Northern Agricultural Region

Draft Regional Strategy Natural Resource Management

April 2000

Northern Agricultural Integrated Management Strategy Group

a partnership between
the rural community,
government agencies &
local government authorities

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introducing...

NAIMS: Northern Agricultural Integrated Management Strategy, **a venture of cooperation between government and community to best manage natural resources in Western Australia's Northern Agricultural Region (NAR) - an area spanning 7 million hectares; incorporating 16 shires; hosting 13% of W.A.'s total regional population and with a production value of $1025M in 1995/96.**

NAIMS reflects the recognition that sustainable management of our natural resources is necessary for the economic, ecological and social viability of the NAR and that management must be coordinated at the regional level. The NAIMS group is providing direction to a positive future through the identification of key regional natural resource issues, development of strategies to best manage these issues and coordination of plans for implementation of the strategies.

Following four years of community consultation and collation of technical information, NAIMS has developed two documents to facilitate these endeavours. They are the *'Situation Statement'* and the *'Regional Strategy'*.

The Situation Statement is a snap shot of the key land, water and biodiversity issues in the NAR. It identifies our current state of knowledge and threats to these resources and what further information is required to enable effective resource management. The Regional Strategy summarises the key natural resource management (NRM) issues and identifies strategies by which desired outcomes for NRM and social issues can be achieved in the region.

why a regional strategy?

The Regional Strategy document will:

- identify regional NRM priorities
- provide the basis for stakeholders in the region to integrate their natural resource activities in a more coordinated and effective manner
- inspire a greater community understanding of NRM
- assist in attraction of financial and other resources to the region
- place the region into a state and national perspective with respect to its priority for accessing National Heritage Trust (NHT) funds.
- assist with development of marketing opportunities based on the natural advantages of the region

The issues and strategies identified through community and agency consultation and contribution have been brought together in the Regional Strategy. Actions to implement the strategies will continue to be developed at the local level under the guidance and coordination of the sub-regions.

who is involved?

Every Northern Agricultural Region (NAR) community member has a stake in the maintenance of our environment through effective and conservative management of natural resources.

The NAIMS Group brings together community and government agency representatives that have a role in NRM in the NAR. There are two community representatives from each of the four sub-regions of the NAR and representation of the government agencies: Agriculture Western Australia, Department of Conservation and Land Management, Water & Rivers Commission, Department of Environmental Protection, Ministry for Planning, WA Municipal Authority, Mid-West Development Commission and Wheatbelt Development Commission.

the NAR...

The Northern Agricultural Region stretches north from Gingin to beyond Kalbarri and eastwards out to Kalannie - it is an area of some seven million hectares (70,000 square kilometres). 56,000 people live in the NAR, a region with a diverse range of primary production industries and valuable soil and water resources. There are many rivers and drainage basins - the Greenough, Irwin, Hutt, Chapman, Arrowsmith, Bowes, Murchison and Moore Rivers and Yarra Yarra Lakes being the major systems. There are areas within the region that support a very high level of flora and fauna diversity by both national and international standards.

its sub-regions

Named the Greenough, Moore River, West Midlands and Yarra Yarra Sub-regions, the boundaries of these zones of the NAR broadly follow natural river-basin boundaries as defined by the Water & Rivers Commission.

A hierarchy of community driven natural resource management (NRM) groups exists within the sub-regions ensuring community input and action in environmental concerns on a regional level. Landowners from smaller areas within a catchment (a geographical area that is a common natural water drainage system/area) form *Sub-catchment Groups*. Representatives from these groups can form a *Catchment Group*, which looks at and acts upon issues specific to their whole catchment. Each Catchment Group is then represented on their local *Landcare District Committee (LCDC)*. The four sub-regions have many active LCDCs, working in conjunction with government agencies. There is now a move towards formalising locally elected "whole of sub-region" groups that will coordinate activities between LCDCs and catchment groups in the sub-region. These groups will be made up of representatives from the community NRM groups, local government, government agencies and other interested community organisations. At present, two such groups exist, the Yarra Yarra Catchment Group and the Moore Catchment Group. Finally, all four sub-regions have representation alongside government agencies in the "whole of region" group - *NAIMS*, providing overall direction and coordination for NRM activities in the region. The Chair of the NAIMS Group acts as a delegate to representative NRM policy bodies at the state level, such as the Regional Chairs Forum.

its population

The population of the NAR in 1996 was 55,573. Distribution of people in the region is heavily weighted to the major city centre - a little over half of the region's population resides in the City of Geraldton and associated Shire of Greenough. The region's population dynamics show consistent trends of change: inland shires exhibit a decreasing population trend whilst coastal areas tend to have increasing populations. These trends reflect the different landuses in these areas and population movement due to cultural influences and lifestyle decisions.

