Health assessment of vegetation composition in the reclamation area of PT Natarang Mining, Tanggamus Regency, Lampung Province

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Abstract. Reclamation is a recovery activity in mining areas, one of which is revegetation. The success of revegetation plants can be seen from the health of the composition and structure of the vegetation when the trees are six years old and over. This study aims to determine the health of the vegetation composition (location, type, and level of tree damage) in the reclamation area of PT Natarang Mining, Tanggamus Regency, Lampung Province. The location of this research is in the area around the main office of PT Natarang Mining, Way Linggo Forest, Bandar Negeri Semuong, Tanggamus Regency, covering an area of 2.97 Ha. The research was conducted through vegetation analysis using the circular plot method and assessing the health of the vegetation composition based on the damage index at the plot level. The results showed that tree vegetation obtained 12 species. The most common tree species found was Falcataria moluccana (Sengon) which amounted to 22 individuals. The most significant contribution of tree species indicated by the highest importance value index was Falcataria moluccana. The location of most damage found in most of the plots was at the bottom of the stem (code 3) and the bottom and top of the stem (code 4). Types of open wound damage (code 03) and gall rust (code 26) were the most dominant causes of damage, with an average damage rate of 35% and 22%, respectively. The health value of the vegetation composition has a value range of 1.20 – 2.00. The average health value of the vegetation composition is 1.50, which is included in the medium category.

1. Introduction
The mining sector can hurt forest destruction, so it is necessary to carry out reclamation activities to overcome it. According to its designation, forest reclamation activities include efforts to repair or restore the land with damaged forest vegetation to function optimally [1]. Generally, reclamation activities are carried out in land management and revegetation to improve post-mining land conditions [2]. According to Munir and Setyowati (2017), reclamation activities are expected to generate added value for the environment and create much better conditions than the previous state of the environment [3]. One of the forest ecosystems that has been reclaimed is the protected forest ecosystem at PT Natarang Mining.

PT Natarang Mining is a company engaged in mining protected forests to utilize the mineral resources on the forest floor in the form of gold ore and its associated minerals. However, this
promising activity also has a detrimental impact on humans and the environment [4]. Therefore, the protected forest ecosystem must function as a life support system. The protected forest is a resource that has an extraordinary role, so the forest's health condition must be maintained to remain sustainable. Monitoring of health forests needs to be implemented to monitor the condition of the forest and evaluate the results of plant growth from the reclamation that has been carried out.

A healthy forest condition is a condition in a forest ecosystem that is still good or has not been damaged so that the forest can carry out its functions properly [5]. Monitoring of forest health is carried out to determine the current condition of the forest. These changes occur future, and trends may occur due to activities carried out in the forest [6]. Forest health measurements is a system for monitoring the condition of forest ecosystems using the method Forest Health Monitoring (FHM). The system can provide management recommendations for forest managers to realize the principles of forest sustainability [7]. Thus, the growth of individual plants from PT Natarang Mining's reclamation activities needs to be known about their health conditions through the damage level.

Damage to trees can be caused by several things, such as destructive human and animal activities, pest and disease attacks, and environmental factors. Damage to trees to a certain extent can affect the growth and development of trees in the forest, which as a whole can affect the health of the forest [8]. As explained by Nuhamara and Kasno (2001), the impact of all types of tree damage will result in decreased growth rates, low canopy conditions, loss of biomass, and especially death and will impact the overall health of the forest [9]. Therefore, tree damage will play a vital role as an early warning and provide information about flexibility, sustainability, productivity, and forest sustainability [5]. Therefore, this study was conducted to determine the health of the vegetation composition (location, type, and level of tree damage) of forest stands in the reclamation area of the main office of PT Natarang Mining.

2. Methods

This research was conducted in August 2020, located on the reclamation land of the main office PT Natarang Mining, Way Linggo Forest, Semuong Bandar Negeri, Tanggamus Regency. This research was conducted by making 1 (one) cluster plot on an area of 2.97 hectares. The research location is as presented in Figure 1.

![Figure 1. Map of research locations.](image-url)
Forest health measurements were carried out using the FHM method (Forest health monitoring) using vitality indicators. The vitality indicator in this study was obtained using tree damage parameters. FHM is a forest health monitoring technique that is carried out to determine the forest's current condition. These changes occur future and trends that may occur due to activities that have been carried out in the forest [6]. The data and information obtained using FHM techniques can provide management recommendations for forest managers to realize the principles of forest sustainability.

