

Biomass Supply in BC

26 Jan – 10 Feb 2020

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FPInnovations

AVAILABILITY

An attempt to answer the question:

How much biomass is available?

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HARVEST RESIDUES – IMAGINE THE POWER!

BC RESIDUES/YR = POWER BC FOR 217 DAYS

DEFINITIONS AND ASSUMPTIONS

Parameters	Parameters	Parameters
▪What's "in-bounds" for the studies is '**logging residue**' – debris from forest operations ▪NOT merchantable logs ▪NOT mill residues	▪Biomass **costs** start with material piled at roadside (=$0), then add grinding and transport	▪Assumes harvest costs are paid for by timber (roundwood)

GRINDER MAKING HOG FUEL

HOG PILE

PILING PRACTICES

Oriented piles

Logging residues that have been handled carefully to create a neatly stacked ‘deck-like’ formation that is much easier for secondary harvesters to handle - not a ‘well-ventilated’ burn pile

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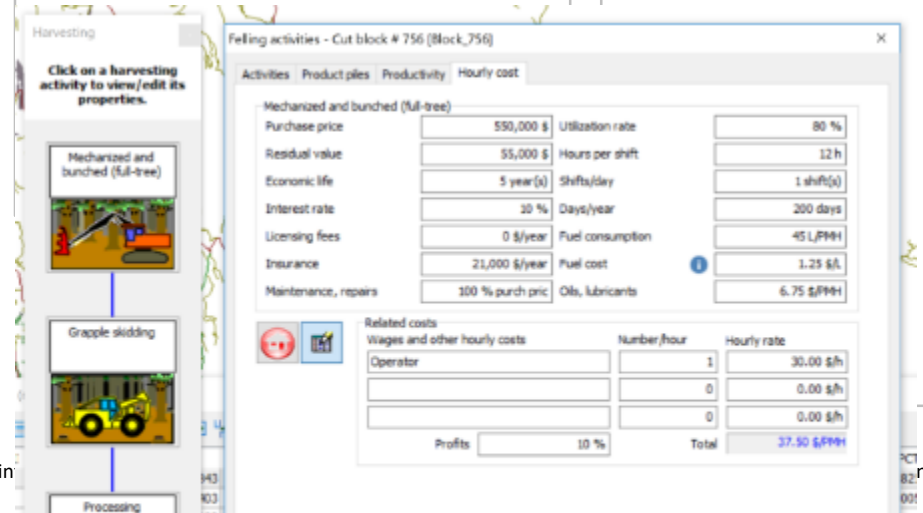
WHAT IS FPINTERFACE?

- FPInterface is a GIS-based simulator developed by FPInnovations to calculate forest **harvest amounts** and costs

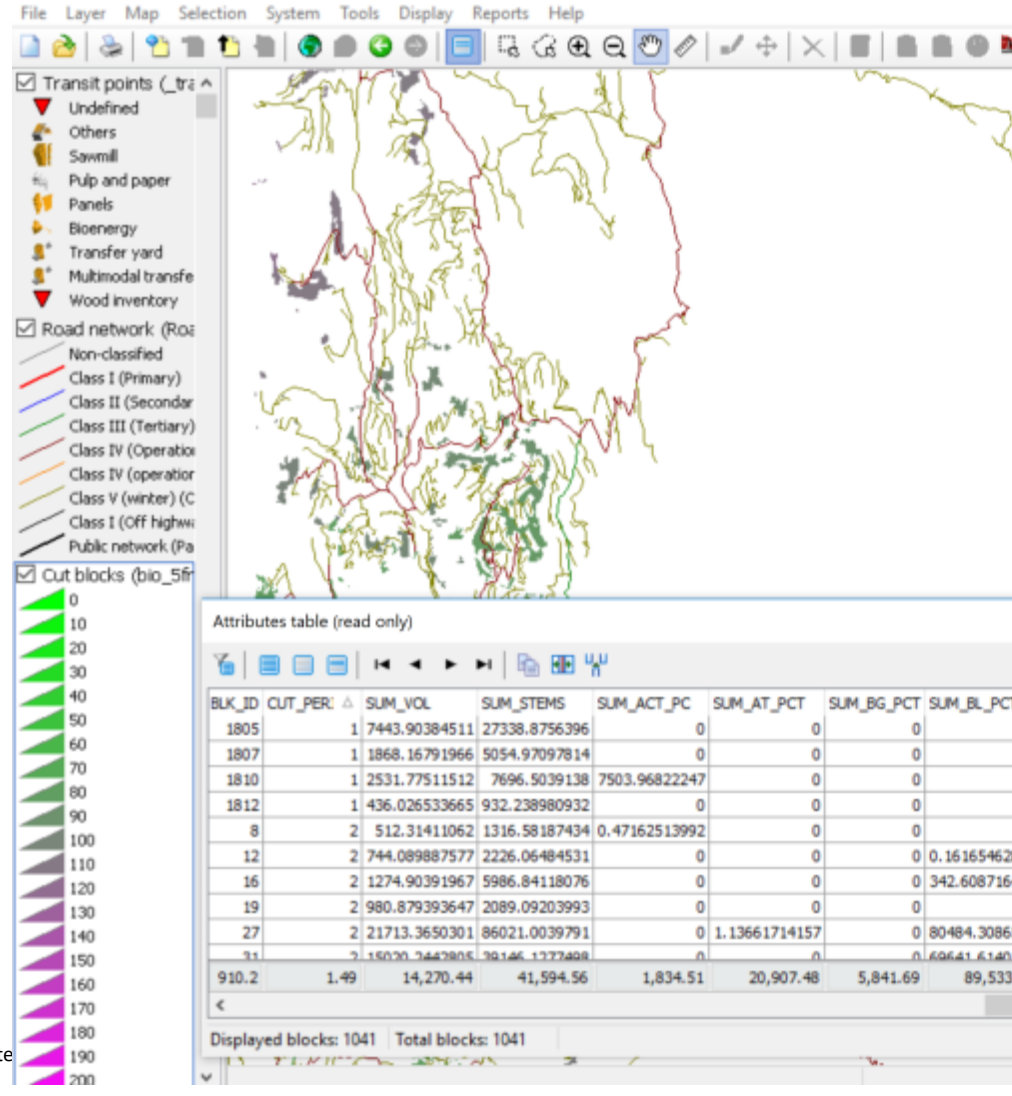
- In regards to **biomass** in BC, the goal has been to develop a process for calculating biomass **supply** in Timber Supply Areas (TSAs) of BC.

- Interior TSA's:
  - Quesnel
  - Williams Lake
  - Prince George
  - Lakes (Burns L)
  - Mackenzie
  - 100 Mile House
  - Kamloops
  - Kootenay Lake
  - Boundary
  - Arrow
- Coastal TSA's:
  - Bulkley (Smithers)
  - Fraser
  - Strathcona
  - Arrowsmith

