Southwest Australia Ecoregion Initiative

A Regional Planning Project for Australia's Biodiversity Hotspot

CARING FOR OUR COUNTRY

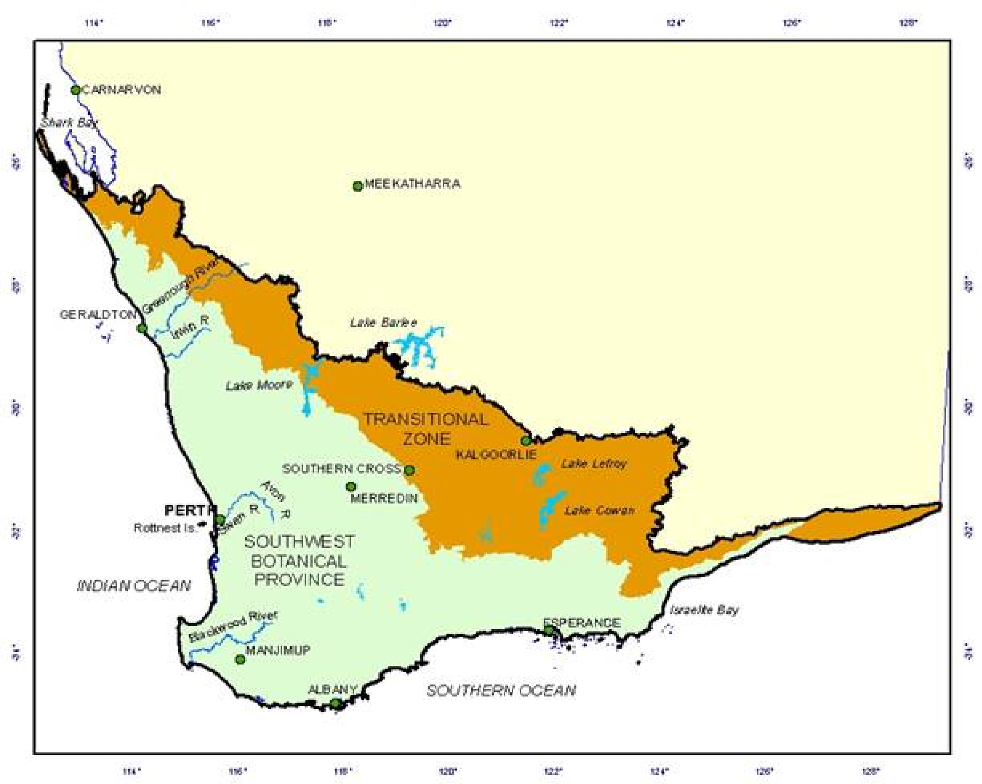
Southwest Australia Ecoregion Initiative

WWF

Department of Environment and Conservation

Our environment, our future

What is the Southwest Australia Ecoregion?



•Includes the Southwest Botanical Province;

•The transitional zone; and

• 100km buffer

•Triangular in shape, it extends from Shark Bay to Esperance with a narrow strip to the SA border

Why is it important?
•Highest concentration of rare and endangered species in Australia;

Home to 6759 species of plants – nearly 50% endemic to SWAE and over 30% are of conservation concern;
7 mammal species, 13 birds, 34 reptiles and 28 frogs;

Why is it important? continued

•One of the top 34 hotspots for biodiversity in the world
•recognized by WWF as one the Global 200 Ecoregions;
•Endemic Bird Areas (BirdLife International);
•it is one of only five globally significant Mediterranean-type regions in the world;
•Centre for Plant Diversity (WWF/IUCN).

What is the SWAEI?

Consortium of conservation experts working together since 2001 with the objective to develop a cooperative approach to biodiversity conservation in the Southwest of Australia

Project Co-Chairs
•WWF-Australia
•Department of Environment and Conservation

Working Group Members
•Australian Government
•Department of Environment and Conservation
•Department of Planning
•Greening Australia Western Australia
•State NRM Office
•WWF-Australia

Stake Holder Reference Group
36 representatives from NRM Groups, community, state, federal and local government, tertiary and research institutions

Conservation Planning Team
Dr Geoff Barrett (Chair)
Prof. Bob Pressey
Dr. Trevor Ward
Danielle Witham

Informal expert guidance as required




Caring For Our Country Open Grants

(08-09)

• Successfully Sought $333,755 (GST exclusive)

•Achieved value for money with $495,000 in-kind contribution

•Widely supported by additional stakeholders:

- –Perth Region NRM
- –Avon Catchment Council
- –South Coast NRM
- –Rangelands
- –WALGA
- –DEC
- –DPI
- –UWA
- – Greening Australia; and
- –Conservation Council




Objectives of Systematic Conservation Planning Project

Objectives:

•to deliver integrated planning and conservation process at a regional and landscape scale;
•using a systematic conservation planning process informed by experts; and
•Explore options for delivery in at least one of the priority areas.

Aims:

•To identify priority species, functional groups and ecological communities for conservation through a rigorous, defendable and transparent process;

•To identify high priority “Areas for Conservation Action”;
-these areas represent high biodiversity value to be managed and protected for conservation through acquisition, perpetual covenants, voluntary management agreements and landscape recovery programs.
-based on asset-threat feasibility analysis;

•report on the process and results; and

•to develop a decision support tool to allow on-going refinement and review of the conservation priorities as new data sets and information becomes available.




Why Plan?

- The attrition of biodiversity and other natural values continues, even in regions with controls on clearing

- Conservation resources are limited and must be spent carefully|

- Without planning, the chances are high that resources will be spent in the wrong places, on the wrong actions, and at the wrong time … and we will preside over the unnecessary loss of natural values

- Failing to plan is planning to fail




Conservation planning

- The location of high priority conservation areas that have features of interest (e.g. species, vegetation types)
- The configuration of conservation areas (e.g. size, shape, connectivity)
- The conservation actions that should (or can) be applied to particular areas
- The timing of conservation actions, given limited resources
- The ongoing management of conservation areas after they have been established

Process

- Identified appropriate data
  - –Biophysical Data
  - –Ecological process Data
  - –Non-Biophysical Data
  - –Threat Data
- Standardised a data cleaning process
- Decided on conservation planning software (Marxan and ZC interface)
- Decided on PUs
- Identified “Conservation Features”
- Specified targets for Conservation Features
- Ran the software
- Identified threats and lock-ins as a demonstration
- Ran software again…and again….and again

Conservation Features and Target Setting

•any part of the environment, ecosystem or biodiversity for which a target is set to be achieved within the decision making problem

•may be areas containing populations of individual species, or distributed meta-populations of a species; areas with high proportions of locally endemic species; areas of specific habitats; other identifiable features of an ecosystem, such as areas of congregation, structural formations or processes such as migration pathways.

