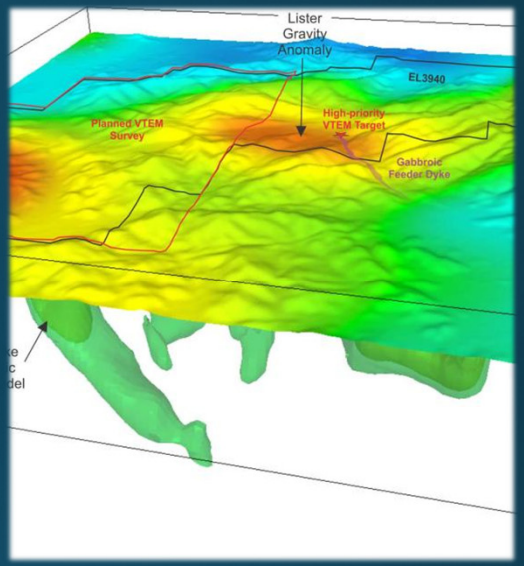
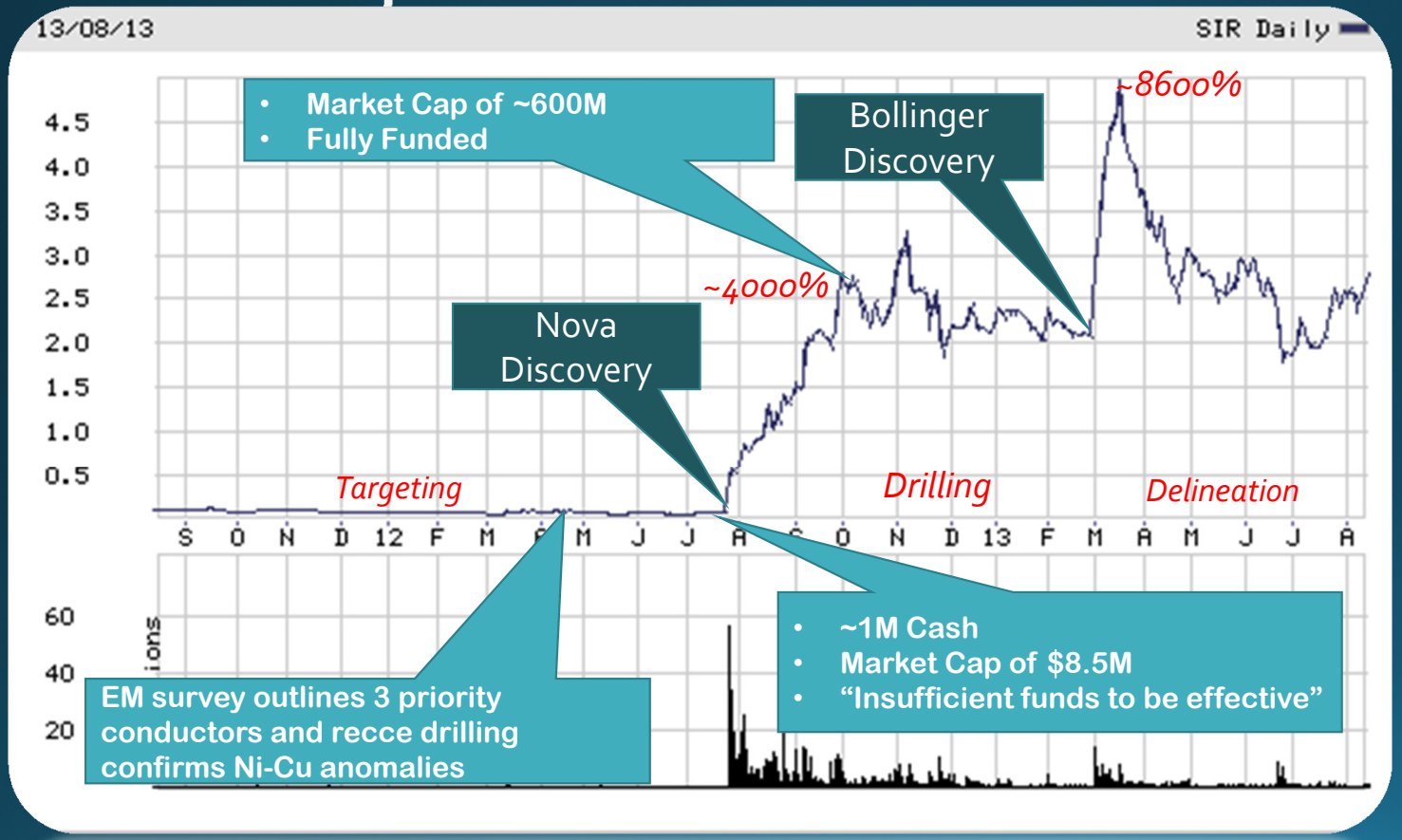


The Economic Need to Explore Undercover

ASEG 2013 August 15 Melbourne

Workshop on Exploration Undercover;
challenges and opportunities for industry, academia and government

We explore to add value….



Sirius Resources Ltd

- Nova discovery results in massive re-rating
- 14.6Mt grading 2.2%Ni, 0.9%Cu and 0.08%Co

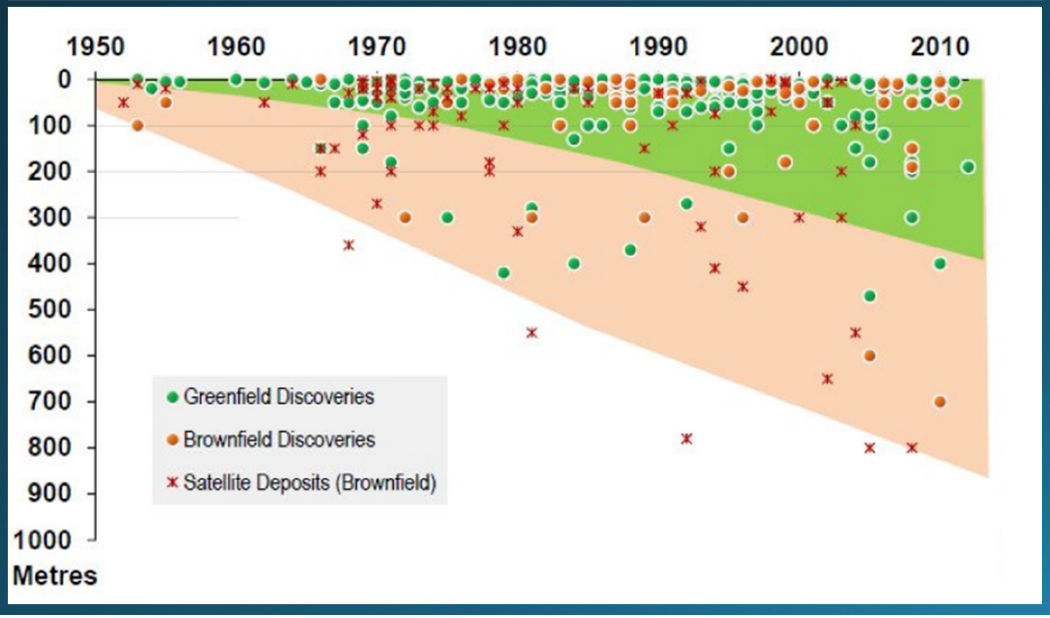
The Imperative to Explore Undercover

- Ensure resource inventory matches demand
- Readily identifiable resources (outcropping) discovered
- Next tier of major deposits will come from greenfield areas – areas that have been considered too deep, too remote or too difficult to explore
- Style of exploration will need to change (empirical and conceptual)

Discoveries are getting deeper,….

