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Serpihan Marin dalam Ekonomi Biru Kitaran

5. Peranan industri ekonomi biru dalam penjanaan pencemaran plastik

(Tutorial, Perbincangan atau Lawatan Lapangan)

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Dibiayai oleh Kesatuan Eropah. Walau bagaimanapun, pandangan dan pendapat yang dinyatakan adalah pandangan pengarang sahaja dan tidak semestinya mencerminkan pandangan Kesatuan Eropah atau Agensi Eksekutif Pendidikan dan Kebudayaan Eropah (EACEA). Kesatuan Eropah mahupun EACEA tidak boleh dipertanggungjawabkan ke atas mereka.

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Universiti Malaysia Terengganu
UMT

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RAKAN KONGSI PROJEK

Malaysia

Universiti Malaysia Terengganu UMT

Universiti Sains Malaysia

APEX

Persatuan Kemajuan Akuakultur Malaysia
Malaysia Aquaculture Development Association

Indonesia

Universitas Indonesia
Veritas, Probitas, Iustitia

ITS Institut Teknologi Sepuluh Nopember

Greece

Πανεπιστήμιο Αιγαίου
University of the Aegean

symplexis

AEGEAN rebreath

Cyprus

University of Cyprus
Oceanography Centre

Center for Social Innovation
www.csicy.com

Co-funded by the European Union

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Kandungan

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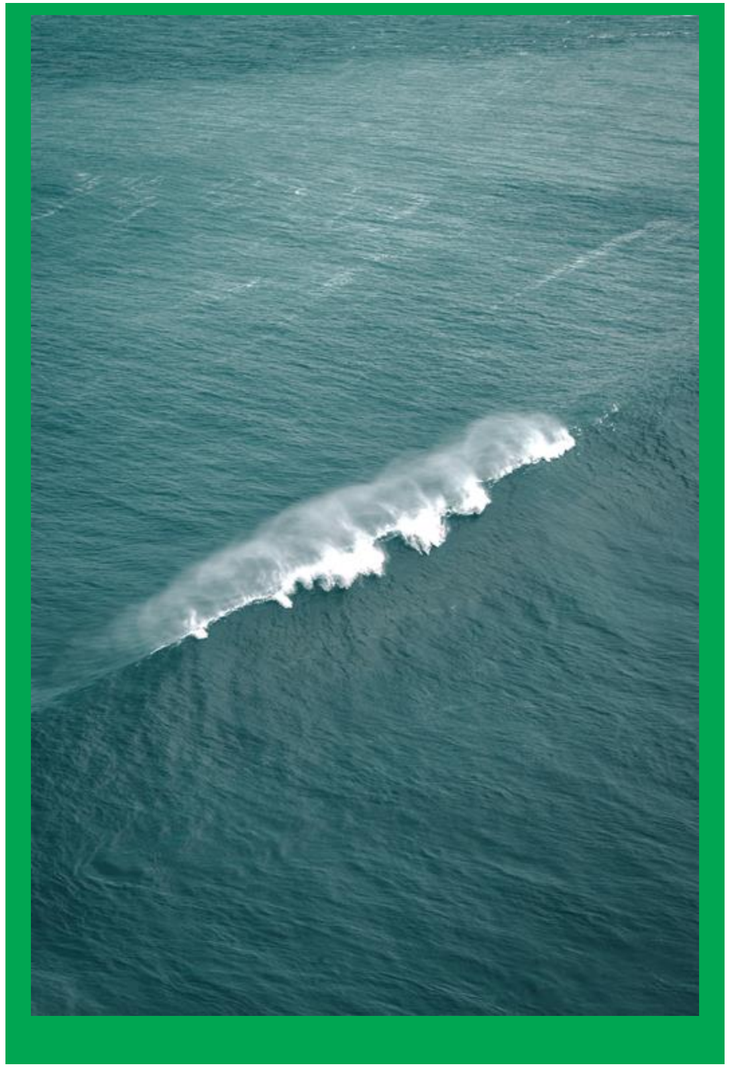
Pengenalan

Tutorial ini meneroka strategi amalan untuk mengurangkan penjanaan sisa dan meningkatkan kadar kitar semula, termasuk sistem penyesoran sisa, inovasi teknologi, pendidikan awam dan pembangunan infrastruktur. Dalam sesi perbincangan, peserta akan membangunkan dan membentangkan pelan tindakan atau cadangan yang disasarkan untuk inisiatif ekonomi kitaran, dengan memberi tumpuan kepada sektor atau wilayah geografi tertentu.



