



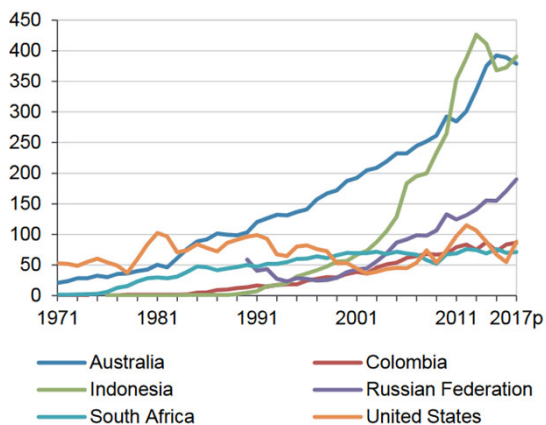
Coal on the Shoal... ...a seamless response

David Campion, Technical Advisor, ITOPF

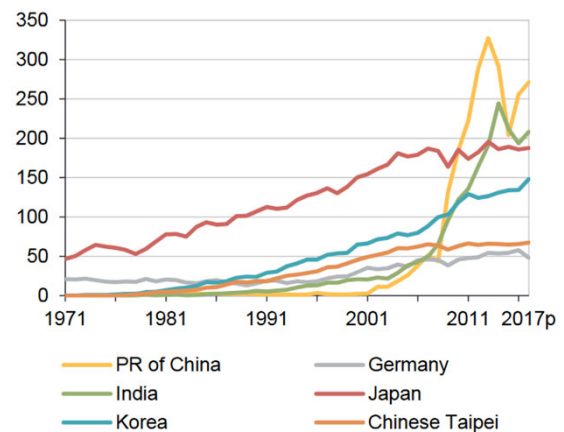


The Global Coal Trade

Total Coal Exports by Major Exporters (Mt)



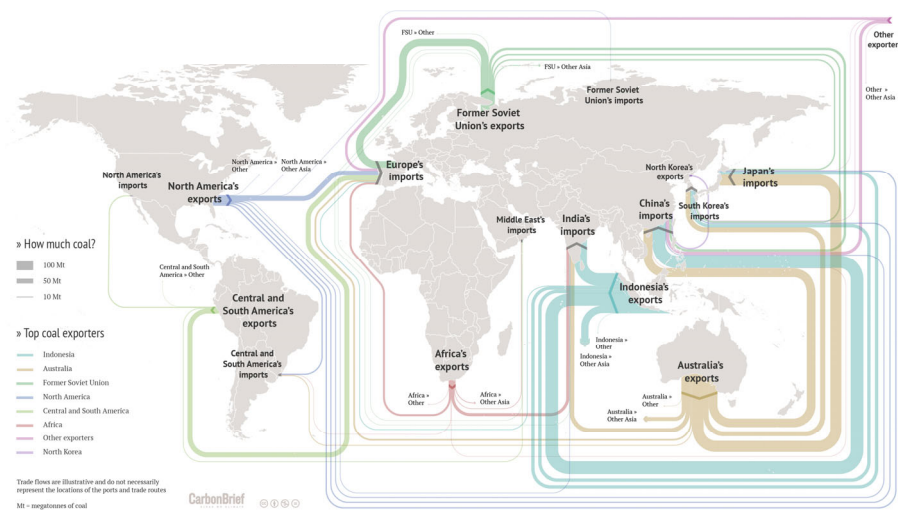
Total Coal Imports by Major Importers (Mt)



Images: International Energy Agency; Coal Information: Overview (2018 edition)



The Global Coal Trade



RUSSIA

- Coal shipment from the Russian Arctic to Europe will start in the Northern Sea Route from 2019 for 5 years.
- Shipments will run year round with ice breaker assistance.

