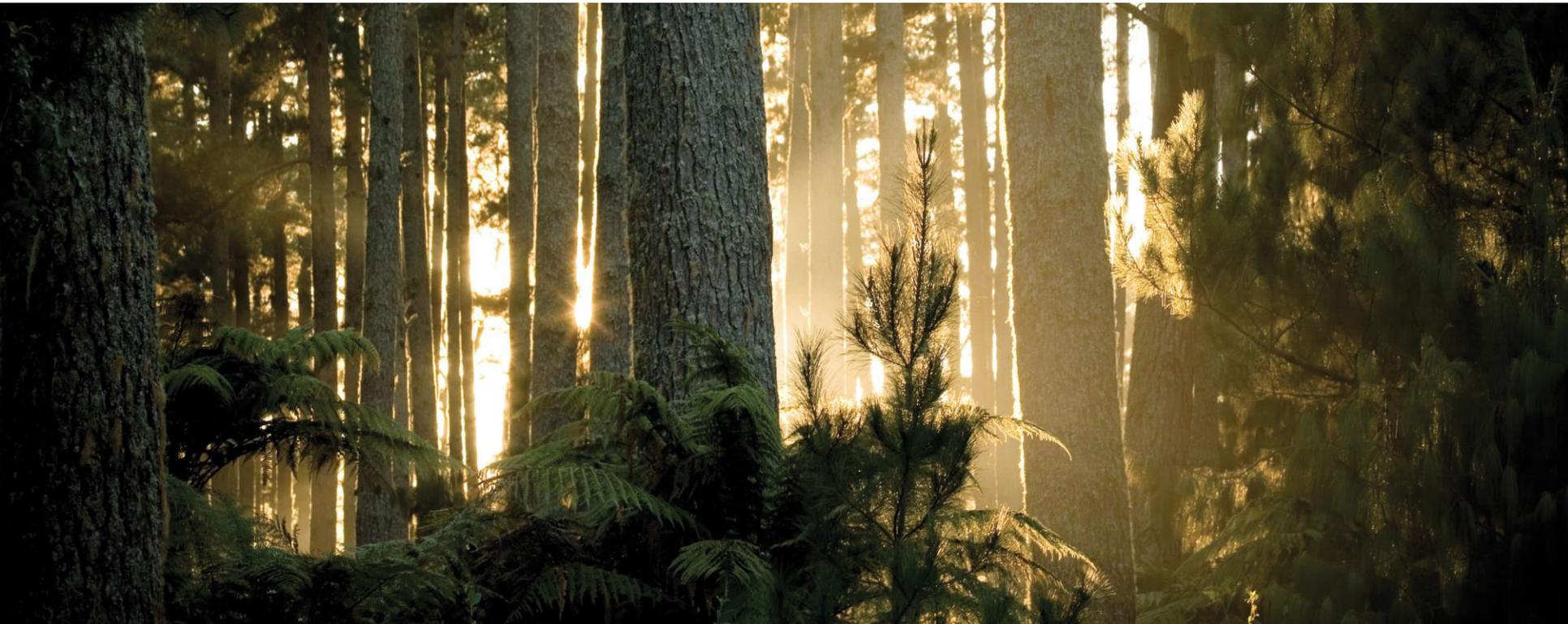


Analysing forestry harvesting setback options in the Sounds using ES approach

RT Yao, B Hock, D Harisson, P Hall, B Baillie, T Evanson



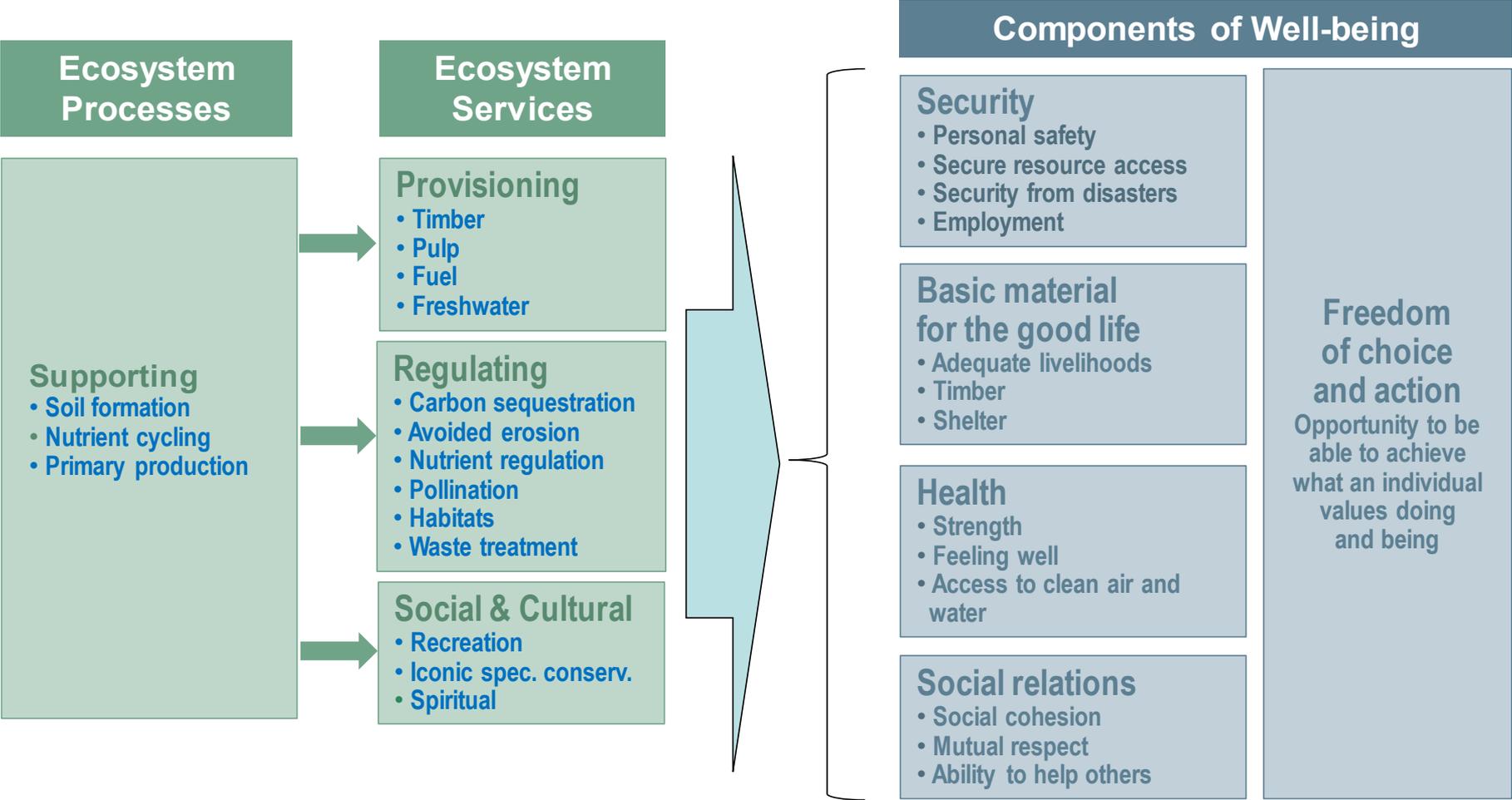
Outline

- Ecosystem services in NZ planted forests
- Project overview
- Preliminary results
 - Quantitative analysis
 - Area and employment
 - Profitability
- Discussions

ES in New Zealand's planted forests



Forest ecosystem services (FES)