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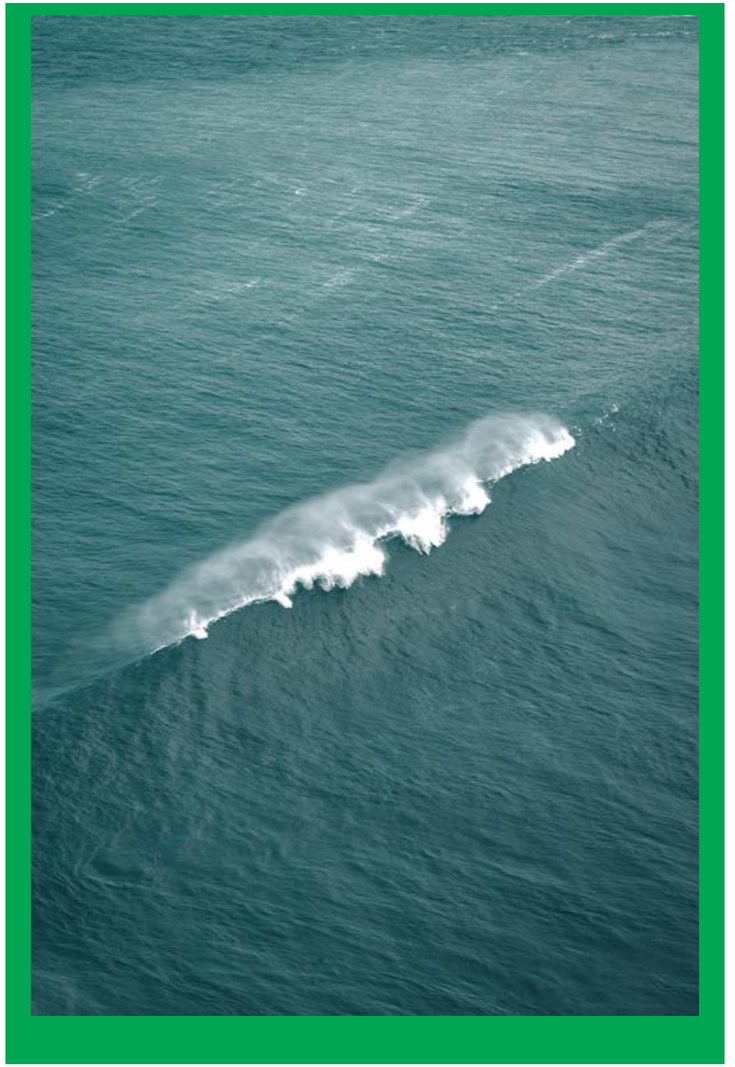
Hasil pembelajaran:

- Mengenal pasti dan menilai strategi pengurangan sisa.
- Reka bentuk projek ekonomi kitaran untuk aplikasi dunia sebenar
- Meningkatkan kemahiran komunikasi dan kerjasama.



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1. Mata pembelajaran

Perbincangan antara pelajar dan pensyarah (atau refleksi diri) tentang jenis sisa marin biasa dan mencadangkan penyelesaian pengurangan dan kitar semula yang realistik.

Contoh perkara perbincangan:

- Hierarki sisa: Kurangkan, Guna Semula, Kitar Semula
- Jenis bahan kitar semula (plastik, logam, kaca, sisa organik)
- Sistem kitar semula berasaskan komuniti
- Inovasi teknologi dalam kitar semula (cth pengisihan AI, kitar semula bio)
- Teknologi pemintasan sampah marin (cth, ledakan sungai, penghalang terapung)
- Peranan kerajaan dan industri dalam pengurusan sisa
- Perubahan tingkah laku dan strategi pendidikan awam

(10 – 15 mins)

