

Appendix 8

Conditional probabilities. Twenty owners of large, forested properties (at least 20 ha in total area with at least 4 ha of forest) in Macon County, North Carolina, participated in a structured decision making (SDM) process consisting of two series of workshops with ten landowners each. In each series, landowners evaluated what they can do to their forest to maximize the achievement of their land use objectives. Forest management decision options were evaluated through a decision network that predicted expected outcomes from each decision option. Conditional probabilities describing the probability of outcomes given states were required to analyze the decision network. Scientific experts completed the conditional probability tables related to shade-intolerant tree abundance, exotic species abundance, the conservation value of the forest for herpetofauna, the conservation value of the forest for birds, water quality, erosion severity, fire severity, human safety, property damage, and net income. The landowners completed the conditional probability tables related to maintaining a rural landscape, keeping the property in the family, minimizing development, and aesthetics. If the conditional probability tables differ between the two series of discussion meetings, the series is indicated above the table.

Table A8.1

Decision option	Expert	High severity of	Low severity of	No fire
		fire	fire	
No modification	1	0.01	0.04	0.95
No modification	2	0	0	1
Personal use	1	0.01	0.04	0.95
Personal use	2	0	0	1
Thinning	1	0.01	0.04	0.95
Thinning	2	0	0	1
Group selection	1	0.01	0.04	0.95
Group selection	2	0	0	1
Shelterwood	1	0.01	0.04	0.95
Shelterwood	2	0	0	1
Easement with no modification	1	0.01	0.04	0.95
Easement with no modification	2	0	0	1
Easement with personal use	1	0.01	0.04	0.95
Easement with personal use	2	0	0	1
Easement with thinning	1	0.01	0.04	0.95
Easement with thinning	2	0	0	1
Easement with group selection	1	0.01	0.04	0.95
Easement with group selection	2	0	0	1
Easement with shelterwood	1	0.01	0.04	0.95
Easement with shelterwood	2	0	0	1

Sell 5 acres, remainder personal use	1	0.01	0.04	0.95
Sell 5 acres, remainder personal use	2	0	0.2	0.8

Table A8.2

Decision option	Expert	High severity of erosion	Medium severity of erosion	Low severity of erosion
No modification	1	0	0.3	0.7
No modification	2	0.05	0.35	0.6
Personal use	1	0	0.3	0.7
Personal use	2	0.1	0.4	0.5
Thinning	1	0	0.3	0.7
Thinning	2	0.15	0.45	0.4
Group selection	1	0.1	0.3	0.6
Group selection	2	0.2	0.45	0.35
Shelterwood	1	0.1	0.3	0.6
Shelterwood	2	0.22	0.43	0.35
Easement with no modification	1	0	0.3	0.7
Easement with no modification	2	0.05	0.35	0.6
Easement with personal use	1	0	0.3	0.7
Easement with personal use	2	0.1	0.4	0.5
Easement with thinning	1	0	0.3	0.7
Easement with thinning	2	0.15	0.45	0.4
Easement with group selection	1	0.1	0.3	0.6
Easement with group selection	2	0.2	0.45	0.35
Easement with shelterwood	1	0.1	0.3	0.6
Easement with shelterwood	2	0.22	0.43	0.35
Sell 5 acres, remainder personal use	1	0.5	0.3	0.2
Sell 5 acres, remainder personal use	2	0.22	0.43	0.35

Table A8.3

Erosion severity	Fire severity	Expert	No property damage	Low property damage	High property damage
High severity	High severity	1	0	0.2	0.8
High severity	High severity	2	0.2	0.6	0.2
High severity	Low severity	1	0	0.3	0.7
High severity	Low severity	2	0.4	0.5	0.1
High severity	None	1	0	0.3	0.7
High severity	None	2	0.55	0.4	0.05
Medium severity	High severity	1	0	0.4	0.6
Medium severity	High severity	2	0.3	0.55	0.15
Medium severity	Low severity	1	0	0.5	0.5
Medium severity	Low severity	2	0.5	0.45	0.05
Medium severity	None	1	0	0.5	0.5
Medium severity	None	2	0.65	0.35	0
Low severity	High severity	1	0.15	0.5	0.35
Low severity	High severity	2	0.3	0.55	0.15
Low severity	Low severity	1	0.25	0.5	0.25
Low severity	Low severity	2	0.85	0.1	0.05
Low severity	None	1	0.25	0.5	0.25
Low severity	None	2	1	0	0

