Office of the Queensland Chief Scientist

QWMN Forum 2020

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The perfect storm ... Food - Energy- Water trilemma

(Tillman et al. 2009. Science)



World population stabilization unlikely this century

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~12B by 2100

Science, 2014

"Climate change is the defining issue of our time – and we are at a defining moment"

United Nations Secretary-General



What are the elements of the "pipeline"



How it can work... Bioregional Assessments Program

- Partnership between CSIRO-GA-BoM (>100 scientists) and the DoEE
- \$60M piece of work that examined the cumulative effects of large scale coal mining and coal seam gas development on water resources and water dependent assets in key catchments

Bioregional assessments program

- Assessed the potential impacts, particularly focusing on regional scale and cumulative impacts, due to CSG and open-cut and underground coal mining developments (in the past, present and foreseeable future)
- Investigated risk by indicating the level of impact and the probability of that impact occurring
- Are made up of a number of products such as registers, models and reports which are available to the public
- Were developed by independent scientific experts in the fields of ecology, hydrology, hydrogeology, geology, informatics (computer information systems) and risk analysis, in consultation with state government agencies, catchment management authorities, local governments, and industry groups and their members.



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Outcomes

- BA provides critical advice to key decision makers across the private sector-governments-NGOs
- Bioregional assessments are a source of information that the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development can use to formulate their advice to the Australian Government on decisions under the Commonwealth's Environment Protection and Biodiversity Conservation Act 1999, and to state government regulators

How it can work... Northern Australia Water Resource Assessment

- Collaborated with northern jurisdictions, research partners and communities to undertake these assessments over 2.5 years.
- Studied Fitzroy, Darwin and Mitchell catchments of northern Australia
- Evaluated soil & water resources (surface and groundwater) and water capture and storage options
- Tested the viability of irrigated agriculture and aquaculture
- Assessed environmental, social and economic impacts of water resources and irrigation developments



Outcome

 Science underpinning decision-making to help informed planning decisions by governments and potential investors



Independent economic analysis by Acil Allen in April 2018

CASE STUDY	COST OF PROJECT (2017/18 \$M)	VALUE OF BENEFITS (2017/18 \$M)	NETT PRESENT VALUE (2017/18 \$M)	BENEFIT/COST RATIO
Bushfire risk management	2.42	24.96	22.55	10.33
GHG mitigation	1.49	119.47	117.97	79.99
GISERA	1.043	6.105	5.062	5.85
TraNSIT	0.245	68.7	68.46	280.4
WIRADA	106.9	2254.4	2147.6	21.1
Aquifer replenishment	3.48	356.6	353	102.6
Goyder Institute	15.02	990	974.9	65.9
Bioregional assessments	76.8	574	497.2	7.48



It doesn't always end well and then it does!

- Even when the science is clear, political decisions, or perverse incentives can trump sound policy decisions
- In situ remediation of metals and radionuclides
- \$100M and \$300M USD savings lost



Par Pond Drawdown: 1991









An SRS Case Study: Par Pond

- Cooling reservoir for P and R Reactors on the SRS
 - 1,050 ha impoundment
- 30 lineal shoreline miles of wetland/littoral vegetation
- **High ecological value** High research value: ~300 publications



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Par Pond Outcome

- Site-specific risk assessments justified repair and refill without cleanup of the sediments
- Ecosystem essentially recovered in ~ 5 years
- Over \$2 Billion saved
- Cost to repair dam < 1% that of dredging
- Cost for site-specific research for risk assessments < 0.001% that of dredging
- One key to decision was good communication with stakeholders

>\$2B USD saved!





Savannah River Ecology Laboratory

Take-aways

- Collaboration, partnerships, consultation and communication are key
- Engage across the pipeline and break down silos
- QWMN is a valuable community of practice to enhance engagement, better operationalise IWRM, and deliver positive outcomes