Quantifying environmental water needs

eWater Ecological Tools

Near channel wetlands and floodplain habitats along the Murray
How much water do they need?

Wearing the hat of the environmental water manager;

- What are the broader social implications of a watering decision?
- How do you quantify the environmental return?
- How do you quanitfy the water cost?

Using eWater tools to approach the problem

1) Identifying the problem – who are the stakeholders and how will they be affected?
   - Concept
2) Quantifying the environmental benefit of a given watering scenario
   - Eco Modeller
3) Determining how much additional water may be required
   - Eflow Predictor

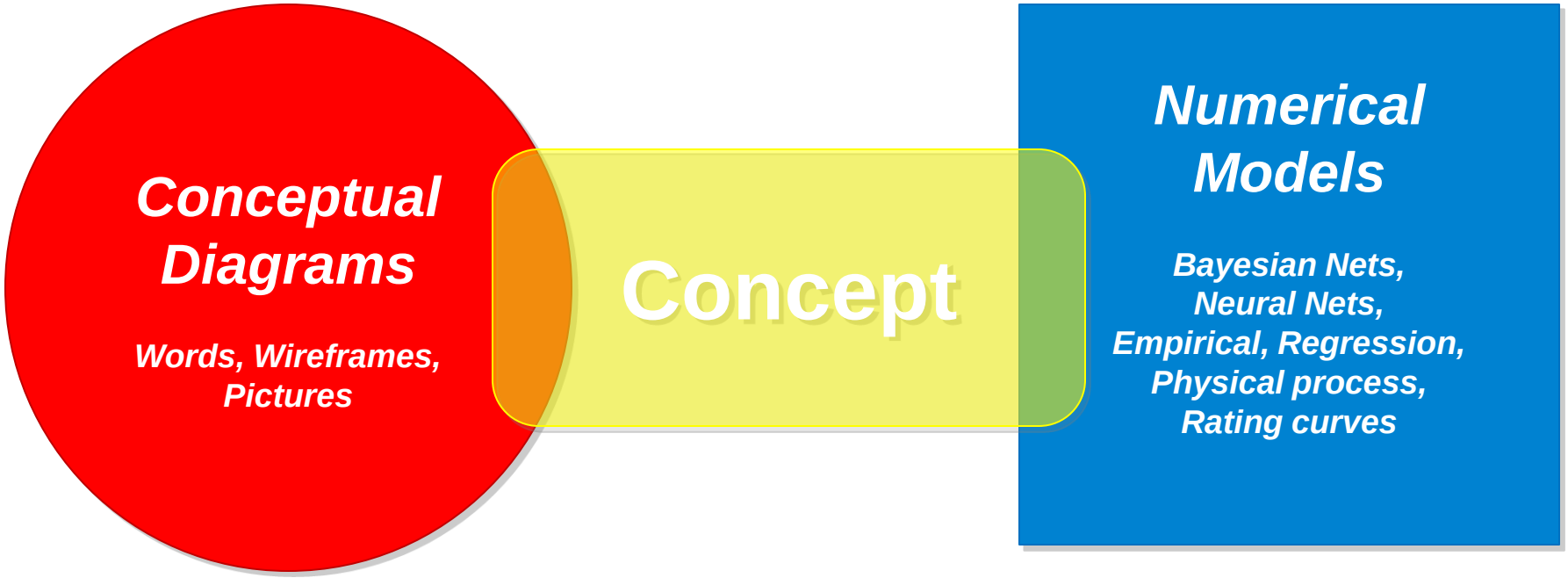
Communication as a key issue in natural resource management (NRM)

- Many different stakeholders, with different priorities and values and different ways of understanding their world
- Need to bring all the views together to create a picture
- Synthesise knowledge, communicate and build consensus

Our solution to consensus

Communication

Numeric prediction



Quantifying the environmental benefit

From the Concept example, the Environmental Water Manager is aware of the broader stakeholder interests and their likely response to a watering decision.

