

**AN INVENTORY OF RESEARCH AND
AVAILABLE INFORMATION ON
WETLANDS IN WESTERN AUSTRALIA**



A.W. CHIFFINGS 1977

J.M. BROWN (Revision)

NOVEMBER 1979



**DEPARTMENT OF
CONSERVATION & ENVIRONMENT
WESTERN AUSTRALIA**



BULLETIN Nº 65

DEPARTMENT OF CONSERVATION AND ENVIRONMENT

AN INVENTORY OF RESEARCH AND AVAILABLE INFORMATION

ON WETLANDS IN WESTERN AUSTRALIA

A.W. CHIFFINGS

MAY 1977

REVISED EDITION

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INTRODUCTION

An interdepartmental committee, the Wetlands Advisory Committee, has been set up to review and advise the Environmental Protection Authority on aspects of wetland management. The definition of wetlands accepted by the Committee is:

"Wetlands are areas of seasonally, intermittently or permanently waterlogged soils or inundated land whether natural or otherwise, fresh or saline, eg, waterlogged soils, ponds, billabongs, lakes, swamps, tidal flats, estuaries, rivers and their tributaries".

Over the past years, the Committee has been collecting relevant information on Western Australian rivers, swamps and lakes. It became clear that a great deal of information exists (much in unpublished form), and many on-going research projects on various aspects of wetlands are being undertaken. It was, therefore, decided that an inventory of this research, including a listing of departments or institutions involved, major personnel, the nature of the research project and the location, could assist in the co-ordination of the various investigations and would make information more accessible.

The Department of Conservation and Environment undertook to have such an inventory compiled and, in May 1977, Tony Chiffings published 'An Inventory of Research and Available Information on Wetlands in Western Australia'. Because some projects are short-term and new studies continue to be undertaken, this Bulletin is the first of what are planned as regular revisions of Chiffings' 1977 Inventory.

SCOPE OF OTHER INVENTORIES

It should be noted that although the definition of wetlands adopted includes estuaries (see above), a listing of published and unpublished information on estuaries in Western Australia has already been prepared by Hodgkin and Majer (1976) in "An Index to Ecological Information on Estuaries and Marine Embayments in Western Australia", CSIRO Division of Fisheries and Oceanography Report, No 70, 1976. Therefore, research on estuaries has not been included in this inventory. However, some entries referring to river estuaries, eg Swan River, appear in both reports. In addition, the CSIRO Division of Land Use Research has already published a review of literature and other information on wetlands in Western Australia (Smith, 1975). Smith's review was part of a nation-wide assessment of the status of knowledge on Australian wetlands. This study was to be a first step in a systematic survey of Australian wetlands, and it helped to demonstrate the existence of considerable but very fragmentary information about them.

Smith's review gives a brief account of some of the more prominent references on National Parks, flora and fauna reserves and their locations. Another table based almost entirely on Riggert 1974, lists wetlands considered important as conservation areas. A comprehensive bibliography and a brief listing of research activities by government departments and universities in Western Australia are given.

SCOPE AND STRUCTURE OF THIS INVENTORY

The structure of this inventory has been slightly modified from Chiffings' original format to include a subject index and a location index for the research activities and the bibliography, and a map of the south-west of the State.

The subject index (Table I) lists numbers relating to the research activities in italics and the bibliography numbering in bold faced type. This system is also used in the location index (Table II) which lists in alphabetical order locations on wetlands, rivers and towns mentioned in the inventory and bibliography. The numbers preceding the locations refer to one of the three maps. Numbering of locations is in sequence on each map from south-west to north-west.

References in the location index are not made to wetlands being monitored by the following institutions.

- | | | |
|--------------------------------|---|--|
| a) Fisheries and Wildlife | - | depth, salinity and waterfowl numbers. |
| b) M.W.S.S. & D.B. * | - | <i>E. coli</i> , salmonella, viruses, algae, water chemistry and water levels. |
| c) Geological Survey | - | geology, hydrology, water balance. |
| d) Public Works Dept | - | stream flow, water quality |
| e) West Aust Field & Game Assn | - | depth, waterfowl counts and breeding activity |

Information on these monitoring programmes may be obtained by contacting the department concerned (see Table III).

* Metropolitan Water Supply, Sewerage & Drainage Board

Table III is an inventory of the activities of, and data being collected by, individuals and institutions. Reports and papers referred to in this table are listed in the bibliography, and locations underlined or listed are recorded in the location index and on one of the three maps.

The bibliography has been relisted in alphabetical order and accompanied by a sequential number corresponding to those in the location and subject indexes.

Acknowledgements

The author and the Department of Conservation and Environment wish to thank all those people who so generously gave their time and information during the compilation of this inventory.

Although every effort was made to contact all of the people involved in wetlands research in Western Australia, it is expected that omissions may have occurred. If this is the case, then the Department would be most grateful for notification of the same. Address as below:

The Chairman
Wetlands Advisory Committee
Department of Conservation and Environment
BP House
Mount Street
PERTH. W.A. 6000

TABLE I

SUBJECT INDEX *

GEOLOGY, GEOMORPHOLOGY AND SOILS	36, 37, 9, 25, 39, 40, 41, 51, 75, 110, 121, 132, 165, 205, 206, 208, 268, 314, 315, 332, 390, 404, 405.
HYDROLOGY, GROUNDWATER	6, 31, 35, 37, 40, 41, 45, 56, 61, 85, 1, 14, 11, 21, 25, 36, 80, 81, 96, 99, 105, 106, 107, 108, 121, 178, 226, 241, 244, 309, 301, 327, 338, 399, 454, 470.
ENVIRONMENTAL INVENTORIES AND BIOLOGICAL SURVEYS	4, 7, 11, 25, 26, 27, 35, 64, 76, 78, 82, 80, 17, 20, 53, 66, 72, 103, 104, 119, 125, 126, 147, 170, 180, 181, 182, 183, 188, 189, 209, 212, 214, 215, 242, 249, 276, 282, 289, 326, 343, 380, 381, 391, 393, 394, 395, 398, 407, 408, 409, 418, 419, 430, 433, 456, 457.
FLORA	3, 4, 19, 23, 27, 81, 1, 50, 84, 184, 262, 263, 264, 334.
- AQUATIC	3, 11, 12, 23, 24, 44, 47, 56, 57, 59, 63, 73, 14, 15, 17, 20, 54, 65, 98, 118, 119, 163, 169, 221, 243, 269, 271, 270, 385, 386, 388, 434, 435,
- TERRESTRIAL AND MARSHLAND	3, 4, 7, 8, 10, 11, 12, 22, 23, 31, 35, 44, 45, 53, 54, 55, 63, 64, 88, 13, 16, 17, 20, 30, 31, 33, 64, 90, 97, 98, 99, 118, 149, 170, 174, 176, 246, 271, 290, 313, 383, 384, 387, 392, 400.

* Numbers in Italics refer to items in Table III
those in bold faced type refer to items in Table IV.

TABLE I (cont.): SUBJECT INDEX

FAUNA

- CRUSTACEAN	12, 21, 30, 48, 49, 93, 26, 27, 28, 29, 42, 43, 62, 63, 77, 78, 85, 127, 156, 157, 160, 162, 187, 230, 272, 275, 294, 295, 300, 302, 303, 304, 305, 306, 307, 308, 311, 312, 319, 320, 321, 322, 323, 324, 342, 360, 362, 372, 373, 375, 376, 463, 472.
- INSECTS	11, 50, 60, 76, 93, 45, 46, 47, 48, 49, 115, 118, 120, 133, 187, 230, 231, 282, 233, 349, 434, 426, 424, 427, 428.
- MOLLUSC	11, 12, 17, 93, 86, 88, 186, 210, 270, 280, 468.
- OTHER INVERTEBRATE	12, 73, 74, 75, 247, 417.
- FISH	11, 12, 15, 16, 18, 33, 52, 66, 67, 68, 69, 70, 91, 92, 93, 94, 3, 4, 5, 6, 7, 91, 116, 142, 143, 161, 166, 187, 197, 223, 224, 225, 230, 238, 239, 245, 273, 274, 283, 286, 287, 293, 296, 297, 298, 299, 316, 346, 347, 370, 374, 425, 432, 443, 460, 461.
- AMPHIBIAN	7, 14, 44, 68, 70, 82, 83, 117, 127, 187, 227, 228, 229, 234, 235, 236, 237, 248, 251, 252, 253, 254, 256, 257, 258, 259, 260, 266, 329, 359, 402, 420, 429, 458.
- REPTILE	7, 9, 10, 11, 13, 14, 20, 35, 50, 71, 74, 158, 159, 161, 164, 186, 191, 217, 277, 281, 288, 325, 350, 352, 367, 402.
- BIRD	7, 9, 10, 11, 13, 14, 19, 22, 35, 42, 58, 59, 62, 81, 85, 86, 89, 93, 19, 34, 50, 55, 56, 57, 58, 59, 60, 61, 76, 84, 100, 113, 122, 135, 136, 137, 139, 140, 141, 144, 145, 146, 155, 179, 186, 190, 193, 194, 198, 199, 200, 202, 203, 204, 207, 219, 220, 222, 240, 277, 281, 284, 290, 291, 335, 336, 338, 339, 340, 344, 345, 351, 354, 355, 356, 357, 361, 363, 364, 365, 366, 367, 377, 389, 401, 403, 411, 422, 439, 447, 459.

TABLE I (cont.): SUBJECT INDEX

- OTHER VERTEBRATES	7, 9, 11, 22, 35, 201, 216, 277.
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RECREATION	30, 46, 79, 80, 90, 1, 8, 134, 182, 200, 218, 263, 415, 423.
MANAGEMENT AND CONSERVATION	9, 22, 25, 26, 27, 35, 43, 64, 71, 84, 85, 73, 95, 103, 104, 112, 123, 124, 125, 218, 217, 219, 220, 261, 262, 264, 277, 318, 336, 337, 341, 430, 437, 440, 444, 445, 446, 455, 456, 457.
WATER QUALITY AND LANDUSE	1, 2, 5, 6, 19, 23, 29, 32, 34, 35, 38, 39, 47, 46, 64, 65, 73, 77, 84, 85, 86, 1, 10, 16, 17, 20, 21, 22, 23, 24, 35, 37, 38, 49, 52, 79, 99, 109, 118, 119, 125, 129, 131, 132, 163, 170, 172, 173, 175, 177, 196, 213, 265, 267, 270, 278, 328, 330, 348, 368, 369, 378, 411, 412, 414, 421, 436, 438, 462, 464, 467, 469.
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GENERAL	28, 12, 18, 67, 79, 94, 102, 148, 245, 250, 310, 331, 353, 379, 382, 413, 416, 431, 465, 471, 473.

TABLE II
LOCATION INDEX

Numbers in italics refer to items in Table III, those in
to items in Table IV.