Table A8.4

Erosion severity	Fire severity	Expert	High human safety	Moderate human safety	Low human safety
High severity	High severity	1	0	0.2	0.8
High severity	High severity	2	0.2	0.6	0.2
High severity	Low severity	1	0	0.3	0.7
High severity	Low severity	2	0.4	0.5	0.1
High severity	None	1	0	0.3	0.7
High severity	None	2	0.55	0.4	0.05
Medium severity	High severity	1	0	0.4	0.6
Medium severity	High severity	2	0.3	0.55	0.15
Medium severity	Low severity	1	0	0.5	0.5
Medium severity	Low severity	2	0.5	0.45	0.05
Medium severity	None	1	0	0.5	0.5
Medium severity	None	2	0.65	0.35	0
Low severity	High severity	1	0.15	0.5	0.35
Low severity	High severity	2	0.3	0.55	0.15
Low severity	Low severity	1	0.25	0.5	0.25
Low severity	Low severity	2	0.85	0.1	0.05
Low severity	None	1	0.25	0.5	0.25
Low severity	None	2	1	0	0

Table A8.5

Decision	Expert	Negative net income	Even net income	Positive net income
No modification	1	1	0	0
No modification	2	1	0	0
No modification	3	1	0	0
Personal use	1	1	0	0
Personal use	2	1	0	0
Personal use	3	1	0	0
Thinning	1	0.33	0.33	0.34
Thinning	2	0.33	0.33	0.34
Thinning	3	0.33	0.33	0.34
Group selection	1	0.2	0.4	0.4
Group selection	2	0.2	0.4	0.4
Group selection	3	0.2	0.4	0.4
Shelterwood	1	0.1	0.3	0.6
Shelterwood	2	0.1	0.3	0.6
Shelterwood	3	0.1	0.3	0.6
Easement with no modification	1	1	0	0
Easement with no modification	2	1	0	0
Easement with no modification	3	1	0	0
Easement with personal use	1	1	0	0
Easement with personal use	2	1	0	0
Easement with personal use	3	1	0	0
Easement with thinning	1	0.4	0.4	0.2
Easement with thinning	2	0.2	0.2	0.6
Easement with thinning	3	0.9	0.1	0
Easement with group selection	1	0.2	0.3	0.5
Easement with group selection	2	0.15	0.15	0.7
Easement with group selection	3	0.75	0.2	0.05
Easement with shelterwood	1	0	0	1
Easement with shelterwood	2	0.1	0.1	0.8
Easement with shelterwood	3	0.6	0.3	0.1
Sell 5 acres, remainder personal use	1	0	0	1
Sell 5 acres, remainder personal use	2	0.05	0.1	0.85
Sell 5 acres, remainder personal use	3	0.33	0.34	0.33

Table A8.6
Series 1

Net income	100-67% of property in the family	66-34% of property in the family	33-0% of property in the family
Positive	1	0	0
Even	0.8	0.1	0.1
Negative	0.1	0.4	0.5

Series 2

Net income	Aesthetics	100-51% of property in family	50-0% of property in family
Positive	Good	0.9	0.1
Positive	Bad	0.7	0.3
Even	Good	0.8	0.2
Even	Bad	0.4	0.6
Negative	Good	0.6	0.4
Negative	Bad	0.1	0.9

Table A8.7
Series 1

Decision option	Maintain rural landscape	Lose a little rural landscape	Lose a lot of rural landscape
No modification	1	0	0
Personal use	0.9	0.1	0
Thinning	0.9	0.1	0
Group selection	0.8	0.2	0
Shelterwood	0.7	0.3	0
Easement with no modification	1	0	0
Easement with personal use	1	0	0
Easement with thinning	0.9	0.1	0
Easement with group selection	0.8	0.2	0
Easement with shelterwood	0.7	0.3	0
Sell 5 acres, remainder personal use	0.2	0.6	0.2

Series 2

Income from property	Future development	Maintain rural landscape	Lose rural landscape
100-51% of income	No division	0.8	0.2
100-51% of income	At least one division	0.6	0.4
50-0% of income	No division	0.7	0.3
50-0% of income	At least one division	0.25	0.75

Table A8.8

Series 1

Net income	No division	Up to two division	More than two divisions
Positive	0.8	0.2	0
Even	0.4	0.4	0.2
Negative	0	0.5	0.5

Series 2

Net income	No division	At least one division
Positive	0.9	0.1
Even	0.75	0.25
Negative	0.1	0.9

Table A8.9

Rural landscape	Native diversity	Water quality	Good aesthetics	Bad aesthetics
Maintain	High	Low	0.3	0.7
Maintain	High	High	1	0
Maintain	Low	Low	0.1	0.9
Maintain	Low	High	0.7	0.3
Lose	High	Low	0.2	0.8
Lose	High	High	0.8	0.2
Lose	Low	Low	0	1
Lose	Low	High	0.2	0.8

