



#### **ASX Announcement Metals of Africa Ltd**

#### 9 September 2014

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#### **MTA Capital Structure**

Shares on Issue: 95,577,407

Shares Trading: 80,234,207

Listed Options: 57,904,395 (\$0.15, 07/01/2017)

**Unlisted Options** 

5M (\$0.25; 30/6/15) 5M (\$0.40; 30/6/15) 4M (\$0.25; 31/12/15) 2.49M (\$0.15; 3/12/16) 600k (\$0.168; 3/12/16) 2.5M (\$0.093; 31/3/17)

Mkt Cap. @ \$0.16; A\$15.3M

#### **MTA Board**

Gilbert George Non Exec Chairman

Cherie Leeden **Executive Director** 

**Brett Smith** 

Non Exec Director

**Steven Wood** Company Secretary

ASX Code: MTA

www.metalsofafrica.com.au

#### By e-lodgement

#### **Executive Director Presentation** Mozambican Geological Congress **COGEO** Congresso De Geologia De Mozambique

Metals of Africa Limited (ASX: MTA) is pleased to lodge a copy of the presentation that Executive Director Ms Cherie Leeden was invited to present at this year's Mozambican Geological Congress, being held today in Mozambique.

Please refer enclosed the presentation.

-Ends-

#### **About Metals of Africa Limited**

Metals of Africa (ASX: MTA) is a diversified minerals exploration company dedicated to exploring for world class deposits in Africa. The Company's core commodity targets are: lead, zinc, copper and graphite.

In Mozambique, it is focused on lead-zinc-silver exploration for a Broken Hill Type target within the Rio Mazoe Project and adjacent Changara Project. The Company is also focused on graphite exploration at its Montepuez Project.

In Tanzania, Metals of Africa is currently focused on the Mkindu Project where the target is an Olympic Dam-style, Uranium-Iron oxide-Copper-Gold (U-IOCG) deposit. The Kroussou Project in Gabon represents a shallow Mississippi Valley Type leadzinc-silver target. The Company's management staff reside in Africa, which ensures optimum in-country relationships and maximum resources are spent in-ground.

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# 9<sup>th</sup> September 2014 Mozambican Geological Congress COGEO

Congresso De Geologia De Mozambique

**ASX: MTA** Rushinga Metamorphic Complex (Tete) Evidence of Broken Hill Type Pb-Zn-Cherie Leeden + Executive Director BSc (Hons) Applied Geology

### **Disclaimer & Competent Person Statement**

Statements and material contained in this Presentation, particularly those regarding possible or assumed future performance, resources or potential growth of Metals of Africa Limited, industry growth or other trend projections are, or may be, forward looking statements. Such statements relate to future events and expectations and, as such, involve known and unknown risks and uncertainties. Such forecasts and information are not a guarantee of future performance and involve unknown risk and uncertainties, as well as other factors, many of which are beyond the control of Metals of Africa Limited. Information in this presentation has already been reported to the ASX.

The information in this report that relates to exploration results is based on information compiled by Ms Cherie Leeden. Ms Leeden is the Executive Director of Metals of Africa Limited and full time employee and shareholder of Metals of Africa Limited. Ms Leeden is a member of Australian Institute of Geoscientists and has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Ms Leeden consents to the inclusion in the report of the matters based on information in the form and context in which it appears.

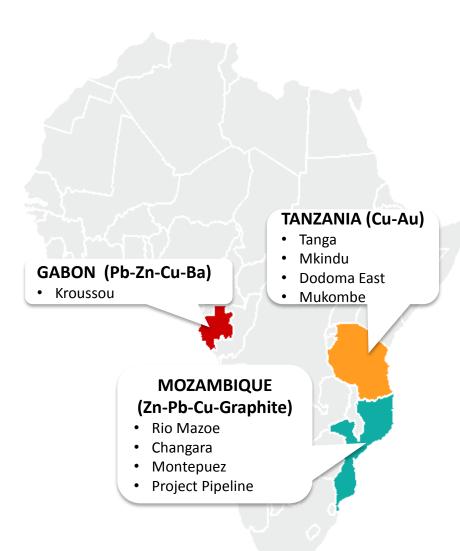
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Before making an investment decision, you should consider, with or without the assistance of a financial adviser, whether an investment is appropriate in light of your particular investment needs, objectives and financial circumstances.



# Metals of Africa – exploring for world class projects



- Listed on Australian Stock Exchange (MTA)
- Focussed on zinc, lead, copper & graphite
- Geography diversified
- Mining friendly jurisdictions
- Existing rail, road and port infrastructure
- Geologically rich terrains boasting high level datasets
- Underexplored yet highly prospective geology
- Tier 1 project potential assets
- Coastal countries
- Primary focus is on Mozambique



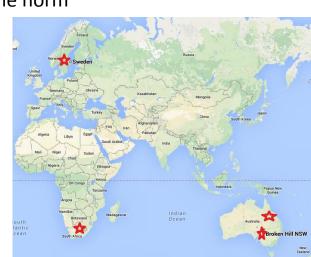
### What is Broken Hill Type?

