Independent Forestry Panel

Public submission

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13 October 2024
Independent Forestry Panel
by email

Dear Panel,

Should logging of the NSW Forests managed by the NSW Forestry Corporation continue? If it continues, strategies need to be put in place to improve forest productivity, improve outcomes for wildlife & reduce breaches of logging conditions to nil. Fines for breaches need to be increased substantially to act as a deterrent. Courts need to be provided with a Schedule of substantial fines to be imposed. Supervision of logging operations needs to be significantly increased in order to reduce breaches to nil.

It would be good for the forests & wildlife if logging were to stop. There would need to be a transition period. More hardwood plantations need to be established. An industry transition package would need to be implemented.

Currently, the effects of earlier excessive logging and bushfires have resulted in a shift to increasing the volume of High Quality Small logs. Flooding has also acted to curtail logging volumes particularly in 2020-21. The shift to more supply of High Quality Small implies that rotation cycles will fall.

SUSTAINABLE YIELD (SY)
A Linear Programming Model is used to derive the sustainable yield figures, where the objective function is the supply of high quality (HQL+HQS) sawlogs: i.e. High quality sawlogs are maximised.

In 2018 the DPI identified a trend to the supply of smaller diameter logs due to excessive logging & fires in the past. This was the case for Eden, North Coast & South Coast-Southern. In Tumut 100,000 cu metres p.a. of High Quality Alpine Ash was killed and available for salvage operations. HQ SY fell to 20,400 p.a.

Tumut standing volume figures for HQL were overstated by about 100% in the 2009 AG Report due to the standing volume figure for HQL being on a gross basis instead of a net merchantable volume basis. This can be confirmed from P45 of the Wildfires 2020 Report for HQL. A pre fire standing volume can be estimated as 1,602,027 cu m - being 1,185,500 cu m DIVIDED BY 0.74 for HQL.
My 2009 estimate of 1,691,610 is close to the 1,602,027 figure.

In past modelling it was HQL sawlogs that were maximised in the Linear Programming model.

We can derive an estimate of the theoretical sustainable yield for High Quality sawlogs using:

> Sustainable yield High Quality per ha = carrying capacity High Quality per ha DIVIDED by 2. For hectares use the net harvestable area in hectares.

* Carrying capacity/ha = NET merchantable standing volume of HQ/ ha

* We divide by 2 because:
  the idea behind sustainable yield is that at the end of the rotation cycle i.e. the time to log the whole forest once, the forest, i.e the supply of HQ sawlogs, will have grown back to its original size again.

It is necessary to separate Native Forest from Plantation figures
Example: the 2009 Auditor Generals Report at page 46 for North Coast:
HQL+V+G = 191,086 cu metres for 2007-08. Of this amount approximately 21,000, 11%, was from plantations & 170,086 from NF - but this was not made clear in the AG's Report. (V=veneer, G=girder)

In addition, FOI figures for HQL+HQS+V+G FOR 2007-08 were 35,036 cu metres LESS than the figures provided to the AG by FNSW. This difference may have been due to plantations. Implies plantation HQS of 14,036 cu metres for 2007-08.

AG report Apr 2009 has 48,140 ha of hardwood plantations - of which 48,100 North Coast. DPI 2018 Report at P35 has 38,000 ha on the North Coast, 2022-23 Annual Report says 34,000 ha. **Which figure is the right one?**

WE NOW WANT TO CHECK IF THE NATIVE FOREST LOGGING IS SUSTAINABLE

Compare the theoretical sustainable yield/ha with the ACTUAL yield/ha.
If actual yield/ha < theoretical sustainable yield/ha the logging is not sustainable.

The logging is not sustainable because the rotation cycle has to fall. In order to meet a fixed commitment more hectares have to be logged.

EXAMPLE
These are figures from the 2009 Auditor General's Report & FOI Figures.

North Coast - years 1 to 5
Standing Volume in N.F. of HQL sawlogs 7,819,737 cu m.
FNSW Sustainable Yield was 220,000 cu m for HQL. It seemed N.F. only, as per P41 'Ecological Sustainable Timber Yield', lower NE ESFM Plan 2005.
Rotation cycle was 35.54 years = 7,819,737/220,000
Actual yield per ha = 10 cu m per ha.
This was based on 77,352 ha logged for 773,442 HQL sawlogs, 04/05 to 07/08, on the North Coast. On average 19,338 ha were logged each year. FOI figures.

Theoretical sustainable yield N.F. 7,819,737/(2 X 314,036) = 12.45 cu m/ha
The logging was not sustainable because 10 < 12.45.
The rotation cycle fell to 28.5 years.
I estimated the sustainable yield N.F. HQL = 176,717 cu m p.a.
= (10 X 2 X 314,036)/35.54

It appeared the standing volume for HQL sawlogs of 7,819,737 cu m should have been approximately 6,280,520 cu m, (10 X 2 X 314,036).
Standing volume was overstated by 24.5%, (7,819,737-6,280,520)/6,280,520.
This occurs because defects cannot be correctly identified in standing trees.

THE CURRENT SITUATION

1) Optimisation has changed to consider:
   a) All High Quality, b) Low Quality
2) Standing volume data could be obtained from the Wildfires 2020 Report.
3) I don't have area logged figures for each region - which are needed.
4) Wildfires of 2019/20, flooding & subsequent regrowth complicate matters.
5) The rotation cycles for high quality large & high quality small are different.

In Eden there is a transition to smaller high quality logs. HQL will reduce to 25% of the high quality volume . HQL will decline from 20,000 to 6,500 cu metres p.a. due to the forest having suffered from intensive logging & wildfires. Sustainable yield of High Quality shown as 26,000 cu metres p.a. at P10 in the DPI document, **'Sustainable Yield in New South Wales Regional Forest Agreement Regions'** of November 2018. Wildfires 2020 document has 25,000 cu m reducing to 18,000 cu m. High Quality = HQ large+HQ small+HQ25 (HQ25 Eden only).

In South Coast-Southern, the supply of High Quality & Low Quality will need to be increasingly supplied from difficult foothill & tablelands forests. These areas have lower yields and increased costs and are likely to be economically unviable for logging.

In South Coast-Tumut, my understanding was: the standing volume figure for HQL sawlogs were on a gross basis and it was necessary to divide the figures by 2 in order to derive the figures on a net merchantable volume basis. This reduced the standing volume figure for HQL in the AG's 2009 Report from 3,383,221 cu metres to 1,691,610. This compares to 1,602,027 cu m I derived from P45 of the Wildfires 2020 Report - being 1,185,500 cu m DIVIDED BY 0.74 for HQL.

The sustainable yield for HQL fell from 48,000 cu metres p.a. to 33,800 using a an actual yield figure of 18.17 cu metres p.a. However there were significant problems with the area logged figures which would reduce the sustainable yield for HQL to around 27,000-29,000 cu metres. One of these problems was the supply from Ingebirah State Forest. **Tumut forests have been adversely affected by heavy logging & extensive bushfires.** Management of the Yellow Bellied Glider temporarily reduced logging to around 3,000-5,000 cu metres p.a. Logging resumed to earlier levels from 2013. **SY of HQ is now 20,400 cu m p.a. 2020-24. Of which about 15,000 HQL & 5,000 HQS.**

In North East, some wood supply agreements were bought back. According to the modelling, High Quality sustainable yield from **NF+Plantations = 230,000 cu metres p.a. rising to 250,000 from around 2050 due to plantations.** Small High Quality is expected to rise from 25% to 50% of High Quality volume. **It appears neither of these will be achievable.**

The rotation cycle in plantations is less than in Native Forest. There is an issue as to which figure for North East plantations is right = 38,000 ha, 34,000 ha or 48,100?

COMMENT – TIMBER THE ULTIMATE RENEWABLE

The Forestry Corporation website describes timber as the ultimate renewable. However, there has been:

- Over cutting
- Factor X – more bushfires, more flooding
- A transition from HQ Large sawlogs to HQ Small sawlogs.
- Rotation cycles continuing to fall.

Timber supply is not the ultimate renewable unless care is taken to improve forest productivity & repair damage from previous carelessness & excessive logging. Factor X – fires & flooding – also arise to thwart the plans of mice & men.

NET HARVESTABLE AREA – ha

	EDEN	SC–STH'N	SC–TUMUT	NORTH EAST
AG 2009	119,258	102,200	47,635	314,036
DPI 2018	114,300	98,100	37,400	336,900
WILDFIRES 2020	109,400	128,800	44,800	408,500
				NF 360,400 or 370,500?

I think the 408,500 ha figure includes plantations – 48,100 ha in North East? **If it was 38,000 ha then N.F. harvestable area would be 370,500.** This is an increase of 56,464 ha from the 314,036 ha in the 2009 AG's Report. **WHY?**

SUSTAINABLE YIELD – cu metres

	EDEN	SC–STH'N	SC–TUMUT	NORTH EAST
	Sustainable yield figures in the AG Report are for HQL sawlogs			
AG 2009	23,000	42,070	48,000	220,000
		48,500		200,000
	Change of Basis: High Quality (large+small) + HQ25 (HQ25 Eden only)			
DPI 2018	26,000	50,000	35,000	230,000
WILDFIRES 2020 (for 2020–24)	25,000	35,000	20,400	230,000 200,000? NF

SC–Southern figure of 48,500 cu metres was increased from 42,070 due to leasing/ buying an estimated 15,600 ha of private land – but this was not disclosed in the AG Report. It was noted in the 2006–07 Corporate Business strategy but not the area that was leased/and or bought.

