

CEPA MANUAL

for

Dugong & Seagrass Conservation Project

“Overcoming the knowledge Gaps and Involvement of Local Community to Establish a Marine Protected Area (MPA) for the Conservation of Dugongs and Seagrass in the Bay of Brunei, Lawas, Sarawak, Malaysia Borneo ”

MY 5 - 2115



Team Members:

Bistari Mahmood
Karen Beverley Seem
Shirley Naning
Ivy Esra Matius
Roslan Shah
Hosli Singa
Tom Imang

**Communication Education & Public Awareness Program
for Dugong & Seagrass Conservation Project
Kuala Lawas**

Date: 21-24 Mac 2016
Location: SMK Lawas, SMK Sundar, SMK Merapok, SMK Trusan
Time: 8am – 12.30pm

Schedule		
8.00-8.15	Briefing Pre test	Teacher Bistari
8.15-9.00	Power Point Presentation & Video Dugong and Sea Grass of Sarawak - General introduction on the different types of sea grass and dugong in Sarawak (morphology, physical characteristic, food) Dugong & Sea Grass at Lawas - General information on dugong & Sea grass at Lawas	Karen & Roslan
9.00-9.45	- Activity 1 – Help me to survive	Karen & Roslan & Tom
9.45-10.00	Tea Break	
10.00-11.00	Story Telling & Quiz Dugong and Sea Grass of Sarawak - Treats towards conservation of Dugong and Sea Grass - Treats conservation on dugong & Sea grass at Lawas - Activity 2- Wihyeob to dugong and seagrass	Shirley & Hosli
11.00-11.45	- Activity 3 – Experiment	Ivy & Bistari
11.45-12.30	-Result & Conclusion -Post test -Close	All Bistari
12.30	<i>End of day</i>	

Fakta Dugong

Dugong

Haiwan yang lembut dan sosial, juga dikenali sebagai 'lembu laut' disebabkan sifatnya yang meragut rumput laut. Dugong hidup sepanjang hayatnya di dalam persekitaran marin tetapi **bernafas di udara**

Rupa bentuk dugong

- ✓ Dugong adalah mamalia bersaiz besar yang hidup sepanjang hayatnya di dalam laut. Mempunyai kulit lembut dan sedikit sahaja bulu di badannya.
- ✓ Kepala dugong bebenak bulat dengan mata yang kecil dan muncung mulut yang besar.
- ✓ Sirip tidak mempunyai kuku
- ✓ Dugong bergerak dalam kumpulan

Saiz

Dewasa- lebih kurang 2.7m dan berat 250-300kg

Anak- lebih kurang 1m panjang semasa lahir dan berat 20-35kg

Saiz dugong jantan dan betina adalah sama.

Pernafasan

Dugong bernafas di udara. Tidak boleh menahan nafas di dalam air dalam jangka masa yang panjang.

Penglihatan

Penglihatan yang kurang jelas

Pergerakan

Lambat, bergerak dalam 10km/jam

Pada jarak pendek kelajuan maksima boleh mencapai 25km/jam

Pertahanan

Musuh – manusia, jerung pembunuh, buaya

Pemakanan

Hanya makan rumput laut dalam kuantiti yang banyak setiap hari untuk mendapat tenaga harian.

Habitat

Kawasan perairan yang cetek, terlindung dari ombak besar dan angin kuat, seperti teluk-teluk cetek dan kawasan terlindung di pulau yang besar berhampiran dengan daratan. Ini penting kerana kawasan tersebut banyak rumput laut.

Kitar hayat

Jangka hidup sehingga 70 tahun

Matang pada umur 6-17 tahun

Dugong betina melahirkan anak seekor setiap 3-7 tahun.

Mengandung selama 12-13 bulan

Melahirkan anak di dalam air dan berenang ke permukaan air untuk penafasan pertamanya.

Anak dugong menyusu dan bersama ibunya lebih kurang 18 bulan.

Anak dugong boleh makan rumput laut sebaik sahaja dilahirkan.

Note: Power Point

Activity 1- Game

Facilitator Worksheet

Title: "Help me to survive?"