Table 1 - Average depth of cover for Greenfield and Brownfield Discoveries (in metres) in Australia: 1950-2012 (Source: MinEx Consulting © August 2012)

	1950-59	1960-69	1970-79	1980-89	1990-99	2000-12
Greenfield	5	35	45	52	27	64
Brownfield (including satellite deposits)	46	86	66	77	114	185

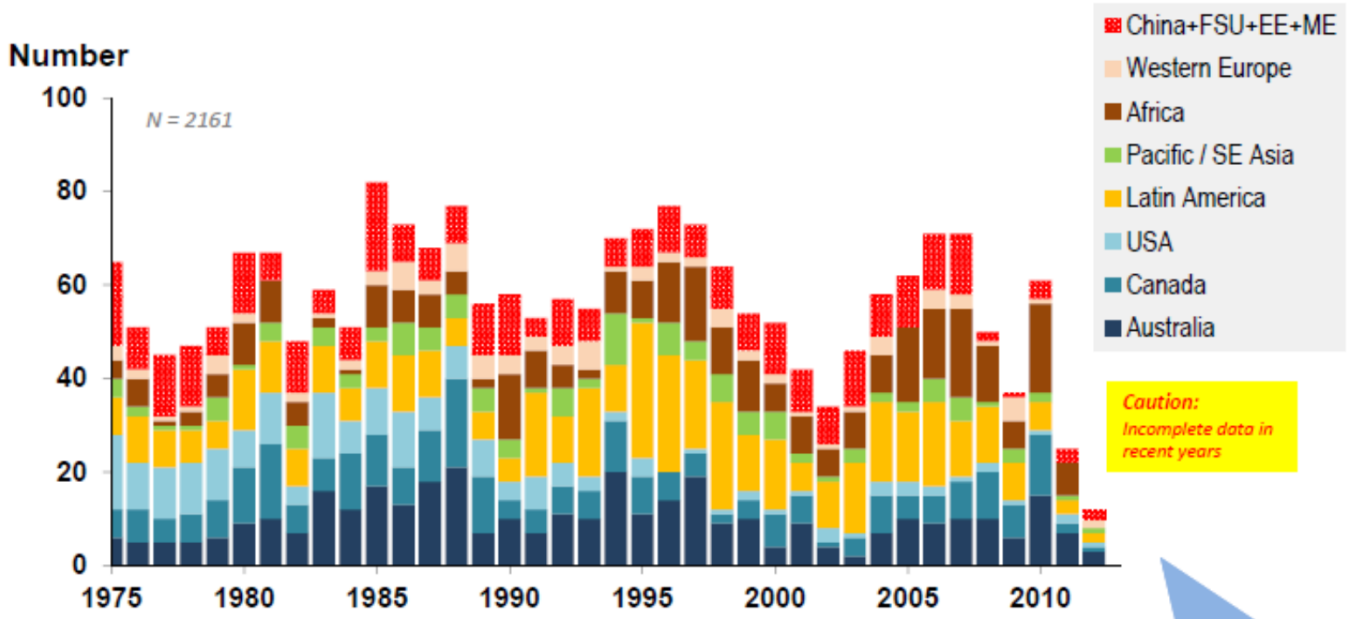


- Readily identifiable resources have been discovered
- Fewer, near surface discoveries
- Technology advances required to identify and delineate resources at depth

..there are fewer of them,...

Number of deposits found each year – by Region

Mineral deposits# found in the World: 1975-2012



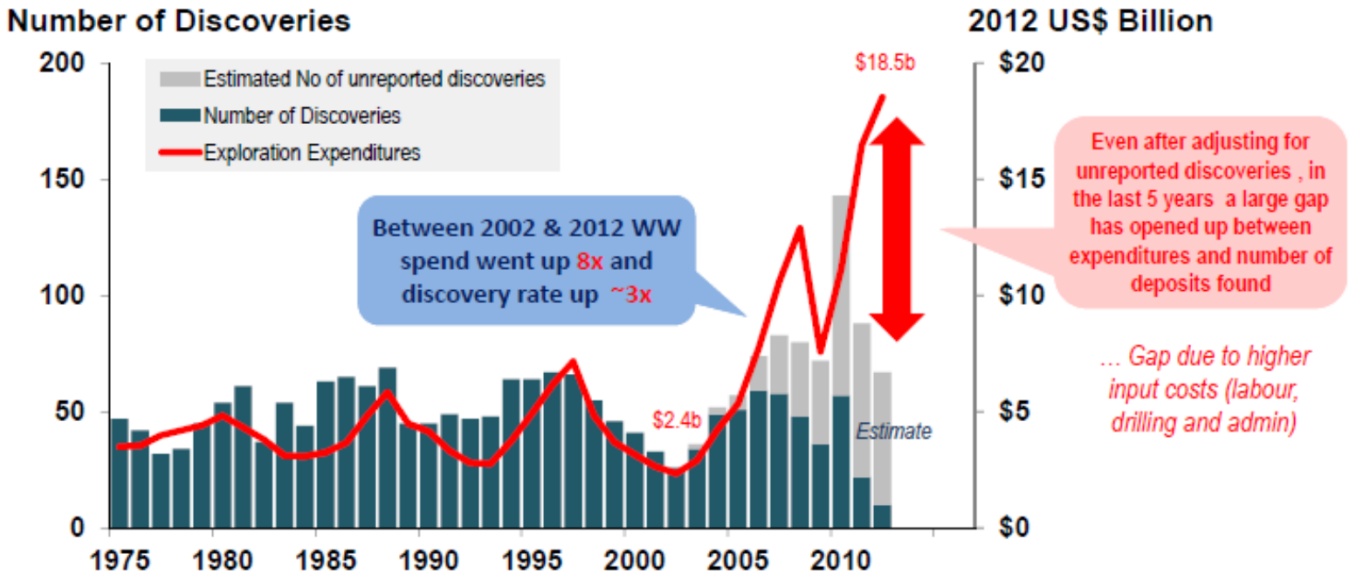
Note: # Discoveries are for deposits >0.1 Moz Au, >5 kt U_3O_8, >10 kt Ni, >0.1 Mt Cu-equiv
Excludes satellite deposits within existing Camps
Excludes bulk mineral discoveries

Source: MinEx Consulting © July 2013

….and they cost more to find!

Discovery rate versus spend

Western World non-ferrous exploration spend and discoveries



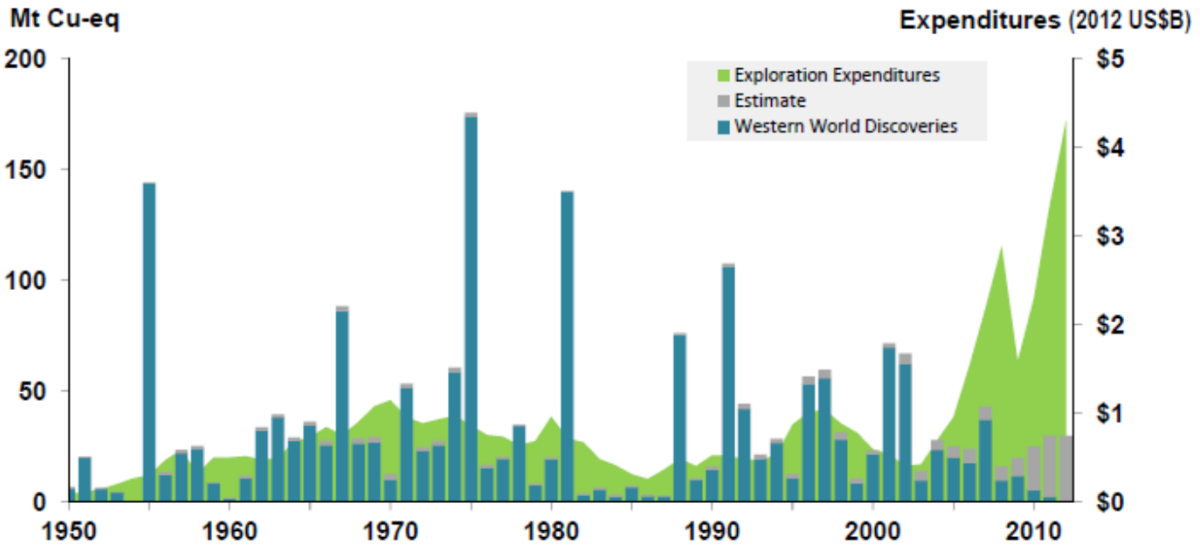
Note: Excludes expenditures and discoveries for Bulk Minerals
Discoveries are for deposits >0.1 Moz Au, >5 kt U_3O_8, >10 kt Ni, >0.1 Mt Cu-equiv

