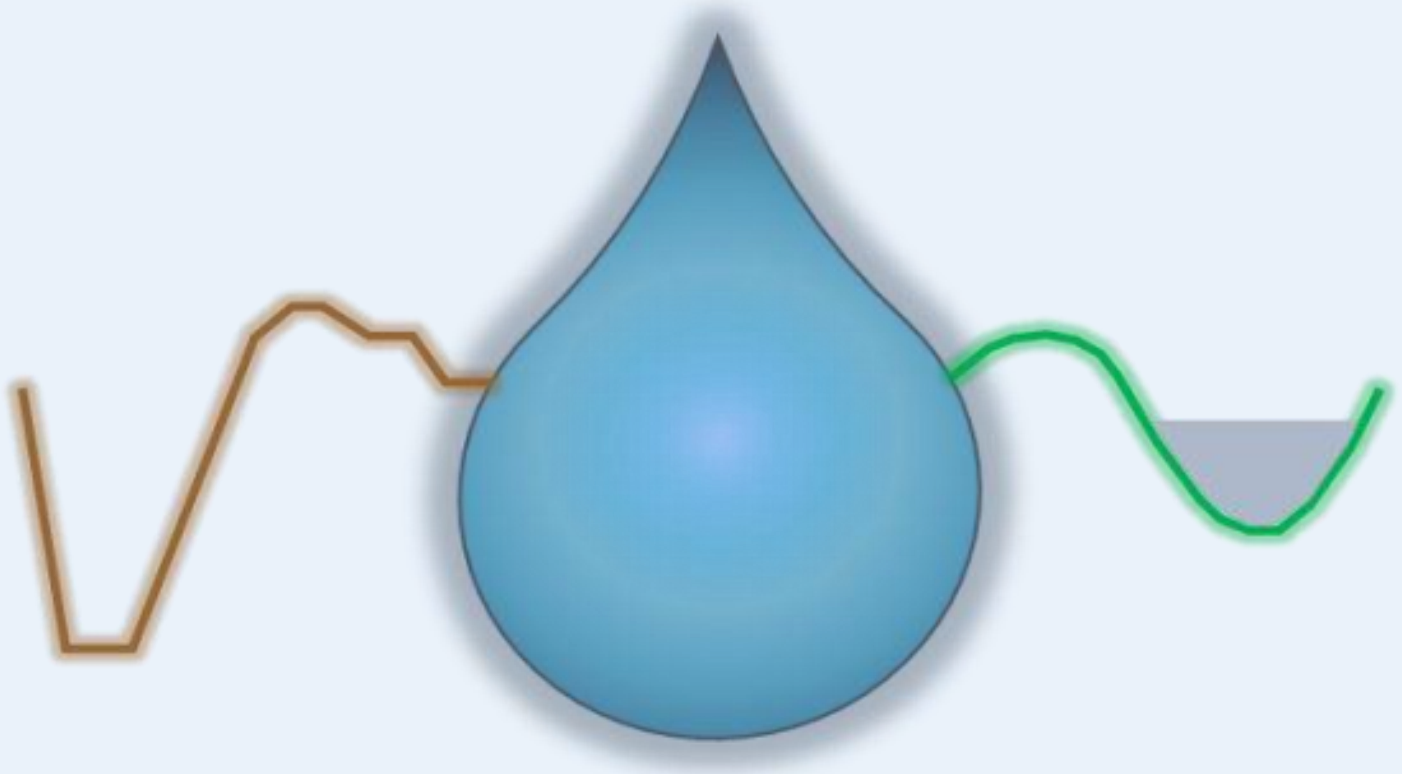

LEARNING FROM LUSATIA:

AN INTEGRATED APPROACH TO PLANNING FOR POST-MINING LAND AND WATER USE IN THE UPPER HUNTER VALLEY, NSW

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UPPER HUNTER MINING DIALOGUE ANNUAL FORUM
DATE: 22 NOVEMBER 2017

Please note that this presentation was developed at the request of the New South Wales Minerals Council to summarise a Masters Final Project written by the presenter.

The Masters Final Project was Submitted as a self-driven applied research project in fulfilment of the requirements of the Masters of Integrated Water Management from the International Water Centre and the University of Queensland course WATR7501.

If you would like a copy of the Masters Final Project, please contact the presenter.