Table A8.10
Series 1

Decision option	Expert	Low water quality	Medium water quality	High water quality
No modification	1	0	0.3	0.7
No modification	2	0.05	0.35	0.6
No modification	3	0.03	0.07	0.9
Personal use	1	0	0.3	0.7
Personal use	2	0.1	0.4	0.5
Personal use	3	0.05	0.1	0.85
Thinning	1	0	0.3	0.7
Thinning	2	0.15	0.45	0.4
Thinning	3	0.1	0.15	0.75
Group selection	1	0.1	0.3	0.6
Group selection	2	0.2	0.45	0.35
Group selection	3	0.15	0.35	0.5
Shelterwood	1	0.1	0.3	0.6
Shelterwood	2	0.22	0.43	0.35
Shelterwood	3	0.25	0.35	0.4
Easement with no modification	1	0	0.3	0.7
Easement with no modification	2	0.05	0.35	0.6
Easement with no modification	3	0.03	0.07	0.9
Easement with personal use	1	0	0.3	0.7
Easement with personal use	2	0.1	0.4	0.5
Easement with personal use	3	0.05	0.1	0.85
Easement with thinning	1	0	0.3	0.7
Easement with thinning	2	0.15	0.45	0.4
Easement with thinning	3	0.1	0.15	0.75
Easement with group selection	1	0.1	0.3	0.6
Easement with group selection	2	0.2	0.45	0.35
Easement with group selection	3	0.15	0.35	0.5
Easement with shelterwood	1	0.1	0.3	0.6
Easement with shelterwood	2	0.22	0.43	0.35
Easement with shelterwood	3	0.25	0.35	0.4
Sell 5 acres, remainder personal use	1	0.5	0.3	0.2
Sell 5 acres, remainder personal use	2	0.22	0.43	0.35
Sell 5 acres, remainder personal use	3	0.08	0.12	0.8

Series 2

Decision option	Expert	Low water quality	High water quality
No modification	1	0	1
No modification	2	0.225	0.775
No modification	3	0.065	0.935
Personal use	1	0	1
Personal use	2	0.3	0.7
Personal use	3	0.1	0.9
Thinning	1	0	1
Thinning	2	0.375	0.625
Thinning	3	0.175	0.825
Group selection	1	0.25	0.75
Group selection	2	0.425	0.575
Group selection	3	0.325	0.675
Shelterwood	1	0.25	0.75
Shelterwood	2	0.435	0.565
Shelterwood	3	0.425	0.575
Easement with no modification	1	0	1
Easement with no modification	2	0.225	0.775
Easement with no modification	3	0.065	0.935
Easement with personal use	1	0	1
Easement with personal use	2	0.3	0.7
Easement with personal use	3	0.1	0.9
Easement with thinning	1	0	1
Easement with thinning	2	0.375	0.625
Easement with thinning	3	0.175	0.825
Easement with group selection	1	0.25	0.75
Easement with group selection	2	0.425	0.575
Easement with group selection	3	0.325	0.675
Easement with shelterwood	1	0.25	0.75
Easement with shelterwood	2	0.435	0.565
Easement with shelterwood	3	0.425	0.575
Sell 5 acres, remainder personal use	1	0.65	0.35
Sell 5 acres, remainder personal use	2	0.435	0.565
Sell 5 acres, remainder personal use	3	0.14	0.86

Table A8.11
Series 1

Decision option	Expert	High abundance of exotic species	Medium abundance of exotic species	Low abundance of exotic species
No modification	1	0	0.3	0.7
No modification	2	0.2	0.3	0.5
Personal use	1	0	0.3	0.7
Personal use	2	0.25	0.35	0.4
Thinning	1	0	0.3	0.7
Thinning	2	0.3	0.4	0.3
Group selection	1	0.1	0.3	0.6
Group selection	2	0.35	0.4	0.25
Shelterwood	1	0.15	0.25	0.6
Shelterwood	2	0.37	0.38	0.25
Easement with no modification	1	0	0.3	0.7
Easement with no modification	2	0.2	0.3	0.5
Easement with personal use	1	0	0.3	0.7
Easement with personal use	2	0.25	0.35	0.4
Easement with thinning	1	0	0.3	0.7
Easement with thinning	2	0.3	0.4	0.3
Easement with group selection	1	0.1	0.3	0.6
Easement with group selection	2	0.35	0.4	0.25
Easement with shelterwood	1	0.15	0.25	0.6
Easement with shelterwood	2	0.37	0.38	0.25
Sell 5 acres, remainder personal use	1	0.5	0.3	0.2
Sell 5 acres, remainder personal use	2	0.37	0.38	0.25

