geographical area (headquartered in Narrogin) of the Wheatbelt DBCA Region.

THOMSONS





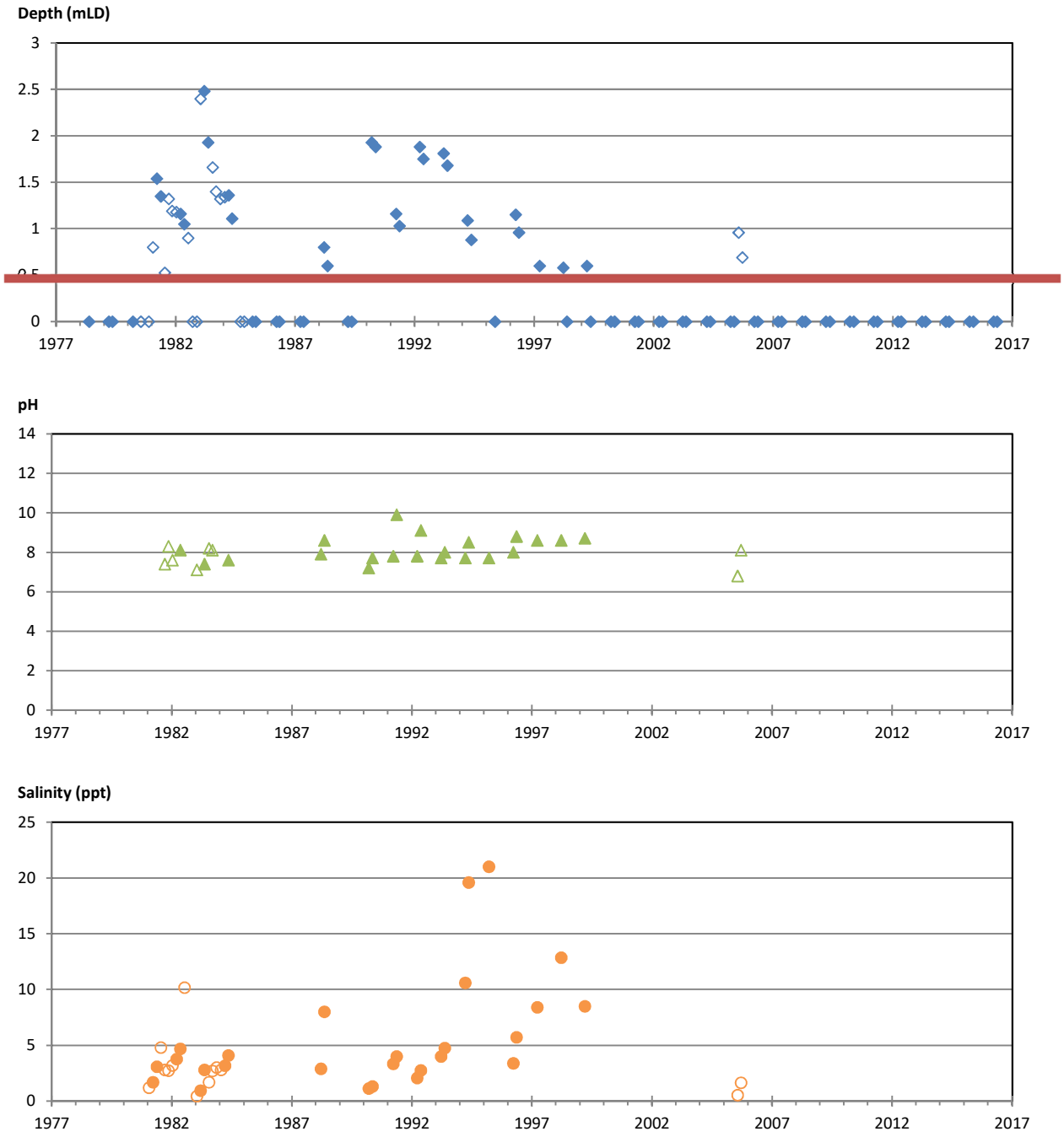


Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Thomsons Lake is a component of the 'Forrestdale and Thomsons Lakes' system, which is listed as a Wetland of International Importance under the 'Ramsar' Convention on Wetlands, and is also listed in the 'Directory of Important Wetlands in Australia'.

Thomsons is in the Swan Coastal District (headquartered in Wanneroo) of the Swan DBCA Region.

TOOLIBIN [IM]



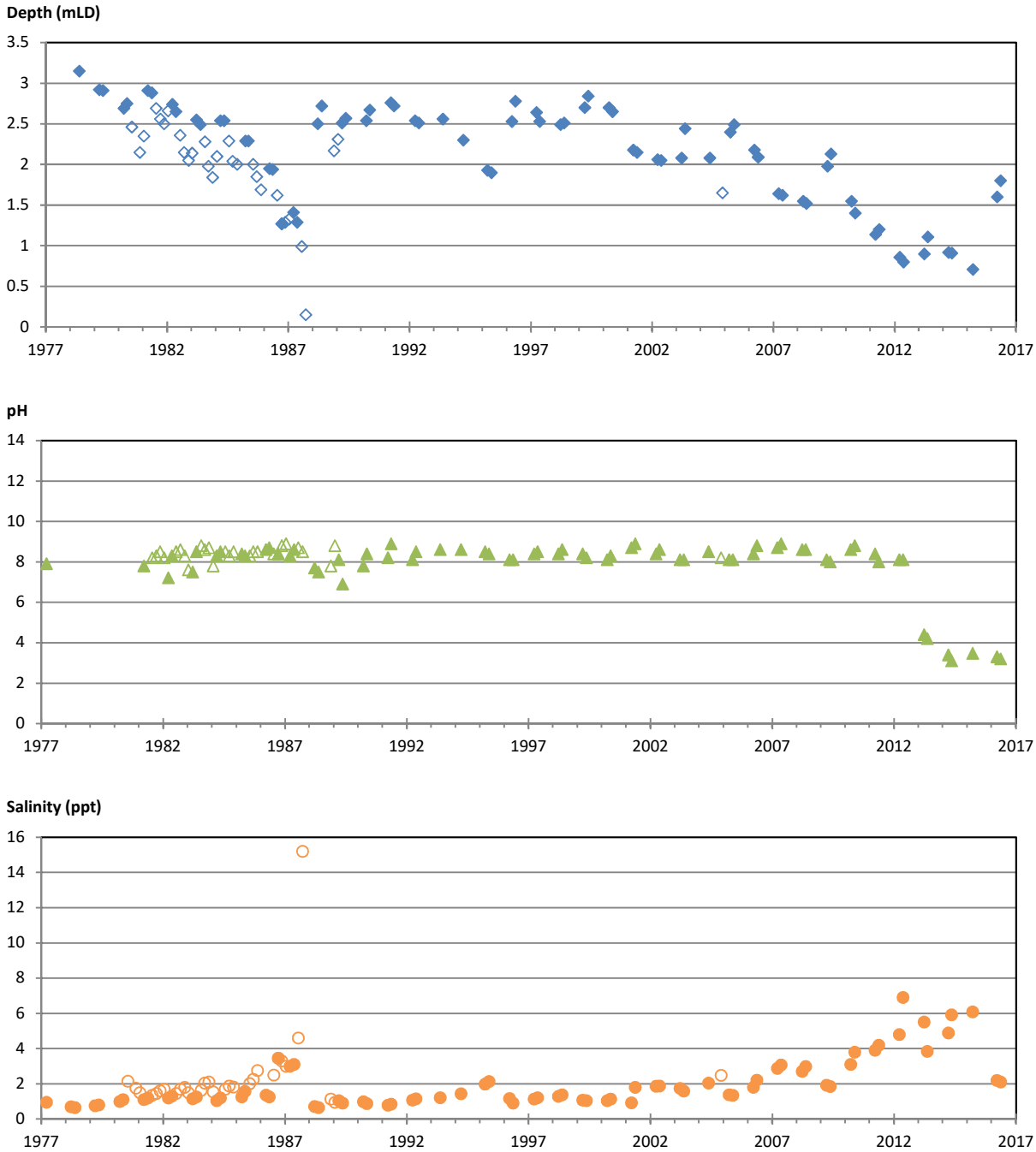
Notes:

1. [IM] indicates this is one of 25 wetlands Intensively Monitored for additional biological and physico-chemical attributes.
2. Year labels are positioned at 1st July each year.
3. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.
4. Some depth recordings less than ≈ 0.5m at Toolibin are problematic. Contact author J. Lane for guidance.

Toolibin Lake is listed as a Wetland of International Importance under the 'Ramsar' Convention on Wetlands and is also listed in the 'Directory of Important Wetlands in Australia'.

Toolibin is in the Toolibin Lake Natural Diversity Recovery Catchment and is in the Southern Wheatbelt geographical area (headquartered in Narrogin) of the Wheatbelt DBCA Region.

TORDIT-GURRUP

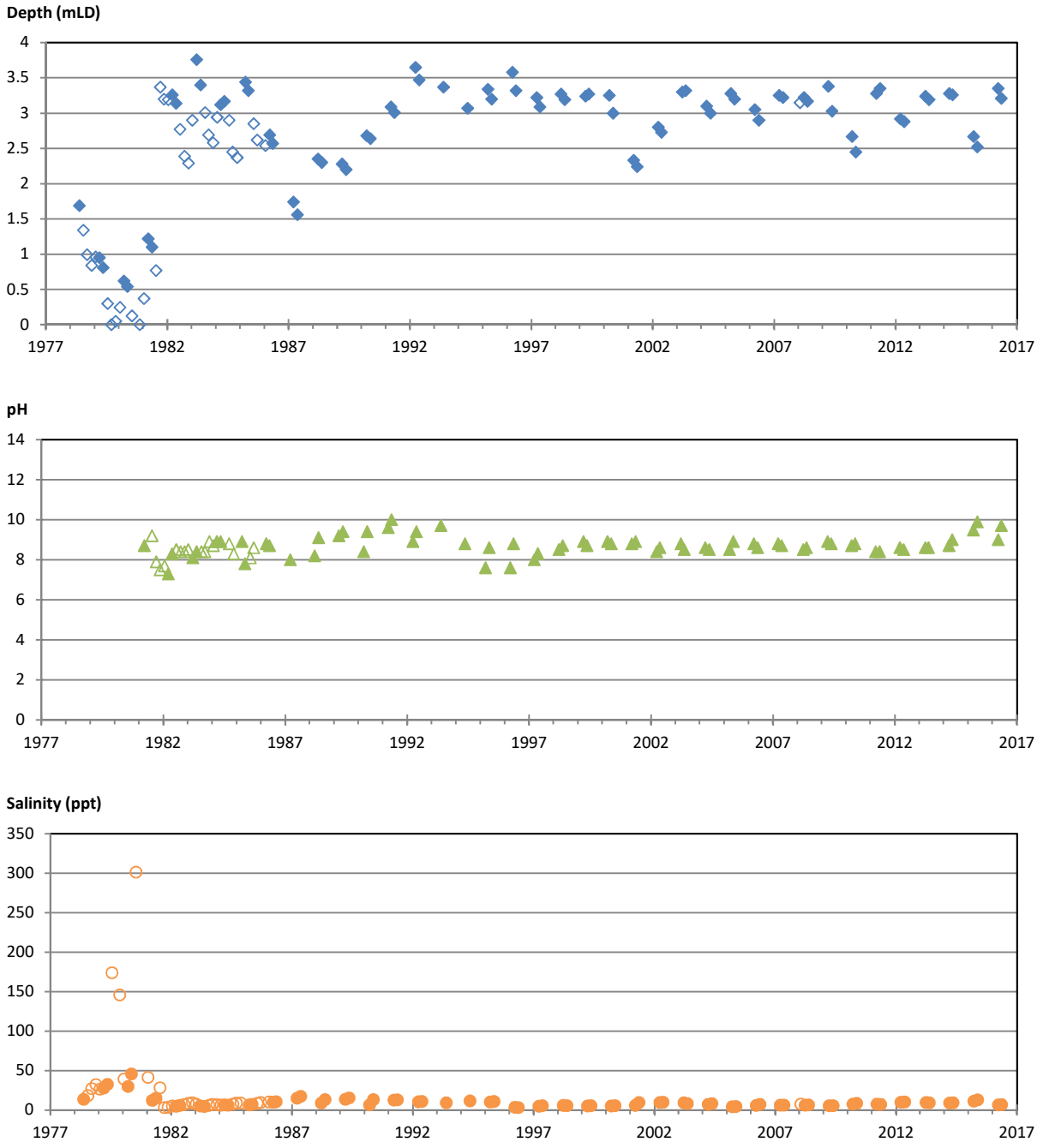


Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Tordit-Gurrup is a component of the 'Muir-Byenup System', which is listed as a Wetland of International Importance under the 'Ramsar' Convention on Wetlands, and is also a component of the 'Byenup Lagoon System' listed in the 'Directory of Important Wetlands in Australia'.

Tordit-Gurrup is within the former Muir-Unicup Natural Diversity Recovery Catchment and is in the Donnelly District (headquartered in Pemberton) of the Warren DBCA Region.