Source: MinEx Consulting © July 2013

Resource depletion outstrips replenishment of supply

Exploration expenditures and amount of copper found

Primary copper deposits >0.5 Mt Cu-eq found in Western World: 1950-2012

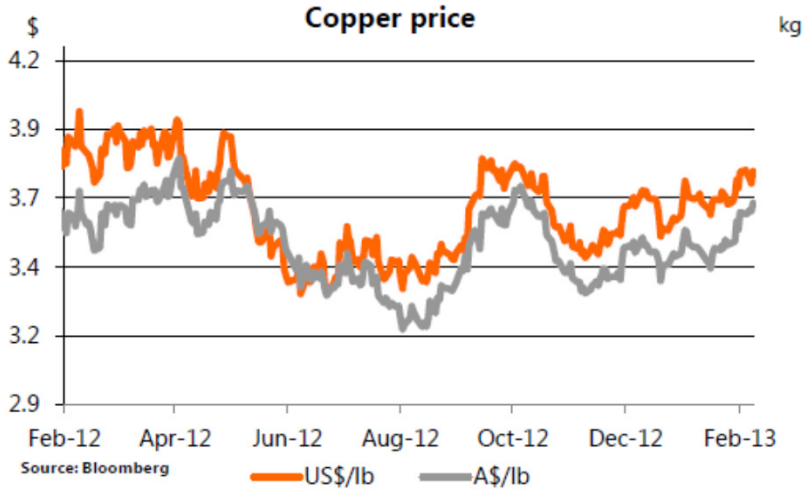


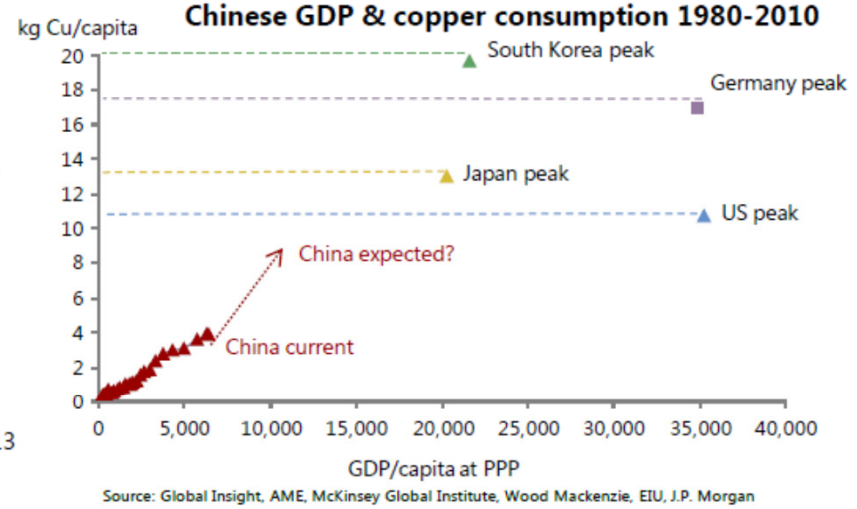
Note: Estimate includes adjustments for deposits with no discovery year and deposits missing from the database

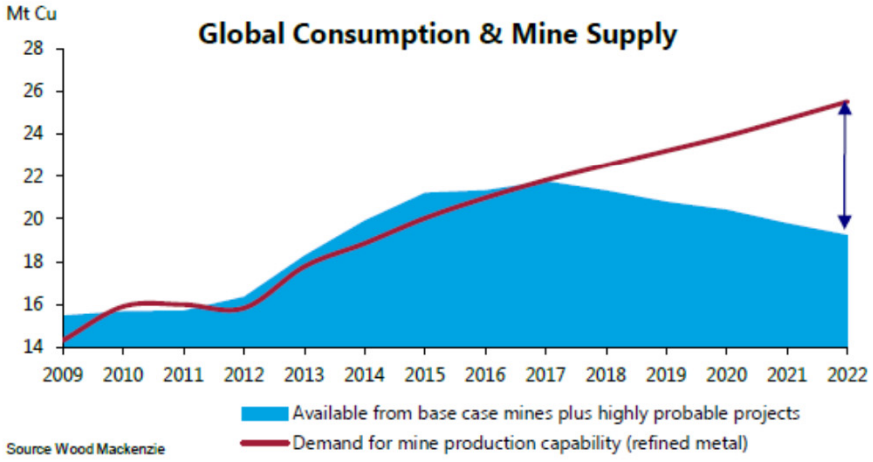
Source: MinEx Consulting © June 2013

FORECAST TO 2014									
REGIONS	MINE PRODUCTION			REFINED PRODUCTION			REFINED USAGE		
(1000 t)	2012	2013	2014	2012	2013	2014	2012	2013	2014
Africa	1,450	1,753	2,039	1,057	1,295	1,506	251	258	269
N.America	2,284	2,351	2,636	1,647	1,691	1,826	2,216	2,270	2,333
Latin America	7,109	7,407	7,675	3,420	3,637	3,663	618	640	667
Asean-10	636	857	922	402	553	577	789	818	881
Asia ex Asean/CIS	1,945	2,185	2,388	8,881	9,295	9,816	12,195	12,044	12,541
Asia-CIS	546	551	571	439	462	465	100	101	102
EU-27	826	832	837	2,742	2,691	2,801	3,073	3,079	3,182
Europe Others	852	875	901	1,067	1,091	1,122	1,154	1,240	1,273
Oceania	1,039	1,145	1,175	461	495	495	113	115	118
TOTAL	16,687	17,956	19,144	20,116	21,210	22,271	20,509	20,566	21,366
World adjusted 1/ 2/	16,687	17,561	18,541	20,116	20,983	22,046	20,509	20,566	21,366
% change		5.2%	5.6%		4.3%	5.1%		0.3%	3.9%
Refined Production - Usage Balance							**-393**	**417**	**681**

COPPER MARKET







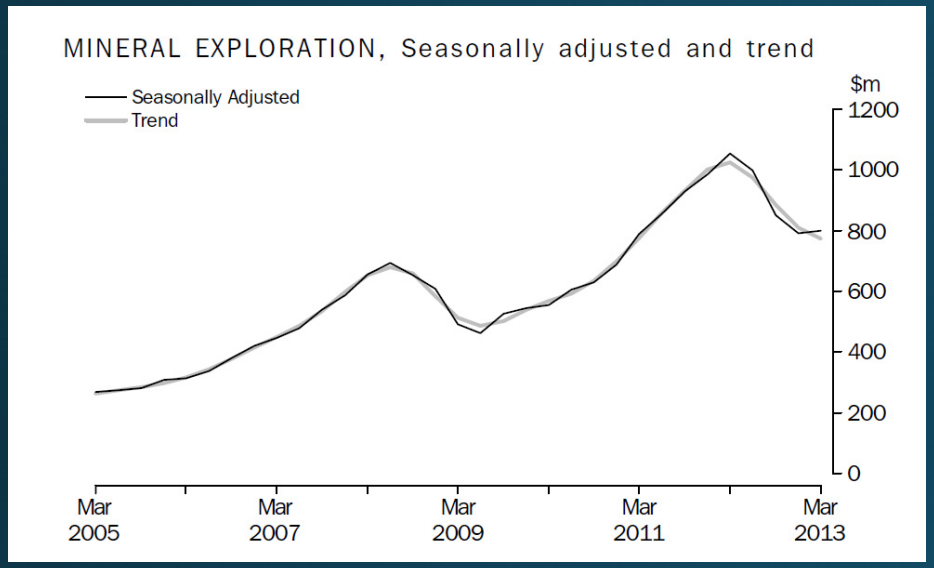
- Requirement for 6.3Mt of new mine production capability by 2022.
- On average an additional 1 million tonnes of production is required per year to keep up with demand.
- New production to come on at a higher cost in jurisdictions that may be new to mining with deposits being deeper – underground mining will become the future.

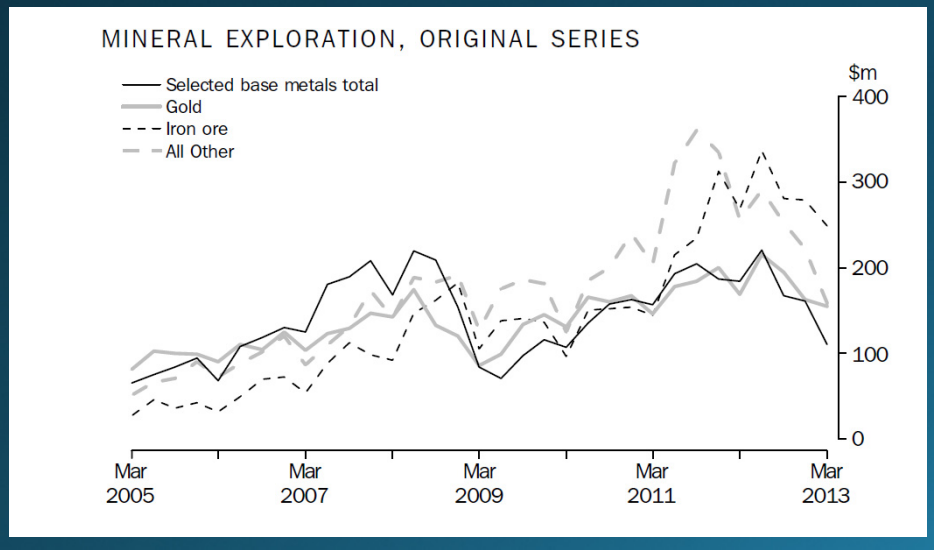
Source: OZ Minerals Presentation to BMO Conference Feb 2013

Not all discoveries make the cut….