The forest health measurement plot in the reclamation area was made using the purposive sampling technique. According to Sugiyono (2010), purposive sampling is a technique using specific considerations. The land area of the reclamation area in the main office is the main reason for determining the number of cluster plots [10]. The reclamation area at PT Natarang Mining is sporadic (spreading). Therefore, the land in the main office is reclamation land with the most significant area compared to other reclamation areas, making it suitable as a location for making cluster plots. The number of cluster plots created was determined using the Sampling Intensity (IS) of 12.5%. Based on [11], using measuring circle, square, point, and path, the minimum sampling intensity is 0.0025%. Thus, the number of plot clusters made with a land area of 29.7 Ha is 1 (one) cluster plot.

Cluster plots or measuring plots are made to take some objects to represent the entire area being observed. Cluster plot design is based on the reference of the FHM technique [12], as presented in Figure 2.

In identifying tree damage, several damage parameters need to be understood, namely the location of damage, type of damage, and the severity of each damage that occurs. The type of tree damage identified is the cause of damage to the tree that can affect the physiological function of the tree and even cause death. At the same time, the level of tree damage is recorded if it meets the severity threshold value. Damage that occurs to individual trees on a small scale does not have a significant impact. In the observations, only three significant damage to individual trees needs to be recorded. Observations were made by looking at the damage location first, which was then continued by determining the type of damage and the severity that occurred. The individual trees observed are those in each plot in the cluster plot. The code and description of the location, type, and severity for easy observation can be seen in Table 1.
| Code | Damage Location Tree                  | Damage Type                          | Code | Level Severity |
|------|--------------------------------------|--------------------------------------|------|----------------|
| 0    | No damage                            |                                      |      |                |
| 1    | Roots and stumps appear              | Cancer                               | 01   | 10%            |
| 2    | Roots and stems low part             | Konk                                 | 02   | 20%            |
| 3    | Lower stem                           | Open wound                           | 03   | 30%            |
| 4    | The bottom and top                   | Resinosis / gummosis                 | 04   | 40%            |
| 5    | The top of the stem                  | Broken stem                          | 05   | 50%            |
| 6    | Header stem                          | Termite nest                         | 06   | 60%            |
| 7    | Branch                               | Stem/root broken                     | 07   | 70%            |
| 8    | Shoots and Shoots                    | Brum on root/stem                    | 08   | 80%            |
| 9    | Leaf                                 | Broken/dead root                     | 09   | 90%            |
| 10   | Lose of dominant shoots/dead         | Liana                                | 10   |                |
| 11   | Branch broken/dead                   | Branch broken/dead                   | 11   |                |
| 12   | Branching/Brum that too much         | Branching/Brum that too much         | 12   |                |
| 13   | Leaves, shoots, or shoots damaged    | Leaves changing color                | 13   |                |
| 14   | Rust/tumor                           | Rust/tumor                           | 14   |                |
| 15   | Etc.                                 |                                     | 15   |                |

3. Results and discussion

3.1. Tree species diversity

The results obtained from the assessment of tree damage in the reclamation area around the main office of PT Natarang Mining with one (1) cluster of observation plots noted that 75 individual trees were found from 12 different tree species. The tree species are 18 plants of Medang (*Phoebe hainanensis*), one plant of Bungur (*Lagerstroemia speciosa*), Sengon Laut (*Paraserianthes falcataria*), 22 plants, one plant of Durian (*Durio zibethinus*), three plants of Trembesi (*Samanea saman*), Kayu sabun (*Sapindus rarak*) as many as four plants, Mahoni (*Swietenia macrophylla*) as much as one plant, Gamal (*Gliricidia sepium*) as one plant, Kayu Afrika (*Maesopsis eminii*) as much as two plants, Kapuk Randu (*Ceiba pentandra*) as much as one plant, Waru (*Hibiscus tiliaceus*) as many as 19 plants, and Bayur (*Pterospermum javanicum*) as many as two plants. The condition of damaged trees can be seen visually or with the naked eye. Therefore, Safe’i (2014) stated that the condition of a healthy tree refers to the pathological aspects and condition of the external appearance of the tree [13].