TOWERRINNING [IM] (with Salinity axis 0–350 ppt)

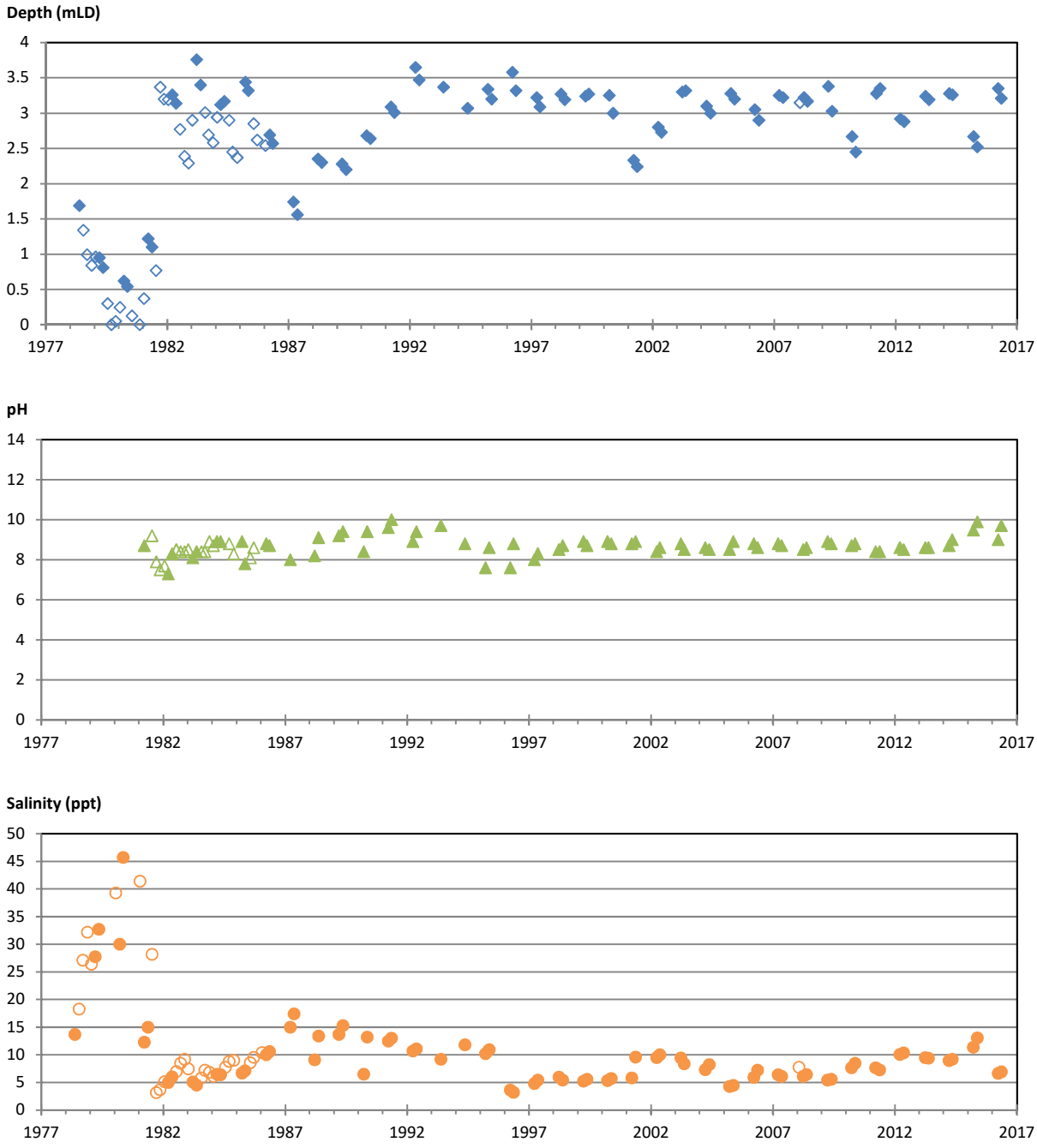


Notes:

1. [IM] indicates this is one of 25 wetlands Intensively Monitored for additional biological and physico-chemical attributes.
2. Year labels are positioned at 1st July each year.
3. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Towerrinning is in the Wellington District (headquartered in Collie) of the South West DBCA Region.

TOWERRINNING [IM] (with Salinity axis 0–50 ppt)

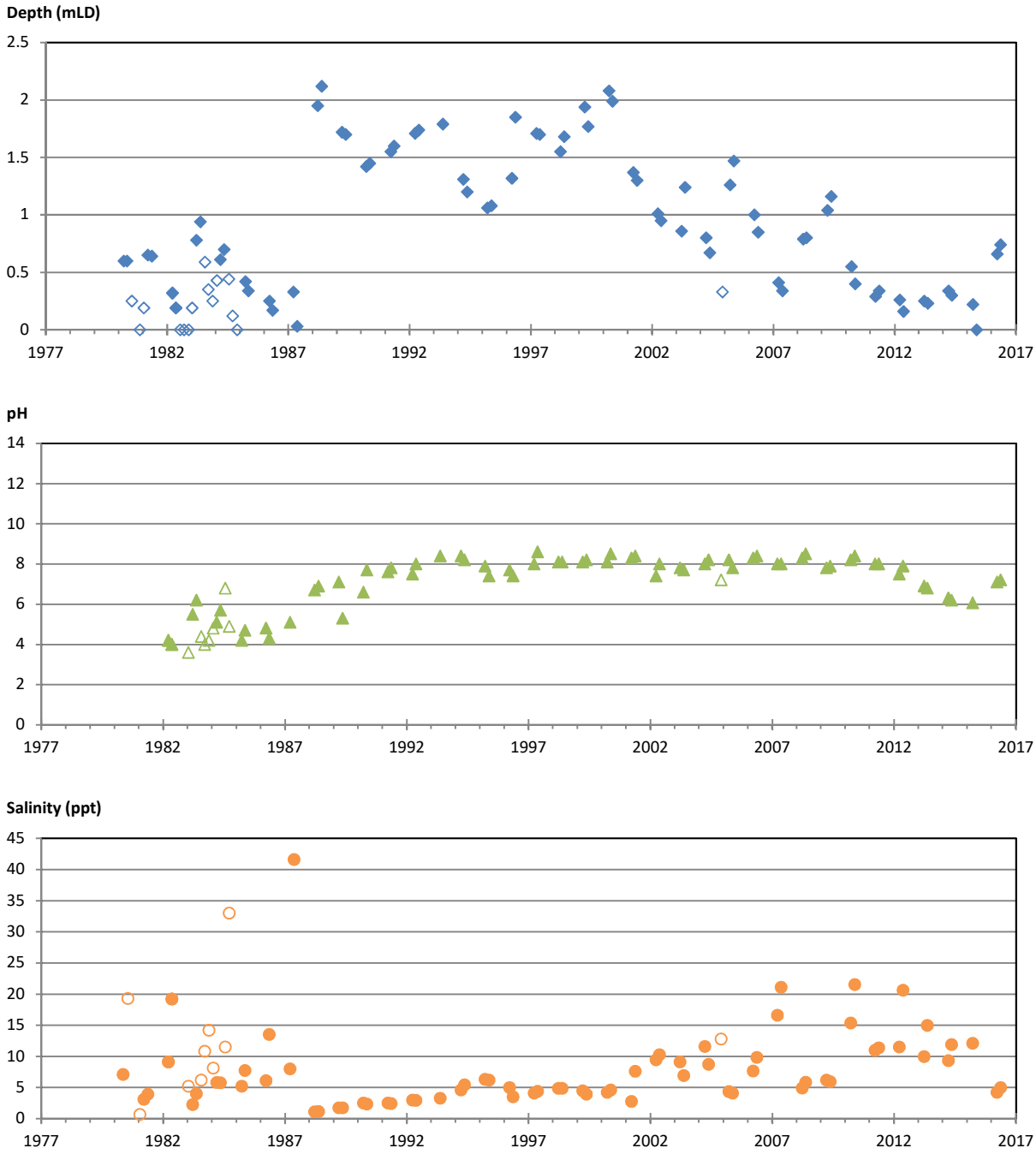


Notes:

1. [IM] indicates this is one of 25 wetlands Intensively Monitored for additional biological and physico-chemical attributes.
2. Year labels are positioned at 1st July each year.
3. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Towerrinning is in the Wellington District (headquartered in Collie) of the South West DBCA Region.

UNICUP

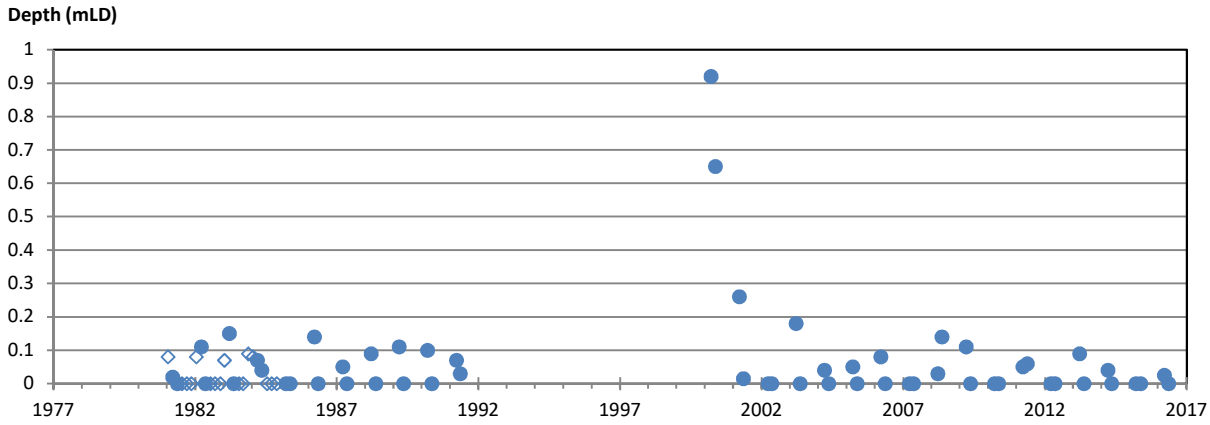


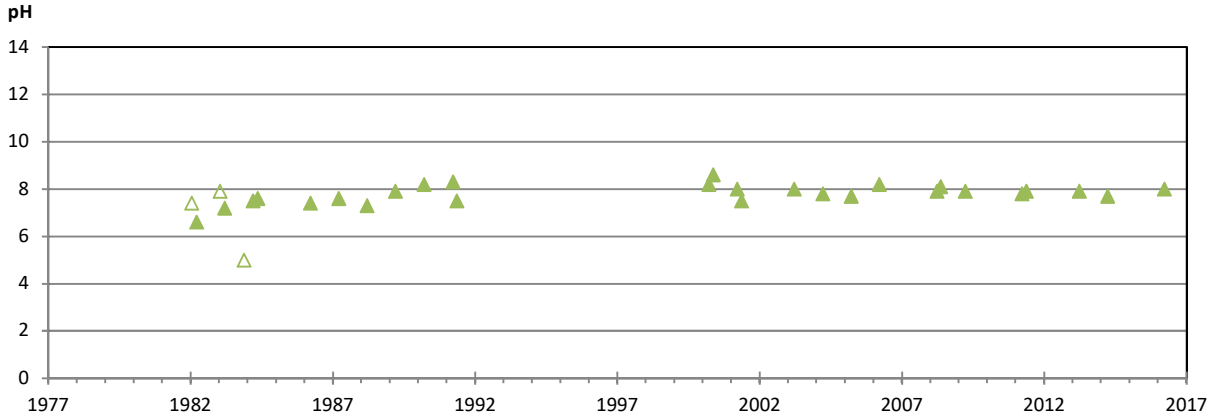
Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

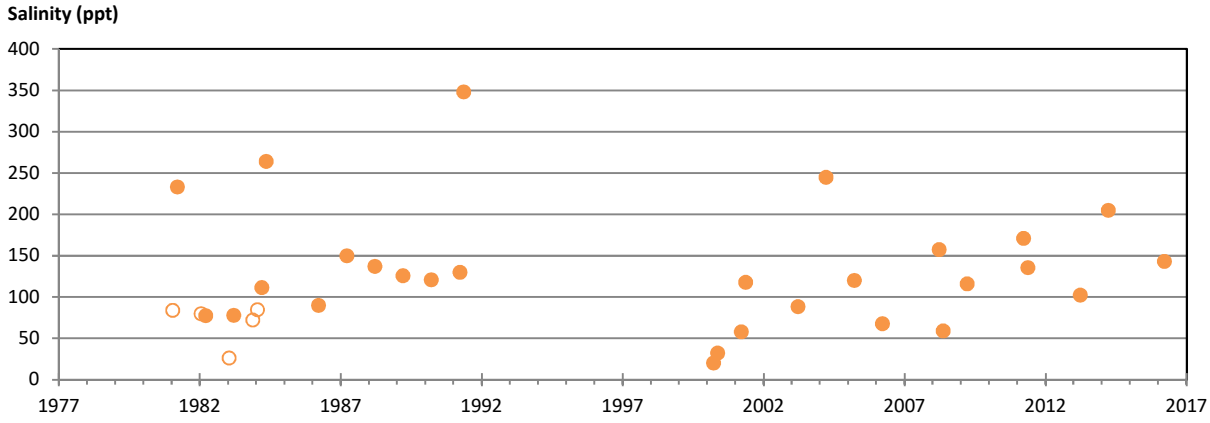
Unicup is a component of the 'Byenup Lagoon System', which is listed in the 'Directory of Important Wetlands in Australia'.

Unicup is within the former Muir-Unicup Natural Diversity Recovery Catchment and is in the Donnelly District (headquartered in Pemberton) of the Warren DBCA Region.