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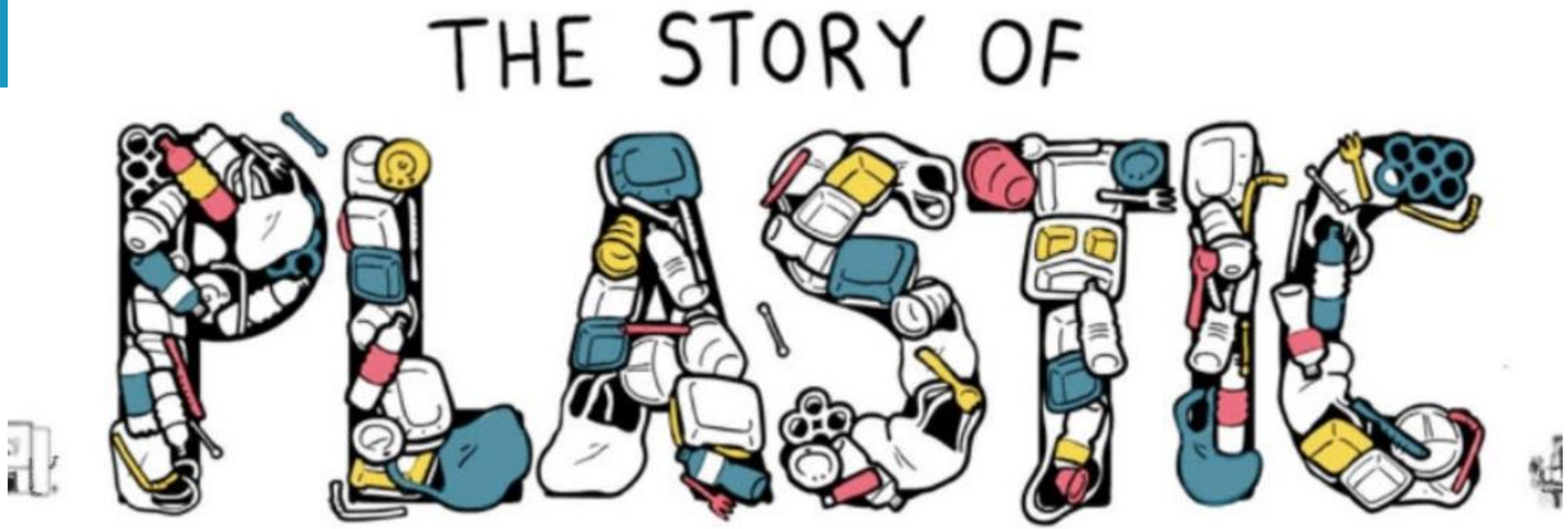
2. Video



CREDITS: Narration by Tiza Mafira Animation by Ruben DeLuna Creative Written & produced by Brett Chamberlin, Michael O'Heaney, and Ruben DeLuna Based on The Story of Plastic documentary, directed and produced by Deia Schlosberg

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SustainaBlue – Acara Latihan Transnasional di Athens, Greece, 2025.
Lawatan sambil belajar ke Kitaran Biru.

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3. Contoh

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Gambar diambil oleh Jennie Lee semasa lawatan itu.