Based on table 1, it can be seen that 1 cluster of observation plots consisting of 4 plots, plot two and plot 3 have the same percentage of damaged trees of 100%. Proves that all the trees in the stands in the two plots were damaged, thus causing a higher level of damage to the stands in the reclamation area around the main office of PT Natarang Mining. The high percentage of damaged trees is due to the absence of maintenance measures for the trees in the reclamation area. As a result, tree stands are allowed to grow naturally so that they form their natural ecosystem. In addition, temperatures and temperatures that support cause a lot of pest and disease attacks that occur. Therefore, tree damage will play a vital role as an early warning and provide information about flexibility, sustainability, productivity, and forest sustainability [5].

Processing and analyzing of vitality indicator measurement data. The level of tree damage is calculated based on the tree damage index value per individual (Tree Level Index-TLI) and the tree damage index value per plot (Plot Level Index-PLI). The values obtained in each plot are then classified first into low, medium, and high categories based on the highest and lowest values owned by the damage parameters. The data obtained from tree damage data are then processed into protected forest health values using a forest health web-GIS, namely the Forest Health Monitoring Information System (SIPUT). Web-GIS SIPUT can conduct forest health assessments based on indicator data taken in the field to make it easier for users to assess forest health.
The most significant contribution of tree species indicated by the highest importance value index is the sengon, as its number and percentage of damaged trees are higher than those of the other species. The number of damaged trees in the main office of PT Natarang Mining consists of 12 different species. To find out how big the distribution and diversity of the various species are, it is necessary to do a vegetation analysis. This analysis can show the level of diversity found in the stand. According to Moesa (2001), states that the diversity index results obtained can be categorized into three categories, namely: if $H < 1$, then the diversity index is categorized as low; if $1 < H < 3$, then the diversity index is categorized as moderate, and; if the result of $H > 3$ then the diversity index is categorized as high [14]. Based on the results of Table 3, it can be seen that the diversity index value in the reclamation area stands has a value of 0.9751, so it can be seen that the diversity in the reclamation area of the main office PT Natarang Mining can be categorized as low. In addition, the most significant contribution of tree species indicated by the highest importance value index is the sengon (*Falcataria moluccana*) species.

3.2. Identification of tree
Abiotic and biotic factors can cause damage that occurs to a forest stand. Abiotic factors are caused by the surrounding environment, such as climatic, chemical, and edaphic conditions [15] and forest fires. At the same time, biotic factors can be caused by pests and diseases and disturbances from animal and human activities. Damage to trees due to biotic and abiotic factors can be seen physically; namely, the three organs have abnormalities or nuisance organisms [16]. According to Safe’i et.al. (2020), the type of tree damage is a form of plant growth disturbance whose symptoms can be seen in shape, size, color, and texture [17]. Therefore, the condition of damage that occurs to trees needs to be identified through three stages of observation, namely observing the location of the damage, the type of damage, and the severity of the tree.

### Table 2. Number and percentage of damaged trees in the four research plots

| No. | Plot  | Number of trees | Number of damaged trees | Percentage of damaged trees (%) |
|-----|-------|-----------------|-------------------------|----------------------------------|
| 1   | P1    | 15              | 8                       | 53.33                             |
| 2   | P2    | 23              | 23                      | 100.00                           |
| 3   | P3    | 17              | 12                      | 70.59                            |
| 4   | P4    | 20              | 20                      | 100.00                           |

### Table 3. Important Value Index (INP) of plants in the reclamation area of the main office of PT Natarang Mining.

| No. | Species name | K   | KR  | F  | FR   | D   | DR   | INP | H   | Percentage of damaged trees (%) |
|-----|--------------|-----|-----|----|------|-----|------|-----|-----|----------------------------------|
| 1   | Medang       | 10  | 25  | 1  | 22.2 | 2.84| 18.10| 65.32| -0.144155 |
| 2   | Bungur       | 2   | 5   | 0.25| 5.6  | 0.17| 1.07 | 11.63| -0.054716 |
| 3   | Sengon       | 7   | 17.5| 0.75| 16.7 | 4.94| 31.49| 65.66| -0.144412 |
| 4   | Durian       | 2   | 5   | 0.25| 5.6  | 0.21| 1.32 | 11.87| -0.055513 |
| 5   | Trembesi     | 2   | 5   | 0.25| 5.6  | 0.65| 4.15 | 14.71| -0.064199 |
| 6   | Kayu Sabun   | 5   | 12.5| 0.5 | 11.1 | 0.82| 5.22 | 28.83| -0.097762 |
| 7   | Mahoni       | 2   | 5   | 0.25| 5.6  | 0.10| 0.64 | 11.19| -0.05329  |
| 8   | Gamal        | 2   | 5   | 0.25| 5.6  | 0.09| 0.56 | 11.12| -0.05303  |
| 9   | Afrika       | 2   | 5   | 0.25| 5.6  | 0.40| 2.54 | 13.09| -0.059354 |
| 10  | Kapuk Randu  | 2   | 5   | 0.25| 5.6  | 1.20| 7.64 | 18.20| -0.073824 |
| 11  | Waru         | 2   | 5   | 0.25| 5.6  | 1.36| 8.65 | 19.21| -0.076418 |
| 12  | Bayur        | 2   | 5   | 0.25| 5.6  | 2.92| 18.62| 29.18| -0.098433 |
| Total|              | 40  | 100 | 4.5| 100.0| 15.70| 100.00| 300.00| -0.9751 or 0.9751 |