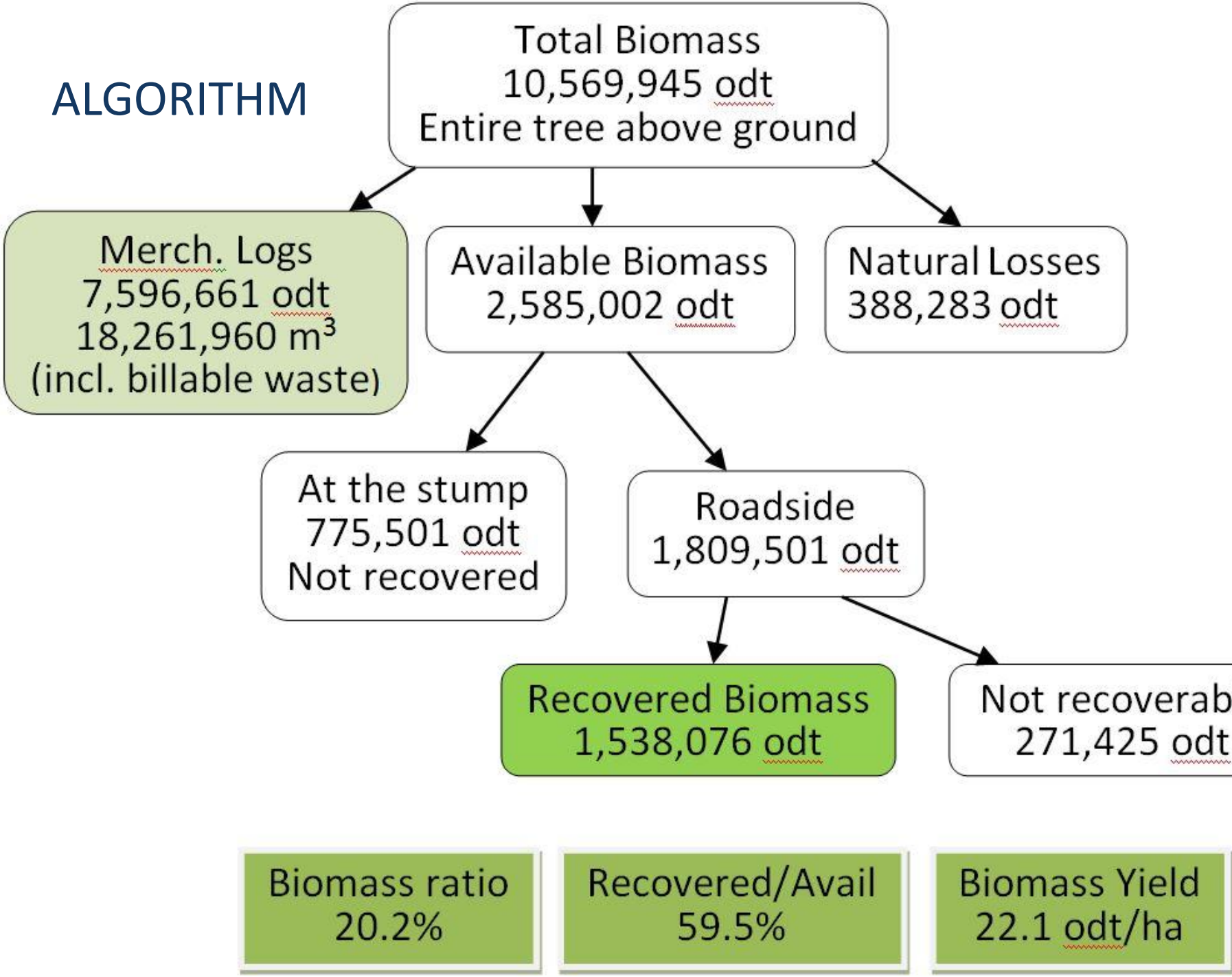


DATA REQUIREMENTS

- GIS polygons with attributes
- GIS road segments with attributes
- Harvest plan by year



ALGORITHM


Total Biomass
10,569,945 odt
Entire tree above ground
Merch. Logs
7,596,661 odt
18,261,960 m3
(incl. billable waste)
Available Biomass
2,585,002 odt
Natural Losses
388,283 odt
At the stump
775,501 odt
Not recovered
Roadside
1,809,501 odt
Recovered Biomass
1,538,076 odt
Not recoverable
271,425 odt
Biomass ratio
20.2%
Recovered/Avail
59.5%
Biomass Yield
22.1 odt/ha

AVAILABILITY - COST

Remember this question:

How much biomass is available?

What if you could know:

How much is available for $60 per dry tonne? Or $80 per dry tonne?

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OUTPUTS

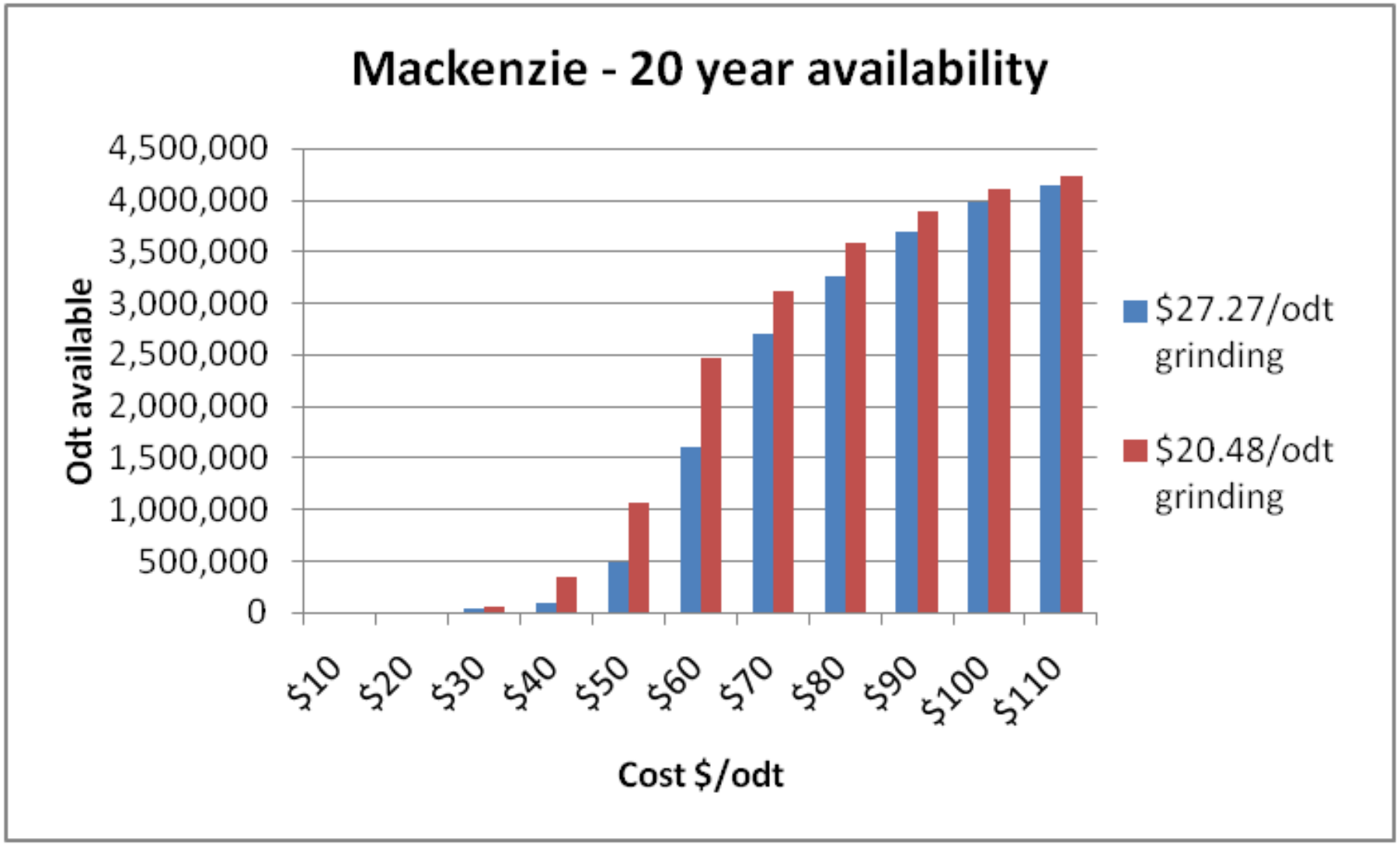
Cost-availability table:

How much biomass is available at each price point

$60/odt is the assumed market rate

Cost ($/Odt)	Total (Odt)	Annual (Odt)
10	0	0
20	0	0
30	0	0
40	0	0
50	778	78
60	157,140	15,714
70	382,239	38,224
80	735,522	73,552
90	1,072,156	107,216
100	1,242,878	124,288
110	1,354,065	135,407
120	1,461,756	146,1766

