Coordinated planning of harvest and roads at SCA

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Seasonal climate variation

Insufficient bearing capacity

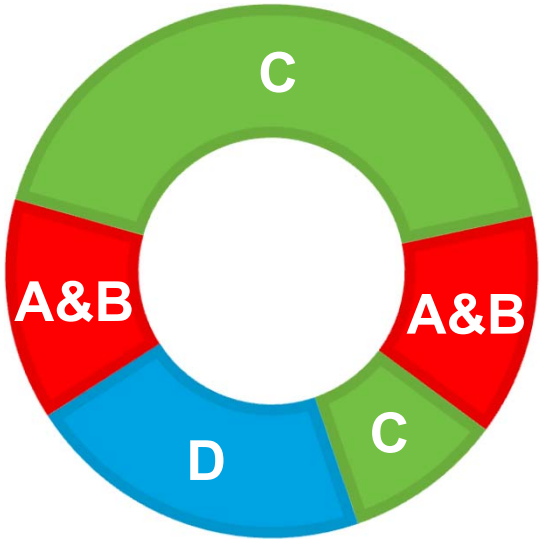
- High costs due to quality losses
- Higher transport costs due to road blockings

Methods

- Central Tyre Inflation
- Terminal storage
- Road investments

Seasons and forest roads

July - **Summer**



April - **Spring thaw**

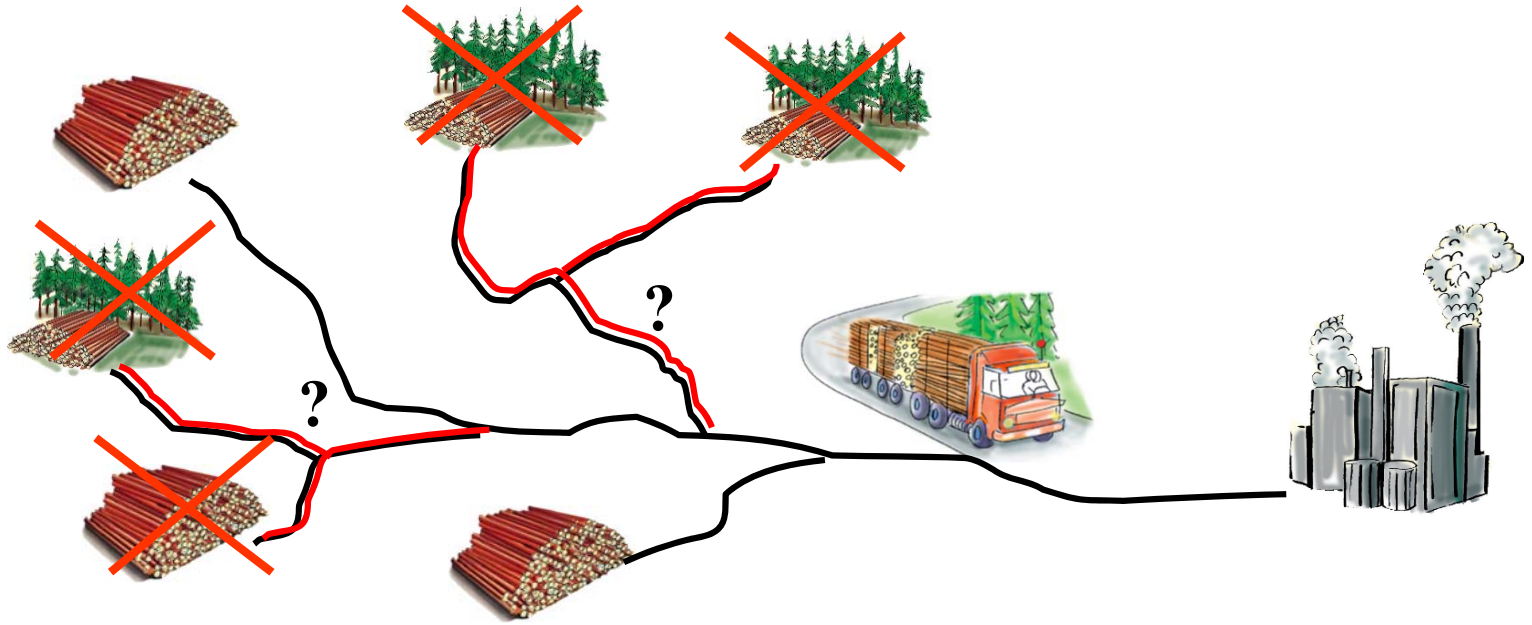
October - **Heavy rain**

January - **Winter**

Forest roads classification

- A&B – All year around
- C – All year around, not spring thaw and heavy rain
- D – Only frozen roads

Road investment problem



- Which links should be upgraded to secure the flow of round wood while minimizing costs?