Note:

- $K = $ Density; $KR = $ Relative Density; $F = $ Frequency; $FR = $ Relative Frequency; $D = $ Dominance; $DR = $ Relative Dominance; $INP = $ Important Value Index; $H = $ Diversity Index of

Standing forest in the reclamation area of the main office PT Natarang Mining consists of 12 different species. To find out how big the distribution and diversity of the various species are. It is necessary to do a vegetation analysis. This analysis can show the level of diversity found in the stand. According to Moesa (2001), states that the diversity index results obtained can be categorized into three categories, namely: if $H < 1$, then the diversity index is categorized as low; if $1 < H < 3$, then the diversity index is categorized as moderate, and; if the result of $H > 3$ then the diversity index is categorized as high [14]. Based on the results of Table 3, it can be seen that the diversity index value in the reclamation area stands has a value of 0.9751, so it can be seen that the diversity in the reclamation area of the main office PT Natarang Mining can be categorized as low. In addition, the most significant contribution of tree species indicated by the highest importance value index is the sengon (*Falcataria moluccana*) species.
3.2.1. Location of damage. Observation of the location of tree damage is needed to determine the location of damage to the tree. According to Sitinjak et. al (2016), the damage's location consisted of roots, stems, branches, crowns, leaves, shoots, and shoots [18]. The results showed that the most common damage locations were location code 3 (lower stem) by 42%, location code 4 (bottom and top of the stem) by 30%, and location code 5 (top of the stem) by 17%. Location of damage to reclamation area stands the main office PT Natarang Mining can be seen in Figure 3.

Note: (*) is the tree damage location code

**Figure 3.** Percentage of damage locations to reclamation area main office PT Natarang Mining.

3.2.2. Type of tree damage. Based on observations, 12 types of damage occurred in the reclamation area of the main office of PT Natarang Mining, out of a total of 17 types of damage proposed by Mangold (1997) [12]. The damage that occurs is the presence of cancer, open wounds, broken stems, termite nests, broken stems or roots, lianas, dead shoots, broken or dead branches, damaged and discolored leaves, fungal rust, and other damage (Figure 4). The most frequent damage was damage code 03 (open wound) with a percentage of 35%, damage code 26 (rust calculi) with a percentage of 22%, and damage code 20 (liana) with a percentage of 12%.
The type of tree damage that has been observed can indicate the factors causing damage to a tree. One of the causes of tree damage in PT Natarang Mining's reclamation area is wildlife activity. Wildlife that can still be found in PT Natarang mining land is Coconut Squirrel (*Callosciurus notatus*), Simpai (*Presbytis melalophos*), Kra Monkey (*Macaca fascicularis*), Boar (*Sus scrofa*), Siamang (*Symphalangus syndactylus*), and Beruk (*Macaca nemestrina*). The description of the types of tree damage observed in the reclamation area of the main office of PT Natarang Mining is as follows: the type of damage to open wounds was found at most at 35%. Open wounds found in the reclamation area of the main office of PT Natarang Mining can be caused by climatic conditions in the stands, pest and disease attacks, and wildlife activities. Open wounds generally occur in two parts: the outer skin and the inner skin to the wood. Damage to open wounds is often the beginning of the emergence of disease because it facilitates the entry of pathogens into the tree, which causes weathering of the tree and even death. This is in line with the statement Rikto (2010), which states that open wounds are a place for entry and development of destructive organisms such as fungi, viruses, bacteria, pests, and other organisms. One of the causes of open wounds at the research site is wild animals such as wild boars, macaques, and hoops that can damage plants [19].

