ShortCuts

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SHE HAS THE BLUEPRINT

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DEAD WOOD – RARE SPECIES | **NEW REPORT** – FOREST FUEL RESEARCH

KEY HABITATS – COST-EFFECTIVE CONSERVATION MEASURE

The most cost-effective way to protect forest species is to set aside key habitats – they contain the greatest number of species needing protection in relation to wood value. This is shown in a study by Skogforsk and SLU investigating which conservation measures in forests gave most diversity for the money.

The researchers have examined species and wood value in four different types of forest – nature reserves, key habitats, retention patches and older forests that were ready for felling.

Greatest number of species

The study showed that key habitats contain the greatest number of species, and also the most red-listed species – beetles, lichens and mosses needing special protection. Key habitats have high wood value – about the same as nature reserves and older forest ready for felling – but the large number of species means that they offer most diversity for the money.

Retention patches are also relatively cost-effective. They do not contain as many species requiring protection but on the other hand they do not contain as much valuable wood. However, they often contain completely different species compared with old forest.

All measures have good qualities

"All ways of protecting forest have their qualities," says Line Djupström at Skogforsk, who carried out the study. "The study doesn't mean that key habitats can replace nature reserves or retention patches. The measures should complement each other if we're to retain the biological diversity."

According to the report, the least cost-effective method was to protect the final-felling forests.

"But the results are not black and white," says Line Djupström. "Rare beetles were almost as common in final-felling forests as in key habitats.

PHOTO: SVERKER JOHANSSON

More diversity for the money. Key biotopes are a cost-effective conservation method.

Consequently, stands for final felling can contain valuable cores. The challenge is to find the cores and protect them."

READ MORE:
Resultat no. 1/2011
CONTACT:
Line Djupström,
+46-18-188508
E-MAIL
line.djupstrom@skogforsk.se

THE BRÄNSLE-ESS AWARD

This year's Bränsle-ESS award for the best university study in the field of forest fuel technology was announced at the Skogforsk conference, "Future Energy", 23-24 March in Sundsvall. The winner this year was Tobias Andersson, forestry student at the Swedish University of Agricultural Sciences.

Tobias Andersson won the prize for his study, "TOMO Hugglink", which examined performance, system structure and potential for improvement for the system developed by TOMO Skog. The system consists of a full-sized chip truck with a chipping unit and crane mounted on a link.

PRIZE FROM THE KING FOR MOOSE RESEARCH

On 12 April, the Swedish King presented Skogforsk's Roger Bergström the Guldkvisten Prize for his important studies of the moose. The Swedish Forestry Association awards the Guldkvisten Prize, which is announced at the Forest Industry Week in Stockholm.

The motivation was as follows:

"For many years, Roger Bergström has acted like lubricating oil, a balsam, easing the friction between enthusiastic hunters and moose tourists – and confused forest users and car drivers. Such conflicts of interest can only be resolved through knowledge and fact-based argumentation. He is one of the country's foremost experts on moose behaviour and grazing habits. Roger is renowned and respected, even among those people who do not fully share his conclusions. His objectivity, integrity and calm disposition make him an important balancing factor in the heated debate about the moose. Professor Roger Bergström's work has been very important in the efforts to establish the moose as a forest resource – and to reduce the amount of damage it causes to the forest."

PHOTO: SKOGEN

Guldkvisten winner Roger Bergström and the Swedish King, Carl XVI Gustav (left).

SKOGFORSK RUNS GENDER EQUALITY SITE

On Facebook there is now a page about gender equality in the forestry sector – facebook/jamstalltsskogsbruk. And the site is managed by Skogforsk.

"After a workshop on gender equality in the sector, we were given the task of disseminating information about the work via Facebook," says Line Djupström at Skogforsk. "We hope that the Facebook page will be a resource where different ideas and projects can be presented and discussed."

PHOTO: SKOGFORSK

Line Djupström manages the forestry sector's equality site on Facebook.

> "Our studies indicate that inventories of biological diversity can be made more efficient by looking more at dead wood than at species.