RESULTS – 20 YEAR BIOMASS SUPPLY



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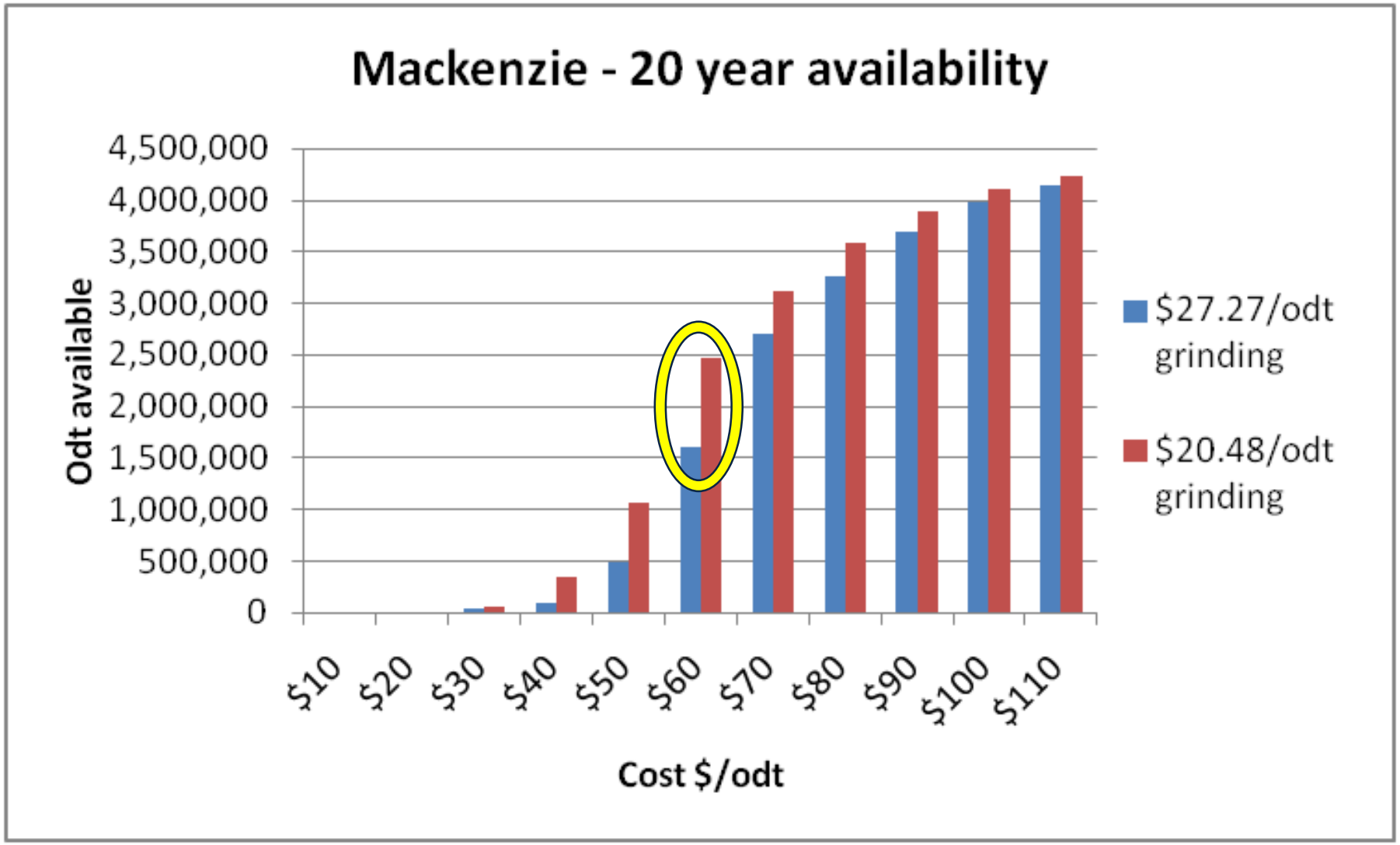


OUTPUTS

Biomass Yield = 22.1 odt/ha

TSA biomass estimates

Interior Results

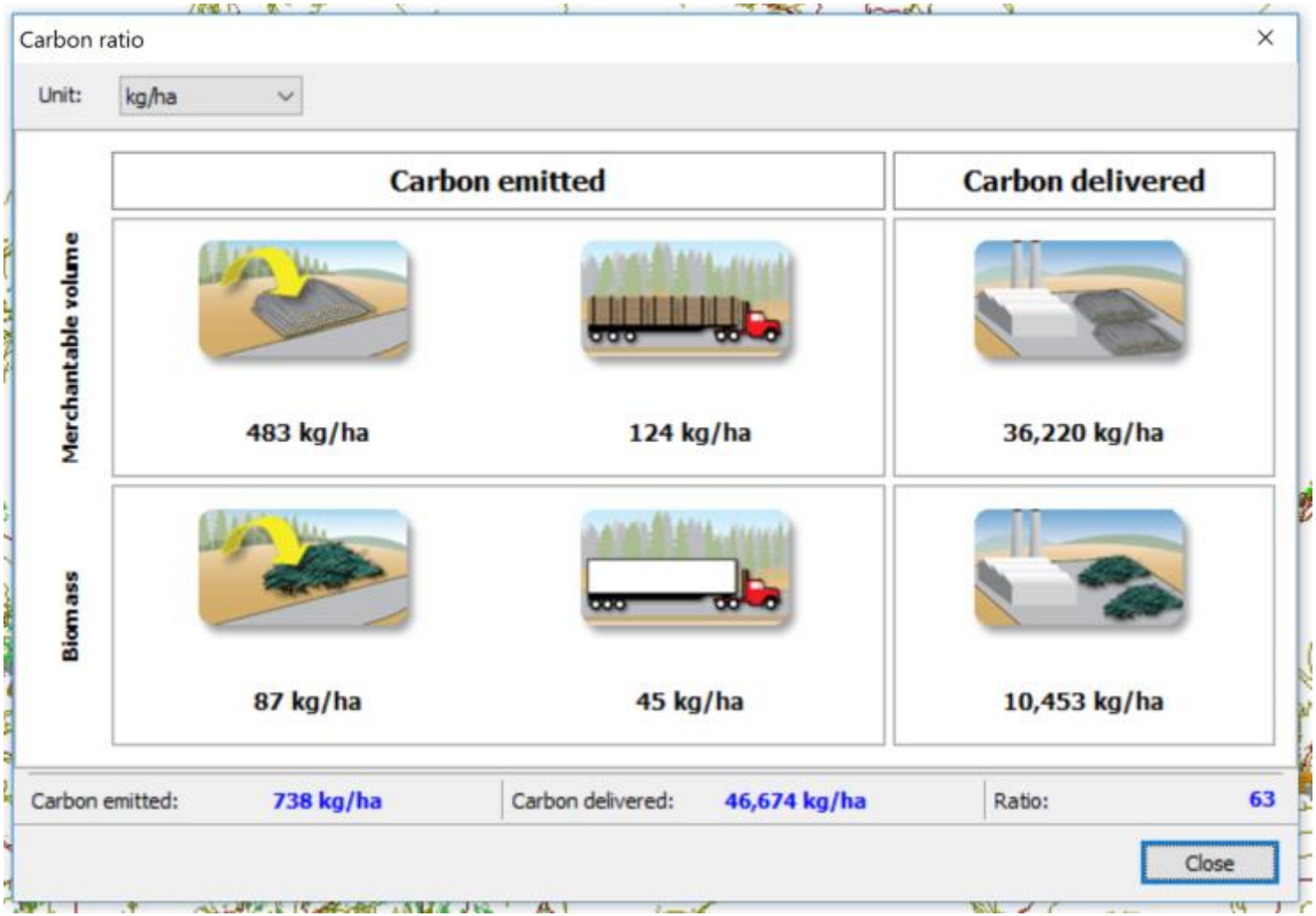
- **Yield/ha = 21.8 odt/ha** (regardless of cost)
- **Biomass ratio = 21%** Biomass ratio is the amount of biomass removed as a % of the amount of merchantable timber removed.
- Economic biomass ratio = 9% (at $60/odt). Amount of biomass available at $60/odt as a % of all merchantable timber removed. Note that this number can be highly variable depending on the specific local conditions of the TSA.
- By extension, economic yield/ha = 9.3 odt/ha (at $60/odt)