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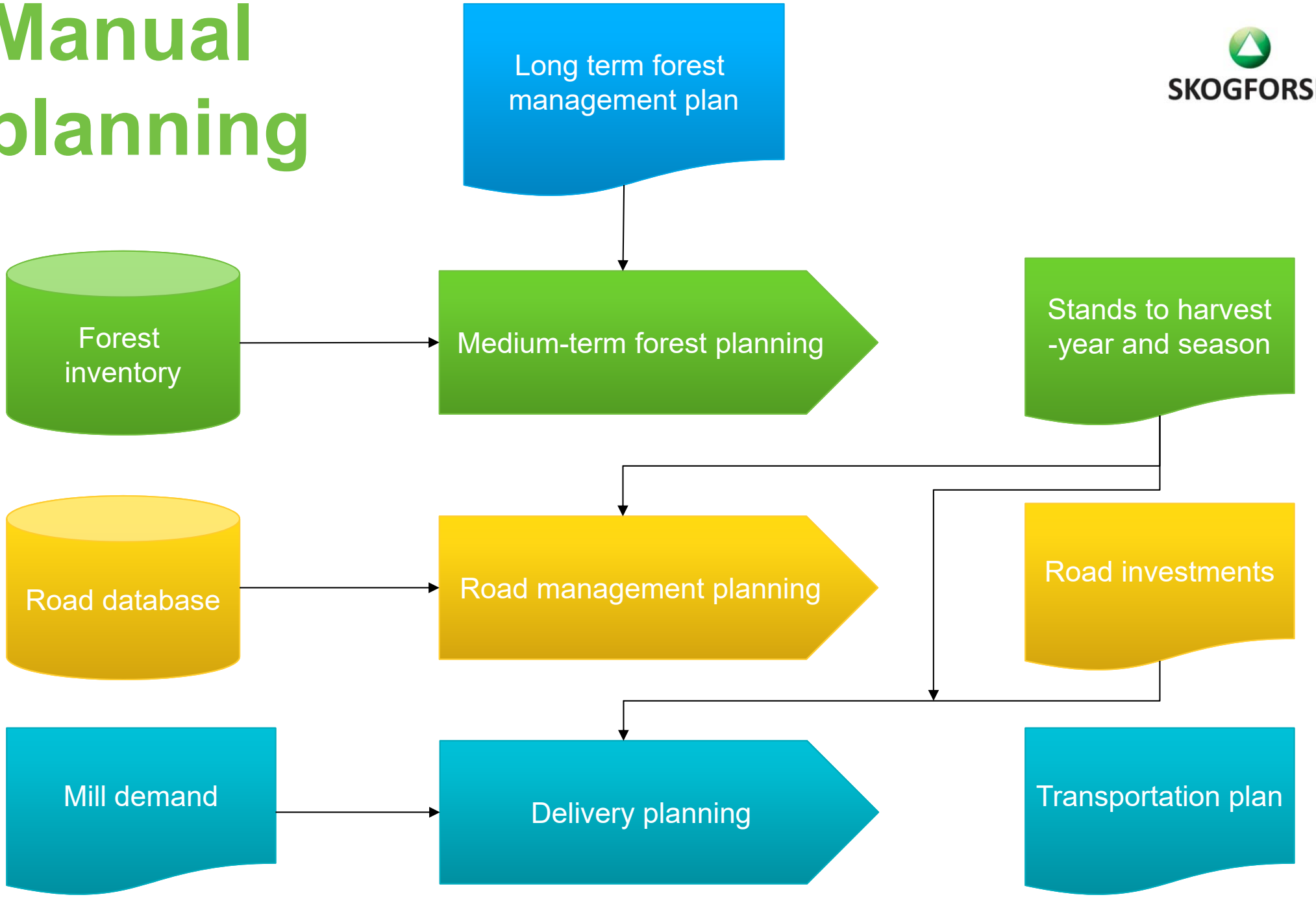
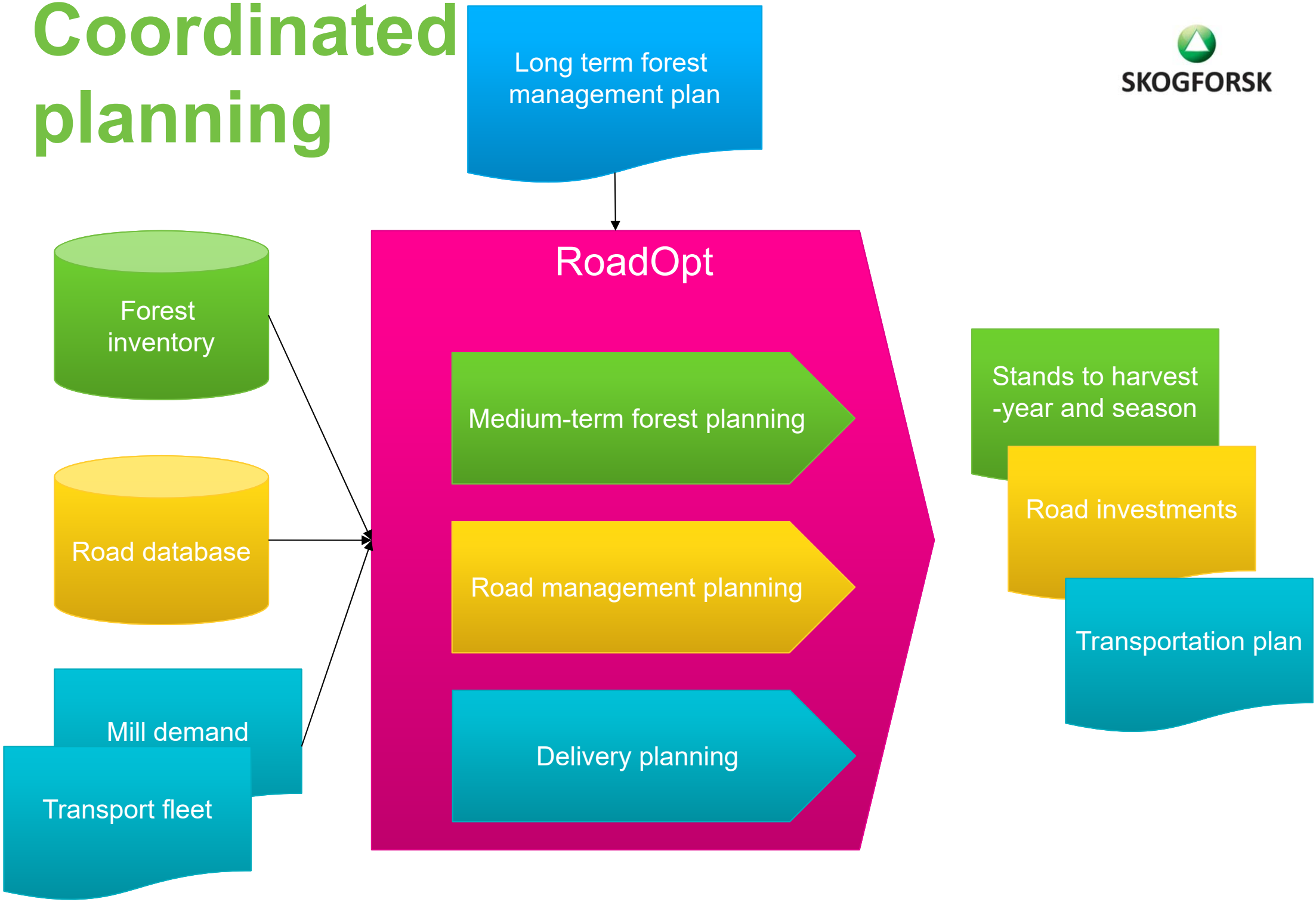
RoadOpt