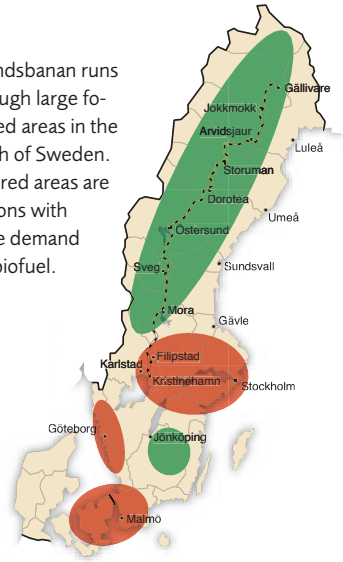
FOTO: BO-GÖRAN BÄCKSTRÖM/SKOGENBILD

DEAD WOOD

SHOWS LOCATION OF RARE SPECIES

Making an inventory of the number of species in the forest can be difficult and time consuming. However, a joint study by Skogforsk and SLU is now showing that valuable sites can be identified through various types of dead wood and dead trees, which are easier to locate than different beetles, lichens and mosses.

"Various types of dead tree – thick, thin, recently-died, rotten, standing, lying, sunlit, shaded – provide favourable conditions for many species in all species groups," says Line Djupström, who is leading the study. "Our studies indicate that inventories of biological diversity can be made more efficient by looking more at dead wood than at species, which often require more time and greater expertise."



Inlandsbanan runs through large forested areas in the north of Sweden. The red areas are regions with large demand for biofuel.

INLANDS-BANAN

– POTENTIAL TRANSPORT ROUTE FOR BIOFUELS

The forests in the interior of Norrland contain large reserves of forest fuel. It is Sweden's store of logging residue and Skogforsk has calculated that one-third, or 6.9 million hectares, of Sweden's productive forest – and a quarter of all growing forest in the country – lies within 50 km of the Inlandsbanan railway line.

Inlandsbanan could serve as an important artery for the areas in Sweden that today require large volumes of bioenergy. A few results from the study:

Potential annual harvest of forest fuel adjacent to Inlandsbanan is approximately 6 TWh, the equivalent of half the current harvest of forest fuel.

In order to transport this volume, 2,000 full system train hauls would be needed.

Replacing fossil fuels with forest-based bioenergy has great environmental benefits, which would be even greater if the raw material were transported by rail.

CONTACT: Johanna Enström, Skogforsk
+46-18-188502, johanna.enström@skogforsk.se

REPORT ON BIOFUELS DEVELOPMENT

The Skogforsk report "Efficient forest fuel supply systems" summarises many of the interesting results from the biofuel programme "ESS" (read more on p. 4-5). The report is available at skogforsk.com

ACES HIGH

The major initiative of the forestry and energy sectors – ESS (Efficient forest fuel Supply Systems) – costing SEK 65 million over four years, has just come to an end. However ESS has now been extended, so SHORTCUTS asked programme manager, Rolf Björheden, to read the cards.

Text and photo | SVERKER JOHANSSON | *bitzer@live.se*

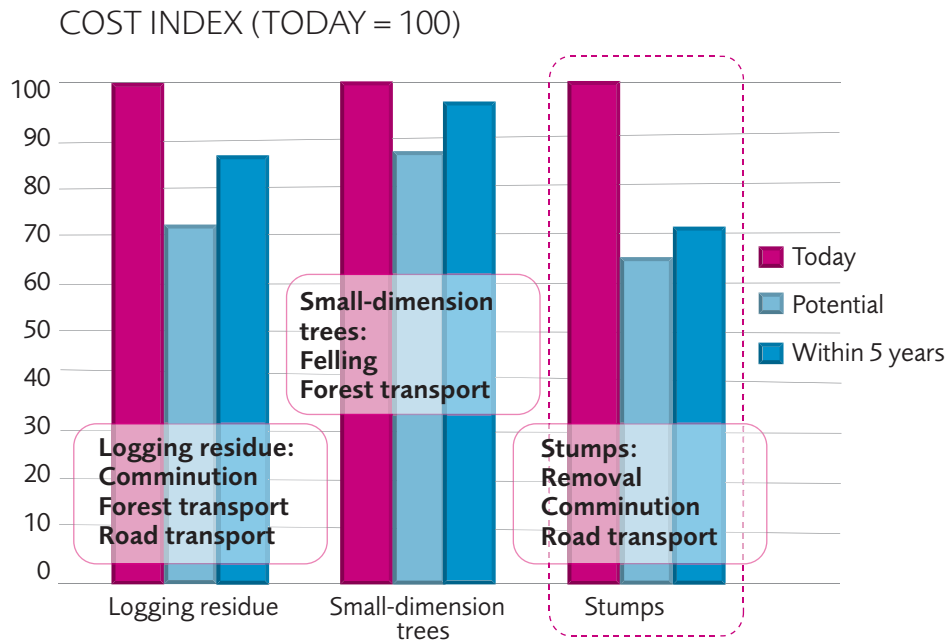
There's more in the pot now. The price of fuel is rising – does that also apply for forest fuel?