Abbreviations used in comment column:

Pks and Rec.	Parks and Recreation
N.P.	National Park
Fl & F. Res.	Flora and Fauna Reserve
Rec. Res.	Recreation Reserve
Trib.	Tributary

Alternate names are in brackets

TABLE II : LOCATION INDEX

MAP	NO.	LOCATION	REFERENCE TABLE III, TABLE IV	COMMENTS
3	60	Adams, Lake	23	Public Open Space
1	51	Argyle, Lake	23	Formed by Ord River Dam
2	26	Arthur River	22, 318	Trib. to Blackwood
3	35	Ashfield Flats	49	Swan River
2	16	Augusta	7, 384	
2	58)	Avon River	66, 67, 68, 69, 70, 75, 88, 91, 201, 211, 348	Becomes Swan River
3	53)			
3	52	Badgerup Lake	23	Privately owned
3	70	Bagdad, Lake	47, 162, 181, 195, 253, 256, 326, 335, 340, 401	Rottnest Island
2	56	Bakers Hill	1	C.S.I.R.O. Experimental Farm
1	18	Ballard, Lake	202, 222	Salt Lake
2	61	Bambun Lake	12, 13, 186	Fauna Reserve
3	7	Banganup, Lake	23, 42, 50, 53	University of Western Australia, Breeding Station
2	64	Beermullah Lake	12, 13, 186	Recreation Res.
2	32	Benger Swamp	22, 357	Reserve
3	44	Big Carine Swamp	42, 452	(Lake Carine) Pks & Rec.
2	41	Big Lake	50, 475	(McLarty) Fl. & F. Res.
3	17	Bibra Lake	42, 64, 77, 53, 135, 136, 137, 170, 198, 247, 406, 411	
3	41	Blackadder Creek	85	Ray Marshall Park
2	17	Blackwood River	1, 69, 131, 132, 197, 308	
3	23	Blue Gum Lake	6, 42, 14	Reserve
1	10	Bluff Knoll	19	Stirling Ranges (NP)
3	22	Booragoon Swamp	6, 42, 14	
1	40	Booyeema Ck.	84	Trib. to Fortescue River
2	19	Broadwater, The	22, 410	Fl. & F. Res.
3	63	Brockman River	330	

TABLE II (cont.) : LOCATION INDEX

MAP	NO.	LOCATION	REFERENCE TABLE III, TABLE IV	COMMENTS
2	27	Bunbury	3, 35, 459	
2	21	Busselton	384, ,	
3	11	Canning Dam	38, 1	
3	24	Canning River	45, 86, 133, 134, 168, 182, 282, 348,	
1	8	Cape Le Grand	214	National Park
2 3	59) 68)	Chandala, Lake	12, 13, 186, 407	
1	27	Chapman River	390	
1	9	Cheyne Bay	3, 4	
1	13	Chinocup, Lake	69, 103, 277	Salt Lake
3	10	Churchmans Brook	38, 1	Reservoir
3	28	Claremont, Lake	42, 77, 78, 122, 126, 186, 292, 345	
2	40	Clifton, Lake	74, 80, 69, 200, 361, 454	Yalgorup N.P. Pk
2	28	Collie	1, 355	
2	29	Collie River	69	
3	12	Coogee, Lake	42, 77	(Munster) Recreation
3	3	Cooloongup, Lake	43, 76, 77, 69, 137, 226, 343, 409, 449	(White Lake) NP Parks and Recreation
2	31	Coolup	266, 389	
1	22	Coorow	81, 458	
1	46	Cooyapooya	83	Harding River
1	3	Cowan, Lake	69	
1	6	Dalyup River	69	
1	19	Dandaragan	3	
2	54	Darkin Swamp	51	in State Forest No. 13.
2	6	Deep River	90	Enters Nornalup Inlet
1	47	De Grey River	83	
2	46	Del Park	1	Bauxite Minesite

TABLE II (cont.) : LOCATION INDEX

MAP	NO.	LOCATION	REFERENCE TABLE III, TABLE IV	COMMENTS
3	38	Dianella Swamp	76	
2	52	Dirk Brook	38	Trib. to Serpentine River
1	42	Dogger Gorge	83, 105	Fortescue River
2	15	Donnelly River	90, 197, 241	
2	23	Donnybrook	32, 278	
2	34	Dryandra	1.	State Forest Reserve
1	55	Drysdale River	16, 209	National Park
2	25	Dumbleyung, Lake	22, 69, 103	Salt Lake
2	20	Dunsborough	14	
2	48	Dwellingup	172	Forest Division
2	35	East Popanyinning	1.	
3	54	Ellen Bk Reserve	20, 186	(Martyn Reserve)
3	46	Emu Swamp	65, 71, 85	Ballajura Estate
1	7	Esperance	358	
1	36	Exmouth	85	
1	49	Fitzroy River	17.	
1	39	Fortescue River	35, 37, 83, 105, 106, 108, 244	
2	5	Frankland River	90	
3	72	Garden Lake	195, 326, 335, 340,401	Rottnest Island
2	9	Gardner River	90	
1	53	Gascoyne River	2, 25, 145, 205, 212, 462	
1	1	Gidgi, Lake	69	Salt Lake
1	5	Gilmore, Lake	69	Salt Lake
2	62	Gingin	81, 146	
2	63	Gingin Brook	76, 111, 143, 149	
3	50	Gnangara, Lake	23, 37, 42, 46, 69	
2	44	Goegrup Lake	50, 474	Rec. Res. & Private
3	1	Gooralong Brook	38	

TABLE II (cont.) : LOCATION INDEX

MAP	NO.	LOCATION	REFERENCE TABLE III, TABLE IV	COMMENTS
1	11	Gordon Inlet	19	
3	74	Government House Lake	195, 326, 335, 340, 401	Rottnest Island
1	14	Grace, Lake	69, 84, 103, 277	Salt Lake
1	25	Greenough River	76, 425	
1	38	Gregory Gorge	83, 105	Fortescue River
2	66	Guraga, Lake	186	
3	42	Gwelup, Lake	42, 78, 418	Pks & Rec.
1	29	Hamelin Pool	103, 139	
1	43	Harding River	85, 138	
2	42	Harvey Estuary	85, 69, 348, 356	
3	39	Hazelmere Lake	78	
3	40	Helena River	28, 10, 21, 23, 133, 249	
3	27	Helena Reservoir	1	
3	36	Herdsman Lake	42, 43, 76, 77, 79, 89, 9, 186, 190, 404, 405, 450	
3	73	Herschell Lake	195, 326, 335, 340, 401	Rottnest Island
3	32	Hyde Park	42, 375, 376	
3	37	Jackadder Lake	42, 19, 380	Urban Development
3	58	Jandabup, Lake	12, 13, 23, 31, 37, 42, 78, 84, 20, 186	Conservation & Rec. Res.
3	9	Jandakot Lake	42, 81, 76, 138	(Forrestdale) Fl. & F. Res.
3	48	Jane Brook	38, 49, 93	
1	35	Jiggalong	234, 235	
1	4	Johnston, Lake	31	Salt Lake
3	57	Joondalup, Lake	12, 13, 23, 31, 36, 42, 43, 46, 56, 57, 58, 71, 84, 20, 97 98, 99, 131, 130, 163, 167, 186, 325, 397., 451	Flora and Fauna Reserve, Pks. & Rec.
1	45	Kangan Pool	84	Sherlock River
2	43	Karrinyup, Lake	6, 42,	
3	4	Kent River	90	

TABLE II (cont.) ; LOCATION INDEX

MAP	NO.	LOCATION	REFERENCE TABLE III, TABLE IV	COMMENTS
1	50	Kimberley Plateau	94	
3	13	Kogolup, Lake	42, 53	Privately owned
2	30	Leschenault Inlet	36, 37, 85	
2	55	Leschenaultia, Lake	17, 147	
3	51	Little Badgerup Swamp	23, 77	
3	67	Loch McNess	12, 13, 86, 16, 20, 100, 101, 131, 163, 186, 271, 290	
1	12	Magenta, Lake	113, 103	Salt Lake
1	48	Mandora	30	
2	13	Manjimup	441	
3	16	Manning Lake	42, 53	(Daviak Swamp)
2	18	Margaret River	189, 291, 432	
3	59	Mariginiup, Lake	23, 42, 84, 50, 199	Privately Owned
1	17	Marmion Lake	222	
2	39	Martin Tank	73	Yalgorup NP
3	34	Maylands Swamp	76	
1	34	McLeod, Lake	103	
3	61	Melaleuca Park	10, 186,	
2	14	Mersea Lake	242	
1	41	Millstream	35, 37, 45, 60, 83, 72, 92, 103, 106	Fortescue River
1	23	Mingenew	221, 252	
1	54	Mitchell Plateau	16,	
3	33	Monger, Lake	42, 78, 14, 66, 118, 130, 131, 137, 163, 169, 186, 349	Pks & Rec.
2	57	Moondyne Spring	77, 78	
2	65	Moore River	111, 143, 240	
3	6	Mt. Brown Lake	77, 53	Privately Owned
2	7	Muir, Lake	125	

TABLE II (cont.) : LOCATION INDEX

MAP	NO.	LOCATION	REFERENCE TABLE III, TABLE IV	COMMENTS
2	60	Mungala, Lake	422	Fauna Reserve
1	28	Murchison River	145, 354, 371	
3	19	Murdoch Swamp	64	
2	47	Murray River	1, 5, 30, 78, 22, 35, 79, 96, 171, 177, 178, 348, 344, 351	Enters Peel Inlet
3	47	Mussel Pool	11, 43, 453	
3	71	Negri Lake	47, 181, 195, 253, 256, 326, 335, 340, 401	Rottnest Island
1	32	Nabberu, Lake	141	
2	3	Nornalup	23	
2	53	North Bannister	1	
3	18	North Lake	42, 64, 53, 137, 138, 170, 406	(Coolbellup) Pks and Rec
2	64	Nowergup, Lake	46	Fauna Reserve
1	52	Ord River	28, 60, 62, 12, 18, 34, 67, 87, 102, 114, 161, 216, 231, 232, 233, 395, 396, 398, 399, 460, 463	
2	24	Parkeyerring Lake	69, 103	
2	43	Peel Estuary	62, 80, 84, 317, 348, 361, 415 416	
2	12	Pemberton	143, 197, 383	
3	31	Perry Lakes	6, 42, 76, 78, 186, 246	
2	37	Preston, Lake	80, 69, 200, 203, 317, 361, 415, 416, 453	Yalgorup N.P.
3	69	Pink Lake	47, 181, 195, 326, 335, 340, 401	Rottnest Island
1	53	Prince Regent River	16, 3, 289, 402,	Fauna Reserve
2	10	Pt. Entrecasteaux	3, 4	
1	2	Queen Victoria Spring	103, 252, 381	
3	4	Richmond, Lake	42, 226, 409	Pks & Rec.
1	37	Robe River	84	
2	22	Sabina River	189	
2	51	Serpentine River	38, 197, 213, 348	

TABLE II (cont.) : LOCATION INDEX

MAP	NO.	LOCATION	REFERENCE TABLE III, TABLE IV	COMMENTS
2	8	Shannon River	90, 241, 346	Enters Broke Inlet
3	29	Shenton Park Lake	42, 62, 79, 188, 191	
1	44	Sherlock River	84	
2	49	South Dandalup River	2, 178, 348, 369	Enters Murray River
3	15	South Lake	42, 53	
3	45	Star Swamp	42, 430	
1	15	Stubbs, Lake	69	
2	26	Swan River	16, 66, 67, 68, 69, 70, 79, 52, 88, 91, 109, 133, 134, 158, 159, 179, 180, 183, 196, 204, 210, 223, 281, 341, 353, 365, 391, 403, 444	
2	68	Taylor's Lake	82	Privately Owned
3	8	Thompson, Lake	42, 50, 76, 53, 406	Fauna Reserve
3	20	Thornlie Swamp	76	
3	30	Tomato Lake	42, 79	
2	33	Toolibin, Lake	22, 31, 318, 339, 366	
2	1	Torbay	19	
3	55	Twin Swamps	20	Fauna Reserve
3	21	Victoria Reservoir	38	
3	2	Walyungup, Lake	43, 86, 69, 137, 140, 226 406, 448 449	(Salt Lake) N.P.
2	67	Wannamal, Lake	82	Flora & Fauna Res.
3	56	Wanneroo	7, 48	
2	11	Warren River	90, 207, 241	
3	5	Wattelup Lake	42, 53	Privately Owned
1	16	White Lake	75	Kalgoorlie
2	38	Yalgorup	74, 200	National Park
3	14	Yangebup, Lake	42, 53, 138	Privately owned
2	36	Yearloring Lake	82,	
3	25	Yule Brook	53, 54, 55, 88	
2	45	Yunderup	83	