Objective:

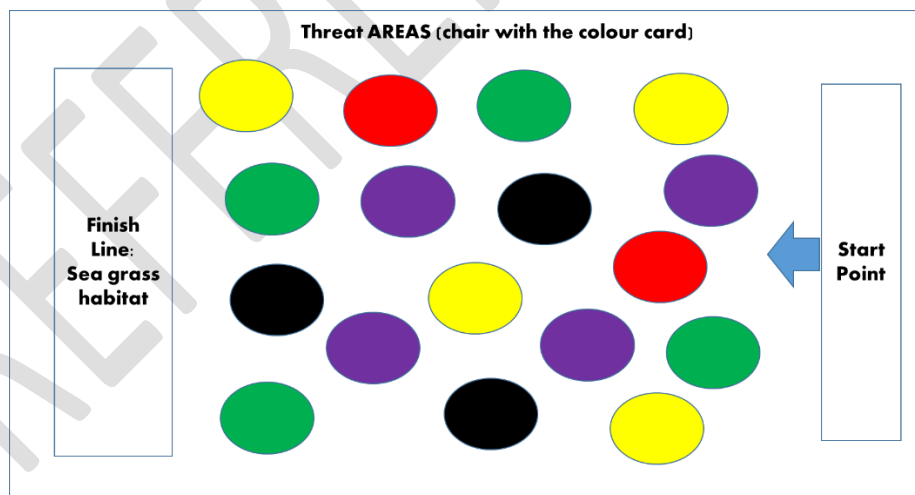
- To enable the participants to recognise different type of threats for survival of dugong
- To enable participants to identify effort can be done to increase survival rate of dugong

Equipment:

- Nylon string- 1 roll
- Colour card- 20 piece
- Chairs- 20 unit

Procedure:

1. Facilitators will place 20 chairs representing the threats for dugong
2. Beneath the chairs there will be the threats and "what can be done to minimize the threat?" The layout are as below.



3. Students will start at the starting point with each students in a group must work together to form a dugong.
4. The students situated at the last in a "dugong" must collect the threats from beneath the chair without touching the chairs.

- Each “dugong” (consist of 1 group of students) must collect 5 colour card and answer the conservation effort in the card before arrive at finish line (seagrass heaven)
- The first group that has answered all the question correctly and arrive at the finishing line is consider the winner.

Conclusion:

The students will learn to understand the threats for survival of dugong and understand the role they need to play to ensure the survival of dugong for future generation.

Front view of the colour paper	Back view of the colour paper
<p>Threat to dugong</p> <p>Dugong trapped in the fishing net</p>	<p>(question for the threats)</p> <p>How to save dugong that get entangled in the fishing net?</p>

Threat Card

Threats and question for the threats:

Yellow Paper

- Threats: Dugong trapped in the fishing net
 Question: How to save dugong that get entangled in the fishing net?
 Answer: Release dugong that trapped in the fishing net

Red Paper

- Treats: Sea grass (food for dugong) died due to eutrophication (lack of sunlight for photosynthesis). Dugong died due to lack of food
 Question: How to minimize nutrient or chemical waste runoff for agriculture activity?
 Answer: Use the amount of chemical required for agriculture activity/
 Reduce soil compaction/apply nutrient or pesticide during hot season and not rainy days/avoid spills at water area.

Black Paper

- Threats: Dugong been hunt for its meat
 Question: How to minimize illegal hunting of dugong as a concern public?
 Answer: Do not buy/consume dugong meat. Report to relevant authority when sighted illegal hunting or trading of dugong meat.

Purple Paper

4. Threats: Conversion of seagrass area for development. Dugong loss its habitat and food
Question: How to protect the seagrass area in Sarawak?
Answer: Gazette it into Totally Protected Areas (national park is acceptable answer too)/ campaigning to reduce coastal development

Green Paper

5. Threats: Dugong died of suffocation due to plastic bag
Question: How to minimize usage of plastic bag in our daily live?
Answer: Bring our own plastic bags or recycle bag when shopping/ 3R.