The motivation for the price increases we've seen has been to give sufficient profitability for the players concerned. But I don't think the prices will continue to rise so sharply. What we'll see instead is a much more specific assortment and fairer prices. It must be worthwhile to supply what's in demand – the right energy content, moisture content and purity – and to ensure that the potential of the raw material is utilised. Today there's a lot missing.

What's in the next hand?

We'll ride on the forestry sector's old hobby horse – rationalisations. There's incredible potential here! The cost of producing logging residue could be reduced by nearly 30 percent through more efficient comminution techniques and forest and road transport. The cost of harvesting small-dimension trees could be reduced by 15 percent with new technology for logging and forest transport. The cost of stumps could be reduced by more than 30 percent

ESS means ace in Swedish – and the quality of the ESS programme was also rated very highly in the follow-up conducted by the Swedish Energy Agency.



Stumps with potential
Stumps offer the greatest potential for bigger and more cost-effective fuel volumes. The diagram shows that the cost of processing stumps can be reduced by 30 percent within five years.

through coarse crushing, cheaper removal methods and improved logistics.

And when you read the cards? What do you see five years from now?
By then production of logging residue will have reduced costs by 15 percent, i.e. half the potential will have been realised. It's a bit like turning an oil tanker, there's a vehicle fleet that takes time to replace, and people think they know it all. There's a resistance to innovation.

For small-dimension trees, it'll be more difficult. Fuel extraction in stands of very small-dimension trees is often carried out by part-time contractors who are not prepared to invest heavily in new technology. Many contractors want the freedom to switch to roundwood production and aren't interested in pure fuel technology. But maybe this will change – we've seen a number of specialists becoming established in the market.

If logging residue is an oil tanker, then stumps are a speedboat. Few systems and no preconceptions – here we can quickly change technology and attitudes. Pretty much all the improvements we know of today could be implemented within a five-year period.

Are there any players who are investing more than others?
In order to develop efficient supply chains we need pilots to grab the helm and identify what is needed. A few players have already started to work in a way that can lead to such a position. It's reasonable to believe that, in the future, profitability and risk will be more closely related to the investment. The clients will be more specific with assortments and prices and I think it will lead to the following developments.

Lead times will be shortened. The target is "no fuel above 50 percent humidity", i.e. similar to that of newly-felled logs.

> "We'll ride on the forestry sector's old hobby horse – rationalisations. There's incredible potential here!

Tomorrow's fuel will be purer than today's, and this applies to both logging residue and stumps.

Fuel from small-dimension trees will become an exclusively-felled assortment for boilers with high fuel requirements and clients with a good ability to pay. Apart from this, more of the fuel will be crushed – this applies to stumps of course but also to logging residue.

Roundwood for energy, small dimension trees and bundled material will be used more as strategic stocks to ensure delivery reliability and consistency in delivered fuel.

Because of these developments and through the requirement for more efficient long-distance transports, terminals will become more important in the supply chain.

Will there be any losers?
The work environment worries me. Many risk factors are greater in biofuel handling, such as dust, spores, noise and whole-body vibrations. The ergonomics in the forest machines needs to be looked at, in the same way as has been done for mechanised forestry as a whole.

The environmental issues must be given more attention. It's not just about reducing the negative effects of forest fuel extraction – this activity can be used as a lever for improving environmental protection and nature and forest conservation.

ESS is now entering a new round. Three ways to play the cards?
There'll be greater integration of fuel with the main forestry operations – new machines will be developed that do more of the work in one process. We'll also develop more efficient long-distance transport through collaboration with various modes of transport. And thirdly, I believe that information technology will grow towards the users and be utilised both for operative and strategic optimisation of the fuel flows.

QUEST FOR THE PERFECT HARVESTING UNIT

"My vision is a light and manoeuvrable unit that continually fells and accumulates many small trees and also compresses the tree bundle when it's placed on the ground." So says Skogforsk's Mia Iwarsson Wide – one of the world's leading experts on felling in stands of small-dimension trees.