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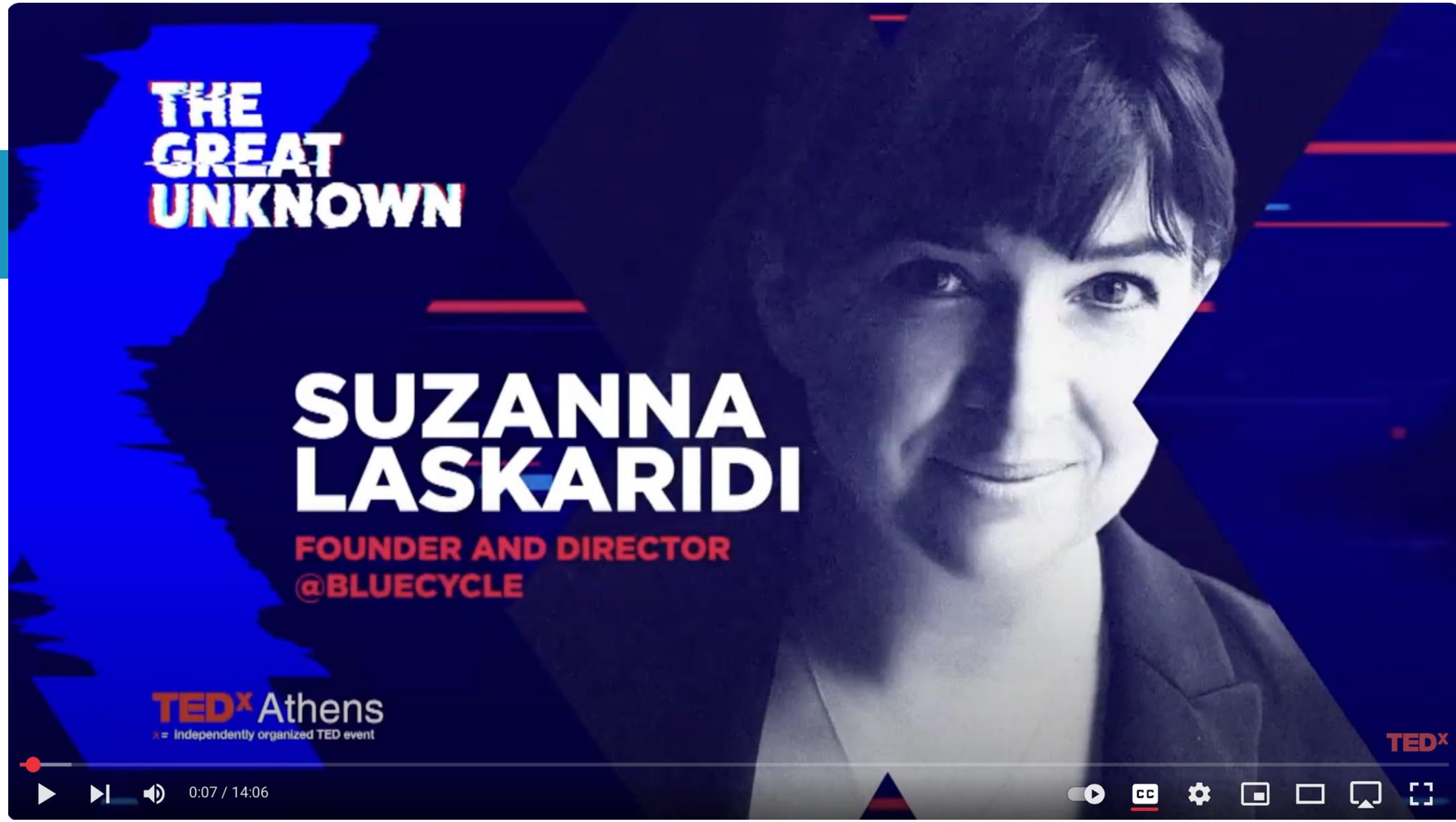
3. Video



Video ini akan membincangkan masalah peralatan memancing yang hilang di seluruh dunia dan di Greece, bagaimana ia boleh ditangani dengan meningkatkan kitar semula dan mengapa ekonomi pekeliling adalah pendekatan ekonomi pilihan masa hadapan.