Based on the actual yield from logging, the sustainable yield was 37,330 cu metres for public N.F not 42,070.

The 230,00 cu metres for North East Includes NF+Plantations.

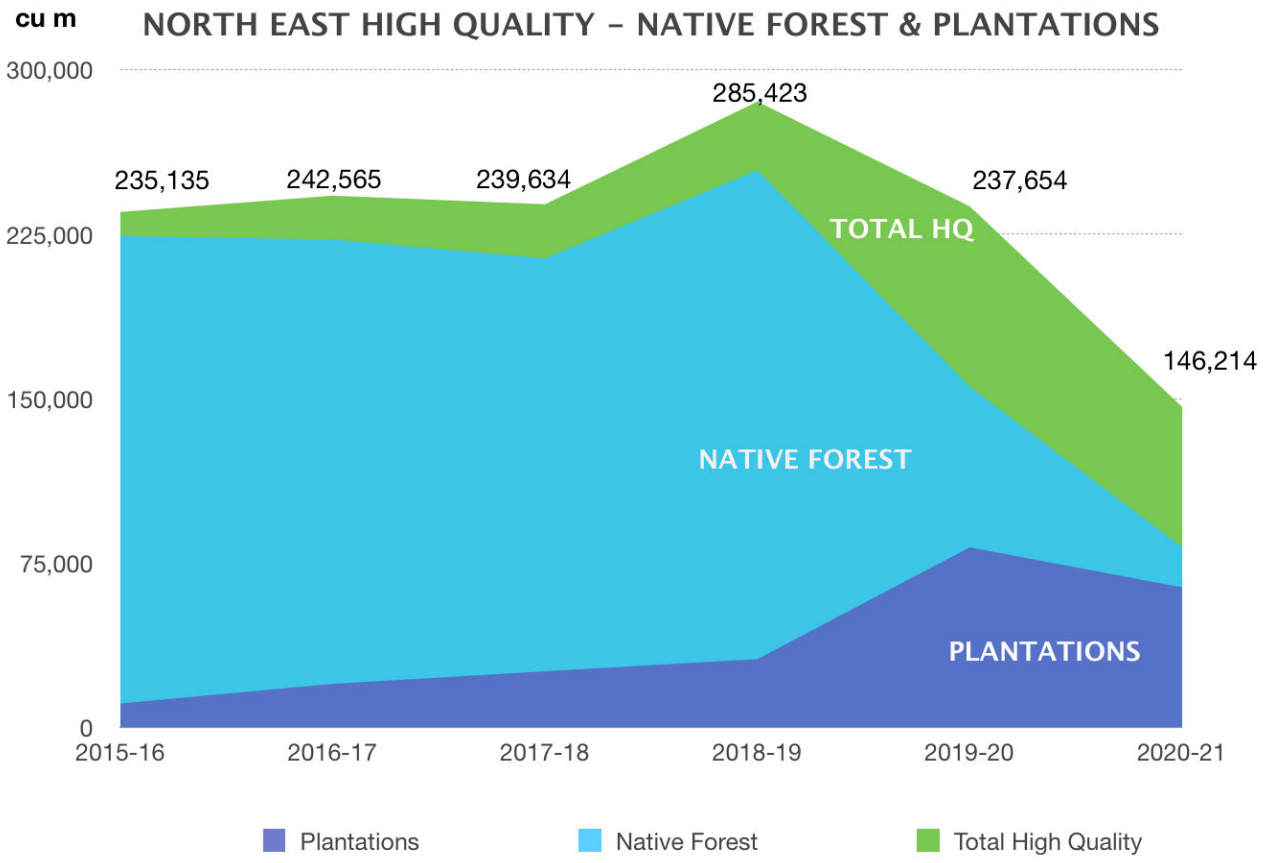
For North East, FCNSW advised HQS increasing from 25% of High Quality to 50% – NF+Plantations. This has been due to excessive over cutting in the past & bushfires. **It appears this is not achievable due to:**

the effects of extreme weather – bushfires & flooding;
the large increase in pulp timber to 165,151 tonnes in 2020–21;
the relatively high level of low quality sawlogs, although this has fallen.

NORTH EAST, HIGH QUALITY, NATIVE FOREST & PLANTATIONS

	Native Forest	Plantations	Total
	cu m	cu m	cu m
2015–16	224,109	11,026	235,135
2016–17	222,585	19,980	242,565
2017–18	213,928	25,706	239,634
2018–19	254,155	31,268	285,423
2019–20	155,435	82,219	237,654
2020–21	82,255	63,959	146,214

Source: NSW Forestry Snapshot Reports, EPA, 2016–17 to 2020–21.
I could not find the figures from 2021–22 onwards.
High Quality = large+small: HQ sawlogs, Veneer, Poles/piles+Girders



The 146,214 is well below the 230,000 High Quality sustainable yield, NF+Plantations. Extreme weather – fires & flooding – have acted to severely curtail the optimistic appraisal in the 2020 Wildfires Report.

"The total yield of high- quality timber products has not been significantly impacted by the fire, with the main reductions in the first four periods ranging from four to six per cent. Although full yield recovery is achieved after 65 years, the fires have caused a small (one per cent) drop in the overall supply of high-quality logs on the North Coast." Source: FCNSW, Wildfires Report 2020 P59.

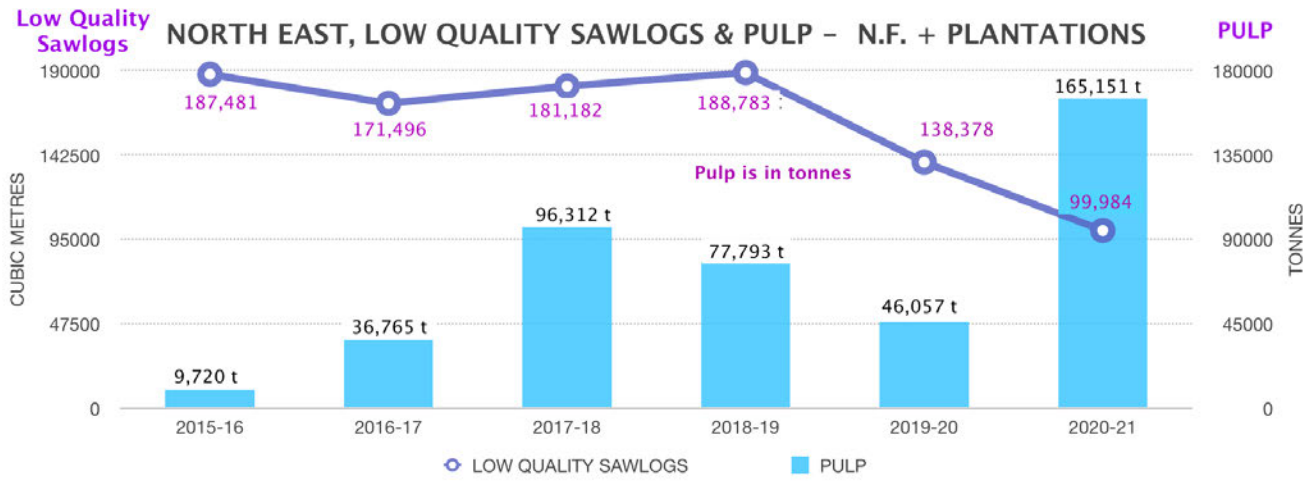
THERE WAS A MARKED INCREASE IN NON SPECIFIED PULP TIMBER FROM HARDWOOD PLANTATIONS IN THE NORTH EAST REGION (UNE+LNE) FROM 32,980 TONNES IN 2019-20 TO 141,090 TONNES IN 2020-21. Adding in the 24,061 tonnes from Native Forest increases the figure to 165,151 tonnes in 2020-21