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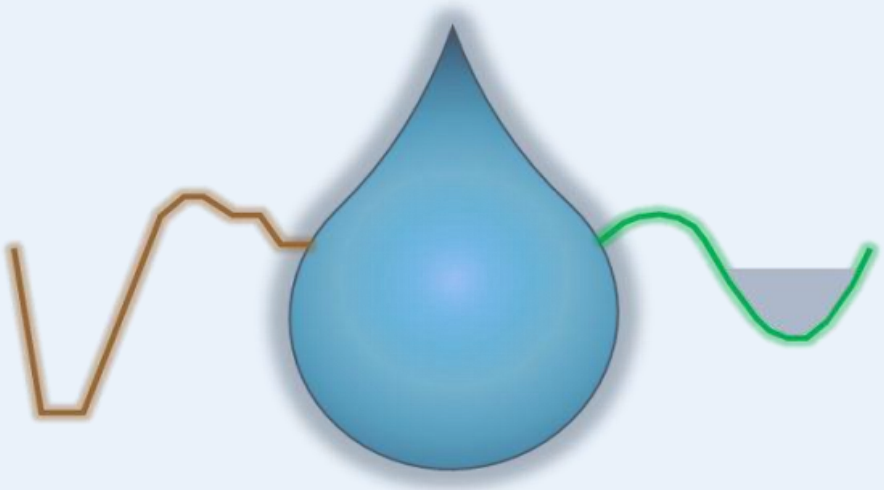
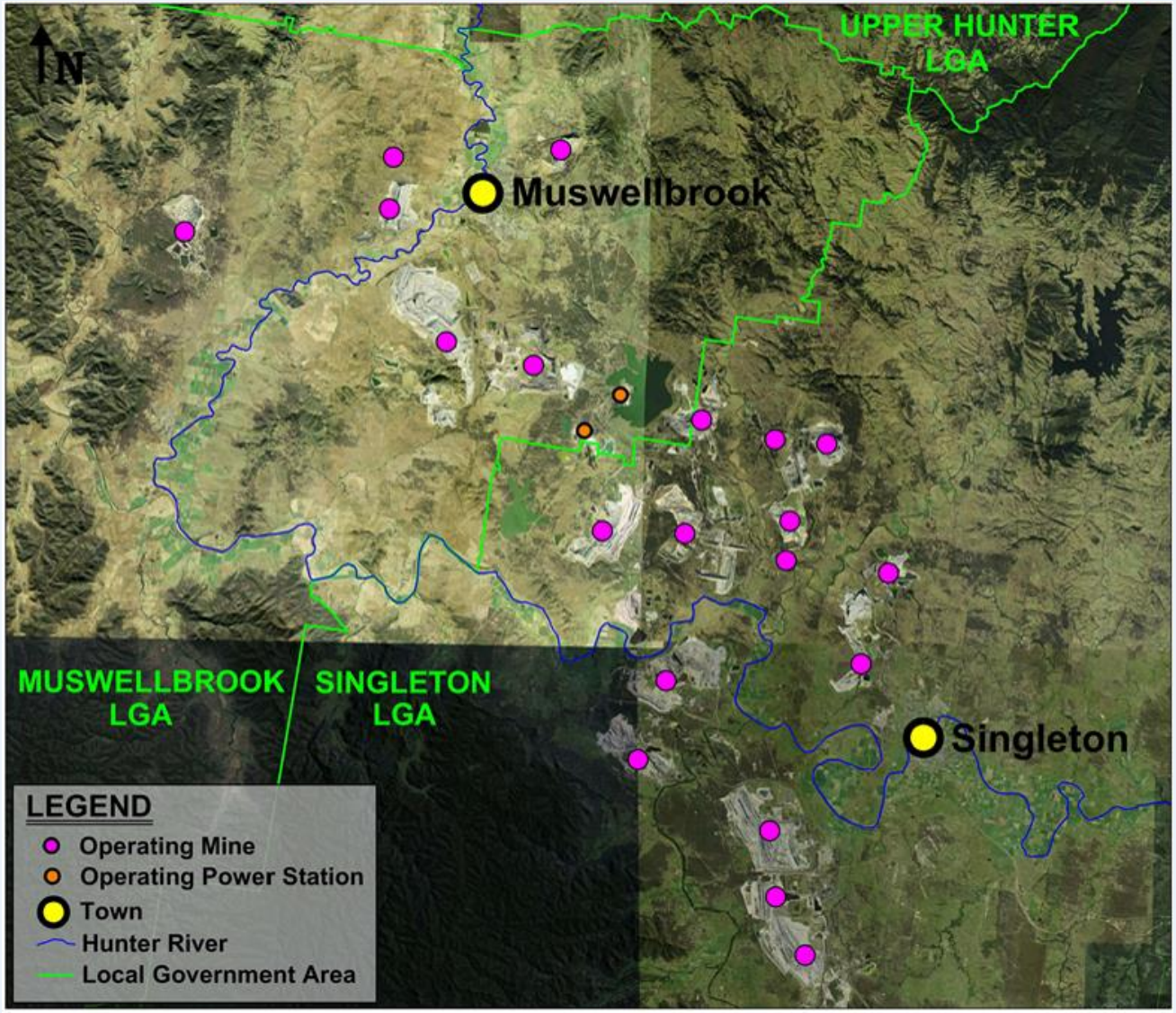