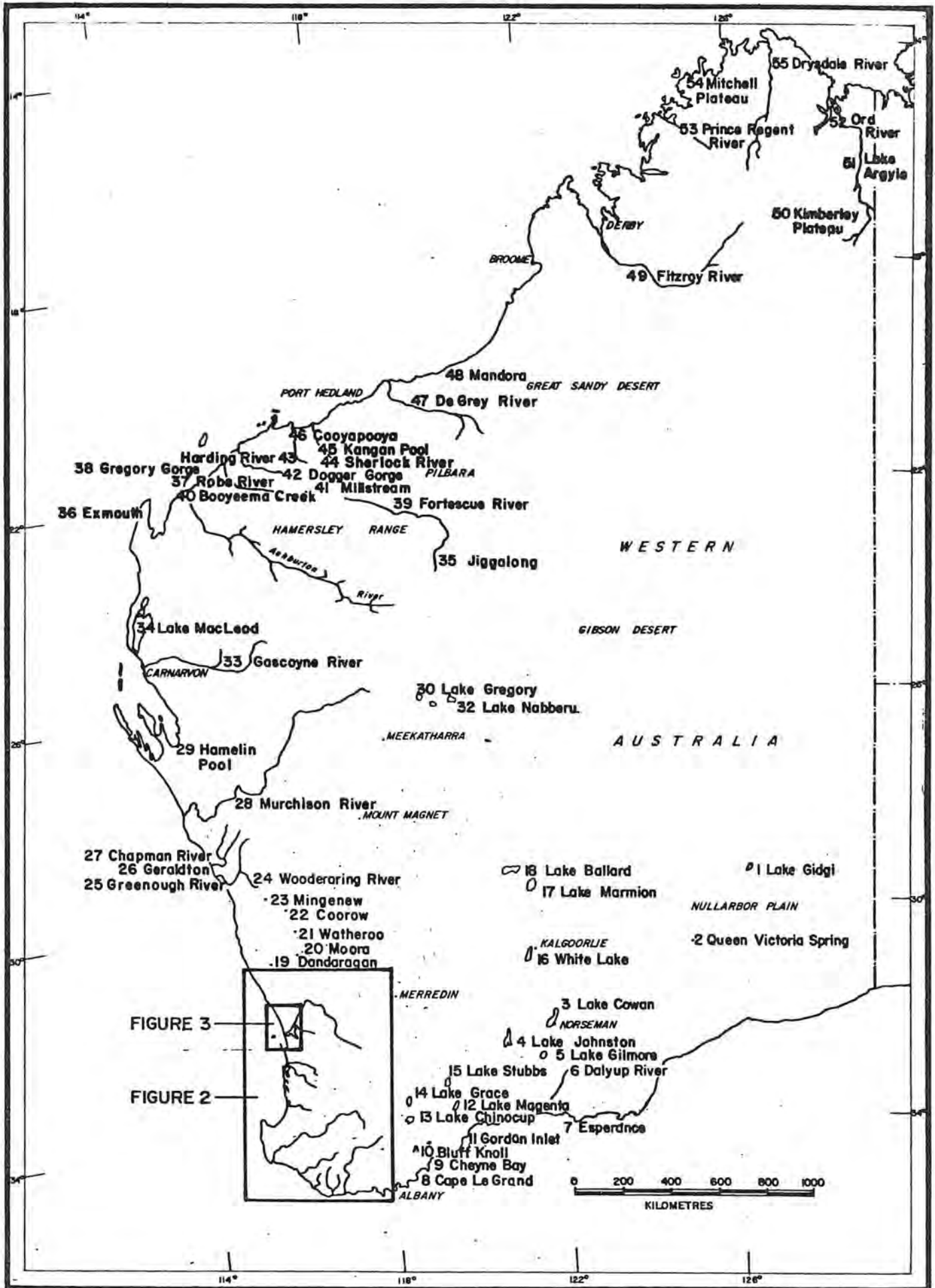


FIGURE I. LOCATIONS IN WESTERN AUSTRALIA

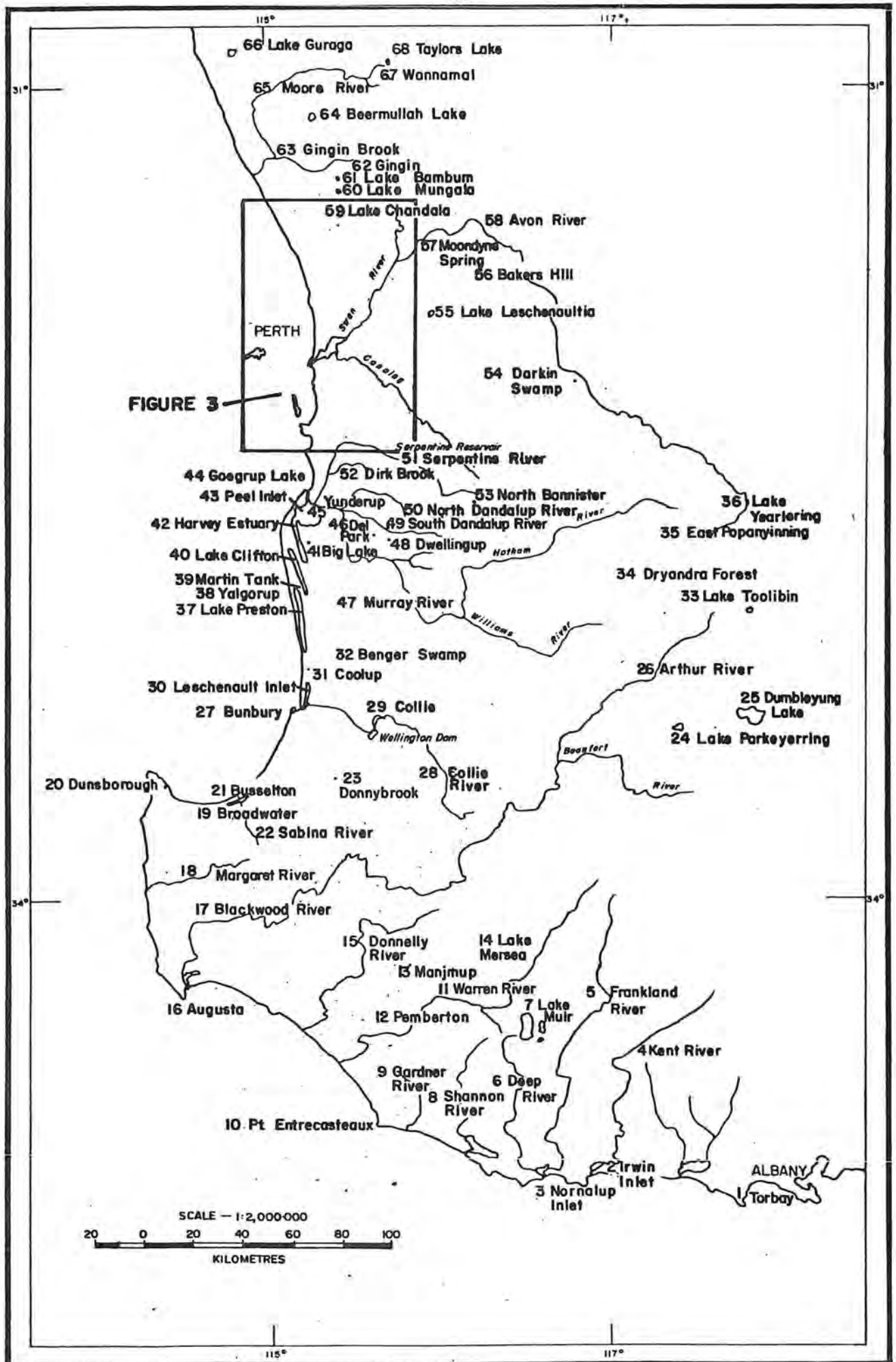


FIGURE 2. LOCATIONS IN SOUTH WESTERN AUSTRALIA

TABLE III
 INVENTORY OF RESEARCH AND DATA COLLECTION
 ON WESTERN AUSTRALIAN WETLANDS

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Mines Department; Geological Survey Branch	28
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Kings Park Board	31
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<u>Conservation Groups</u>	38
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<u>Industry</u>	40
<u>Other Individuals</u>	40

Note: In the column headed "Outline of Research" the prefixes below are intended to indicate"

- "c" - the project is completed
- "o" - the project is ongoing at present
- "p" - the project is proposed

Numbers in brackets in the column headed 'Data' indicate references listed in Table IV.

TABLE III INVENTORY OF RESEARCH AND DATA COLLECTION

INSTITUTION PERSONNEL	OUTLINE OF RESEARCH	DATA
<p>COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION.</p> <p>1. Division of Land Resources Management, Underwood Avenue, Floreat Park.</p> <p>Dr. A.J. Peck Mr. E. Bettenay Dr. F.J. Hingston Mr. D.H. Hurle Dr. M.L. Sharma Mr. D.R. Williamson</p> <p>This study is being done in conjunction with P.W.D., Forests Department and Agriculture Department.</p>	<p>o. Land uses and stream salinity experiments. Changes in stream-water quality and hydrologic regime associated with changes in land use in nine instrumented catchments and four salt seeps in south west W.A. Principally interested in the effects of agriculture and bauxite mining.</p> <p><u>LOCATION:</u> Three basins and one seep at <u>Bakers Hill Experimental Farm</u>; one basin on <u>Del Park</u> mining site, two basins in the immediate proximity of <u>Wellington Dam</u> and three more 30 km east of <u>Collie</u> in the <u>Wellington Dam</u> catchment. Other salt seeps are located at <u>North Bannister</u>, the <u>Dryandra State Forest</u> and <u>East Popanyinning</u>.</p>	<p>Data resulting from 1-2 years monitoring in catchment areas as base-line data prior to changes in catchment land use. Monitoring expected to continue into the early 1980's. Includes data on major ions, sediment yields, electrical conductivity, phosphates, nitrates, heavy metals and trace elements, (also some historical data on trends in salinity and total salt concentration in the <u>Blackwood River</u> and <u>Murray River</u> held by Dr. A.J. Peck). (ref. Williamson D.R. and Bettenay E. 1979); (467).</p>
<p>2. Dr. A.J. Peck</p>	<p>o. Estimating the possible effects of bauxite mining on stream salinity using numerical models.</p>	<p>Also have collected data for use in simulating the effects of bauxite mining in the <u>South Dandalup</u> catchment</p>
<p>3. Dr. F. Honey Mr. P. Hick</p>	<p>o. The development of reliable methods of mapping wetland vegetation using remotely sensed satellite (LANDSAT) data and aerial photography.</p> <p><u>LOCATION:</u> Bunbury to Dandaragan plateau W.A.</p> <p>p. The above methods will be tested and improved using unclassified wetlands as part of the study by McArthur and Churchward.</p> <p><u>LOCATION:</u> From Pt d'Entrecasteaux to <u>Cheyne Bay</u> and inland for about 50 km.</p>	<p>The system has been developed from basic mapping of wetlands in the S.E. planning corridor to the mapping of the <u>Wanneroo</u> wetlands.</p> <p>The project is expected to be completed by the end of 1979 submitted to the <u>Wetlands Advisory Committee</u>; (50, 184, 185).</p>
<p>4. Mr. W.M. McArthur Mr. H.M. Churchward</p>	<p>p. A survey to produce a broad scale picture of the landforms, soils and gross vegetation pattern of an area in the south west. This will include identification, classification and mapping of wetlands. From this, broad scale survey areas of importance or interest will be identified and studied in more detail.</p> <p><u>LOCATION:</u> From Pt d'Entrecasteaux to <u>Cheyne Bay</u> and inland for about 50 km.</p>	<p>Data will be taken from air photos (b/w. 1:40,000), and Lands and Survey's 1:25,000 colour photography.</p> <p>Use will be made of the classification techniques using LANDSAT imagery developed by Hick and Honey.</p> <p>Field observations will be taken where necessary.</p> <p>This project is expected to be completed by the end of 1980.</p>

TABLE III (cont.) : INVENTORY OF RESEARCH AND DATA COLLECTION

INSTITUTION PERSONNEL	OUTLINE OF RESEARCH	DATA
5. Dr. D. Bennett	o. Changes in water quality with changes in land use in <u>Murray River</u> catchment, south west W.A. Modelling being devised to predict optimal land use in terms of total economic yield of catchments with respect to water, forestry and agriculture.	Data for model supplied by Forestry Department, Agriculture Department, Metropolitan Water Supply, Sewerage and Drainage Board, Public Works Department. Theoretical treatment of this data only. Eight papers have been presented on this work; (22, 24, 35, 36, 37, 38).
6. Mr. B. Carbon Mr. G. Bartel Ms. A. Murray	o. The changes in nutrient status of several freshwater, metropolitan lakes in relation to their hydrological regimes and the effects of groundwater on the same, as well as the role played by bottom sediments in influencing both nutrient and hydrological changes. <u>LOCATION:</u> Perry Lakes, Blue Gum Lake, Booragoon Swamp and Lake Karrynyup.	Have collected extensive water quality data, sedimentary chemistry, stratigraphy of lake beds and surrounding areas. Monitoring to date includes changes in piezometric gradient as well as more detailed investigations of bottom sediment chemistry and nutrient gradients. The project is of four years duration and is expected to be concluded in 1979. Results will be published in the scientific literature.
WESTERN AUSTRALIAN MUSEUM, FRANCIS STREET, PERTH. 6000 7. Dr. D.J. Kitchener Mr. A. Chapman Mr. J. Dell Mr. B.G. Muir	c. Fauna (vertebrate) and vegetation survey of the Western Australian Wheatbelt.	Relationship between reserve size and structure (based primarily on vegetation structure and floristic diversity indices) and the mammal, bird, reptile and frog assemblages (including those reserves which have salt lakes - no concentrated attempt to document plants and animals of these seasonal lentic systems but some information is acquired routinely). The results of these surveys are published as supplements to the Museum Records. To date : See 215, 476-482.
8. Mr. B.G. Muir	o. Vegetation surveys of some Nature Reserves in the wheatbelt Area of Western Australia. <u>LOCATION:</u> Shires of Tammin, Kellerberin, Wongan-Ballidu, Narembeen, Bruce Rock, Victoria Plain, Merredin, Dalwallinu, Moora, Coorow, Mt. Marshall, Koorda, Mukinbudin, Westonia, Nungarin, Trayning, Dowerin, Goomalling, Northam, (not shown on maps).	Data includes: Species List, vegetation associations and general comments on history, human impact, fauna and occurrence of salt lakes and salt flats. To date 13 shire reports have been completed and are available from the Department of Fisheries and Wildlife. Others will be available on completion; (313)