We can help inform the subsequent management decisions by **quantifying** the ecological consequences of alternative water use scenarios using Eco Modeller

Consider River Red Gum vegetation communities in Barmah forest

River Red Gum Woodland water requirements

Mature trees:

- **Duration:** 1 to 5 months is good, longer than 2 years is bad
- **Timing**: Anytime is good, but in the second half of the year is best.
- **Time between floods**: Preferred return interval is less than 5 years

Recruitment:

- **Duration**: as per adults
- **Timing:** similar to adults, but best success for Sept, Oct, Nov Floods
- **Time Between Floods**: no preference as the seed bank is long lived

River Red Gum habitat availability
Eco Modeller results

Two modelled scenarios (110 years 1896-2006)

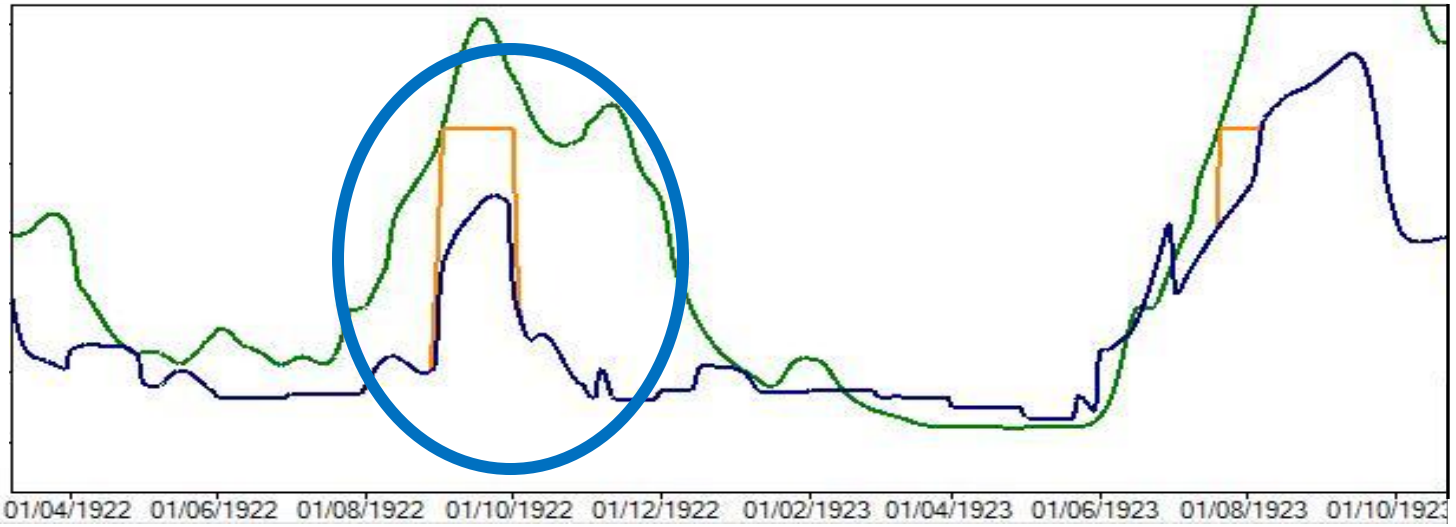
- Predevelopment - all consumptive use turned off for entire period
- Current – all current consumptive use turned on for entire period
- Score = Mean annual habitat score (% of ideal)

asset	Predevelopment	Current
River Red Gum Forest Adult	27%	14%
River Red Gum Forest Recruitment	47%	23%
River Red Gum Woodland Adult	11%	6%
River Red Gum Woodland Recruitment	39%	19%

45 % to 50% decrease in the mean annual habitat score from predevelopment to current scenario