VARLEY



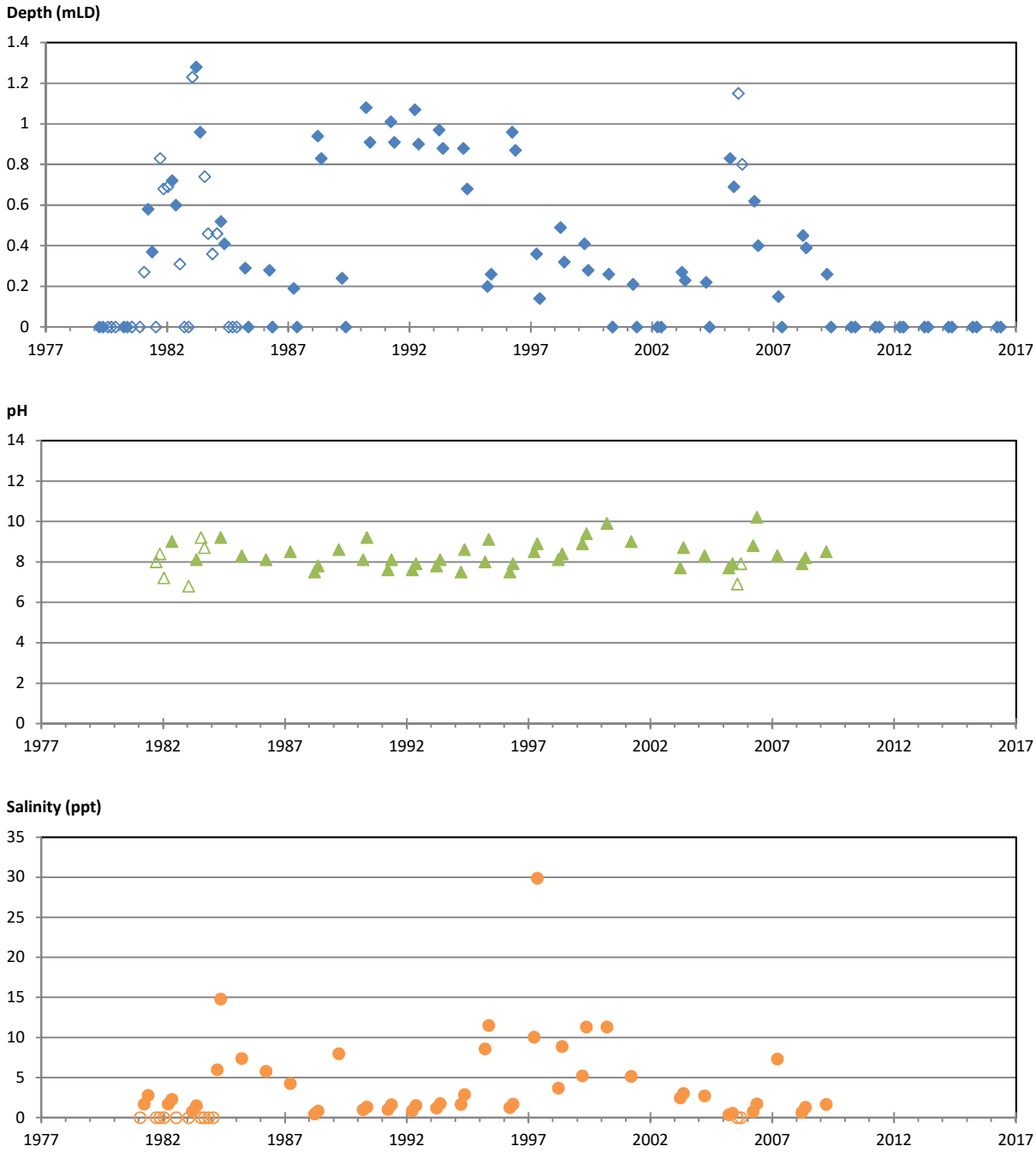




Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Varley is in the Southern Wheatbelt geographical area (headquartered in Narrogin) of the Wheatbelt DBCA Region.

WALBYRING

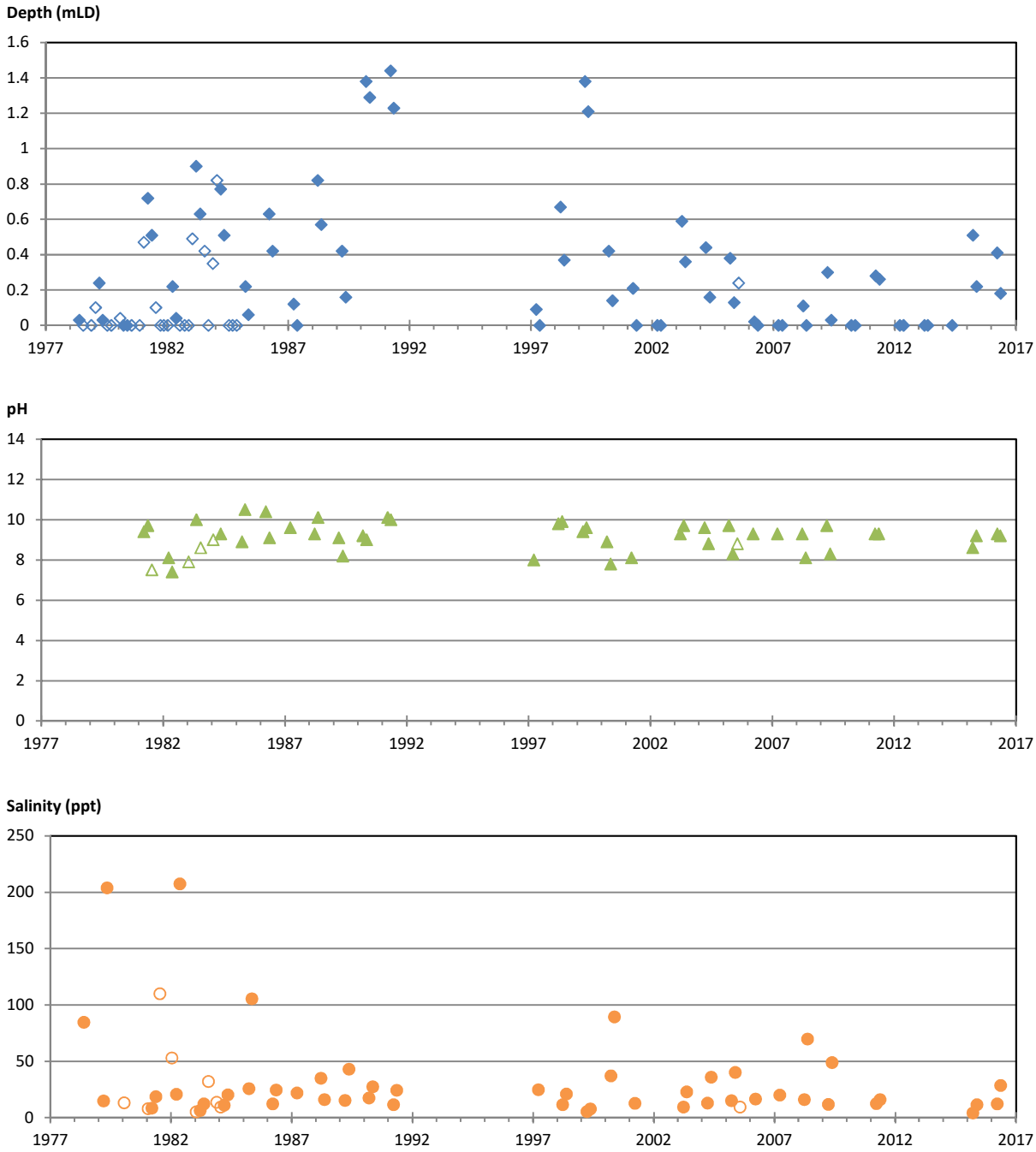


Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Walbyring is a short distance downstream from, and potentially receives overflow water from, the Toolibin Lake Natural Diversity Recovery Catchment.

Walbyring is in the Southern Wheatbelt geographical area (headquartered in Narrogin) of the Wheatbelt DBCA Region.

WALYORMOURING [IM]

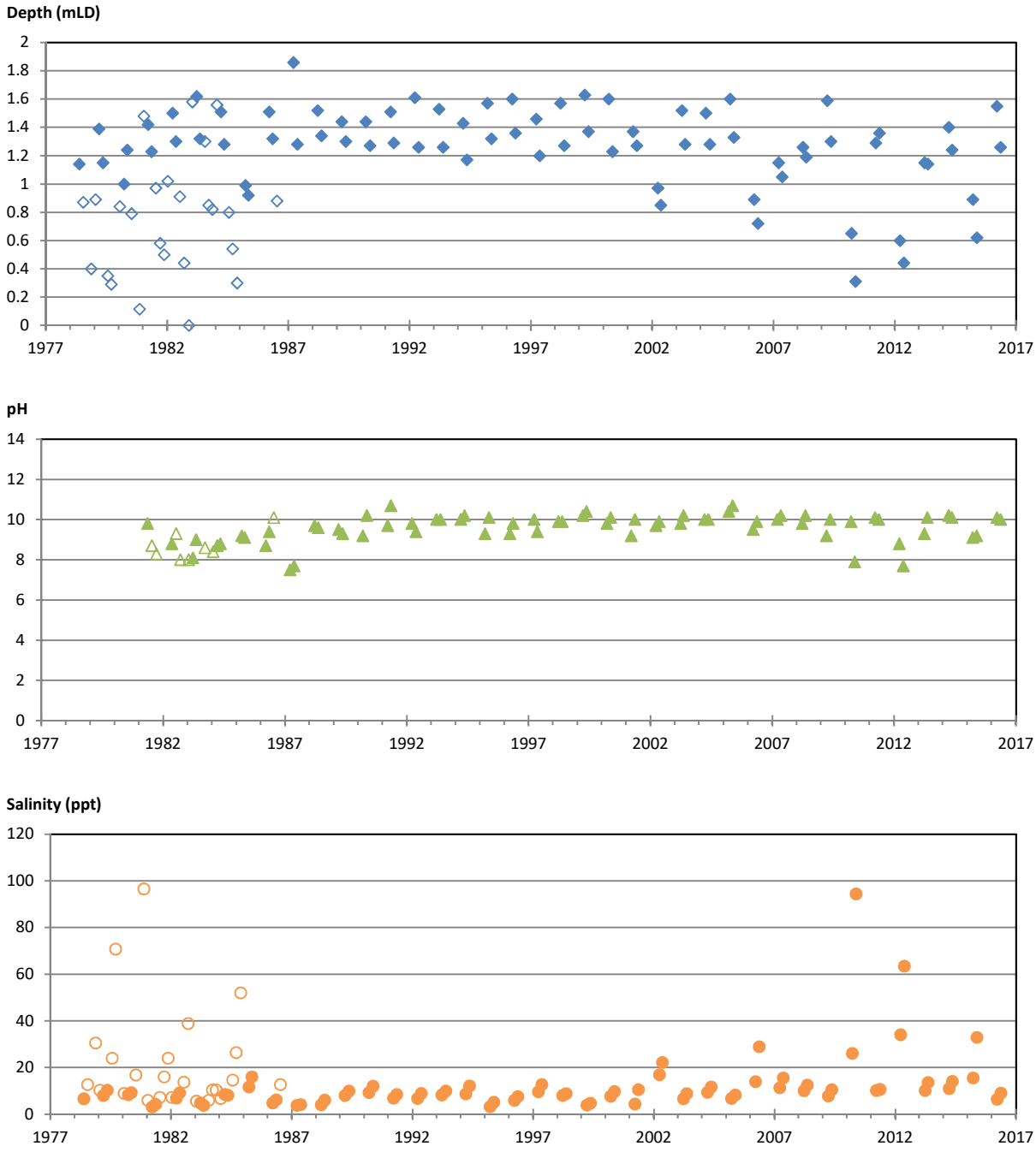


Notes:

1. [IM] indicates this is one of 25 wetlands Intensively Monitored for additional biological and physico-chemical attributes.
2. Year labels are positioned at 1st July each year.
3. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Walyormouring is in the Central District (headquartered in Merredin) of the Wheatbelt DBCA Region.

WANNAMAL

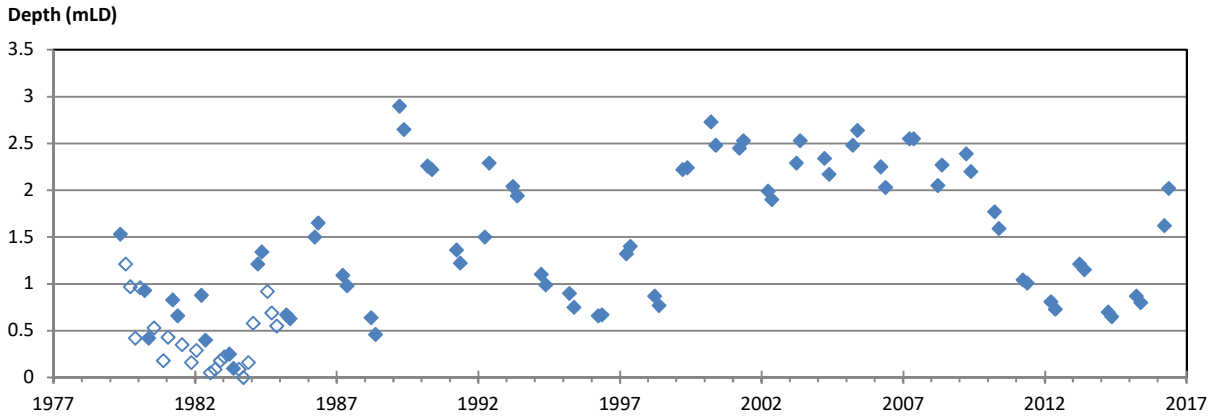


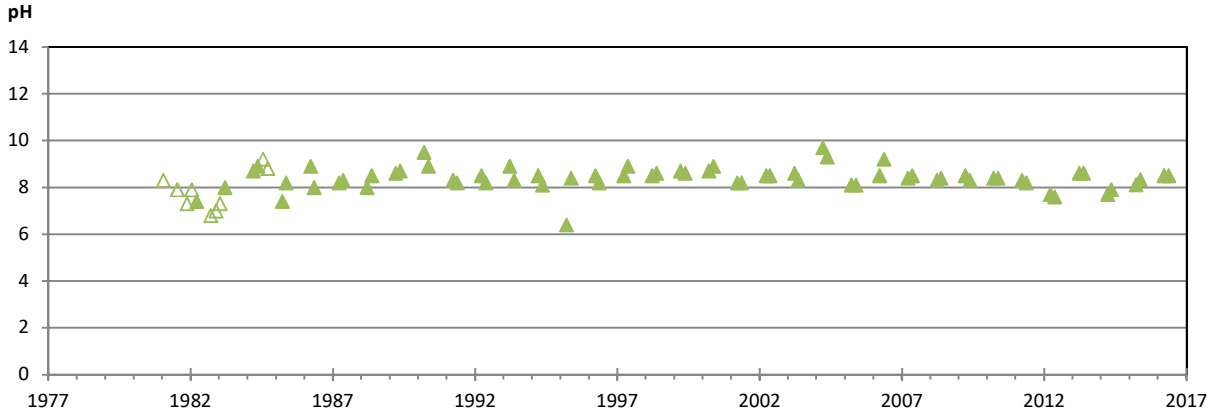
Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