TABLE III (cont.) : INVENTORY OF RESEARCH AND DATA COLLECTION

INSTITUTION PERSONNEL	OUTLINE OF RESEARCH	DATA
9. Dr. R.A. How	o. Faunal inventory of System 11, West Australian Goldfield area.	Species list, distribution and general relation to flora. Eight month survey commenced April 1979.
10. Mr. B.G. Muir Mr. J. Dell	c. Relationships between vegetation, soils, drainage and birds and herptofauna in <u>Melaleuca Park</u> .	Specific data on the change in flowering time with groundwater extraction. The vegetation analysis is available as an unpublished manuscript. A full report should be completed by July 1979.
11. Mr. M. Jackson Mr. K. Morris Mr. G. Harold Dr. D.J. Kitchener (compiled report).	c. A spring 1975, biological survey of the proposed <u>Mussel Pool</u> complex and recommendations for its future development. A study done for the M.R.P.A. in September-October 1975. Floristics were done by the W.A. Herbarium.	Listings, tables and maps of vegetation, birds, mammals, reptiles, fish and invertebrates - principally molluscs and insects. Some interpretation is given of the importance of wetlands to these species (unpublished).
12. Dr. R. George Mr. D. Hembree Mr. N. Sarti	c. A limnological survey of the free-standing waters of a number of lakes in the <u>Wanneroo area</u> . Lake Jandabup was sampled in detail. <u>LOCATION:</u> Jandabup, Joondalup, Lock McNess, Chandala, Bambun, Beermullah, and Guraga Lakes.	Sampling was done using qualitative techniques e.g. netting for insects, molluscs, crustacea and fish every two to three months. The project ran from April 1977 to May 1978; (186).
13. Dr. G. Storr Mr. R. Johnston Mr. G. Harold Mr. G. Barron	c. A survey of the reptiles and birds of the wetlands in the <u>Wanneroo area</u> . <u>LOCATION:</u> as above.	Waterfowl counts, gut contents, frog, snake, lizard and bird species lists; habitat preference, etc.; (186)
14. Dr. G. Storr Mr. R. Johnston Mr. P. Griffith	p. A survey of birds, reptiles and frogs of the southern Swan Coastal plain from <u>Perth to Dunsborough</u> .	Data will be collected from a 4 week field trip, published and unpublished works on the area. A report is expected to be compiled by the end of 1980.
15. Dr. G.R. Allen in conjunction with Dr. D.F. Hoese Australian Museum Sydney	p. Revision of all Australian species of Rainbow fishes (Fam. Melanotaeniidae) p. A semi-popular semi-scientific book on freshwater fishes of Australia	(5) Taxonomy and habitat data

TABLE III (cont.) : INVENTORY OF RESEARCH AND DATA COLLECTION

INSTITUTION PERSONNEL	OUTLINE OF RESEARCH	DATA
16. Mr. J.B. Hutchins	<ul style="list-style-type: none"> c. A survey of fishes in the Prince Regent River Reserve (see Miles J.M. and Burbidge, A.A. 1975; 289) c. A survey of freshwater fishes in the Drysdale River Reserve (see Kabay E.D. and Burbidge A.A. 1977; 209) o. A fish survey of the Mitchell Plateau (in press). c. Examination of Museum Records since 1882 to provide a basis for a check list of fish species in the Swan River (ref. Chubb et al, 1977; 91) 	<p>- annotated lists of species collected including description number collected, lengths, locations, behaviour and breeding; (91, 209, 289)</p>
17. Mr. G.N. Kendrick Mr. J.A. Stoddart	<ul style="list-style-type: none"> o. The taxonomy, ecology and parasitology of Western Australian freshwater molluscs. c. A description of a new species of naiad, or fresh water mussel. <p><u>LOCATION:</u> Fitzroy River</p>	<p>To be presented as an illustrated handbook expected to be completed by the end of 1979.</p> <p>To be published. <i>West. Aust. Nat.</i></p>
18. Dr. G.R. Allen Mr. J.B. Hutchins Mr. N. Sarti	<ul style="list-style-type: none"> o. The Fish section of the museum has a large collection of freshwater fish from throughout the State and this is available for use. 	
<p><u>WESTERN AUSTRALIAN GOVERNMENT</u></p> <p>DEPARTMENT OF FISHERIES AND WILDLIFE</p> <p>Wildlife Research Centre Mullaloo Drive Wanneroo. W.A.</p>	<ul style="list-style-type: none"> o. Routine monitoring (2-monthly at present) of depth and salinity of selected wetlands in the south-west. Twenty-eight wetlands gauged at present; propose to instal depth-gauges on a further seventy during the next two years. Project began in November 1977. o. Index of Wetland Nature Reserves (WNR's) of Western Australia (south of 26°) 	<p>A punched-card index has been prepared and stereo aerial photographic coverage (black and white) of all WNR's and adjacent land has been obtained.</p> <p>A 1:1,000,000 map of WNR's of the south west is near completion and classification of WNR's according to salinity and permanence is proceeding</p>
19. Mr. J.A.K. Lane		

TABLE III (cont.) : INVENTORY OF RESEARCH AND DATA COLLECTION

INSTITUTION PERSONNEL	OUTLINE OF RESEARCH	DATA
Mr. J.A.K. Lane contd.	<ul style="list-style-type: none"> o. Annual surveys of waterfowl numbers, distribution and breeding activity prior to determination of duck-shooting season regulations. o. Monitoring and control of feral domestic duck numbers on Perth Metropolitan wetlands. Annual surveys and culling began in February 1978. o. Survey of "Wetland Complex Eleven". EPA has requested Department Fisheries and Wildlife to make recommendations on the need for additional wetland nature reserves in Wetland Complex Eleven (the south coastal area from Torbay to Bluff Knoll to Gordon Inlet). A Survey of existing WNR's and of other wetlands will be carried out during 1979. Recommendations will be made in 1980. o. Short term projects relating to waterbird and wetland management. o. An assessment of the status of Lake McLeod for waterfowl breeding 	<p>(103, Section 1, 2.11)</p> <p>Data collected on an <i>ad hoc</i> basis from aerial surveys and ground inspections.</p>
20. Dr. A. Burbidge	<ul style="list-style-type: none"> o. The biology of the short-necked tortoise (<i>Pseudemydura umbrina</i> Sienbenrock) and management for its conservation. <p>LOCATION: Twin swamps Nature Reserve. Ellen Brook (Martyn) Nature Reserve.</p>	<p>Intensive population study throughout the winter period each year by mark and return. Total numbers, growth rates, recruitment, age to sexual maturity, breeding in captivity success. One water sample at Ellen Brook and four at Twin Swamps two to three times per year analysed for total nitrogen, nitrate nitrogen, total phosphorus, fluoride, sulphide, total dissolved solids, chloride and dissolved oxygen. (Unpublished).</p>
<p>Marine Research Laboratories, P.O. Box 20, North Perth. 6020</p> <p>21. Dr. Noel Morrissy</p>	<ul style="list-style-type: none"> o. Ecology of marron (<i>Cherax tenuimanus</i>) and their aquaculture, particularly in still water impoundments. 	<p>(294, 295, 300, 302, 303, 304, 305, 306, 307, 310, 311, 312).</p>
<p>22. Head Office. 108 Adelaide Tce., Perth. 6000</p> <p>Mr. J.T. Goodsell</p>	<ul style="list-style-type: none"> o. Managing and rehabilitating wetlands at the Broadwater Reserve (No. 27080) and Benger Swamp. 	<p>Assessing effects of water level and nesting material on breeding of swans. Obtaining detailed contour maps. Mapping vegetation of Benger Swamp.</p>

TABLE III (cont.) : INVENTORY OF RESEARCH AND DATA COLLECTION

INSTITUTION PERSONNEL	OUTLINE OF RESEARCH	DATA
Mr. J.T. Goodsell contd.	<ul style="list-style-type: none"> o. Managing the fauna refuge at <u>Lake Dumbleyung</u>. o. Member of the Northern Arthur River Wetlands Rehabilitation Committee investigating the feasibility of maintaining the ecological integrity and rehabilitating lakes and streams that comprise the headwaters of the Arthur River (In conjunction with Agriculture, Public Works and Forests Departments). 	<p>Surveys of fauna and flora.</p> <p>Aerial photography and vegetation mapping, and contour plotting proposed. Some piezometers installed; (318).</p>
<p>W.A. HERBARIUM Department of Agriculture, Jarrah Road, South Perth, 6151</p> <p>23. Dr. N. Marchant</p>	<ul style="list-style-type: none"> c. Surveyed eleven lakes on the Swan Coastal Plain. Developing a wetlands classification system based on detailed plant ecology and water quality. Classification criteria include size, salinity, seasonality of water level and percentage vegetation cover. <p>LOCATION: Gnangara, Nowergup, Adams Mariginlup, Jandabup, Joondalup, Badgerup and Little Badgerup Lakes.</p> <ul style="list-style-type: none"> o. The taxonomy, distribution and ecology of aquatic vascular plants. c. An investigation of the aquatic weeds of Lake Argyle and the Ord River. 	<p>Water quality data includes pH, colour, total suspended solids (filtrate residue), Na⁺, Cl⁻, Ca, Mg, Ammonium nitrogen, nitrate nitrogen, total phosphorus and orthophosphate.</p> <p>Information submitted to the Wetlands Advisory Committee.</p> <p>Report submitted to the Ord River Ecology Committee.</p>
24. Mr. T.E.H. Aplin Mr. N.S. Lander	<ul style="list-style-type: none"> o. Identification of blue-green algae as a service to the public and government bodies. 	Records not normally retained.
<p>ENVIRONMENTAL PROTECTION AUTHORITY (E.P.A.) 1 Mount Street, Perth. 6000</p> <p>25. Wetlands Advisory Committee (W.A.C.)</p> <p>Mrs. K. Majer - (Past Chairman) Dr. J. Arnold - (Present Chairman) Mr. N. Orr - (Member)</p>	<ul style="list-style-type: none"> c. An interdepartmental committee to review and advise the E.P.A. on the desirable allocation of wetland reserve resources and the adequacy of their management. 	<p>A large amount of published and unpublished data have been collected and reviewed. Two reports (refer to W.A.C. reports (1977) and Tingay, A. & S.R., (1976)) were submitted to the Environmental Protection Authority (E.P.A.) in February 1978. The E.P.A. decided that these reports should be utilized as input to the Conservation Reserve and National Parks Committee (C.R.N.P.) of the System 6 Study. The reports were not made available for general release.</p>

TABLE III (cont.) : INVENTORY OF RESEARCH AND DATA COLLECTION

INSTITUTION PERSONNEL	OUTLINE OF RESEARCH	DATA
<p>Wetlands Advisory Committee (W.A.C.) contd.</p> <p>Mrs. K. Majer (Environmental Consultant 18 Silverdale Road, Lesmurdie, 6076)</p>	<p>o. Preparation of a series of booklets based on the Information on Western Australian wetlands collected by the W.A.C.</p>	<p>Data divided on basis of locality. Topics include wetlands reserve management, purposes and vesting of wetland reserves and rehabilitation; (261-264).</p>
<p>Dr. E. Hodgkin Dr. R. Field Department of Conservation and Environment 1 Mount Street Perth. 6000</p>	<p>c. Study of the Blackwood River Estuary.</p> <p>o. Peel-Harvey Estuarine System Study</p>	<p>For details of this and other estuarine projects refer to Hodgkin & Majer (1976).</p> <p>- hydrology, nutrients, fauna and aquatic flora.</p> <p>Further information can be obtained from the Estuarine and Marine Advisory Committee (EMAC), Department of Conservation and Environment.</p>
<p>26. Conservation through Reserves Committee (C.T.R.C.)</p> <p>Mr. J.F. Morgan (Surveyor General), Chairman.</p> <p>Prof. R.T. Appleyard, (Professor of Economic History, University of Western Australia).</p> <p>Dr. B.E. Balme, (Reader in Geology, University of Western Australia).</p>	<p>c. A Committee, set up by the E.P.A. in 1972, concerned with preserving and managing areas of native habitat. They divided the State into 12 systems and have completed reports on all except System 6.</p> <p>Reports include information on, and recommendations for wetlands (lakes, swamps, rivers and estuaries) throughout the State).</p>	<p>(103, 104, 123, 124)</p>
<p>27. Conservation Reserves and National Parks Committee (One of the Committees set up under the System 6 Study).</p> <p>Chairman: Dr. P. Wycherley, Director Kings Park & Botanic Gardens</p> <p>10 members, including: Dr. A. Burbidge (Department of Fisheries and Wildlife). Dr. R. Powell (Department of Fisheries and Wildlife).</p>	<p>c. Committee's task was to make recommendations to the System 6 Committee on suitable areas in System 6 for National Parks and Conservation Reserves.</p> <p>Committee compiled a list of all potential conservation reserves greater than 20 ha, within System 6, and inspected as many of these as possible. The Committee reviewed the recommendations of the Wetlands Study, Wetlands of System 6 (by A. and S. Tingay) and various submissions, including those from the W.A. Wildlife Authority and the Shire of Wanneroo. In summary, the Committee did not undertake research, but reviewed recommendations which had been made in other studies.</p>	<p>The Conservation Reserves and National Parks Committee produced a report, which it directed to the System 6 Committee. The recommendations have been responded to by other committees of the Study, and these responses will be taken into account by the System 6 Study, when making its report to the E.P.A. The System 6 Committee's report will be made public later this year. After this time, other government departments may have access to the Conservation Reserves and National Parks Committee's report, containing the original recommendations.</p>