•part of the biodiversity to be conserved, has a specific supporting function or is a surrogate for biodiversity

•Informed by experts

•Listed under state or federal legislation

•Can include:
-Single Features (e.g. Species, Ecological communities, Functional groups)
-Surrogates
-Vegetation complexes

Conservation Features and Target Setting - cont

Category	Number of Conservation Features
Amphibians	5
Birds	90
Flora	137
Inland Water Bodies	17
Inland Water Species	30
Invertebrates	23
Mammals	24
Reptiles	33
Vegetation	494
Others	1

Target Setting Formulas

Target (single feature) = Base (15%) + Rare (45%) + Threatened (15%) + Endemic (15%)

Target (surrogate) = Base (30%) + threats (15%) + importance (15%)

Target (vegetation) = Base (15%)+ Threat (salinity) (5%) + Threat (Dieback) (5%) + Threat (Urbanisation) (5%) + function (Historical versus Present) (up to 15%) + Special Feature (if applicable) (15%)

Planning Units

•Used to compare areas of similar size across an entire project area.

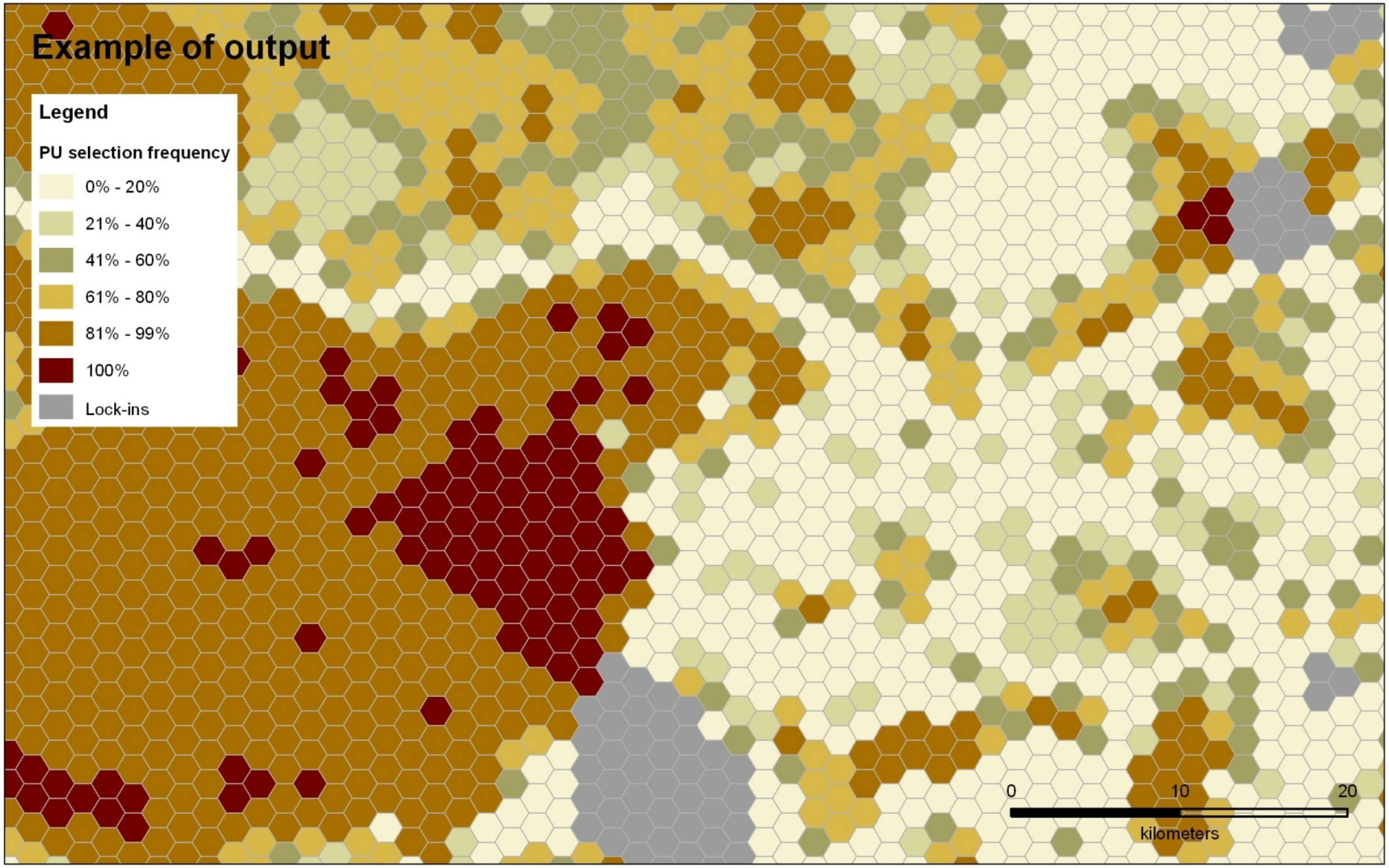
•For the purposes of systematic conservation planning, the smallest spatial entity for modeling and analysis are selected,

•there are options available in determining the size and shape.

•These options are metered by processing time - more planning units = longer the processing time

Shape	Size	Number of PUs
Square	1km2	691,384
Square	2km2	173,737
Hexagon	2km2	266,821

Planning Units



Analysis

•Marxan aims to meet all targets for all conservation features in the most efficient way

- Consider threats (if there)
- Consider lock-ins (if there)
- Repeated using a specified number of runs




Analysis

We used eight scenarios:

Scenario	Lock-ins	Threats	BLM
A	None	No	.625
B	Some	No	.625
C	All	No	.625
D	None	Yes	.625
E	Some	Yes	.625
F	All	Yes	.625
G	Some	Yes	100
H	Some	Yes	1000




Outputs

1. Best Solution

out of the 100 “runs” for each scenario, which produced the least amount of planning units (or the most efficient) from all the “good solutions” generated.