AUSTRALIA

- New mines and port expansions will see a 4-fold increase in coal exports through the GBR in next decade

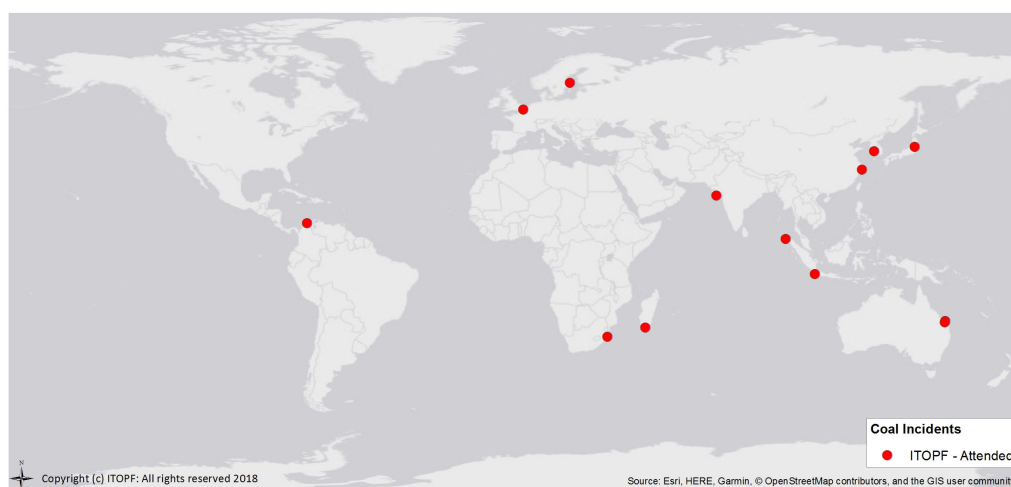
INDONESIA

- Extraction and export is expected to increase year-on-year until a plateau in 2026.
- The government tried to implement all coal exports require national vessels in 2018, but this has been delayed two years to 2020.

Image: CarbonBrief, 2016



ITOPF Coal Incidents Attended

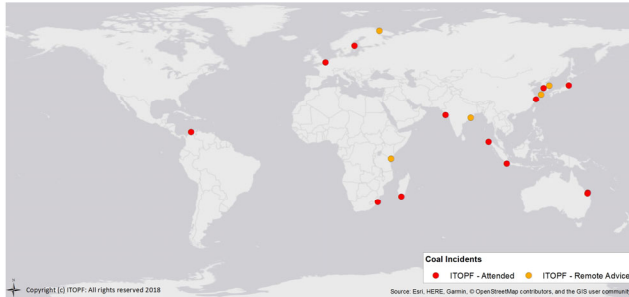


[Location of 12 coal spills attended onsite by ITOPF over 20 years \(1998 – 2018\)](#)

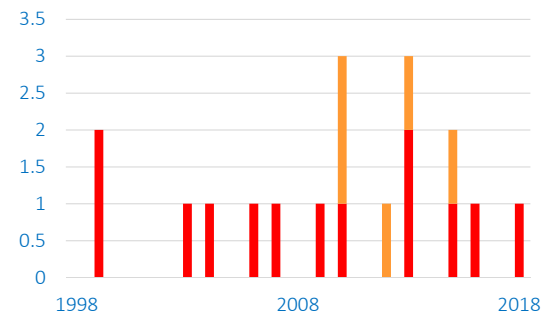


ITOPF Coal Incidents Attended

Location of attended and remotely advised coal spills over 20 years (1998 – 2018)



Number of Coal Spills / yr from Ships (1998 – 2018)



Fate & Behaviour of Coal



< 1mm



Fate & Behaviour of Coal



< 1mm



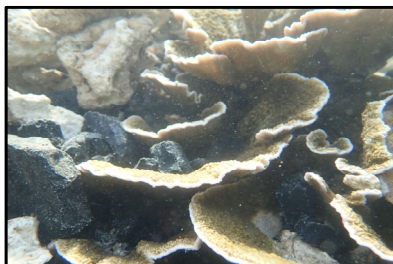
> 1mm – 10 mm



Fate & Behaviour of Coal



< 1mm



> 1mm – 10 mm



> 10 mm



Potential Impacts of Coal

PHYSICAL IMPACTS

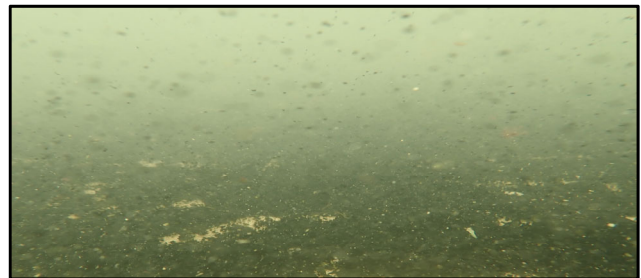
1. SMOTHERING & LIGHT ATTENUATION

Can affect:

- reduced primary productivity
- reduced access to food
- crushed / trapped flora and fauna

Light attenuation by smothering is more significant than plumes which may just cause behavioural change and is generally short lived

The degree of importance depends upon the sensitivity of the affected resources



Potential Impacts of Coal

PHYSICAL IMPACTS

2. PHYSICAL PRESENCE OF SOLID MATERIAL

Can affect:

Sessile organisms:

Abrasion of the substrate inhibits settlement and growth of algae and sessile organisms

Mobile organisms:

Acute impact can lead to mortality, chronic impacts are to gills and feeding mechanisms.

Both juvenile (larval) and adult individuals may be affected

CONTINUING RESEARCH AREA:

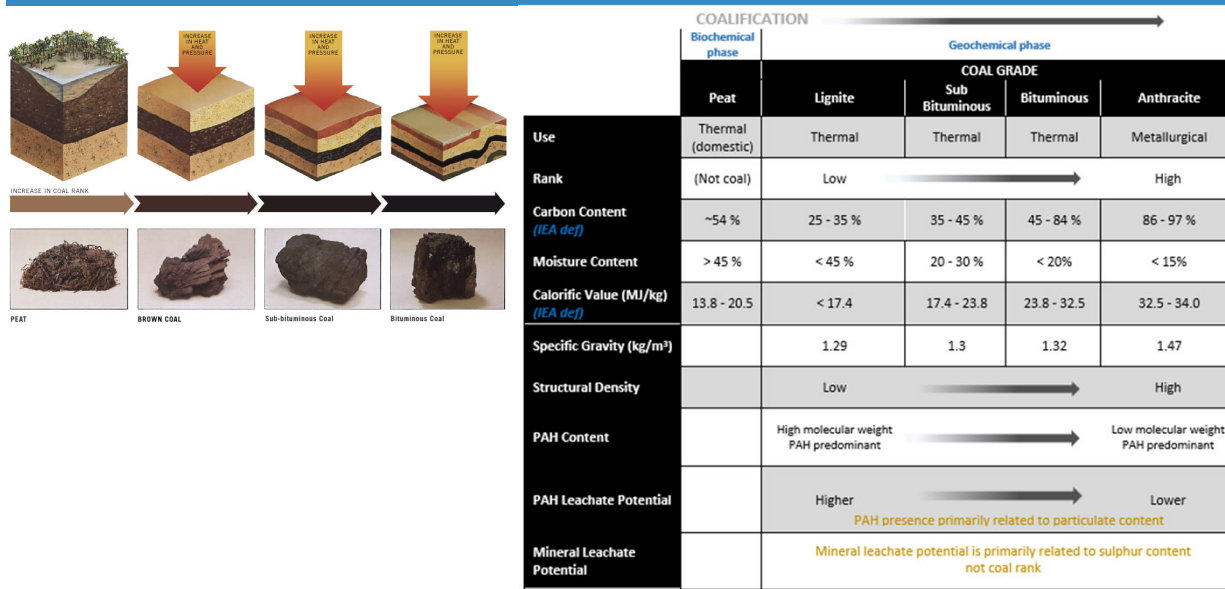
Fish exposed to high levels of suspended coal sediments may show reduced growth rates. This impact is important in areas with fisheries.





