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Session D6: Fishway Offsets: Significant Opportunities Challenged by Management Realities

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Fishway Offsets: Significant opportunities challenged by management realities.

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Australia

- **Fishway Offset Definition – Fishway construction is switched from the original Site A to an alternative site(s).**

SITE A



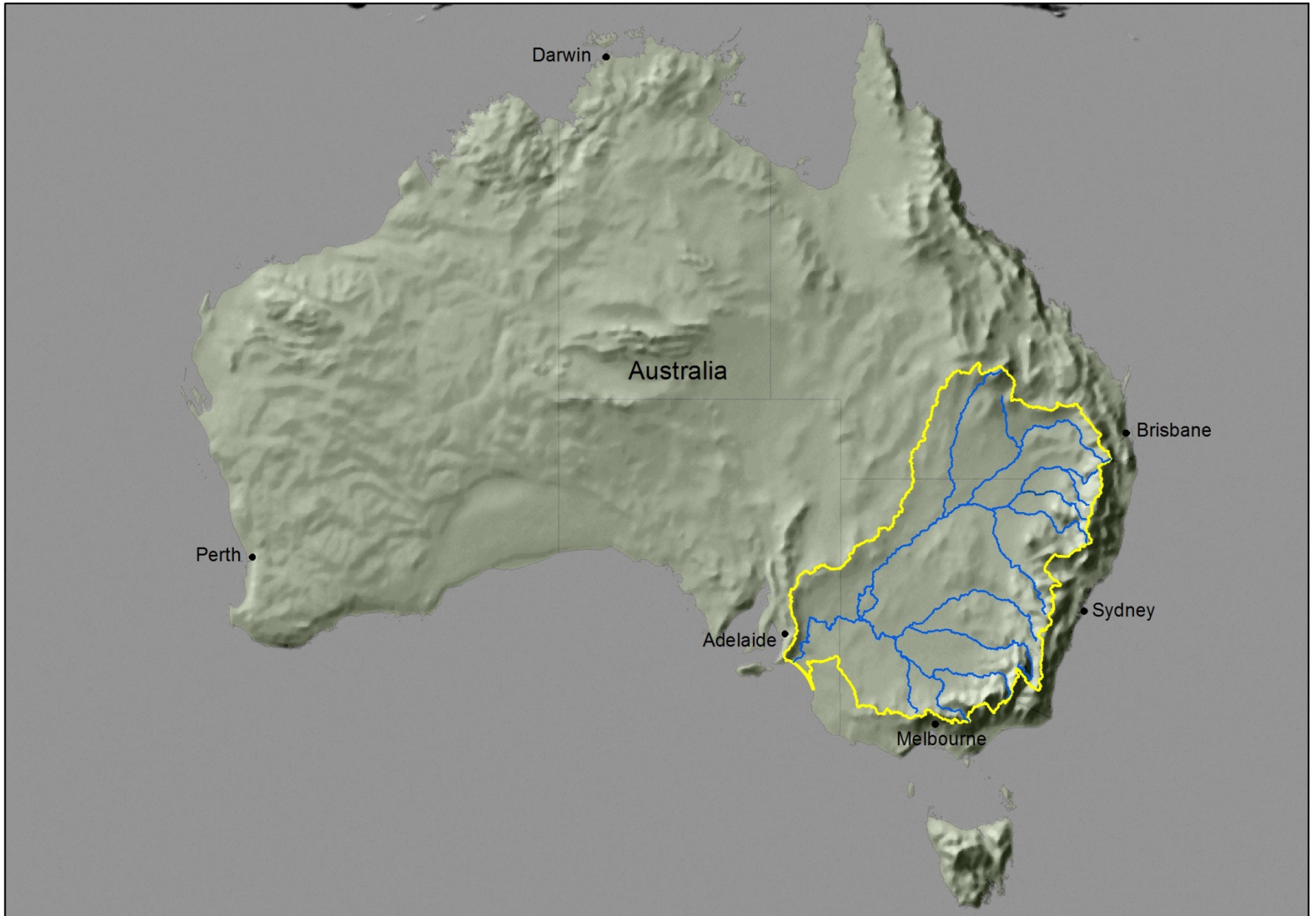
OFFSETS



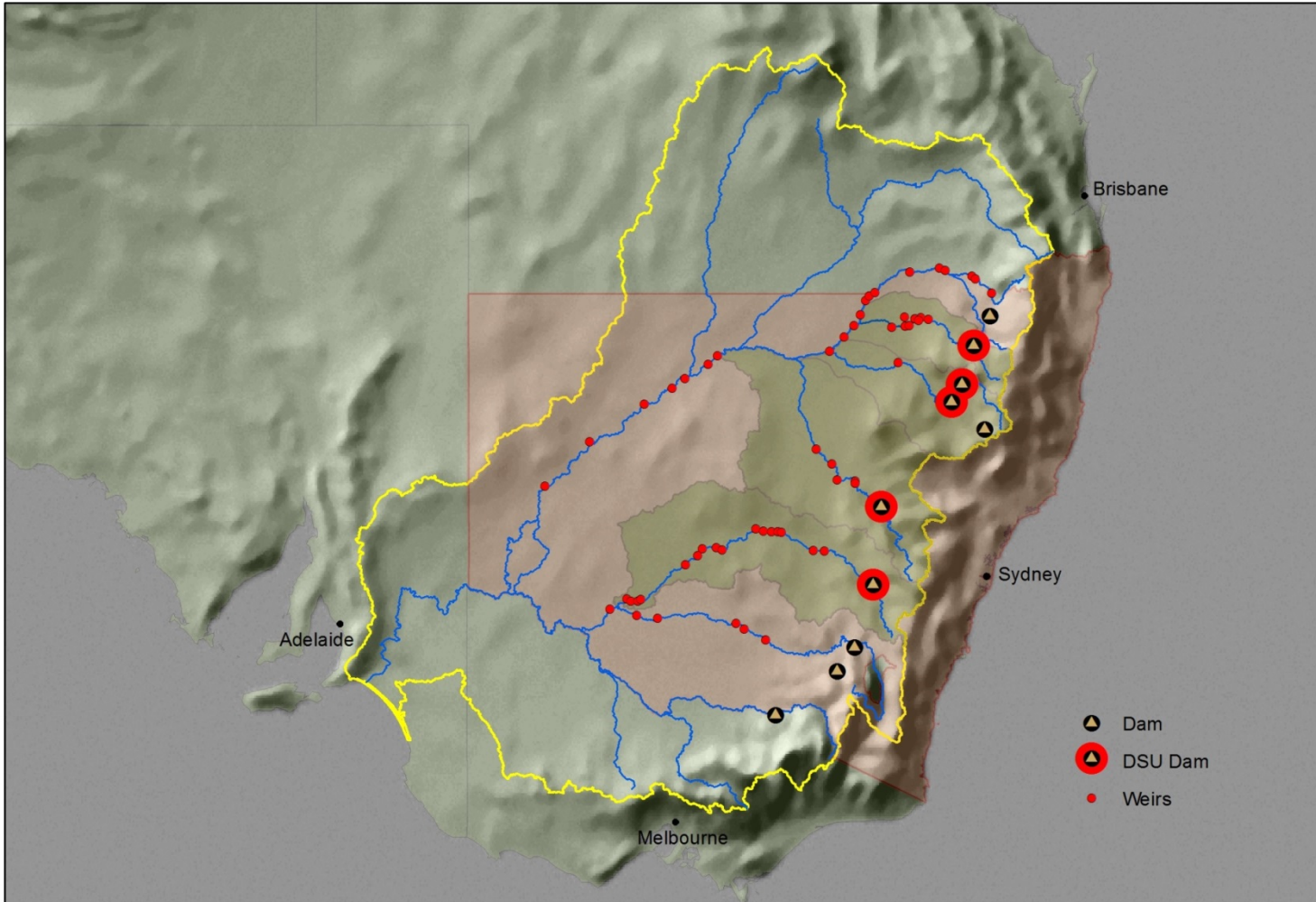
Justification for Fishway Offsets

- **Reduced Project Cost**
- **Reduced Fishway Complexity**
- **Greater Ecological Benefit(s)**