TSA biomass estimates

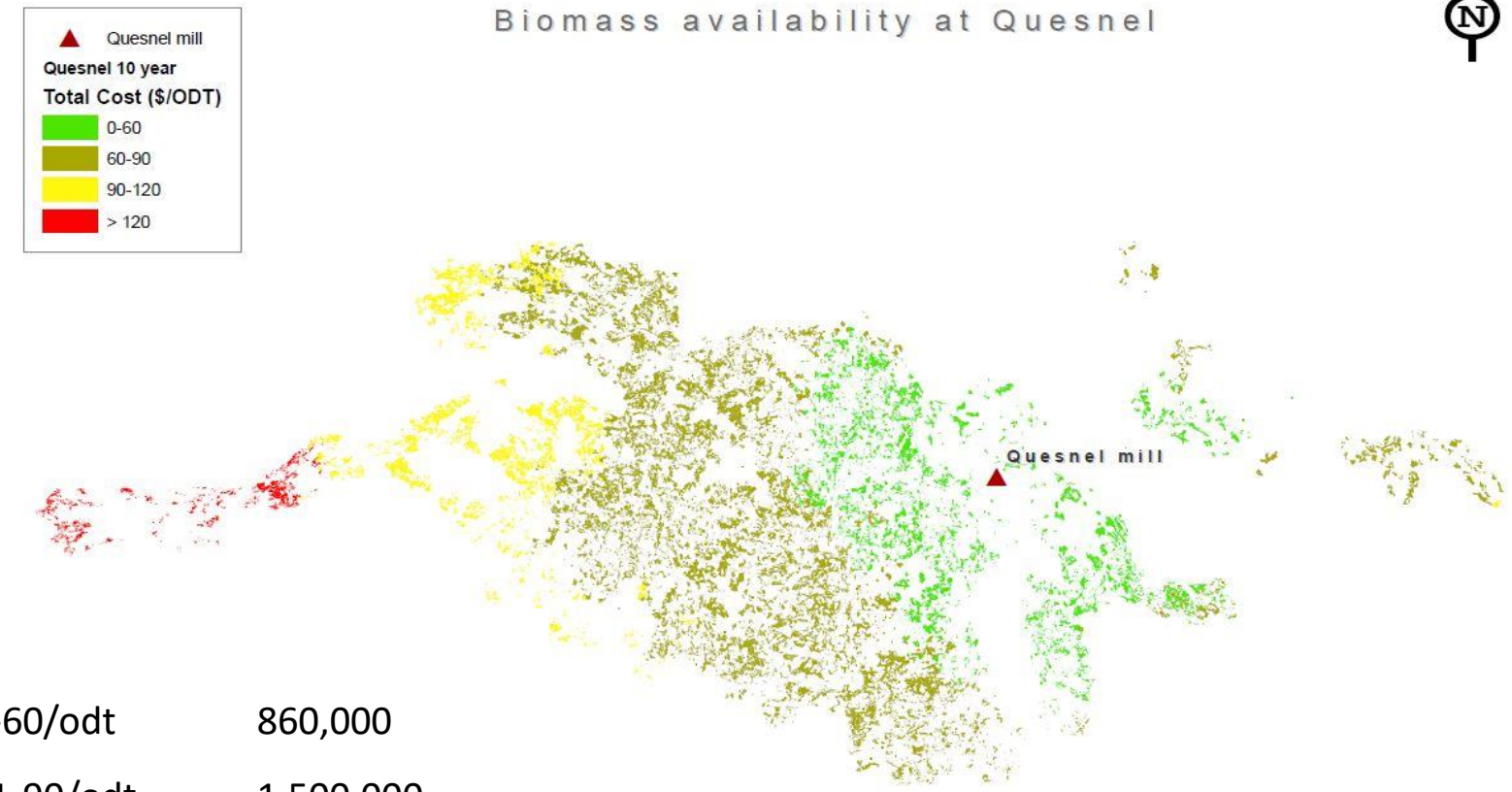
Coastal Results

- **Yield/ha = 34.4 odt/ha** (regardless of cost)
- **Biomass ratio = 14.7%** Biomass ratio is the amount of biomass removed as a % of the amount of merchantable timber removed.
- Economic biomass ratio = 3.2% (at $60/odt). Amount of biomass available at $60/odt as a % of all merchantable timber removed. Note that this number can be highly variable depending on the specific local conditions of the TSA.
- By extension, economic yield/ha = 7.5 odt/ha (at $60/odt)

OUTPUTS



Biomass availability at Quesnel

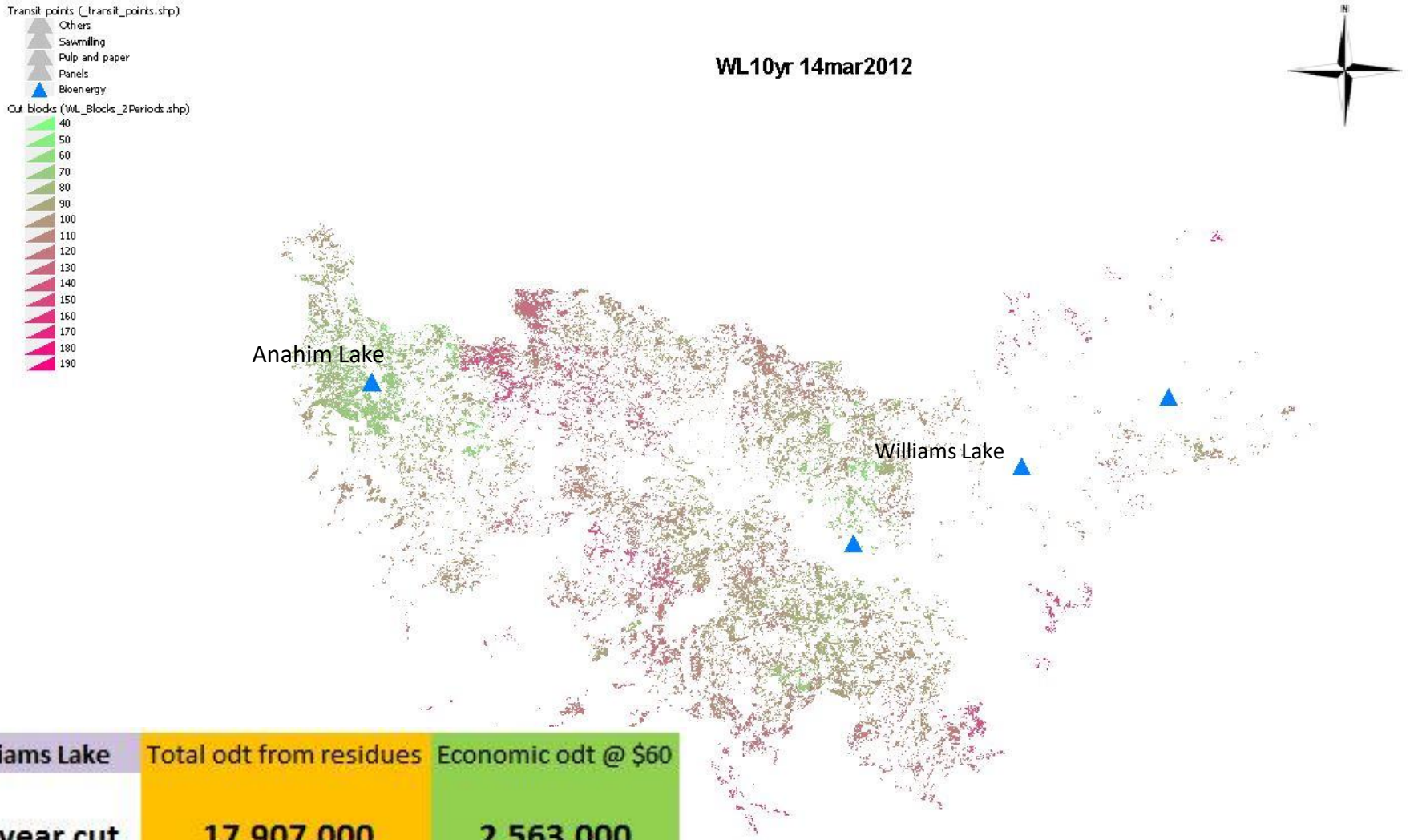


$0-60/odt	860,000
$61-90/odt	1,500,000
$91-120/odt	460,000
$120 + /odt	1,250,000

Most MPB wood > $120/odt

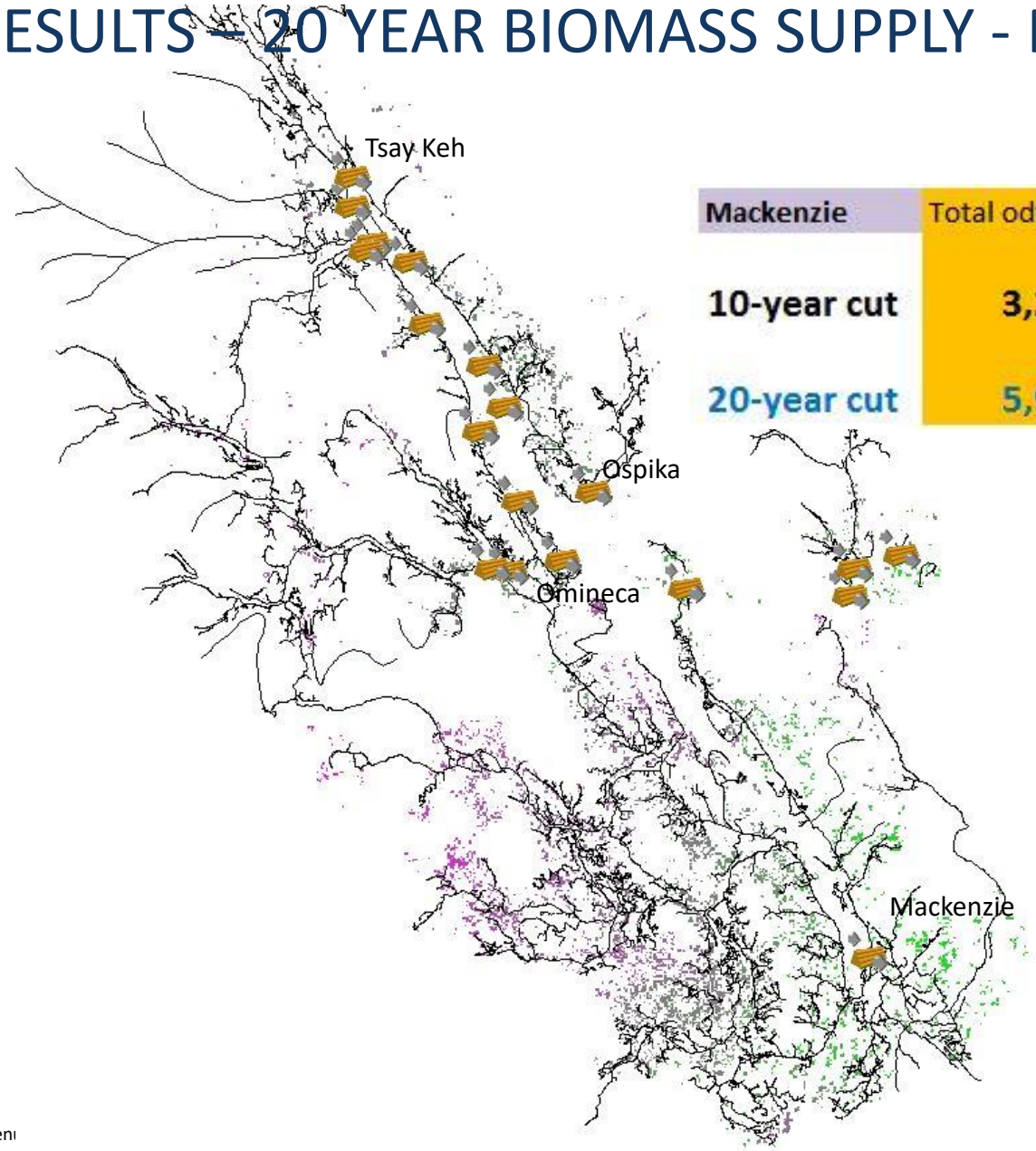
Quesnel	Total odt from residues	Economic odt @ $60
10-year cut	4,077,000	858,000
20-year cut	5,385,292	1,154,526