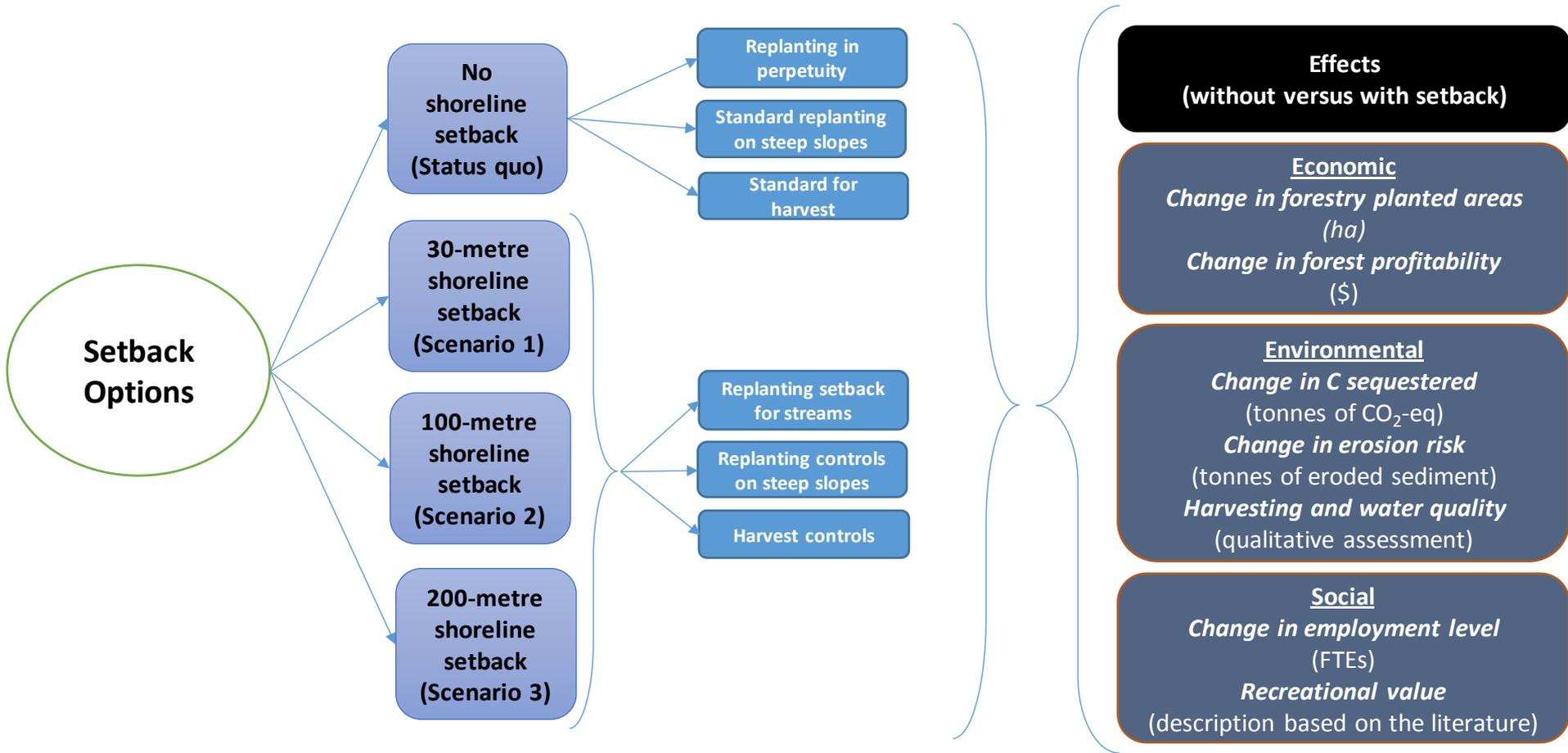


Adapted from MEA (2005) and Yao et al. (2013)