- Objective
  - Minimize cost for road upgrading, transportation and harvest
- Decisions
  - Upgrading decisions for the road links
  - Estimate the overall wood flow
  - Harvest areas to cut
- Constraints
  - Limited supply
  - Demand must be fulfilled
  - Road link accessibility classes

Manual planning

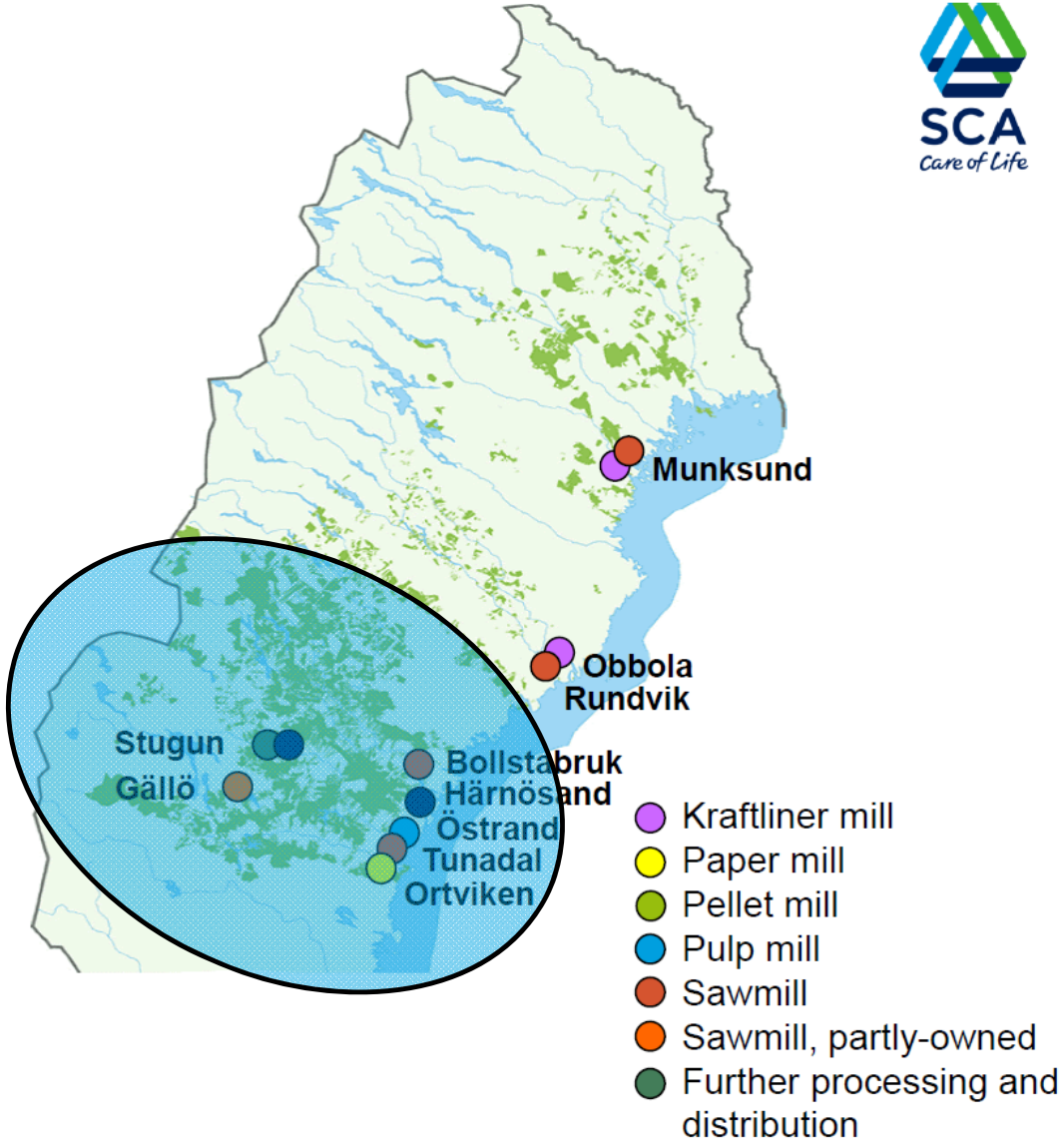


Coordinated planning



Case study SCA

- 5 year planning horizon
- 19 demand points
  - Pulp/Paper-mills
  - Sawmills
  - Railway terminals
- Harvest 15.2 million m^3
- Wood supply areas
  - Jämtland – 600.000 ha
  - Medelpad – 350.000 ha
  - Ångermanland – 350.000 ha