 Broken Hill Type (BHT) deposits constitute some of the largest ore deposits in the world and include the deposits at Broken Hill and Cannington in Australia, the Aggneys-Gamsberg Deposit in South Africa, and the Zinkgruven Deposit in Sweden.

#### **Pre-mining resources and age of major BHT deposits**

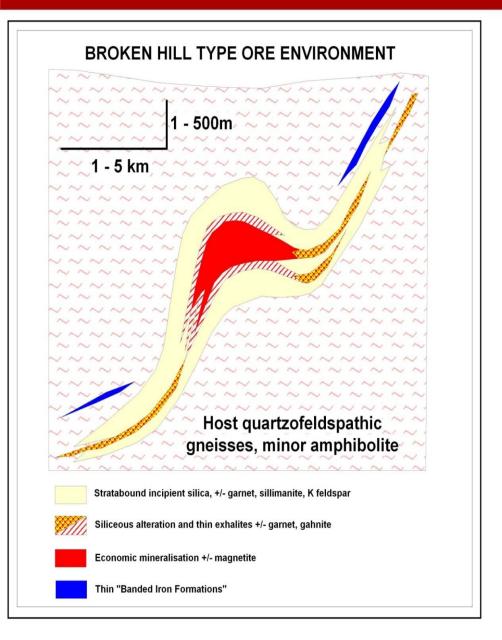
Deposit (Name & Location)	Tonnes (M)	Ag (g/t)	Pb (%)	Zn (%)	Pb+Zn (%)
Broken Hill (NSW, Australia)	280	150	10.0	8.5	18.5
Cannington (Qld, Australia)	44	540	10.9	4.4	15.3
Zinkgruvan (Sweden)	40	100	5.5	10.0	15.5
Broken Hill (South Africa)	38	82	6.4	2.9	9.3
Gamsberg (South Africa)	150	6	0.6	7.1	7.7
Big Syncline (South Africa)	101	13	1.0	2.5	3.5

- Elephant deposits (large size): 35 to 280 MT, large single deposits are the norm
- Economic grades in order of 10-20% combined lead (Pb) and zinc (Zn)
- Strong Zn & Pb zonation trends with high Ag credits (>100pm)
- High Cd, Sb, Mn and Fe with localised elevated As, Cu W Bi and Au
- Mineralisation hosted by diverse range of skarn like Ca-Mn-Fe-P-F rich assemblages
- Galena-sphalerite dominant with subordinate pyrrhotite and minor pyrite; variable magnetite



Named after the massive, high grade Broken Hill deposit located in New South Wales, Australia

### **Broken Hill Type Deposits**



- Part of the SEDEX family of metal deposits
- Most consider Broken Hill to be exhalative
- Pb-Zn-Ag sulfides precipitated during inhalative/exhalative fluid movement during lower to mid Proterozoic
- Zoned deposits with Pb-Ag and Zn enriched zones; low grade Cu and Au possible
- Varied alteration types:
  - Proximal amazonite, garnetite, rhodonite, bustamite, cummingtonite, gahnite, blue quartz, magnetite
  - Distal massive silica, magnetite, hedenbergite, sillimanite, garnet (spessartine), BIF
- Restricted to mobile belt type settings indicates relationship between rifting, metamorphism and mineralisation

#### **BHT Geological Criteria**



#### **Regional Geological Criteria**

- Restricted age range in lower-mid Proterozic mobile belts with long thermal history
- Hosted in amphibolite-granulite facies metamorphic terranes
- Rift-related tectonic setting, with transition from quartzo-feldspathic-dominant lower stratigraphy to psammopelitic and politic sequences in upper stratigraphy
- BHT mineralisation concentrated at transition from lower to upper sequences
- Oxidised clastic metasediments most probably host lithology (metamorphism complicates interpretation of protoliths)

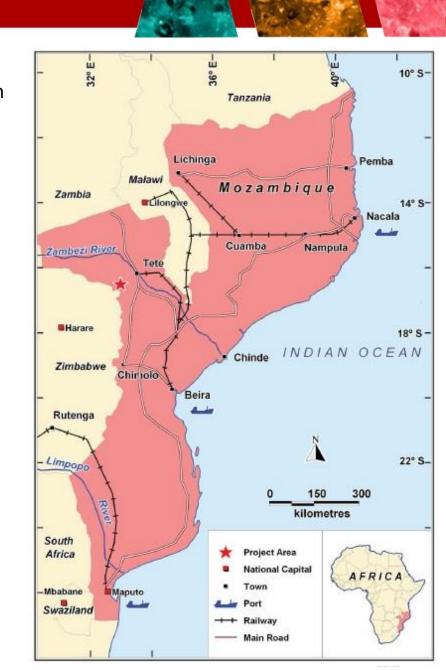
#### **Local Geological Criteria**

- Thin exahalite units (quartz-gahnites) define lateral markers and prospective packages
- Multiple 'exhalite' horizons common
- Graphite and pyrite not common near-ore environments
- Other styles of mineralisation occur in BHT districts (e.g. ironstone associated Cu-Au in lower stratigraphy)
- Concentrations of amphibolite and possible acid volcanics in near-ore and footwall sequences