Series 2

Decision option	Expert	High abundance of exotic species	Low abundance of exotic species
No modification	1	0	1
No modification	2	0.35	0.65
Personal use	1	0	1
Personal use	2	0.425	0.575
Thinning	1	0	1
Thinning	2	0.5	0.5
Group selection	1	0.25	0.75
Group selection	2	0.55	0.45
Shelterwood	1	0.275	0.725
Shelterwood	2	0.56	0.44
Easement with no modification	1	0	1
Easement with no modification	2	0.35	0.65
Easement with personal use	1	0	1
Easement with personal use	2	0.425	0.575
Easement with thinning	1	0	1
Easement with thinning	2	0.5	0.5
Easement with group selection	1	0.25	0.75
Easement with group selection	2	0.55	0.45
Easement with shelterwood	1	0.275	0.725
Easement with shelterwood	2	0.56	0.44
Sell 5 acres, remainder personal use	1	0.65	0.35
Sell 5 acres, remainder personal use	2	0.56	0.44

Table A8.12

Decision	Expert	Less conservation value for birds	Equal conservation value for birds	More conservation value for birds
No modification	1	0	1	0
No modification	2	0	1	0
Personal use	1	0.15	0.75	0.1
Personal use	2	0.1	0.9	0
Thinning	1	0.25	0.5	0.25
Thinning	2	0.2	0.8	0
Group selection	1	0.65	0.2	0.15
Group selection	2	0.3	0.7	0
Shelterwood	1	0.8	0.15	0.05
Shelterwood	2	0.4	0.6	0
Easement with no modification	1	0	1	0
Easement with no modification	2	0	1	0
Easement with personal use	1	0.15	0.75	0.1
Easement with personal use	2	0.1	0.9	0
Easement with thinning	1	0.25	0.5	0.25
Easement with thinning	2	0.2	0.8	0
Easement with group selection	1	0.65	0.2	0.15
Easement with group selection	2	0.3	0.7	0
Easement with shelterwood	1	0.8	0.15	0.05
Easement with shelterwood	2	0.4	0.6	0
Sell 5 acres, remainder personal use	1	0.9	0.1	0
Sell 5 acres, remainder personal use	2	0.65	0.35	0

Table A8.13

Decision	Expert	Less conservation value for herps	Equal conservation value for herps	More conservation value for herps
No modification	1	0	1	0
No modification	2	0	1	0
Personal use	1	0	1	0
Personal use	2	0.15	0.82	0.03
Thinning	1	0.1	0.8	0.1
Thinning	2	0.3	0.5	0.2
Group selection	1	0.5	0.45	0.05
Group selection	2	0.2	0.5	0.3
Shelterwood	1	0.9	0.1	0
Shelterwood	2	0.5	0.05	0.45
Easement with no modification	1	0	1	0
Easement with no modification	2	0	1	0
Easement with personal use	1	0	1	0
Easement with personal use	2	0.15	0.82	0.03
Easement with thinning	1	0.1	0.8	0.1
Easement with thinning	2	0.3	0.5	0.2
Easement with group selection	1	0.5	0.45	0.05
Easement with group selection	2	0.2	0.5	0.3
Easement with shelterwood	1	0.9	0.1	0
Easement with shelterwood	2	0.5	0.05	0.45
Sell 5 acres, remainder personal use	1	0.1	0.9	0
Sell 5 acres, remainder personal use	2	0.5	0.45	0.05

Table A8.14

Decision option	Lower abundance of shade-intolerant trees	Equal abundance of shade-intolerant trees	Greater abundance of shade-intolerant trees
No modification	0	1	0
Personal use	0.33	0.34	0.33
Thinning	0.1	0.6	0.3
Group selection	0.1	0.1	0.8
Shelterwood	0.1	0.1	0.8
Easement with no modification	0	1	0
Easement with personal use	0.33	0.34	0.33
Easement with thinning	0.1	0.6	0.3
Easement with group selection	0.1	0.1	0.8
Easement with shelterwood	0.1	0.1	0.8
Sell 5 acres, remainder personal use	0.32	0.35	0.33