- Gold in Australia (from MCA)
  - More than 2000 active gold exploration projects in Australia alone
  - ~10% (198) are at the scoping to feasibility stage
  - Majority are small, near surface and low grade

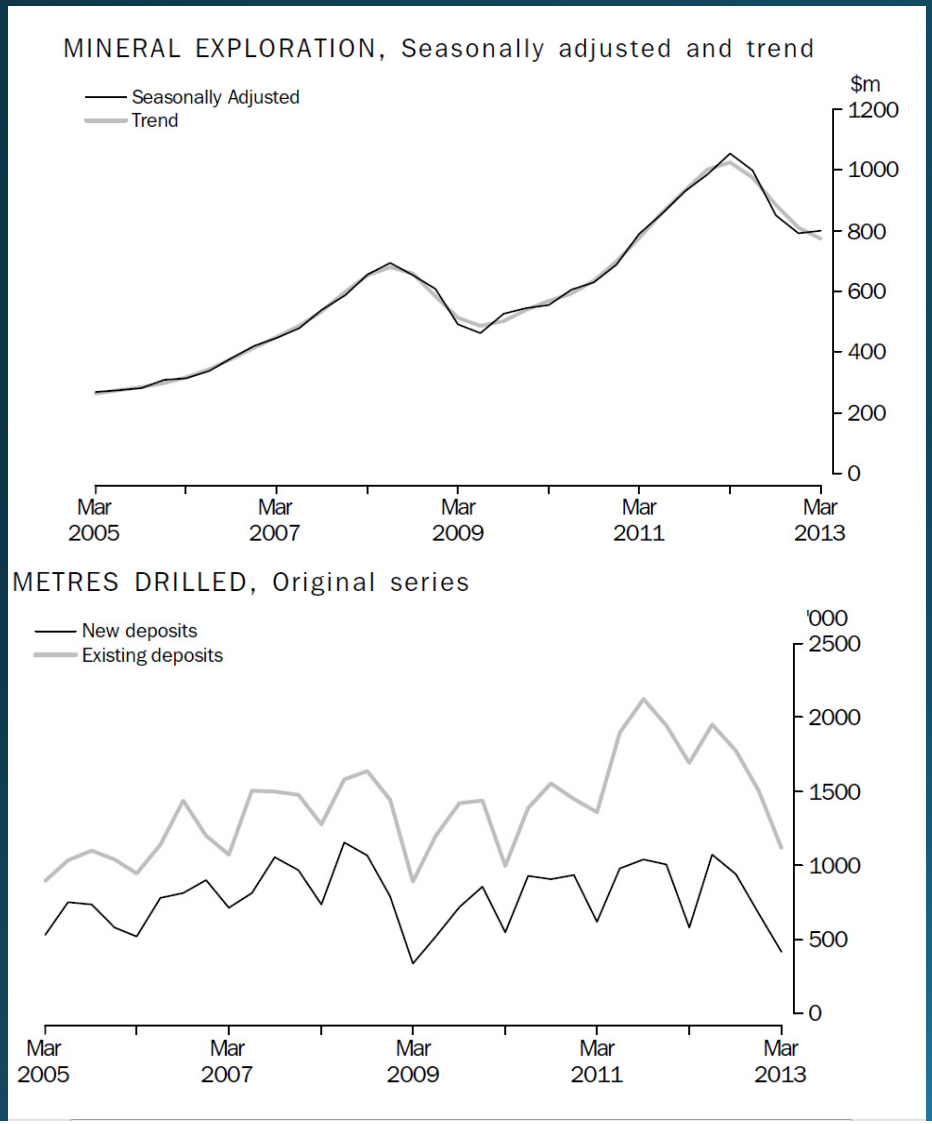
- Copper Globally (SNL Metals)
  - 1998 to 2012 there 100 significant new copper discoveries (>500kt Cu each)
    - Generated ~395Mt of Copper in resources
  - 15 of these projects have reached production
    - Only 1/10th of the resources were converted to reserves
  - The average "replacement" needs of the 22 Major Producers is approximately 500,000t per year. Most of this comes from brownfields but this is unsustainable – need for new world class deposits





Exploration Funding has grown long term but…

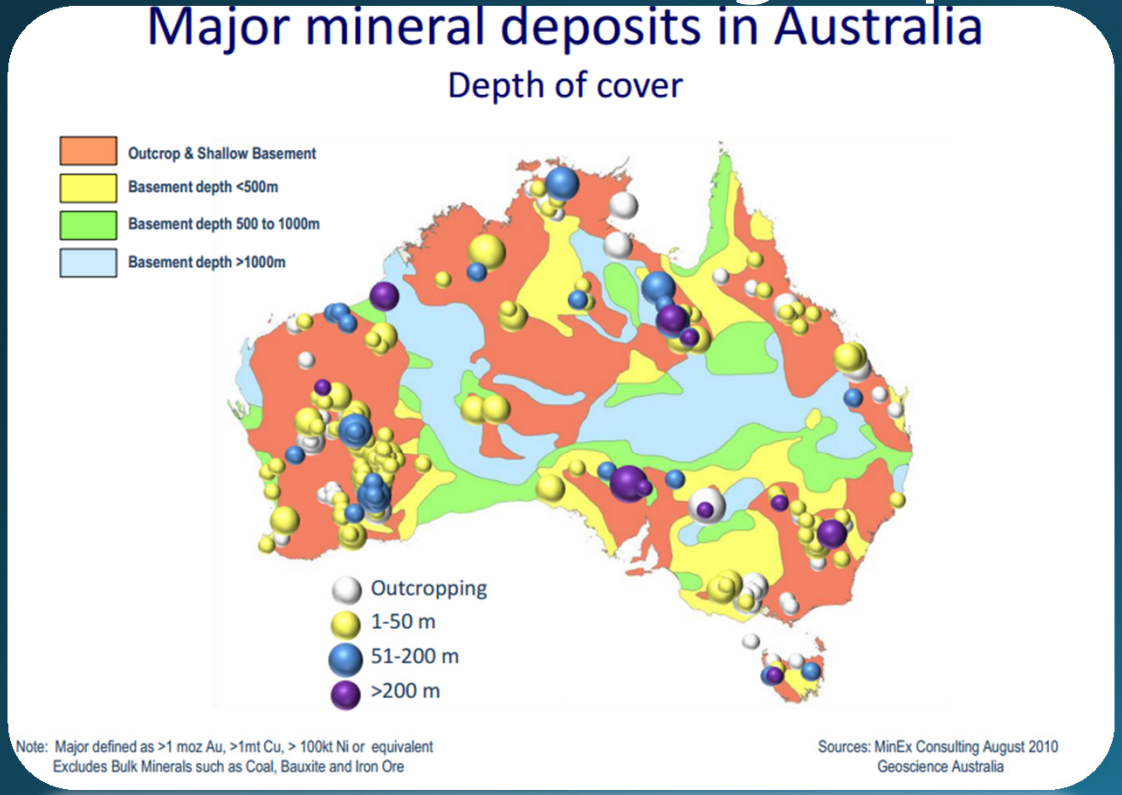
- "cyclical" (near term) exploration expenditure fell 18.4% to $672.2m
- Exploration on areas of new deposits fell **33.1%** (or –$87.1m) and expenditure on areas of existing deposits fell 11.5% (or –$64.7m)
- Current trend towards lower exploration spend in base metals & gold:
  - decreasing discovery rates;
  - a focus on brownfield exploration;
  - difficulty raising equity!



Costs are on the Rise

- Spend is up but drill metres are flat
- Deposits are difficult to find and delineate undercover
- Looking at greater depths
- Larger tonnages and lower grades

Greenfield Exploration required to deliver the big deposits

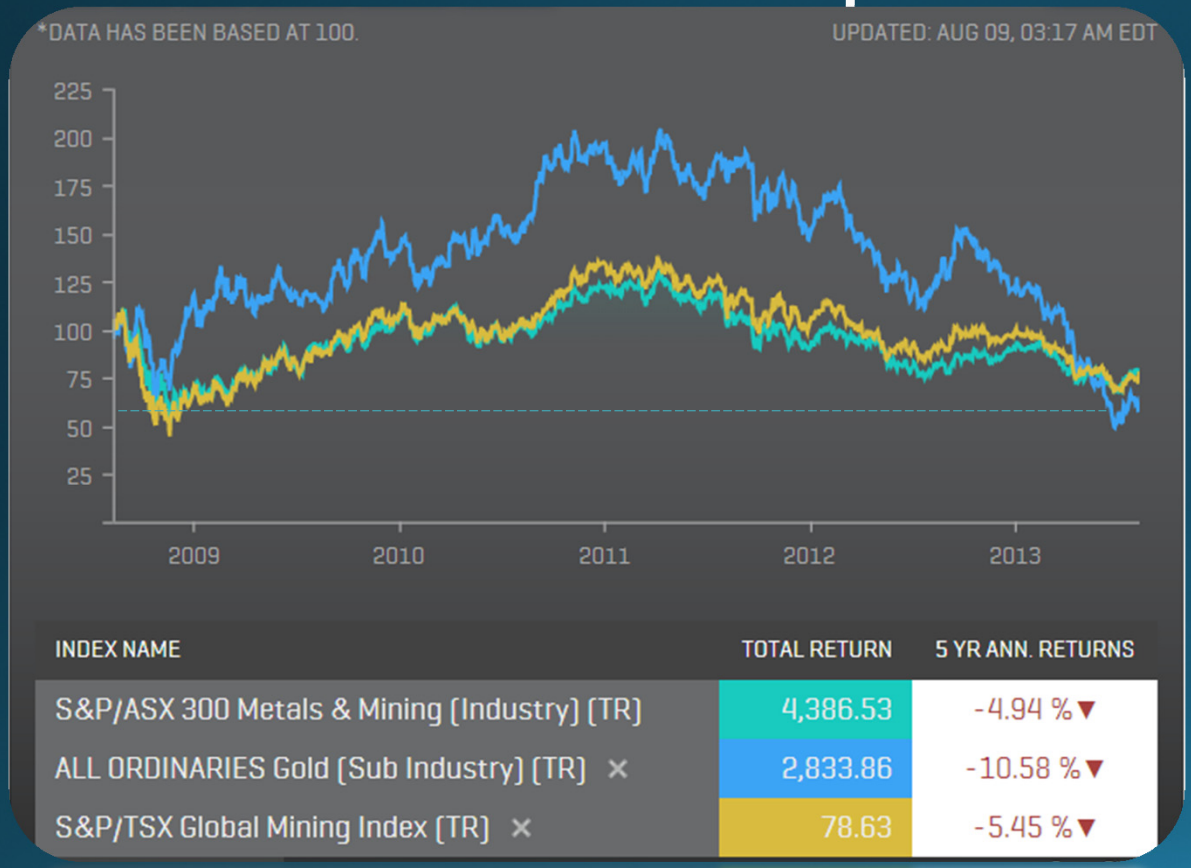


- Incremental discoveries are insufficient to sustain inventories
- General trend of decreasing size of discovery with maturity of terrain
- Large scale discoveries required – new camps/provinces not just single deposits
- Greenfield (undercover) exploration in less explored areas is the best opportunity to deliver the Teir 1 deposits