PART ONE:
Setting the Scene

UPPER HUNTER VALLEY COAL MINING REGION

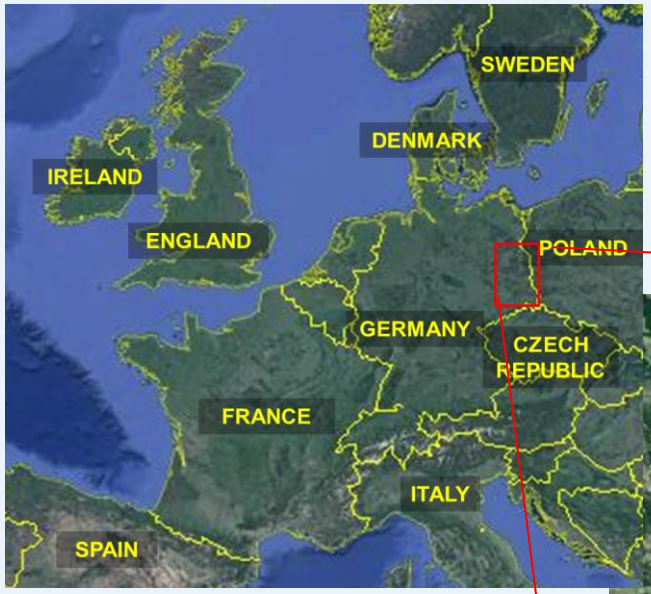
Upper Hunter Region covers 5 LGAs; Singleton, Muswellbrook, Dungog, Upper Hunter and Gloucester

Upper Hunter Valley Coal Mining Region defined as the densely mined region around Singleton and Muswellbrook