Project overview

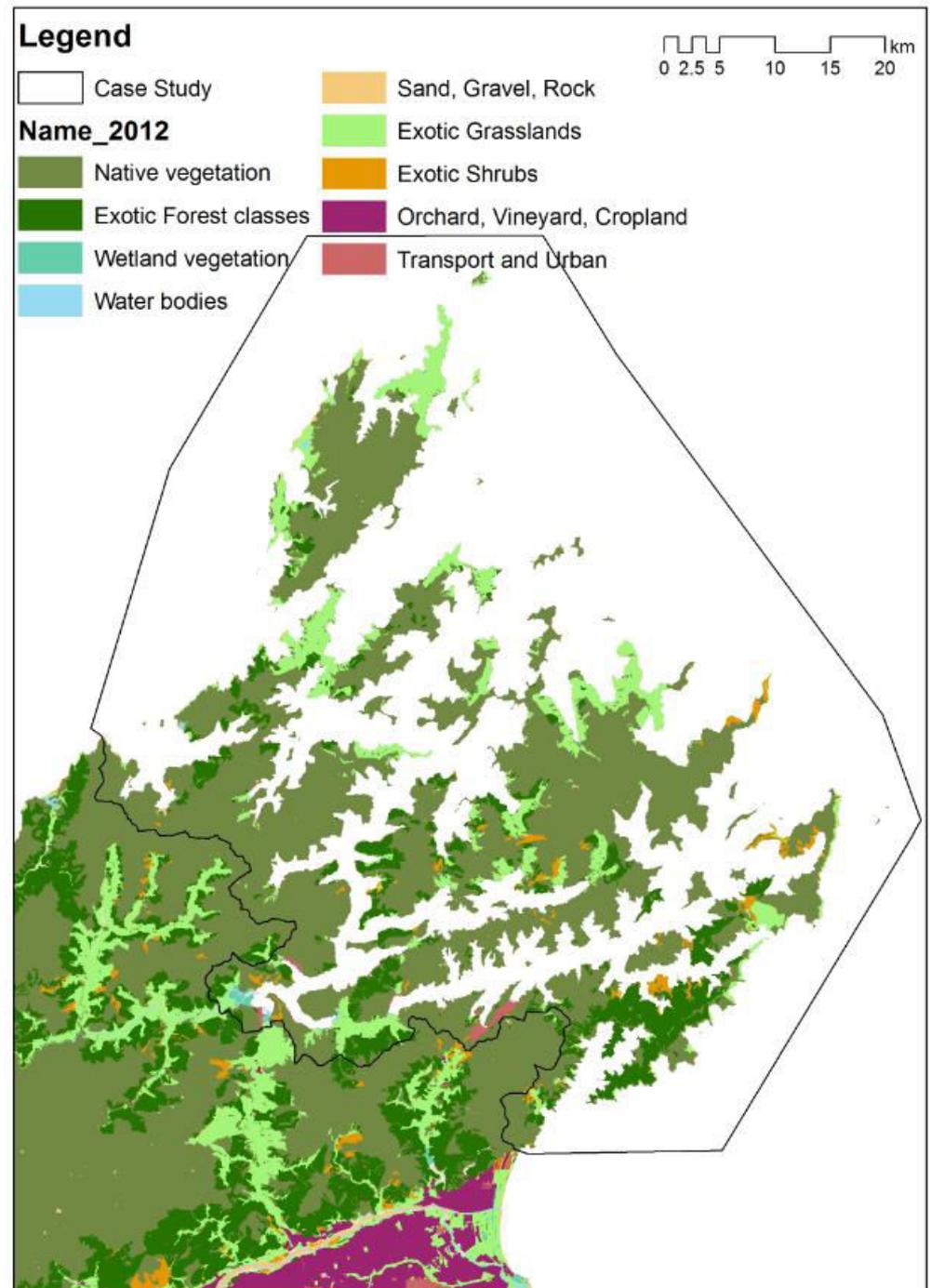
- The importance of forestry to the Sounds
 - Regional economics and employment contributions
 - Environmental and social benefits
- Marlborough District Council (MLDC) conducted a review of studies on the effects of forestry activities on sediment production in coastal waters (Urlich 2015)
 - Options on forest replanting setbacks - 30, 100 & 200m buffers
- MLDC seeks advice from SCION as to the **market** and **non-market** implications of implementing key setback options
- The project aims is to evaluate the **potential impacts of setbacks on economic**, environmental & social values in the Sounds