Murray-Darling Basin - Australia



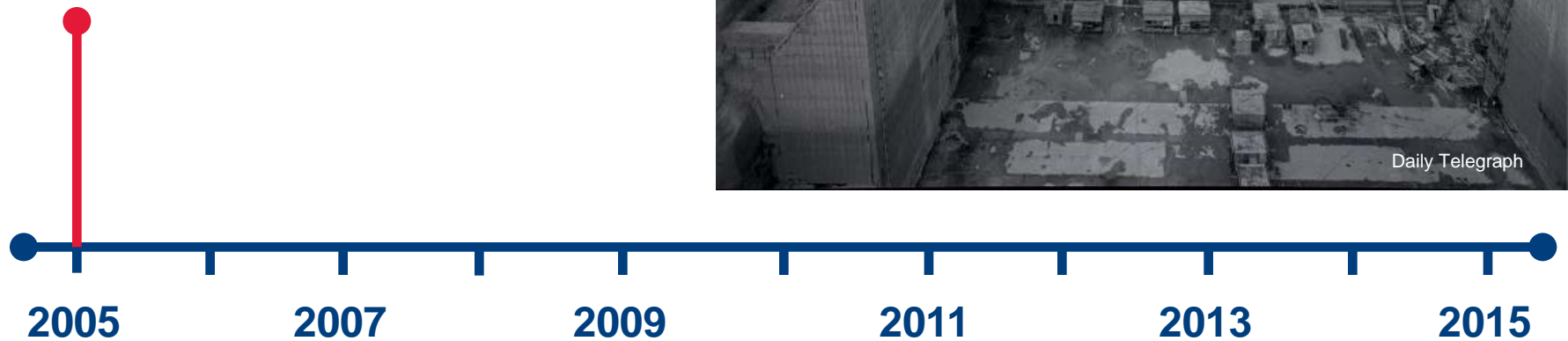
Murray-Darling Basin - NSW



- Large dams capture water, which is released for downstream regulation by smaller weirs.

Fishway Offsets Timeline

Dam Safety Upgrades Proposed



Dam Safety Upgrades (DSU)