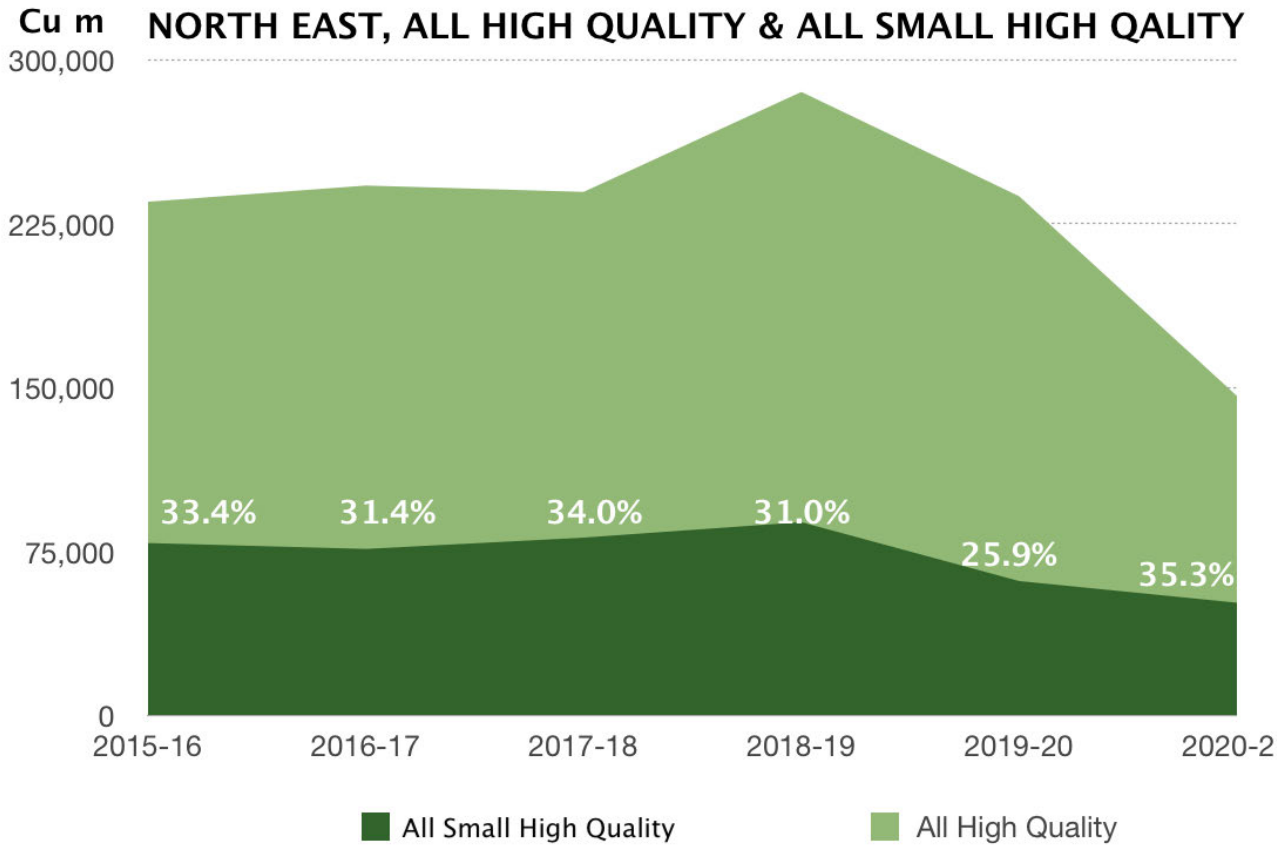
It would seem that hardwood plantations would not be able to push the North East High Quality sustainable yield to 250,000 cu metres p.a. when there has been such a large increase in pulp timber to 141,090 tonnes in Plantations. Were they all salvage logging of fire damaged trees? IF NOT, these logs would not be available to mature into small high quality.

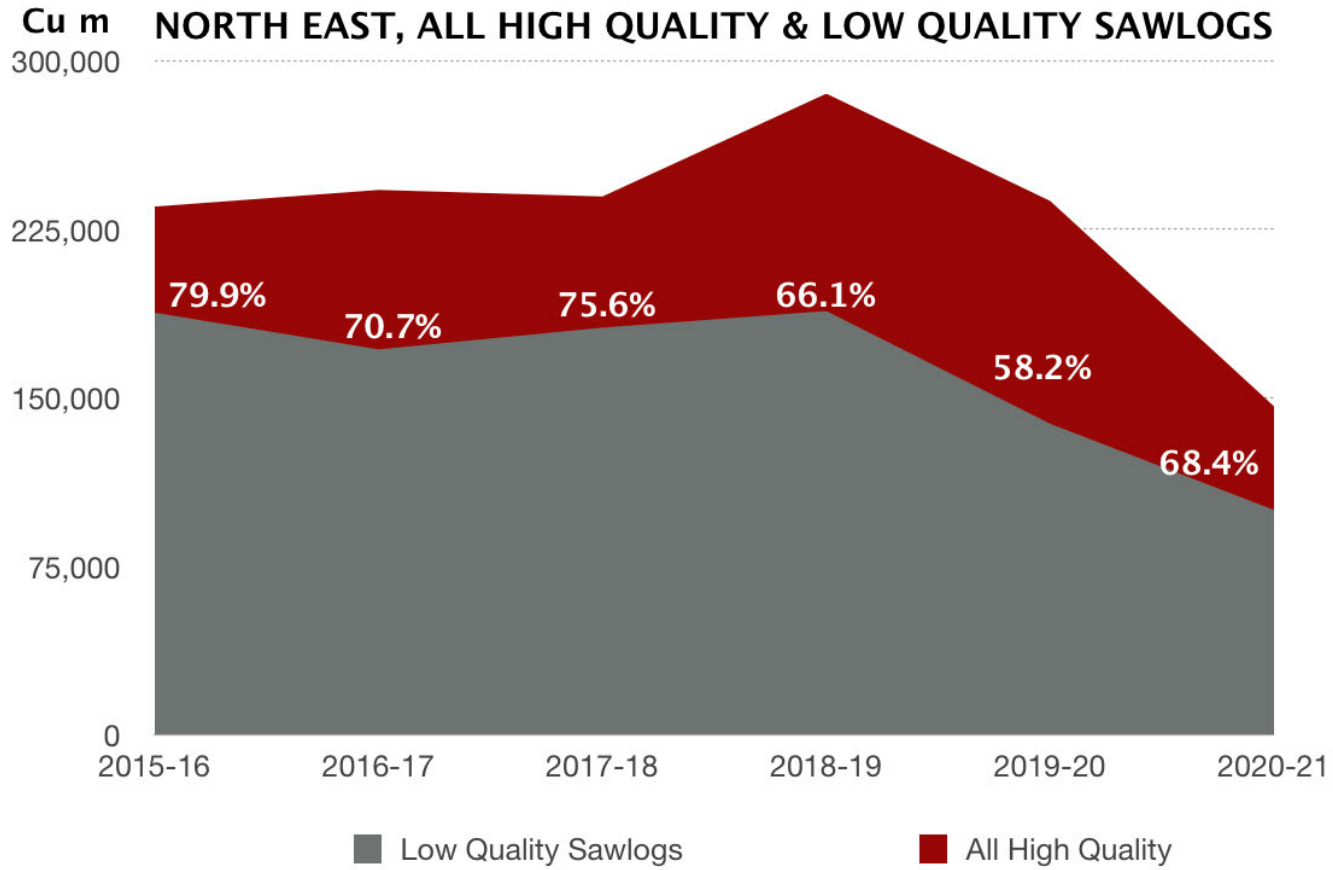
NORTH EAST: SMALL HIGH QUALITY, % OF TOTAL HIGH QUALITY

	NATIVE FOREST	PLANTATIONS	TOTAL
	%	%	%
2015-16	32.4	56.0	33.4
2016-17	30.2	44.6	31.4
2017-18	32.8	43.9	34.0
2018-19	28.7	49.3	31.0
2019-20	21.9	33.4	25.9
2020-21	34.1	36.8	35.3

These figures do not support the idea that small high quality will transition to 50% of high quality. If we now take account of the volume of low quality sawlogs and the marked increase in pulp **the goal of small high quality transitioning to 50% of High Quality in the North East will not be achievable.**




Cu m
NORTH EAST, ALL HIGH QUALITY & ALL SMALL HIGH QALITY
300,000
225,000
150,000
75,000
0
33.4%
31.4%
34.0%
31.0%
25.9%
35.3%
2015-16
2016-17
2017-18
2018-19
2019-20
2020-2
All Small High Quality
All High Quality


Cu m
NORTH EAST, ALL HIGH QUALITY & LOW QUALITY SAWLOGS
300,000
225,000
150,000
75,000
0
79.9%
70.7%
75.6%
66.1%
58.2%
68.4%
2015-16
2016-17
2017-18
2018-19
2019-20
2020-21
Low Quality Sawlogs
All High Quality

PERCENTAGE OF THE FOREST MANAGED BY FCNSW THAT IS LOGGED

It is said that only 1% of the forest estate managed by FCNSW is logged. I find this misleading because the numerator & denominator are not on the same basis. Logging occurs within the net harvestable area. Accordingly, the percentage of the forest that is logged should have the net harvestable area as the denominator.

I don't have current area logged figures by region – but I have some earlier ones.

NORTH EAST
Net Harvestable Area 314,036 ha

Year	Area logged	Percent
	ha	%
04/05	18,049	5.7
05/06	20,821	6.6
06/07	20,716	6.6
07/08	17,766	5.7

Sample size approx 97 compartments based on compartment size of 800 ha.

SOUTH COAST – TUMUT
Net Harvestable Area 47,635 ha

Year	Area logged	Percent
	ha	%
01/02	394	0.8
02/03	718	1.5
03/04	1,110	2.3
04/05	851	1.8
05/06	828	1.7
06/07	1,727	3.6
07/08	1,675	3.5

Sample size approx 9 compartments based on compartment size of 800 ha.