Reluctance to explore undercover

- Long lead times
- Highest risk
- Limited technology to rapidly screen large areas
- Lack of Investor Support
- Juniors often first movers in covered terrain
- Reality is that most investors in juniors are not interested in backing long-term exploration in unproven, high-risk areas
- Most juniors are “forced” to explore in brownfields areas where shorter term (and more modest) outcomes are likely to be found

A Junior's Perspective



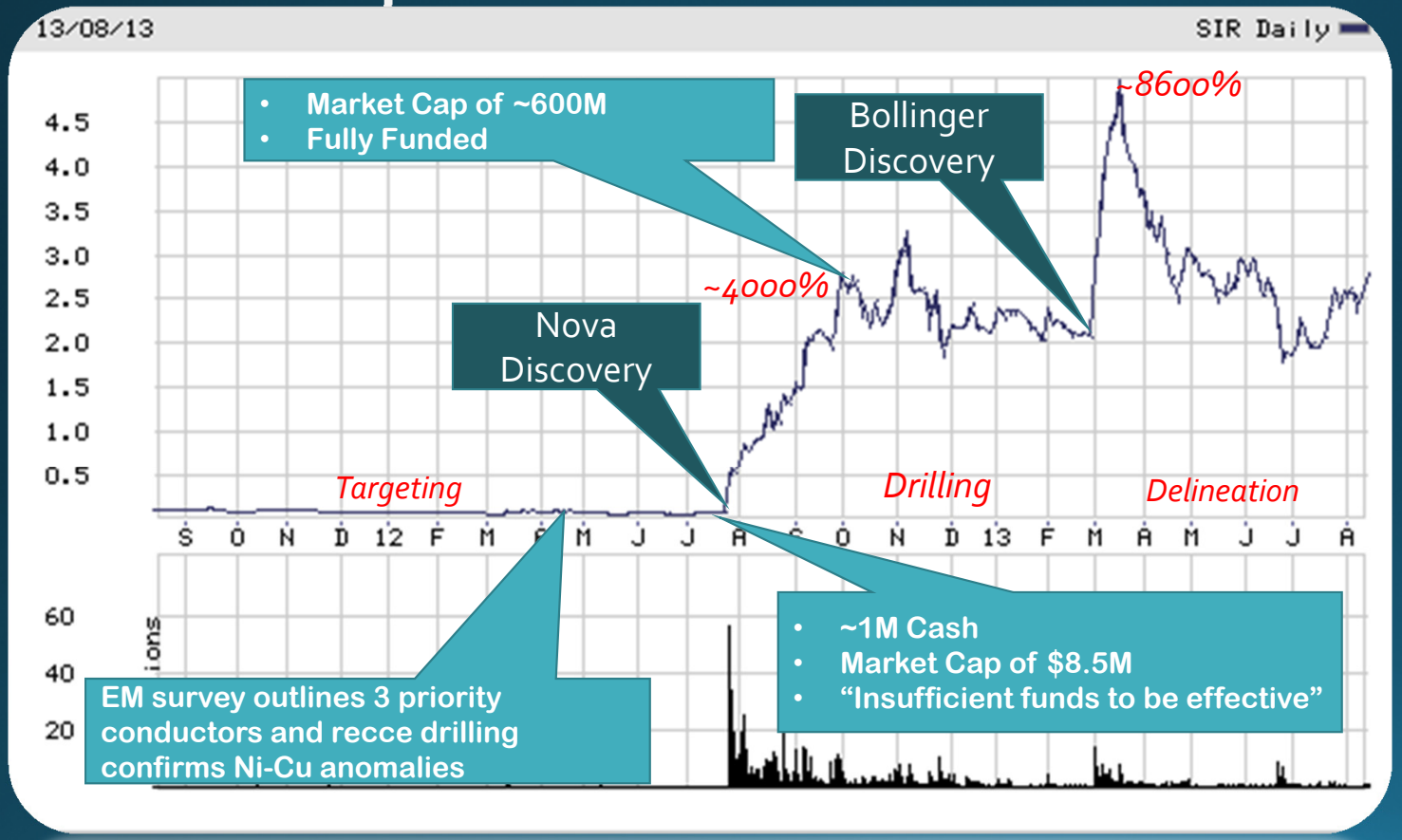
INDEX NAME	TOTAL RETURN	5 YR ANN. RETURNS
S&P/ASX 300 Metals & Mining (Industry) (TR)	4,386.53	-4.94 %▼
ALL ORDINARIES Gold (Sub Industry) (TR) ×	2,833.86	-10.58 %▼
S&P/TSX Global Mining Index (TR) ×	78.63	-5.45 %▼

- Juniors account for over half of all the exploration spend in Australia
- Difficulties in raising finance directly translate into reduced exploration activity particularly greenfield exploration
- 100's of Junior Resource Companies with less than $1M cash
  - Junior Companies need ~$500,000 per annum to stay afloat (compliance costs)
- When sentiment is good, Investors will tolerate high risk but when sentiment turns investors seek lower risk sectors
- Need to lower risk of greenfield exploration by increasing success rates
  - Targeting Technologies
  - Drilling Innovation
- Shorten the time between targeting and drilling

Industry can drive sentiment by making better, faster and more profitable decisions

- Fiscal return on exploration has declined – need to lift our game
  - Demonstrate significant return on Invested Capital
  - Lower risk and shorten time frames
- Enterprise Value must grow at a faster rate than Invested Capital
- No (or limited) growth of EV during the targeting stage is an issue for investors
- Need to build confidence in the targets prior to drill testing

We explore to add value….



Sirius Resources Ltd

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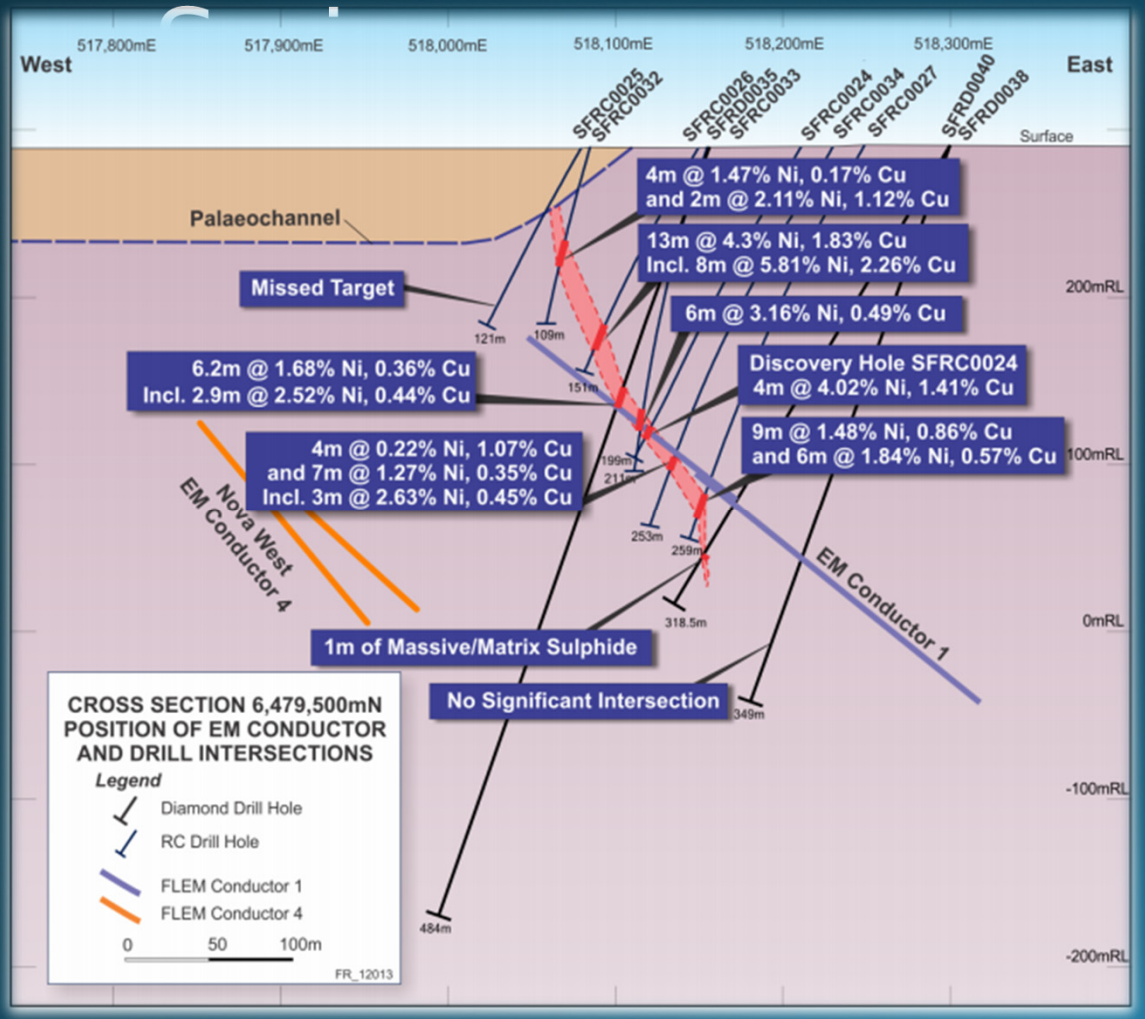
- 14.6Mt grading 2.2%Ni, 0.9%Cu and 0.08%Co