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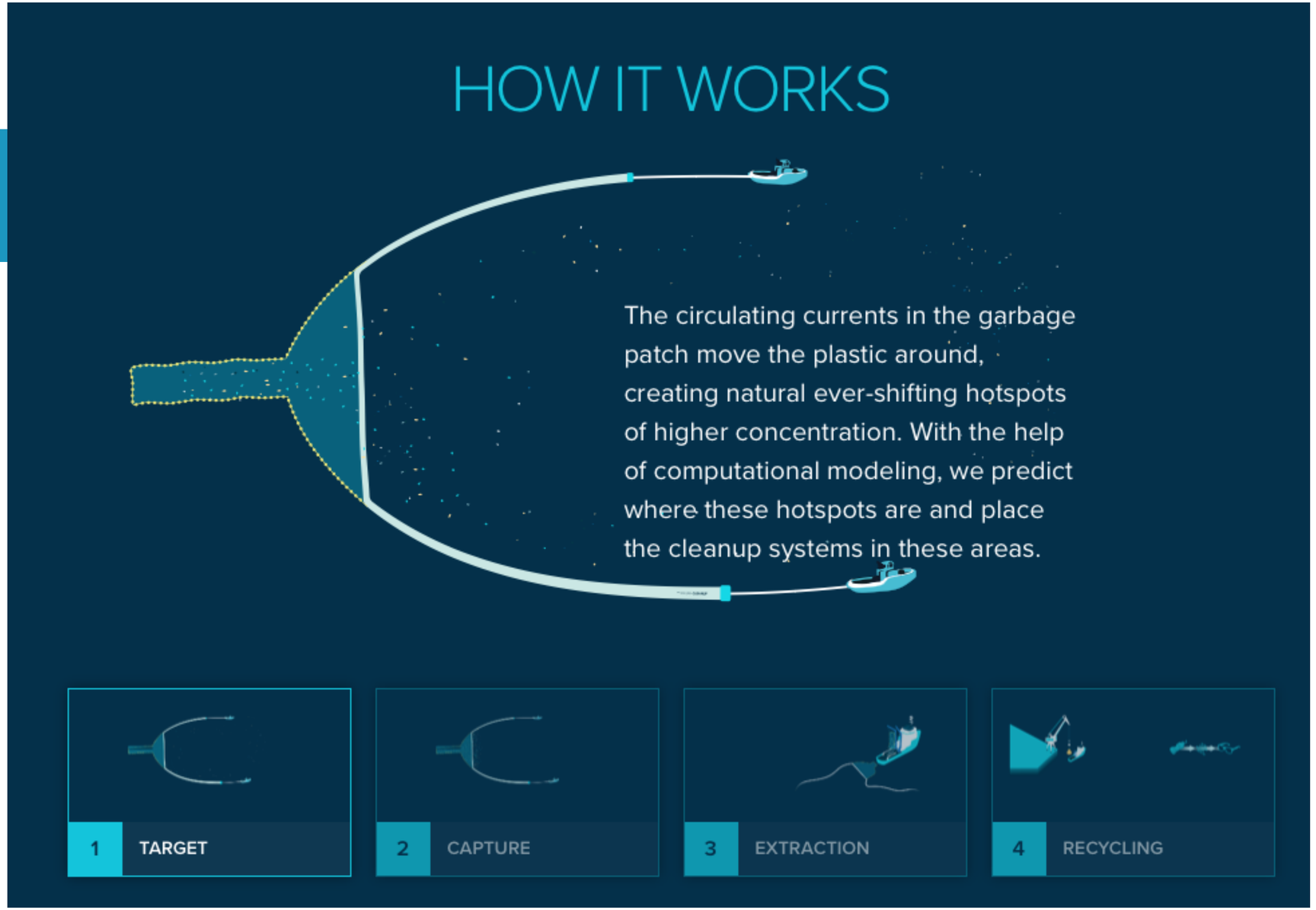
3. Contoh

Ocean Clean Up

https://theoceancleanup.com

Proses

1. Sasaran
2. Tangkap
3. Pengekstrakan
4. Kitar semula



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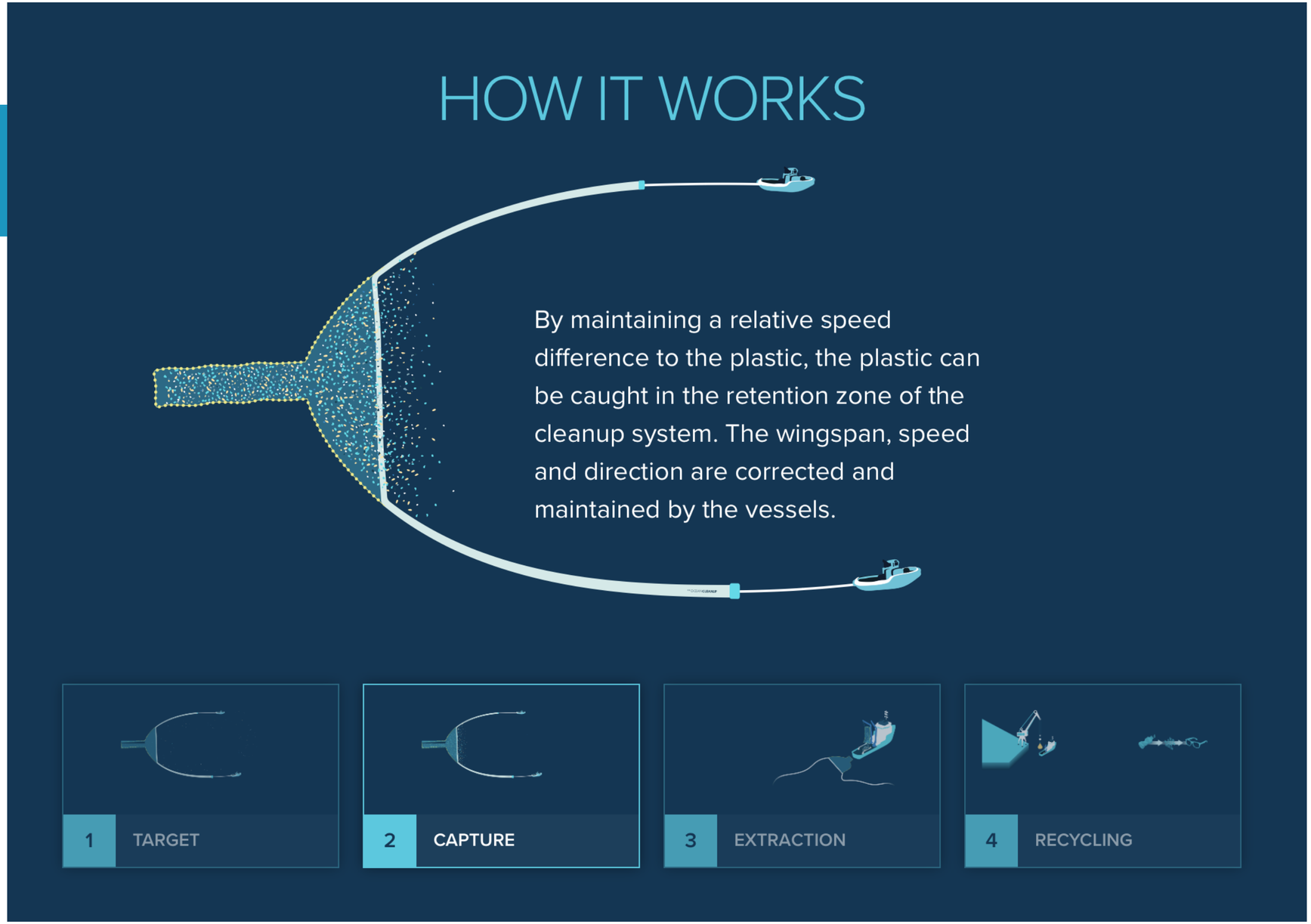