Project components



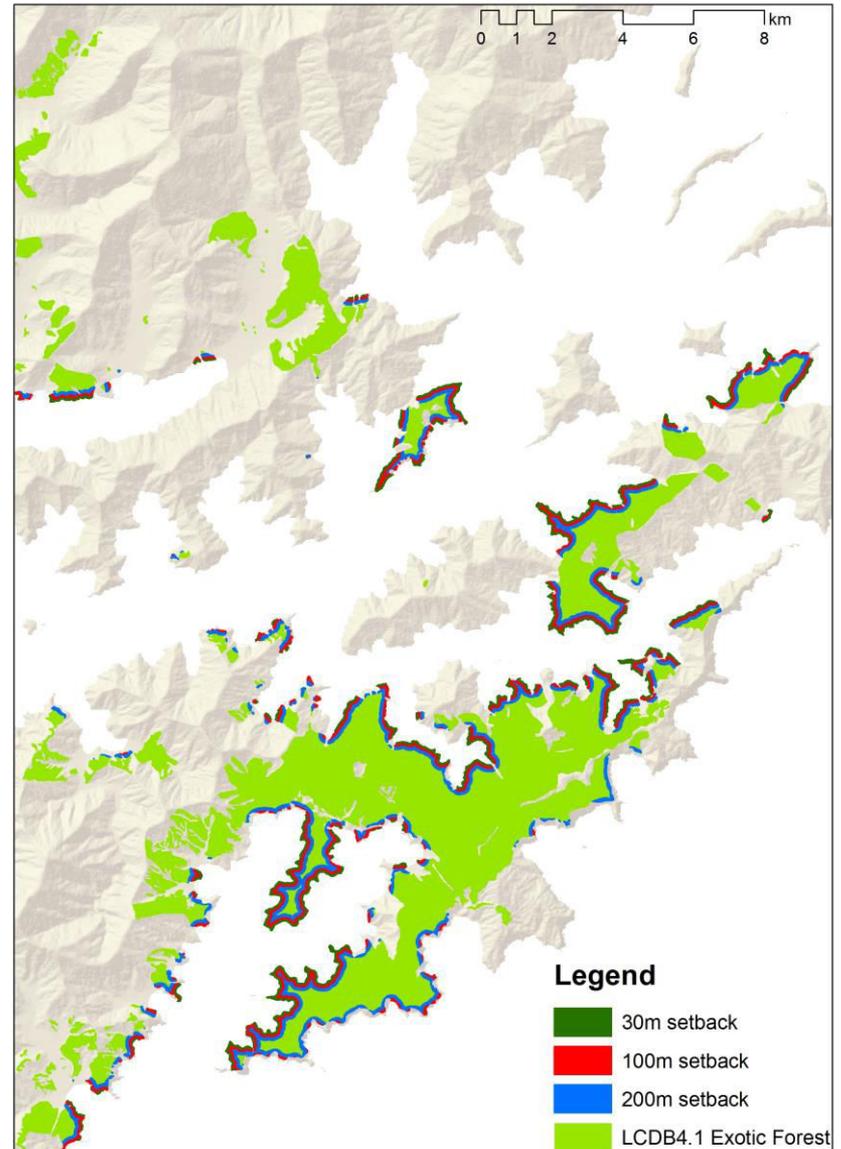
Study site

- Marlborough District's planted forests (MPI):
 - 71,885 ha
- Sound's exotic forests (our spatial analysis)
 - 17,234 ha
 - ~60% is unpruned regime
 - ~85% on steep slopes ($\geq 15^\circ$)



Exotic forestry with harvesting setbacks

- The eastern section of the Sounds, forest blocks and setbacks.