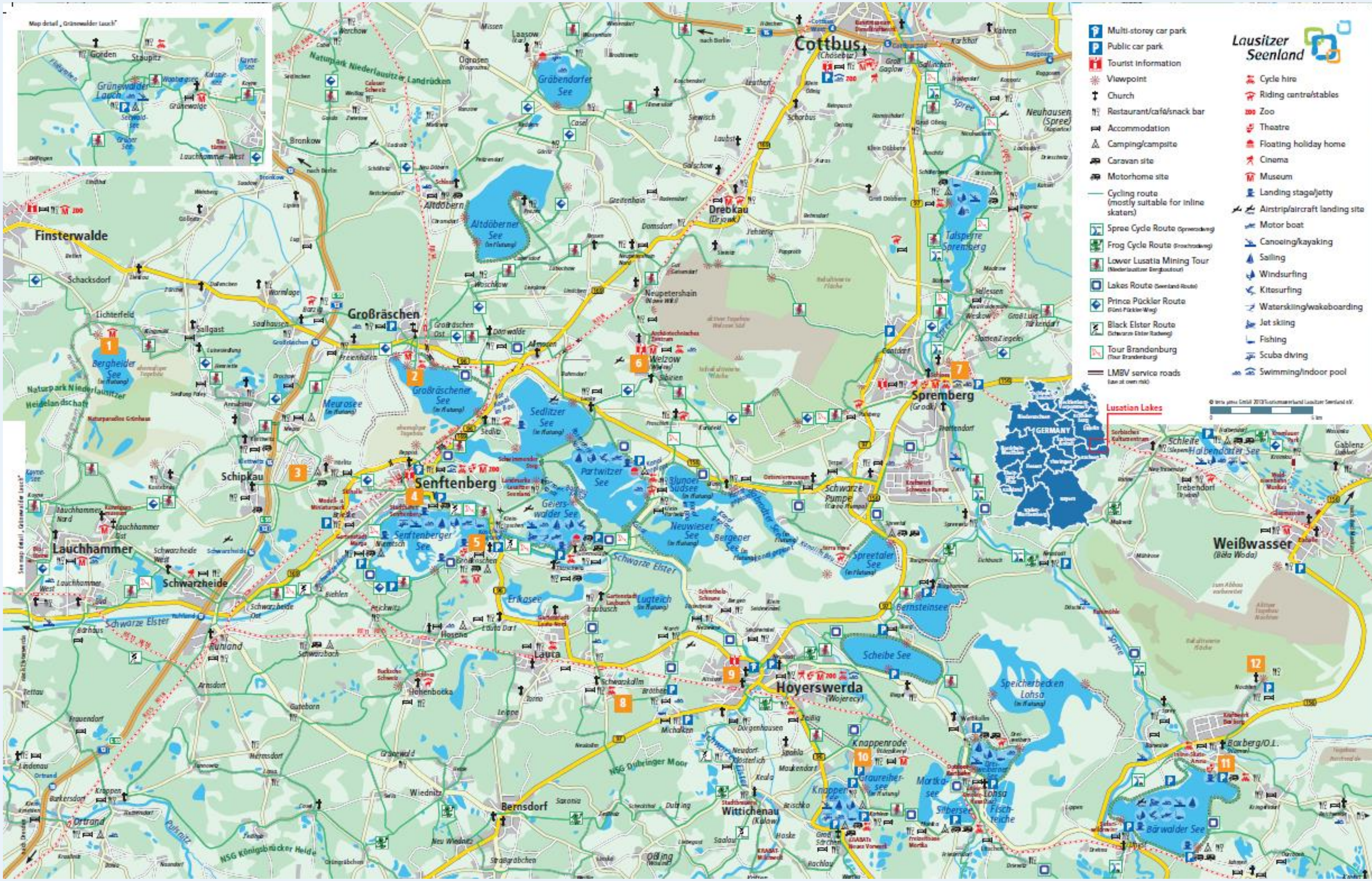
LUSATIA

Europe's largest artificial lake district by next year



Lignite mining areas rehabilitated by Federal Government via LMBV

Internationale Bauausstellung (IBA) 2000-2010 to bring new life to the region



Lausitzer Seenland
Multi-storey car park
Public car park
Tourist information
Viewpoint
Church
Restaurant/café/snack bar
Accommodation
Camping/campsite
Caravan site
Motorhome site
Cycling route (mostly suitable for inline skaters)
Spree Cycle Route
Frog Cycle Route
Lower Lusatia Mining Tour
Lakes Route
Prince Pückler Route
Black Elster Route
Tour Brandenburg
LMBV service roads
Cycle hire
Riding centre/stables
Zoo
Theatre
Floating holiday home
Cinema
Museum
Landing stage/jetty
Airstrip/aircraft landing site
Motor boat
Canoeing/kayaking
Sailing
Windsurfing
Kitesurfing
Waterskiing/wakeboarding
Jet skiing
Fishing
Scuba diving
Swimming/indoor pool
Lusatian Lakes
GERMANY
Cottbus
Finsterwalde
Großräschen
Senftenberg
Lauchhammer
Schwarzheide
Schipkau
Drebkau
Spremberg
Weißwasser
Hoyerswerda
Lauta
Bernsdorf
Wittichenau
Altdöbern
Altdöberner See
Gräbendorfer See
Bergheider See
Großräschener See
Sedlitzer See
Partwitzer See
Geierswalder See
Senftenberger See
Neuwieser See
Bergener See
Spreetaler See
Bernsteinsee
Scheibe See
Speicherbecken Lohsa
Bärwalder See
Talsperre Spremberg
Erikasee
Lugteich
Meurasee
Knappensee
Graureihersee
Silbersee
Schwarze Elster
Spree
Schwarze Pumpe
Knappenrode
Boxberg/O.L.
Welzow
Neupetershain
Lohsa
Ruhland
Ortrand
Grünewalder Lauch

LUSATIAN LAKES

25 lakes total; 13 complete, 8 on-going and 4 planned

Accelerated filling via flood flows or pumped inflows

On-going water treatment

Geotechnical stabilisation


see Sporthalle


see


© Profifoto Kliche 2009


© Christina Glanz 2009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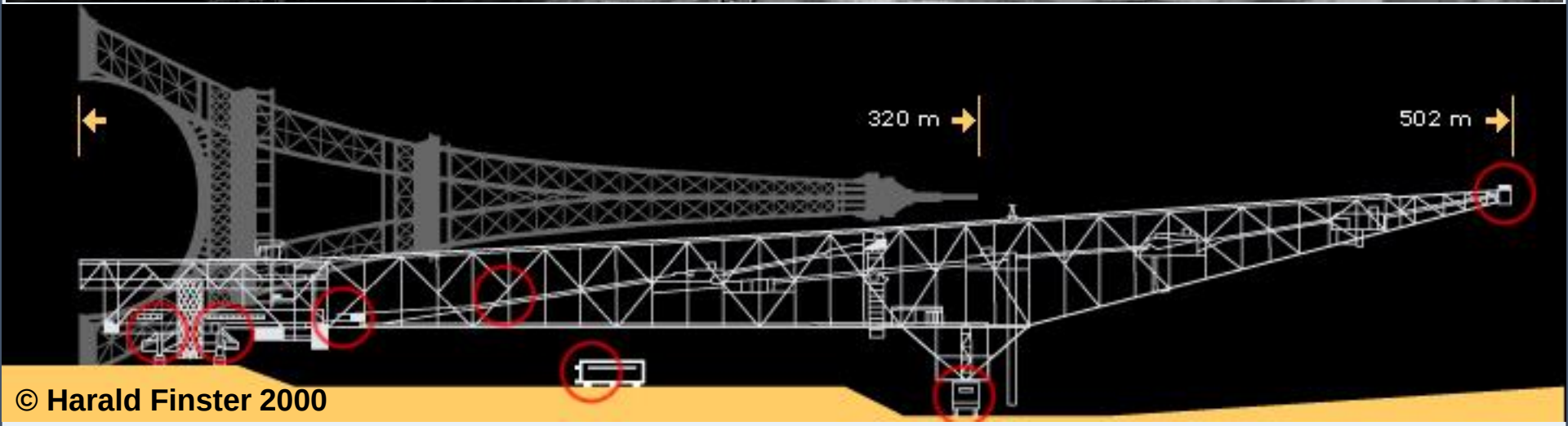