Sirius RESOURCES

ASX ANNOUNCEMENT **26 JULY 2012**

SIRIUS RESOURCES NL

ASX: SIR

ABN: 46 009 150 083

Street address:
Unit 5, 5 Mumford Place, Balcatta 6021, Western Australia

Postal address:
PO Box 1011, Balcatta 6914, Western Australia

Tel: +61 8 9240 8914

Fax: +61 8 9240 8915

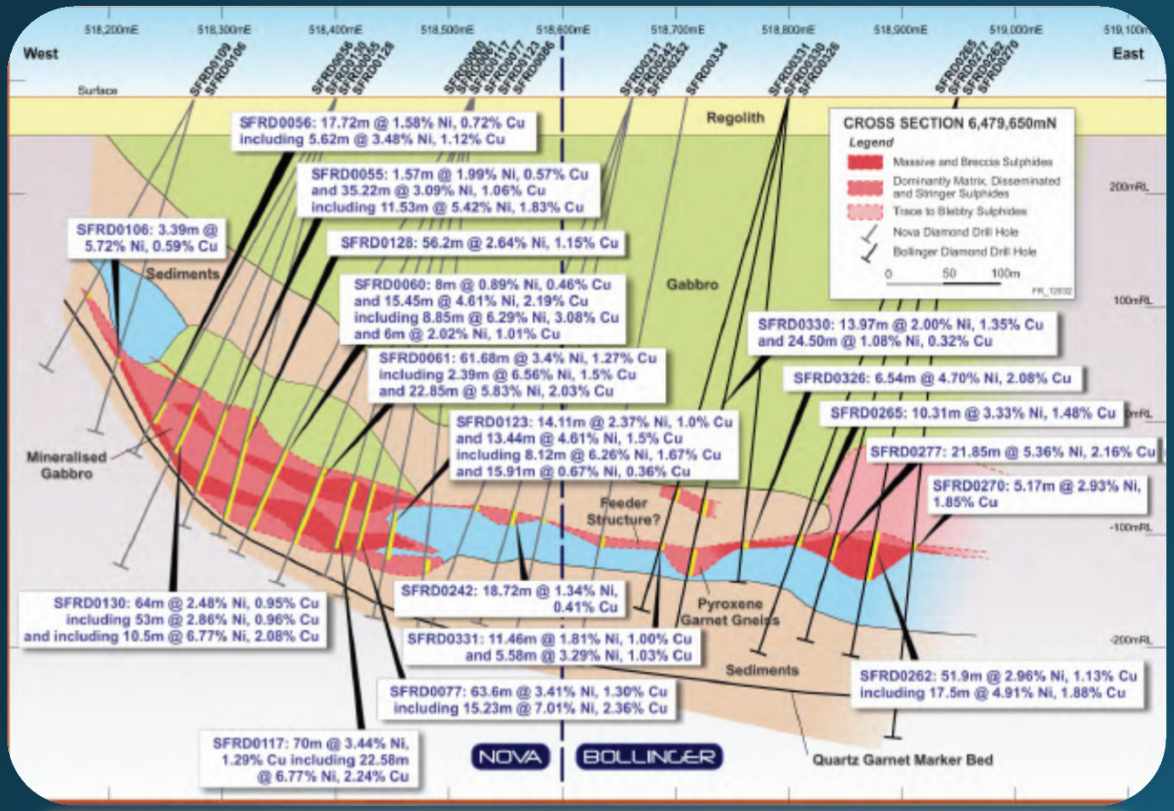
MAJOR NICKEL-COPPER DISCOVERY

New deposit style, new nickel province, first of three EM targets to be tested at the Eye

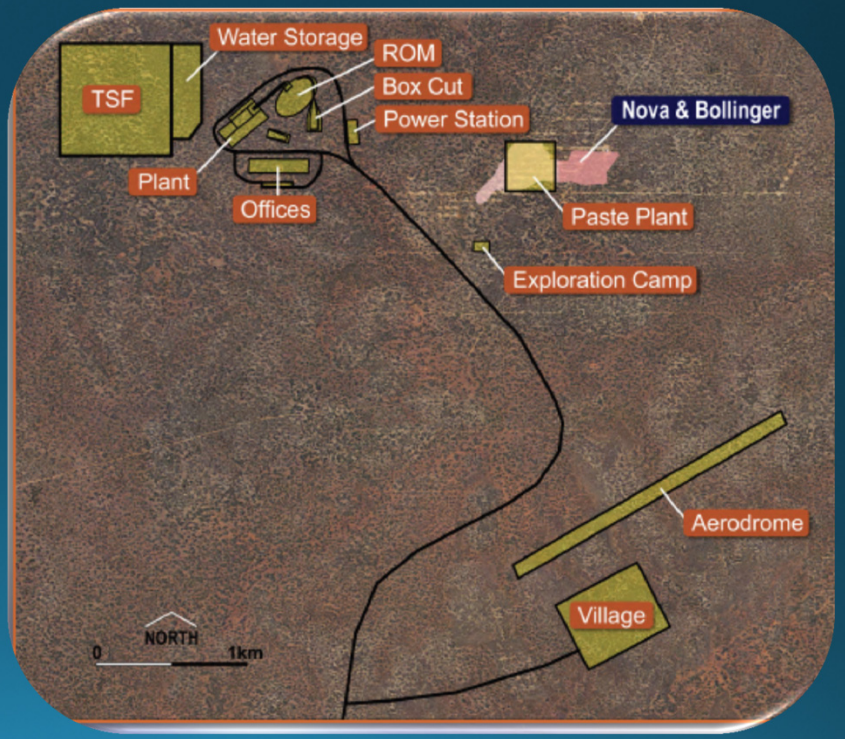
Sirius Resources (**ASX:SIR**) advises that it has discovered significant nickel and copper sulphide mineralisation in the first reverse circulation (RC) drill holes at its 70% owned Fraser Range project in Western Australia.

The discovery has been named the Nova deposit.

The Nova deposit is located in a previously unexplored and inaccessible area, beneath transported overburden, and was discovered with the first drill hole designed to test a very large electromagnetic (EM) conductor – one of three EM conductors at the Eye prospect.