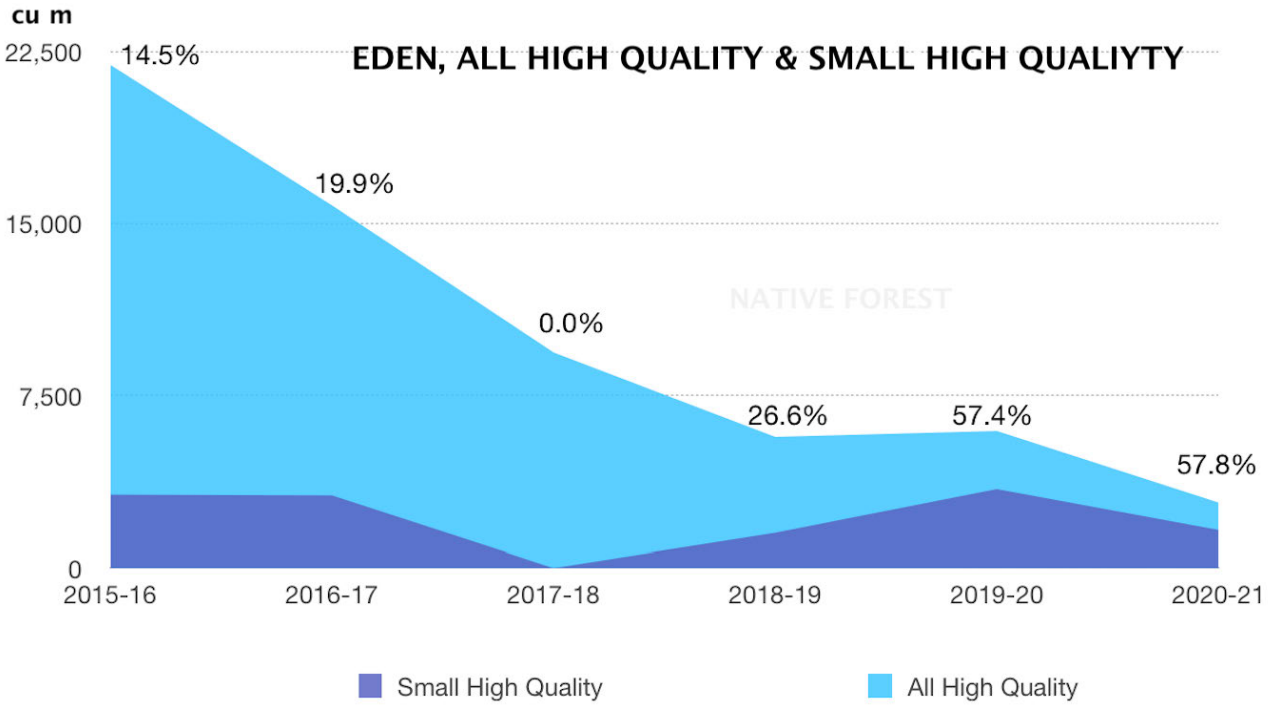
SOUTH COAST – SOUTHERN
Net Harvestable Area 102,200 ha
(Strategic net area, P39 ESFM Plan)

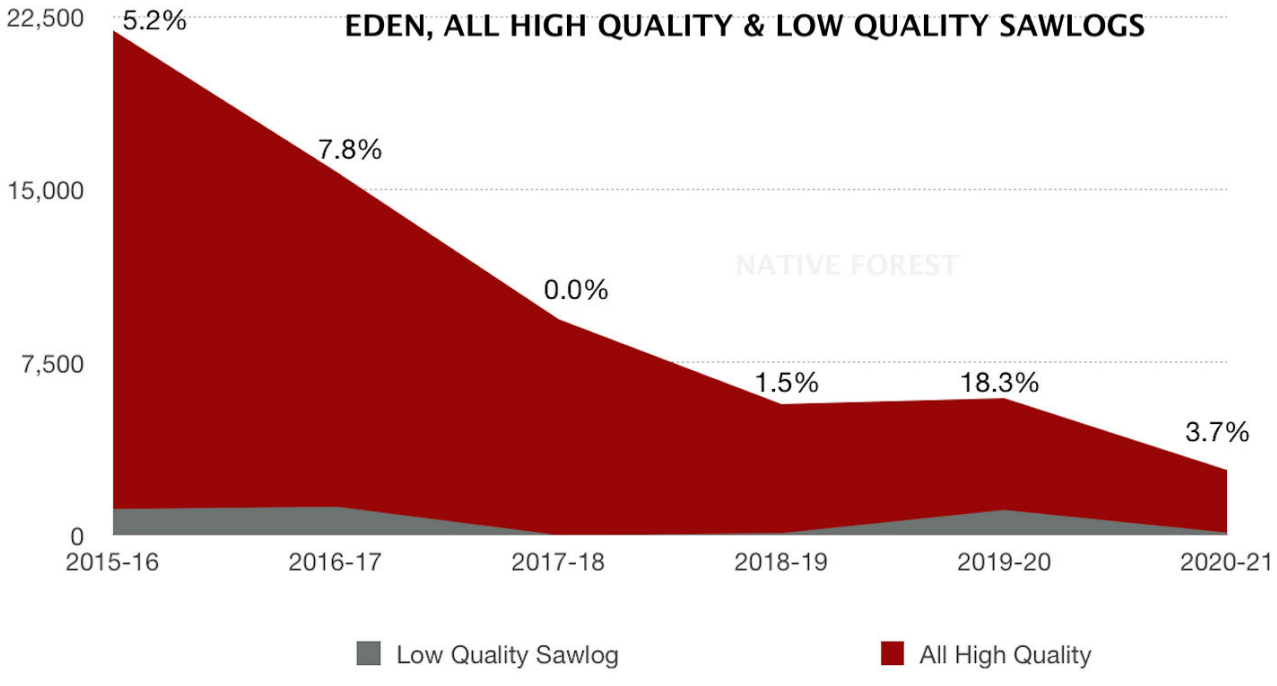
Year	Area logged	Percent
	ha	%
01/02	3,794	3.7
02/03	3,710	3.6
03/04	4,363	4.3
04/05	3,361	3.3
05/06	5,095	5.0
06/07	7,618	7.5
07/08	3,924	3.8

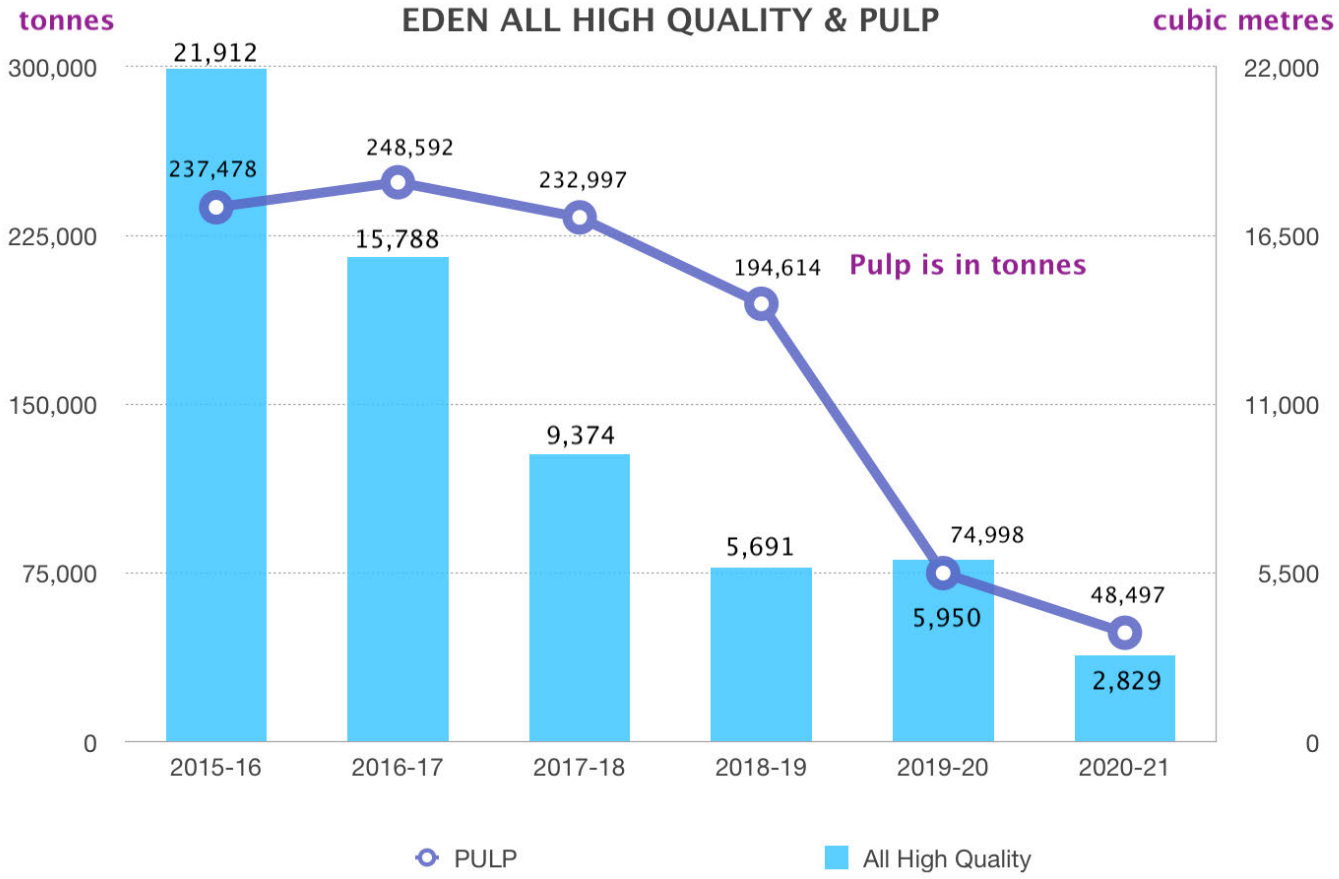
Sample size approx 40 compartments based on compartment size of 800 ha.