Impact of setbacks on forestry areas

Setback	<i>Unpruned</i>		<i>Pruned</i>		<i>Total area</i>	<i>Area reduction</i>	<i>Percent reduction</i>
	<i>flat/rolling</i>	<i>steep</i>	<i>flat/rolling</i>	<i>steep</i>			
	ha	ha	ha	ha			
No setback	1,551	8,789	1,034	5,860	17,234	-	-
30m setback	1,489	8,620	993	5,747	16,849	385	2%
100m setback	1,426	8,077	951	5,385	15,840	1,394	8%
200m setback	1,304	7,152	869	4,768	14,092	3,142	18%

Labour hours for a 28-year forest rotation

Forest operation	<i>Unpruned hours per ha</i>		<i>Pruned hours per ha</i>		<i>Weighted ave hours per ha</i>
	Flat	Steep	Flat	Steep	
Nursery	22	22	22	22	22
Site preparation	4	5	4	5	5
Planting & spraying	16	18	16	18	18
Thinning	6	8	8	10	9
Prunning			32	40	16
Landing & road maintenance	7	8	7	8	8
Harvesting	90	140	90	140	133
Transport	46	46	46	46	46
Administration	26	26	28	28	27
Total hours per ha	217	273	253	317	282
FTE per ha	0.10	0.13	0.12	0.15	0.14

Impacts on forestry production employment

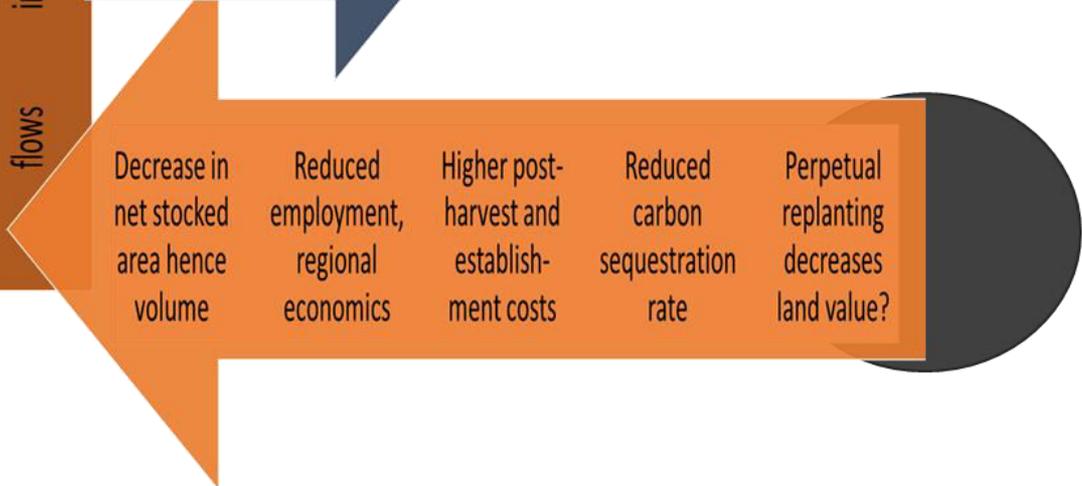
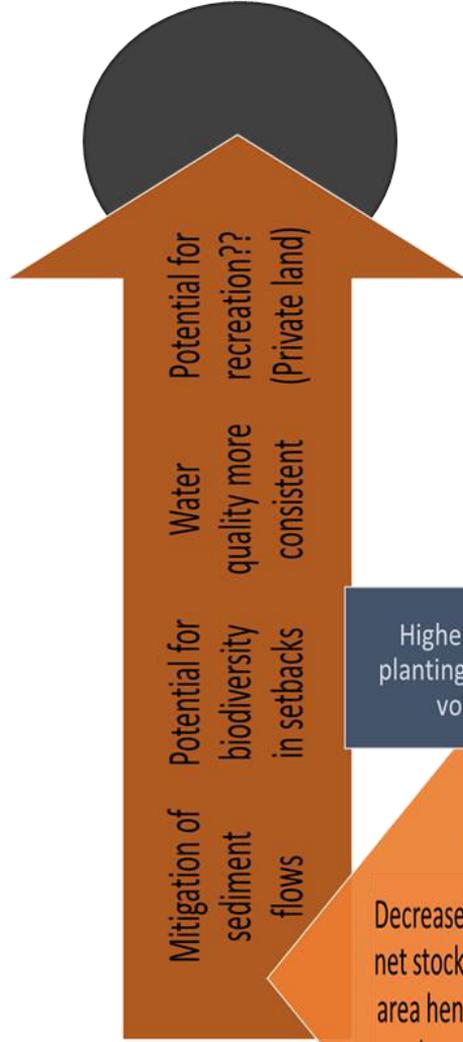
<i>Setback</i>	<i>Unpruned</i>		<i>Pruned</i>		<i>Total FTEs/yr</i>	<i>Change in FTEs/yr</i>
	<i>FTEs/year</i>		<i>FTEs/year</i>			
	<i>Flat/Roll</i>	<i>Steep</i>	<i>Flat/Roll</i>	<i>Steep</i>		
No setback	5.8	41.1	4.5	31.8	83.1	
30-metre	5.5	40.3	4.3	31.2	81.3	1.8
100-metre	5.3	37.8	4.1	29.2	76.4	6.7
200-metre	4.8	33.4	3.8	25.9	67.9	15.2