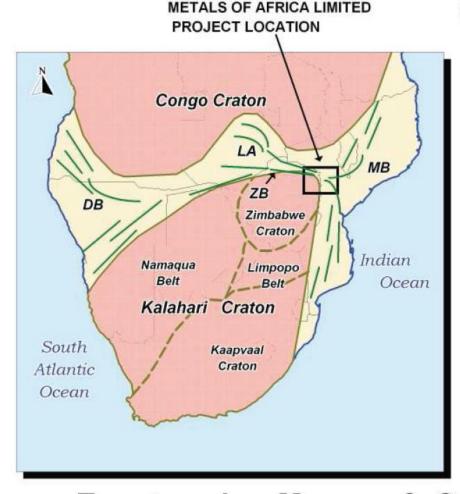


### Rio Mazoe Project - Mozambique

- MTA is exploring for Broken Hill Type (BHT) lead-zincsilver deposits in the Rushinga Metamporphic Suite in Mozambique
- Project located in world class BHT geological setting and boasts key ingredients to host a potential BHT deposit, including the right:
  - ➤ Age of rocks (1600-1700 Ma), type of rocks (Quartzo-felspathic and pelitic sequences within the stratigraphy)
  - Metamorphic and tectonic setting;
  - Widespread Mn occurrences;
  - ➤ Indicator minerals including Mn-rich gahnite, garnet and amazonite
  - ➤ High grade lead, zinc and silver mineralisation occurrences at surface



# Ideal Tectonic Location – junction of two major mobile belts



SOUTHERN AFRICAN CRATONS
AND MOBILE BELTS

DB Damara Belt

LA Lufiljan Arc

ZB Zambezi Belt

MB Mozambique Belt

Major Craton boundary

Sub Craton boundary

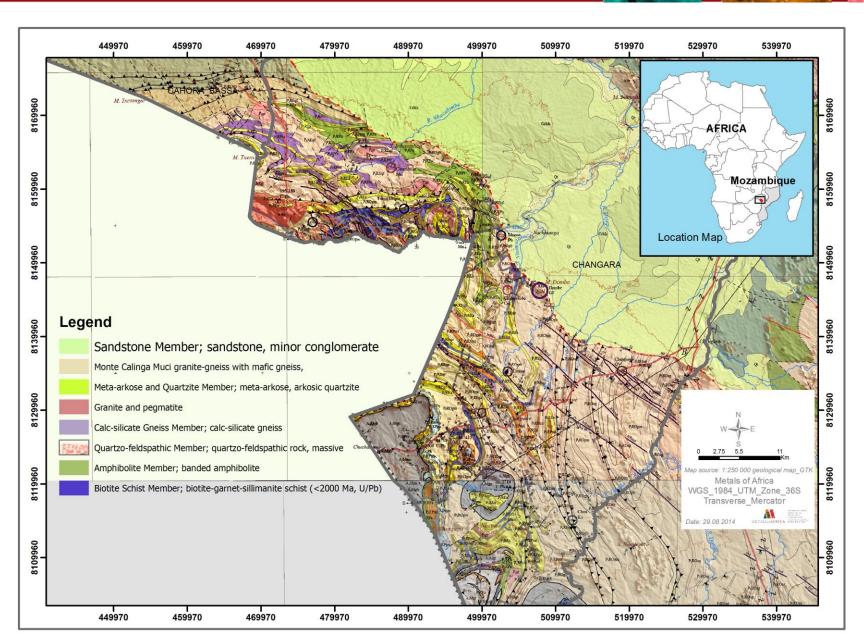
Mobile Belt

International boundary line

Tectonic Map of Southern Africa



# Rushinga Metamorphic Suite – Ideal Geological Setting



#### **Rushinga Metamorphic Suite**

- Large surface area 180 km x 40 km
- Very little modern exploration prior to MTA
- Amphibolite to granulite facies supacrustals
- Multiphase deformation (supacrustals record sedimentation in an extensional tectonic regime along the northern margin of the Zimbabwe craton)
- Strongly deformed during Pan African (550-533 Ma) orogenesis
- The Rushinga Suite boasts the key ingredients required to host a potential BHT deposit

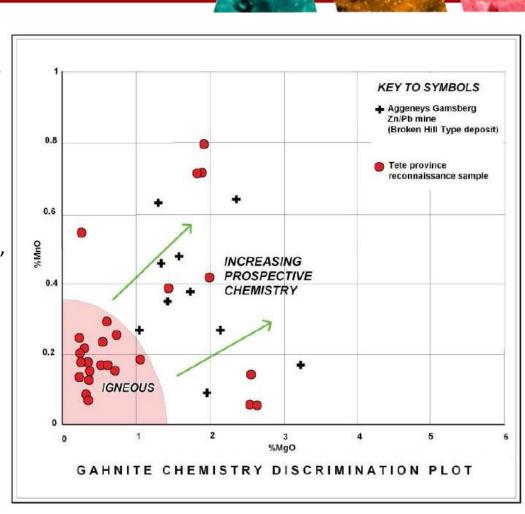
### Indicators for BHT style mineralisation

