Environmental Water Requirements

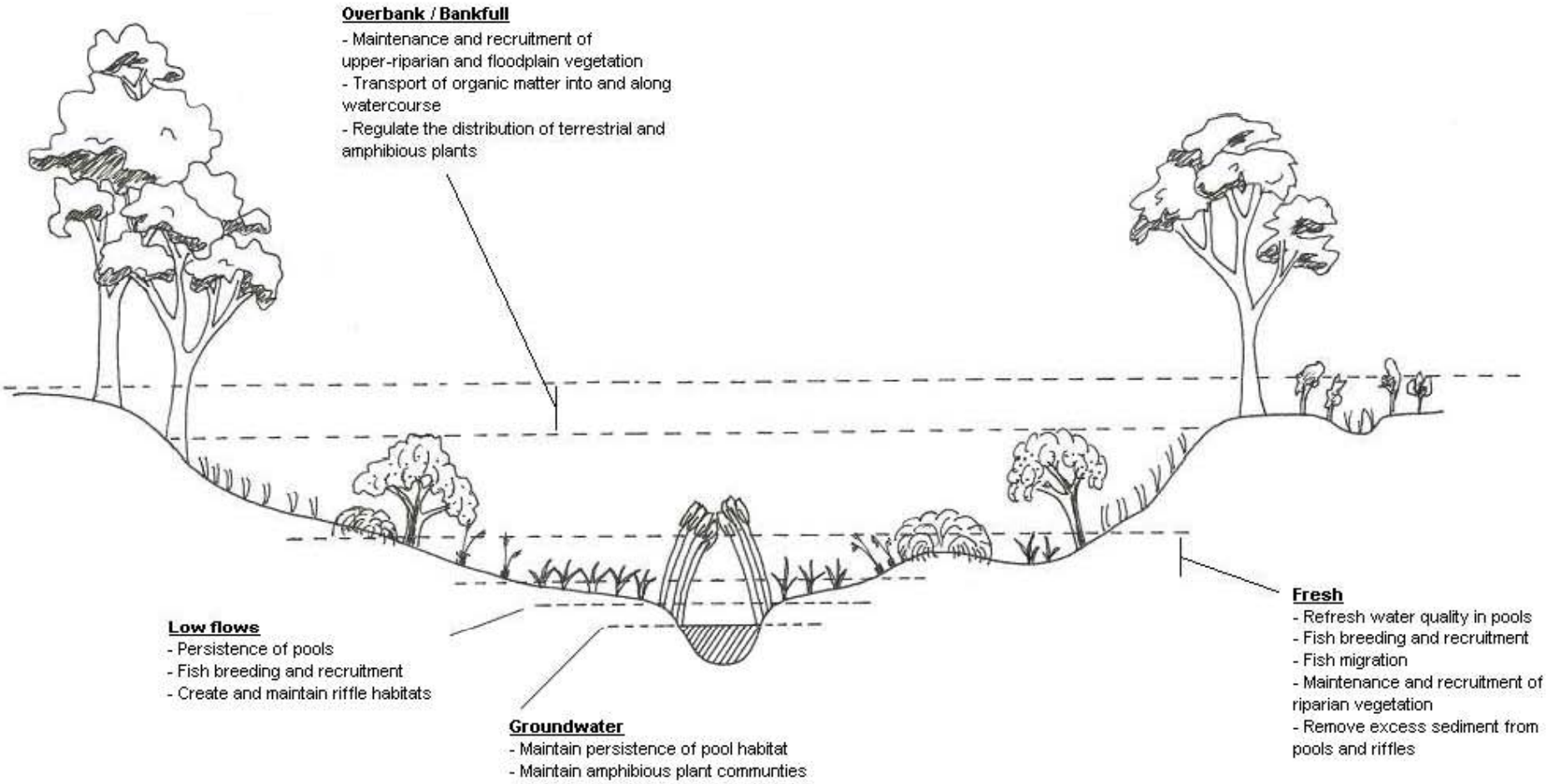
&

Environmental Water Provisions

Government of South Australia
Department of Water, Land and Biodiversity Conservation

