ASRAMA RAYA SDN BHD

STANDARD OPERATING PROCEDURE REDUCING RISKS AND MITIGATE NEGATIVE IMPACTS FROM NATURAL HAZARDS

AR/ SOP 17/ Reducing Risks and Impacts from Natural Hazards/ V1	
Prepared by **Name:** Pong Kuan Kin **Position:** Assistant Forest Manager **Date:** 5-1-2025	**Approved by** **Name:** Chan Kim Men **Position:** Forest Manager **Date:** 9-1-2025
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	ASRAMA RAYA SDN BHD		**Ref.**	AR/ SOP 17/ Reducing Risks and Impacts from Natural Hazards/ V1
	Policy/Procedure/ Title	**Standard Operating Procedure Reducing Risks and Mitigate Negative Impacts from Natural Hazards**		
	Relevant Indicator	10.9.1, 10.9.3		
	Prepared by	Asst. Forest Manager	**Approved by**	Forest Manager
	Version No.	1	**Approval Date**	9-1-2025

1. PURPOSE

To reduce identified risks and mitigate negative impacts from natural hazards on infrastructure, forest resources and communities.

2. SCOPE

This SOP applies to all personnel and community members involved in the management, conservation, and utilization of the forest reserve.

3. RESPONSIBILITIES

The forest management team are responsible for:

- Conduct natural hazards risk assessment and identify hazard-prone areas.
- Identifying risks associated with natural hazards on infrastructure, forest resources and communities.
- Develop strategies for mitigate negative impacts from natural hazards on infrastructure, forest resources and communities.
- Engage with communities in preparedness and awareness efforts.

The Forest Manager are responsible for:

- Overall implementation of hazard risk reduction and mitigation measures.
- Monitoring effectiveness of the implemented measures.

4. PROCEDURE

4.1 NATURAL HAZARD RISK IDENTIFICATION AND ASSESSMENT

1. Topographic Risk Mapping

- Utilize GIS, AutoCAD, and ArcGIS to identify steep slopes >40° (landslide-prone zones) and elevation zones (e.g., above 1,000 m a.s.l.).
- Outline buffer zones using contour data.

2. Climatic Risk Analysis

- Use Visual Crossing weather to monitor rainfall intensity.
- Identify periods of hydrological stress (e.g., November-March monsoon season);
- Track temperature peaks and dry spells for fire risk profiling.

3. Relevant Stakeholder, Communities and Worker Surveys

- Conduct interviews, Natural Hazards Risk Assessment survey (refer to Appendix 1) and Google Form surveys (Asrama Raya Sdn Bhd, 2025) with relevant stakeholder, local community and field staff.
- Use Social Impact Assessment (SIA) checklists to evaluate socio-ecological vulnerability.

4.2 REDUCING IDENTIFIED RISKS

i. Reducing Landslides Risk

- Exclude logging on steep slopes >40° and areas above 1,000 m elevation.
- Use log fishing system (cable extraction) in extracting log from logging area to log landing area to reduce soil disturbance.
- Apply Selective Management System (SMS) and Reduced Impact Logging (RIL) principles to retain vegetation cover and maintaining slope stability (FDPM, 2020; FDPM, 2024).

ii. Reducing Flooding Risk

- Suspend all forest operations during peak monsoon (November –March).
- Ensure all heavy machinery and vehicles are placed 100 m away from watercourses.
- **Set up buffer zones**
  - Mark the trees located along the watercourse and these trees are not allowed to be harvested.

- They are painted with one (1) yellow ring at not more than 10 m intervals. Table 1 provides guideline for creating buffer zones based on width of watercourse. The size of buffer zones is related to the size of the watercourse and surrounding topography (FDPM, 2020).

Table 1. Recommended buffer zones based on width of watercourse (FDPM, 2024).

Width (m)	**Buffer zone (m)**
≤10	10
10-20	20
20-40	40
>40	45

- **Infrastructure Protection**
  - Dismantle wooden bridges before monsoon season.
  - Repair eroded road or collapsed culverts after rainfall.
  - Use high-strength PVC water pipes and reinforced connectors.

iii. **Reducing Wildfires Risk**

- Maintain canopy closure using SMS and RIL to reduce surface evaporation.
- Record monthly temperature and dryness index (although risk currently assessed as very low).
- Prohibit open burning within concession.
- Monitor temperature trends and dryness index.

