

Contents

1	Introduction	1
2	Background	3
3	The Endogenous Fixed Charge Model	6
4	ARDM: Accelerated Road Decay Model	11
4.1	The Effect of Higher Precipitation on Road Decay	11
4.2	The Effect of Extreme Storm Events on Road Failure	14
4.3	ARDM Cost Structure Summary	17
5	Data	18
5.1	Climate Data	18
5.2	Forest and Road Data	23
6	Climate Data Processing and Scenario Generation	29
6.1	Climate Data Processing	29
6.1.1	Extreme Event Probability Realizations	30
6.1.2	Extra Erosion Realizations	35
6.1.3	New Road Reconstruction Cost Realizations	38
6.2	Scenario Generation	40
7	Stochastic Program	42
7.1	Scenario Tree:	42
7.2	Stochastic Program and Naïve Models	45
8	Results	47
8.1	Deterministic Model	47
8.2	ARDM/Stochastic Model vs. Naïve Models	49
8.2.1	Schedule comparison: ARDM vs. NMs	55
9	Conclusions	59
9.1	Final Thoughts	60
Appendix		61
Bibliography	66