The environment and water

The flows needed to keep aquatic ecosystems at a low level of risk



Environmental water requirements

The flows needed to sustain aquatic ecosystems at a **low level of risk**

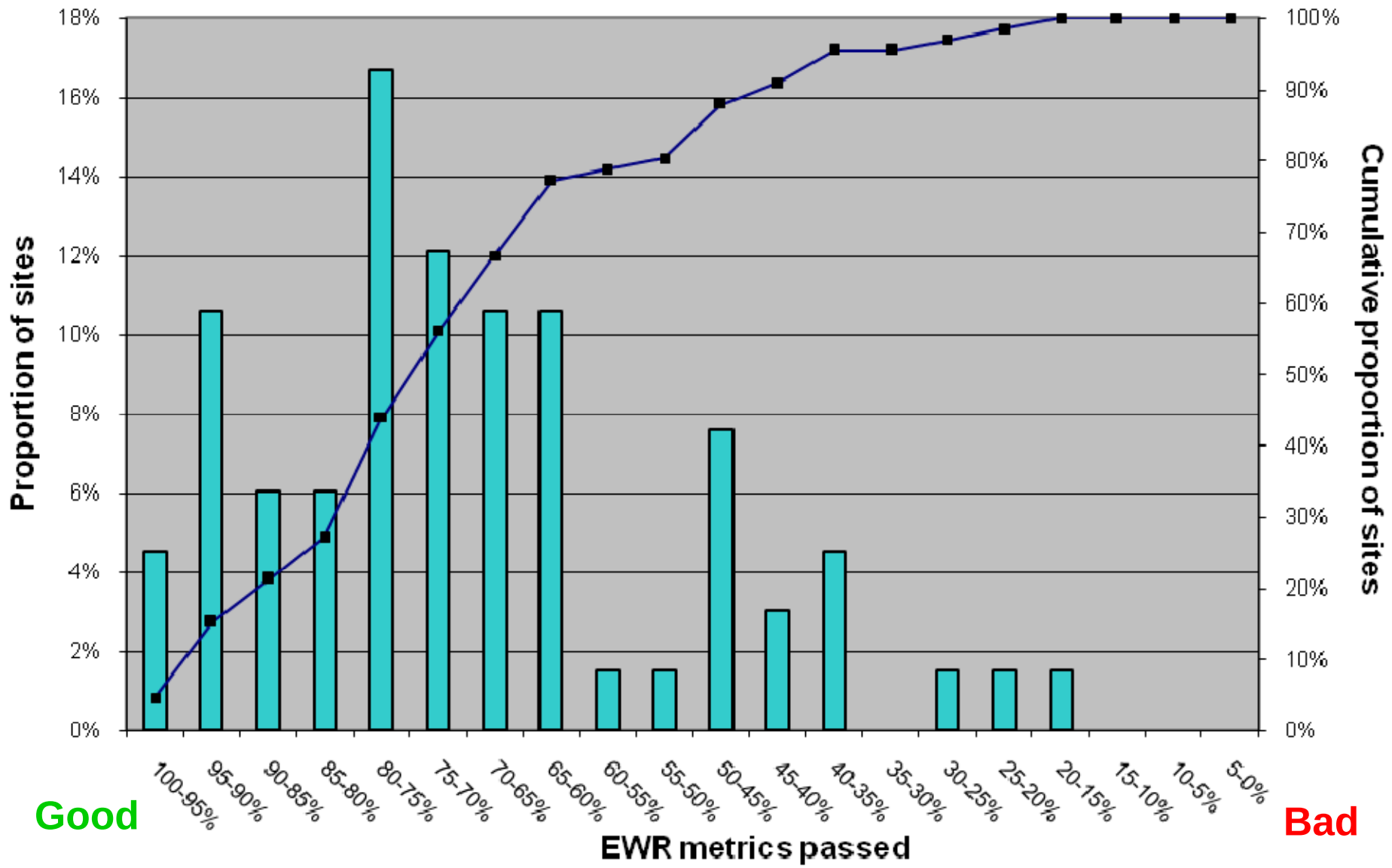
- 45 measures of EWRs have been determined.
  - Example:
    - Low flows to refresh pools in autumn
    - Flows to allow fish migration to the sea in winter
    - Flows to water aquatic plants during summer
- At any given site, increasing levels of deviation of flow from the 'adjusted annual flow' will increase the level of stress in EWRs.