320 m
502 m
© Harald Finster 2000

CONTEXTUAL COMPARISON

LUSATIA	UPPER HUNTER VALLEY
ECONOMIC	
Brown coal (lignite)	Soft coking coal and thermal coal
Both contribute greatly to economic progress in each region	
Funding for physical rehabilitation: - reunification mines by LMBV (Federal & State Govt.) - active mines by mining companies	Funding for physical rehabilitation: - active mines by mining companies
SOCIAL - DEMOGRAPHICS	
Population~150,000 Employees in mining in 1990 ~80,000 to ~7,000 in 2001	Population~41,000 Employees in mining in 2016~8,000 (based on 6% unemployment and 20-25% employed in the mining industry)

CONTEXTUAL COMPARISON

LUSATIA	UPPER HUNTER VALLEY
ENVIRONMENT – PROXIMITY TO A MAJOR CITY	
100 km south-east of Berlin	110 km north, north-east of Sydney
ENVIRONMENT – COAL MINING REGION LAND AREA	
~1300km^2	~2000km^2
ENVIRONMENT – AVERAGE ANNUAL RAINFALL AND EVAPORATION	
Rainfall~550mm Evaporation~450mm	Rainfall~600mm but high spatial variability Evaporation~1,500mm
ENVIRONMENT – SOIL TYPE	
Sands and gravel interspersed with silts, clays and glacial till	Singleton coal measures include sandstone, shale, mudstone and conglomerate
ENVIRONMENT – LAND USE	
Mining/industry, lakes, residential	Agriculture, mining/industry and residential.
ENVIRONMENT – WATER USERS	
Municipal, industry, environment	Municipal, industry, environment, private

SPATIAL COMPARISON

LUSATIA

UPPER HUNTER

LUSATIAN INTERVIEWS

"LMBV made the base for security and safety. The IBA was the icing on the cake."

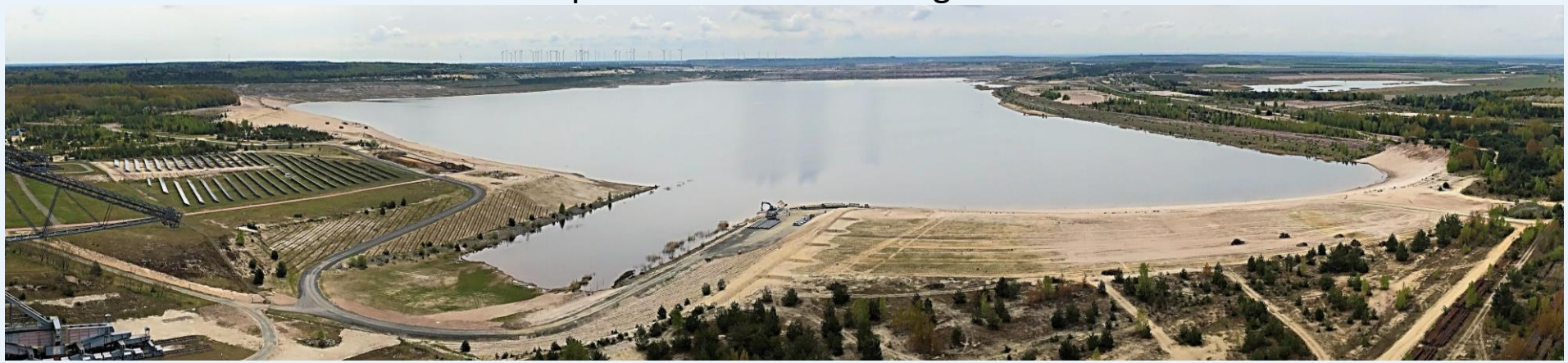
"The IBA was about changing perceptions and fostering identity"

"Water levels rising within your lifetime mean you have a responsibility for it"

"Rehabilitation can bring jobs…it's not the end of jobs but the start of new jobs"

"It is not in the first hand, a technical problem nor is it a political problem…it is a planning problem"

"Technology can solve anything – need to realise that this is an opportunity to solve the problem…it's a challenge."