Text CARL HENRIK PALMÉR
Photo SVERKER JOHANSSON

Mia Iwarsson Wide has worked with forest fuel in the ESS programme for four years. Her main task has been to develop technology and methods for extracting small-dimension trees in cleaning and thinning of untouched, 7-10-metre high forests with a lot of hardwood trees.

The forests are dense – an extraction of 2,500-4,000 stems in a cleaning/thinning programme is not unusual. However, the stems are thin – the majority are less than eight centimetres at breast height – so creating viability in this type of felling is a tough challenge.

But if we are to extract this raw material for energy, we must attain a zero result in cleaning/thinning. Because if the landowner has to pay for felling, it won't happen – for the second time.

"At some time in the past, the landowner has 'forgotten' to clean these stands, often because they thought it would be too expensive. It seems a bit naïve to believe that the landowner would now suddenly be willing to pay for the forest to be felled," she says.

Mia Iwarsson Wide paints an optimistic picture of a system that would achieve a financial zero result. "It involves a unit that fells the trees with a circular saw – or possibly a heavy saw chain mounted on a circular saw bar. Shears are too slow and an ordinary chain saw blade can be too sensitive," she says. "The unit is mounted on a long crane, preferably eleven metres. This requires a stable base machine, like today's thinning harvesters."

Geometrically operating boom

The forest is cleaned geometrically in boom corridors, approximately one-metre wide, away from the striproad. All the trees in these corridors are felled in one continuous movement and gathered together in bundles. The bundles are piled on the ground along the crane corridor before forwarding.

"The operator works the boom in the desired pattern" she says. "The operator doesn't need to position the boom for every stem. That would take too long and would be too expensive."

Between the corridors, the forest is left untouched in 1-3-metre strips, and then a new corridor is cleared. The distance between the corridors depends on the number of stems.

"The unit must be light to ensure a high payload in each boom cycle," she says. "There should be at least 15 to 30 trees per boom cycle. The machine should manage around 600 trees per hour if the felling is to be viable. Preferably more, because everyone likes a profit…"

Another big advantage is if the forest fuel can be compressed at the time of felling. This makes the forwarding much more efficient – with loose bundles there is far too much air in the load.

Cross-cut saw on the unit

"The simplest way is to pull the accumulated trees through the felling head using feeder rollers and then place the bundle on the ground – roughly the same way as today's harvester unit works but without delimbing knives," she explains.

"That's enough to hold the limbs together and form a more easily-handled bundle. Furthermore, many needles, leaves and small limbs drop onto the ground, improving the nutrient status."

"Perhaps there could also be a cross-cut saw on the unit to shorten the bundle if it becomes too long and difficult to handle."

> "The arms that hold the bundle must be placed sufficiently high up – otherwise it will be like trying to keep a bunch of flowers together by holding the bottoms of the stems.

8

REQUIREMENTS FOR THE PERFECT UNIT

- Continual and stable accumulation
- Continual and fast felling
- Robust yet easy to handle
- Adapted for geometrical harvesting pattern
- Designed for multi-tree handling
- Grip – and accumulating arms
- Multi-tree feeding
- Stable base machine with long and strong crane

When will this become reality?

"This isn't a vision for some long-distant future," says Mia Iwarsson Wide. "There are already units on the market that have come a good way."

"But multi-tree handling must be improved – and that also applies in normal thinning. All equipment used today is fitted onto existing units. In the future, multi-tree handling must be integrated from the start. Then we can improve the efficiency of multi-tree handling and delimbing would be improved."

She gives a convincing example: the arms that hold the bundle must be placed sufficiently high up – otherwise it would be like trying to keep a bunch of flowers together by holding the bottoms of the stems. Anyone can see it would just fall apart!

Most interesting development right now?

Mia Iwarsson Wide has high hopes for a student project at Luleå University of Technology. A couple of students are building a prototype for "the perfect unit for stands with small-dimension trees".

"They'll be focusing on continuous felling and accumulation."