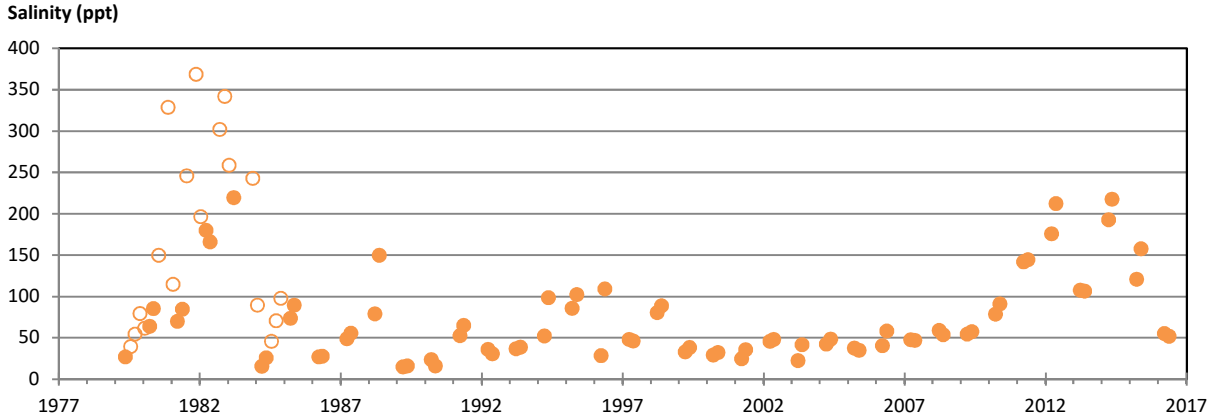
Wannamal is a component of the 'Wannamal Lakes System', which is listed in the 'Directory of Important Wetlands in Australia'.

Wannamal is in the Swan Coastal District (headquartered in Wanneroo) of the Swan DBCA Region.

WARDEN







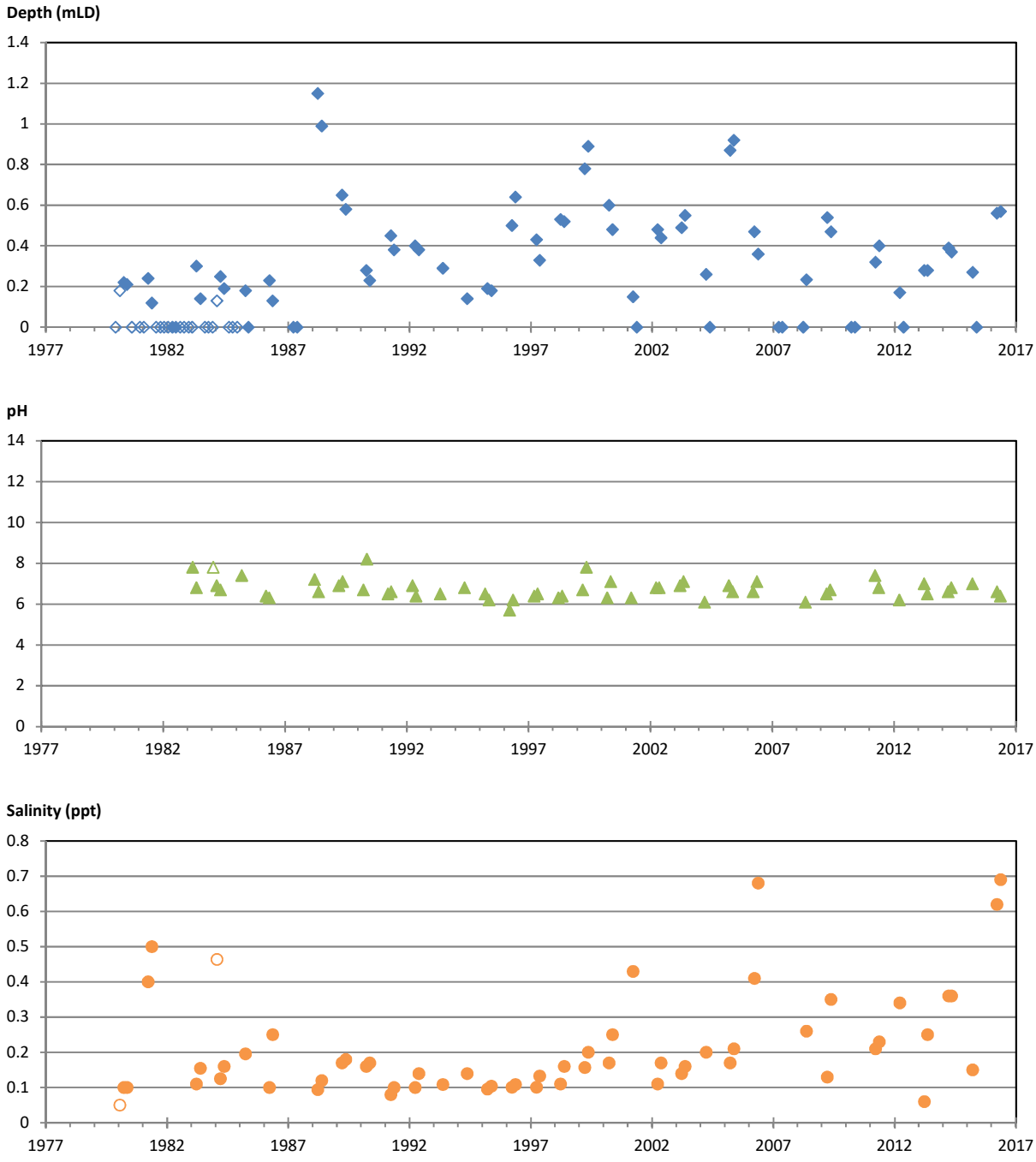
Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Warden is a component of the 'Lake Warden System', which is listed as a Wetland of International Importance under the 'Ramsar' Convention on Wetlands.

Warden is also a component of the 'Lake Warden System' listed in the 'Directory of Important Wetlands in Australia'.

Warden is within the former Esperance Lakes Natural Diversity Recovery Catchment and is in the Esperance District of the South Coast DBCA Region.

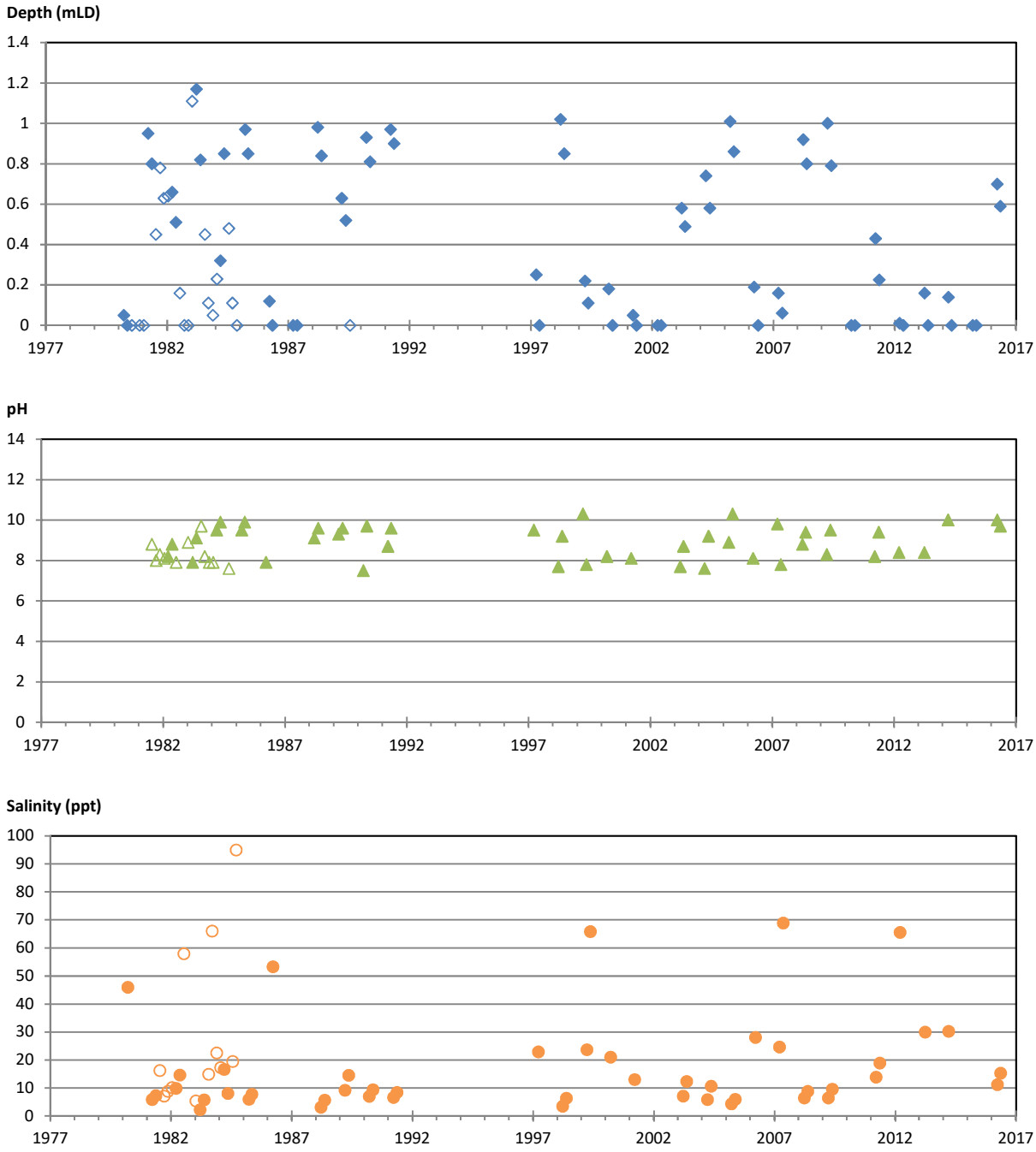
WARRINUP



Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Warrinup is in the Southern Wheatbelt geographical area (headquartered in Narrogin) of the Wheatbelt DBCA Region.

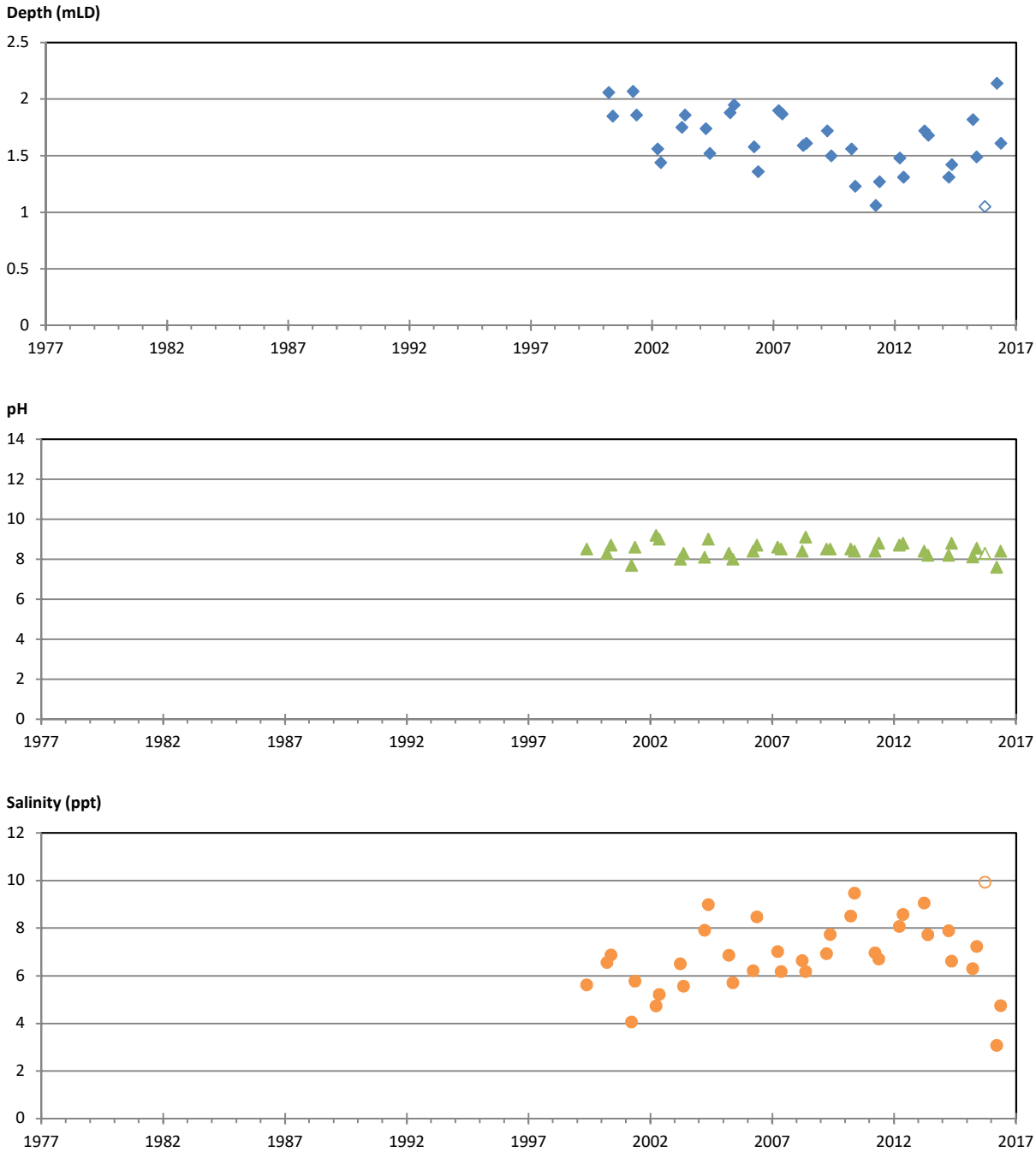
WEST ARTHUR 5456



Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

West Arthur 5456 is in the Southern Wheatbelt geographical area (headquartered in Narrogin) of the Wheatbelt DBCA Region.