The type of rust damage is caused by the fungus *Uromycladium tepperianum*, which attacks the stems, twigs, and leaves of sengon [20]. The cause of this damage was due to environmental factors at the study site located in the highlands and areas that were often foggy, making it difficult for the stands to get sunlight, thus supporting the fungus to grow faster. Generally, the damage caused by puru rust occurs on sengon plants in the form of swelling/lumps either on the trunk, branches, or twigs which can cause the death of the tree. This is supported by the statement Anggraini (2009), which states that the symptoms of the disease begin with local swelling (tumefaksi) in the affected plant parts [21]. Type of damage liana is a type of vine, creeping or hanging, that requires a host to reproduce. Liana plants climb on other more extensive and taller plants, but their roots remain in the soil as a means of obtaining food [22]. Environmental factors such as temperature, humidity, availability of nutrients, and light intensity at the study site are among the causes for the development of quite a lot of lianas.

The type of broken / dead branch damage has symptoms of branch fracture, which results in wilting and falling of leaves on the branch. Broken branches are usually caused by environmental factors and branch rot which is a continuation of damage from pests or diseases. According to Stalin et al (2013), this is possible due to fungi (*Schizophyllum commune*) and parasites. This type of cancer damage...
attacks the cambium of the tree trunk, which results in disruption of the distribution of nutrients and nutrients to all parts of the tree [23]. According to Haris et al (2004), cancer damage is more often caused by fungi [24]. Symptoms of cancer are usually part of the dead tree that dries up, is well-demarcated, settles, and breaks [25] so that the inside of the wood is visible. This type of damage to damaged and discolored leaves is usually caused by pests, diseases, and environmental factors. Symptoms of this damage are wilting of the leaves and incomplete leaf structure due to leaf destroying pests and leaves that are no longer green. The main office PT Natarang Mining reclamation area has low temperatures and foggy areas, making it difficult for plants to get sunlight, which causes chlorosis of the leaves. According to Palgunadi and Almandatya (2014), chlorosis is a condition of plant tissue, especially in leaves that experience color changes due to lack of chlorophyll, so that they are not green but yellow or pale, almost white [26].

This type of shoot death damage is generally caused by pests and diseases with symptoms of death at the tips of the shoots. This damage is usually found in young or growing trees [27]. The type of damage to stems/broken roots is injury or death of the roots or stems, which are generally caused by human activities when using sharp tools or wild animals. Broken stems are still at the bottom of the live crown, and broken roots are < 3 feet from the stem [15]. The type of broken stem damage, according to Pertiwi et al (2019), has symptoms of damage characterized by the breaking of the stem until the inside of the wood is visible through the broken stems. Broken stems are usually caused by environmental factors such as strong winds or excessive branch loads. This type of damage to termite nests has symptoms of the appearance of soil crust forming a path that runs on the outside of the tree trunk [25]. Termite nest damage attacks the inside of the tree trunk so that it forms a tunnel that can cause the tree to break easily or fall, which leads to the death of the tree. Termite attacks do not only occur on one tree but can spread from one tree to another through trunks, branches, twigs on the forest floor, and also from lianas found on the tree [28].

3.2.3. Severity. The severity level is observed after determining the location and type of damage to an individual tree. The percentage of the type of damage to the tree can be determined [25]. The percentage is measured based on the extent of the attack that occurred at the location of tree damage, given a percentage code according to predetermined provisions. Based on the results of observations, the most common severity levels found in the observations were the severity with code 1 (threshold value of 10%) occurred as much as 54%, the severity with code 2 (threshold value of 20%) occurred as much as 18%, and severity with code 4 (threshold value 40%) occurred as much as 13%. The percentage of the severity of tree damage based on the severity threshold values found is presented in Figure 5.

![Percentage of Severity](image)

**Figure 5.** Percentage of severity in PT Natarang Mining main office reclamation area stands.
The impact of all types of tree damage will result in decreased growth rates, low canopy conditions, loss of biomass, and especially death and will impact overall forest health \[9\]. Therefore, this damage can affect the health of forest stands in the reclamation area of the main office of PT Natarang Mining. The damage to trees depends on the location where the damage is found, the type of damage, and the severity of a tree. Knowing the level of tree damage that occurs can provide appropriate management recommendations in the form of maintenance activities. In addition, to meet the success of PT Natarang Mining's reclamation, the health of the forest stands must be maintained so that, at a minimum, the forest can still carry out its primary function as a protected forest.