EDEN, HIGH QUALITY LARGE & HIGH QUALITY SMALL

	HQ Large cu m	HQ Small cu m	Total HQ cu m
2015-16	18,743	3,169	21,912
2016-17	12,650	3,138	15,788
2017-18	9,374	0	9,374
2018-19	4,179	1,512	5,691
2019-20	2,680	3,408	5,950
2020-21	1,194	1,635	2,829







Eden looks to be in a bad way. Everything is well down. Total High Quality declined to 2,829 cu metres in 2020-21 from 21,912 cu metres in 2015-16.

According to the Wildfires Report the level of high quality sawlog cut will be 25,000 cu metres p.a. in the early periods. The main contributor to this will be HQ25. i.e. a smaller log than the current small HQ.

This suggests a further fall in the rotation cycle.

After 10 years the cut is reduced to a sustainable 18,000 cu metres per annum.

According to the Wildfires Report at P30 the Standing volume of all HQ logs was 74% of the pre fire volume. This included HQ25 logs. HQ Large was 87% & HQ Small 71% of the pre fire volume.

Why then has High Quality volume declined 87% to 2020-21?
The Assessment in the Wildfires Report looks to be too optimistic.

WOODCHIPPING - EDEN

The Wildfires Report at P32 advises pulp output will not be affected by the fires for the first 10 years because high quality timber will be salvaged before it degrades. The long term sustainable yield of pulp = 140,000 tonnes p.a. This is a 10% decline in sustainable yield. It is a long way below the 345,000 tonnes in the RFA.

PULP in 2020-21 of 48,497 tonnes was well below the 140,000 tonnes sustainable yield figure. PULP in 2019-20 of 74,998 tonnes was also well below the 140,000 tonnes.

PULP in Eden has been subsidised by sawlogs as PULP was priced at marginal cost when it was not a marginal activity.

The activities FCNSW undertakes to supply pulplogs to the chipmill are those activities associated with the management of native forests.

pre harvest planning & mapping
pre logging soil and water surveys
mark up of trees
feral animal surveys
wildlife surveys
e.g. threatened & endangered species
supervision of logging
environmental compliance
safety compliance
post logging burns
management of cultural heritage
education programs
pest and weed control
fire fighting & fire prevention
silviculture activities

office administration
management of sales & delivery dockets
supply of data to head office
mapping
research
coupe management
road management & maintenance
liaison with the chipmill
liaison with the public
liaison with logging contractors
liaison with other South Coast offices
e.g. Eden with Batemans Bay
liaison with head office
management of workshops
technical matters

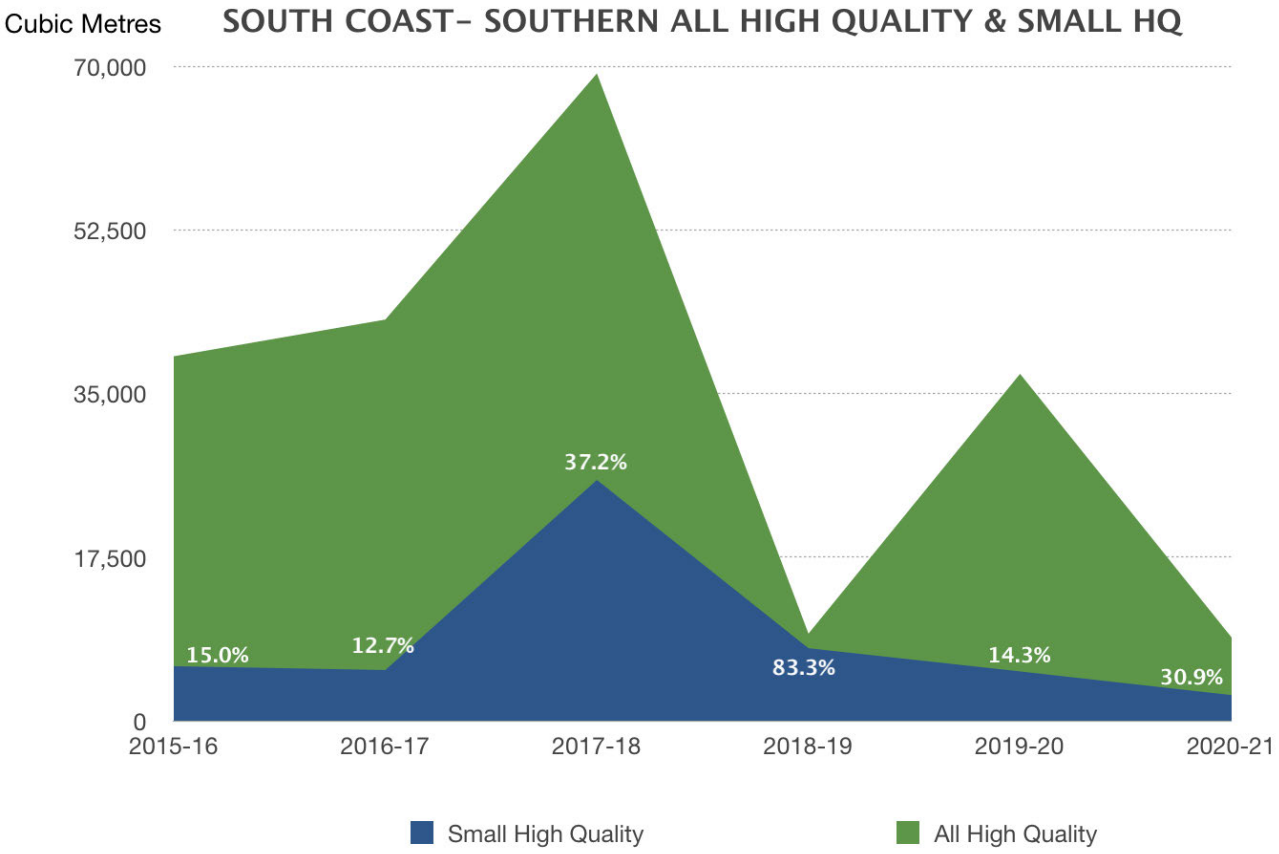
I think pulp logging should cease. It is a contentious activity, a loss making activity and a harmful activity. The scale of it has come down very significantly from around 300,000 tonnes p.a. in earlier years in Eden to a low of 48,497 tonnes in 2020-21.

The Forestry Commission, State Forests NSW and Forests NSW subsidised the Eden chipmill and found themselves trapped in a loss making situation. The chipmill on the other hand, did well.

I had previously estimated that the Eden Chipmill would be 'propped up' by an amount of approximately $134 mn-$140 mn of the chipmill's before tax profits assuming things remained as they were and inflation was about 2% over the then 20 year life of the RFA. This was caused by low royalty rates compared to the original intention of making a real return.

SOUTH COAST–SOUTHERN, HIGH QUALITY LARGE & HIGH QUALITY SMALL

	HQ Large cu m	HQ Small cu m	Total HQ cu m
2015–16	33,137	5,856	38,993
2016–17	37,478	5,440	42,918
2017–18	43,473	25,767	69,240
2018–19	1,562	7,774	9,336
2019–20	31,821	5,297	37,118
2020–21	5,262	2,761	8,023



According to the Wildfires Report high quality standing volume was 80% of the pre fire volume. High Quality Large was less affected at 90% of pre fire volume. High Quality Small was more affected at 61% of pre fire volume.