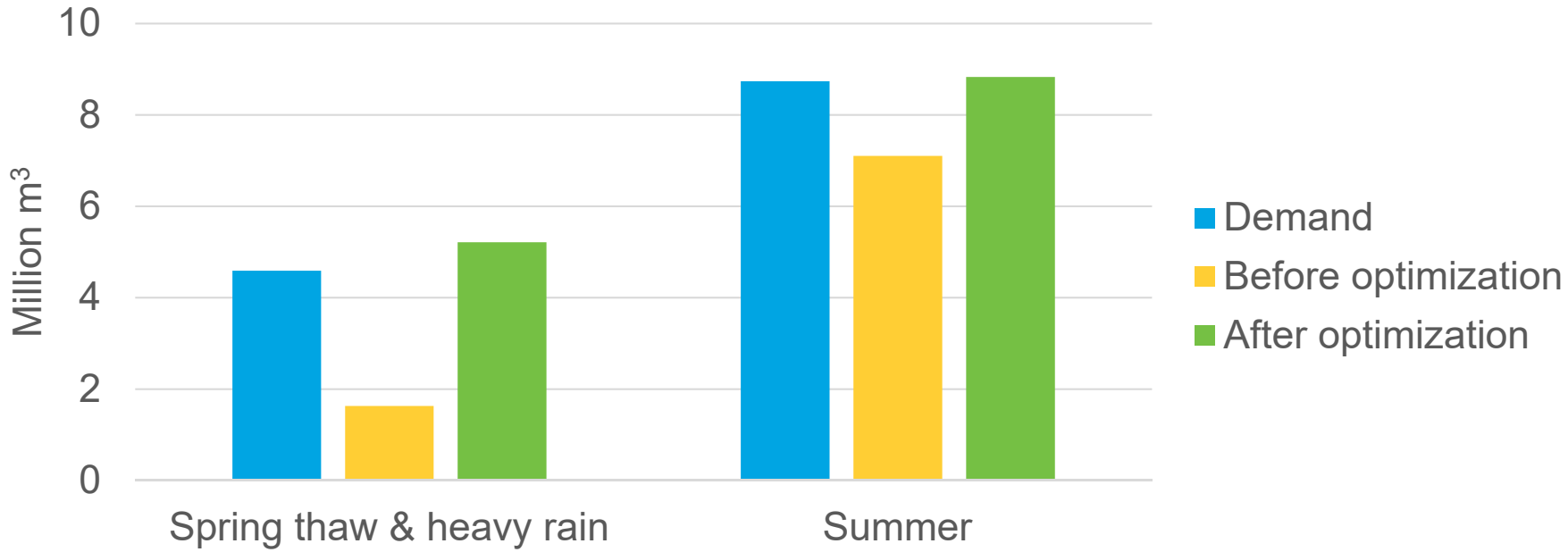
Objective of case study

Investigate the potential savings of planning road upgrading, harvest and transport together

Scenarios

- Manual planning – using manual harvest plan from SCA
- Coordinated planning – harvest plan decided by the model

Accessible volumes



- Road upgrading 33 million EUR
  - From class C to B 3 023 km
  - From class D to B 372 km
  - From class D to C 908 km