- 14.6Mt grading 2.2%Ni, 0.9%Cu and 0.08%Co
- Conceptual Studies Underway



TROPICANA GOLD PROJECT

IGO 30%, AGA 70%, MANAGER

Independence Group

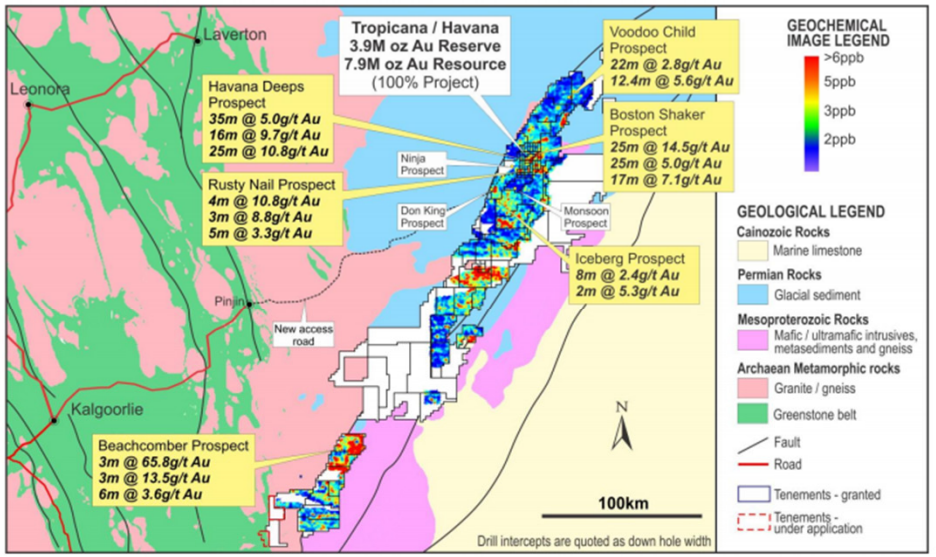
NEW AUSTRALIAN GOLD PROVINCE UNDER SAND DUNES

- Tropicana also in Albany-Fraser province
- Discovered in 2005 through follow-up of gold-in-soil anomaly in data collected in the 1990's

TROPICANA GOLD PROJECT

IGO 30%, AGA (MANAGER) 70%

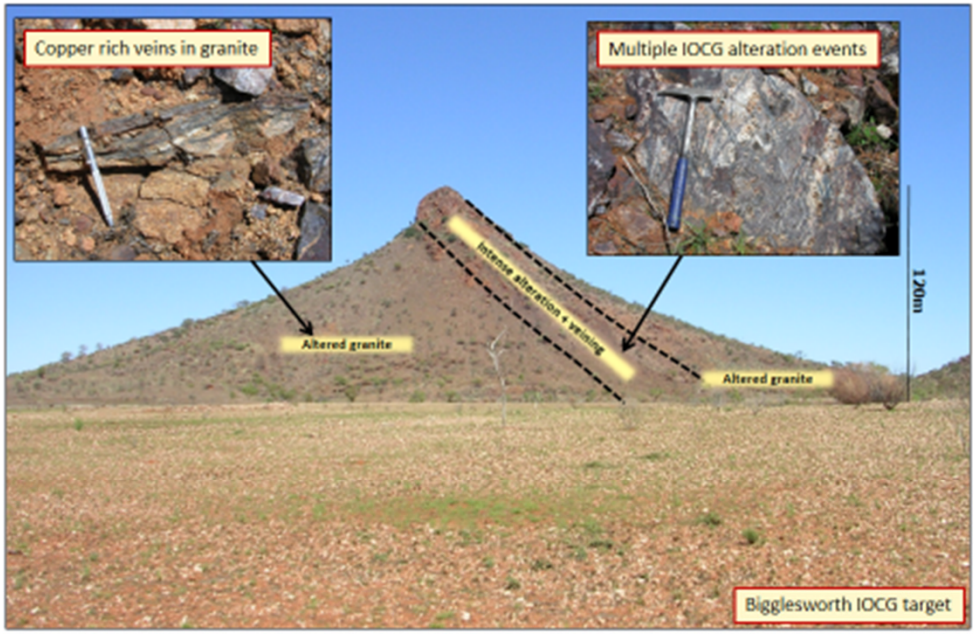
Independence Group



References : IGO & AGA 4/12/2012 ASX Releases for Tropicana Gold Project Mineral Resource Estimate
IGO & AGA 27/7/2011 ASX Releases for Tropicana Ore Reserve Estimate

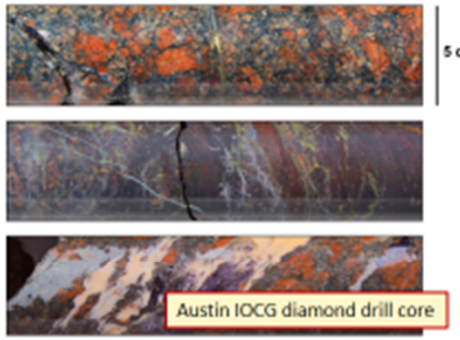
Challenge of Greenfield Exploration - Mithril

Copper Search Area – outcropping copper



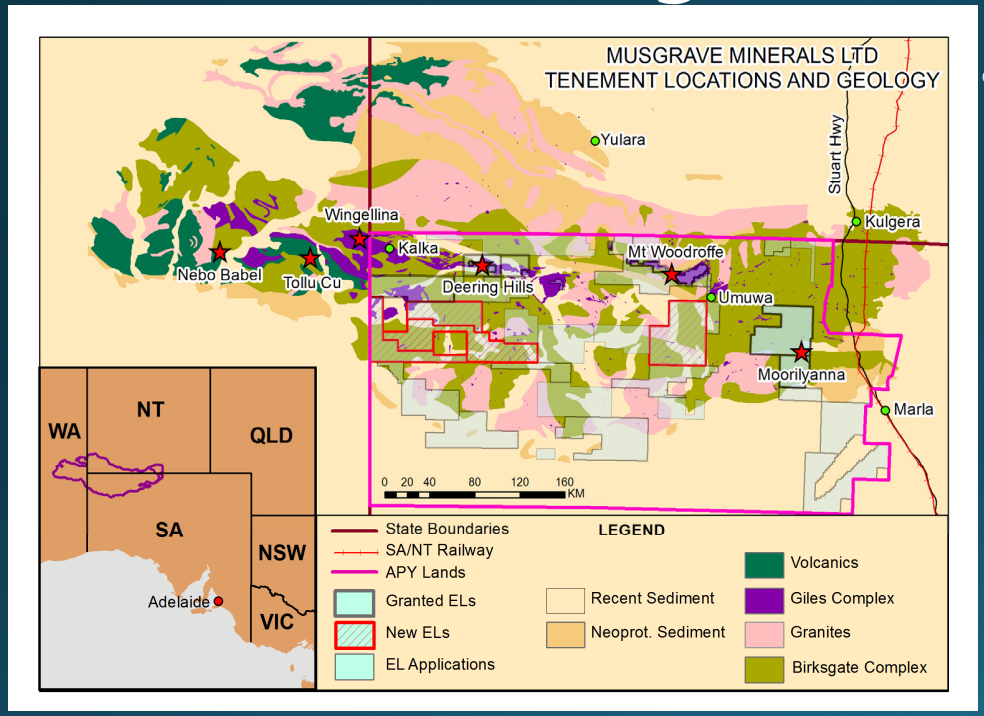
- New IOCG Area – 50km x 15Km
- 95% of the area is undercover
- $2.2M Cash

Copper Search Area – first mover advantage



- No modern exploration with Mithril discovering Illogwa IOCG in 2011
- Outcropping copper – NO PREVIOUS DRILLING
- Mithril's first drilling in 2012 intersected copper (*i.e. 14m @ 0.34% Cu from 18 metres incl. 2m @ 1.15% Cu*)
- 2013 - Systematic workup defines quality drill targets
- September 2013 – 3,000m RC drill program to commence

Explorers also need to be innovative to attract funding

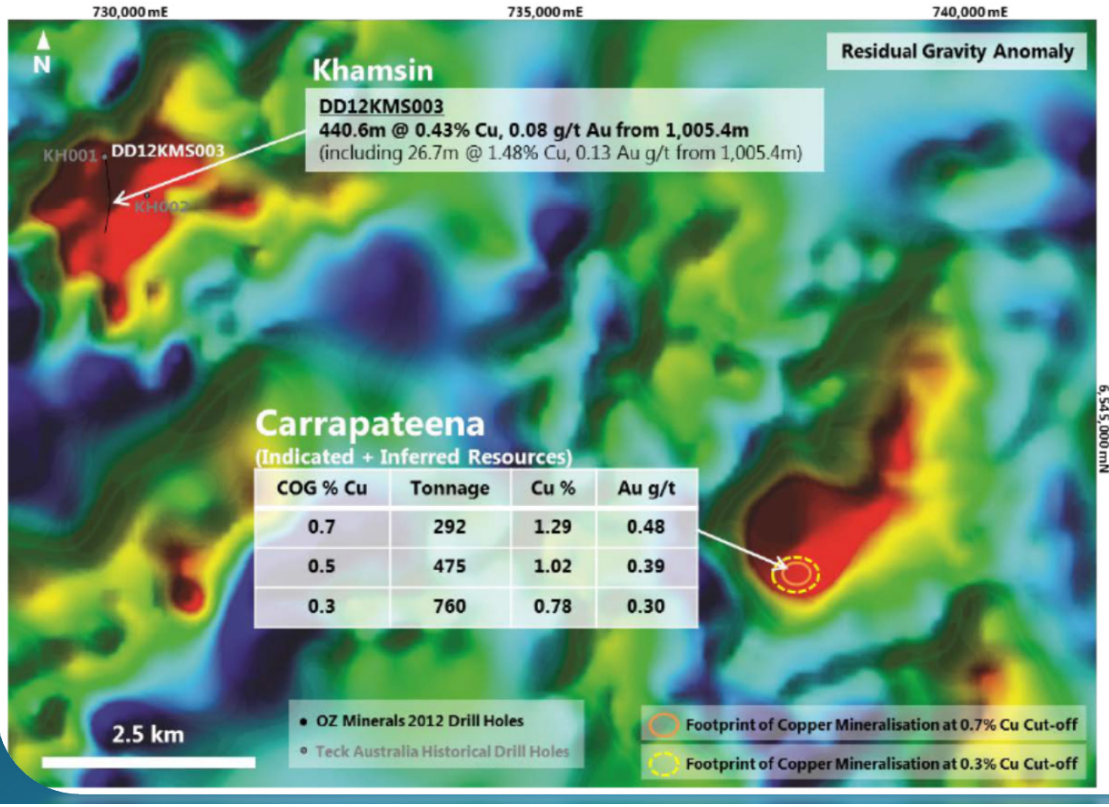


- Musgrave Minerals Limited
  - 6 companies agree to vend their SA Musgrave tenure to new entity
  - Creates dedicated exploration company and investment vehicle
  - Successful $20M IPO in 2011
  - 55,000km² Land Holding in the "Greenfield" Musgrave Province