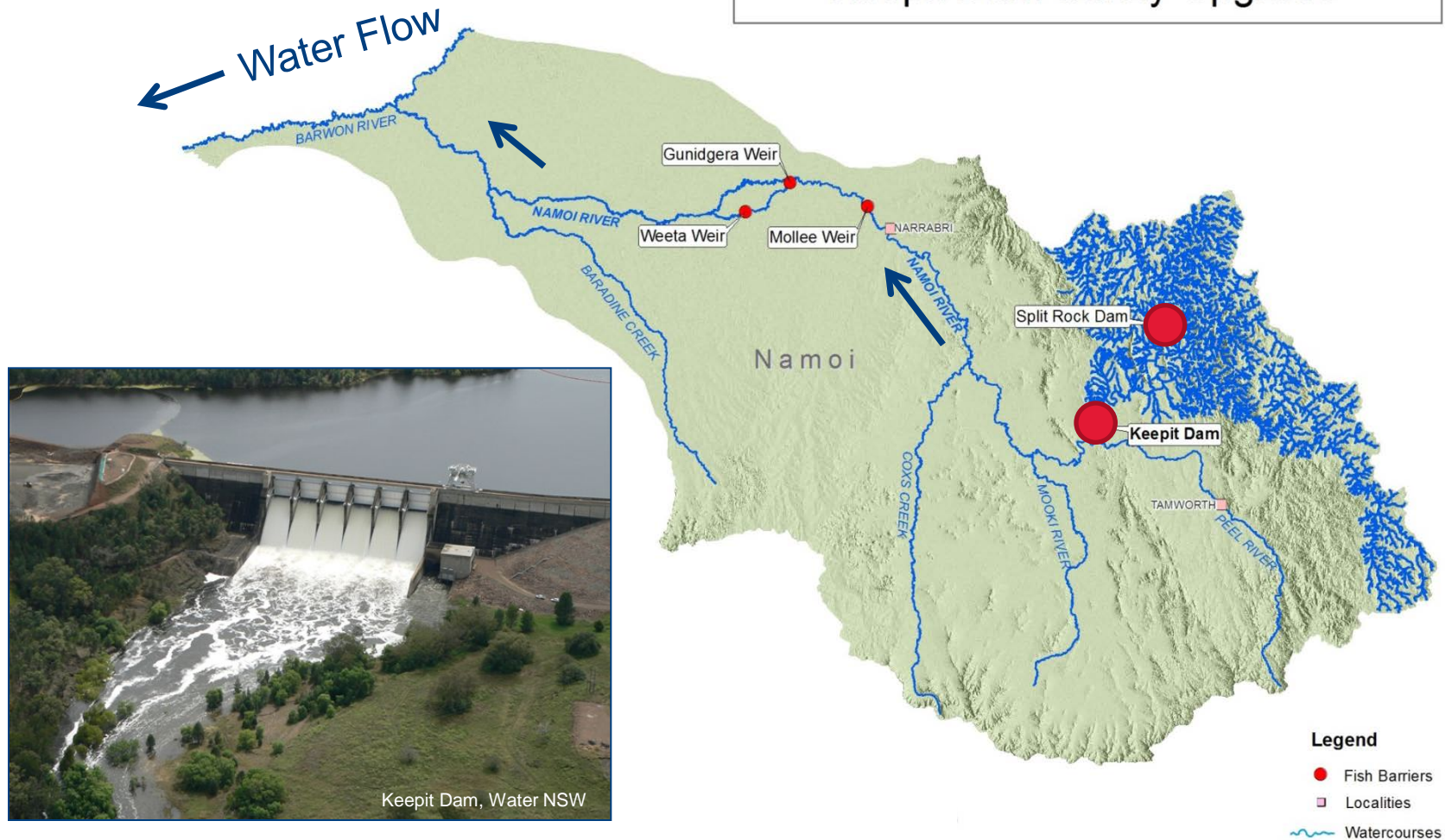
- Five (5) Dams proposed for upgrades
- Dams constructed b/w 1940's – 1970's
- Updated safety requirements for:
 - Probably Maximum Flood
 - Earthquakes
- Dam upgrades triggered NSW *Fisheries Management Act 1994*

NSW Fisheries Management Act 1994

Section 218 states that if an asset owner:

- Constructs, alters or modifies a dam or weir:
 - They must include a fishway, **if the Minister so requests.**
- DSU works alter & modify the original dams