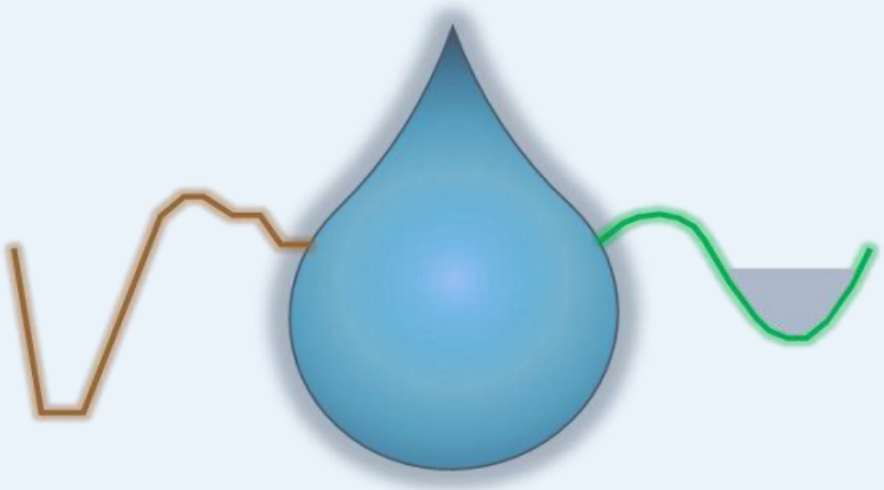
MANAGEMENT TOOLS IN LUSATIA

Regional Plan documents

Groups in which stakeholders can communicate

Regional water balance model

IBA



PART TWO:
Focus on the Upper Hunter

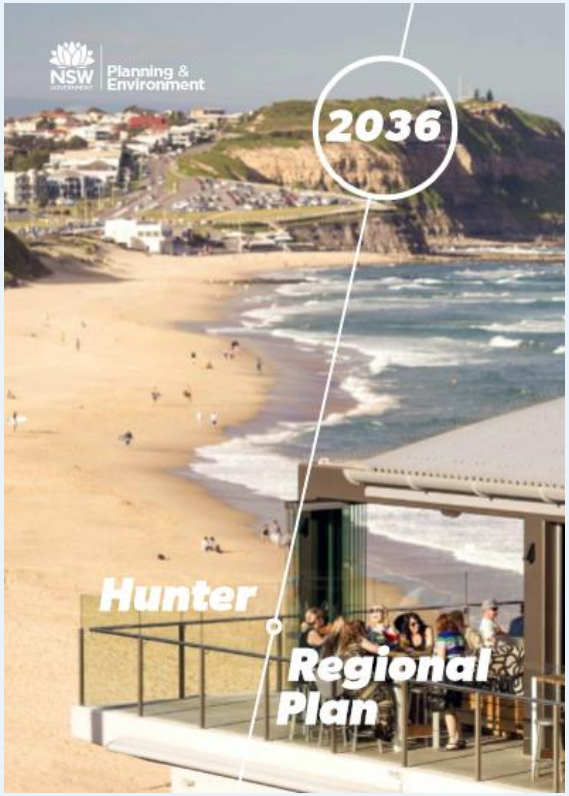
UPPER HUNTER REGIONAL PLANS

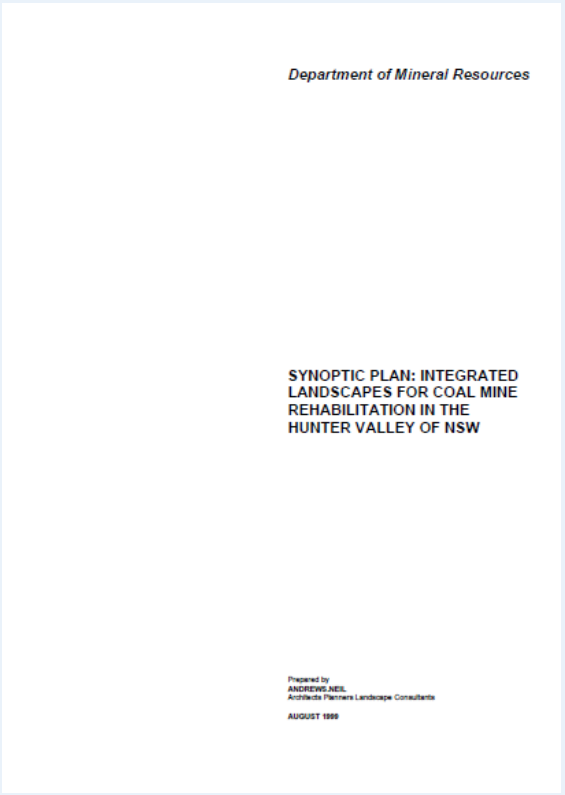
Hunter Regional Plan

Hunter Valley Synoptic Plan (being revised)