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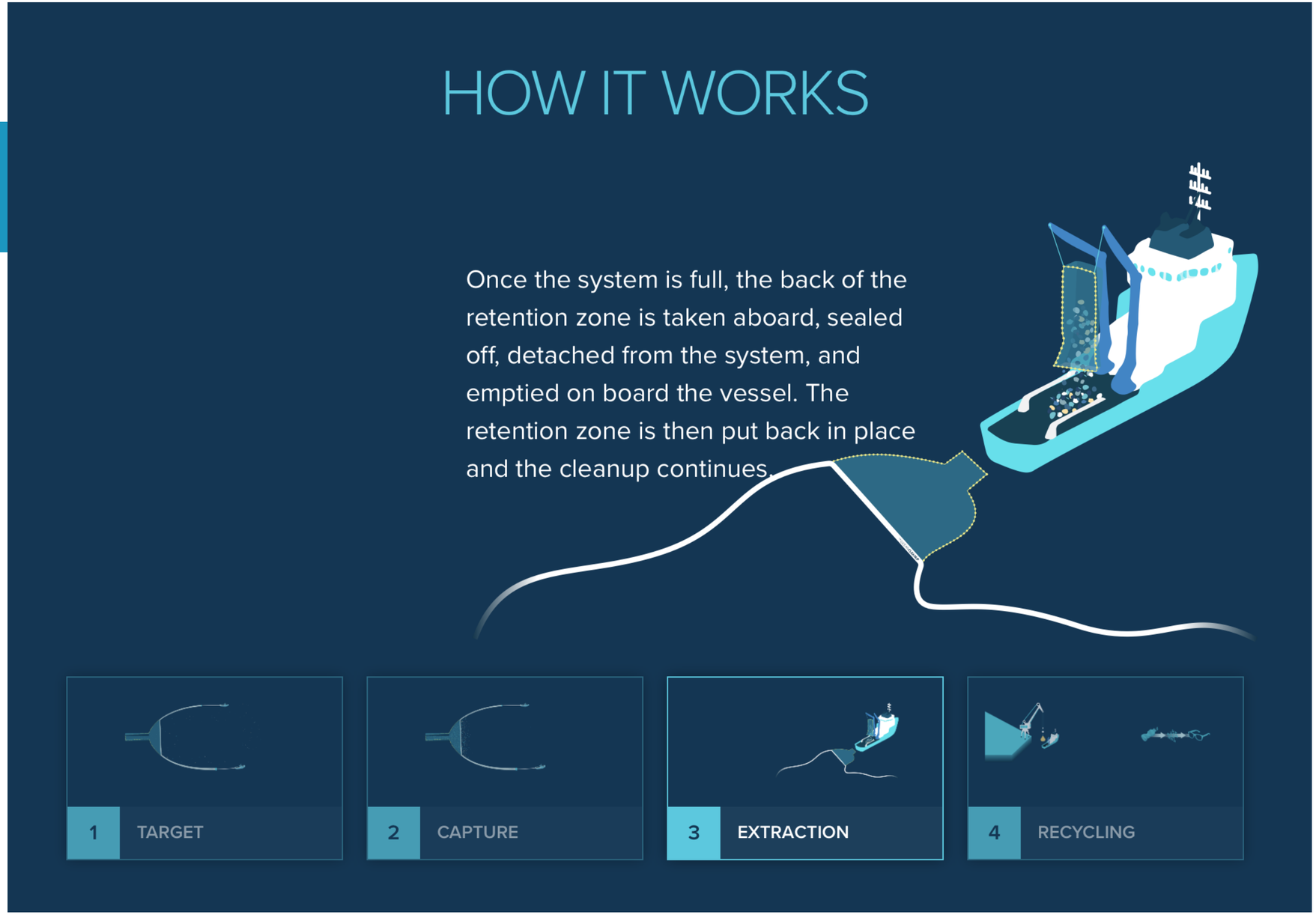