Seagrass Facts

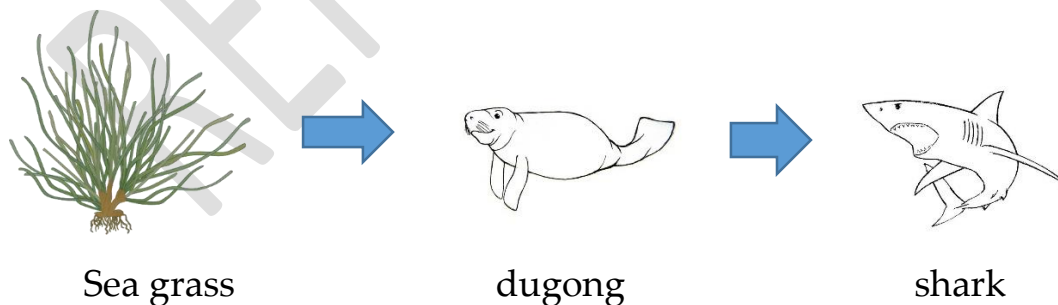
Seagrass is the only marine flowering plant. Seagrass in oceans throughout the world and is the basis for many important marine ecosystems. Seagrass meadows are commonly found along coastlines, on reef tops and estuaries.

A special kind of grass

They are called 'seagrass' because most have flat, ribbon-like, grassy leave. But they are not a true grass. There are found around 60 different species world-wide, and some do not like a grass at all. Seagrass leaves rely on the light to convert carbon dioxide and water into oxygen and sugar-photosynthesis process. The sugar and oxygen are then available for use by other living organism, making seagrass an important link in the food web.

Seagrass Food Web

In a seagrass meadow as elsewhere, all the living things are connected to each other. Let's look an example a food chain.



Energy in the food chain moves from the plant to the first animal, and on to second animal. At each stage energy is used by many things. Seagrass uses some of its energy to flower and make seeds. The dugong uses energy to breed and move about.

Seagrass Habitat

Seagrass need plenty of sun and clean water to grow. Seagrasses also live in locations sheltered from wave action. Species of seagrass are adapted to live in a variety of coastal marine habitats. Seagrasses are usually found growing in mud or sand, in subtidal areas (areas that are covered with salt water all time). Subtidal areas can include very deep water (more than 15m depth). Some seagrass species can also be found in the intertidal region (covered by water during high tide and uncovered during low tide).

Fisheries

One of the most important roles of seagrass is providing a nursery and shelter area for fish and prawns which are valuable to recreational, commercial and indigenous fisheries. Juveniles of some important species which depend on seagrass meadows include fish. Tiger prawns, king prawns and tropical rock lobsters also live in seagrass meadows as juveniles. Shellfish such as some oysters and pearl shell may be more likely to settle and survive where there is seagrass.

Dugongs

The dugong is a marine mammals which eats seagrass. Dugong can eats up to 40 kilograms of seagrass per day. When dugong eats, it digs its snout into the sea -bed to uproot the seagrass, leaving a trail in the meadow where they have fed. Dugong can travel for great distances searching for food. They have a good memory and satellite tracking has shown that they can return hundreds of kilometers to a specific place.

Note: Power Point



Seagrasses

" UNEP GEF PROJECT REVERSING ENVIRONMENTAL DEGRADATION
TRENDS IN THE SOUTH CHINA SEA AND GULF OF THAILAND "



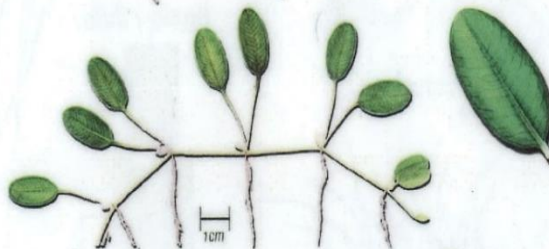
Enhalus acoroides
หญ้าชะเงา



Halophila beccarii
หญ้าใบพาย



Halophila decipiens
หญ้าใบมะกรูดขน



Halophila ovalis
หญ้าใบมะกรูด



Halophila minor
หญ้าใบมะกรูดแคระ



Thalassia hemprichii
หญ้าชะเงาเต่า

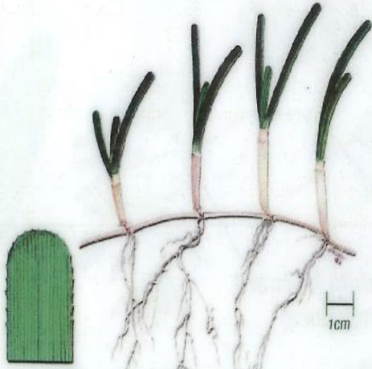
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SOURCE: UNEP GEF Project