TABLE III (cont.) : INVENTORY OF RESEARCH AND DATA COLLECTION

INSTITUTION PERSONNEL	OUTLINE OF RESEARCH	DATA
<p>28. Ord Ecology Sub-Committee</p> <p>Mr. C. Murray Department of Conservation and Environment (Present Secretary)</p>	<p>c. A Committee set up by the E.P.A. to coordinate people working in the area. It is a sub-committee of the Ord Project Coordinating Committee set up by the State Government.</p> <p><u>LOCATION</u>: Ord River</p>	<p>Reports and data collected by University of Western Australia Microbiology Department, Government Chemical Laboratories, Public Works Department, Fisheries and Wildlife, W.A. Museum, Department of Agriculture, Public Health Department.</p>
<p>FOREST DEPARTMENT, Institute of Forest Research Cnr. George & Thelma Streets, Como. 6152</p> <p>29. Mr. F. Batini</p> <p>in conjunction with the Water Resources Section of the Public Works Department.</p> <p>and</p> <p>CSIRO Division of Land Resource Management</p>	<p>o. Monitoring the affect of a green firewood cut clearing operation on the salt water yield of a water catchment area.</p> <p><u>LOCATION</u>: Helena River Catchment</p> <p>o. Researching the affects of Agro Forestry in catchment areas on water quality.</p>	<p>Salinity of and depth to deep and perched groundwater, water yield, rainfall and salt fall. Some results have been published in Forest Department Research Bulletins; (21, 23).</p> <p>Salinity water yield.</p>
<p>30. Mr. W. Schmidt</p>	<p>o. An assessment of amateur marron fishing in the Murray Valley. On-site interviews have been conducted with fishing parties during the 1973 and 1977 season. On-going counting of vehicles (found to correspond directly to number of fishermen).</p> <p>o. Relationship between reaction and landforms. 12,000 questionnaires 1977-1978. Monthly observation surveys.</p> <p><u>LOCATION</u>: State forests of the South West.</p>	<p>Includes number of fishing nights per person, number of marron caught per night per person, size of marron caught per night per person.</p> <p>Activity, location, time, population, data collection has been completed. Observation data is being related to die-back occurrence, wetland areas and reservoirs. Findings will be presented for publication by the Forest Department 1980.</p>
<p>31. Dr. E. Mattiske (Heddle) Mr. J. Havel.</p>	<p>o. Impact of groundwater fluctuation on the native flora of the Swan Coastal Plain. Have assessed natural fluctuations in level over the last 12 years. 1972 included extra transects to take in <u>Lake Joondalup</u> and <u>Lake Jandabup</u>.</p> <p>Dr. Mattiske is a member of the Northern Arthur River Wetlands Rehabilitation Committee.</p>	<p>Data is currently being prepared for a range of publications to be submitted in 1979; (176).</p> <p>Vegetation surveys of Lake Toolibin and Surroundings; (318).</p>

TABLE III (cont.) : INVENTORY OF RESEARCH AND DATA COLLECTION

INSTITUTION PERSONNEL	OUTLINE OF RESEARCH	DATA
MINES DEPARTMENT 66 Adelaide Terrace, Perth. 6000 Geological Survey Branch		
36. Director - Mr. J.H. Lord	o. Member of Steering Committee on Effects of Bauxite Mining and Woodchip Steering Committee	Data on bauxite mining and woodchip projects listed under working group members.
Assistant Director Dr. P.E. Playford	o. Research on Quaternary sedimentation and coastal geomorphology.	Data on Shark Bay-Zuytdorp Cliffs area, Rottnest Island, Swan Coastal Plain. Publication on Hamelin Pool.
Sedimentary Division	o. Geological mapping of sedimentary basins.	Published Bulletin (Geological Survey Bulletin) maps and unpublished records and reports.
Mineral Resources Division.	o. Geological mapping in mineral fields and evaluation of mineral resources.	Published Bulletins, (Geological Survey Bulletin) maps and unpublished records and reports.
Regional Mapping Division	o. Geological mapping in hard rock areas.	" " "
Common Services Division	o. Specialist services in palaeontology fossil identification, petrology, geophysics, library services, also environmental and urban geology.	" " "
Dr. A.E. Cockbain	o. Examination of Quaternary fossils	Unpublished reports.
Mr. E.R. Biggs	o. Limited involvement in studies of Laporte Effluent Disposal - Leschenault Inlet. Environmental conditions on proposed mining in estuaries, on coasts and elsewhere.	
	o. Urban geological mapping (1:50,000) currently <u>Bunbury</u> .	Published maps and notes.
Mr. R.H. Archer	o. Urban geological mapping (1:50,000) currently <u>Port Hedland</u> .	Published maps and notes.
<u>Engineering Geology</u> Division Supervising Engineer- ing Geologist - Mr. R.P. Mather	o. Engineering investigations of dam sites, tunnels and other works.	Unpublished reports.
37. <u>Hydrogeology</u> Division Supervising Hydro- geologist - Mr. T.T. Bestow	o. Groundwater Resources assessment.	Records of boreholes throughout the State and reports.
	o. Supervisory panel of projects on the changes in hydrology resulting from mining, catchment monitoring, rehabilitation studies, paired catchment study and salinity model in bauxite mining area.	Published and unpublished reports on the effects of bauxite mining including salinity and hydrographic data from bores in mined and unmined areas of the Darling Range.
	o. Supervisory panel of paired catchments and monitoring studies in the woodchip licence areas.	

TABLE III (cont.) : INVENTORY OF RESEARCH AND DATA COLLECTION

INSTITUTION PERSONNEL	OUTLINE OF RESEARCH	DATA
<p><u>Hydrogeology Division</u> contd.</p> <p>in conjunction with Dr. K.J.B. Hirschberg.</p> <p>Dr. A.D. Allen</p> <p>Dr. A.D. Allen Mr. W.A. Davidson</p> <p>Mr. A.T. Laws</p> <p>Dr. K.J.B. Hirschberg Mr. A.T. Laws</p> <p>Mr. J.C. Barnett</p> <p>Mr. J.C. Barnett</p> <p>Mr. L.J. Furness</p>	<ul style="list-style-type: none"> o. Studies of Laporte Effluent Disposal, <u>Leschenault Inlet</u>. o. Evaluation of groundwater resources throughout the State. o. Studies of water balance and aquifer characteristics in <u>Gnangara</u> area. o. Water balance studies of shallow lakes in the Perth Coastal Plain (L. Jandabup, L. Mariginiup). o. Studies of the detailed geology and hydrogeology of the Perth Metropolitan area, groundwater evaluation. o. Township water supply investigations. o. Advice on groundwater conditions in rural areas of W.A. o. Groundwater Pollution studies waste disposal sites (Hertha Road, Jones Street, Gnangara, Kingsway, Alcoa Red Mud Lakes). o. Hydrogeological assessment of the calcrete and other aquifers of the Fortescue River and pumping effects in Millstream. <p>Hydrogeological assessment of flood damage to Pools in the Millstream National Park.</p> <ul style="list-style-type: none"> o. Member of working groups studying the effects of bauxite mining and woodchipping on hydrology. o. Member of the Northern Arthur River Rehabilitation Committee. 	<p>Unpublished reports in Annual Reports. Unpublished reports.</p> <p>Published and unpublished reports, borehole data.</p> <p>Borehole data. Unpublished reports.</p> <p>Borehole data. Unpublished reports.</p> <p>Unpublished reports.</p> <p>Hydrogeologic, water level data, geological data. Unpublished reports.</p> <p>Hydrographic, geological, salinity and borehole data.</p> <p>Geological, hydrogeological, hydraulic hydrographic and salinity data from monitoring bores.</p> <p>Hydrogeology of <u>Lake Toolibin</u>; (318).</p>
<p>METROPOLITAN WATER SUPPLY SEWERAGE AND DRAINAGE BOARD, 2 Havelock Street, West Perth. W.A. 6005</p> <p>38. Mr. H.E. Hunt Chief Engineer</p>	<ul style="list-style-type: none"> c. Water quality in the hills catchment areas. <p><u>LOCATION</u>: Canning, Little Dandalup, Serpentine, South Dandalup, Gooralong Brook, Jane Brook, Dirk Brook, Victoria, Churchmans Brook Dams.</p> <ul style="list-style-type: none"> o. Chairman of the Advisory Committee on water purity 	<p>Bacteriological tests.</p> <p>Report submitted to the System 6 Committee, Department of Conservation and Environment, 1978.</p> <p>Ref. to Report submitted to System 6 Committee; (1).</p>

TABLE III (cont.) : INVENTORY OF RESEARCH AND DATA COLLECTION

INSTITUTION PERSONNEL	OUTLINE OF RESEARCH	DATA
<p>39. Water Supply and Maintenance Branch</p> <p>Mr. B. Fleay.</p>	<ul style="list-style-type: none"> c. 12 month study of <i>E. coli</i> total coliform, Salmonella in service reservoirs, hill reservoirs and ambient waters at monthly intervals. p. The development of sampling methods for virus testing as a regular procedure in assessing the water quality of service reservoirs. To be done in conjunction with the State Health Department. o. Twice weekly, total algal counts, using the millipore method, on all service reservoirs o. Chemical analyses of waters from all the hills catchment reservoirs, once weekly. o. Monitoring the water quality of all hill reservoirs and their catchment streams, down to primary streams. 	<p>Study done in conjunction with State Health Laboratory (see below).</p> <p>A field virus sampling unit has been set up and should be in full operation by the end of 1979.</p> <p>Total counts done only. All records maintained in a manual filing system (unpublished).</p> <p>pH, total dissolved solids, sodium chloride, estimate of clarity. Data stored manually at Leederville depot (unpublished).</p> <p>At present sampling some 600 locations for salinity, fecal coliforms, <i>E. coli</i> and turbidity. Some herbicide hydrocarbon and pesticide data. Data is retained raw, in a manual filing system (unpublished) in special locations.</p>
<p>40. Forward Planning and Computing.</p> <p>Mr. M.J. Caldwell</p>	<ul style="list-style-type: none"> o. The investigation of groundwater resources and the planning of their use and management. Work in closely with the Geological Survey of the Mines Department. 	<p>Monitoring of changes in groundwater levels over time for a large number of bores throughout the metropolitan area. All data stored on the Department's own computer system (unpublished).</p> <p>Initial Sampling for Chemical Analysis of approximately 400 monitoring wells located on the Coastal Plain between Gingin Brook and Murray River. Proposed to sample every 5 years. Selected locations sampled more frequently. All data stored on Department files (unpublished).</p> <p>Limnological investigations of Lakes Jandabup (1978) and Mariginiup (1978/79). Drilling for geological interpretation and sampling for chemical analysis of 54 wells around these lakes. Chemical sampling of wells on an annual basis.</p> <p>Studies initiated by MWB and hydrogeological interpretation and sampling for chemical analysis of 54 wells around these lakes. Chemical sampling of wells on an annual basis.</p> <p>Studies initiated by MWB and hydrogeological component carried out by G.S.W.A.</p> <p>Data stored on Departmental files (unpublished).</p>