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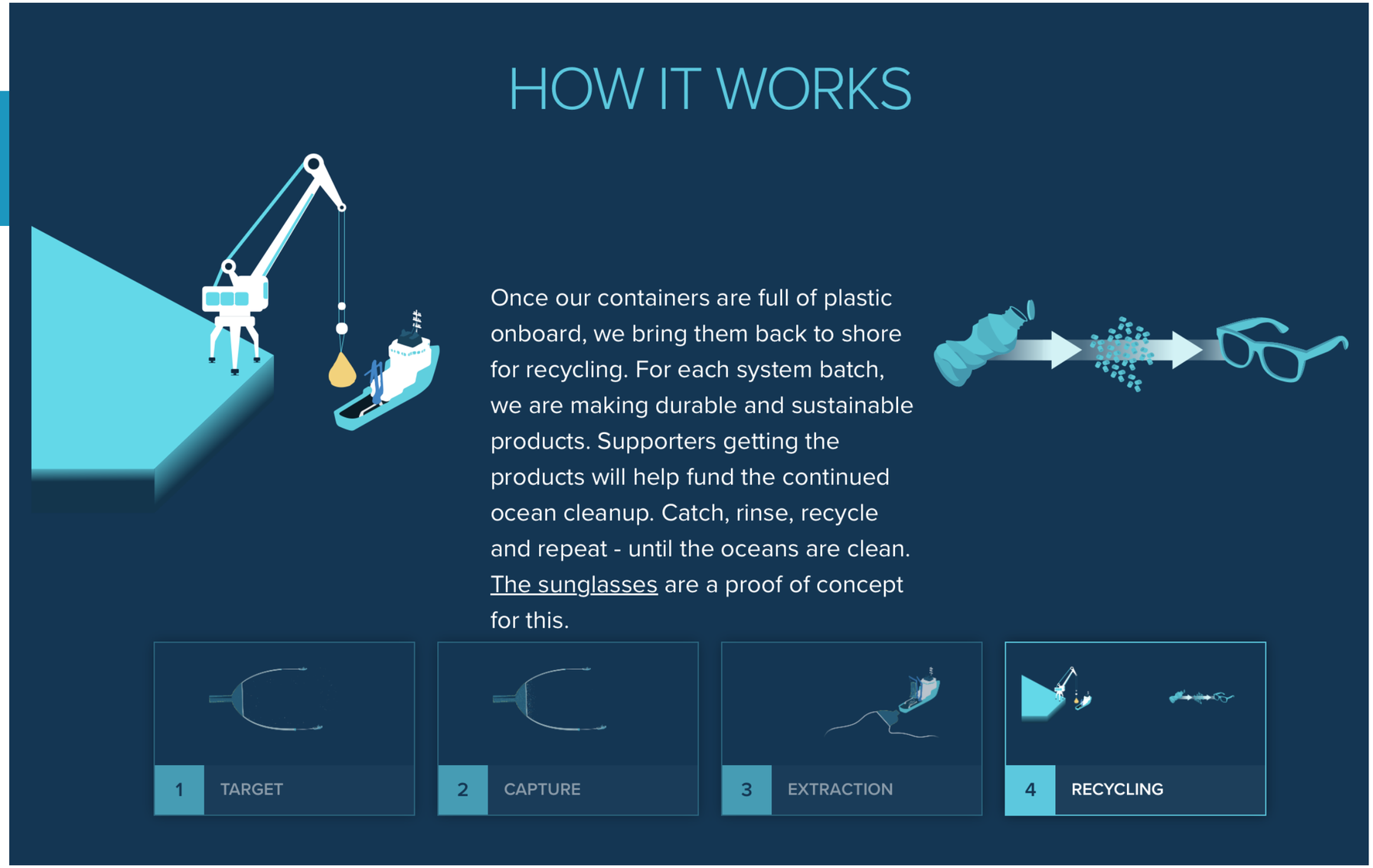