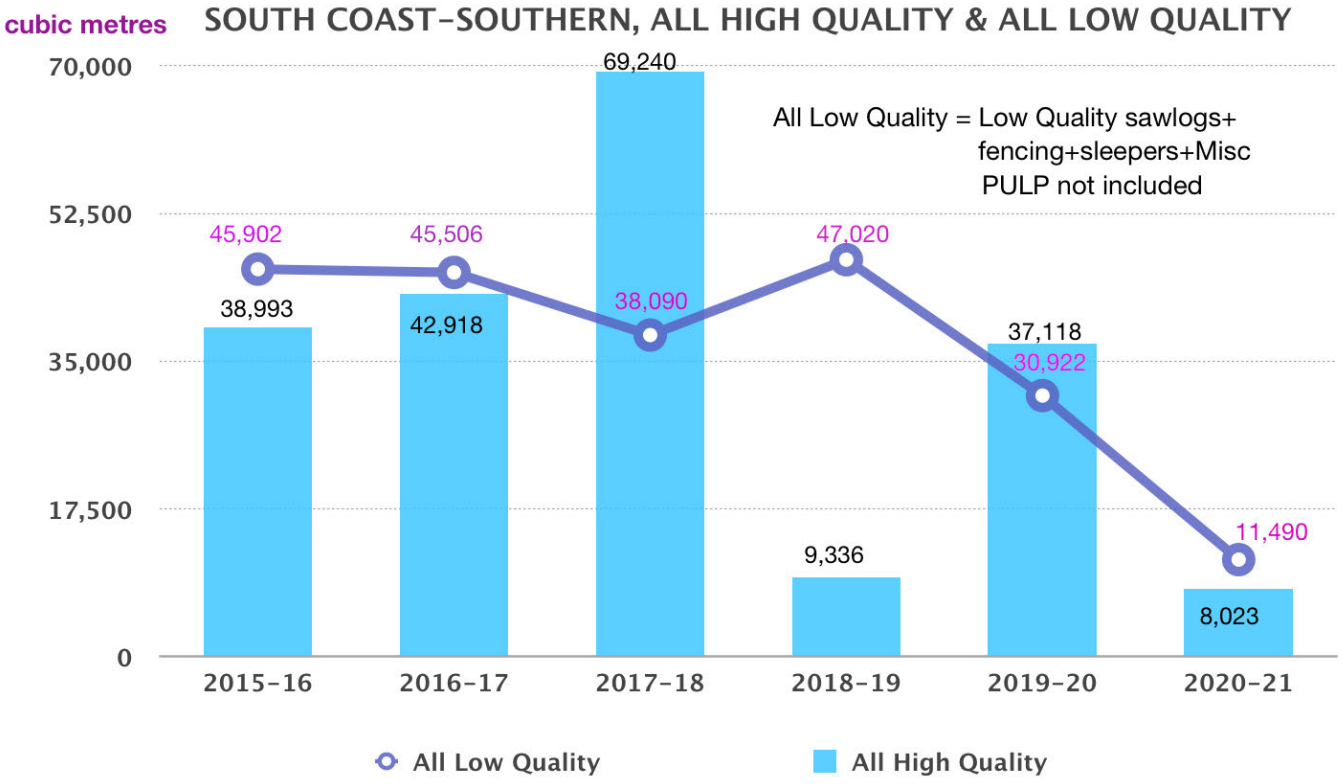
Sustainable yield for High Quality (large+small) is shown as 35,000 cu metres per annum for 2020–24 at P3 of the Wildfires Report.

In 2020–21 the yield of High Quality was 8,923 cu metres – well below the 35,000 cu metres.

Future problems of high cost of logging and difficult foothills & Tablelands areas with lower yields were foreshadowed in the 2018 DPI Report.

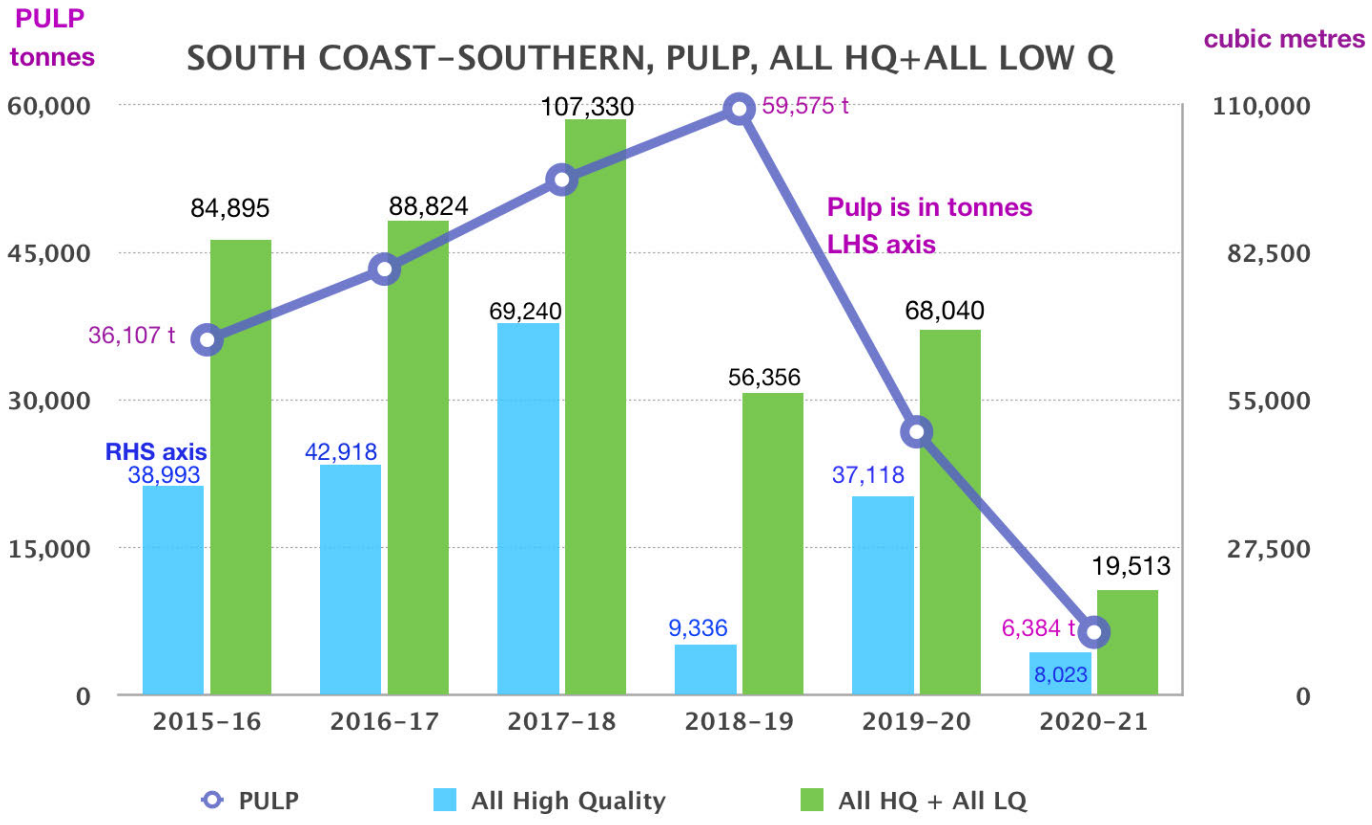
SOUTH COAST-SOUTHERN, LOW QUALITY, PULP & MISC

	PULP	Low Quality Sawlogs	Fencing/Misc Sleepers	Total Low Quality
	tonnes	cu m	cu m	cu m
2015-16	36,107	16,277	29,625	45,902
2016-17	43,288	15,683	29,823	45,506
2017-18	52,381	0	38,090	38,090
2018-19	59,575	16,802	30,218	47,020
2019-20	26,756	10,031	20,891	30,922
2020-21	6,384	2,244	9,246	11,490



All low quality has significantly declined.
All High Quality has significantly declined.

Significant quantities of fencing/landscape/sleepers were previously supplied. This has markedly fallen away. Low quality sawlogs have also significantly declined.



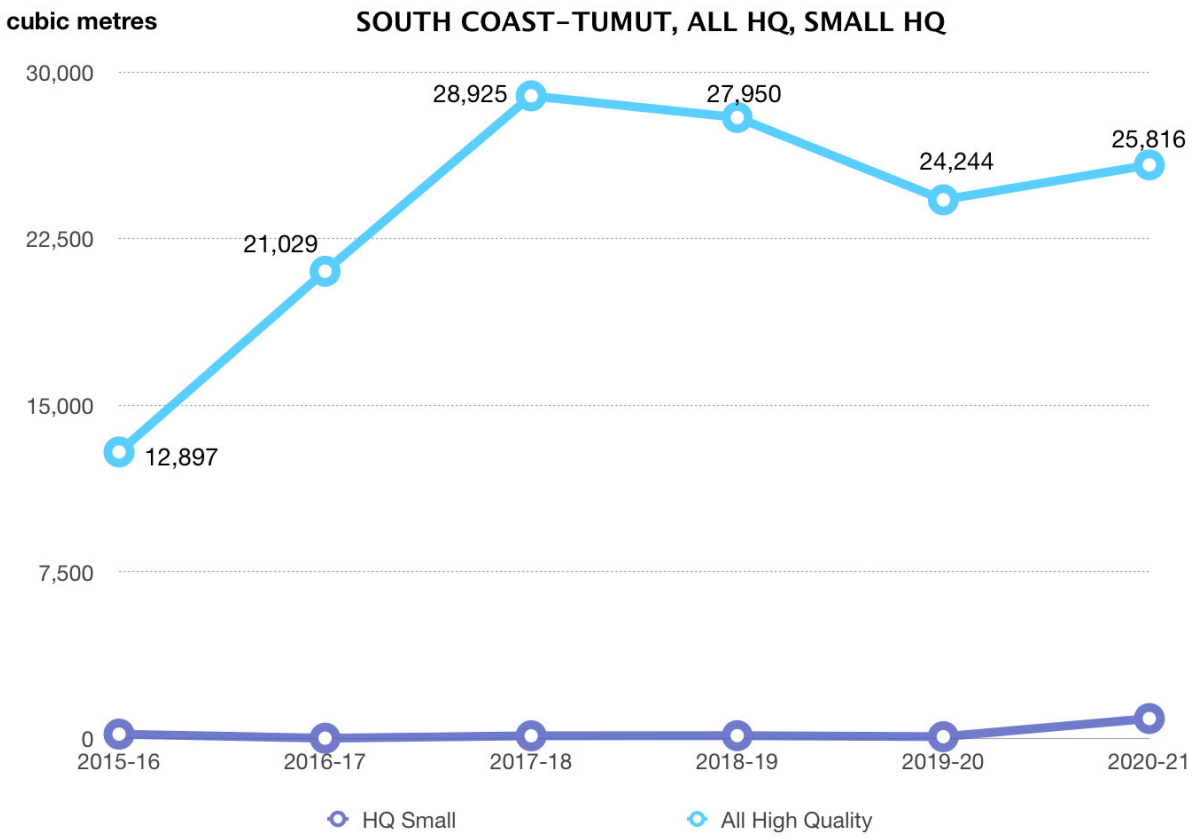
After the fires, it was thought there would be a significant increase in pulp due to salvage operations. However, the supply of pulp has continued to decline.