its industries

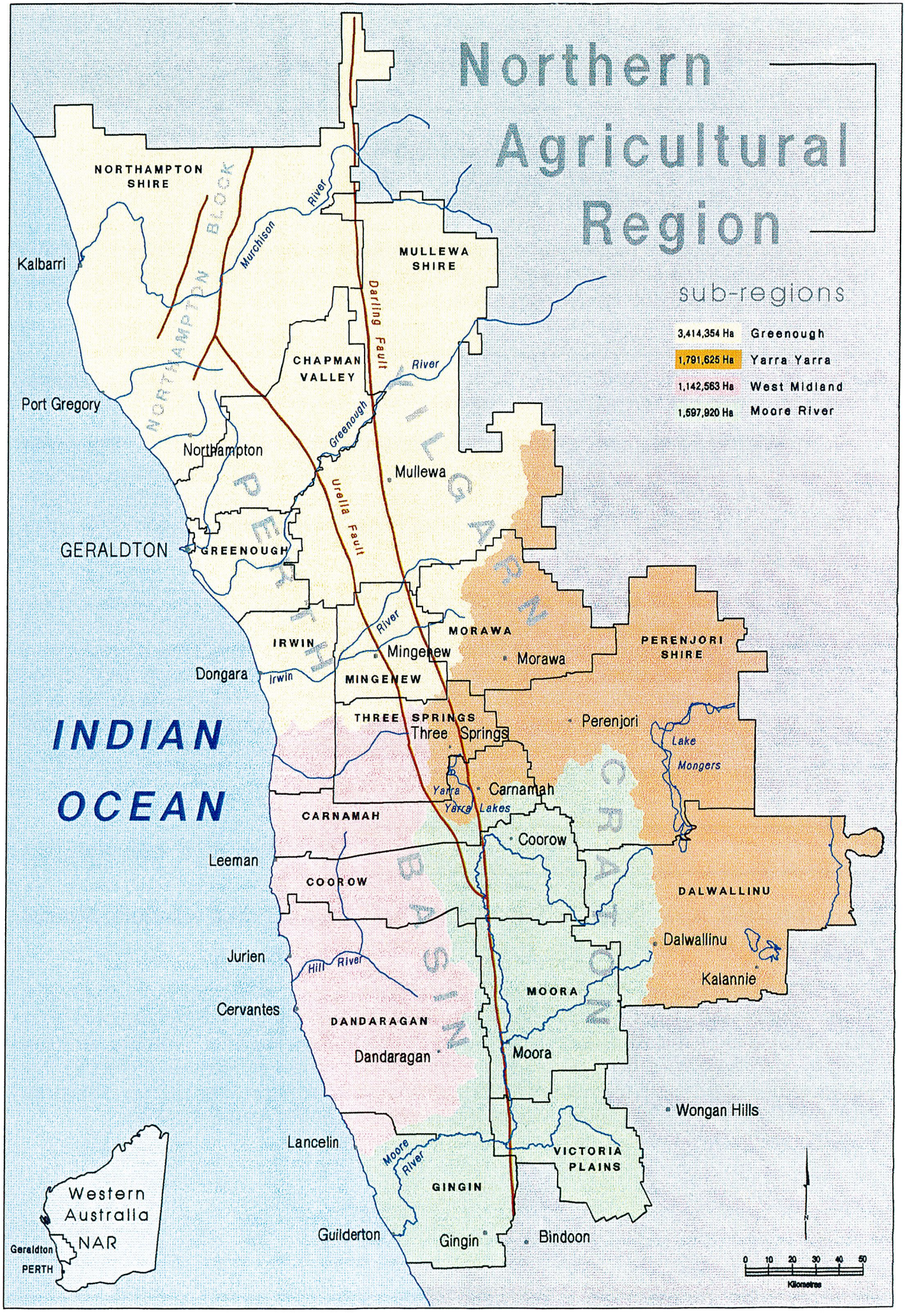
In 1995/96, total production value from the NAR was $1025M. The main contributing industries in our region and percentage share of regional economy (estimated by Australian Bureau of Statistics) are: agriculture(35%), retail trading(19%), mining(11%), manufacturing(11%), fishing(10%), tourism(7%) and building(3%).

Agriculture is the greatest single contributor to NAR's economy - approximately half of the region is cleared and cropped or pastured supporting over 2000 agricultural enterprises. These enterprises are predominantly broadacre grain and meat production - producing 35% of the state's wheat crop, 50% of lupins and 10-15% of oats and barley. The region also supports horticultural pursuits and developing aquaculture and silviculture (farm forestry) enterprises. Other industries that impact on natural resources and their management in the NAR include mining (primarily extraction of mineral sands); fishing and some forms of tourism.

its natural diversity

The NAR is a region where spectacular, diverse and valuable natural features can be found.