- Pre-metamorphic Zn-Pb-Cu mineralisation
- Pegmatite containing amazonite (plumbian microcline)
- Zinc rich magnetite
- Banded to massive garnet quartzite to garnetite (with associated base metal mineralisation)
- Fine grained psammite and gahnite (with variable disseminated sulphides)
- Zones of calcite with spessartine garnet and hedenbergite
- Occurrences of cummingtonite, bustamite and rhodonite (petrography underway for confirmation)
- Very strong Ca-Mn-Fe-P (+/- F as late veins) rich assemblages

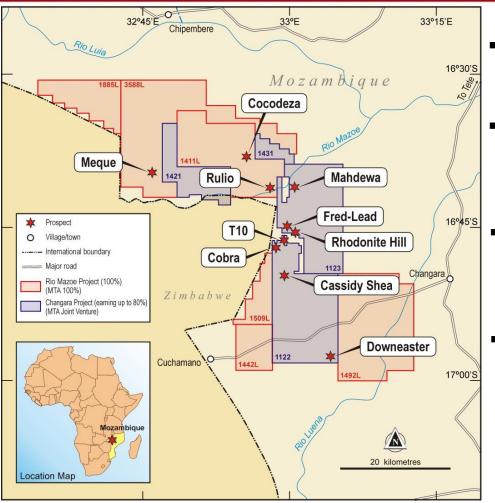


## Rushinga Metamorphic Suite Field Observations

- Large base metal system
- Significant multielement soil anomalies (Cu, Zn, Pb, As) over an area more than 700km2
- Mineralisation is hosted by a thick sequence of parageniess
- Metamorphosed to lower granulite facies –
  including psammite, psammopelite and pelite,
  amphibolite, calc-silicate rocks, calcite horizons,
  a variety of quartzo-feldspathic rocks and
  pegmatite segregations and dykes
- Base meal mineralisation occurs as pre metamorphic mineralisation (most likely BHT style) and syn to post Jurassic vein related mineralisation (likely related to the Rukore Daciite Intrusions and associated dyke swarms)
- Mineralisation is broadly zoned and is present within a variety of stratigraphic horizons



# Metals of Africa's Rio Mazoe Project - Introduction

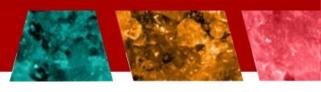


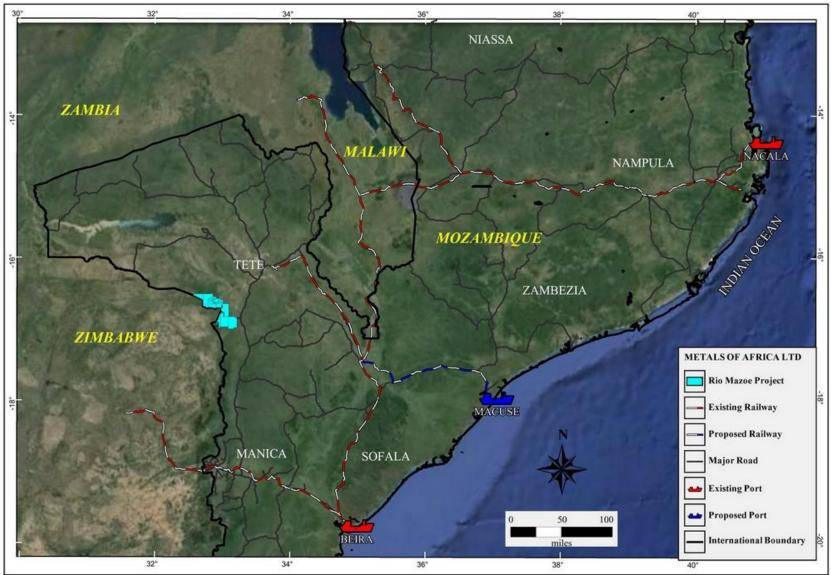
- Exploration project for Broken Hill Type (BHT) lead
   (Pb), zinc (Zn), copper (Cu), and silver (Ag)
- Extensive soil sampling program of c. 30,000 samples has identified numerous geochemical anomalies
- Priority focus is on Cassidy Shea and Rhodonite Hill prospects where significant BHT alteration has been mapped
- High grade Cu and associated Zn mineralisation outcropping at Cassidy Shea

39 Base Metal Prospects have been identified via soil sampling

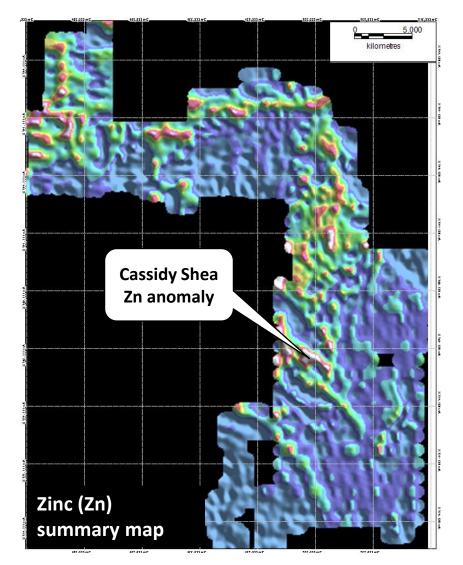


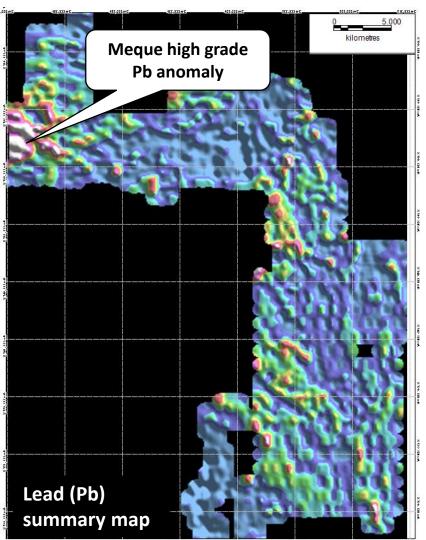
# **Rio Mazoe Project Infrastructure Map**