RESULTS – 10 YEAR BIOMASS SUPPLY – WILLIAMS LAKE



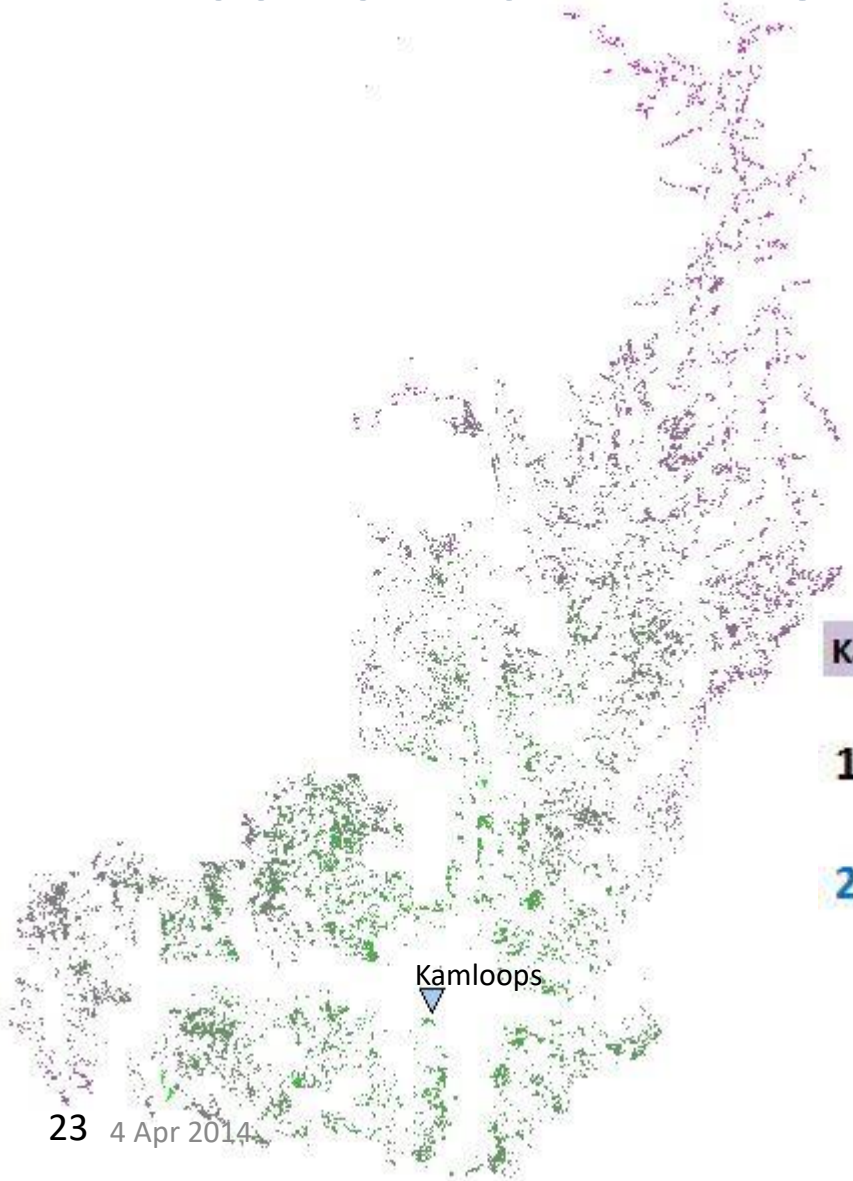
Williams Lake	Total odt from residues	Economic odt @ $60
10-year cut	17,907,000	2,563,000
20-year cut	30,438,261	5,164,192

RESULTS – 20 YEAR BIOMASS SUPPLY - MACKENZIE



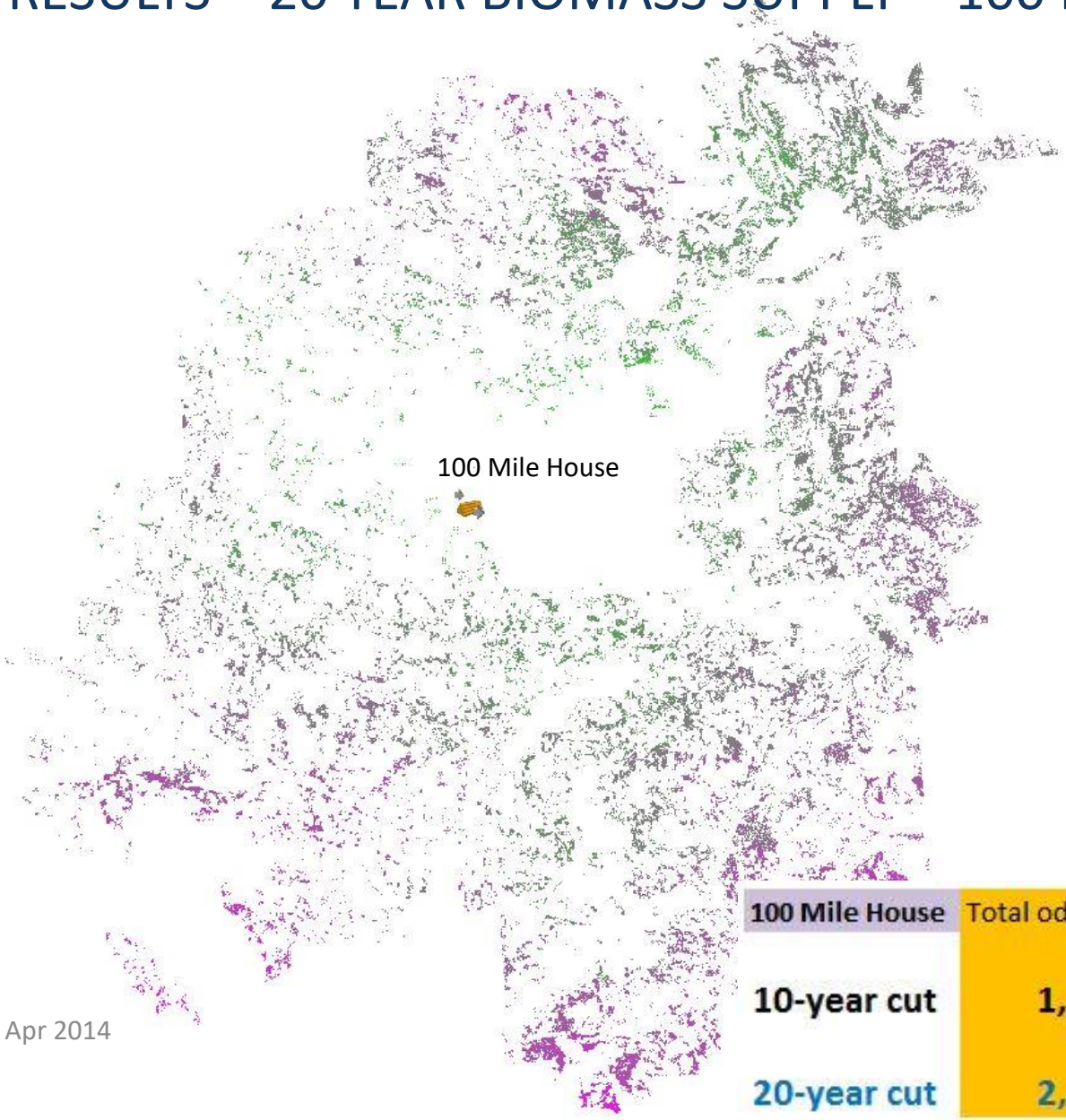
Mackenzie	Total odt from residues	Economic odt @ $60
10-year cut	3,231,000	1,031,000
20-year cut	5,952,511	2,476,427