TABLE III (cont.) : INVENTORY OF RESEARCH AND DATA COLLECTION

INSTITUTION PERSONNEL	OUTLINE OF RESEARCH	DATA
<p>41. Sewerage and Drainage</p> <p>Drainage Design</p>	<p>o. Twice yearly sampling of a large number of metropolitan lakes for a wide range of water quality parameters; since 1970 for most of the lakes. Also sample a large number of stormwater drains prior to their discharge to the Swan and Canning estuaries.</p> <p><u>LOCATION</u>: Refer Appendix A and Figure 2.</p> <p>o. The measurement of water levels of lakes and swamps throughout the metropolitan area.</p> <p><u>LOCATION</u>: Ref. Appendix B.</p>	<p>Biological oxygen demand, suspended solids, methyl blue active substance, pH, phosphorus, fluoride, ammonia as nitrogen, organic nitrogen, total coliforms, salmonella, total organic carbon, specific conductivity, sodium chloride, and in the last two to three years, chromium, zinc, cadmium, lead, copper, mercury, iron and turbidity (unpublished).</p> <p>Stormwater drain samples are checked for chromium, zinc, Salmonella and <i>E. coli</i> only.</p> <p>At present measuring water levels at some 50 localities.</p>
<p>PUBLIC HEALTH DEPARTMENT State Health Laboratories, Perth Medical Centre Shenton Park. 6008</p> <p>42. Enteric Diseases Unit, Mr. J. Iveson Mr. R. Curtis</p>	<p>o. The monitoring of total coliforms, <i>E. coli</i> and Salmonella in a large number of ambient waters, service and hill reservoirs and tip sites in the metropolitan area (see Annual Report p.13) and special study area <u>Lake Banganup</u>.</p> <p>p. To publish a report on Salmonella and <i>E. coli</i> levels in wetlands over 1970-1978 period.</p>	<p>2 month or monthly sampling results are recorded on a card index system. (193, 195, 331).</p>
<p>METROPOLITAN REGION PLANNING AUTHORITY 22 St. George's Terrace, Perth. W.A. 6000 Urban Design Branch</p> <p>43. Open Space Team Mr. D. Everall</p>	<p>o. Involved in the planning and management of several wetlands reserved for Parks and Recreation in the Metropolitan Regional Scheme.</p> <p><u>LOCATION</u>: Lake Joondalup, the Rockingham Lakes (Cooloongup and Walyungup), Herdsman Lake and Mussel Pool/Bennett Brook in the Whiteman Park area.</p>	<p>Unpublished reports of significance are normally made available for the Department of Conservation and Environment for comment, but generally written information is not readily available.</p>
<p>KINGS PARK BOARD Fraser Avenue Kings Park</p> <p>44. Mr. G. Keighery Dr. N.C. Marchant (W.A. Herbarium)</p>	<p>o. A list of rare and endangered species of flora, including wetland species, for the entire state.</p> <p>o. Collection and propagation of native species of flora including wetland species.</p>	<p>List of species and their status, i.e. "rare, poorly collected, restricted distribution" and notes on their distribution for monocots and dicots. To be published as a Kings Park Research Note in July 1979.</p>

TABLE III (cont.) : INVENTORY OF RESEARCH AND DATA COLLECTION

INSTITUTION PERSONNEL	OUTLINE OF RESEARCH	DATA
<p>NATIONAL PARKS AUTHORITY OF W.A. Hackett Drive Crawley.</p> <p>45. Dr. A.N. Start</p>	<p>o. Monitoring program to assess the effect of groundwater extraction by the P.W.D. on Millstream pools and surrounding vegetation.</p>	<p>Borehole data and vegetation analysis along transect lines.</p>
<p>COMMUNITY RECREATION COUNCIL Sir Thomas Meagher Pavilion, Perry Lakes Stadium, Floreat Park. W.A.</p> <p>46. Mr. R. Bailey</p>	<p>c. 1976 Notes on some interested groups utilizing wetlands in System 6.</p> <p>c. 1977. A survey of the recreational usage of the lakes in the Northern Planning Corridor. Sampled one mid-summer weekend and one mid-summer week day. Information obtained by interviewing and the completion of a questionnaire by visiting parties.</p> <p><u>LOCATION:</u> Lakes Joondalup, Gnangara, Nowergup.</p>	<p>Paper submitted to Wetlands Advisory Committee.</p> <p>Age and sex composition of groups, group structure, distance travelled, frequency of visits, duration of visits, rank ordering of use pressure and facilities considered desirable -</p> <p>Report prepared for the Wetlands Advisory Committee Department Conservation and Environment, February, 1977.</p>
<p><u>EDUCATIONAL INSTITUTIONS</u></p> <p>UNIVERSITY OF WESTERN AUSTRALIA Nedlands. 6009</p> <p>47. Zoology Department Dr. D. Edward</p>	<p>c. Rottnest Island Lakes - sampled two-weekly for 12 months, for phytoplankton, zooplankton, benthic and marginal organisms, macroscopic plants and water quality.</p> <p><u>LOCATION:</u> Bagdad, Pink and Negri Lakes.</p> <p>o. Preparation of a key to the Chironomid (non-biting) midges of South Western Australia.</p>	<p>pH, total soluble salts. At quarterly intervals, full analysis, including N,P,K, colour, odour, Na, Cl, etc (unpublished).</p>
<p>48. Dr. B. Knott</p>	<p>o. The taxonomy, species diversity and general ecology of freshwater isopods, amphipods and parastacid decapods.</p> <p><u>LOCATION:</u> Australia-wide</p>	<p>Work to be published in scientific journals.</p>
<p>49. Mr. C. Austin</p>	<p>o. Taxonomy of Western Australian members of the genus <i>Cherax</i> (Parastacidae: Decapoda).</p>	<p>1979 Honours thesis under Dr. B. Knott</p>

TABLE III (cont.) : INVENTORY OF RESEARCH AND DATA COLLECTION

INSTITUTION PERSONNEL	OUTLINE OF RESEARCH	DATA
50. Mr. B. Clay (Jandakot Research Station)	o. Biology of the long-necked tortoise (<i>Chelodina</i> sp.) including population dynamics, breeding biology, patterns of movement and effects of predation over the last four years.	Population estimates using mark and return techniques, body metrics, sex ratios, growth rates, nest structure, clutch size, incubation temperatures, egg sizes/weights, hatching success, nesting and mating behaviour, general movements in relation to humidity and air temperature. Work to be published in scientific journals.
51. Mrs. J. Prince	o. Masters thesis under Dr. R. Black on the resource sharing of four species of Black fly larvae (Simuliidae) which occur together in a small stream characterised by highly variable seasonal flow. <u>LOCATION:</u> Jane Brook, between Mt. Helena and the Great Northern Highway.	Sampled 10 locations fortnightly, for 12 months. Determined occurrence of larvae and substrate type. Also measured dissolved oxygen, temperature, pH, depth and flow rate. Should be completed end 1979.
52. Mr. J. Trendal	o. PhD thesis under Dr. M. Johnston on reproductive strategies using populations of the mosquito fish <i>Gambusia affinis</i> .	Has collected most of the data and a report should be completed in 1980.
53. Botany Department Dr. W.A. Loneragan	o. The population structure of the tuberous plant, <i>Tribonanthes variabilis</i> , at <u>Yule Brook</u> Botany Reserve.	Recorded the number of individuals, annually since 1968. More detailed work on population structure commenced 1976.
54. Mr. I. Colquhoun	o. A study of the fire succession and detailed biology of <i>Adeanthes cygnorum</i> and <i>Jacksonia floribunda</i> . <u>LOCATION:</u> Yule Brook Reserve	PhD project under Dr. D.T. Bell. Data will be relevant to development management programs for the area.
55. Mr. L. Stephens	o. Phenological studies on the flora of ridge communities. <u>LOCATION:</u> Yule Brook Reserve	M.Sc. project under Dr. D.T. Bell. Data will be relevant to developing management programs for the area.
56. Dr. R.A. Congdon	o. Ecological study <u>Lake Joondalup</u> compiling hydrological and nutrient budgets, analysing water quality and understanding the relationship between algal blooms and nutrient concentration. o. Accumulation of data on nutrient levels and vegetation on several metropolitan wetlands.	Data includes:- Lake evaporation storm water inputs, nutrient status of sediments, chlorophyll and phaeophyton, nitrate, ammonium - nitrogen, Kjeldahl nitrogen, phosphate, total phosphorous and chloride. Report was submitted to the Wetlands Advisory Committee Department Conservation and Environment in May, 1979.
57. Mr. T.W. Rose	o. Seasonal changes in periphyton productivity and the relationship between benthic chlorophylls and sedimentary phytoplankton in <u>Lake Joondalup</u> .	1979 Honours thesis under Dr. A.J. McComb.

TABLE III (cont.) : INVENTORY OF RESEARCH AND DATA COLLECTION

INSTITUTION PERSONNEL	OUTLINE OF RESEARCH	DATA
<p>Geography Department</p> <p>58. Mr. H. Bekle</p>	<p>c. Seasonal biogeography of Lake Joondalup including the relationship between habitat and water-fowl.</p>	<p>Six month study November 1978 to April 1979. Data collected for the comparison between a deep water location at the northern end and a seasonal water location at the southern end.</p> <p>Report submitted as part of B.A. Hons. requirement, 1979.</p>
<p>Biochemistry Department</p> <p>59. Dr. P. Weaver</p>	<p>c. The effects of ABATE on photosynthesis of planktonic algae - Laboratory experiments using <u>Chlorella</u> undertaken.</p>	
<p>Department of Microbiology, Perth Medical Centre, Shenton Park, 6008</p> <p>60. Prof. N.F. Stanley Mr. P. Liehne Mr. A. Wright (Mr. N. Hamilton) Miss D. Britian Mrs. P. Pihu Mrs. C. Liehne</p> <p>in conjunction with Health Department</p>	<p>o. Arbovirus ecology and epidemiology of the Ord River area. The project's objective is to determine and to define changes in mosquito populations and to detect arboviruses by isolation and serological techniques.</p> <p>o. Epidemiological survey throughout the State, concentrating on towns and water bodies in the Pilbara or where outbreaks of encephalitis occur.</p> <p><u>LOCATION:</u> Millstream</p> <p>o. Monitoring of mosquito populations. <u>LOCATION:</u> Ord River</p>	<p>Accurate description and typing of Western Australian mosquitoes. Arboviruses are being isolated and identified from mosquitoes and the pattern of distribution in man, animals and birds is being determined by antibody estimation.</p> <p>Analysis of infection sites with respect to bird, mosquito and domestic animal populations.</p> <p>Fortnightly monitoring at 3 sites in the area.</p>
<p>61. Mr. W.F. Parker in conjunction with CSIRO Division of Land Resources Management.</p>	<p>o. To study the absorption of the bacterial and viral components of septic tank effluents by the sandy soils of the Swan Coastal Plain - groundwater pollution. 'Critical' areas of septic tank operation are where water tables are within 2 m of groundwater surface e.g. open drains which often connect to larger water bodies.</p>	<p>Data: Soil and groundwater analysis. Tracing dyes from septic tanks.</p> <p>The work commenced in April 1977 and is expected to take 3 years; (327).</p>
<p>62. Dr. J. McKenzie</p>	<p>o. World Health Organization program studying avian influenza. Samples taken from Albany, Windy Harbour, Mandurah, Shenton Park Lake, Rottnest, Moora, Lancelin, the Abrolhos Is., and Kununurra (<u>Ord River</u>).</p> <p>o. Assisting the Enteric Diseases Unit, Public Health Department, with Salmonella and <i>E. coli</i> sampling at the above locations.</p>	<p>Isolating influenza from cloacal swabs from 30 species of birds including pelicans, ducks, waders, terns and shearwaters.</p> <p>Project has been running for 2 years and is expected to be completed by the end of 1979. Results should be published in <i>Aust. J. Exp. Biol. & Med. Sci.</i> (1979).</p>