Table A8.15
Series 1

Trees	Herps	Birds	Very high native diversity	Moderately high native diversity	Moderately low native diversity	Very low native diversity
Less shade-intolerant	Less conservation value	Less conservation value	0	0.33	0.34	0.33
Less shade-intolerant	Less conservation value	Equal conservation value	0.17	0.39	0.23	0.22
Less shade-intolerant	Less conservation value	More conservation value	0.25	0.30	0.23	0.22
Less shade-intolerant	Equal conservation value	Less conservation value	0.17	0.39	0.23	0.22
Less shade-intolerant	Equal conservation value	Equal conservation value	0.33	0.44	0.11	0.11
Less shade-intolerant	Equal conservation value	More conservation value	0.42	0.36	0.11	0.11
Less shade-intolerant	More conservation value	Less conservation value	0.25	0.30	0.23	0.22
Less shade-intolerant	More conservation value	Equal conservation value	0.42	0.36	0.11	0.11
Less shade-intolerant	More conservation value	More conservation value	0.50	0.28	0.11	0.11

Equal	Less conservation value	Less conservation value	0.17	0.39	0.23	0.22
Equal	Less conservation value	Equal conservation value	0.33	0.44	0.11	0.11
Equal	Less conservation value	More conservation value	0.42	0.36	0.11	0.11
Equal	Equal conservation value	Less conservation value	0.33	0.44	0.11	0.11
Equal	Equal conservation value	Equal conservation value	0.50	0.50	0	0
Equal	Equal conservation value	More conservation value	0.58	0.42	0	0
Equal	More conservation value	Less conservation value	0.42	0.36	0.11	0.11
Equal	More conservation value	Equal conservation value	0.58	0.42	0	0
Equal	More conservation value	More conservation value	0.67	0.33	0	0
More shade-intolerant	Less conservation value	Less conservation value	0.25	0.30	0.23	0.22
More shade-intolerant	Less conservation value	Equal conservation value	0.42	0.36	0.11	0.11

More shade-intolerant	Less conservation value	More conservation value	0.50	0.28	0.11	0.11
More shade-intolerant	Equal conservation value	Less conservation value	0.42	0.36	0.11	0.11
More shade-intolerant	Equal conservation value	Equal conservation value	0.58	0.42	0	0
More shade-intolerant	Equal conservation value	More conservation value	0.67	0.33	0	0
More shade-intolerant	More conservation value	Less conservation value	0.50	0.28	0.11	0.11
More shade-intolerant	More conservation value	Equal conservation value	0.67	0.33	0	0
More shade-intolerant	More conservation value	More conservation value	0.75	0.25	0	0

Series 2

Trees	Herps	Birds	High native diversity	Low native diversity
Less shade-intolerant	Less conservation value	Less conservation value	0.33	0.67
Less shade-intolerant	Less conservation value	Equal conservation value	0.55	0.45
Less shade-intolerant	Less conservation value	More conservation value	0.55	0.45
Less shade-intolerant	Equal conservation value	Less conservation value	0.55	0.45
Less shade-intolerant	Equal conservation value	Equal conservation value	0.78	0.22
Less shade-intolerant	Equal conservation value	More conservation value	0.78	0.22
Less shade-intolerant	More conservation value	Less conservation value	0.55	0.45
Less shade-intolerant	More conservation value	Equal conservation value	0.78	0.22
Less shade-intolerant	More conservation value	More conservation value	0.78	0.22
Equal	Less conservation value	Less conservation value	0.55	0.45
Equal	Less conservation value	Equal conservation value	0.78	0.22
Equal	Less conservation value	More conservation value	0.78	0.22
Equal	Equal conservation value	Less conservation value	0.78	0.22
Equal	Equal conservation value	Equal conservation value	1	0
Equal	Equal conservation value	More conservation value	1	0
Equal	More conservation value	Less conservation value	0.78	0.22
Equal	More conservation value	Equal conservation value	1	0
Equal	More conservation value	More conservation value	1	0
More shade-intolerant	Less conservation value	Less conservation value	0.55	0.45
More shade-intolerant	Less conservation value	Equal conservation value	0.78	0.22
More shade-intolerant	Less conservation value	More conservation value	0.78	0.22
More shade-intolerant	Equal conservation value	Less conservation value	0.78	0.22
More shade-intolerant	Equal conservation value	Equal conservation value	1	0
More shade-intolerant	Equal conservation value	More conservation value	1	0
More shade-intolerant	More conservation value	Less conservation value	0.78	0.22

More shade-intolerant	More conservation value	Equal conservation value	1	0
More shade-intolerant	More conservation value	More conservation value	1	0

Table A8.16

	Very high native species diversity	Moderately high native species diversity	Moderately low native species diversity	Very low native species diversity
Less conservation value, Lower shade-intolerant tree abundance	0	0.33	0.34	0.33
Equal conservation value, Equal shade-intolerant tree abundance	0.5	0.5	0	0
Greater conservation value, Greater shade-intolerant tree abundance	0.75	0.25	0	0