WHEATFIELD [IM]



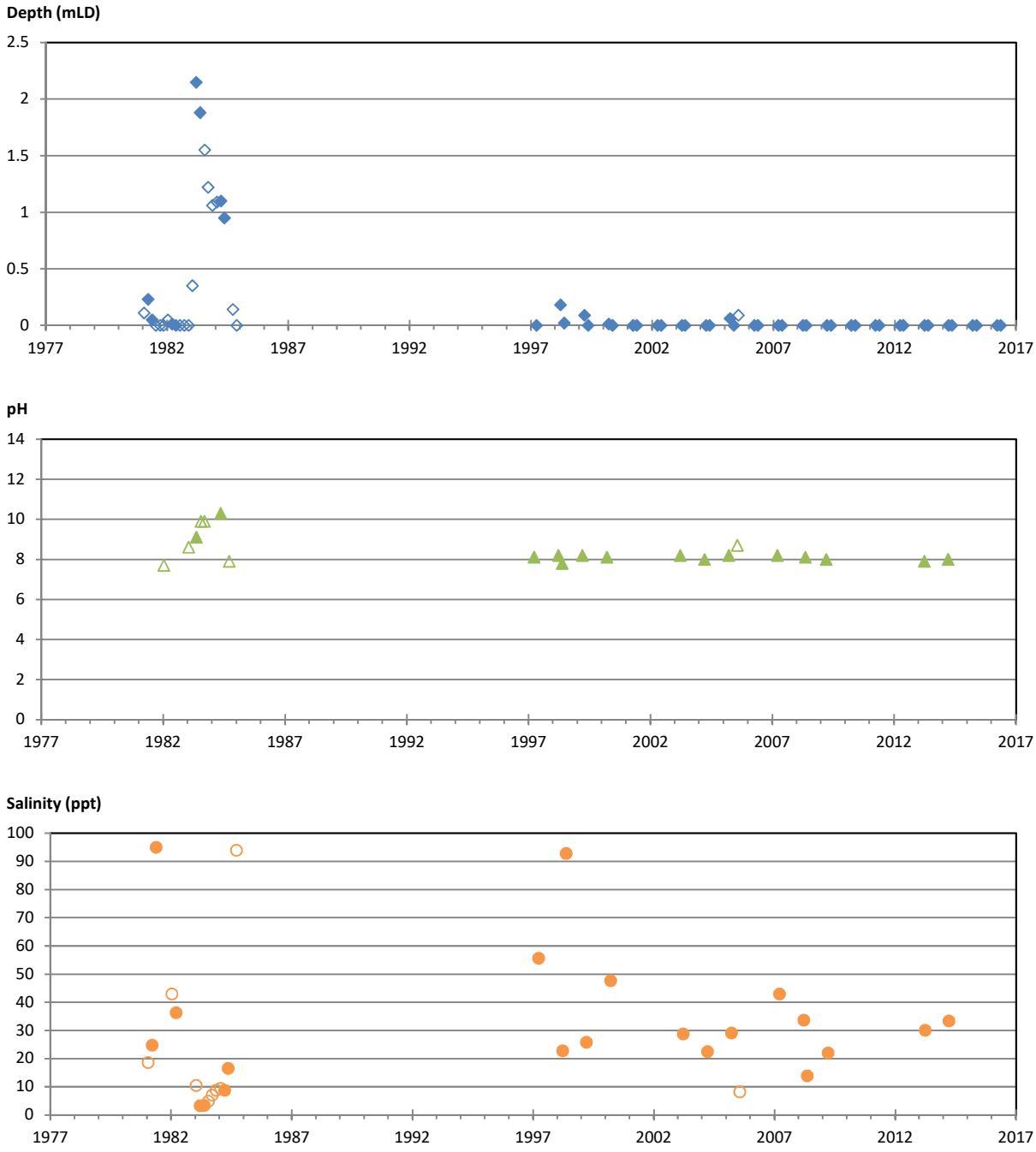
Notes:

1. [IM] indicates this is one of 25 wetlands Intensively Monitored for additional biological and physico-chemical attributes.
2. Year labels are positioned at 1st July each year.
3. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Wheatfield is part of the 'Lake Warden System' listed as a Wetland of International Importance under the 'Ramsar' Convention on Wetlands and is also part of the 'Lake Warden System' listed in the 'Directory of Important Wetlands in Australia'.

Wheatfield is within the former Esperance Lakes Natural Diversity Recovery Catchment and is in the Esperance District of the South Coast DBCA Region.

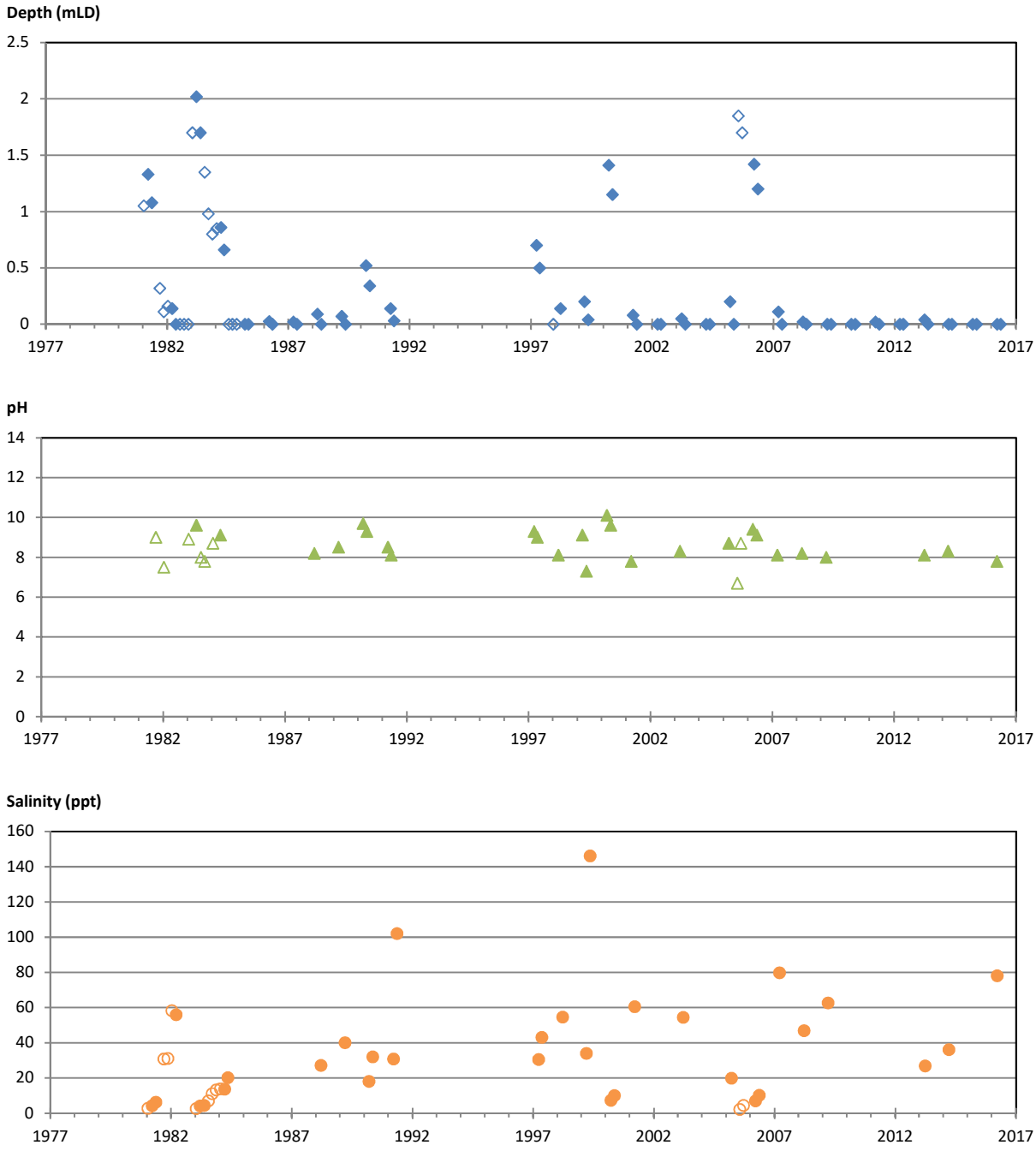
WHITE (NARROGIN)



Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

White (Narrogin) is in the Southern Wheatbelt geographical area (headquartered in Narrogin) of the Wheatbelt DBCA Region.

WHITE WATER

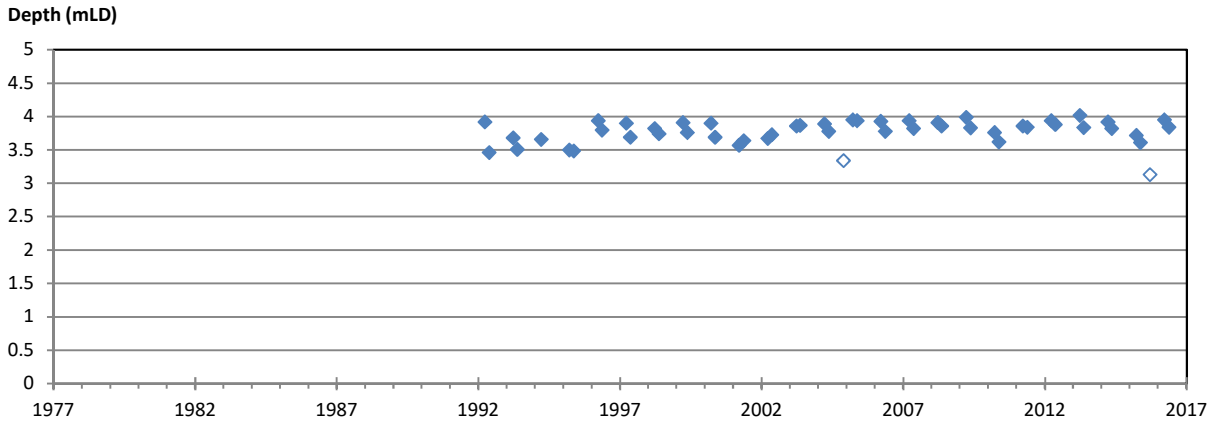


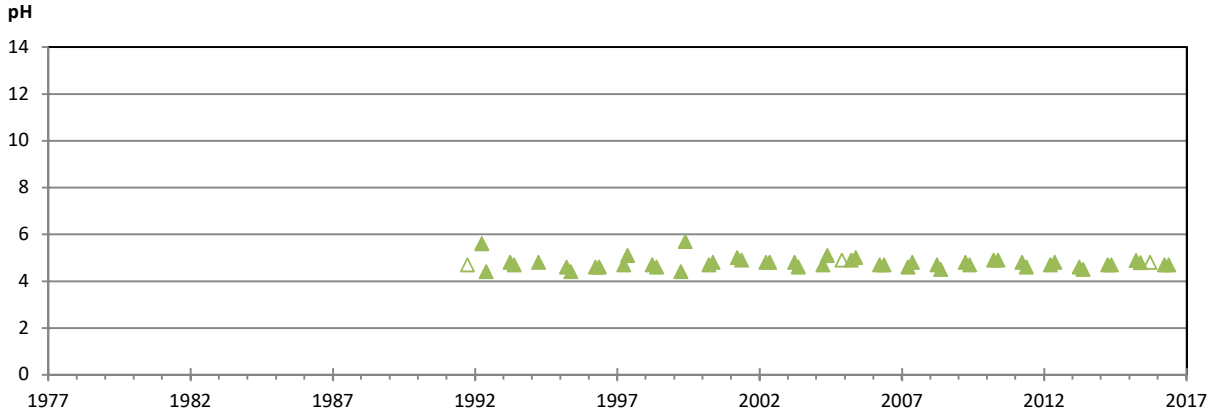
Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

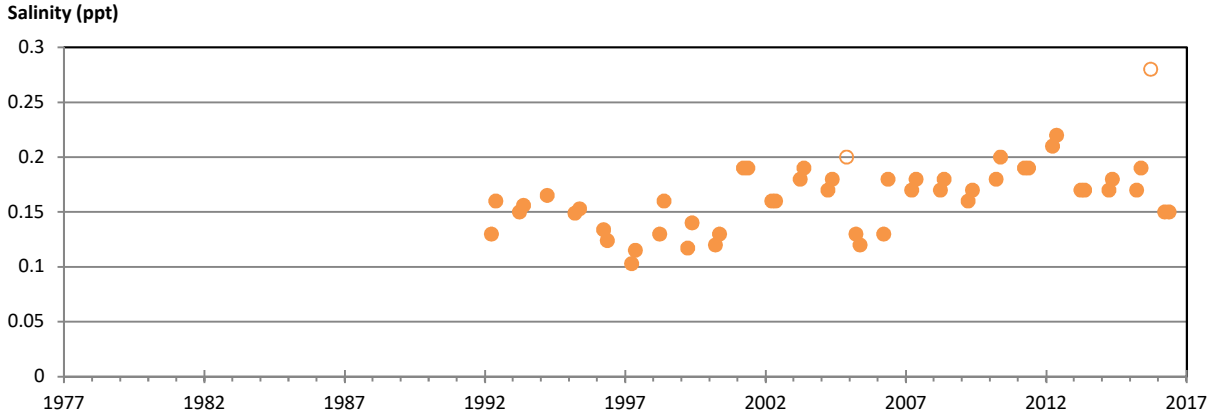
White Water is a component of the 'Yealering Lakes System', which is listed in the 'Directory of Important Wetlands in Australia'.