Potential Impacts of Coal

CHEMICAL IMPACTS



Potential Impacts of Coal

CHEMICAL IMPACTS

CURRENT STATUS

'GESAMP the IMO joint Group of Experts on the Scientific Aspects of Marine Protection (GESAMP 2002)

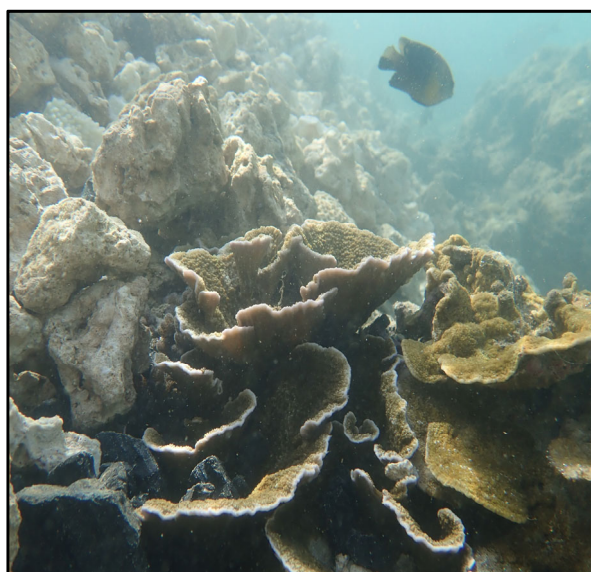
The profile states that coal slurry has:

- No bio-accumulation potential
- Is non hazardous / non toxic to humans and aquatic life
- Is non irritant
- Unlikely to cause a problem to amenities'

CONTINUING RESEARCH AREA:

Recent research has indicated:

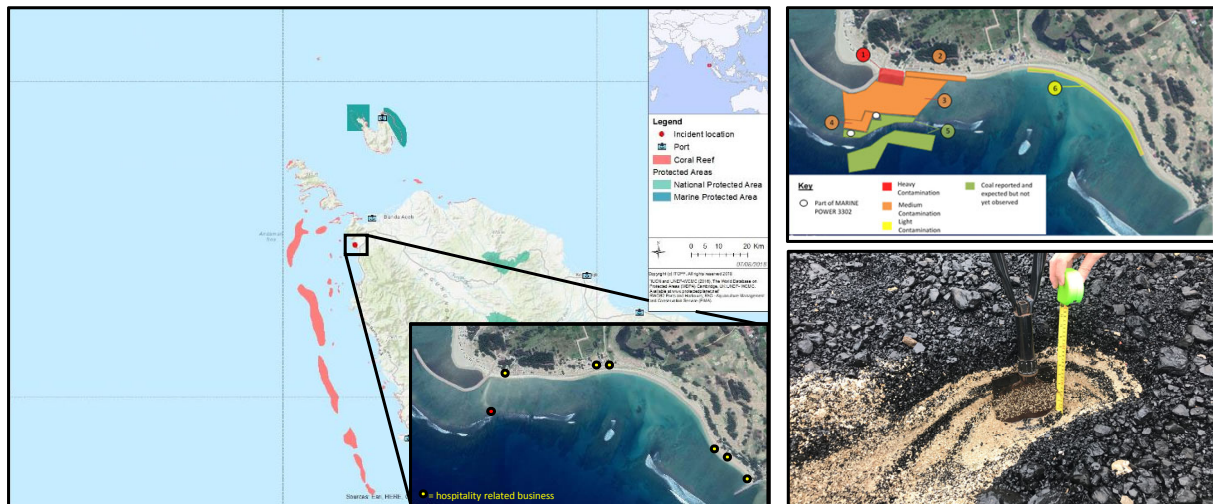
Coal particles on coral demonstrate greater reduction in physiological performance than carbonate. This may be attributable to toxic elements within the coal. Further work is ongoing.





