



Bayesian Networks: a tool to support good decision-making

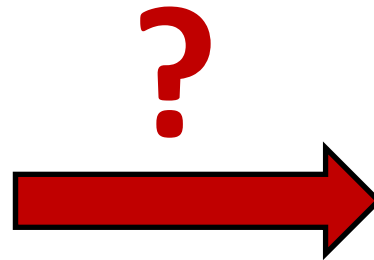
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Bridging the gap between science and values

Modelling

- Nutrient leaching
- Sediment runoff
- Pathogen runoff
- Surface water flows
- Groundwater flows

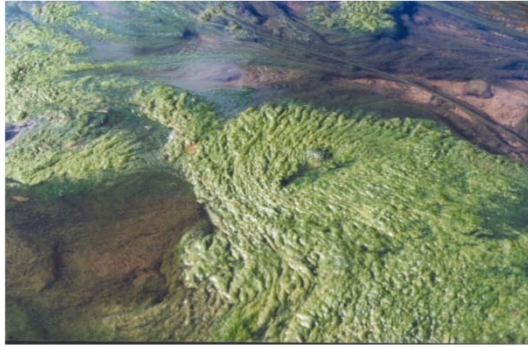


Values

- Natural character
- Recreation (swimming, fishing, boating)
- Biodiversity esp. Taonga species

How to use modelling info to achieve good outcomes for values?

Consequences of policy/management decisions on the things we care about?