White Water is in the Southern Wheatbelt geographical area (headquartered in Narrogin) of the Wheatbelt DBCA Region.

WILSON





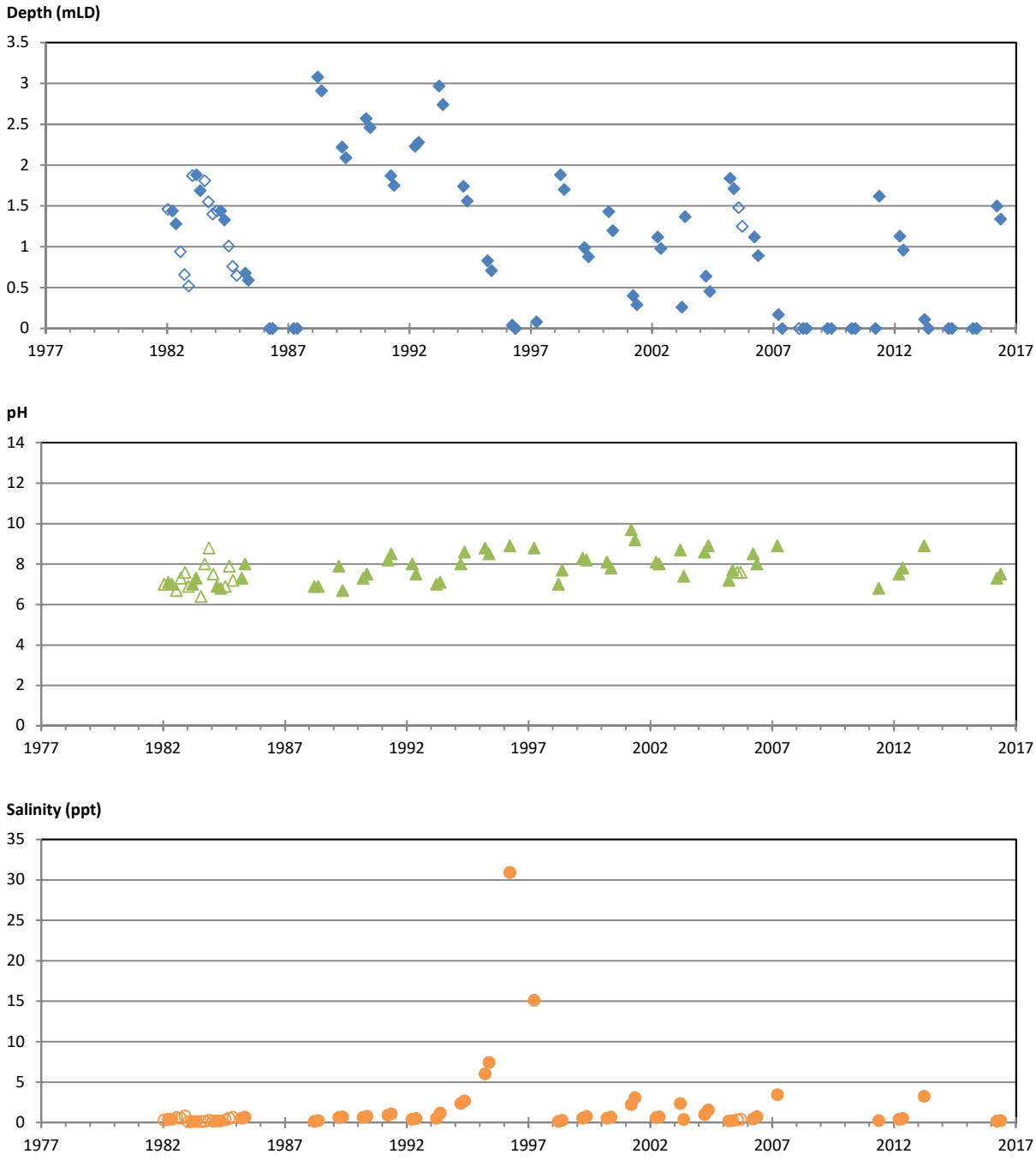


Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Wilson is a component of the 'Gingilup-Jasper Wetland System', which is listed in the 'Directory of Important Wetlands in Australia'.

Wilson is in the Donnelly District (headquartered in Pemberton) of the Warren DBCA Region.

YAALUP [IM]

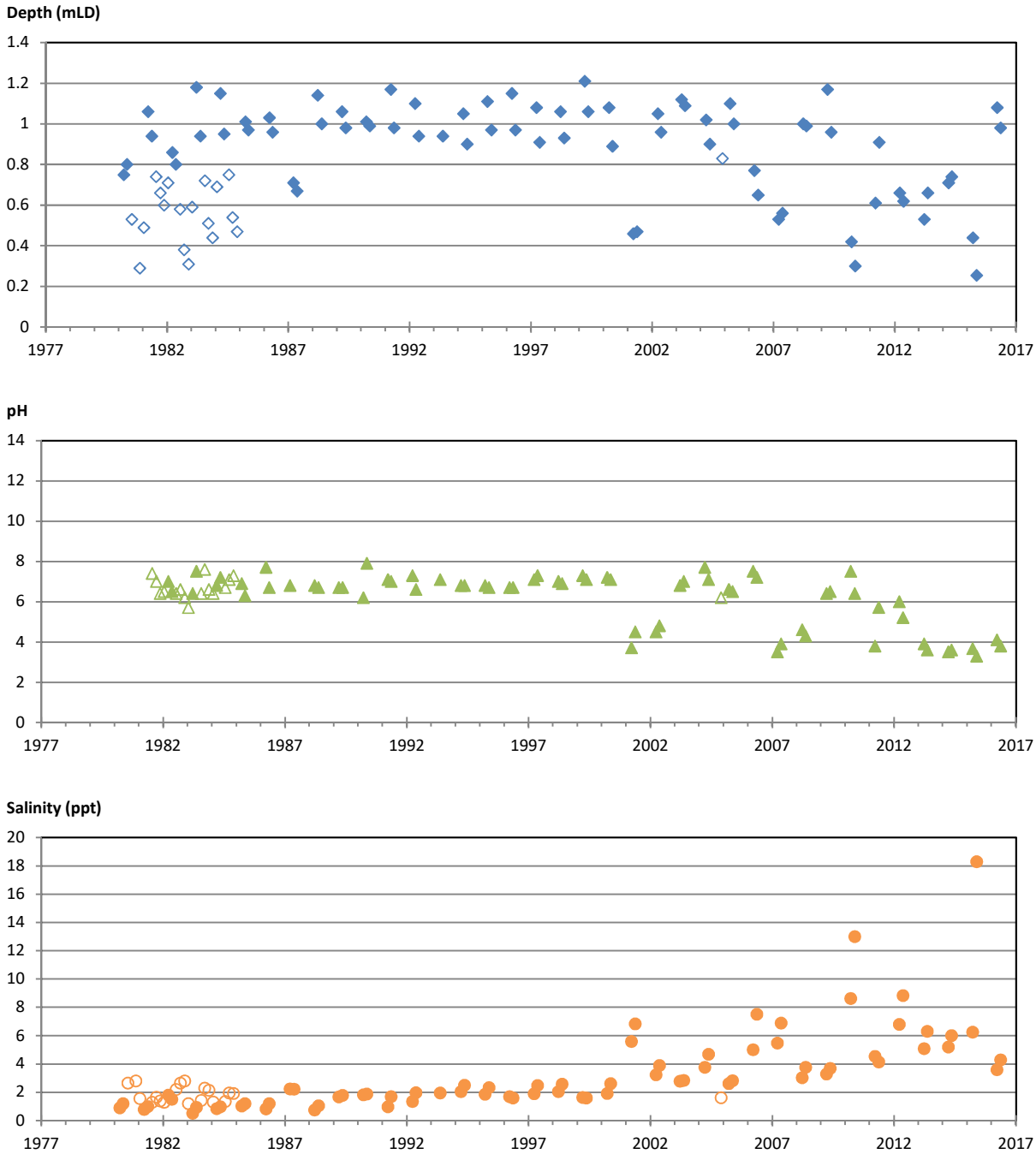


Notes:

1. [IM] indicates this is one of 25 wetlands Intensively Monitored for additional biological and physico-chemical attributes.
2. Year labels are positioned at 1st July each year.
3. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Yaalup is in the Southern Wheatbelt geographical area (headquartered in Narrogin) of the Wheatbelt DBCA Region.

YARNUP



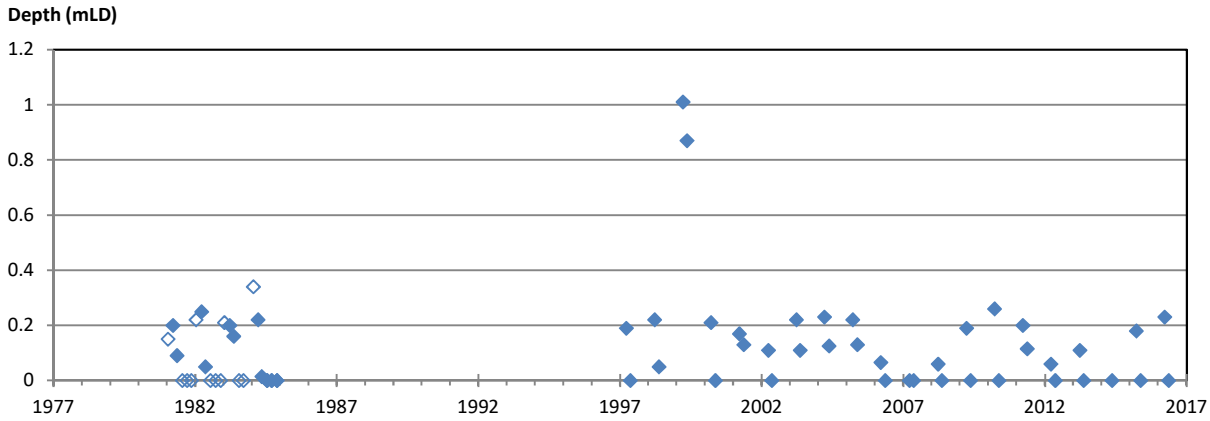
Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

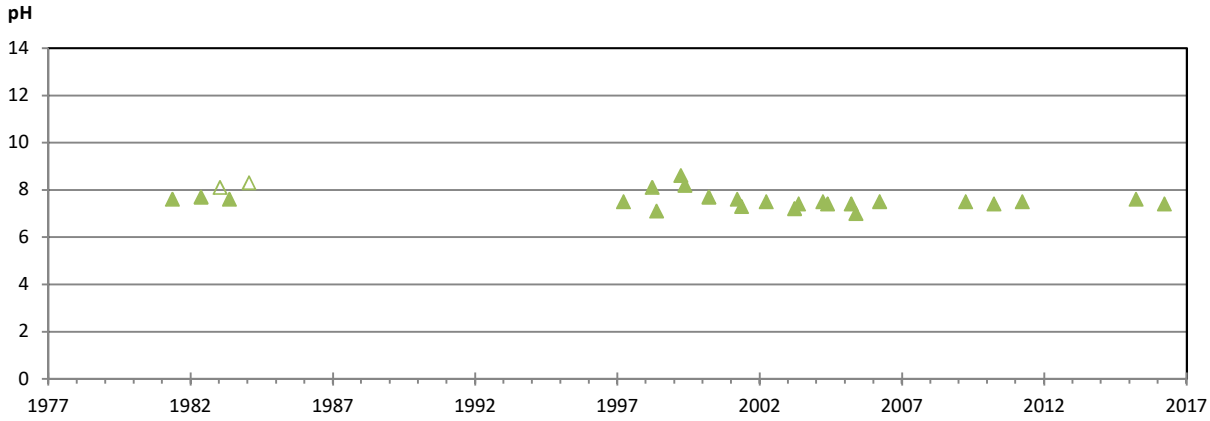
Yarnup is a component of the 'Byenup Lagoon System', which is listed in the 'Directory of Important Wetlands in Australia'.

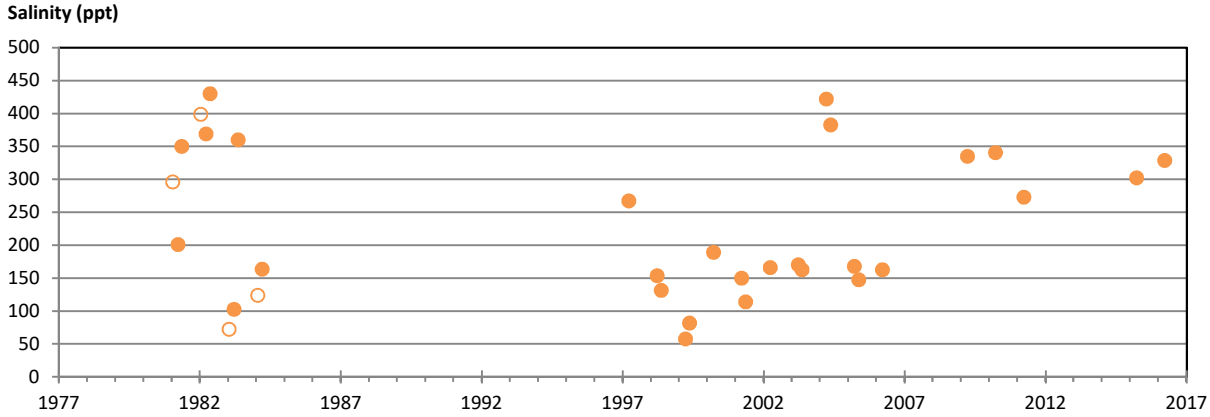
Yarnup is within the former Muir-Unicup Natural Diversity Recovery Catchment.