SOUTH COAST-TUMUT

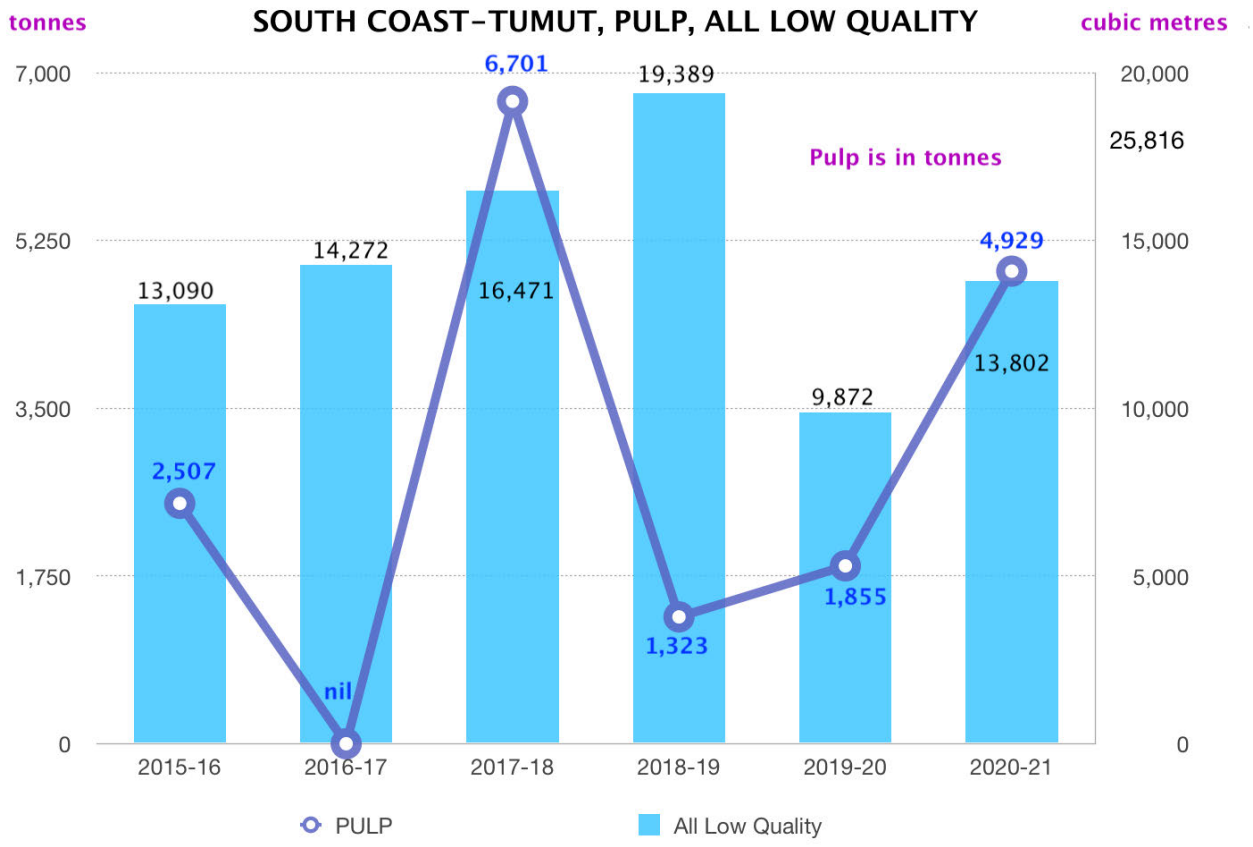
	HQ Large	HQ Small	Low Q	Misc	PULP
2015-16	12,703	194	12,640	450	2,507
2016-17	21,018	11	13,875	377	0
2017-18	28,806	119	13,663	2,808	6,701
2018-19	27,824	126	17,587	1,802	1,323
2019-20	24,164	80	8,266	1,606	1,355
2020-21	24,920	896	10,608	3,194	4,929

According to the Wildfires Report standing volume in the Tumut sub region for all HQ logs was 76% of the pre fire volumes. HQ large was 74% of the pre fire volume.

There has been a significant decline in the sustainable yield for all High Quality to 20,400 for 2020-24 from 35,000 in the DPI 2018 document. Of the 20,400 about 15,000 cu m HQL & 5,000 cu m HQS. Expected to increase to about 22,500 cu m in 2025-29. 2021 output remained at a reasonable level c.f. 2017-18, being 25,816 cu m in 2020-21 & 28,925 cu m in 2017-218.

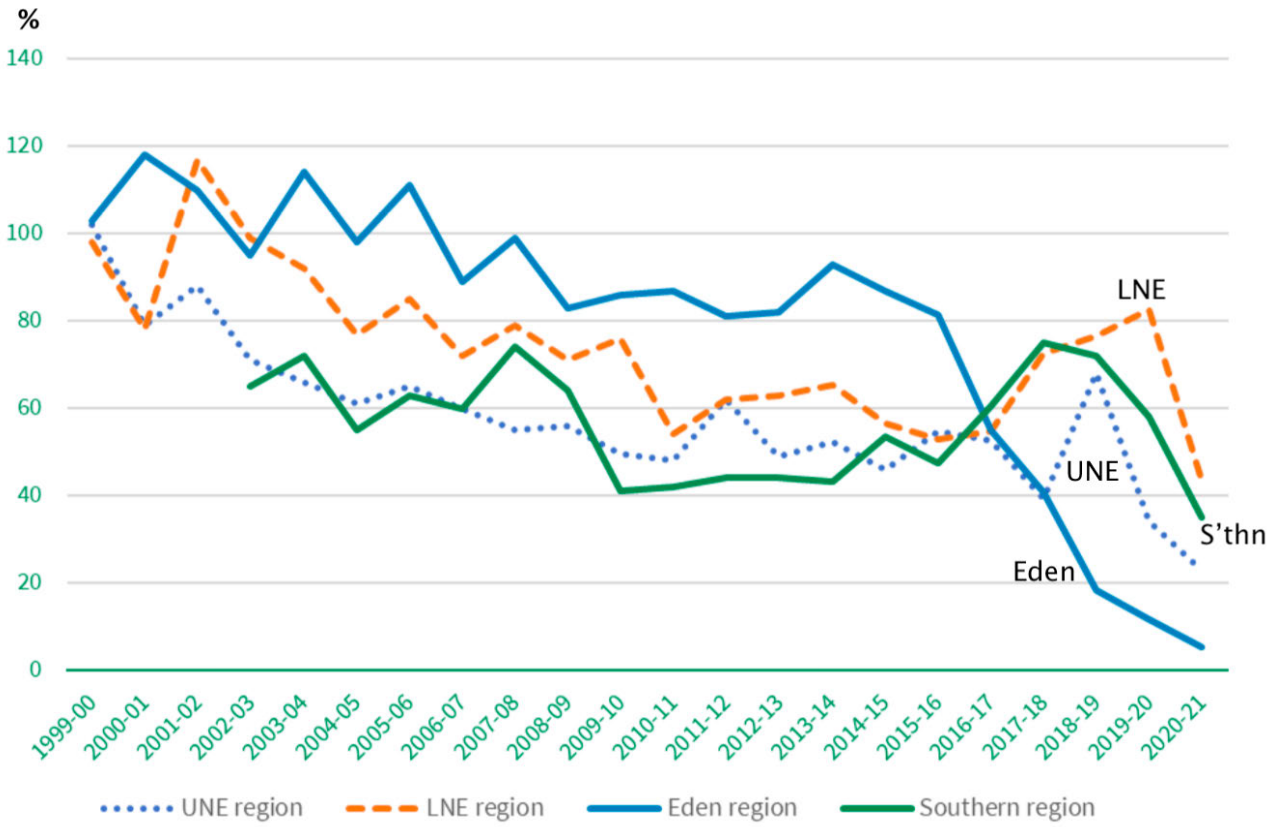


The strategy was to undertake salvage logging of burnt Alpine Ash trees as they degrade relatively quickly following moderate to severe fires. Low Quality and pulp have remained at reasonable levels.



LOG VOLUMES AS A PERCENTAGE OF VOLUMES IN THE IFOA

Source: 'NSW Forestry Snapshot 2020-21, P21 EPA. Original source: Forestry Corporation



Quota sawlogs harvested are from native forest in the Eden and Southern regions, and from native forest and hardwood plantations in the UNE and LNE regions. The South Coast sub-region and Tumut sub-region figures have been combined as Southern region since 2002.

There have been significant declines in the volume of quota sawlogs logged from 1999-00 to 2020-21 in all regions.