Upper Hunter Strategic Assessment (proposed)

Upper Hunter Strategic Regional Land Use Plan




Department of Mineral Resources

SYNOPTIC PLAN: INTEGRATED LANDSCAPES FOR COAL MINE REHABILITATION IN THE HUNTER VALLEY OF NSW

Prepared by
ANDREWS.NEIL
Architects Planners Landscape Consultants

AUGUST 1999

CURRENT POST-MINING APPROVALS IN NSW

- Environmental Assessment:
  - Post-mining landform provided;
  - Assessment of the final void water level/quality and flooding risk; and
  - Cumulative post-mining impacts assessment.

- Currently many approved projects show:
  - Voids can take hundreds of years to fill and reach an equilibrium;
  - That equilibrium level can be below the groundwater table (sink); and
  - Hyper-saline lake.

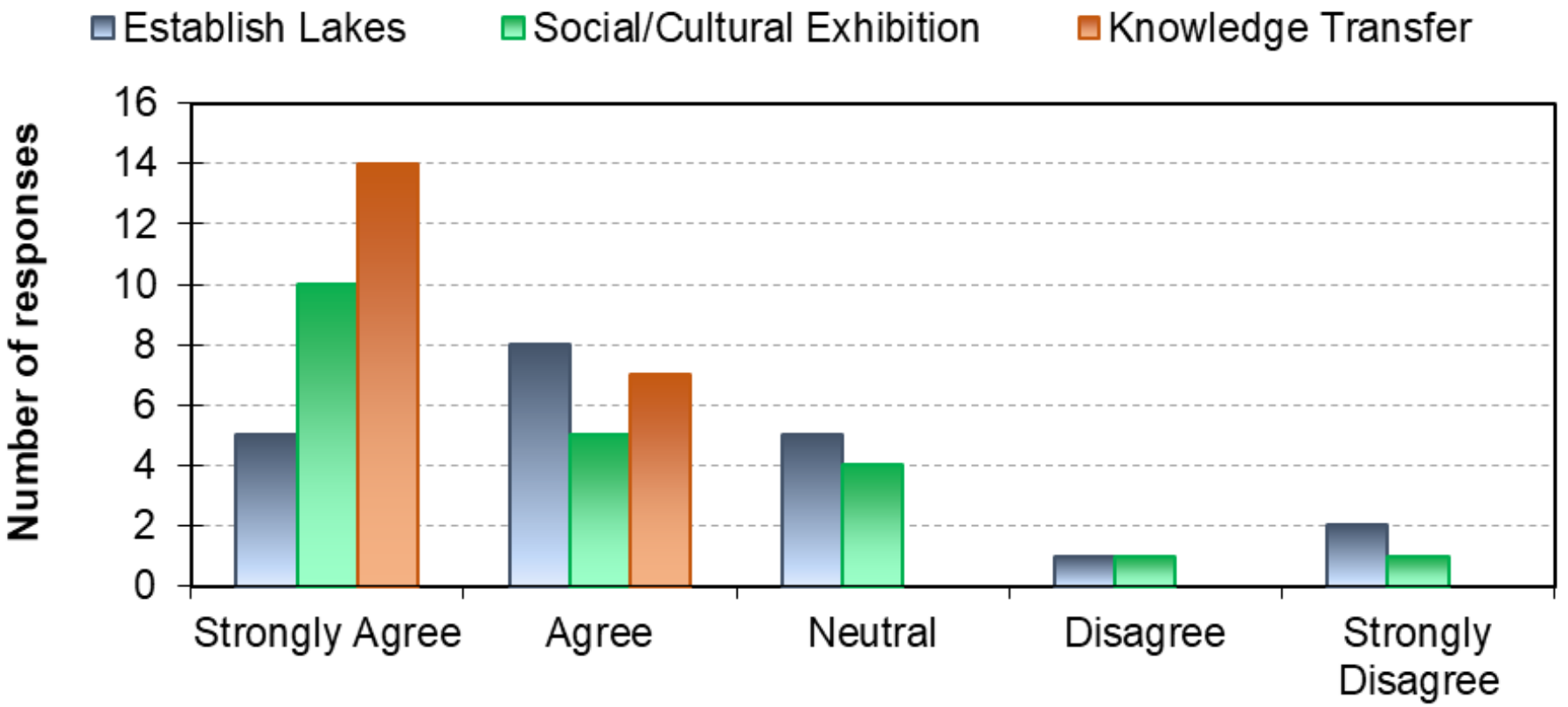
MINING VOIDS IN THE UPPER HUNTER

- Currently approximately 25 voids approved and 5 voids part of proposed projects
- Voids area predicted to be approximately 45 km^2
- Details are provided in each individual assessment – calls for a publicly available map to summarise approved void locations, size and timing
- Evoke emotive responses from people