B
SVERIGE
PORTO BETALT

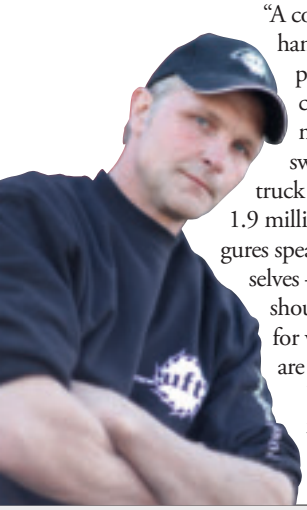
Text and photo | SVERKER JOHANSSON | *bitzer@live.se*

He's done the sums. With investments of over SEK 20 million, Jimmy Andersson wants to optimise utilisation:

"CHIPPERS SHOULD CHIP –TRUCKS SHOULD ROLL"

Jimmy Andersson at Upplands Flis & Transport has three chipper trucks and three container trucks. He also hires in more container trucks when necessary.

Most chip transports go to Brista Värmeverk outside Märsta. It is here that I meet Jimmy and join him in the cab for a few hours. After five years of working with chipper trucks, and producing more than a million cubic metres of wood chips, Jimmy Andersson doesn't have the slightest doubt.



"A container-handling chipper truck costs SEK 4.5 million, and a switch-body truck costs SEK 1.9 million. The figures speak for themselves – they should be used for what they are good at."

When planning his chipping assignments, he can adapt the number of container trucks used depending on transport distance. The aim is to minimise waiting times.

"We drove between Gästrikland and Brista a while ago, a distance of 220 kilometres. I had five switch-body trucks on the go. Today we're chipping in Sigtuna, very close to Brista. We drive one container at a time, so we can both chip and transport continuously."

Containers the favoured option

Chipper trucks are becoming more common, but Jimmy Andersson believes there could be other solutions. Tractor-mounted chippers operate on small stands and where the logging residues cannot be placed on the roadside. But if he could choose between the switch-body system and normal chipper trucks that both chip and transport, he has no doubts.

"It has to be the switch-body system. A normal chipper truck is more expensive – SEK 5.5 million. And it also spends much of the time on the road, so it's really too expensive."

Bright future

Lars Eliasson at Skogforsk at Skogforsk analysed the container handling chipper truck system – and likes what he's seen. and likes what he's seen. It is one of the most profitable combination from a distance as short as 20-30 kilometres, but he believes that there are other reasons for choosing traditional chipper trucks.

"For small biomass landings close to the customer, a traditional chipper truck is a good choice. But a chipper costing SEK 2.5 million shouldn't be driven around unnecessarily. It should be chipping."

RESULTS FROM SKOGFORSK

The container-handling chipper truck (CCT) can be utilised more efficiently than a traditional chipper truck because the container trucks take care of the transport. Compared with chippers mounted on forwarders or tractor-pulled chippers, the CCT is cheaper to move and logistics are simplified.

READ MORE:
Resultat 19/2010
CONTACT: Lars Eliasson, 018-188525, lars.eliasson@skogforsk.se

SKOGFORSK

UPPSALA (Head Office) Uppsala Science Park,
SE-751 83 Uppsala, Sweden Phone: +46 18 188500
EKEBO Ekebo 2250, SE-268 90 Svalöv, Sweden
Phone: +46 418 471300
UMEÅ P.O. Box 3, SE-918 21 Sävar, Sweden.
Phone: +46 90 2033350
www.skogforsk.se

RESEARCH PROGRAMMES
WOOD UTILIZATION Lars Wilhelmsson
lars.wilhelmsson@skogforsk.se.
Phone: +46 18 188555
FOREST TECHNOLOGY Magnus Thor
magnus.thor@skogforsk.se
Phone: +46 18 188596
LOGISTICS Gert Andersson,
gert.andersson@skogforsk.se
Phone: +46 18 188567

FOREST BIOENERGY Rolf Björheden
rolf.bjorheden@skogforsk.se
Phone: +46 18 188509
TREE BREEDING NORTH
Bengt Andersson
bengt.andersson@skogforsk.se
Ph: +46 90 2033358
TREE BREEDING SOUTH Bo Karlsson
bo.karlsson@skogforsk.se
Phone: +46 418 471305

SILVICULTURE
Lars-Göran Sundblad
lars-goran.sundblad@skogforsk.se.
Ph: +46 90 2033369
ENVIRONMENT Jan-Olov Weslien
jan-olov.weslien@skogforsk.se
Phone: +46 18 188505

Editor in chief: Jan Fryk | **Form:** Pagarango | **Editor:** Bitzer | **ISSN:** 2000-2726 | **Photos:** Sverker Johansson unless otherwise stated
Translated by: Leslie Walke, CommunicAID | **Printed by:** Gävle Offset, 2011