3.3. Health assessment of vegetation composition
An assessment of the condition of tree damage in forest stands in the reclamation area of the main office PT Natarang Mining can be known through the plot-level tree damage value (Plot Level Index-PLI) from 4 observation plots obtained by first calculating the damage index for each tree (Tree Level Index-TLI). The results of the assessment of the condition of tree damage in each plot can be seen in Table 5, while the threshold value for damage to protected forests can be seen in Table 4. Based on the results of Table 5, it can be seen that the value of forest health based on the level of tree damage at the research site is in the category good at plots 1 and 3 and poor category in plots 2 and 4. Overall the value of the damage condition in this protected forest has a range \[1.20 \text{ – } 2.00\], which is included in the medium category. The value of forest health based on tree damage is 1.50, which indicates the moderate category.

Plots 2 and 4 have the worst forest health value of 0.30, while plot 1 has the best health value of 3.00. The smaller the PLI value, the less intensity of damage occurs to a tree, so the better the health level of the plot. The damage that occurred at the research site was caused by environmental factors, human activities, pest disturbances, and disease attacks on trees. Plots 2 and 4 had much more significant damage than cluster plots 1 and 3 due to the significant intensity of attacks that occurred on the stands on the land, which was caused by the environment in plots 2 and 4 being more supportive of pest and activity disease to attack the stands and the location of the plots which were quite far away. From the human environment so that the stands can grow more naturally and support the growth of pests.

Tabel 4. The threshold value of tree damage in protected forest reclamation area main office PT Natarang Mining.

| No. | Category | Class       |
|-----|----------|-------------|
| 1   | Good     | 2.10 – 3.00 |
| 2   | Medium   | 1.20 – 2.00 |
| 3   | Poor     | 0.30 – 1.10 |

Tabel 5. The final value of tree damage at plot level (Plot Level Index).

| Cluster Plot | PLI | Category |
|--------------|-----|----------|
| 1            | 3.00| Good     |
| 2            | 0.30| Poor     |
| 3            | 2.40| Good     |
| 4            | 0.30| Poor     |
| Average      | 1.50| Medium   |

The damage that is often found at the observation site is open wounds, scabies, and lianas. Environmental conditions at PT Natarang Mining in the highlands with an altitude of ± 1000 mdpl cause the air humidity to be relatively high, 80 - 88%, making it very easy for pests and diseases to breed. In addition, vital wind speed can be one of the causes of damage to the protected forest. Neglected tree damage will affect the tree's health, which will eventually lead to the death of the tree. The damage to trees depends on the location where the damage is found, the type of damage, and the severity of a tree. This damage needs to be minimized by carrying out proper maintenance. Proper
maintenance activities need to be carried out, especially on plots with high tree damage values. Maintenance of forest plants is one of the activities that can help increase the success of a plant. The existence of forest maintenance activities aims to get the best balance between ecological demands and economic demands to obtain sustainable and maximum results.

The types of activities in the maintenance vary depending on the habits of the land farmers. For example, in one community forest, according to Oktaviyani et. al. (2017) stated that plant maintenance activities in community forests are in the form of fertilization, embroidery, weeding, weeding, branch pruning, wiping, thinning, and pest control [29]. Meanwhile, maintenance techniques that are often carried out by the team environment in the reclamation area of PT Natarang Mining are embroidery, weeding, fertilizing, and watering. The maintenance technique is carried out once every 3 (three) months, except for watering, carried out in the morning when the dry season occurs. Good maintenance will have a good impact on the health of PT Natarang Mining's protected forest, mainly so that the trees are maintained without any damage. Treatment so that the managed forest remains healthy and sustainable can also be carried out by monitoring forest health regularly because it is more effective and efficient. Ultimately, sustainable forest management is the goal of maintaining forest health [30].

4. Conclusion
Species in the reclamation area around the main office of PT Natarang Mining with one cluster of observation plots noted that 75 individual trees were found from 12 different tree species. The diversity index value in the reclamation area stands has a value of 0.9751, so it can be seen that the diversity in the reclamation area of the main office of PT Natarang Mining can be categorized as low. There were seven locations of tree damage in the forest stands, with the most damage locations occurring at the bottom of the trunk by 42%, the bottom and top of the trunk by 30%, and the top of the trunk by 17%. Then 12 types of damage occur with the most significant type of damage, namely open wounds by 35%, scabies by 22%, and lianas by 12%. In addition, the most severe level occurred at the threshold value of 10%, which was 54%, the threshold value of 20% was 18%, and the threshold value of 40% was 13%.

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