KEY FINDINGS FROM UPPER HUNTER SURVEYS

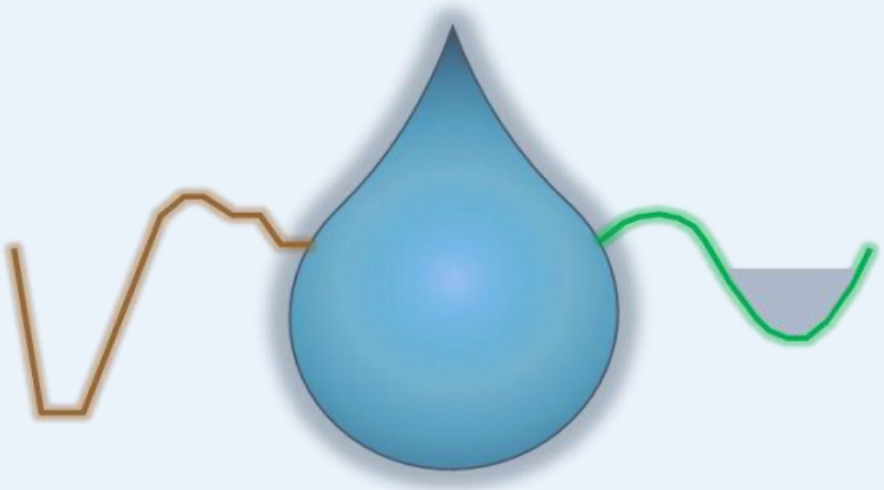
- High participation from mining industry (>50%)
- More than half don't think existing planning and laws are sufficient
- Most think mining industry should pay while responsibility lies with Government
- Majority most concerned about economy (not environment)
- Barriers identified such as lack of information/misinformation, existing approvals and legislation, and government disengagement

KEY FINDINGS FROM UPPER HUNTER SURVEYS



FINAL VOID MODELLING

- Example void assumed
- Scenarios were based on Lusatian management techniques and considered:
  - Groundwater sensitivity
  - Diverted catchment
  - Creek inflow
  - External pumped inflow
  - Treatment
  - Runoff salinity reduction over time (finite salt source)
- Results show allowing accelerated filling reduces salinity rate of increase at equilibrium



PART THREE:
Learning from Lusatia

KEY LEARNINGS

- A regional water balance model:

  to inform water management decisions by providing an indication of quantity, quality and associated timing of water availability to potential users of previously mined areas.

- A social/cultural program such as the IBA:

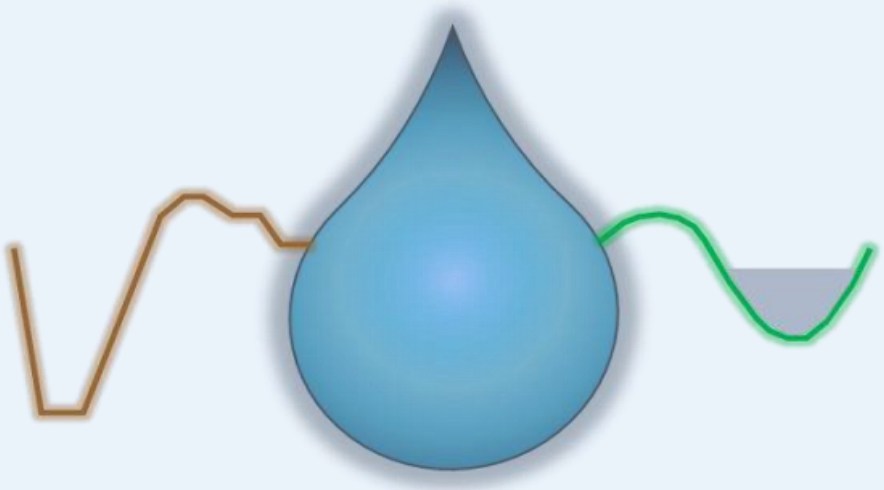
  to stimulate a change in perception of stakeholders regarding possible land and water uses after mining.

- One post-mining steering organisation:

  to demarcate responsibility, assign funding and drive planning for post-mining land and water use in the region.

- Establishment of a research centre:

  initially to compile information, examples and lessons from other post-mining planning examples, followed by instigation of relevant local studies, and finally retention of and access to knowledge gained.



QUESTIONS