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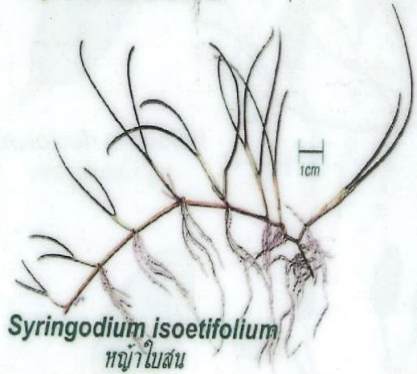
" UNEP GEF PROJECT REVERSING ENVIRONMENTAL DEGRADATION
TRENDS IN THE SOUTH CHINA SEA AND GULF OF THAILAND "



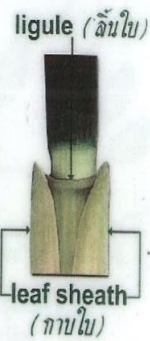
Cymodocea serrulata
หญ้าชะเงาเส้นปลายหนาม



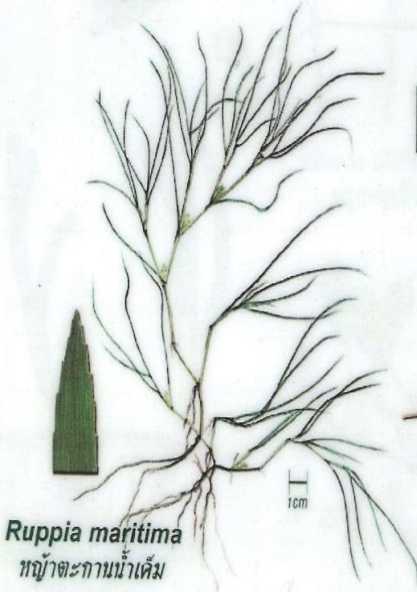
Cymodocea rotundata
หญ้าชะเงาเส้นปลายมน



Syringodium isoetifolium
หญ้าใบสน



Halodule pinifolia
หญ้าชะเงาฝอย



Ruppia maritima
หญ้าตะกานน้ำเค็ม



Halodule uninervis
หญ้าชะเงาใบแคบ

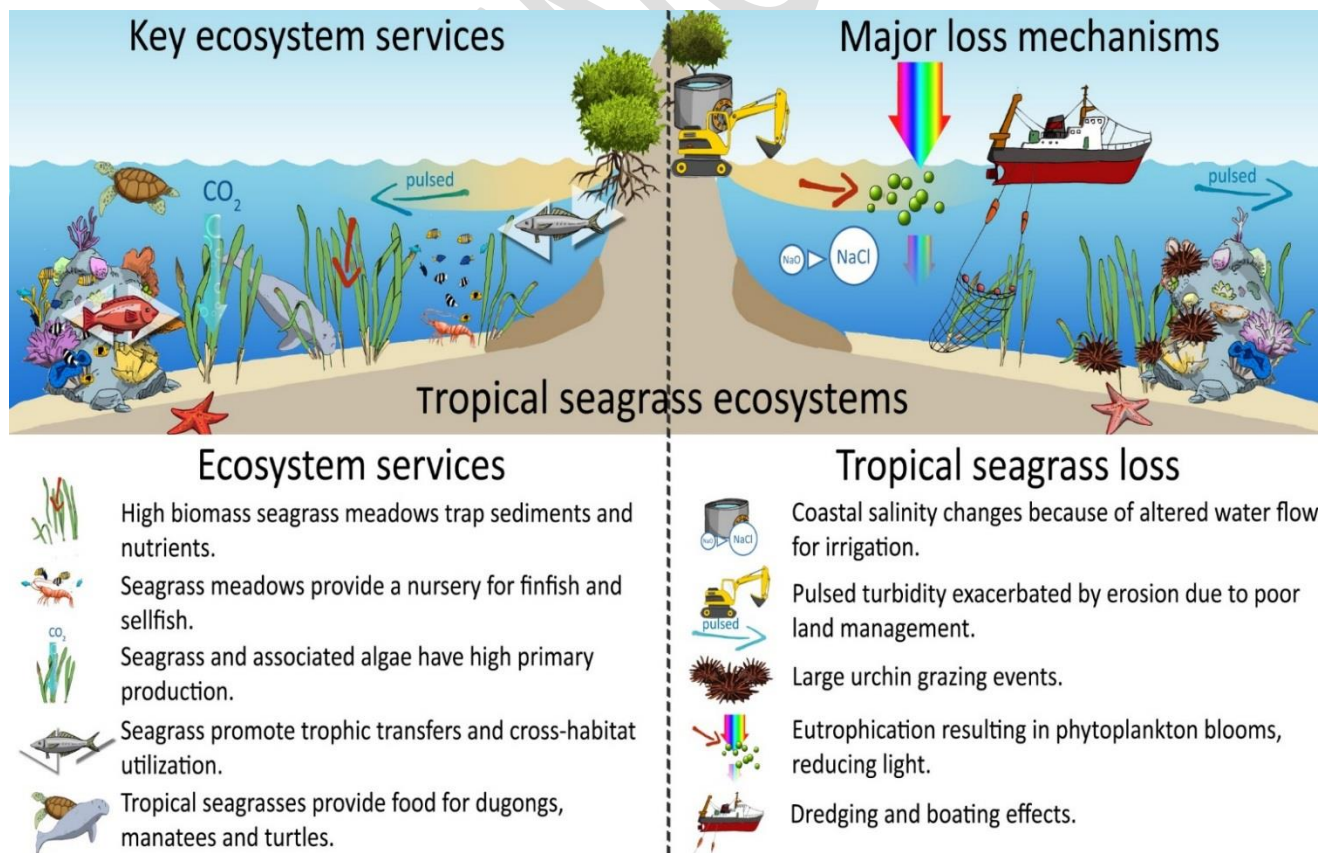
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SOURCE: UNEP GEF PROJECT