Summary of Results

Setback (m)	<i>Change in Area, Employment and Profitability</i>		
	Area of forestry Area index	FTEs FTE index	Profit LEV index
0	100.0%	100.0%	100.0%
30	97.8%	97.8%	98.7%
100	91.9%	91.9%	94.1%
200	81.8%	81.7%	84.0%

- Modelling assumptions include:
 - forest operations under ideal conditions
 - best practice for the forest regime
 - average log prices and estimated costs were used
 - simplified barging assumptions
- Setback effects on C-sequestration and avoided erosion will be modelled

Public good



Private benefit

Discussions

- ES approach helps to demonstrate the broader value of an ecosystem and its connections
- Economic and environmental connections
 - Forestry's contribution to the regional economy and employment is negatively associated with public good
 - Public benefits and costs of forestry
 - Recreation and habitats for native species
 - Avoided erosion/Soil protection when trees are growing
 - Soil erosion mitigation during harvest & establishment
- ES approach helps to account for the economic, environmental and community values to increase their recognition and inclusion in policy and investment discussions in the longer term

Acknowledgements

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- Project is funded by Envirolink Medium Grant and Marlborough District Council



Thank you!

RT Yao and B Hock

24 May 2017
FES Regional Forum in the Sounds

www.scionresearch.com



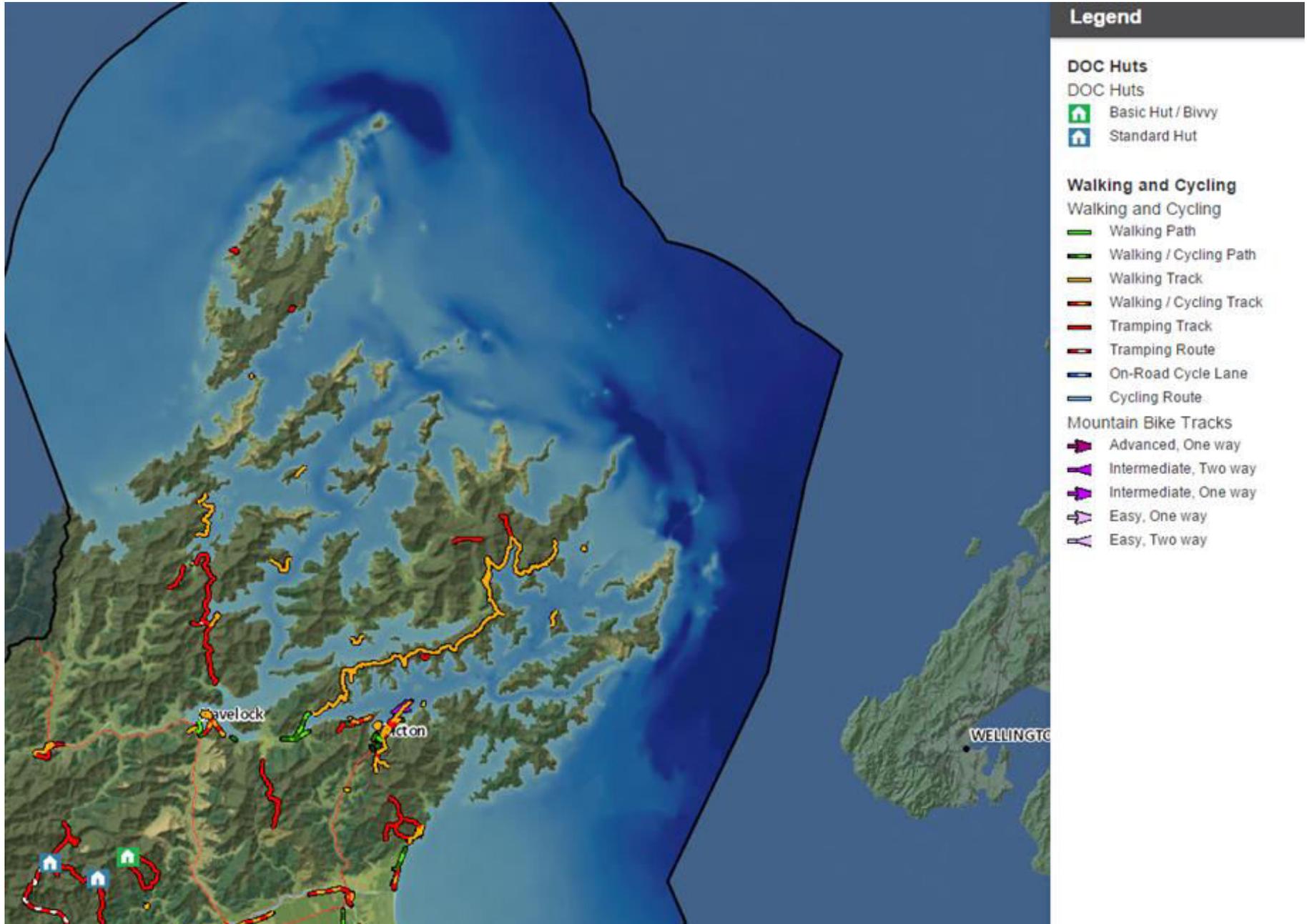
Prosperity from trees *Mai i te ngahere oranga*

Scion is the trading name of the New Zealand Forest Research Institute Limited

Discussions

- As Ulrich (2015) indicated, “[setbacks] are likely to be effective in reducing sediment derived from diffuse sources by surface processes” – refers to marine environmental values (ecological downstream beneficiaries).