Keepit Dam Safety Upgrade



- **Dams have significant impact on connectivity**

Fishway Offsets Timeline

Minister determined fishways required at five dams

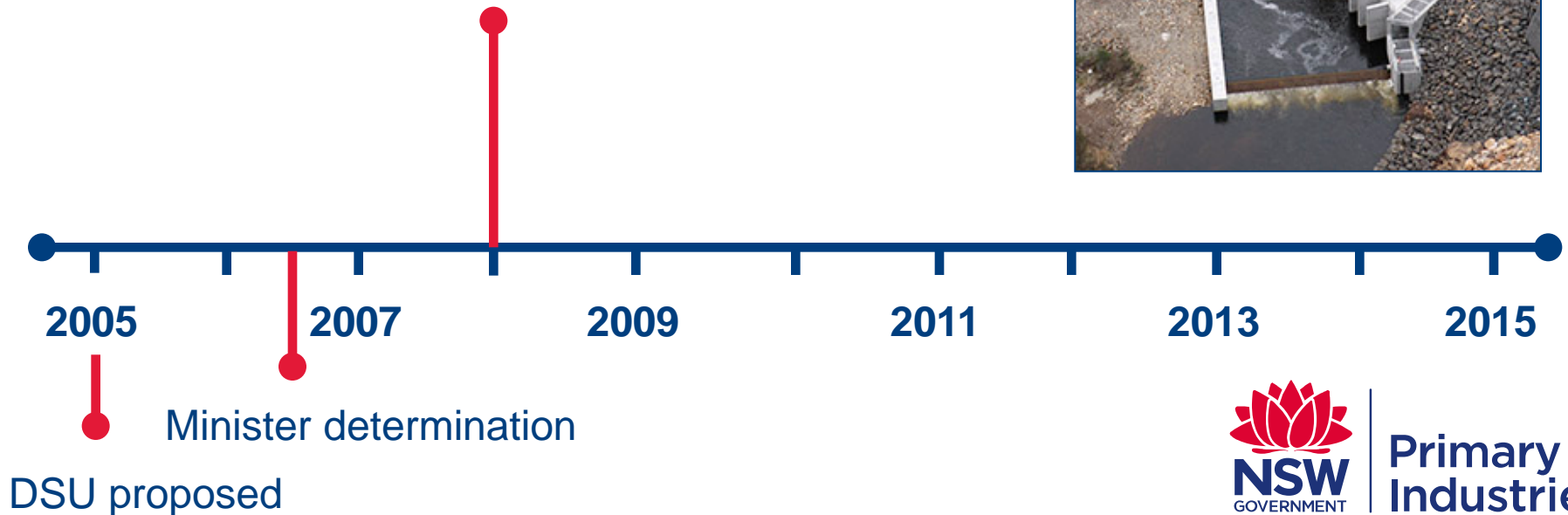
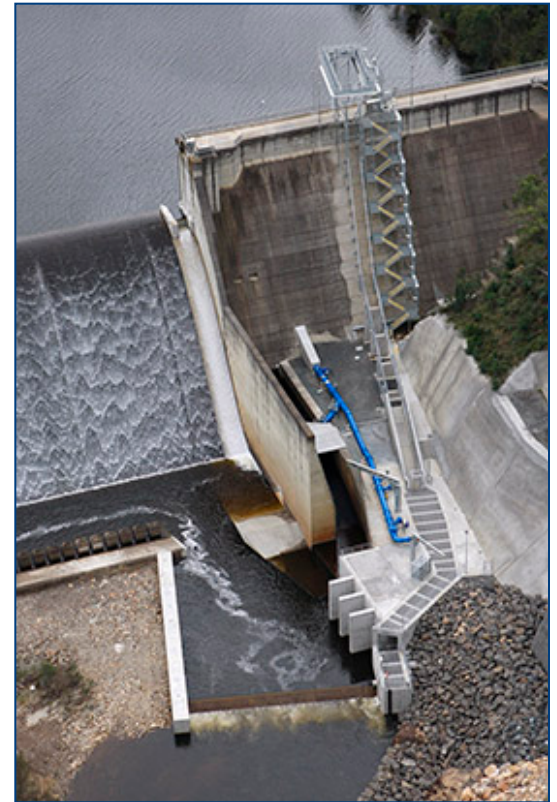