RESULTS – 20 YEAR BIOMASS SUPPLY – KAMLOOPS



Kamloops	Total odt from residues	Economic odt @ $60
10-year cut	2,657,617	1,428,014
20-year cut	4,902,101	2,352,193

RESULTS – 20 YEAR BIOMASS SUPPLY – 100 MILE HOUSE



100 Mile House	Total odt from residues	Economic odt @ $60
10-year cut	1,705,788	1,411,282
20-year cut	2,203,845	2,012,599

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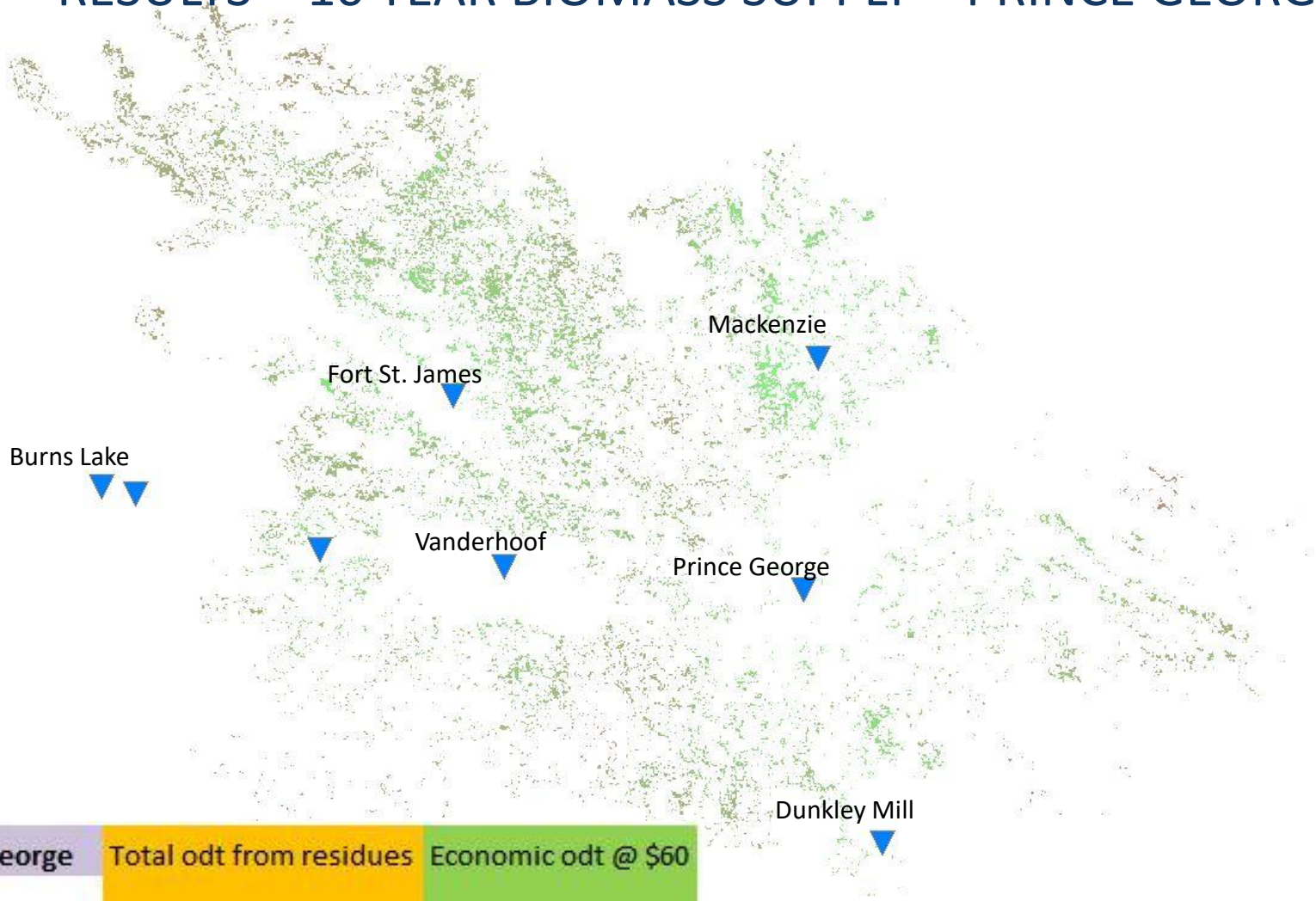
RESULTS – 10 YEAR BIOMASS SUPPLY – PRINCE GEORGE



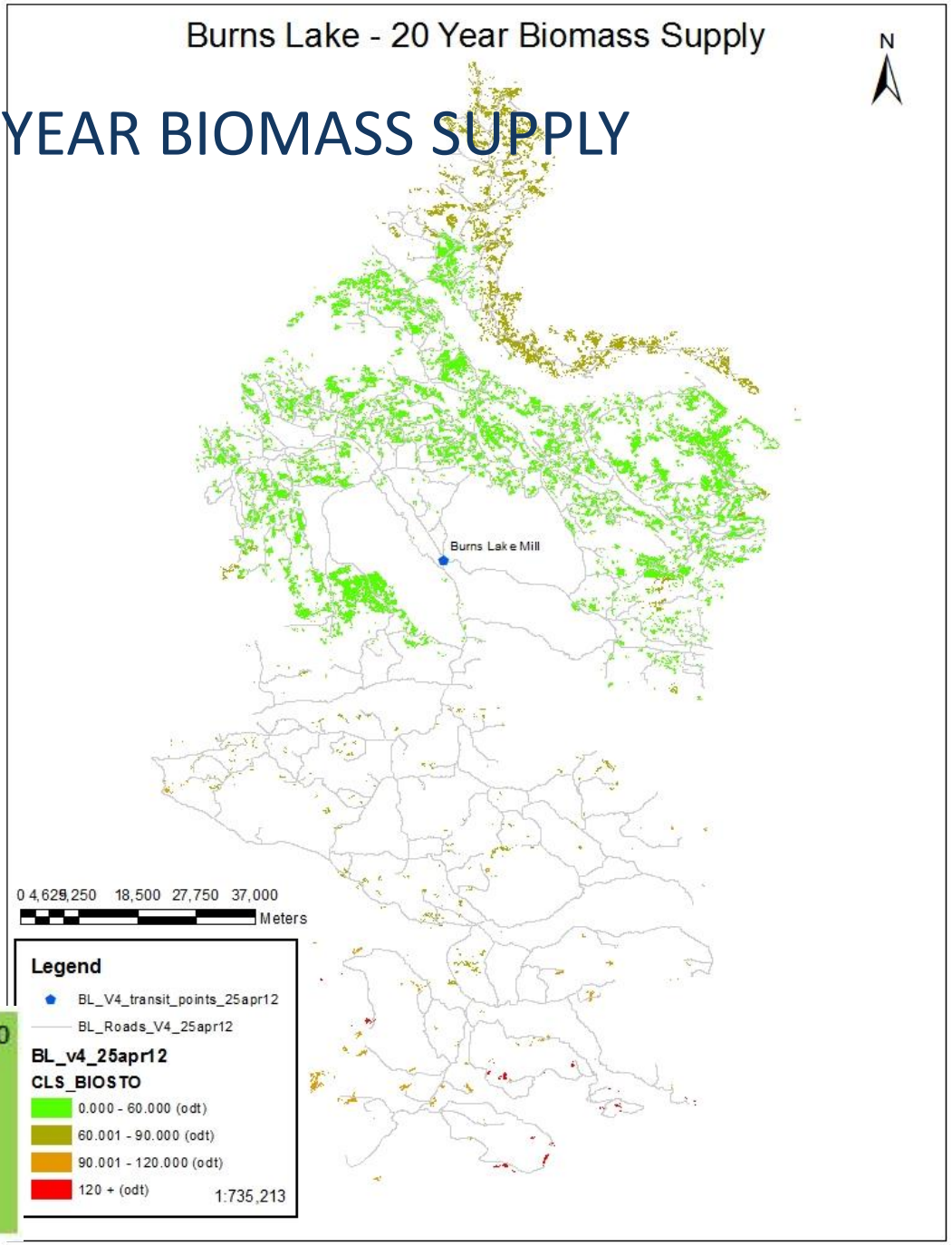
Prince George	Total odt from residues	Economic odt @ $60
10-year cut	8,863,000	1,498,000
20-year cut	13,825,935	3,048,050