EWR measures for the Mount Lofty Ranges

Metric	Sites failed	Number of sites tested	% Sites failed
Annual: can occur at any time of the year			
Number of years with 1 or more bankfull flows	6	66	9.1
Average duration of bankfull flow spells	1	66	1.5
Average total duration of bankfull flow per year	6	66	9.1
Low flow season			
Average daily LFS flow	16	66	24.2
80th percent exceedence non-zero flow [low flow]	62	66	93.9
Number of years with LFS zero flow spells	9	66	13.6
Average number of LFS zero flow spells per year	5	66	7.6
Average duration of LFS zero flow spells	21	66	31.8
Number of years with one or more LFS freshes	37	66	56.1
Average number of LFS freshes per year	46	66	69.7
Average total duration of LFS freshes per year	62	66	93.9
Transition 1: Low to high flow season			
Average daily T1 flow	20	66	30.3
80th percent exceedence non-zero flow [low flow]	55	66	83.3
Current month reaching median flow of natural T1 median (delay)	28	47	59.6
Number of years with T1 zero flow spells	9	66	13.6
Average number of T1 zero flow spells per year	1	66	1.5
Average duration of T1 zero flow spells	15	66	22.7
Number of years with one or more T1 freshes	20	66	30.3
Average number of T1 freshes per year	33	66	50
Average total duration of T1 freshes per year	39	66	59.1
Number of years with 2 or more T1 Freshes	26	60	43.3
Frequency of spells higher than LFS fresh level	1	2	50
High flow season			
Average daily HFS flow	4	66	6.1
80th percent exceedence non-zero flow [low flow]	47	66	71.2
Number of years with HFS zero flow spells	16	66	24.2
Average number of HFS zero flow spells per year	1	66	1.5
Average duration of HFS zero flow spells	14	66	21.2
Number of years with one or more HFS freshes	8	66	12.1
Average number of HFS freshes per year	12	66	18.2
Average total duration of HFS freshes per year	9	66	13.6
Number of years with 1 or more spell greater than the annual 5th p.e. flow in HFS	3	41	7.3
Number of years with 2 or more freshes early in the season (Jul, Aug)	1	19	5.3
Transition 2: High to low flow season			
Average daily T2 flow	6	66	9.1
Median non-zero daily T2 flow	45	60	75
80th percent exceedence non-zero flow [low flow]	61	66	92.4
Current month reaching median flow of natural T2 median (early onset)	37	66	56.1
Number of years with T2 zero flow spells	20	66	30.3
Average number of T2 zero flow spells per year	0	66	0
Average duration of T2 zero flow spells	18	66	27.3
Number of years with one or more T2 freshes	22	66	33.3
Average number of T2 freshes per year	18	66	27.3
Average total duration of T2 freshes per year	33	66	50
Frequency of spells higher than LFS fresh level	1	2	50
Number of years with 1 or more spell greater than the annual 5th p.e. flow	10	47	21.3
Number of consecutive years with no T2 fresh	4	6	66.7

Government of South Australia
Department of Water, Land and Biodiversity Conservation

Current state of EWRs in the WMLR



Environmental water provisions

How can we provide water for development while achieving sustainable environmental outcomes?

- Should be as close as possible to environmental water requirements
- Need to be environmentally sustainable
- Need to recognise the rights of existing users

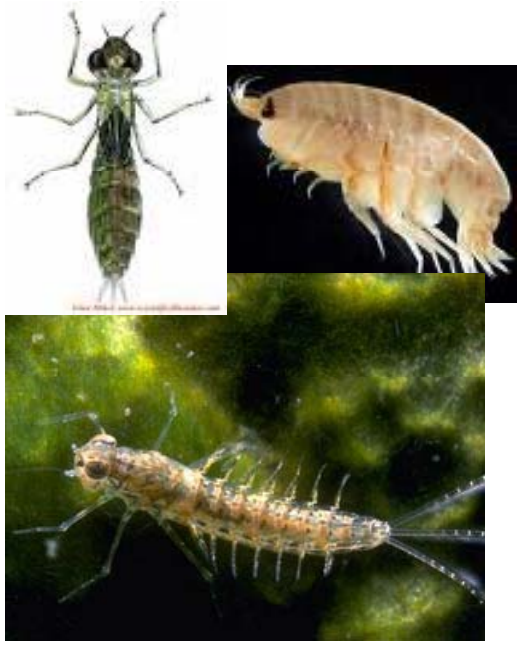
Using the best available science to find the balance between environmental, social and economic needs

Ecological responses to flow

Real survey data

Relate fish and macroinvertebrate monitoring data to flow and EWRs.

Objective: recruitment (breeding and survival to adulthood) should be good to moderate in no less than 7 years in 10.