- Growing interest in integrating and using the ES approach by New Zealand government agencies and the industry.
- Economic and environmental connections
 - Forestry contributes to the regional economy and provides employment
 - Downstream benefits and costs
 - Avoided erosion when trees are growing
 - Sediments
- The approach helps to account for the economic, environmental and community values to increase their recognition and inclusion in  SCION policy and investment discussions in the longer term.

Recreation in planted forests



Recreation in Whaka forest

- The 5,667-ha Whaka forest in Rotorua is popular for its walking & mountain biking (MTB) trails
- A 2009 survey estimated 88,500 walking visits; 101,800 MTB visits
- Dhakal et al. (2012) used Travel Cost to estimate the recreation value based on 706 visitors (366 walkers & 340 MTBikers)
 - \$40 per walking & \$55 per MTB visit
 - annual aggregated recreation value was more than twice the annual timber revenue



Potential gains and losses from setbacks

Gain

Environmental

Reduction in sediments during harvest and re-establishment

Public benefits

- Diversity
- Recreation potential

Loss

Economic

- productive lands
- employment
- profitability

Environmental

- slower C sequestration under native trees

Other

Downstream

- effect on adjacent sectors (marine, pasture, conservation)

Technological

- Steep land harvesting

Pig hunting in Wenita forests in Dunedin

- ~50% of the 30,000-ha of Wenita forest estate is accessible for recreational hunting
- Every year:
 - Wenita issues >200 hunting licenses
 - Hunters collect ~1,500 pigs
 - Value of game meat ~\$200,000



Pruning radiata pine