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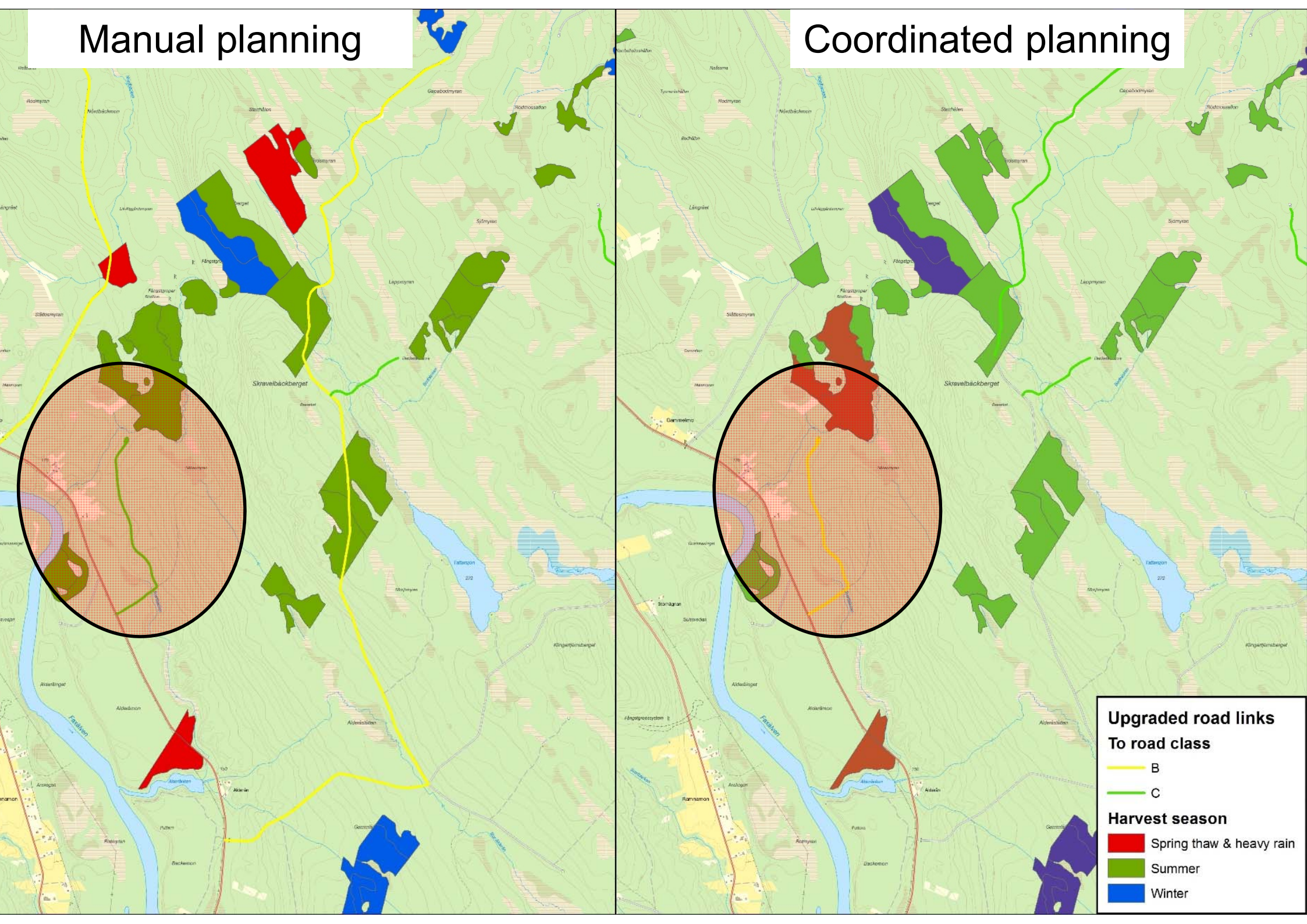
Results

Scenario	Road upgrading	Transportation	Total
Manual planning (million EUR)	33.0	166.4	199.4
Coordinated planning (million EUR)	13.3	162.0	175.3
Savings (million EUR)	-19.7	-4.4	-24.1
Diff cost (%)	-60%	-3%	-12%

Potential savings: 24.1 million EUR or 1.6 EUR/m^3


Manual planning
Coordinated planning
Skravelbäckberget
Upgraded road links
To road class
B
C
Harvest season
Spring thaw & heavy rain
Summer
Winter

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Conclusions

- Important results for SCA:

  "Big savings by planning harvest, road upgrading and transport together"
- Complex problem is to hard to solve manually
- A need of advanced DSS like RoadOpt
- Important with good input data

- Even greater potential when optimizing on total inventory – further research

Thanks for listening

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