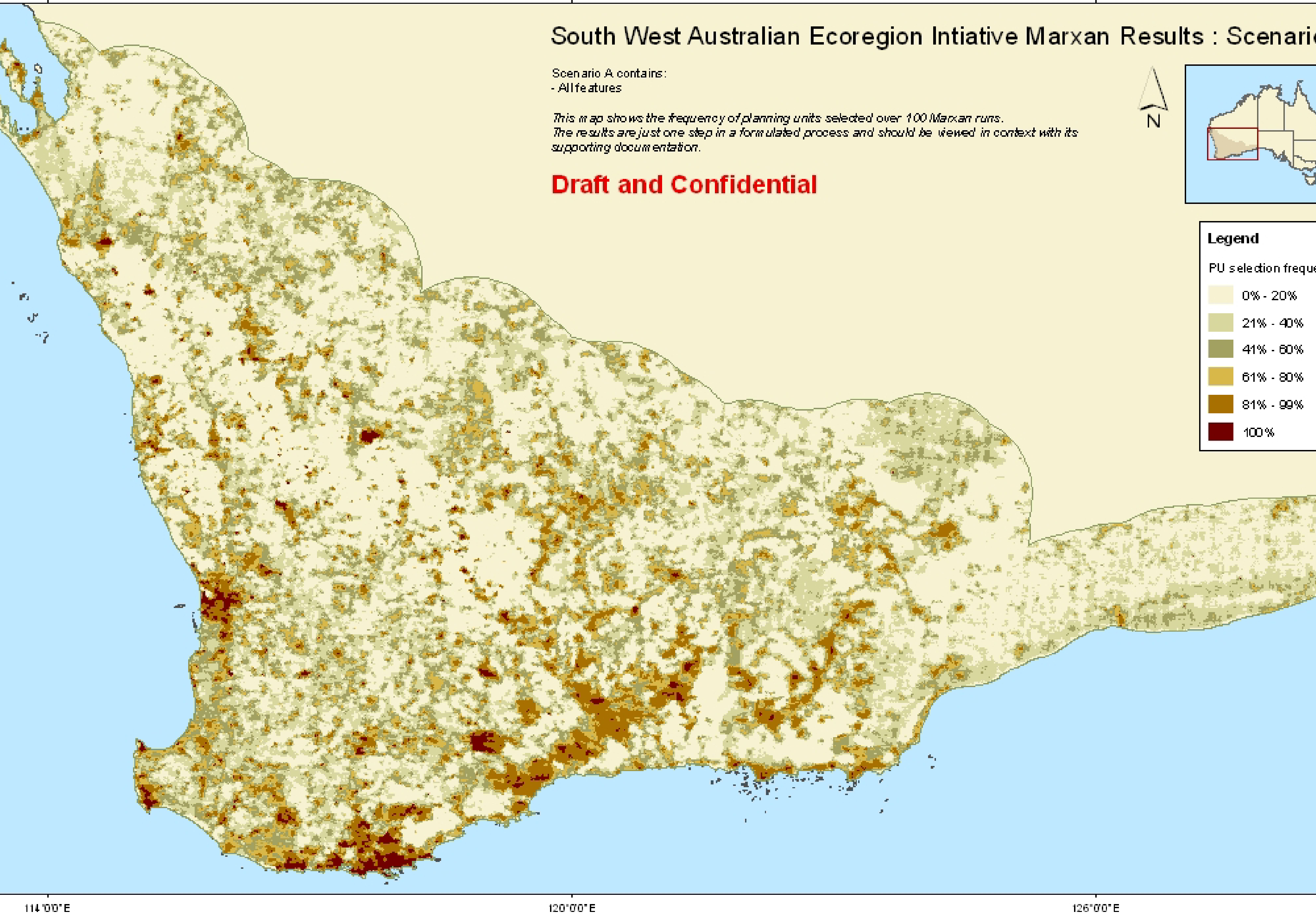
•Cautionary Note!

2. Irreplaceability (selection frequency)

a measure of how important that planning unit is to the achievement of the planning objectives. Planning units are selected less often when there is a range of equally good alternatives and are considered replaceable. Planning units that become “irreplaceable” appear in every solution and must be included to achieve the planning objectives.

Best to use both in a complementary way



15 September 2009
: GDA94
1:6 600 000
By: Gaia Resources

Data Sourced:
- Ecoregion boundary: *Based on Aust Govt Dept of Environment, Water, Heritage and the Arts IBRA 6.1 region data*
- Australia outline: *Geoscience Australia Geodata 250K*

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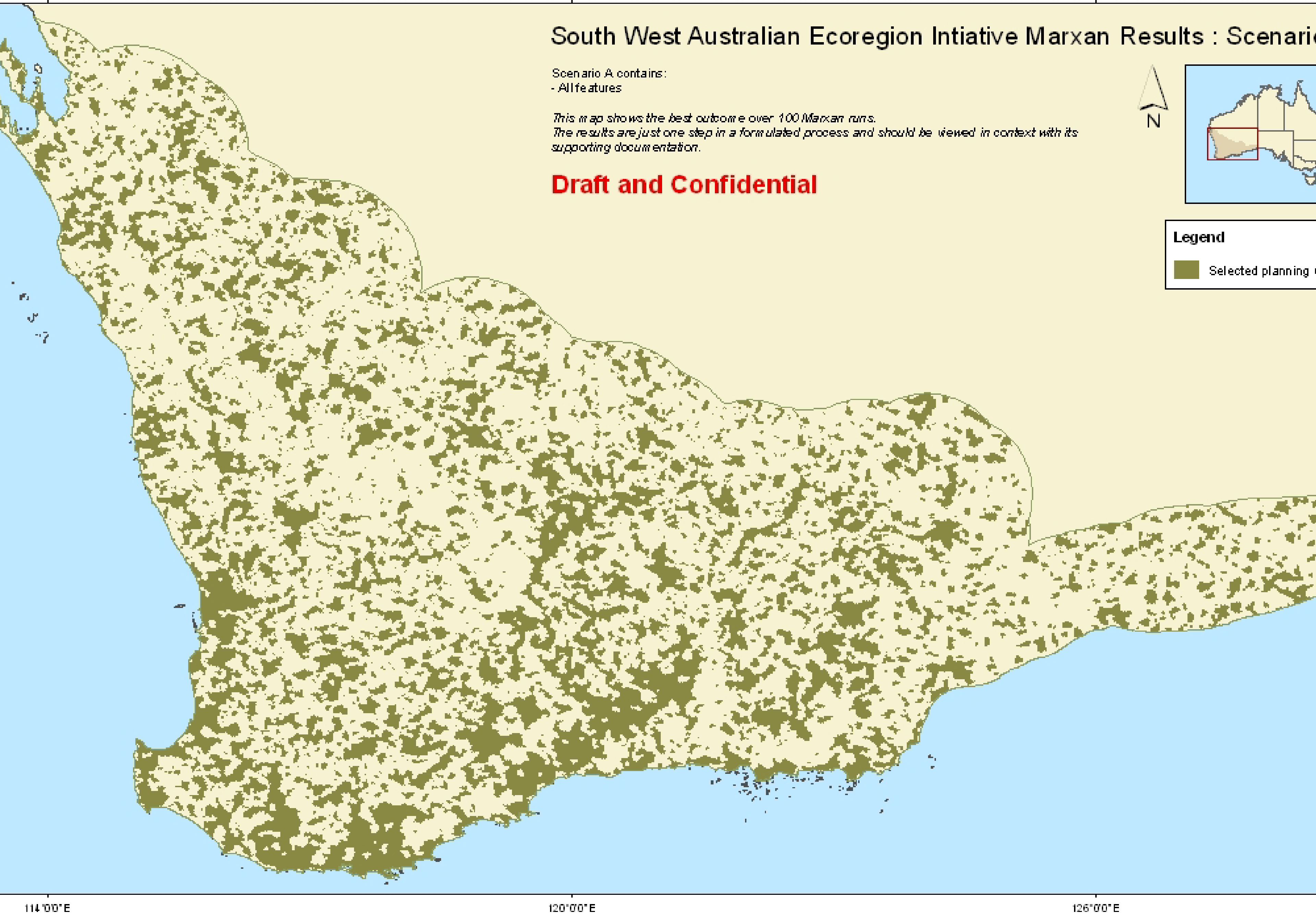
kilometres