Ancaman Dugong

1. Kegiatan menangkap ikan: Dugong terperangkap dan mati dalam pukat yang dipasang oleh nelayan.
2. Kemusnahan habitat rumput laut akan menyebabkan sumber makanan dugong tiada: ini disebabkan oleh :
 - ✓ pukat tunda dan aktiviti pembangunan di kawasan perairan pantai.
 - ✓ Kualiti air yang tercemar juga akan memusnakan rumput laut.
 - ✓ Hakisan tanah dari darat ke laut juga akan menghalang cahaya matahari yang diperlukan rumput laut untuk tumbuh
3. Bunyi bising dari bot akan menakutkan dugong untuk pergi ke kawasan sekitar perairan. Selain itu bot-bot ini juga kadang kala memecut di perairan cetek dan melanggar serta mencederakan atau boleh membunuh dugong.
4. Pencemaran: kawasan perairan yang dicemari sampah seperti plastic, kaca, pukat lama, tali pancing dan bahan-bahan logam yang berbahaya. Selain itu, air yang tercemar juga memberi bahaya kepada dugong.

Threat on Seagrass



Activity 2-
Facilitator Worksheet

REFERENCE ONLY

Activity 3- Experiment

Student Worksheet

Activity 1: To build a model of habitat of sea grass using aquarium and other materials.

Participants: 25 students (Form 4 Science student)

Group: 4 groups (consist of 4-5 students)

Objectives:

- To set up, and create a model of habitat of sea grass
- To give more understanding to students by involving in designing sea grass habitat model.
- To engage students in learning the threat of sea grass habitat

Equipment needed:

- Aquarium – 6 sets
- Sea grass
- Cooking oil- 2 bottle
- Sands- 1 plastic
- Soil 1 plastic
- Detergents- 2 bottle
- Plastic
- Threads
- Artificial leaves
- Artificial grass
- Torch Light-4 set

Preparation time: 1 hour

Presentation time: 20 minutes

Procedures:

- 1) Have students to discuss among them to appoint one leader.
- 2) Ask students to discuss among themselves about the habitat of sea grass. Example; what do sea grass need to grow in certain places.
- 3) Have students to identify components that contribute to a healthy habitat of sea grass. Example: sufficient sunlight, clear water.
- 4) Assist student in designing a healthy, unpolluted habitat for sea grass using equipment provided.
- 5) Facilitator to assist students to identify and list down at least one threat that could be detrimental to the sea grass. Example: Upriver activities cause soil pollution, water pollution, eutrophication.
- 6) Ask the students to put the materials provided that representing/illustrating the threats inside the aquarium.
- 7) Have students to discuss how the threats can be detrimental to the sea grass and ask them to explain it with the model.
- 8) Have students to fill up the observation form and make conclusion from the observation.
- 9) After the seagrass habitat model is ready, students will be asked to present their model to another group.