# **Rio Mazoe Soil Sampling Summary**







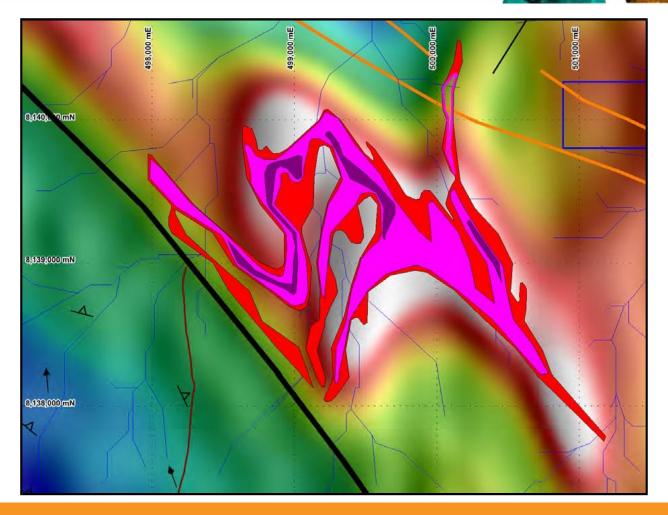
# Cassidy Shea – an outcropping mineralised Zn-Cu system

- Very large (>3km x 3km) Zinc-Copper target with spot high grades up to 11.9% Cu and 5.1% Zn in rocks at surface
- Sulphide assemblages noted at Cassidy Shea include thick sequences with disseminated chalcopyrite and sphalerite (copper and zinc) in fine psammite to psammopelite garnet bearing rocks with associated gahnite and banded quartz garnet rocks with weakly layered sulphide. These types of rocks are common at Broken Hill proximal to the basal part of the system (Zinc Lodes).
- At Cassidy Shea, the disseminated sulphide zones identified may represent a large Cu-Zn target in their own right
- Multiple zones of outcropping Zn and Cu mineralisation are present which demonstrates its strong mineralised potential
- Geophysics (IP and magnetics) has commenced with the aim of defining drill hole locations
- Earthworks and drilling to follow soon
- The Zn-Cu target is shallow (mineralisation is present at the surface)

Very large Zinc-Copper target with spot high grades up to 11.9% Cu and 5.1% Zn in rocks at the surface



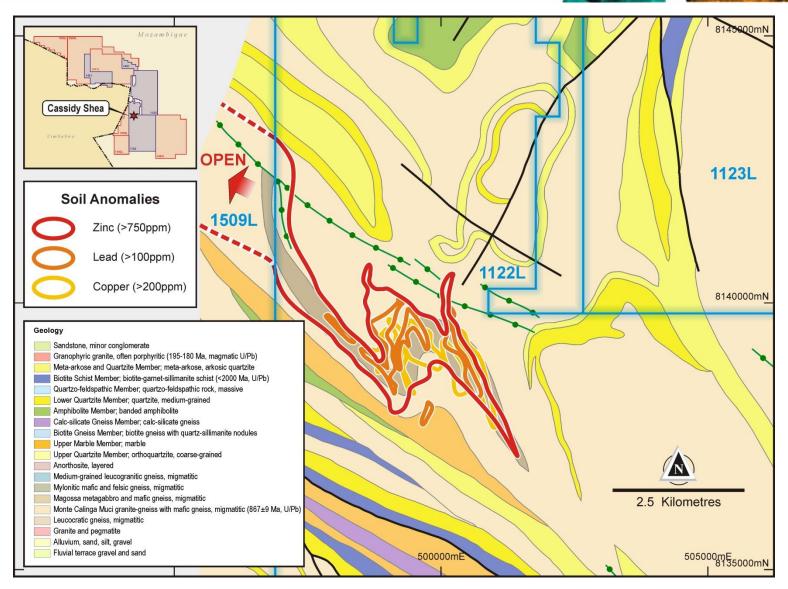
# Cassidy Shea — Coincident geochemistry and geophysics anomaly



Highly anomalous zinc geochemistry (>750ppm) contoured over a magnetic RTP AS image for Cassidy Shea Prospect