Algae on streambed



Gravel extraction

Flow

River braidedness

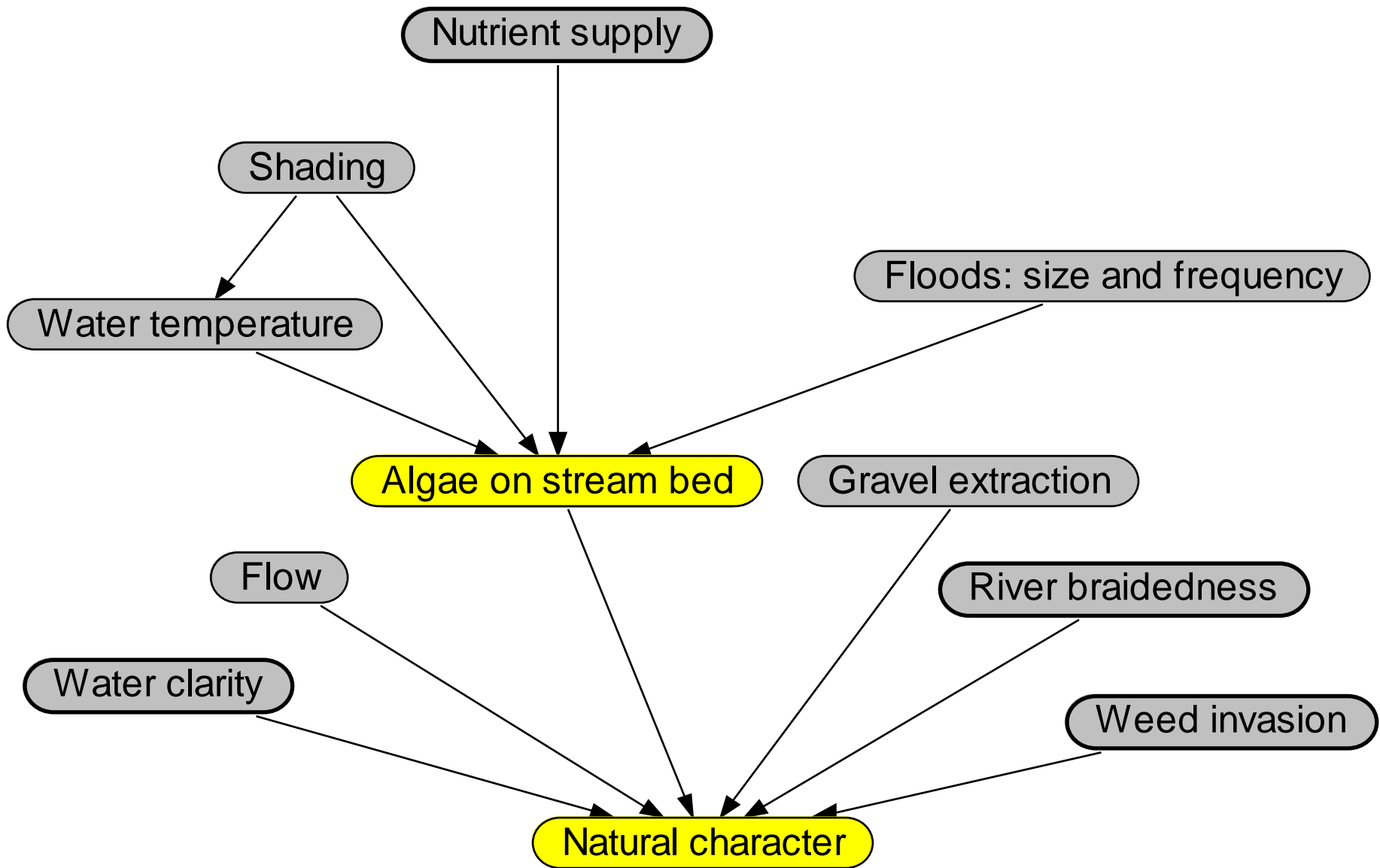
Water clarity

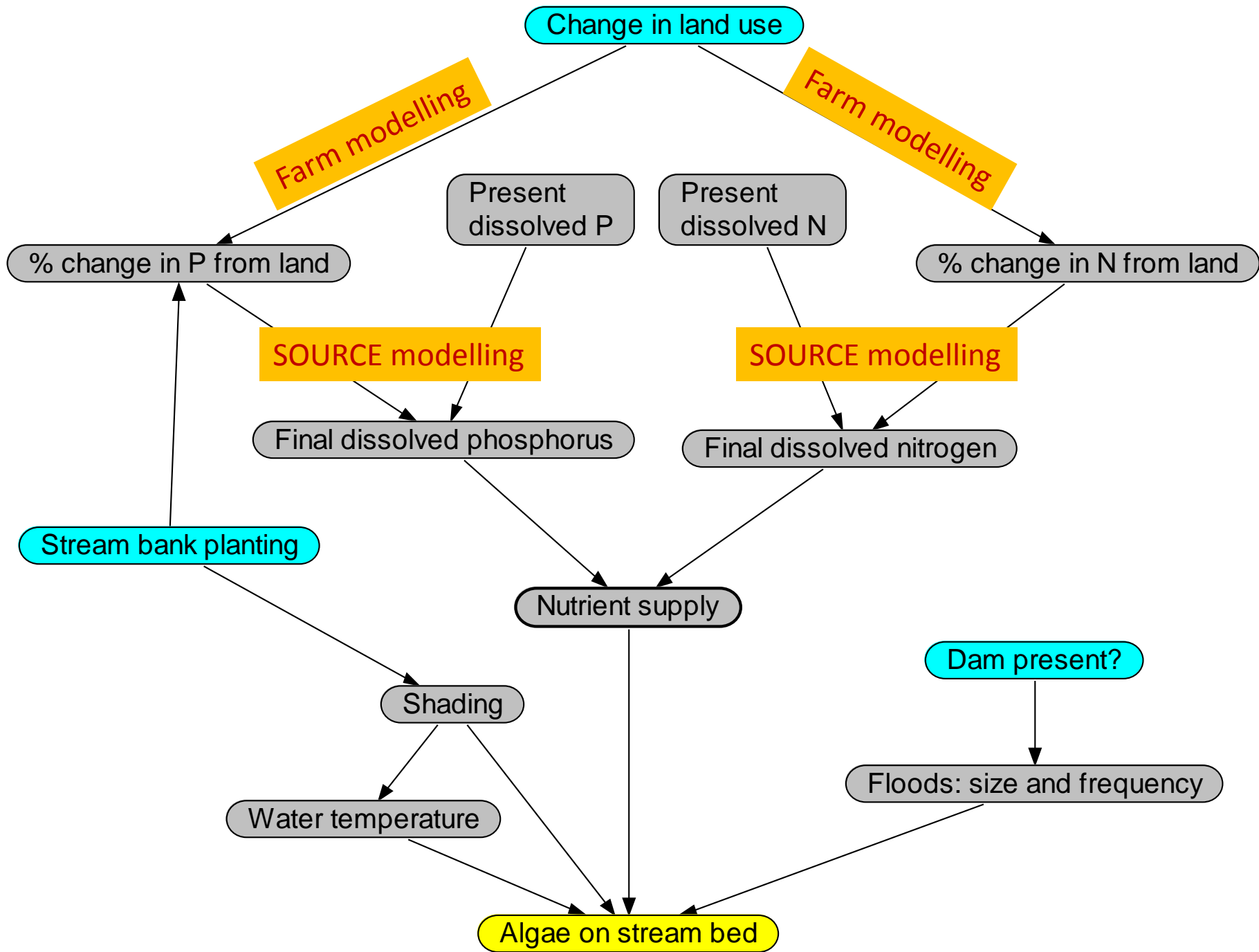
Weed invasion



Natural character







Streambank planting %		
0 to 50	50.0	
50 to 100	50.0	
50 ± 29		

Dam present?		
yes	50.0	
no	50.0	

Shading %		
0 to 50	65.0	
50 to 75	30.0	
75 to 100	5.00	
39.4 ± 24		

Nutrient supply		
low	33.3	
med	33.3	
high	33.3	

Floods: size and frequency		
low	55.0	
med	25.0	
high	20.0	

Water temperature		
0 to 15	4.50	
15 to 20	41.0	
20 to 25	54.5	
19.8 ± 4		

Algae on stream bed (% cover)		
0 to 30	39.2	
30 to 100	60.8	
45.4 ± 30		

states

probabilities

Streambank planting %	
0 to 50	100
50 to 100	0
25 ± 14	

Dam present?	
yes	100
no	0

Shading %	
0 to 50	80.0
50 to 75	20.0
75 to 100	0
32.5 ± 20	

Nutrient supply	
low	33.3
med	33.3
high	33.3

Floods: size and frequency	
low	80.0
med	20.0
high	0

Water temperature	
0 to 15	2.00
15 to 20	36.0
20 to 25	62.0
20.4 ± 3.4	

Algae on stream bed (% cover)	
0 to 30	29.1
30 to 100	70.9
50.5 ± 29	

Streambank planting %	
0 to 50	100
50 to 100	0
25 ± 14	

Shading %	
0 to 50	80.0
50 to 75	20.0
75 to 100	0
32.5 ± 20	

Water temperature	
0 to 15	2.00
15 to 20	36.0
20 to 25	62.0
20.4 ± 3.4	

Information from SOURCE model

Nutrient supply	
low	0
med	0
high	100

Dam present?	
yes	100
no	0

Floods: size and frequency	
low	80.0
med	20.0
high	0

Algae on stream bed (% cover)	
0 to 30	11.4
30 to 100	88.6
59.3 ± 25	

What does the Bayesian Network do?

- shows the effects of decisions on key attributes
 - focus on ecology and natural character
- outputs are probabilities of being in different states
- inputs are from other models (OVERSEER, SOURCE, groundwater models).
- links models with ecological values
- combines information from various sources