Results

Environmental water requirements

Low level of risk to ecosystems

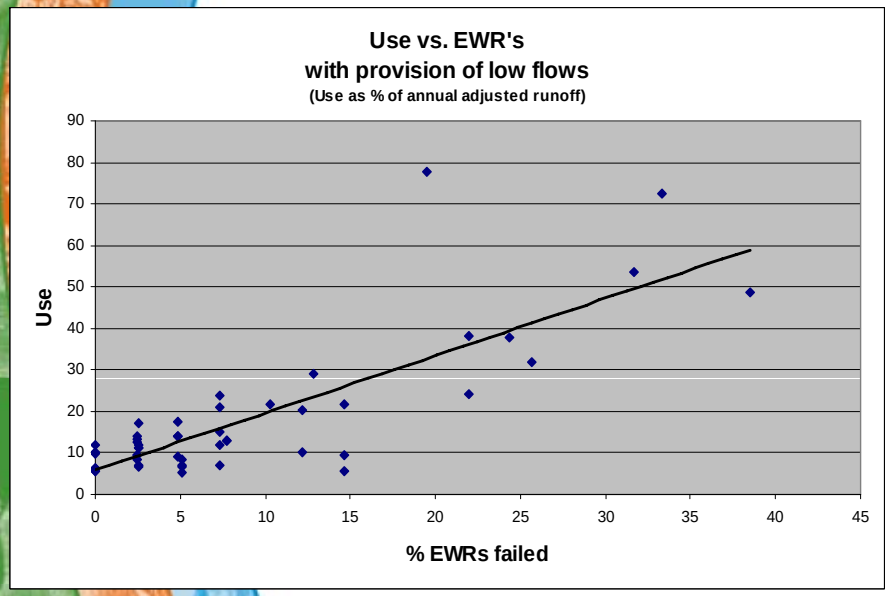
Environmental water provisions

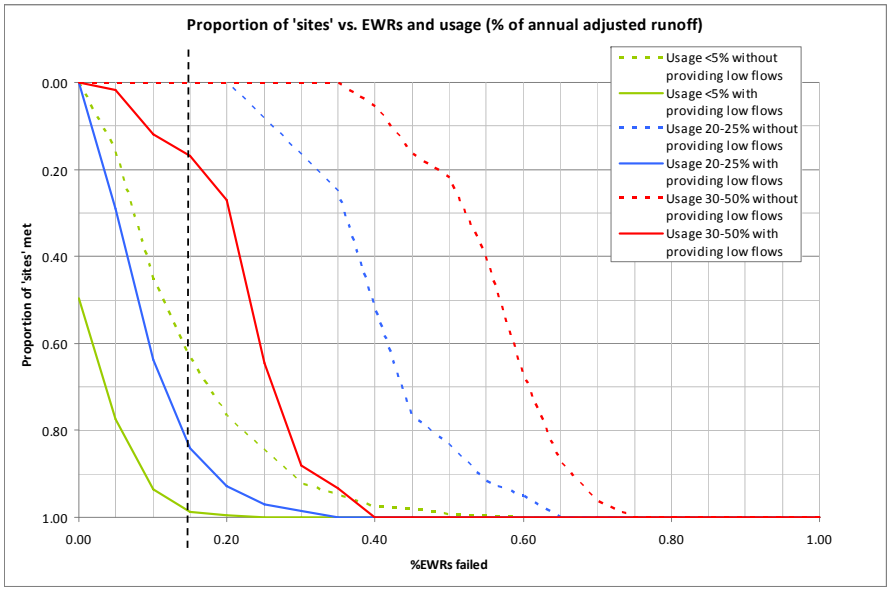
Acceptable risk to ecosystems, balancing against existing demands

- **Fail no more than 15% of EWR's**
- **At no less than 75% of sites**

Next step – converting this to an extraction limit

Summary: Sustainable Extraction Limits





EWP to meet the target

Allocate no more than **25% of annual adjusted runoff**

- *With the provision of low flows from licensed dams (both new and existing)*

Allocate no more than **5% of annual adjusted runoff**

- *Without the provision of low flows from licensed dams*

Sustainable Extraction Limits to Swamps

Wetlands on the Fleurieu Peninsula are different

- *Swamps of the Fleurieu Peninsula (EPBC)*
- *Support >700 plants species (30% of conservation significance)*
- *Support >180 vertebrate species (25 have conservation significance)*
- *Many have water-sensitive peat substrates which exist at the limits of climatic sustainability*

Sustainable Extraction Limits to Swamps

Environmental water provisions for the MLR

Target is to maintain the environment at a low-moderate level of risk.