# Cassidy Shea – Geochem anomalies over geology





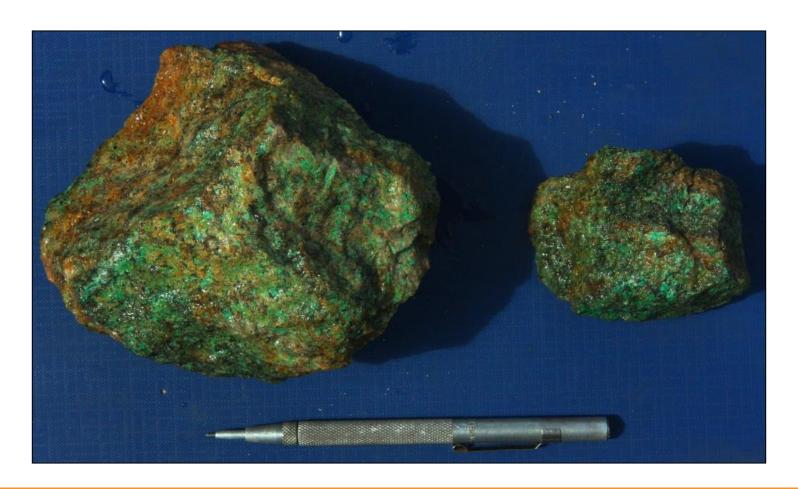
### **Cassidy Shea Geology**

- Cassidy Shea coincident with large magnetic
- Large Pb-Zn-Cu geochemical anomaly observed at Cassidy Shea coincident with large magnetic anomaly
- Metamorphosed sedimentary hosted, disseminated Cu and Zn mineralisation hosted in psammitepsammopelite-pelite rocks
  - Cu-phosphate replacing probable chalcopyrite
  - > Smithsonite (Zn bearing) replacing sphalerite
  - Pb anomalism mineralogy not yet explained
- Numerous alteration types including:
  - Garnetite with ex-sphalerite and trace blue quartz
  - Layered garnet-gahnite-quartz rock
  - ➤ Massive magnetite with up to 5.5% Zn
  - Cummingtonite-sillimanite-magnetite with and without gahnite-garnet
  - Massive silica alteration is coarse sillimanite and magnetite



# **Cassidy Shea Mineralisation**





Disseminated Cu-phosphate replacing chalcopyrite. XRF spot highs of 12.2% Cu and 1.8% Zn







Garnetite (massive fine grained spessartine) with ex-sphalerite and quartz

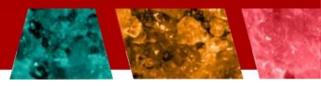


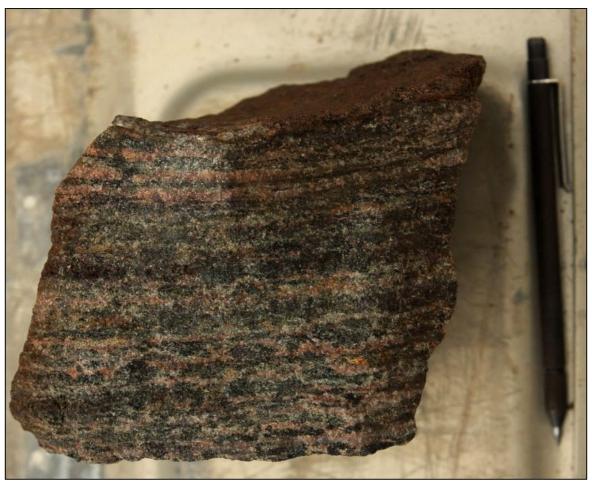




**Banded garnet-gahnite-quartz with ex-sphalerite** 

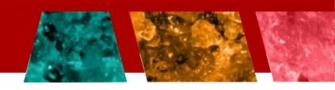






Banded garnet-quartz-hedenbergite rock with trace gahnite and ex-sphalerite







Cummingtonite(?)-sillimanite-magnetite rock associated with zones of Cu and Zn mineralisation







Coarse feldspar-quartz pegmatite veins hosting subhedral-euhedral magnetite with up to 5.5% Zn. These pegmatites are common and host magnetite closer to Cu-Zn zones with Zn bearing magnetite coincident with mineralisation



#### **Rio Mazoe: Meque Prospect**

- Maiden drill program in Q1 2013 intersected **high grade Pb & Zn** mineralisation at shallow depths (<130m) refer to below summary table
- Abundant high grade lead, zinc, copper and silver surface mineralisation in rock chip grab samples
   (Silver up to 1251ppm Ag, Lead up to 21.56% Pb, Zinc up to 27.48% Zn)
- Geological mapping confirmed prospective BHT alteration at the Meque prospect
- Meque system is also prospective for skarn style mineralisation
- Very large and compelling surface geochemistry anomaly

Drill Hole No.	From	То	Width (m)	Ag (g/t)	Cu (%)	Pb ( %)	Zn ( %)	Combined Zn+Pb %
RMZMQDD001	70.85	71.6	0.75	29.18	0.27	3.22	18.68	21.9%
RMZMQDD006	25.8	26.3	0.5	11.62	0.15	3.39	3.73	7.12%
RMZMQDD007	27.75	28.75	1	8.66	0.01	3.05	4.70	7.75%
RMZMQDD009	92.96	93.46	0.5	11.05	0.14	1.03	8.82	9.85%
RMZMQDD009	96.95	98.7	1.75	68.84	0.43	1.55	5.21	6.76%
RMZMQDD009	125.99	126.99	1	63.28	0.60	9.32	10.81	20.13%

Summary of Meque drill core laboratory results applying a combined Zn+Pb minimum cut-off grade of 7% and minimum width of 50 centimetres. For additional information please refer to Company Announcement dated 4<sup>th</sup> June 2013.