The region has a large number of nature reserves and several significant National Parks. These nature conservation areas protect biodiversity at a local, regional and state level and provide the foundation for a strong tourism industry. Notable features include the diversity of flora across the region and a range of features including the Pinnacles in Nambung National Park, the spectacular Murchison River Gorge in Kalbarri National Park and the beautiful, mostly undeveloped central west coastline.


Northern Agricultural Region
sub-regions
3,414,354 Ha Greenough
1,791,625 Ha Yarra Yarra
1,142,563 Ha West Midland
1,597,920 Ha Moore River
NORTHAMPTON SHIRE
MULLEWA SHIRE
CHAPMAN VALLEY
IRWIN
MINGENEW
MORAWA
PERENJORI SHIRE
THREE SPRINGS
CARNAMAH
COOROW
DALWALLINU
DANDARAGAN
MOORA
GINGIN
VICTORIA PLAINS
GREENOUGH
Kalbarri
Port Gregory
Northampton
Mullewa
GERALDTON
Dongara
Mingenew
Morawa
Perenjori
Three Springs
Carnamah
Coorow
Leeman
Dalwallinu
Kalannie
Jurien
Cervantes
Dandaragan
Moora
Wongan Hills
Lancelin
Guilderton
Gingin
Bindoon
Murchison River
Darling Fault
Greenough River
Urella Fault
Irwin River
Hill River
Moore River
Yarra Yarra Lakes
Lake Mongers
NORTHAMPTON BLOCK
PERTH BASIN
DARLING RANGE
CRATON
INDIAN OCEAN
Western Australia
NAR
Geraldton
PERTH
0 10 20 30 40 50
Kilometres

a vision...

the vision of NAIMS is that:

A co-operative approach to natural resource management exists throughout the region that promotes broad principles of sustainable resource development and resource protection.

Appropriate monitoring and evaluation programmes are in place to ensure resource development and protection targets are achieved. The value and importance of natural features such as land and water resources, wetlands, water courses, remnant vegetation and biodiversity are acknowledged by all within the region. Widely endorsed plans are in place to manage these resources.

Threats to the resource base such as salinity and water use imbalances are identified and understood, with procedures in place to contain and ameliorate degradation problems.

An expanded, stable economic base with thriving and diverse industries is supported by a well developed infrastructure. Regional industries are producing quality assured and value added products. There is a good quality of life for all in the region who benefit from a high level of social facilities and services - this encourages continued regional growth and development.

The region's achievements and attributes are recognised and "owned" by all stakeholders at the regional level and are also recognised statewide, nationally and internationally.

value of our natural resources...

land & land use systems:

- There is a large range of agriculturally productive soils within the region.
- Soils in the region are inherently of low chemical fertility due to poor parent material and the age of the landscape but tend to have good physical fertility. Fertility can be improved for agricultural production purposes with fertiliser and trace element application and adoption of farming systems including legumes.
- The diversity of soils, water and proximity to transport and Perth enable a wide range of successful production industries to exist in the region. These span from horticultural pursuits, floriculture, viticulture to broadacre crop and meat production to forestry.
- Extensive areas have suitable soils and climate for highly productive broadacre agriculture.
- Irwin River District, Gingin, Dandaragan and the Northampton Block have suitable soil and water resources for there to be great potential for horticultural, viticultural and floricultural industries.
- Farming systems within traditional broadacre enterprises are being developed and adopted to maximise value and protection of soil resources.
- Alternative farming systems such as tree shelterbelts, alley farming, tagasaste plantations and diversification into "new crops" are being used to assist economic and environmental sustainability of NAR agricultural enterprises.
- Australian Bureau of Agricultural & Resource Economics (ABARE) figures show W.A. farmers adopt these new measures for soil protection quickly relative to other states.

social:

- There exists a choice of lifestyles ranging from small city urban to isolated regional living. Most communities are smaller "friendly communities" with members who support each other.
- Government and community innovations for improved regional communities are strongly supported - strategies and innovations supporting inland communities, community building and improved infrastructure.
- Environmental features in the region improve quality of life for community members and attract social, cultural and economic benefits to the region through tourism.
- There is a widespread sporting culture and network throughout the region.
- Art and cultural pursuits are active in the region.
- Geraldton is the major centre north of Perth and is a valuable service centre for the region.
- There is great scope for recreational pursuits, extensive resources for coastal recreation - fishing, diving, boating, and great land features for 4WD adventures and camping.
- There is strong government NRM support for the region and community.
- There is strong community interest in NRM and protection of our resource values.

water:

- There are a number of healthy, prominent winter-flowing river systems, including the Moore, Greenough and Murchison Rivers.
- To date, salinity and contamination by nutrients or pollutants have not significantly impacted upon the quality of NAR river systems.
- Estuaries and permanent pools of a number of rivers have high water quality and biodiversity values, with few known incidents of toxic algal blooms.
- The Hill River estuary is the last near-pristine estuary on the West Coast of WA.
- There are a large number of coastal wetlands with high biodiversity values.
- The permanent water bodies of a number of rivers, estuaries and wetlands are social, sporting and recreational assets for the regional community.
- Groundwater is generally readily available in a number of aquifers throughout the region, with much of it being of high potable quality - most rural towns are serviced by an adequate and potable groundwater resource.
- The aquifer formations of the Perth Basin are a major water resource for the region, holding large quantities of high quality water.
- There is generally a low allocation of the groundwater resource, the key exception being the Gingin Groundwater Area.
- There is minimal evidence of contamination or declining quality of groundwater resources.

biodiversity:

- Diverse flora/fauna types exist across the NAR.
- Areas of internationally recognised plant diversity occur in the West Midlands around Mt Lesueur/Eneabba.
- The NAR contains a high number of 'Threatened' and 'Priority' flora species.
- Extensive areas of contiguous native vegetation occur in the West Midlands and along the Central West Coast. Much of this is set aside for conservation.
- Significant areas of contiguous conservation reserve and crown land exist through the Central Midlands (Watheroo/Coorow).
- The Kalbarri National Park protects an area of the northern sandplains now not represented in the areas south of the Park. It represents an area of transition in the flora of the SW.
- Management plans exist or are in preparation for key conservation areas.
- The remaining extensive tracts of native bushland provide scope for the reintroduction of locally extinct native fauna.
- There is potential to establish and/or enhance links between the extensive conservation reserves in the east and west of the NAR.
- There is still much remnant vegetation remaining on private property although a lot is fragmented in its distribution.
- The value of private remnant vegetation can be enhanced and protected through fencing and additional planting. Funding mechanisms exist to promote these opportunities.
- There is a growing interest in biodiversity and on-farm values associated with remnant vegetation.
- Commercial wildflower picking from crown land is a significant industry.
- Beekeeping on crown lands in the NAR is a significant component of statewide apiary production.

current state of our resources...

land resources,

soils,

- Current hazards to NAR's soils are - wind and water erosion, development of hard setting soils, nutrient leaching, acidification, compaction, water repellence, waterlogging and salinisation.
- Technical information is available regarding soil structure, nutrition, acidification and wind erosion but indicators of soil status are not readily available to landowners and monitoring is variable.
- Erosion resulting primarily from broadacre agriculture threatens river systems in the region, in particular the Irwin River.
- Many locations, particularly in the West Midlands sub-region, have rising ground-water levels. There is poor understanding of hydrological processes.
- Dryland salinity affects large areas of the region, in particular in the Yilgarn. Salinity is increasing in the Perth Basin and Northampton Block areas.
- A higher level of coordination, commitment and action that includes community involvement within catchments is required.

land use systems,

- Some current farming systems are not economically and environmentally sustainable. This needs to be addressed with creativity and a willingness by all stakeholders to develop new opportunities
- Agricultural systems that further enhance the protection of natural resources of the region need to be developed and incorporated into production enterprises - integrating productivity with principles of environmental protection and catchment management.
- Responsible environmental management of private land is becoming increasingly important. It is significant in terms of environmental protection and in maintaining and capturing market share for commodities. The NAR can position itself as a "clean and green" agricultural locality.
- Agricultural land is of enormous economic benefit to the region and its value needs to be recognised in any planning for development, subdivision, urbanisation or infrastructure construction.
- Diversification of agricultural production is occurring, particularly in southern and coastal areas. There is increasing development of intensive agriculture, in particular horticultural enterprises where there is sufficient quality water. This presents both environmental risks and economic opportunities.
- Conflicts between different forms of agriculture are developing and need to be handled with sensitivity. These land use conflicts are beginning to emerge due to the increased diversification and intensified development within the region. Prioritising land use, development of frameworks to address such conflicts and recognition of the value of agricultural land involved in future development are important issues to be addressed. A willingness to embrace change is also important.

rivers,

- Poor knowledge of the state of rivers in the region.
- Currently, salinity levels in lower reaches of rivers are not significantly high. However in a number of instances there is a slow increase in salt levels and many situations are not monitored.
- Water quality is not extensively monitored throughout the region.
- Generally there is a high level of erosion and sedimentation and these degradation problems are increasing.
- Contamination generally unknown.
- Fringing vegetation is poor and is deteriorating.
- Where there is significant river foreshore vegetation, there is high biodiversity.
- Hill River is in good condition in lower reaches.
- Moore River catchment is in a variable and declining condition with high community concern.
- Irwin River is in very poor condition and declining.
- At this time there is no knowledge as to whether catchment management activities are improving the state of rivers.
- Floods significant for Moore, Irwin, and Greenough Rivers.

estuaries,

- Poor knowledge of the state of estuaries in the region.
- Water quality is generally unknown.
- Erosion/sedimentation generally high.
- Contamination generally unknown but anticipate it to be a problem in the future.
- Generally, fringing vegetation is in better condition than on the rivers.
- Biodiversity values are not recorded.
- Hill River estuary is in excellent (near pristine) condition and currently has no intense urban or recreation pressures, although these are imminent.
- Irwin River estuary is in poor condition due to sedimentation.

wetlands,

- Poor knowledge of the state of wetlands in the region.
- Water quality is generally unknown but expect it to be declining due to increasing salinity.
- Contamination is generally unknown but anticipate it is an increasing problem.
- Biodiversity values are poorly recorded.