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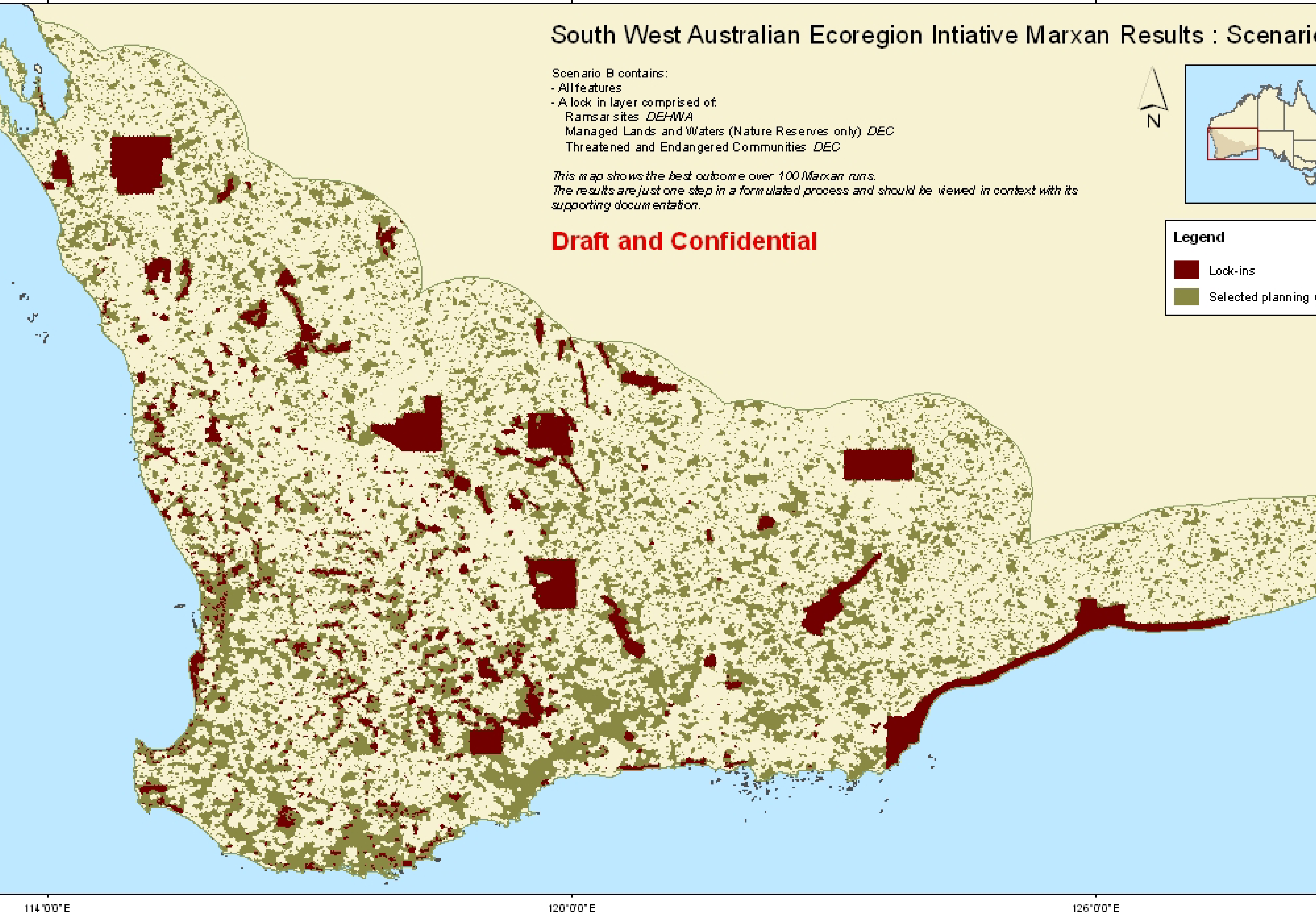