RESULTS – 10 YEAR BIOMASS SUPPLY

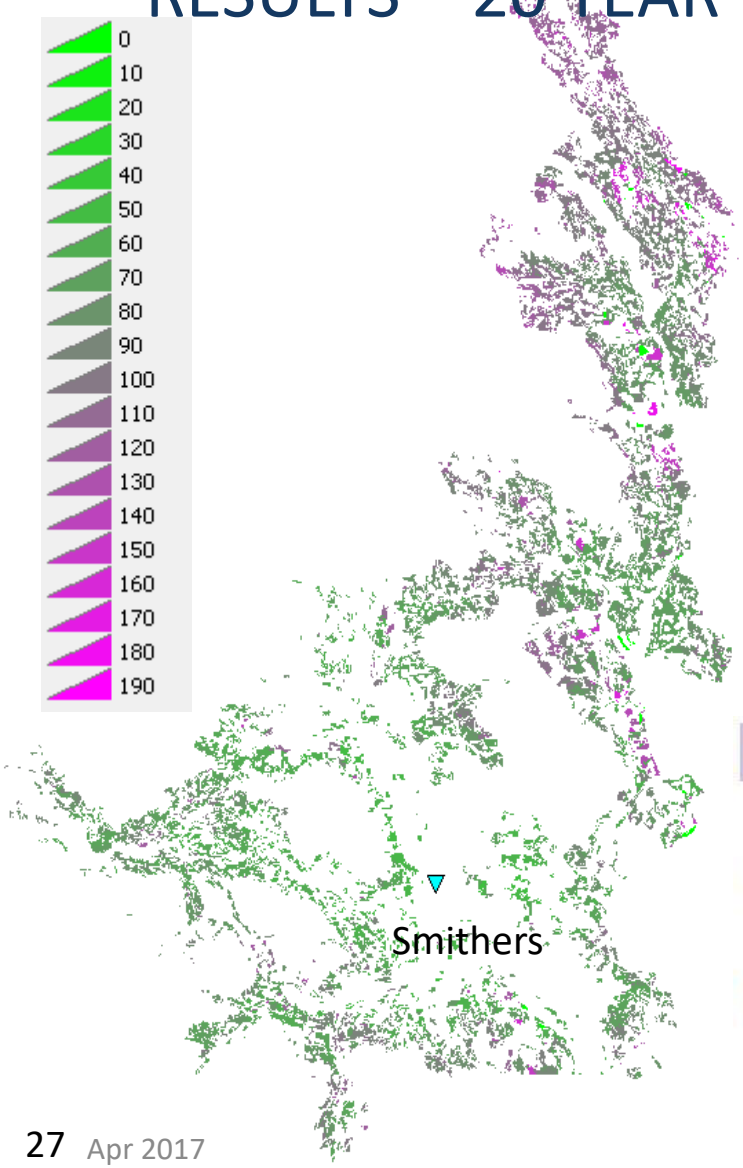
Transportation Cost	20 Year Volumes (odt)
$0 – 60 / odt	1,491,362.9
$61 – 90 / odt	555,489.2
$91 – 120 / odt	62,944.0
$120+	17,576.0

*Residues Only

Burns Lake	Total odt from residues	Economic odt @ $60
10-year cut	2,826,000	761,000
20-year cut	3,399,569	888,824



RESULTS – 20 YEAR BIOMASS SUPPLY – BULKLEY



Bulkley	Total odt from residues	Economic odt @ $60
10-year cut	881,375	55,393
20-year cut	1,645,279	120,146

RESULTS – 20 YEAR BIOMASS SUPPLY – ARROWSMITH

Arrowsmith	Total odt from residues	Economic odt @ $60
10-year cut	233,320	31,352
20-year cut	451,406	65,386

Biomass availability for completed TSA's can be found here:

https://www2.gov.bc.ca/gov/content/industry/forestry/forest-tenures/forest-tenure-administration/residual-fibre-recovery

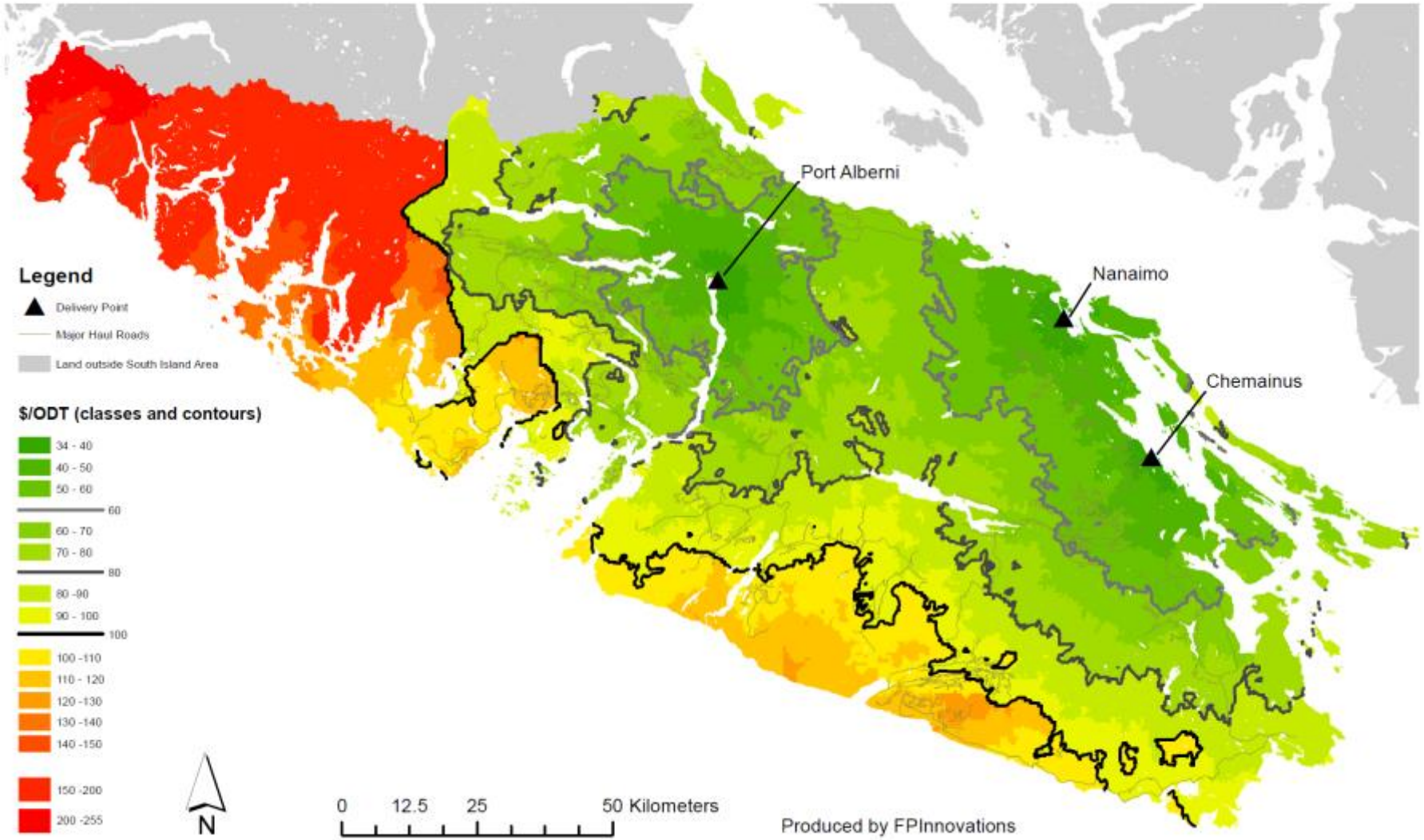
Search: **residual fibre recovery**

HEAT MAPS

We discovered that the maps produced from biomass analyses are not very visually friendly.

ARROWSMITH – BIOMASS COST – 20 YEAR PLAN
WHAT IS THE COST FROM **ANYWHERE**??