The key wetland systems in the region are:

* Swan Coastal Plain wetlands and springs
* Wheatbelt wetlands and springs
* Yarra Yarra lakes system
* Hutt Lagoon
* Central west coast subterranean systems

groundwater,

- Groundwater quality is generally high.
- Contamination levels are generally low or unknown.
- In a number of areas the available groundwater resource is of poor quality.
- Perth Basin groundwater resource is relatively undeveloped, however there is increasing demand on resources.
- There is a high allocation of the resource in the Gingin Groundwater Area.
- Saline intrusion is an increasing concern with coastal developments.

[redacted] and the resource that is biodiversity.

flora/vegetation,

- There are many species of Threatened flora in the NAR requiring management.
- There is a high level of biodiversity. It is not well documented in the NE of the NAR.
- Lowland and valley sites are at risk from salinity, placing many species at risk in the long term.
- Some vegetation types are poorly represented in the Conservation Reserve System.
- There are a number of threatened ecological communities in the NAR that require special management and protection.
- There is no coordinated approach to environmental weed management in the NAR.
- There is a need for detailed survey work in the NE and some N areas of the NAR to record species distribution and diversity.

fauna,

- There has been a considerable decline in the abundance and distribution of medium sized native mammals in the NAR.
- Preparations are underway for the reintroduction of some fauna species into Kalbarri National Park.
- There is no co-ordinated approach to feral animal control (foxes, rabbits) in the NAR.
- Protection and enhancement of habitat is essential for the viability of fauna populations in remnant vegetation.
- Very little is known of the abundance, diversity and role of invertebrate fauna in the NAR.
- Little is known of the fauna values associated with remnant vegetation in the fragmented landscapes in the N and NE of the NAR.

ecosystems,

- The extent of agricultural clearing in some parts of the NAR has serious implications for the maintenance of biodiversity values in remaining remnants.
- Large areas of crown land remaining in the NAR have been identified previously as important for the conservation of biodiversity, and as such should be part of the Conservation Reserve System.
- Continued interest in land clearing for agriculture is an issue that affects conservation of biodiversity, particularly in the West Midlands where significant areas of privately owned bushland remain.
- Available mechanisms to assist with protection of remnant vegetation have not attracted significant landowner interest in the past.
- There is a need for further knowledge on regeneration and rehabilitation of native plant communities in the NAR, particularly in the more highly cleared landscapes.
- There is a need to increase community knowledge and appreciation of the role and values of biological diversity within the agricultural landscape.

our primary regional concerns...

✯ Fragmentation of natural vegetation areas over the landscape.

✯ Changing hydrology and water balance.

✯ Existing farming systems inadequate in addressing hydrological changes in the landscape.

✯ Lack of awareness and education of natural resource values.

✯ Poor communication networks within and between sub-regions.

✯ Lack of identified research priorities to address key regional issues.

✯ Marketing opportunities for regional produce and attributes not fully developed.

✯ Changing dynamics of the regional population.

✯ Lack of integration of activities between government agencies and the community.

✯ Decline in quality of soils and land.

✯ Decline in quality of waterways and wetlands.

✯ Loss of natural biodiversity.

✯ Increasing land use demands on natural resources.

natural resource management - issues, objectives & regional strategies

key land & land use issues

- Technical information on degradation hazards such as wind erosion, hard-setting, compaction, nutrient status, water repellence and acidification exists but indicator systems are not readily available and monitoring is inadequate.

(strategies 1.1, 1.2, 2.4, 3.6)

- Limited knowledge of water erosion risk or implementation of best-practice surface water control measures.

(strategies 2.1, 2.2, 2.3, 2.4, 4.1, 4.2)

- Lack of technical information regarding rising groundwater levels and associated waterlogging, flood risks and salinity.

(strategy 3.3)

- Lack of recognition of the threat of salinity in the region and limited knowledge of methods of amelioration and avoidance.

(strategies 3.1, 3.2, 3.4, 3.5, 3.6, 4.1, 4.2)

- Limited implementation of integrated catchment plans.

(strategies 2.4, 3.6)

- Limited knowledge and comprehension of farming systems that will be sustainable in the long-term.

(strategies 4.1, 4.2, 4.4)

- Opportunity exists for development and adoption of Environmental Management Systems.

(strategy 4.3)

- Need to use groundwater more effectively to reduce recharge, but there is a lack of commercially viable, deep rooted perennial plant options or other sustainable enterprise options for incorporation into farming systems to improve efficiency of groundwater use.