Observation Form:

Materials	Observation
Algae/ Leaves	
Water colour	
Oil	
Plastic/Rubbish	

Question Sheet:

Materials	Representing/Illustration	Effects	Sources
Example: Cooking oil	Oil waste	-Reducing O2 in the water -Blocking sunlight	Housing/Oil palm/Factories/Resort/ Restaurant

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Activity 3-Experiment ***Facilitator Worksheet***

Activity 1: To build a model of habitat of sea grass using aquarium and other materials.

Participants: 25 students (Form 4 Science student)

Group: 4 groups (consist of 4-5 students)

Objectives:

- To set up, and create a model of habitat of seagrass
- To learn the importance of healthy seagrass habitat to the dugong
- To give more understanding to students by involving and engaging in designing seagrass habitat model.

Equipment:

- Aquarium – 6 sets
- Sea grass
- Cooking oil- 2 bottle
- Sands- 1 plastic
- Soil 1 plastic
- Detergents- 2 bottle
- Plastic
- Threads-4 pieces
- Artificial leaves
- Artificial grass
- Torch Light- 4 piece

Preparation time: 1 hour

Presentation time: 20 minutes

Procedures:

1. Have students to discuss among them to appoint one leader.
2. Ask students to discuss among themselves about the habitat of sea grass. Example; what do sea grass need to grow in certain places.
3. Have students to identify components that contribute to a healthy habitat of seagrass. Example: sufficient sunlight, clear water.
4. Assist student in designing a healthy, unpolluted habitat for seagrass using equipment provided.
5. Facilitator to assist students to identify and list down at least one threat that could be detrimental to the seagrass. Example: Upriver activities cause soil pollution, water pollution, and eutrophication.
6. Ask the students to put the materials provided (that representing/illustrating the threats) inside the aquarium.
7. Have students to discuss how the threats can be detrimental to the seagrass and ask them to explain it with the model.
8. Have students to fill up the observation form and make conclusion from the observation.
9. After the seagrass habitat model is ready, students will be asked to present their model to another group.

Pollutants Element:

Materials (Experiment)	Pollutant Elements
Cooking oil	Oil waste
sands	Sediments
Soil	Sediments
Detergents	Chemical waste
Plastic/Thread	Solid waste
Daun palsu	Algae
Water color	Chemical waste/ Fertilizer

Observation Form:

Materials	Observation
Algae/ Leaves	Light cannot reached/penetrate the bottom surface
Water colour-Red	Water colour mix into the water and settle at the bottom surface
Oil	Oil floated on the surface
Plastic thread	Plastic/thread sink into the water

Question Sheet:

Materials	Type of pollution	Effects	Sources
Cooking oil	Water pollution	-Reducing O ₂ in the water -Blocking sunlight	Housing/Oil palm/Factories/Resort/ Restaurant
Soil	Water pollution - Sewage discharges/land reclamation	-Increase turbidity in the water column Less light reaching the seagrass-reduce photosynthesis-increase stress on the plant	<ul style="list-style-type: none"> • Oil palm • Housing
Detergents	Water pollution - Nutrients discharge	-Increase algae growth (free floating & grow on leaves and stems on seagrass). -Free floating algae-contribute to water turbidity -Epiphytic algae reducing the photosynthesis activity and increase the weight seagrass.- break the leaves	<ul style="list-style-type: none"> • Oil palm • Farming activities • Factories
Sediments	Erosion	-Seagrass is rapidly lost as sand blow out is created and increase in size. - Caused the seagrass washed ashore. -Disruption to ecosystem	<ul style="list-style-type: none"> • Development of housing • Absent of buffer zone at development area on seaside. • Flood

Plastic/Sampah Thread/Sampah/ Pukat	Water pollution	-Reduce water turbidity thus reducing the photosynthesis activity -	<ul style="list-style-type: none"> • Housing • Oil palm • Factories • Restaurant Resort/
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REFERENCE ONLY