TABLE III (cont.) : INVENTORY OF RESEARCH AND DATA COLLECTION

INSTITUTION PERSONNEL	OUTLINE OF RESEARCH	DATA
<p>MURDOCH UNIVERSITY Murdoch. 6153</p> <p>School of Environmental and Life Sciences.</p> <p>63. Dr. P. Bridgewater</p>	<p>o. Compiling an inventory on Phytosociology (Plant Sociology) of wetlands.</p>	<p>Full floristic data (all species, associations and classifications) for freshwater and tidal wetlands.</p> <p>Initially for metropolitan wetlands. Later other areas in W.A. Commenced 1979, should have a large amount of data collected by end 1980.</p>
<p>54. Dr. P. Newman and associated students.</p>	<p>o. Collection of data on a swamp on the Murdoch University campus as a basis to understanding coastal plain wetlands. Tran- sects of vegetation, water table and soils have been made and the overall pattern of vegetation mapped. A model to show hydro- logical and nutrient balances has been prepared.</p> <p>c. Collection of data from <u>Bibra Lake and North Lake</u> following study done in 1978; (170). Compiling a management program for the 2 Lakes based on water quality, vegetation, wildlife, landuse alternatives and recreation patterns.</p>	<p>Water quality (weekly)*, water depth of swamp and adjacent bores (daily), rainfall, evaporation, temperature, humidity (daily) at two sites.</p> <p>* dissolved oxygen, conductivity, pH, orthophosphate, nitrate nitrogen.</p> <p>Results will be presented in a paper to be submitted for publication.</p>
<p>5. Mr. R. Orepeza</p>	<p>c. Monitoring <u>Emu Lake</u> for water quality parameters particularly turbidity. Observing seasonal variations and examining the possibility of removal by flocculation using Alum or other chemicals.</p>	<p>Data collected from September 1978 and will be presented in a report for Masters of Environmental Science by the end of 1979.</p>
<p>5. Mr. R.C.J. Lenanton (Marine Research Laboratory, Department of Fisheries and Wildlife) Prof. I.C. Potter Dr. C. Grant (WAIT) Mr. C.F. Chubb Mr. J.H. Wallace Mr. J.D. Prince Mr. P. Holt Mr. K. Brooker</p>	<p>o. The ecology of the fishes and the prawn <i>Metapenaeus dalli</i>.</p> <p>LOCATION: The Swan-Avon River system. Comparing the checklist of species with other south west river systems. Future work will concentrate on the general biology of a few of the more abundant species.</p>	<p>Project began 1977. Seasonal data collected from beach seining, trawling and mesh netting yields, information on species, occurrence, abundance, movement in the river, weight, age, length, feeding habits and reproduction.</p>
<p>Prof. I.C. Potter Dr. P. Marks (replacing Dr. D. Glaskin)</p>	<p>o. The concentration of various heavy metals have been invest- igated in 20 different species of teleost from the Swan River Estuary. Particular emphasis is being placed on the relation- ship between concentrations and the ecology of the fishes, and on the relationship between concentrations and body weight.</p>	

TABLE III (cont.) : INVENTORY OF RESEARCH AND DATA COLLECTION

INSTITUTION PERSONNEL	OUTLINE OF RESEARCH	DATA
School of Environmental and Life Sciences. contd. 68. Mr. J.D. Prince	o. Studying the general biology of the species of Hardy head (Fam. Atherinidae). <u>LOCATION:</u> Swan River	Data includes occurrence, feed and breeding activities and some limited taxonomic information. 1979 Honours project under Dr. I. Potter.
69. Mr. J. Wallace	o. Studying the general biology of the perch family (fam. Theraponidae). Especially the yellow-tailed trumpeter (<i>Amniataba caulavittatus</i>). <u>LOCATION:</u> Swan River	Data includes occurrence utilization of the River, response to salinity, and feeding and reproduction activities. 1979 Honours project under Dr. I. Potter.
70. Mr. C. Chubb	o. General biology of the Perth Herring (<i>Nematalosa Vlaminghi</i>) comparing some specific aspects with the biology of the blowfish (<i>Torquigener pleurograma</i>).	Data includes distribution, length frequency, gut analysis, spawning and feeding analysis and ageing. Ph.D thesis under Dr. I. Potter to be completed by February 1981.
UNIVERSITY OF SYDNEY 71. Mr. J.P. Singleton, 37 Ranelagh Crescent South Perth. 6151	o The Planning and Management of Urban Wetlands. <u>LOCATION:</u> Lake Joondalup	Report should be completed by the end of 1979 and presented as a Masters thesis University of Sydney.
WESTERN AUSTRALIAN INSTITUTE OF TECHNOLOGY Heyman Road Bentley. W.A. Department of Biology 72. Mr. J. John	o. Taxonomy and ecology of the marine and freshwater diatoms of Western Australia.	To be presented as a Ph.D. Thesis.
73. Mrs. J. Osborne	o. Is currently carrying out a reconnaissance of the zoo-plankton and invertebrate, benthic fauna of five lakes in the Martin Tank chain, Yalgorup. Sampling has been carried out regularly every three to four weeks for the past 3 years in order to enable identification and documentation of the invertebrate fauna and seasonal changes. Some physiochemical data is also collected.	Species lists, temperature, dissolved oxygen, depth, salinity, chlorinity. Some nutrient analysis to be done in the future (unpublished)
74. Mrs. L. Moore	o. Survey of littoral fauna of Lake Clifton and assessing changes with reduction of temperature and salinity (winter).	No data as yet. 1979 Project under Dr. C. Grant for Graduate. Diploma in Natural Resources.

TABLE III (cont.) : INVENTORY OF RESEARCH AND DATA COLLECTION

INSTITUTION PERSONNEL	OUTLINE OF RESEARCH	DATA
75. Dr. R. Rippingale	<ul style="list-style-type: none"> o. Long-term interest in Plankton fauna in <u>Avon River</u> pools. 	Data collected over many years on species, and abundance.
CLAREMONT TEACHERS COLLEGE Goldsworthy Road Claremont 76. Mr. P. McMillan	<ul style="list-style-type: none"> o. The biology of <i>Iridomyrmex conifer</i> Forel, an ant which is commonly found in swampy areas throughout the south west of Western Australia, particularly on the Swan Coastal Plain. o. The relationship between seasonal nesting behaviour of <i>I. conifer</i>, water-balance and physical habitat. o. Student surveys of local wetlands, often as a result of a request from the Department of Conservation and Environment. <p>LOCATION: To date - Thornlie, Maylands, Dianella, Herdsmans, Perry (2), Thompson Lakes, and Cooloongup (White).</p> <ul style="list-style-type: none"> o. Chairman of Australian Heritage Commissions Panel of Evaluation (W.A.). <p>Assessment of submissions for the conservation of places of historic interest or natural landscapes, includes wetlands, rivers and lakes.</p> <p>Presently collecting information to prepare a submission requesting the Gingin Brook and adjacent land to be listed as a Landscape Protection area.</p> <ul style="list-style-type: none"> o. Survey of the Greenough River flats. With students from the Teachers College and funds from the Australian Heritage Commission. Information collected will be the basis of a recommendation to classify the area as a Landscape Protection area. <p>LOCATION: The area of Coastal dunes from the Greenough River Mouth to the "S" bend 17 km South.</p>	<p>A large amount of distribution and other information (unpublished).</p> <p>Masters thesis Zoology Department, University of Western Australia.</p> <p>Complete species lists of flora and vertebrate and invertebrate fauna.</p> <p>Data collected from 2 visits to date include flora and fauna observations and photographic coverage.</p> <p>Data collected by students on a week field trip (September, 1978, 1979) includes flora and fauna listings, vegetation and soil maps.</p> <p>1978 results are being compiled and a report for 1978, 1979 should be completed by the end of 1979.</p>
77. Dr. I.R. Lantzke	<ul style="list-style-type: none"> c. The water chemistry of metropolitan lakes. Detailed studies of vertical stratification, diurnal and short period changes. <p>LOCATION: Herdsman, Perry (3), Claremont, Bibra, Cooloongup (White) and Coogee Lakes.</p> <ul style="list-style-type: none"> o. The water chemistry of nine lakes on the Swan Coastal Plain. <p>LOCATIONS: Jandabup, Little Badgerup, Hazelmere (2), Bibra, Mt. Brown and Perry (3) Lakes.</p>	<p>Data collected 1948-76 includes water clarity, pH, dissolved oxygen, total and orthophosphate, phosphorus and chloride ion.</p> <p>Results will be written up by the end of 1979.</p> <p>Data as above plus calcium, magnesium and alkalinity collected every six months.</p>

TABLE III (cont.) : INVENTORY OF RESEARCH AND DATA COLLECTION

INSTITUTION PERSONNEL	OUTLINE OF RESEARCH	DATA
<p>GRAYLANDS TEACHERS COLLEGE, Mimosa Avenue, Graylands, W.A.</p> <p>78.</p>	<p>o. Students theses in Natural Resources and Ecology.</p> <p>LOCATIONS: Tomato Lake, Lake Monger, Perry Lakes, Shenton Park Lake, Lake Claremont, Swan River, Jackadder Lake, Narrows Interchange Lakes, Lake Gwelup, Murray River, Lissiman Street Swamp, Gosnells.</p>	<p>The College is closing down end 1979. Copies will be available from Dr. I. Lantzke - Claremont Teachers College and Dr. A. Kinnear, Churchlands Teachers College (1980). (54, 65, 183, 188, 246, 269, 351, 391, 418, 419, 433.</p>
<p><u>CONSERVATION GROUPS</u></p> <p>79. Environment 2000 (in recess)</p> <p>Dr. P. Weaver c/- Department of Biochemistry, University of Western Australia.</p>	<p>c. Survey of recreational usage of seven metropolitan lakes in 1970 and 1971.</p> <p>c. Submission to M.R.P.A. on planning proposals affecting Herdsmans Lake.</p>	<p>Data on soils, vegetation, waterfowl.</p>
<p>80. The National Trust of Australia (W.A.) Old Perth Boys School, 139 St. George's Terrace, Perth. 6000</p>	<p>c. An 18 month survey to assess the resource value and recreational potential of the <u>Peel/Harvey Estuaries</u> and <u>Lakes Clifton and Preston</u>.</p>	<p>Mostly descriptive or presented on a map format (unpublished).</p>
<p>81. Western Australian Naturalist Club, Dr. D. Serventy, 27 Everett Street, Nedlands. 6009</p>	<p>o. Natural resources inventory of the <u>Yundurup</u> delta wetlands.</p>	<p>Records of birds, fish, invertebrates, and vegetation since 1968 on a seasonal basis. Once considered complete, will be published as a Naturalist Club Handbook.</p>
<p>82. West Australian Field and Game Association 46 Rossmoyne Drive, Rossmoyne. 6155</p> <p>Research Section: Mr. B. Kneebone Mr. R. Burking</p> <p>in conjunction with:</p> <p>Mr. J.A.K. Lane Department of Fisheries and Wildlife.</p>	<p>o. Regional Wetland Survey of Wetlands in the South West Land Division including a large number of wetlands in the Perth Metropolitan area.</p> <p>An aerial survey of wetlands in the Watheroo, Coorow, Moora, Wannamal, Gingin, Perth and Jandakot areas was undertaken in November 1976.</p>	<p>The scheme commenced operation in 1974. Surveys are now carried out in September-October each year. Information: water levels, waterfowl census; breeding activity and available aquatic food.</p> <p>Progress report for 1977-1978 is being prepared.</p> <p>See (219, 220).</p>

TABLE III (cont.) : INVENTORY OF RESEARCH AND DATA COLLECTION

INSTITUTION PERSONNEL	OUTLINE OF RESEARCH	DATA
<p>West Australian Field and Game Association</p> <p>Research Section: contd.</p>	<ul style="list-style-type: none"> o. Compilation of a wetland card index. Wetland complexes listed alphabetically. o. Yearling project - study of waterfowl and management of an area for habitat improvement. <p><u>LOCATION:</u> A string of small lakes on private property running parallel to and east of Yearling Lake.</p> <ul style="list-style-type: none"> o. Taylors Lake Wetland Conservation Project. A study of waterfowl and wetlands with particular attention being given to the effects of such management activities as installation of nesting boxes, and control of water level. <p><u>LOCATION:</u> Approximately 120 km north of Perth, close to Wannamal Siding on the Perth-Moora railway line.</p>	<p>Data on vegetation, depths and classification. Work has just begun and will take about three years to complete.</p> <p>Data on soils, water quality, vegetation, and avifauna collected every 3-4 months. Report of first year's survey is being prepared.</p> <p>Description of area, vegetation and soil. Waterfowl counts as of August 1973 as well as behaviour and breeding observations. Water depth, pH, total salts and sodium chloride monthly. (Unpublished). Progress report to 1975 is included in Kneebone, R.C. and Burking, B.C. (1975); (219). Involvement since 1975 has been reduced because of change in land ownership.</p>
<p><u>CONSULTING GROUPS</u></p> <p>83. Dames & Moore 26 Lyall Street South Perth. 6151</p>	<ul style="list-style-type: none"> o. Environmental assessments of a number of proposed dam sites and bore fields. <p><u>LOCATIONS:</u> Dogger Gorge, Gregory Gorge, Millstream, Fortescue River, Kangan Pool, Nunyeery Creek - Sherlock River, 20 km upstream from Pannawonica. Robe River, Booyemala Creek - upstream Fortescue River, Cooyapooya - Harding River and De Grey River.</p>	<p>Lists of species (some seasonal) of fish, invertebrates, phytoplankton. All reports prepared for the P.W.D.; (105, 106, 107, 108).</p>
<p>4. Institute of Environmental Science</p> <p>Murdoch University Prof. D.C. O'Connor</p>	<ul style="list-style-type: none"> o. Monitoring Emu Lake, Ballajura for all water quality parameters to observe changes over time as the man-made wetland begins to develop as a more complex ecosystem. o. To define the vegetation boundaries of the <u>Wanneroo Lakes</u> using aerial photography and some groundwork. 	<p>Data collected from September 1978 - September 1979.</p> <p>Report will be presented to the Ballajura Estate Development Corporation.</p> <p>Report to be commissioned by the System 6 study.</p>