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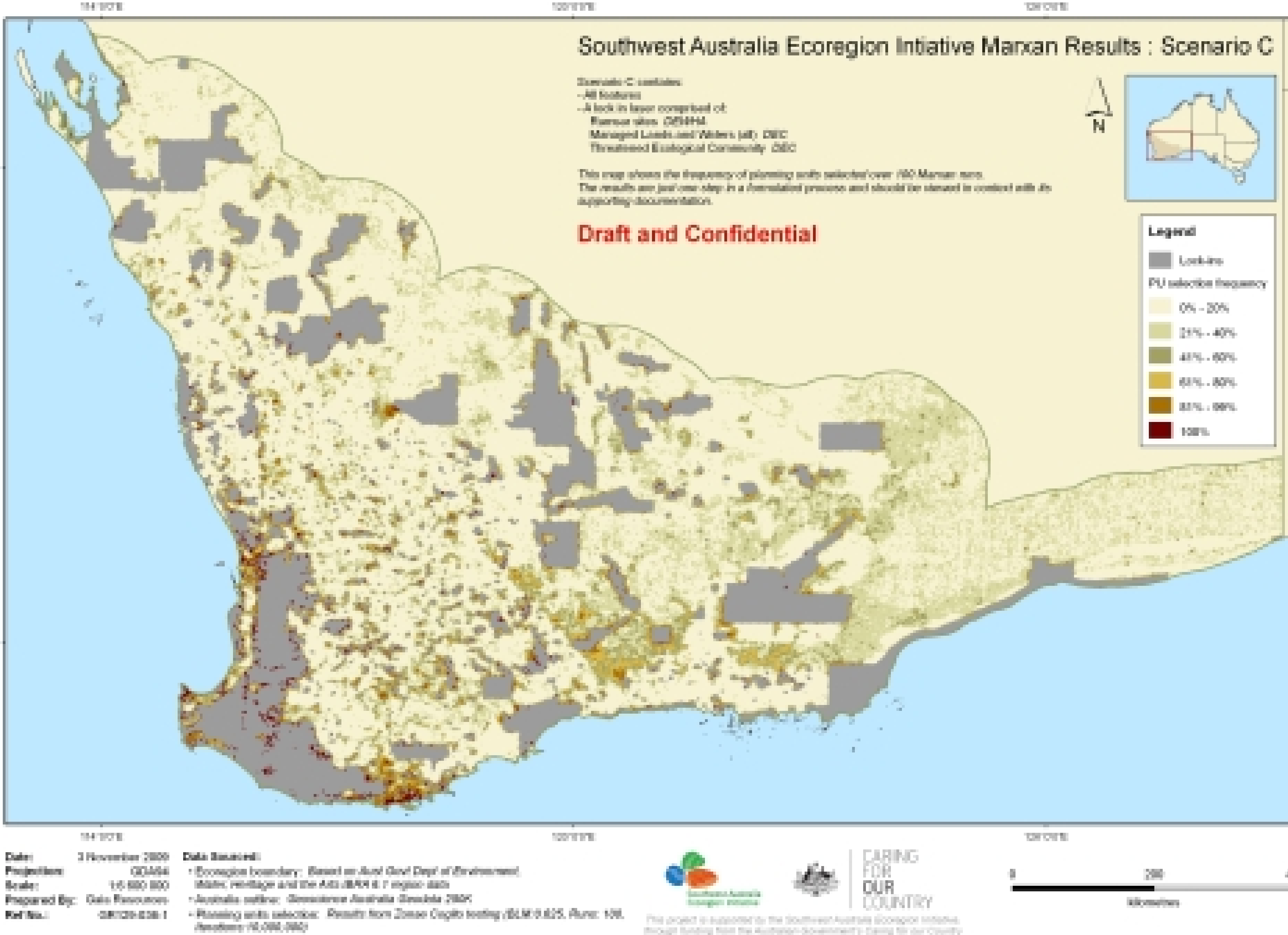
Southwest Australia Ecoregion Intiative Marxan Results : Scenario C
Draft and Confidential
N
Legend
Lock-ins
PU selection frequency
0% - 20%
21% - 40%
41% - 60%
61% - 80%
81% - 99%
100%
Data Sources:
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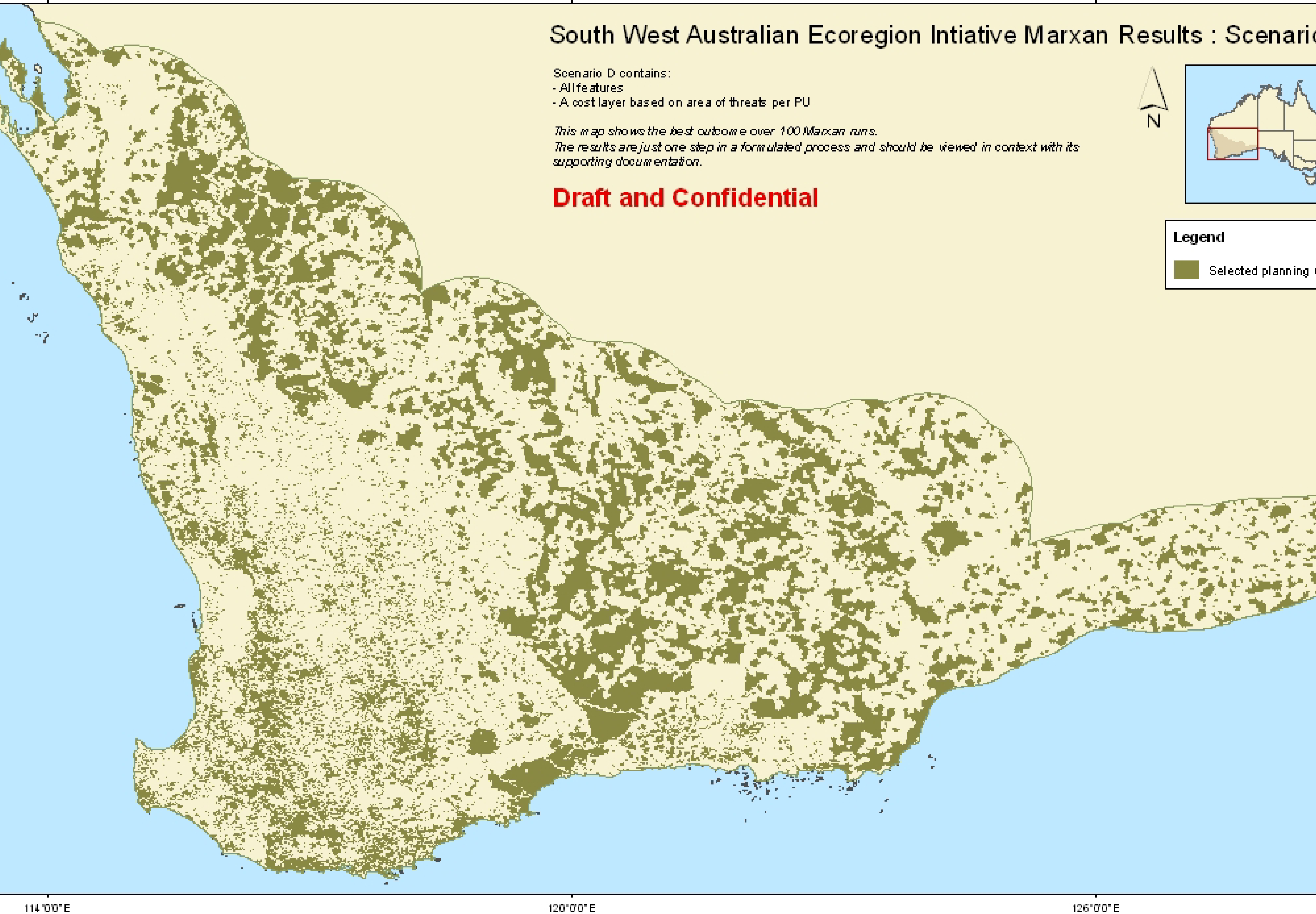
South West Australian Ecoregion Intiative Marxan Results : Scenario

Scenario D contains:
- All features
- A cost layer based on area of threats per PU

This map shows the best outcome over 100 Marxan runs.
The results are just one step in a formulated process and should be viewed in context with its supporting documentation.