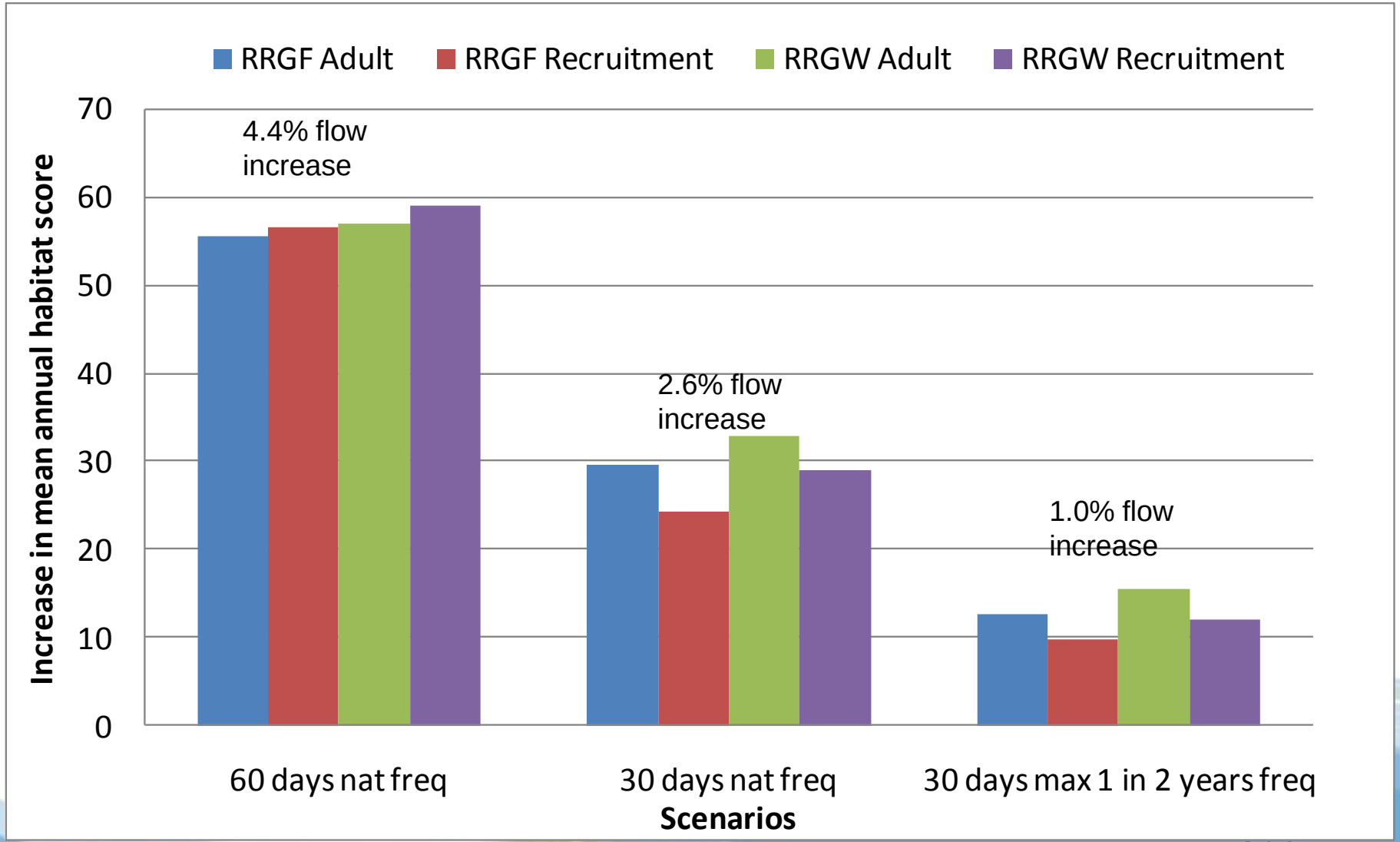
Consider adding more water –eFlow Predictor

Create some new flow scenarios by increasing the flow at specific parts of the hydrograph to mimic the natural frequency of these small events