Yarnup is in the Donnelly District (headquartered in Pemberton) of the Warren DBCA Region.

YARRA YARRA



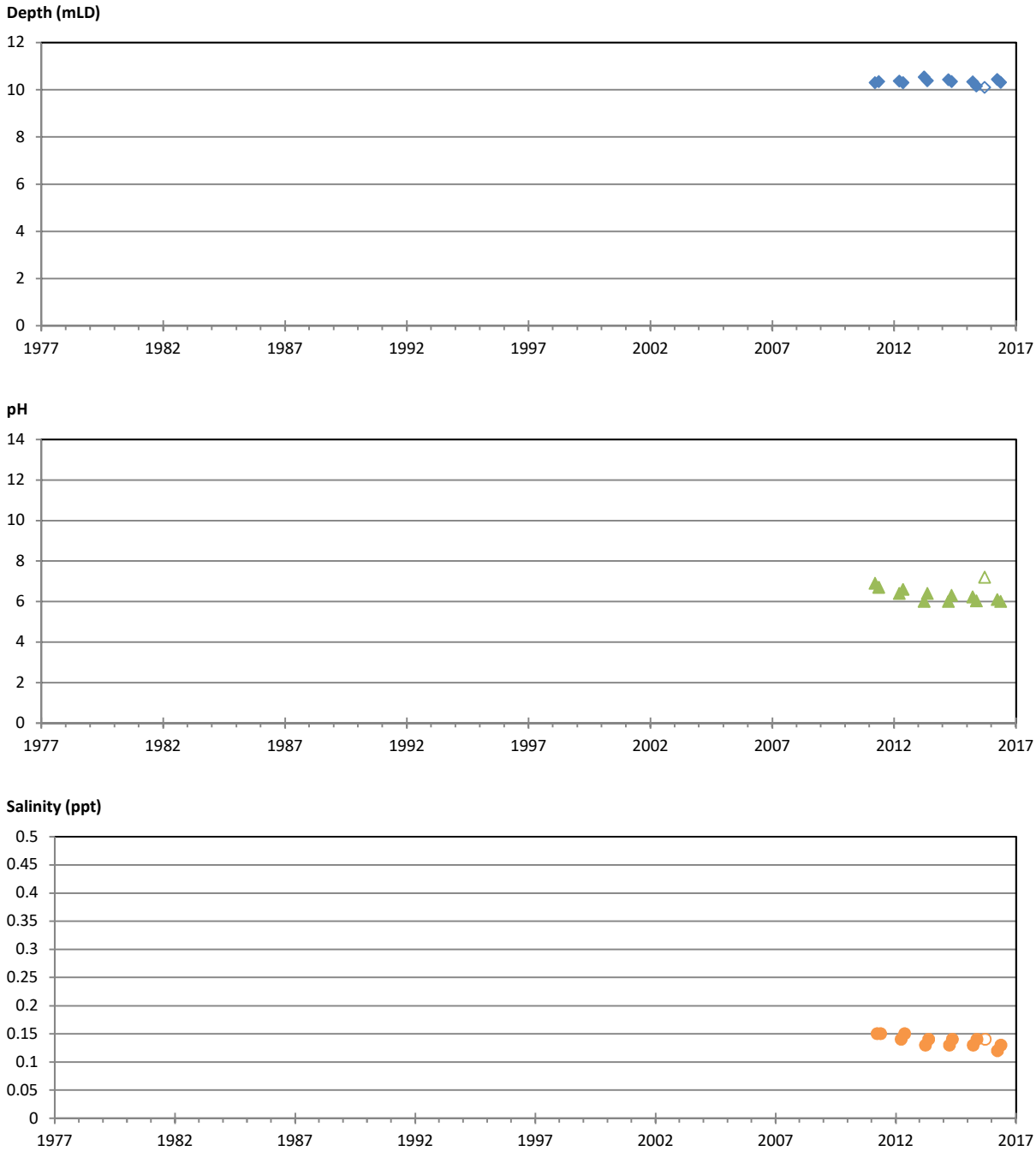




Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Yarra Yarra is in the Moora District (headquartered in Jurien Bay) of the Midwest DBCA Region.

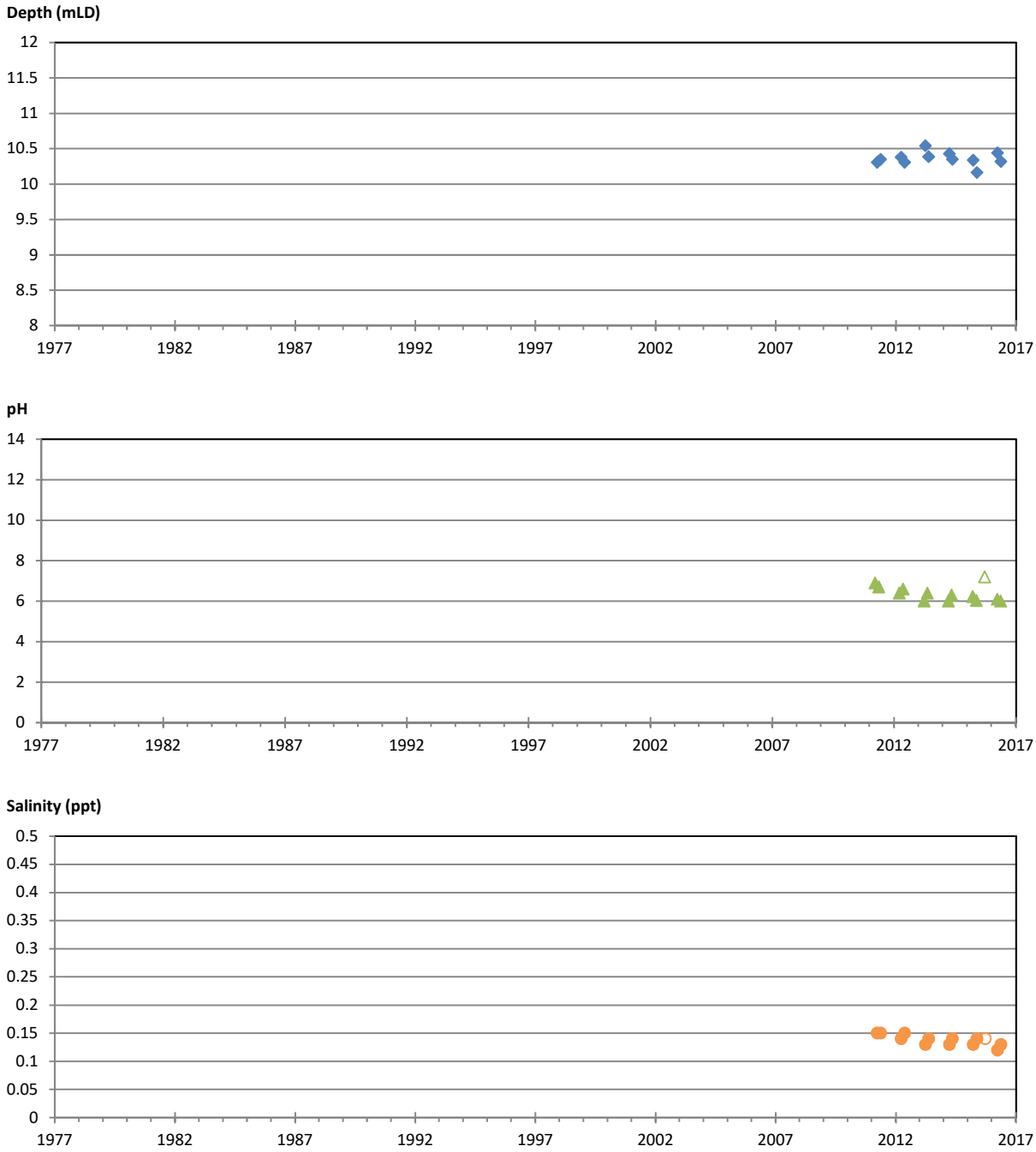
YEAGARUP (with Depth axis 0–12m)



Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Yeagarup is in the Donnelly District (headquartered in Pemberton) of the Warren DBCA Region.

YEAGARUP (with Depth axis 8–12m)

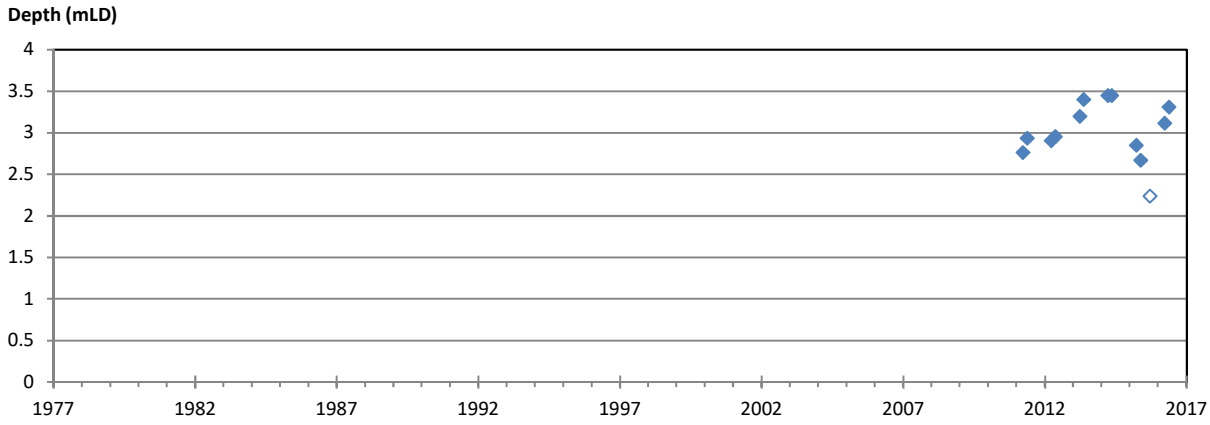


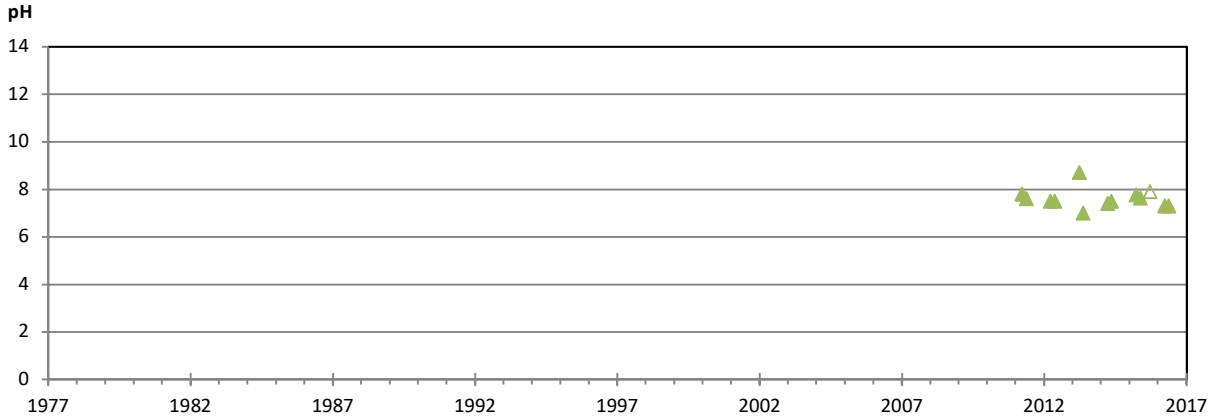
Notes:

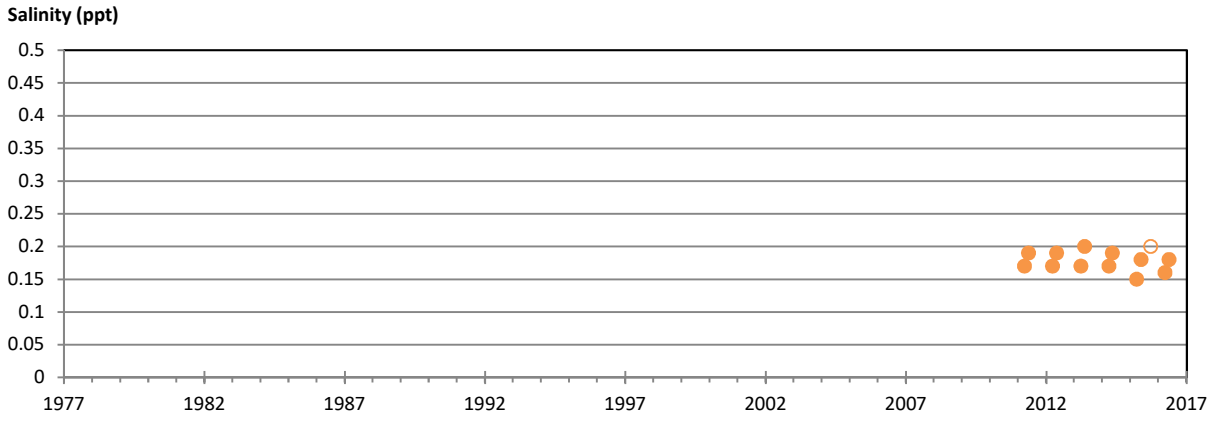
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Yeagarup is in the Donnelly District (headquartered in Pemberton) of the Warren DBCA Region.