DSU Proposed



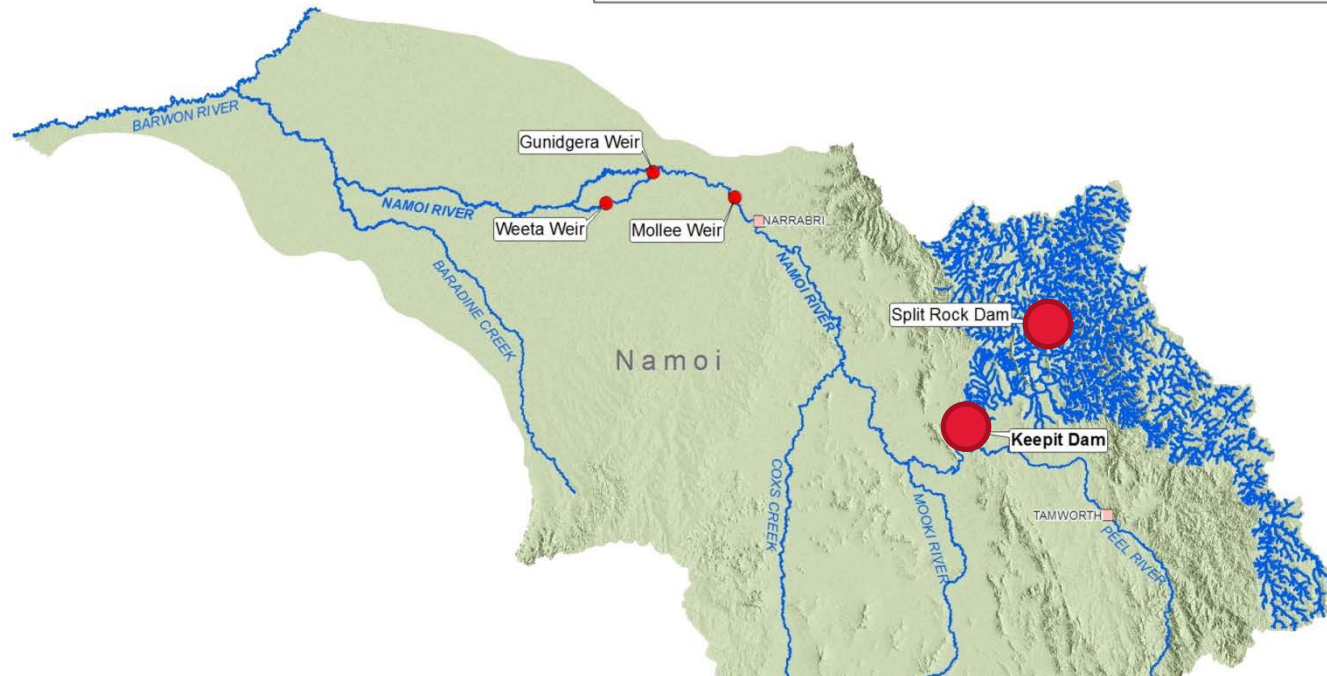
Fishway Offsets Timeline

- High Level Fishways estimated at **\$285 M**
- Concern over Fishway effectiveness due to:
 - Cold Water Pollution discharge from dams
 - Effectiveness of fish lifts in passing fish
 - Operational reliability