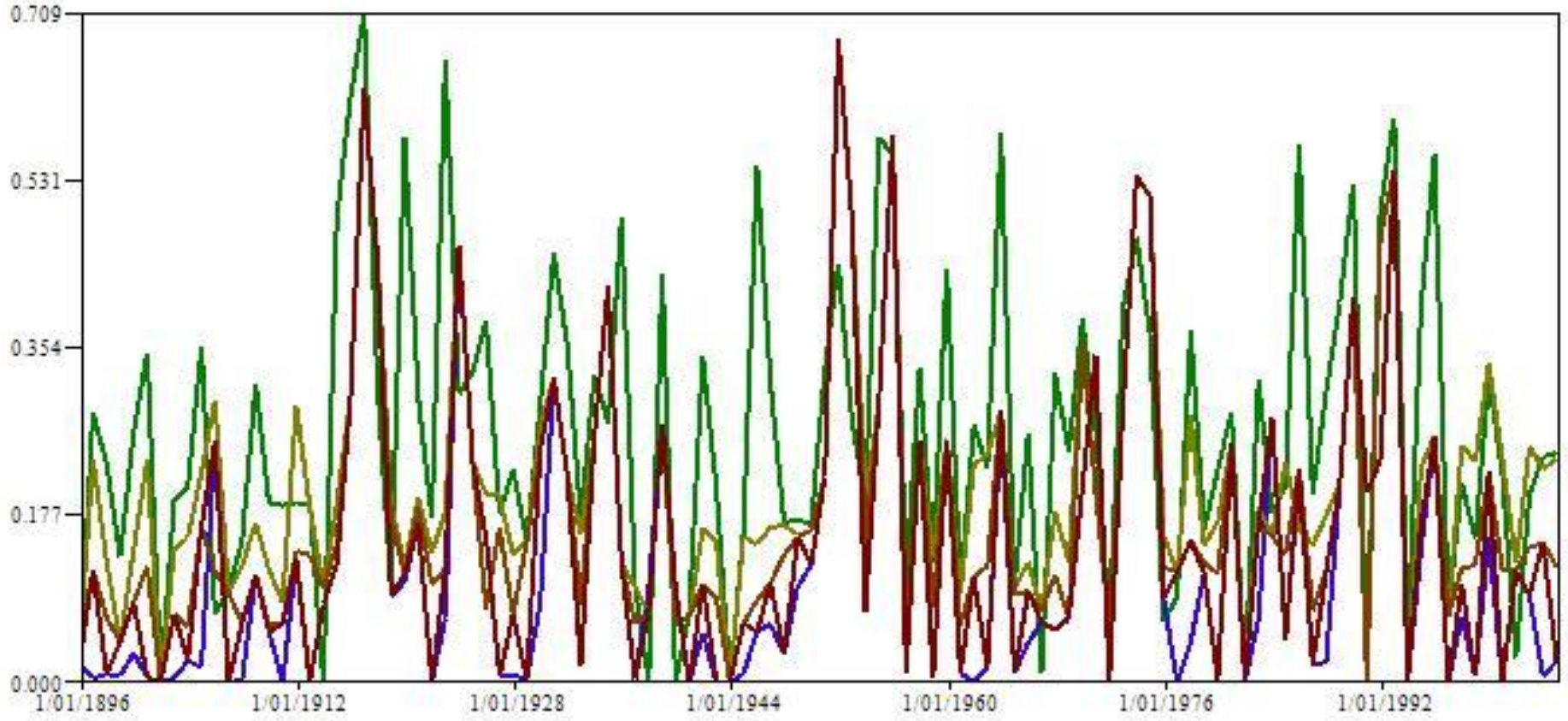


Option	Additional Water Cost (% of current)
18,300ML/d 60 days return to pre-development frequency	4.4%
18,300ML/d 30 days return to pre-development frequency	2.6%
18,300ML/d 30 days max 1 in every 2 years	1.0%

What impact do these flow changes have on River Red Gum?



There is detail below the habitat summary



18,300 Ml/d 60 days pre development frequency

Ecological tools to help water management

Gaining consensus in system understanding and problem definition

- **Concept**

Defining ecological water requirements and quantifying the impact of alternative flow regimes

- **Eco Modeller**

Predicting the order of environmental water requirements

- **eFlow Predictor**