Draft and Confidential



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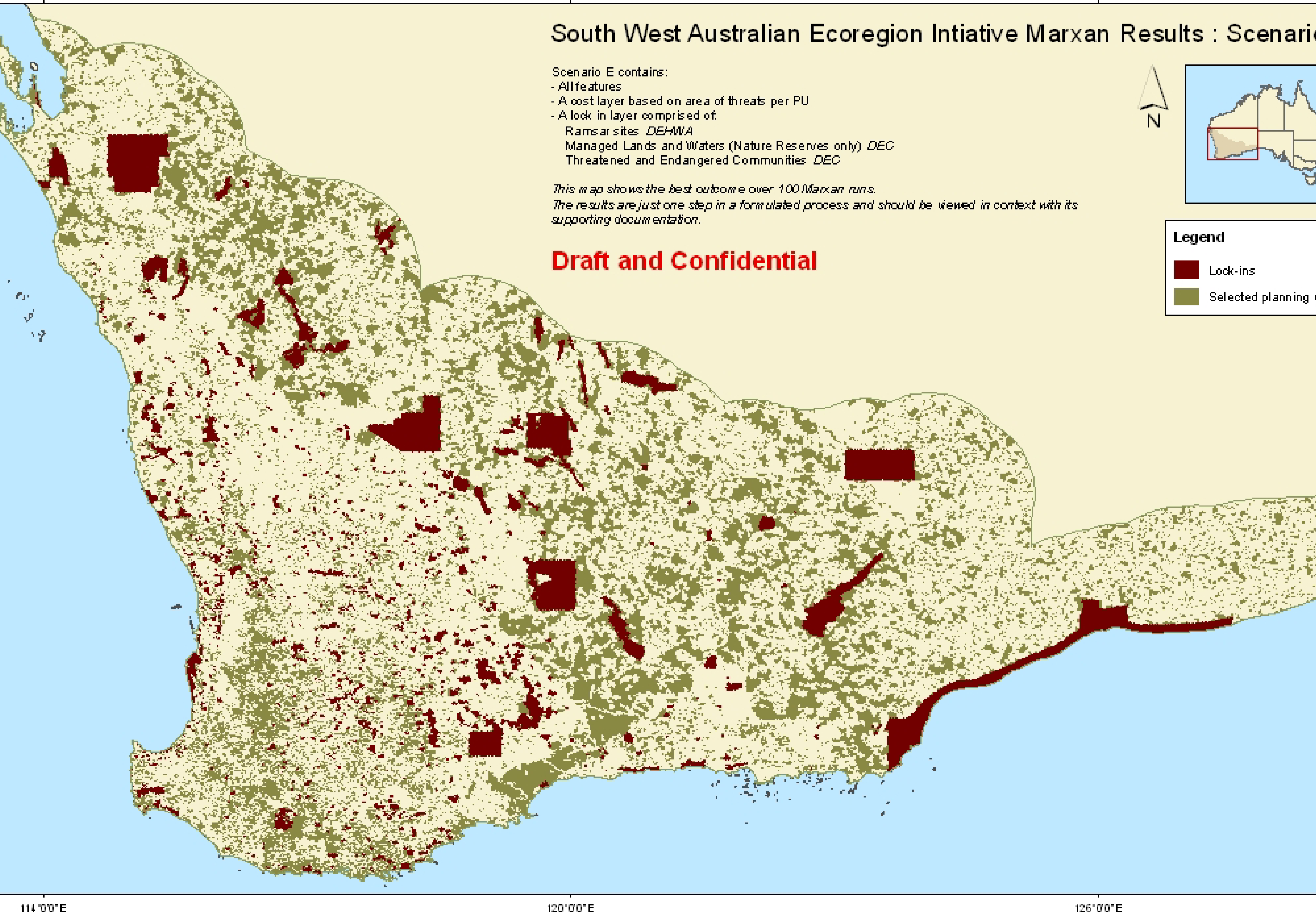

15 September 2009
GDA94
1:6 600 000
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Data Sourced:
- Ecoregion boundary: *Based on Aust Govt Dept of Environment, Water, Heritage and the Arts IBRA 6.1 region data*
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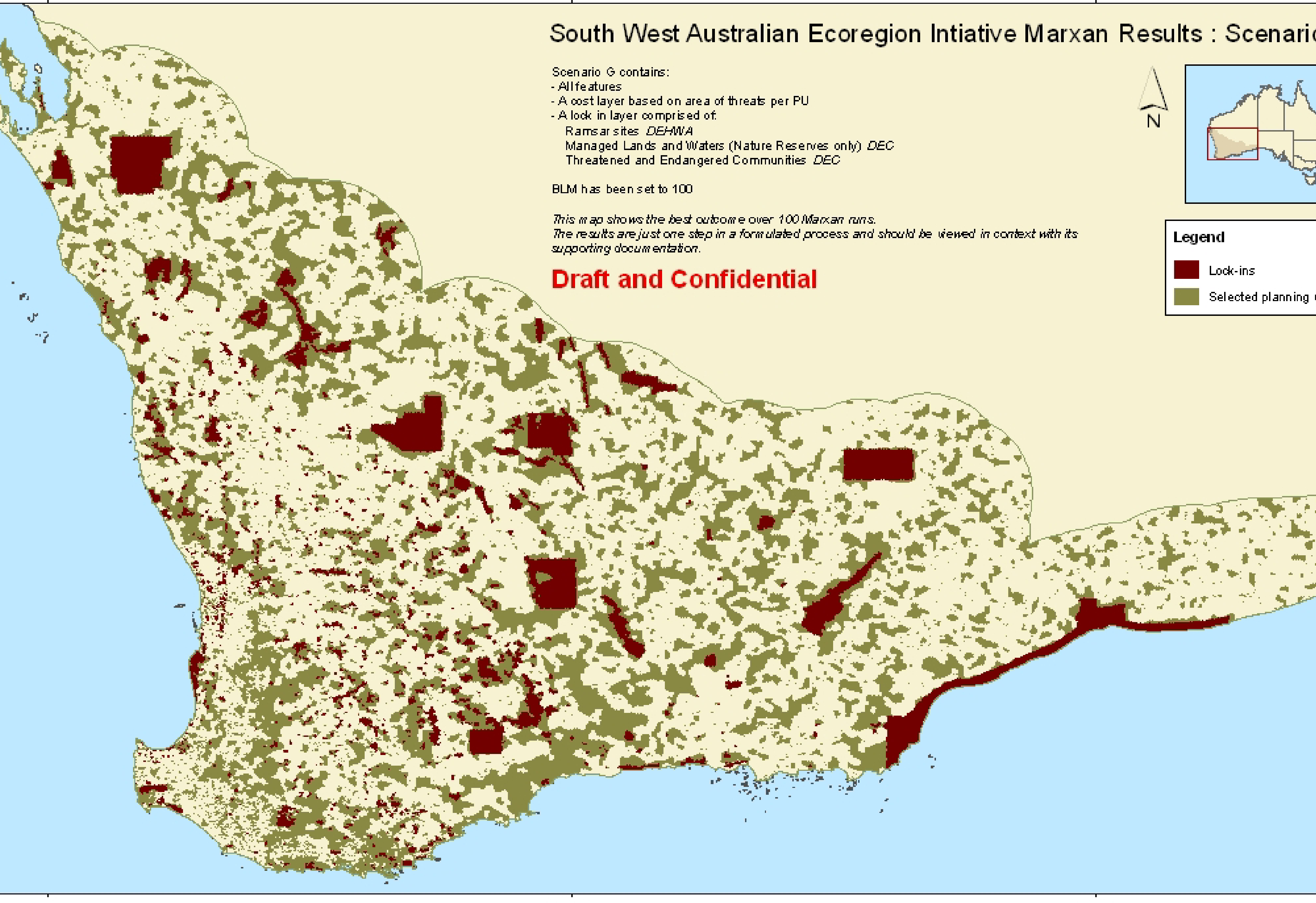
kilometres