Fishway Offsets Proposed

Keepit Dam Safety Upgrade



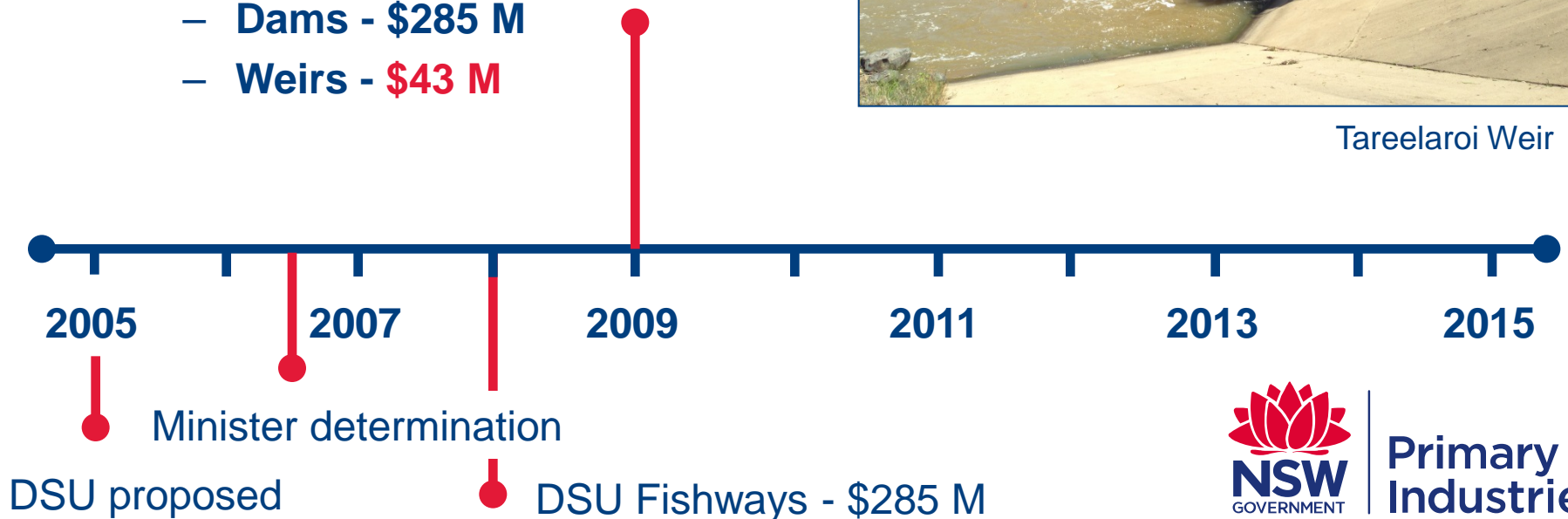
Fishway Offsets Timeline

Fishway Offset Agreement

- **Fishway Sites:**
 - Dams - 5
 - Weirs - **13**
- **Upstream Habitat:**
 - Dams – 2,700 km
 - Weirs – **2,650 km**
- **Estimated Cost:**
 - Dams - \$285 M
 - Weirs - **\$43 M**



Tareelaro Weir



Fishway Offsets Timeline



Weeta Weir

Fishway Offsets Program Halted

- Weir removed: 1
- Fishway Constructed: 1
- Fishways Designed: 11
- Estimated Cost - **\$85 M**



What happened?

- **Estimated costs doubled**
- **Financial landscape changed - GFC**
 - **Reduced available government funding**
 - **Lack of irrigator support (50 % funding)**
- **Personnel changed**

Fishway Offsets Timeline



Program Re-assessment

- Site Selection
- Biological Criteria
- Fishway Criteria
- Structural Criteria
- Project Contingencies



What are we doing to reduce costs?

- **Re-assessment of offset site selection**
 - **Better information now available to assess habitat and fish condition at priority sites**
 - **Better fishway site prioritisation via optimisation models (e.g. OptiPass)**
 - **Better ecological outcomes for reduced number of sites / fishways**

What are we doing to reduce costs?

- **Biological Criteria**

- **Targeting specific ecological priorities rather than aiming to pass all species and size classes over all flows at fishways.**

What are we doing to reduce costs?

- **Fishway Criteria**

- **Draft fishway designs were conservative to ensure effective fish passage (e.g. slope, cell size, turbulence).**
- **Reviewing designs to better match with ecological priorities**

What are we doing to reduce costs?

- **Structural Criteria**

- **Draft designs included 100 year design life, automated gates, multiple entrances / exits...**
- **Revised criteria being reassessed for what is necessary to pass fish, using novel design features (e.g. multi-height baffles) to reduce fishway cost and complexity.**

What are we doing to reduce costs?

- **Project Contingencies (e.g. risks)**
 - **Contingencies nearly doubled initial project estimates**
 - **Assessing design / build assumptions and risks to reduce contingencies.**
 - **Weir owners to accept higher risk profiles**

Fishway Offsets Conclusion

- **Fishway offsets should achieve a greater ecological benefit for significantly reduced costs.**
- **Clear, defensible guidelines are required at the start of the project to guide fishway offset selection & management.**
- **Significant fishway expenditure can be saved by focusing on defined priority outputs.**