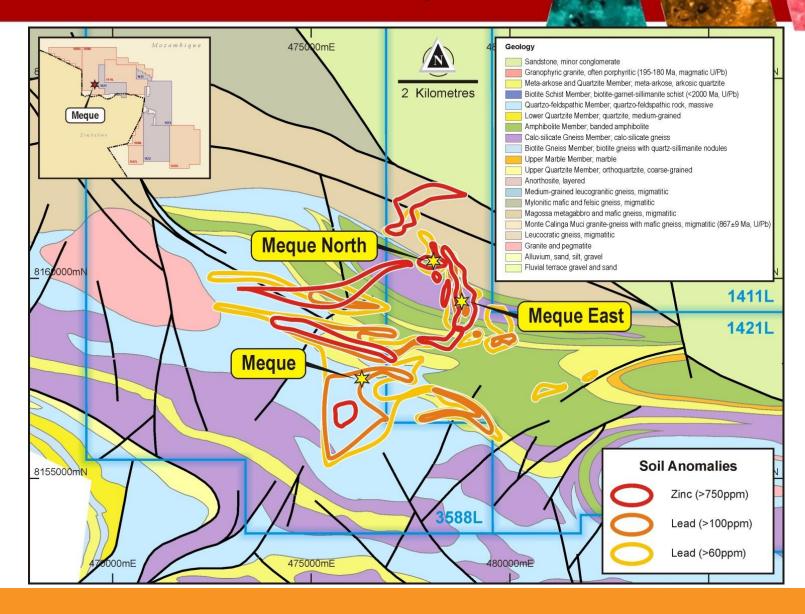
# High grade remobilised lead and zinc mineralisation



Drill core of mineralised fault zone intersected at the Meque prospect

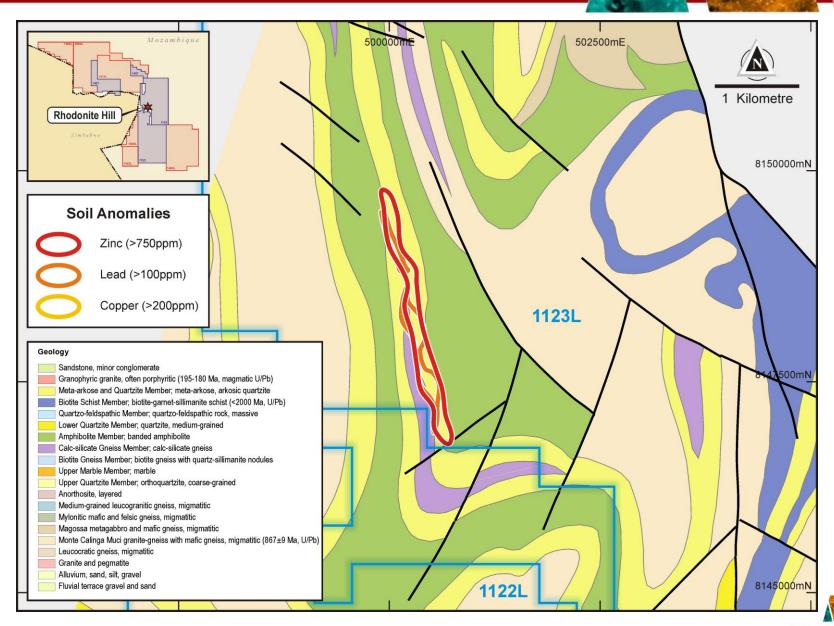


## **Meque Zinc and Lead Soil Anomaly**



5 x 5 km of Zinc and Lead Anomalism – and open to the West

# **Rhodonite Hill Prospect**



## **Rhodonite Hill Geology**

- 3 km long compelling base metal target Located 7 km north of Cassidy Shea
- Displays high Pb anomalism in soils with coincident Zn-Cu-Mn
- Wide range of BHT alteration minerals observed including:
  - ✓ Amazonite (Pb bearing microcline feldspar)
  - ✓ Rhodonite
  - ✓ Red muscovite
  - ✓ Bustamite
  - ✓ Spessartine garnet
  - ✓ Unknown red garnet
  - ✓ Variety of MnO rich minerals
- Late stage drusy quartz vein hosting galena
- Petrology is being completed to identify unknown mineral phases
- Ground geophysics underway commencing in late September



## **Rhodonite Hill Alteration**

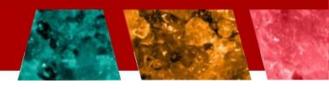




Amazonite with up to 0.6% Pb in pegmatite with garnet and unknown MnO rich orange mineral