15 September 2009
: GDA94
1:6 800 000
By: Gaia Resources

Data Sourced:
- Ecoregion boundary: *Based on Aust Govt Dept of Environment, Water, Heritage and the Arts IBRA 6.1 region data*
- Australia outline: *Geoscience Australia Geodata 250K*

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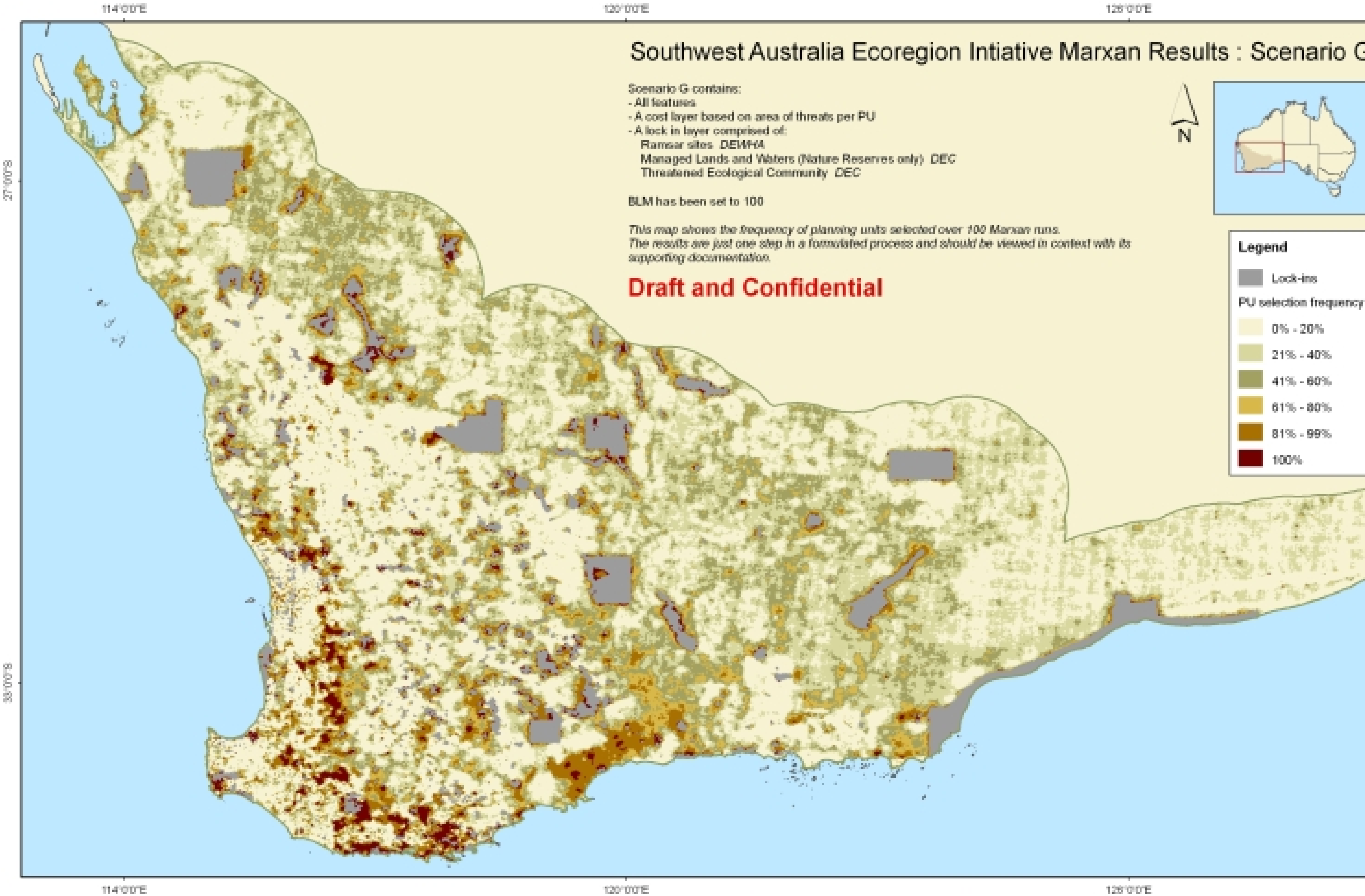

Date: 4 November 2009
Projection: GDA94
Scale: 1:6 600 000
Prepared By: Gaia Resources
Ref No.: GR129-040-1

Data Sourced:
- Ecoregion boundary: *Based on Aust Govt Dept of Environment, Water, Heritage and the Arts IBRA 6.1 region data*
- Australia outline: *Geoscience Australia Geodata 250K*
- Planning units selection: *Results from Zonae Cogito testing (BLM:100, Runs: 100, Iterations:10,000,000)*