4.3 MITIGATING NEGATIVE IMPACTS FROM NATURAL HAZARDS ON INFRASTRUCTURE, FOREST RESOURCES AND COMMUNITIES

i. **On Infrastructure**

- Pre-monsoon: Dismantle temporary wooden bridges.
- Conduct post-monsoon inspections of forest roads, culverts, and bridges.
- Repair infrastructure promptly after hazard events to ensure safe access.

ii. **On Forest Resources**

- Implement RIL techniques to minimize soil disturbance by using log fishing systems for extracting timber from steep areas.
- Implement reforestation using native dipterocarp species (e.g., *Shorea* spp., *Hopea* spp., *Dipterocarpus* spp.).
- Prioritize replanting in logged-over areas.
- Prohibit felling of mother trees and protected tree species (refer to Appendix 2) that serve as critical food sources or habitat for avian fauna or other wildlife.

iii. **On Communities**

- Conduct awareness campaigns in nearby local community (Kg. Payong).

- Develop simple evacuation plans (even though direct hazard impact is low).

5. MONITORING AND ADAPTIVE MANAGEMENT

5.1 Monitoring

Environmental Monitoring

The Forest Management and Certification Team is responsible for conducting environmental monitoring through the following methods:

- Use topographic, satellite imagery and ground surveillance to monitor forest cover, buffer zones, and slope stability.
- Track real-time weather conditions: rainfall, temperature and wind.
- Conduct watercourse monitoring.

Biodiversity Monitoring

- Forest Management and Certification Team conduct flora and fauna surveys, including the use of camera traps and species checklists, to detect presences of wildlife, especially rare and threatened species.

Infrastructure Monitoring

- 'Kepala Hutan' (Forest Supervisor) conduct scheduled inspections of all roads, bridges, culverts, and other infrastructures to identify and report any damages or maintenance needs especially after rains.

5.2 Evaluation & Modification

- Analyze environmental and operational monitoring data annually.
- Review effectiveness of:
  - RIL and SMS practices on slope protection.
  - Buffer zone effectiveness in sediment and flood control.
  - Community preparedness outcomes.

- Modify SOP and management protocols based on:
  - New hazard data
  - Field observations
  - Stakeholder input

6. Records and Documentation

- Maintain records of:

- Risk maps and assessments,
- Community consultation records,
- Monitoring data and photographs,
- SOP reviews and updates.

- Retain documentation for a minimum of 5 years.

REFERENCES

Asrama Raya Sdn Bhd (2025). Penilaian Risiko Bencana Alam di Hutan Simpan Petuang [Online survey form]. https://forms.gle/L34RxADh6UtpqDHk6.

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FDPM. (2020). Guidelines for Reduced Impact Logging in Peninsular Malaysia (Revised 2020). Kuala Lumpur: Forestry Department Peninsular Malaysia.

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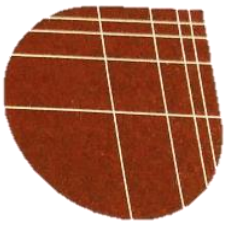
TSFD (2025). List of the fundamentals of fruits and fundamentals of food sources in particular avian fauna (which are not harvestable). Retrieved from https://trgforestry.terengganu.gov.my/index.php?option=com_content&view=article&id=81&Itemid=337&lang=en.

APPENDICES

Appendix 1. Natural Hazards Risk Assessment Questionnaire

	**ASRAMA RAYA SDN BHD**
	Address: Tingkat 2, 134-B, Jalan Sultan Zainal Abidin, 20000 Kuala Terengganu, Terengganu. Tel: +609-6310831; Fax: +609-6233831 Email: asramarayakt@gmail.com
	NATURAL HAZARDS RISK ASSESSMENT QUESTIONNAIRE

Name: _____ Date: _____
Nama **Tarikh**

Place of Residence: _____
Tempat Tinggal

Occupation: _____
Pekerjaan

1. FLOOD
   BANJIR

1.1 During the monsoon season, does HS Petuang (Petuang Forest Reserve) experience heavy rainfall?
Semasa musim monsun, adakah Hutan Simpan (HS) Petuang mengalami hujan lebat?

☐ Yes **(Ya)**
☐ No **(Tidak)**

1.2 If yes, does the water level of Sungai Petuang rise during the monsoon season?
Jika ya, adakah paras air Sungai Petuang naik semasa musim monsun?

☐ Yes **(Ya)**
☐ No **(Tidak)**

1.3 The rise of the river's water level cause flooding in HS Petuang?
Kenaikan paras air sungai ini menyebabkan banjir berlaku di kawasan mana?