(strategies 3.4, 3.6, 4.1, 4.2, 4.4)

- An increasingly diversified and intensive agriculture presents both environmental risks and economic opportunities.

(strategies 4.2, 4.4, 4.5, 5.1, 5.2)

- Land use planning conflicts highlight the need for recognising the value of agricultural land and for developing sound decision frameworks.

(strategies 5.1, 5.2)

land & land use systems...

Objectives	and strategies
1. Maintain and enhance the quality of agricultural soil and land.	***1.1*** *Develop a set of indicators showing the status of soil and land systems that are suitable for application at the farm level.* ***1.2*** *Promote soil and land monitoring.*
2. Protect agricultural land and water resources from the impacts of water erosion	***2.1*** *Provide information on the risk of water erosion.* ***2.2*** *Develop a protocol for best-practice surface water control measures.* ***2.3*** *Promote the use of appropriate control measures.* ***2.4*** *Encourage a coordinated community approach to solutions.*
3. Protect agricultural land from the threat of rising groundwater and salinity.	***3.1*** *Increase recognition of the threat of salinity in the region.* ***3.2*** *Provide information on, and encourage adoption of methods to reduce recharge and for dealing with the on-farm effects of rising groundwater and salinity.* ***3.3*** *Investigate the hydrological prosesses contributing to rising groundwater and associated waterlogging and salinity.* ***3.4*** *Develop suitable commercial deep-rooted perennials* ***3.5*** *Develop other low-recharge enterprise options* ***3.6*** *Promote a coordinated catchment approach and greater community participation.*
4. Increase adoption of sustainable land management practices.	***4.1*** *Investigate enterprise options and land-management techniques and identify any environmental risks or threats.* ***4.2*** *Analyse and promote principles of farming systems that will be environmentally and economically sustainable into the long-term.* ***4.3*** *Develop and promote an Environmental Management System that is practical an relevant to NAR landowners.* ***4.4*** *Promote adoption of sustainable diversification options.* ***4.5*** *Promote the 'clean and green' image of the region.*
5. Ensure protection of the environmental and produtive values of agriculture land through effective land use planning.	***5.1*** *Promote the adoption of land use systems that recognise both the environmental value and productive capacity of the land.* ***5.2*** *Support networks to address land use conflicts.* ***5.3*** *Recognise and seek protection of environmental and productive values of agriculture land in Local Government Town Planning schemes and rural strategies.*

key water issues

- Lack of sufficient knowledge of water resources in the region.

  (strategies 6.1, 6.7, 7.1, 7.5, 8.1, 9.1, 9.4)

- Some landholders perceive "deep drains" to be the primary solution for salinity management

  (strategies 6.4, 6.5, 7.4, 8.4)

- Increasing urbanisation along the coast with a concern for impacts on estuaries and wetlands, particularly upon the high ecological values of the lower reaches of the Hill River.

  (strategies 6.2, 6.3, 6.4, 6.6, 7.2, 7.3, 9.6)

- Irwin River - significant ongoing decline.

  (strategies 6.1, 6.2, 6.3, 6.6)

- Unknown impact of all surface land uses (such as broadacre agriculture) on water resource quality.

  (strategies 6.1, 6.4, 6.7, 7.1, 7.5, 9.4)

- Community concern regarding rising groundwater in the West Midlands and Moore River catchments.

  (strategies 7.1, 7.4, 8.1, 8.2, 8.3, 8.4, 9.1, 9.4)

- Demands and pressures on groundwater resources in the Perth Basin are increasing, and will require a revised management response.

  (strategies 9.1, 9.2, 9.3, 9.4, 9.5, 9.6, 9.7, 9.8)

- Increased demands from industrial and mining developments on water resources.

  (strategies 9.2, 9.3, 9.4, 9.5, 9.6, 9.7, 9.8)

- Community demand for flood mitigation measures for Greenough and Moora.

  (strategies 10.1, 10.2, 10.3, 10.4)

Objectives

6. Improve protection and promote the restoration of key river and estuary environments.

7. Improve protection and promote the restoration of key wetland environments.

8. Protect key water resources from impacts of rising groundwater and salinity.

9. Manage groundwater resources to facilitate better regional development, enable sustainable allocation and maintain environmental values.

10. Provide quality and timely information on the occurrence, duration, intensity and mitigation of floods.

and strategies

6.1 Enhance knowledge of the state of, and threats to, the fringing vegetation and water quality of rivers and estuaries in the region.
6.2 Facilitate protection of priority sections of rivers and estuaries of high environmental value.
6.3 Increase community and landholder involvement in river and estuary restoration and management.
6.4 Promote the integration of river system management into catchment planning activities.
6.5 Assess and document best practice management systems for rivers and estuaries in the region.
6.6 Enhance industry and community training and education of river and estuary system management.
6.7 Monitor water quality of rivers and estuaries to establish any evidence of decline or contamination.