Clean-up Considerations

1. ASSESSMENT



Clean-up Considerations

2. SPEED OF RESPONSE

Shoreline



Sea floor





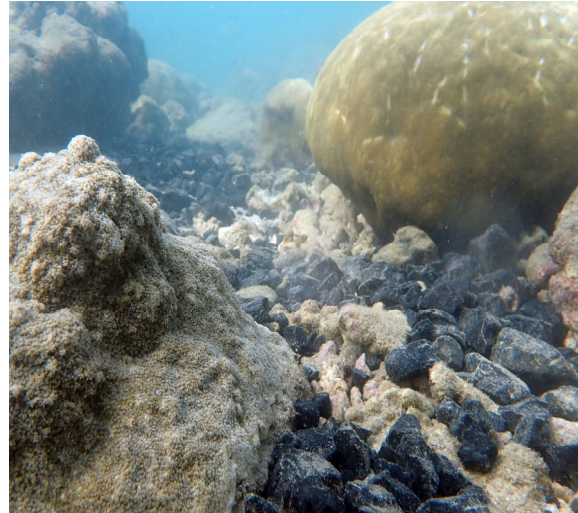
Clean-up Considerations

2. SPEED OF RESPONSE

Shoreline



Sea floor



Clean-up Considerations

3. METHOD OF RESPONSE





Clean-up Considerations

3. METHOD OF RESPONSE



Clean-up Considerations

4. MATERIAL MANAGEMENT





Clean-up Considerations

4. MATERIAL MANAGEMENT



Clean-up Considerations

5. STORAGE & LOGISTICS



1.10.15

30 days after the incident
~ 5 m³



15.10.15

45 days after the event
> 700 m³



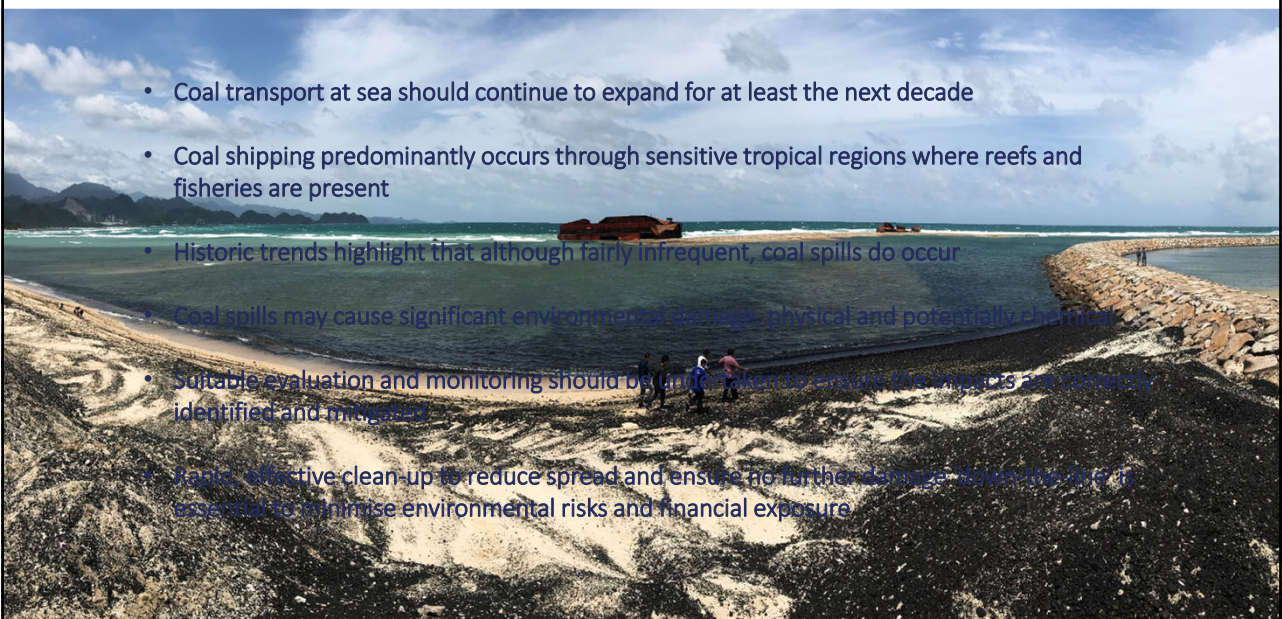
Clean-up Considerations

5. STORAGE & LOGISTICS



SUMMARY

- Coal transport at sea should continue to expand for at least the next decade
- Coal shipping predominantly occurs through sensitive tropical regions where reefs and fisheries are present
- Historic trends highlight that although fairly infrequent, coal spills do occur
- Coal spills may cause significant environmental damage, physical and potentially chemical
- Suitable evaluation and monitoring should be undertaken to ensure the impacts are correctly identified and mitigated
- Rapid, effective clean-up to reduce spread and ensure no further damage down the line is essential to minimise environmental risks and financial exposure





SUMMARY