# **Rhodonite Hill Alteration**

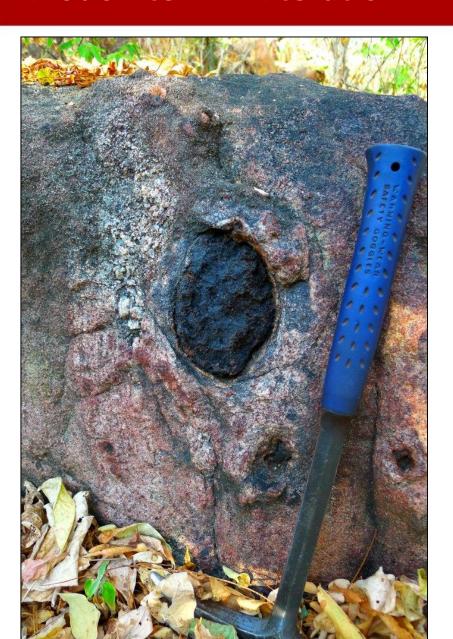




MnO rich mineral assemblage (grey and orange) with rhodonite (pink)



## **Rhodonite Hill Alteration**

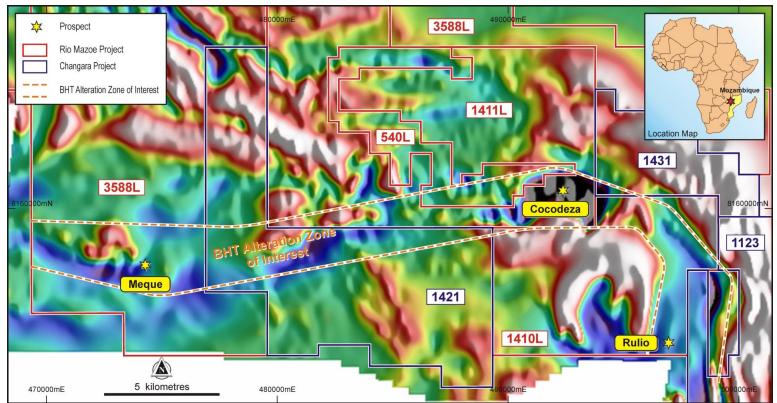


- MnO 'ball' with elevated Pb-Zn-Cu associated with small pegmatite vein
- Likely demonstrates pre-metamorphic origin of Mn and base metals inline with age requirement for BHT deposits



# **Geophysics - Discussion**

- Magnetics useful with structural and lithological interpretation however known BHT deposits have highly variable magnetic signatures (magnetite important component at Cannington but not Broken Hill)
- Radiometrics
- Gravity implication of stacked amphibolites
- Induced polarisation (IP)
- Electro magnetics (won't detect zinc)



### **BHT Exploration Program**

- Regional data appraisal (satellite imagery, geophysics, historical reports)
- Soil sampling (very effective however time consuming and labour intensive due to large surface area)
- Geological mapping (vital to understanding context of soil anomalies) & petrography
- Geophysics (must be used in conjunction with a comprehensive understanding of geochem & mapping
- Drilling

RIO MAZOE WORK PROGRAM	TIMING 2014			
Complete Ground EM, IP & MAG Surveys	September			
Earth Works for drilling	Early October			
Drilling	Mid October-November			

OLD SCHOOL SYSTEMATIC EXPLORATION IS REQUIRED TO DEFINE BHT DEPOSITS

This requires persistence and time!



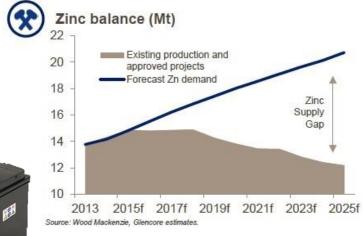
### Why zinc and lead?

The anticipated tightening of zinc mine supply is starting to materialise:

 Metal deficit in 2013, with deficit forecast to grow dramatically beyond 2015

- Insufficient new mine supply to replace closures:
  - Brunswick/Perseverance in 2013
  - Lisheen now winding down
  - Century and Skorpion closing in 2015/2016
- Higher prices required to incentivize new mine supply
- The zinc mining sector has a very high average margin as a percentage of the metal price due to the large contribution of by-product credits like copper, lead, silver and gold, which offset operating costs.
- Zinc is key to preventing corrosion and is the 4th most widely consumed metal in the world. About 50% of the zinc produced is used
  - in zinc galvanizing (to prevent rusting)
  - Upsurge in use of battery dependent devices that rely on lead

#### Higher prices required to incentivise new supply









### **References and Acknowledgements**



I would like to thank Robert Heaslop for his dedication to advancing our Rio Mazoe/Changara Project over the past year. I also wish to acknowledge Iain Groves for his valuable recent prospect ranking input and Prof. Ian Plimer for his encouragement and for hosting Rob and I in Broken Hill, Australia on a geological tour of the surrounding area.

Groves, I. & Heaslop, R., 2014. Geological and geochemical review of the Rio Mazoe Project

Haydon, R.C.. & McConahy, G.W., 1987. The stratigraphic setting of Pb-Zn-Ag mineralization at Broken Hill. Economic Geology, 84, 1235-1261

Parr, J.M. & Plimer, I.R., 1993. Models for Broken Hill Type lead-zinc-silver deposits. In: Kirkham, R.V., Sinclair, W.D., Thorpe, R.I. & Duke, J.M. (editors), Mineral deposit modeling. Geological Association of Canada, Special Paper 40, 253-288.

Walters, S.G., 1998. Broken Hill-type deposits. In: AGSO Journal of Australian Geology & Geophysics, 17 (4), 229-237.