7.1 Enhance knowledge of the state of, and threats to, the fringing vegetation and water quality of wetlands in the region.
7.2 Identify and facilitate protection of wetlands of significant environmental value.
7.3 Increase community and landholder involvement in wetland restoration and management.
7.4 Promote the integration of wetland management into catchment planning activities.
7.5 Monitor water quality of wetlands to establish any evidence of decline or contamination.

8.1 Identify areas where rising groundwater and salinity are significant threats to water resources.
8.2 Develop and implement action plans for priority water resources at risk - in consultation with the community.
8.3 Incorporate water resource protection into integrated catchment planning.
8.4 Promote a "whole of catchment" approach to drainage management, including water resource protection.

9.1 Enhance and document knowledge of groundwater resources, including available quantities.
9.2 Complete and review management plans as knowledge and resource demands change.
9.3 Monitor compliance with resource allocation.
9.4 Assess and monitor groundwater quality to establish any evidence of contamination.
9.5 Enhance industry and community awareness of water quality management and protection concerns.
9.6 Influence rural and coastal landuse planning and practices to protect groundwater resources.
9.7 Increase industry and community involvement in allocation, management, and efficient use of groundwater.
9.8 Link industry with correct groundwater resources to enhance strategic economic development in the region.

10.1 Establish and maintain a flood-response warning network.
10.2 Influence rural land use planning and practices to reduce flood impacts.
10.3 Maintain adequate floodplain mapping for the Moore and Greenough Rivers.
10.4 Support effective floodplain protection and mitigation measures.

key biodiversity issues

- Fragmentation and viability of remnant vegetation in the East and North-East of the region.

  (strategies 11.1-11.6, 12.1, 12.3, 15.6, 15.7, 16.2)

- Lack of an adequate, comprehensive Representative Reserve System in the East and North-East of the region.

  (strategies 12.1, 12.2, 12.3)

- Lack of integrated feral animal and weed controls across areas of different land tenure and purpose.

  (strategies 13.1, 13.2, 16.4)

- Salinity and waterlogging - particularly in the lower parts of the landscape.

  (strategies 14.1, 14.2, 14.3, 16.3)

- Clearing of native vegetation in the West Midlands Sub-region.

  (strategies 15.1, 15.2)

- Lack of appreciation of biodiversity as a significant value in the landscape.

  (strategies 11.2, 11.3, 11.7, 15.5, 15.6)

- Viability of remaining woodlands in the NAR.

  (strategies 15.3, 15.4, 15.6, 15.7)

- Lack of scientific knowledge about biodiversity in northern and eastern parts of the region.

  (strategies 16.1-16.4)

Objectives

11. Improve protection of significant remnant vegetation.

12. Increase the area of regionally significant vegetation and other biodiversity values protected within the conservation reserve system in the E/NE of the region.

13. Achieve integrated feral animal/weed control programs that contribute to biodiversity protection.

14. Protect biodiversity values at risk from rising groundwater, waterlogging and salinity.

15. Increase biodiversity protection and enhancement in property management planning and action by landholders.

16. Improve scientific knowledge of biodiversity in the region.

and strategies

11.1 Identify significant remnant vegetation in the region's East & Northeast.
11.2 Promote protection/fencing of remnant vegetation in farm planning and through incentive schemes.
11.3 Promote projects that use community/agency partnerships to protect biodiversity.
11.4 Seek to have significant road verges recognised for their contribution to biodiversity conservation.
11.5 Use the regionally devolved RVPS funds to target priority areas for remnant vegetation protection.
11.6 Encourage incorporation of significant remnant vegetation into voluntary conservation covenants.
11.7 Foster community involvement in the development and implementation of policies/plans for biodiversity conservation.

12.1 Review representation of significant vegetation types within the reserve system. Identify areas of remnant vegetation that will contribute to a CAR Reserve System.
12.2 Develop a database of biodiversity in the NAR on which to base selection of areas for the Reserve System.
12.3 Investigate options available to achieve incorporation of new areas into the Reserve System. (purchase, covenants, agreements).

13.1 Identify highest priority areas where biodiversity values will benefit from control programs.
13.2 Promote co-ordinated community/agency control programs for feral animal and weed control.

14.1 Identify biodiversity values and areas at risk from waterlogging and salinity.
14.2 Develop action plans for priority areas in consultation with interested community groups and agencies.
14.3 Promote revegetation with endemic species in conjunction with reafforestation with commercial tree species.