☐ Area near river (**Kawasan sekitar sungai**)
☐ Access Road (**Jalan**)
☐ Base camp (**Kongsi**)
☐ Logyard (**Matau**)

1.4 Based on the previous records, has there ever been flood in the HS Petuang or its surroundings?
Menurut rekod yang lepas, adakah pernah berlaku banjir di HS Petuang atau sekitarnya?

☐ Yes **(Ya)**
☐ No **(Tidak)**

1.5 If so, where did the flood occur?
Jika ya, banjir berlaku di mana?

☐ Area near river (**Kawasan sekitar sungai**)
☐ Access Road (**Jalan**)
☐ Base camp (**Kongsi**)
☐ Logyard (**Matau**)

1.6 If yes, was the equipment damaged after the flood?
Jika ya, adakah peralatan mengalami kerosakan selepas banjir?

☐ Yes **(Ya)**
☐ No **(Tidak)**

1.7 If yes, what about the condition of the road and its surroundings?
Jika ya, bagaimana dengan keadaan jalan dan sekitarnya?

Not damage **(Tidak rosak)**	**1**	**2**	**3**	**4**	**5**	Severely damage **(Rosak teruk)**

2. WILDFIRE
KEBAKARAN

2.1 Has there ever been wildfire in the HS Petuang or its surroundings?
Adakah pernah berlaku kebakaran di HS Petuang atau sekitarnya?

☐ Yes **(Ya)**
☐ No **(Tidak)**

2.2 If yes, is the fire serious or not?
Jika ya, adakah kebakaran tersebut serius atau tidak?

☐ Yes **(Ya)**
☐ No **(Tidak)**

2.3 If yes, did the fire department come to put out the fire?
Jika ya, adakah pihak bomba pernah datang untuk memadamkan api?
☐ Yes **(Ya)**
☐ No **(Tidak)**

3. LANDSLIDE
TANAH RUNTUH

3.1 Has there ever been landslide in the HS Petuang or its surroundings?
Adakah pernah berlaku tanah runtuh di HS Petuang atau sekitarnya?

☐ Yes **(Ya)**
☐ No **(Tidak)**

3.2 If yes, is the landslide serious or not?
Jika ya, adakah tanah runtuh tersebut serius atau tidak?

☐ Yes **(Ya)**
☐ No **(Tidak)**

3.3 If yes, were there any people injured during the landslide?
Jika ya, adakah berlaku kecederaan semasa tanah runtuh?

☐ Yes **(Ya)**
☐ No **(Tidak)**

4. NOTES / COMMENTS / SUGGESTIONS
CATATAN / KOMEN / CADANGAN

Appendix 2. List of the fundamentals of fruits and fundamentals of food sources in particular avian fauna (which are not harvestable) (TSFD, 2025).

No.	Scientific Name	Local Name
1	*Ficus* spp.	Ara
2	*Archidendron bubalinum*	Kerdas
3	*Archidendron jiringa*	Jering
4	*Parkia* spp.	Petai
5	*Baccaurea maingayi*	Tampoi
6	*Baccaurea sumatrana*	Tampoi
7	*Artocarpus rigidus*	Keledang Temponek
8	*Nephelium lappaceum*	Rambutan Hutan
9	*Garcinia artoviridis*	Kandis Gelugor
10	*Bouea macrophylla*	Kundang Hutan
11	*Barringtonia* spp.	Putat
12	*Podocarpus* spp.	Podo
13	*Mangifera longipetiolata*	Macang
14	*Dialium* spp.	Keranji
15	*Sandoricum koetjiapi*	Sentul
16	*Durio zibethinus*	Durian Kampung
17	*Knema* spp.	Basong
18	*Myristica* spp.	Basong
19	*Ardisia* spp.	Mata Pelanduk
20	*Artocarpus heterophyllus*	Nangka
21	*Artocarpus integer*	Cempedak
22	*Eugenia* sp. (*Syzygium* sp.)	Kelat Jambu Laut
23	*Mangifera indica*	Mangga
24	*Castanopsis* spp.	Berangan
25	*Sterculia foetida*	Kelumpang Jari
26	*Sterculia parvifolia*	Kelumpang Burung
27	*Santiria laevigata*	Kedondong Kerantai Licin
28	*Irvingia malayana*	Pauh Kijang
29	*Koompassia excels*	Tualang
30	*Aglaia* spp.	Bekak
31	*Dysoxylum* spp.	Mersindok
32	*Lithocarpus cyclophorus*	Mempening Gajah

Source: TSFD (2025)