South Island: Biomass Total Delivered Cost



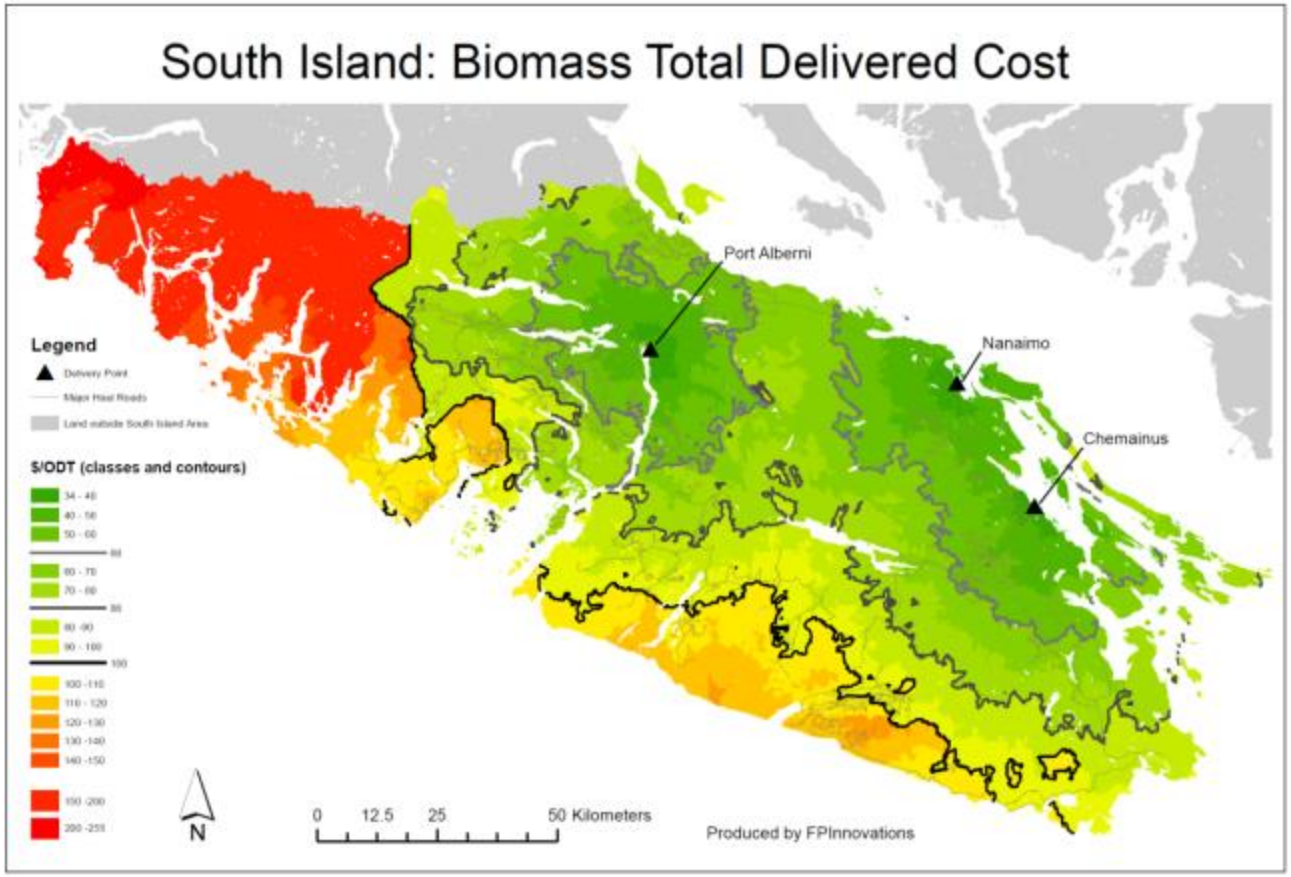
HEAT MAPS

Heat maps model the entire landbase so that costs are easier to visualize.

Colours show cost to grind and deliver biomass from that area.

Lines are at $60/odt, $80/odt, and $100/odt.

Where to put a new plant?



WHY IS IT IMPORTANT?

Know your biomass »

What is there?

Amount/yr?

What it costs?

Expected yield per hectare

Empowers decision-making

HEMLOCK SINKERS

Best Practises Guide

Five years of study

Tops and younger hemlock are more likely to sink.

Big rings = sinking

Know Moisture Content (MC)
Critical MC = 53-56%

High MC hemlock must be dried through a summer.

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USING FIRE TREATMENTS FOR ENERGY - DOCUMENTARY

RESEARCHER: CHARLES FRIESEN

The Forest Will Burn is a documentary-style information video.

There is a natural rhythm to forest fires on the landscape

- Uncontrolled wildfires threaten communities, causing loss of life and destruction of billions of dollars of property and resources.

Communities can undertake FireSmart treatments that are regular and sustainable in the long term.

- These treatments provide a yearly supply of biomass for off-grid communities that can help lessen use of trucked-in fossil fuel.

This solution provides fire protection AND energy independence, while creating local jobs and other benefits for the community.

The power of fire can be harnessed for constructive purposes.

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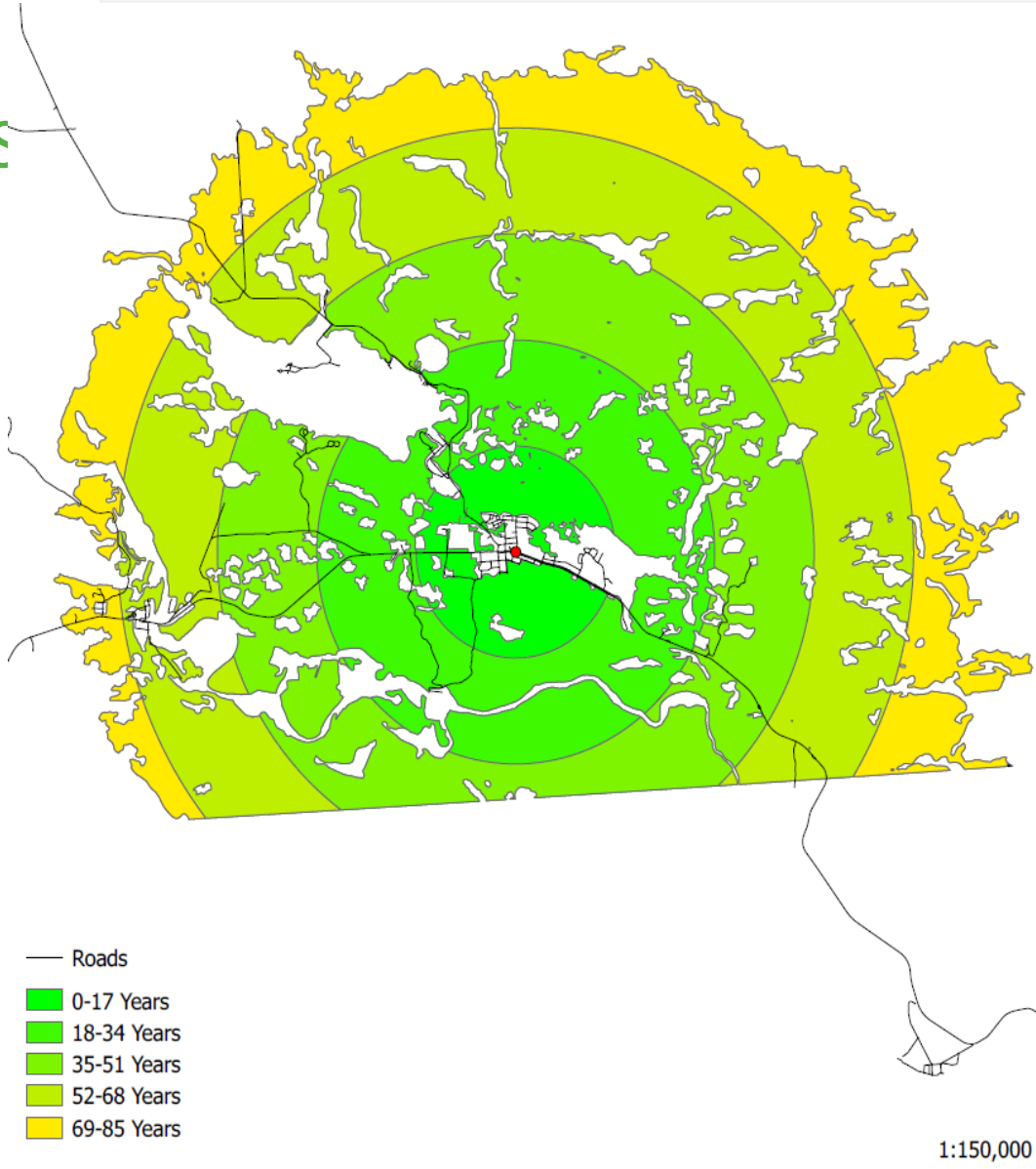
USING FIRE TREATMENTS FOR ENERGY - DOCUMENTARY

RESEARCHER: CHARLES FRIESEN

The video is currently in the production phase.

After a round-the-province (BC) tour, all shooting has been completed.

Expect first cut in March.



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THANK YOU

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