TABLE III (cont.) : INVENTORY OF RESEARCH AND DATA COLLECTION

INSTITUTION PERSONNEL	OUTLINE OF RESEARCH	DATA
<p>85. Mr. A. Tingay Mrs. S.R. Tingay, 13 Kensitt Street, Stonville. 6554</p> <p>Mr. A. Tingay</p>	<ul style="list-style-type: none"> o. Consultants in the field of Wetland Ecology and Wildlife Management. c. Survey for Kinnaird Hill deRohan and Young (Consulting Engineers) of Blackadder Creek and Ray Marshall Park, West Midland. Recommendation to improve the area as a Wildlife habitat. o. Survey of ecosystems and wildlife habitats. Survey for Kinnaird Hill deRohan and Young (Consulting Engineers) of ecosystems and wildlife habitats in the <u>Peel - Harvey and Leschenault Inlets</u> - as a key component in the preparation of management plans for both estuaries. o. Water quality analysis of <u>Emu Swamp</u> at Ballajura, in conjunction with the Institute of Environmental Science, Murdoch University. c. The biology and aggressive behaviour of the Black Swan in South-West Western Australia. 	<p>Water quality data collected to detect leachates from old Swan rubbish tip and strategy developed to maintain trees and water quality in an ornamental lake and bird sanctuary.</p> <p>Assembly and assessment of data on natural vegetation associations and wildlife habitats to assist synthesis of optimum development strategy and continuing maintenance. Scheduled completion August 1979.</p> <p>Correlation of baseline data (water chemistry, turbidity, flora and fauna) at monthly intervals for 1 year from July 1978. A management plan including treatment of storm-water discharged into the Swamp and rehabilitation.</p> <p>Thesis being submitted for Ph.D., Department Psychology, University of W.A.</p>
<p><u>INDUSTRY</u></p> <p>86. Alcoa Medina Mr. E.D. Kabay</p>	<ul style="list-style-type: none"> o. Techniques used for deterring birds from landing on the red mud waste lakes. c. Aerial survey of swan populations in the south west. o. Waterfowl surveys from <u>Loch McNess, to Lake Walyungup</u> (Salt Lake) 	<p>Monitoring world progress in this field and making a detailed study of birds using the mud lakes.</p> <p>Biological, physical and chemical characteristics relevant to waterfowl.</p>
<p><u>OTHER INDIVIDUALS</u></p> <p>87. Mr. G.M. Adam 24 Lilledale Road, Innaloo</p>	<ul style="list-style-type: none"> c. Perth Metropolitan Water Supply. Examination of surface and ground-water usage and conservation. 	<p>Unpublished report. Copy with System 6 submissions Department of Conservation and Environment.</p>
<p>88. Miss A.M. Baird, (Ex Botany Dept., University of W.A.)</p>	<ul style="list-style-type: none"> o. Yule Brook Botany Reserve Area Preparation of relevant material from Speck (1952) and personal observations. <p>LOCATION: Area of approximately 34 ha bounded by Brook, Bickley and Boundary Roads, Kenwick.</p>	<p>Documentation of the plant communities their changes with time and the possible reasons for these changes. Work to be published in the <i>J. R. Soc. West. Aust.</i></p>

TABLE III (cont.) : INVENTORY OF RESEARCH AND DATA COLLECTION

INSTITUTION PERSONNEL	OUTLINE OF RESEARCH	DATA
89. Mr. B. Hutchinson, c/- Secondary Teachers College, Stirling Highway, Nedlands.	Studied the seasonal usage and breeding of birds at Herdsman Lake.	Compiled species lists from 1970 to 1976; data has been sent to Environment 2000 and a bird list to the Royal Australian Ornithological Union.
90. Mr. I. Maley, 13 Herbert Street, North Fremantle.	c. Surveys of seven south-west Western Australian rivers to assess the recreation potential of the rivers for canoeing. LOCATION: Rivers surveyed were: Deep, Gardner, Shannon, Donnelly, Kent, Frankland, and Warren.	Surveys undertaken between 10th October 1975 and 20th November 1975. Photographs and descriptive notes on suitability of each river in a report to the Department of Conservation and Environment (unpublished).
91. Dr. R.M. McDowall, Division of Fisheries Research Development, P.O. Box 19062, Wellington, New Zealand.	o. Studying the taxonomy of Galaxids and has material from Western Australia.	Discovery of new species has been published; (273, 274).
92. Dr. G.F. Mees, Rijksmuseum Van Natuurlijke Historie, Raansteeg 2, Leiden, The Netherlands.	o. Studying the world distribution of <i>Gambusia</i> . Has been sent material from Western Australia.	(287)
93. Dr. D.L. Serventy, 27 Everett Street, Nedlands.	Records of fauna (birds, fish and invertebrates) and salinity for some swamps and lakes throughout Western Australia; including fish records for the Pilbara region.	Data held by Dr. Serventy to be published in the future. Some data has already been reported in other authors' works.
94. Dr. D.E. Rosen, Department of Ichthyology, The American Museum of Natural History, Central Park West, At 79th Street, New York, NY 10024	Has collected freshwater fish from Western Australia principally from the <u>Kimberley Plateau</u> .	Some results have been published; (346).

TABLE IV

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APPENDIX A

LAKES SAMPLED FOR WATER QUALITY TWICE YEARLY BY THE M.W.S.S.D.B.

No. *	LAKE	LOCATION
59	Mariginiup, Lake	
57	Joondalup, Lake	
58	Jandabup, Lake	
50	Gnangara, Lake	
49	Goollelal, Lake	
44	Big Carine Swamp	Okely Road, Carine
43	Karrinyup, Lake	West side of Beach Road, Karrinyup
	Karrinyup Swamp	East side of Beach Road, Gwelup
42	Gwelup, Lake	Gwelup Street, Gwelup
28	Claremont, Lake	
23	Blue Gum Lake	
22	Booragoon Swamp	Aldridge Road, Booragoon
18	North Lake	
14	Yangebup, Lake	
8	Thompson, Lake	
9	Forrestdale, Lake	
12	Coogee, Lake	
4	Richmond, Lake	
3	Cooloongup, Lake (White)	
1	Walyangup Lake (Salt)	
30	Tomato Swamp	Scenic Drive, Kewdale

* shown on map 3

APPENDIX B

WATER-LEVEL SAMPLING LOCATIONS, DRAINAGE DESIGN BRANCH,
M.W.S.S.D.B.

LAKE/SWAMP	LOCATION *	LAKE/SWAMP	LOCATION *
Loch McNess	SWA 0229	Pheonix S.	per 0809
L. Yonderup	SWA 0328	Hatch S.	per 1108
L. Carabooda	SWA 0521	Parkes S.	per 1107
L. Neerabup	SWA 0715	L. Yangebup	per 1207
Coogee S.	SWA 0425	Princep S.	per 1305
L. Nowergup	SWA 0520	Lukins S.	per 1508
Little Coogee S.	SWA 1115	L. Ballanup	per 1806
L. Adams	SWA 1113	L. Coogee	per 0804
L. Mariginiup	SWA 1010	Kogalup L.	per 1204
L. Jandabup	SWA 1108	L. Thompson	per 1103
Little Dundarbar S.	SWA 1308	Dallison Road S.	pee 0904
L. Gnangara	SWA 1303	Forrestdale L.	per 1803
L. Joondalup	SWA 0908	L. Banganup	per 1101
L. Goollelal	PER 1040	Banjup L.	per 1501
Badgerup L.	SWA 1204	Wattleup S.	pee 1140
Big Carine S.	PER 0936	Mandogalup L.	pee 1139
L. Karrinyup	PER 0934	L. Balmanup	pee 1338
Careniup S.	PER 0935	Long S.	pee 1037
L. Gwelup	PER 0933	Lyon S.	per 1303
Emu S.	PER 1436	L. Cooloongup	pee 0927
Star S.	PER 0735	Folly Pool	pee 1224
L. Monger	PER 1127	L. Walyungup	pee 0921
Perry L.	PER 0826	Maramanup Pool	pee 1221
Tomato L.	PER 1722	Anstey S.	pee 0814
Stammer's S.	PER 1015	Paganoni S.	pee 0911
Blue Gum S.	PER 1215	Pike S.	pee 1022
L. Booragoon	PER 1215	W.A.I.T.S.	per 1519
North L.	PER 1111	Bibra L.	per 1109

* Locations grid reference on
1 : 2,000 sheets

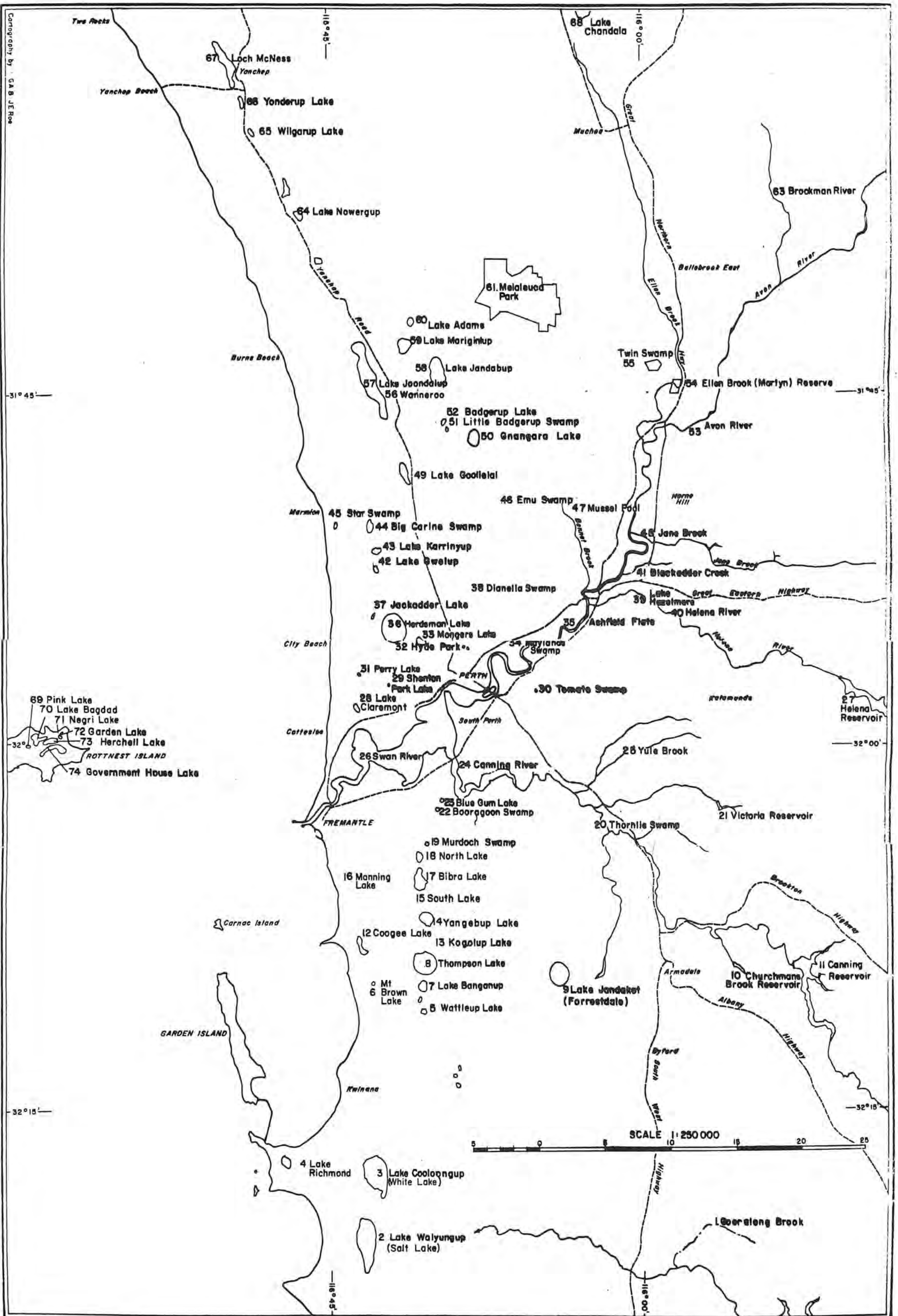


FIGURE 3. LOCATIONS IN PERTH METROPOLITAN AREA