Deep discoveries continue in SA

Prominent Hill, SA

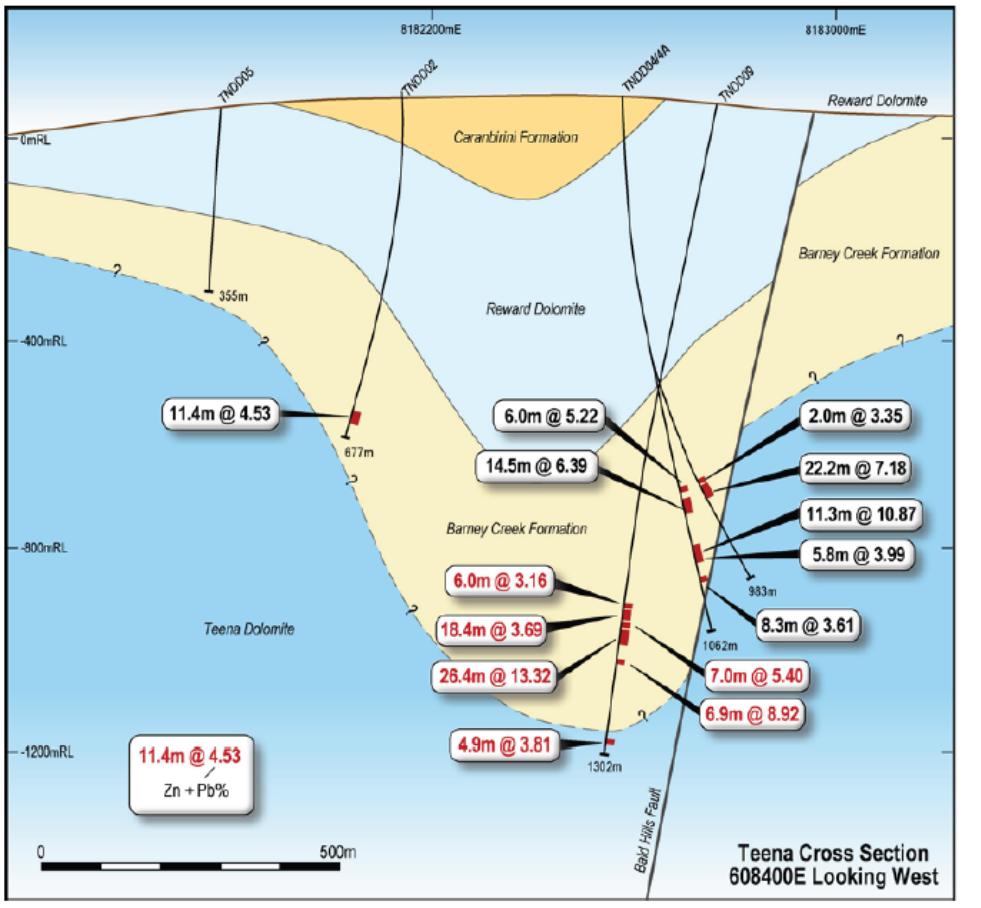
CARRAPATEENA: NEW DISCOVERY KHAMSIN PROSPECT



- New regional discovery made at the Khamsin prospect.
- Khamsin prospect approximately 10kms northwest of Carrapateena.
- Geophysical signature is similar in size to Carrapateena.
- First drill hole with **440.6m @ 0.43% Cu.**

Source: OZ Minerals Presentation to BMO Conference Feb 2013

Majors still active in greenfield exploration

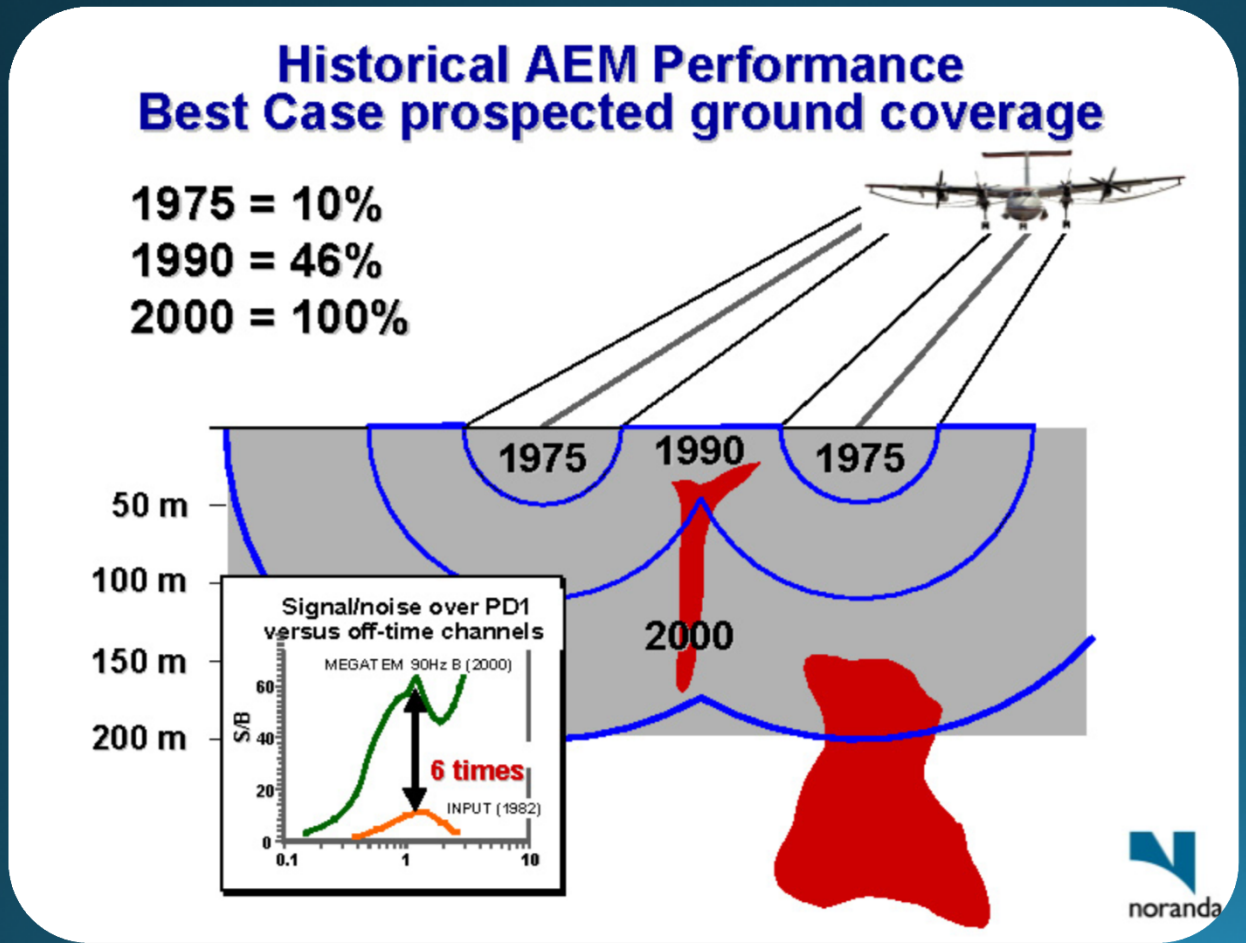


- Rox Resources Ltd in JV with Teck – Teena, NT

The Economic Need to Explore Undercover

- Success stories of exploration "undercover" demonstrate value
- Shallow or Deep - cover is an impediment to success
- The cost of exploration is rising
- Fewer discoveries
- Resource depletion outstrips replenishment in Brownfield Camps
- Small % of "discoveries" convert to "production"
- Market appetite for risk is in decline
- Industry can drive sentiment by making better, faster and more profitable decisions

Need to fill the technology gap



Government and Academia have a role to play

- Incentives for greenfield exploration
- Pre-competitive data
- Support drilling programs to test new concepts
- New exploration models / search techniques