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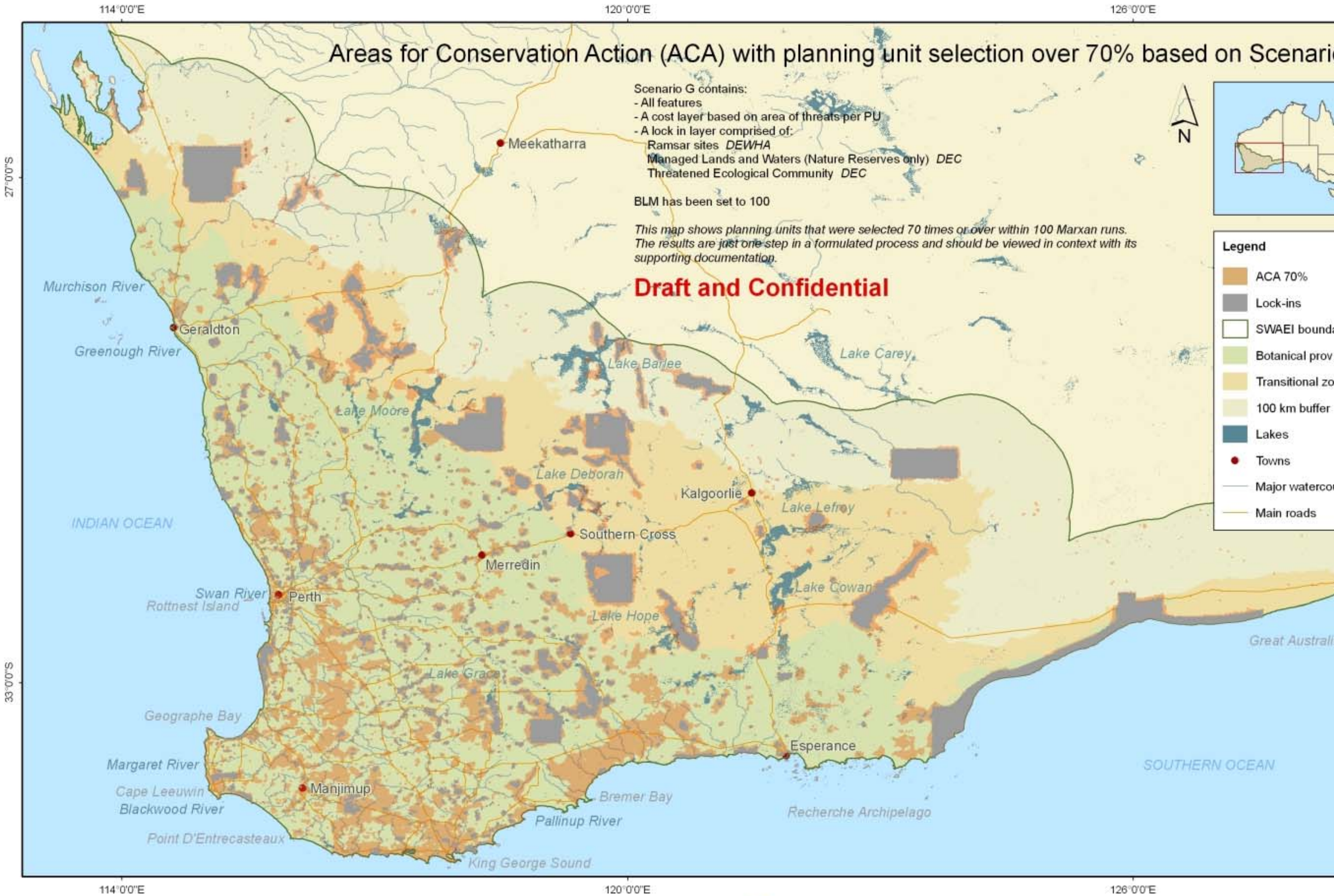

Date: 23 November 2009
Projection: GDA94
Scale: 1:6 550 000
Prepared By: Gaia Resources
Ref No.: GR129-044-2

Data Sourced:
- Ecoregion boundary; Transitional zone; Botanical province: *Based on Aust Govt Dept of Environment, Water, Heritage and the Arts IBRA 6.1 region data*
- Australia outline; Towns; Main roads, Lakes, Watercourses: *Geoscience Australia Geodata 250K*

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How does changing settings impact on meeting targets?

Scenario A - out of 854 conservation features:
755 targets were met (88%)

Scenario B - out of 854 conservation features:
852 targets were met (99%)
621 features were located in lock ins
121 targets were met within lock ins

Scenario C - out of 854 conservation features:
853 targets were met (99%)
730 features were located in lock ins
389 targets were met within lock ins

Scenario D - out of 854 conservation features:
550 targets were met (64%)

Scenario E - out of 854 conservation features:
854 targets were met (100%)
621 features were located in lock ins
121 targets were met within lock ins

Scenario G - out of 854 conservation features:
853 targets were met (99%)
621 features were located in lock ins
122 targets were met within lock ins




How does changing settings impact on meeting targets?

Spp.	Total Points	Total occurance	Target %	Target Amount	Scenario A Amount	Scenario A Target %	Scenario D Amount	Scenario D Target %
Epicyliosoma sarahae	3	3	60%	1.80	3	100.00%	1	55.56%
Tartarus murdochensis	2	2	60%	1.20	1	83%	2	100%
Melaleuca strobophylla	51	51	30%	15.3	35	100%	22	100%




People still make the Decisions!

Trade-Offs

•A Species Penalty Factor should be applied to “force” Marxan to meet our conservation goals – irrespective of how costly it is, if that’s what the judgment is

•Trade Offs – some solutions/scenarios will meet targets differently for the same conservation feature

•Some scenarios/solutions you may still need to decide what you prioritise e.g. do you choose scenario A or D

• – decisions need to be made and consider other aspects e.g. socio-economic factors

Summary of Marxan as a Decision Support Tool

•identifies areas that efficiently conserve an adequate amount of a variety of conservation features for minimal cost.

•uses simulated annealing as the optimization algorithm to find numerous “good solutions” which are generated through multiple iterations or “runs”, with planning units either included or excluded in the ACA solution

•This is dependant whether part of the solution is already contained within the reserve network (complementarity), what the gaps in the network may be and whether solutions can be found away from threats.

Where to from Here?

•Regional Refinement – external review involving experts, decision makers, implementers and wider stakeholders

•Local Refinement – scaling down to cadastral level to commence implementation

•On-ground Implementation – demonstration sites within 1 ACA

•Institutionalisation / Mainstreaming – appropriate endorsement through relevant statutory bodies for both the outputs and the process.

•Stakeholder engagement is very important, in both providing input and for delivery. Also involved in a choice modeling project looking at the divergence between those things scientists value and the community value. Stakeholder engagement continues throughout the life of the project