Wetlands target

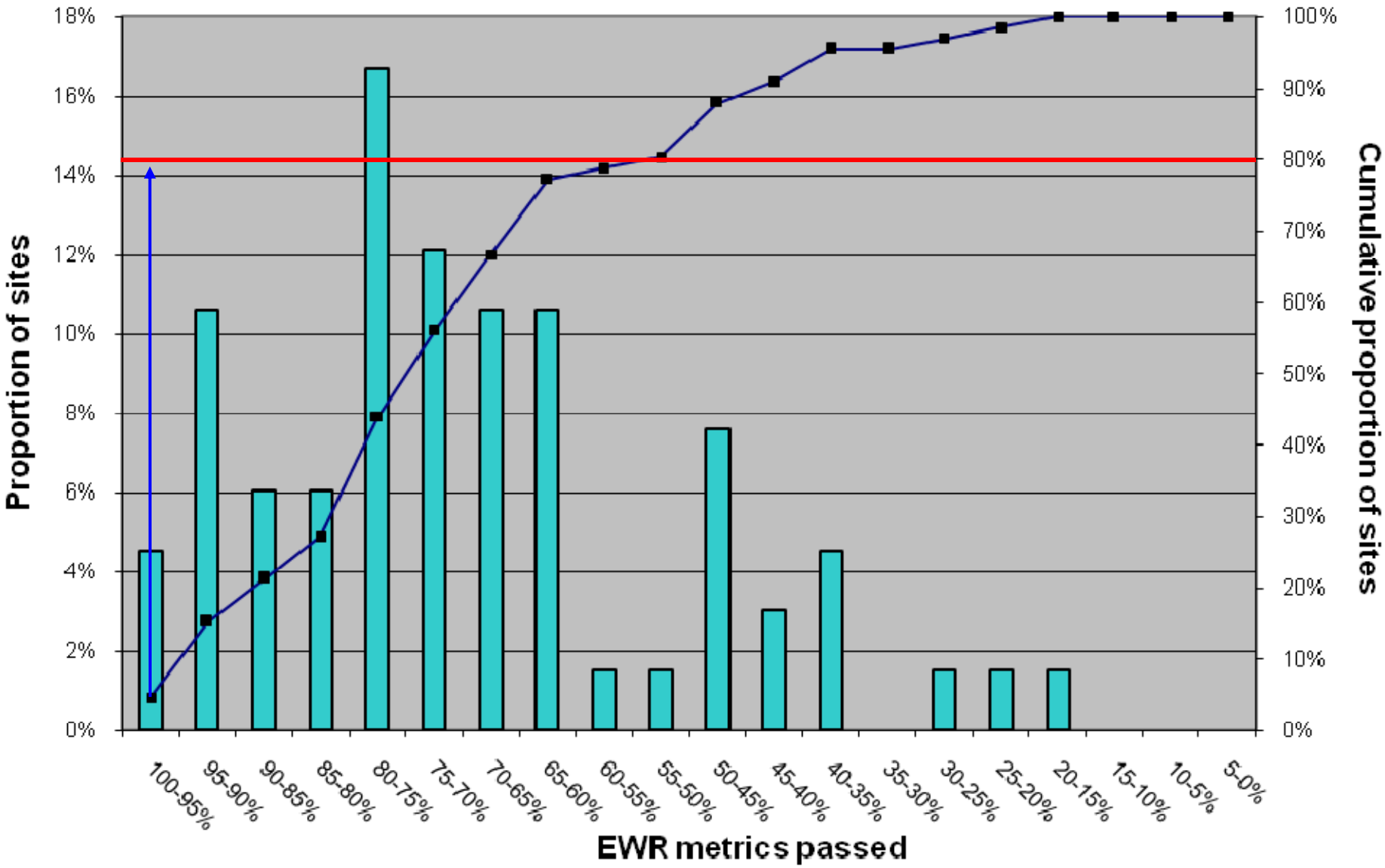
Wetlands warrant another level of risk management given their conservation status, the supported biota, and presence of peat substrates.

Sustainable Extraction Limits to Swamps

Environmental water provisions to wetlands on the Fleurieu Peninsula (WMLR)

- Meeting 100% of metrics equates to maintaining the environment at a low level of risk.
- Given existing development, and with discussions with the recovery team, a target of meeting 95% (c.f. 85% of metrics) of EWRs has been accepted.
- *This equates to an allocation limit of 10% of runoff (c.f. 25%), with a provision of low flows from all dams larger than 5ML.*

Sustainable Extraction Limits to Swamps



Key knowledge gaps/research needs

- Relative dependence on different water sources.
- Relationship between Swamp 'health' and changes in the flow regime.
  - Thresholds, time-lag, recoverability.
  - Low flows, freshes, bankfull, overbank.

END