YEAGARUP SOUTH



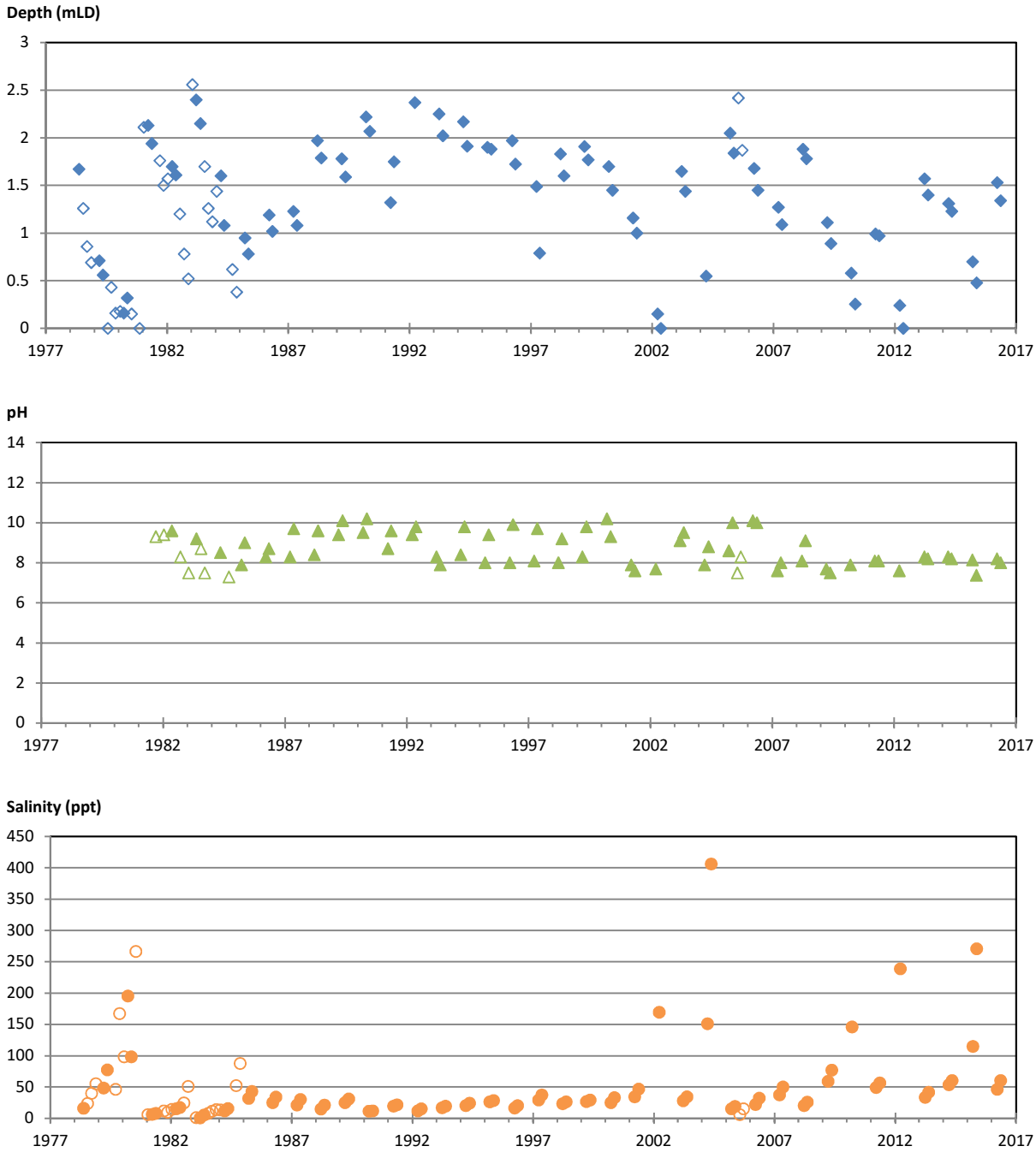




Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Yeagarup South is in the Donnelly District (headquartered in Pemberton) of the Warren DBCA Region.

YEALERING

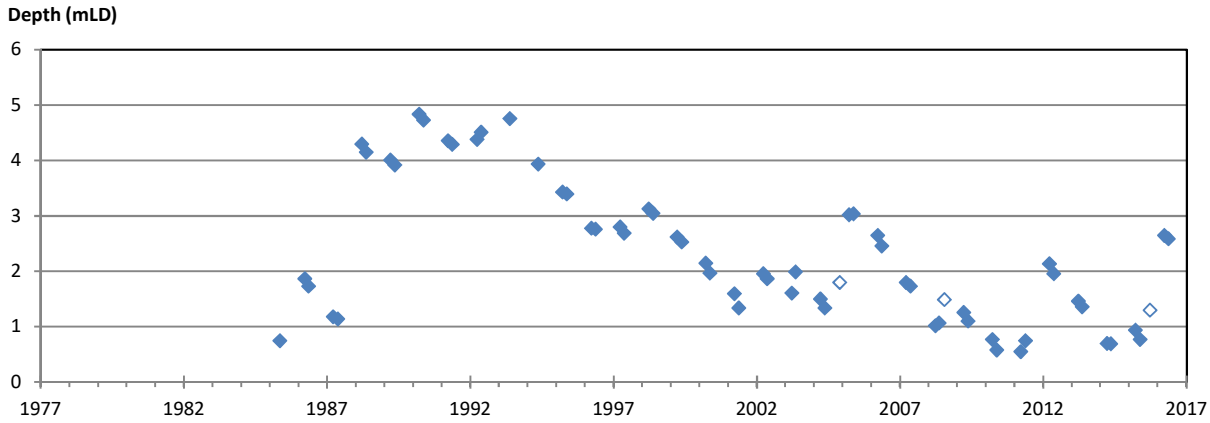


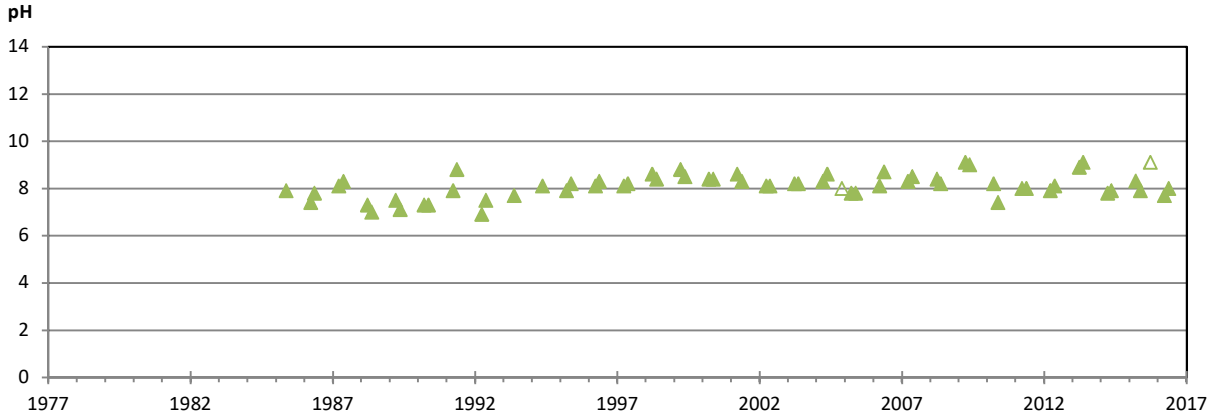
Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

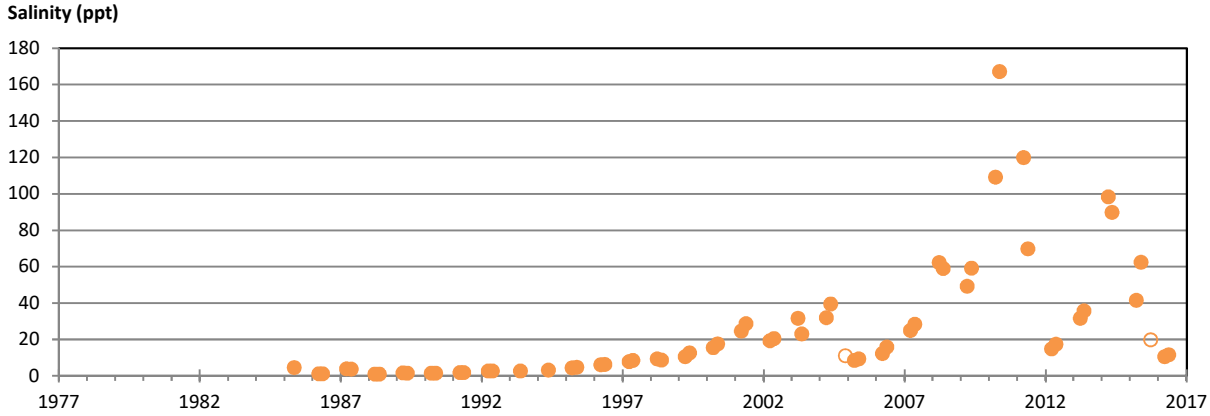
Yealering is a component of the 'Yealering Lakes System', which is listed in the 'Directory of Important Wetlands in Australia'.

Yealering is in the Southern Wheatbelt geographical area (headquartered in Narrogin) of the Wheatbelt DBCA Region.

YELLILUP





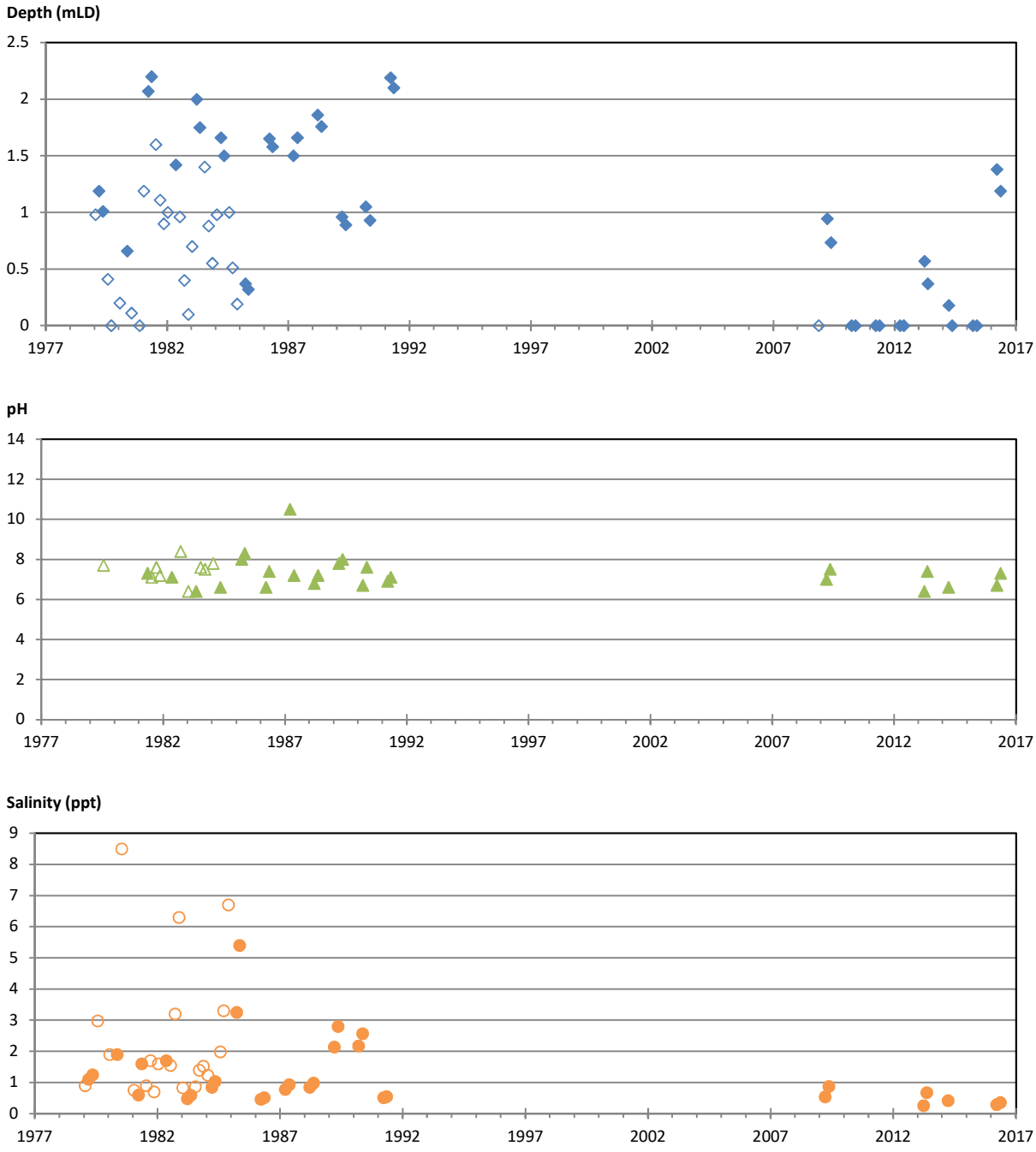


Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Yellilup Lake is a component of the 'Yellilup Yate Swamp System', which is listed in the 'Directory of Important Wetlands in Australia'.

Yellilup is in the Albany District of the South Coast DBCA Region

YURINE



Notes:
1. Year labels are positioned at 1st July each year.
2. Data are from Sept and Nov (filled symbols) and Jan, Mar, May & July (empty symbols) routine monitoring periods only.

Yurine is in the Swan Coastal District of the Swan DBCA Region