15.1 Promote diversification rather than further clearing of native vegetation.
15.2 Continue to investigate alternative options to clearing of native vegetation, including compensation.
15.3 Promote rehabilitation and revegetation of woodlands throughout the region.
15.4 Use Salmon Gum as a flagship species to drive revegetation and rehabilitation of woodlands.
15.5 Communicate information to the community on biodiversity values and how these values can be protected through property management.
15.6 Facilitate the consideration of biodiversity protection in integrated catchment and farm planning.
15.7 Integrate farm and catchment planning with existing nature conservation reserves and corridor linkages.

16.1 Facilitate research that contributes to our knowledge and understanding of biodiversity in the region.
16.2 Determine baseline fauna information for representative sites in the E and NE of the region.
16.3 Continue to research potential impacts of waterlogging and salinity on biodiversity in the landscape.
16.4 Facilitate research on most appropriate control mechanisms for key environmental weeds.

key social issues as for previous pages

- Communication and information flow regarding natural resource management. Development of superior regional networks between community, agencies, funding bodies, educative and other relevant institutions.

(strategies 17.1, 17.2, 19.1, 21.2, 21.3)

- Keeping track of progress - both successes and failures.

(strategies 17.1, 17.2)

- The capacity of rural communities to act on opportunities.

(strategies 20.1, 20.2, 20.3, 21.1, 21.3, 22.1, 22.2)

- Community ownership of Natural Resource Management and cooperation at the catchment level.

(strategies 18.1, 18.2, 19.1, 19.2)

- Attracting and keeping skilled people in the region.

(strategies 19.1, 22.3, all strategies)

- A need for planning of Natural Resource Management to be more strategic.

(strategies 21.1, 21.2, 21.3, 22.1, 22.2)

- Extension of research information to the community, as well as encouragement for implementation of Natural Resource Management measures.

(strategies 17.1, 17.2, 21.2, 21.3)

- Marketing and promotion of the opportunities of the region, including diversification options.

(strategies 20.1, 20.2, 20.3, 21.1, 22.2)

Objectives	and strategies
17. Provide the community of the NAR with ready access to current information on natural resource management.	***17.1*** *Develop and maintain strategic partnerships between relevant government agencies and the community.* ***17.2*** *Develop a process for the dissemination of agency and catchment information on Natural Resouce Management.*
18. Ensure that the community of NAR understand how the positive management of natural resources affects their quality of life.	***18.1*** *Develop and encourage school education programs to assist students understanding of how natural resource management affects their quality of life.* ***18.2*** *Develop training programs for landcare groups to increase awareness of the effects of natural resource management on the community's quality of life.*
19. Encourage greater involvment of indigenous Australians in natural resource management.	***19.1*** *Promote involvement of relevant indigenous people and groups in local NRM issues.* ***19.2*** *Develop a greater understanding of indigenous people's historical links with NRM in the NAR.*
20. Ensure the management of natural resources lease to development opportunities for the region.	***20.1*** *Demonstrate the economic adventures of 'clean and green' production practices* ***20.2*** *Facilitate the removal of constraints on development of camparative advantages, to capitalise on the market potential and opportunities of the region.* ***20.3*** *Identify opportunity for value adding to products whilst still within the region.*
21. Privide the region wth stratic planning for natural resource management.	***21.1*** *Encourage planning based on economic development possibilities rather than historic trends.* ***21.2*** *Encourage catchment groups to work and share information with adjoining groups for mutual benifit.* ***21.3*** *Maintain an understanding of future directions and international issues that affect natural resource management. Develop apporpriate regional directions to ensure the region capitalises on these issues.*
22. Capitalise on advantages created by people wishing to pursue a semi-rural lifestyle.	***22.1*** *Analyse and understand the characteristics of the "semi-rural lifestyle" social group.* ***22.2*** *Demonstrate the economic and social benefits a "semi-rural lifestyle" social group brings to the region and encourage the region to actively pursue sustainable lifestyle residential development.* ***22.3*** *Be pro-active about employing locally.*

where to now? our next step...

The NAR Regional Strategy will provide direction and coordination to all natural resource management activities within the region. The strategy establishes a framework for community groups and government to develop policies, action plans and projects in a coordinated and cooperative environment.

The strategy will be used to:

- Identify regional NRM priorities.
- Ensure that linkages exist between all tiers of government and the community in the management of natural resources throughout the region.
- Coordinate government NRM agency activities and policies within the region.
- Formulate regional NRM action plans for priority issues.
- Coordinate and provide direction for sub-regional strategies.
- Initiate and develop regional NRM projects.
- Provide clear direction for community catchment scale projects.

The NAR Regional Strategy aims to be consistent with the development of the Western Australian and Commonwealth NRM policies. The NAIMS committee will seek endorsement for the Regional Strategy from State and Commonwealth government. The Regional Strategy will provide the basis for establishment of "Partnership Agreements" between the regional community, NAIMS and key NRM government agencies. A Business Plan may also be developed under this framework.

Strategy review -

The strategies and priorities identified within this document will evolve over time through changes in environmental, economic and social circumstances. The regional strategies will be reviewed on a regular basis.