WILDLIFE – GREATER GLIDERS, LISTED AS ENDANGERED

There have been seriously concerning issues about Greater Gliders and cutting down hollow bearing trees. **This casts a dark shadow over the protection of other wildlife.**

FCNSW had not been recording den trees in pre logging surveys even though they had sighted numerous Greater Gliders. Only 1 den tree was recorded in 1,876 ha in Tallaganda State Forest even though, according to Wilderness Australia website of 30 August 2023 almost 400 Greater Gliders were found.

FCNSW failed to apply common sense when searching for den trees. If almost 400 Greater Gliders had been found, it follows that there should be at least 400 den trees. As each Glider uses about 4 or so den trees, then if no double usage of den trees, there should have been about 1,600 den trees.

Very strangely FCNSW had found & protected 5,400 hollow bearing trees – but only one den tree, even though 400 Greater Gliders had been found.

The reason for this was that a **Greater Glider had to be seen entering or leaving a hollow, crevice or fissure in a tree.** The pre logging survey was done in the daytime when the Gliders were asleep in their den trees.

A spokesperson for the Forestry Corporation said they were not required to search for Greater Gliders entering or leaving tree hollows nor did the approval require any specific searches for gliders.

Table 4 in the Approval: protection of nest, roost or den requires a 50 metre radius exclusion zone around Glider dens. How can they be protected when they were not being found despite clear evidence the den trees did exist.

A subsequent report by SEFR, WWF & WA found that in the 442 ha that were logged there would have been about 1,215 glider den trees.

According to the media release of 1 September 2023 by Dailan Pugh of NEFA, the Forestry Corporation had not detected a Greater Glider tree den since 2018 in any of the 85,000 ha of native forest on the North Coast they were either actively logging or proposing to log.

New protocols were introduced by the EPA on 16 February 2024. These meant that about 10% of an area of 100 ha would be covered by the new transect searches, assuming a 25 metre observational limit on each side of the transect.

(6 transects over 2 nights totalling 2 km in length for each 100 ha.)

Other protocols were subsequently introduced requiring a 25 metre exclusion zone around trees where Gliders had been seen but were not seen actually entering or leaving a hollow, crevice or fissure.

HOLLOW BEARING TREES

It is necessary to protect all large hollow bearing trees, large trees that could become hollow bearing trees and all trees over 100 years old.

As you would be aware a very large number of hollow bearing trees were burnt during the 2019-20 wildfires.

There are many animals that are dependent on old trees with hollows for their survival - about 170 species.

A number of threatened species are dependent on hollows. For example, Spotted tail quolls, Powerful Owls, Black Cockatoos and a number of species of micro bats.

The loss of a very large number of hollow bearing trees puts a lot of pressure on wildlife and will have caused a significant decline in numbers.

Before the fires, 8 hollow bearing trees per hectare were meant to be left standing by loggers. Now, there aren't that many hollow bearing trees left and in many cases, none.

Now, the policy needs to shift to retaining large trees that could become hollow bearing trees and all trees 100 years old or over.

Given the fact that there are 4 other types of gliders in NSW in addition to the Greater Glider and there are a number of other animals that use tree hollows, such as owls, parrots, possums and bats, I think more trees need to be protected than under the current requirements.

The NSW NRC recommended 2 recruitment trees for each 8 hollow bearing trees per ha - and if not 8 hollow bearing trees per ha left, to make the number up to 8 with the largest remaining trees.

This is 24 trees/ha compared to:

* 14/ha the EPA has determined for high density Greater Glider zones.
* 12/ha the EPA has determined for low density Greater Glider zones.
* 8/ha the EPA has determined for Eden Greater Glider zones, where the existing density is less than 8. If 8 not available, all trees 50 cms or more in diameter

* 5/ha the EPA has determined for North Coast Greater Glider zones, where the existing density is less than 5. If 5 not available all trees 50 cms or more in diameter.

According to Table 4 in the Approval there are 14 species whose nest, roost or den require a 50 metre exclusion zone AND 14 species whose nest or roost requires a 25 metre exclusion zone AND 2 species whose nest requires a 100 metre exclusion zone.

HOW VALUABLE ARE HOLLOW BEARING TREES?

Pricing a tree as a living organism producing oxygen:

a 100 year old Eucalypt tree is worth $10,920.

A 200 year old Eucalypt tree is worth $28,990

METHOD
The value is derived using present value analysis of the value of the average yearly oxygen output for a 100 year old tree and a 200 year old tree projected forward at the same average rate for 100 & 200 years respectively, using a commercial price for oxygen of $13.619/cu metre & a discount rate of 10%.

Discount Rate, 10%. A high discount rate results in a lower valuation.
I used the Capital Asset Pricing Model to derive the 10%. E(r) = rf + B(rm – rf)

E(r) = expected return to equity
rf = risk free rate = 4.23%, 10 year government bond rate as at 13 Oct 2024.
B = beta = 0.75 = not as risky as market as O2 growth does not fluctuate wildly.
rm = return to market, 12% or thereabouts.
rm – rf = 7.77%

Therefore E(r) = 4.23% + (0.75 X 7.77%) = 4.23% + 5.828% = 10.058%, SAY 10%.

1) 100 YEAR OLD EUCALYPT TREE

The diameter of an average 100 year old Eucalypt tree can be estimated from:
Diameter to the power of 0.98 = age, using diameter measured in centimetres.
This accounts for the relatively fast growth of Eucalypt trees.

Age = 100 years
Diameter = 109.81 centimetres at breast height approx.
Circumference = 344.98 cms, C = Diam X Pi & Pi = 355/113 to 6 decimal places.

Using a Carbon Calculator:
CO2 = 15,756 kgs, O2 = 11,459 kgs, (32/44 X 15,756)
(Atomic weight of carbon = 12, Oxygen = 16, CO2 = 44)

There are 1.429 kgs of O2 per cubic metre = 8,019 cu metres of O2 = 11,459/1.429 over 100 years = **80.19 cu metres per annum (8,019/100).**

Price of O2 = $13.619 per cubic metre for large supply to a hospital.

Therefore over its life a 100 year old tree has produced $1,092 of O2 per annum. As an annuity with an interest rate of 10% the asset value = $10,920

PRESENT VALUE ANALYSIS 100 YEAR OLD TREE

PV = A/r X (1 – (1/1 +r) to the 100 th power)
A = $1,092, r = 10%
PV = ($1,092)/0.1 X (1 – (1/1.1) to the 100 th power)
= $10,920 X (1 – 0.0007256571)
= $ 10,920 X 0.99992743429
= $10,919.21

SAY $10,920

2) 200 YEAR OLD EUCALYPT TREE

The diameter of an average 200 year old Eucalypt tree can be estimated from: Diameter to the power of 0.98 = age, using diameter measured in centimetres. This accounts for the relatively fast growth of Eucalypt Trees

Age = 200 years
Diameter = 222.9 centimetres at breast height approx.
Circumference = 700.26 cms, C = Diam X Pi & Pi = 355/113 to 6 decimal places.

Using a Carbon Calculator:
CO2 = 83,651 kgs, O2 = 60,837 kgs, (32/44 X 83,651)
(Atomic weight of carbon = 12, Oxygen = 16, CO2 = 44)

There are 1.429 kgs of O2 per cubic metre = 42,573 cu metres of O2 = 60,837/1.429 over 200 years = **212.865 cu metres per annum (42,573/200).**

Price of O2 = $13.619 per cubic metre for large supply to a hospital.

Therefore over its life a 200 year old tree has produced $2,899 of O2 per annum. As an annuity with an interest rate of 10% the asset value = $28,990

PRESENT VALUE ANALYSIS 200 YEAR OLD TREE

PV = A/r X (1 – (1/1 +r) to the 200 th power)
A = $2,899, r = 10%
PV = ($2,899)/0.1 X (1 – (1/1.1) to the 200 th power)
= $28,990 X (1 – 0.0000000052657831)
= $ 28,990 X 0.99999999474
= $28,989.99

SAY $28,990

HOW MANY TREES SUPPORT THE BREATHING OF ONE PERSON?

Trees have a beneficial effect on air quality at the local level and are beneficial to the populace.

An average person breathes in 3.75 pints (imperial) of oxygen per minute = 37,800 pints per week = 21,480 litres per week. (1 imp pint = 0.568261 litres). This is 21.48 cubic metres of O2 per week, (since 1 litre = 0.001 cubic metres), which is 93.08 cu metres of O2 per month. (21.48 X 52 divided by 12).

A 100 year old tree has produced 6.6825 cu metres of O2 per month (80.19/12)

A 200 year old tree has produced 17.7387 cu metres of O2 per month (212.865/12)

13.9 – round to 14 – 100 year old trees support the breathing of one person.
= 93.08/6.6825
5.25 – round to 6 – 200 year old trees support the breathing of one person.
= 93.08/17.7387
Note: 37, 50 year old trees support the breathing of 1 person.

Healthy forests therefore, have a beneficial effect on air quality at the local level even though some 72% of atmospheric oxygen is produced by aquatic plants in the oceans. Of this 72%, approximately 50% comes from phytoplankton. Phytoplankton are at risk from increasing sea temperatures especially those in cold waters.

Yours sincerely,

Terrence Digwood