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3. Kajian kes

Reef Check

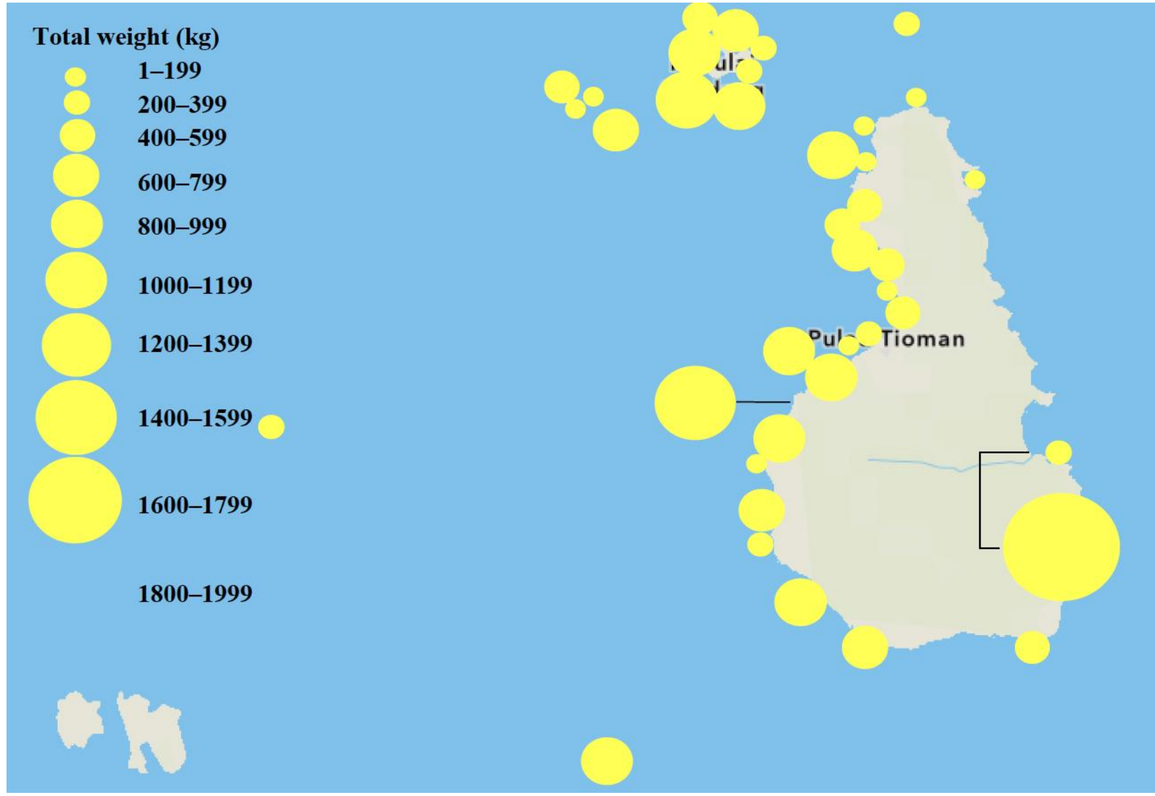
Tackling Ghost Nets

Ghost nets removed by RMCG

Ghost nets contribute to ocean pollution by causing extensive social, economic and environmental impacts. They trap and entangle marine life, besides smothering and damaging important ecosystems such as coral reefs and seagrass beds.

Reef Check Malaysia's teams on the islands have been receiving reports of ghost nets, and have been working hard to remove them from the marine environment before they cause extensive damage. In just the first quarter of 2024, our local group on Redang Island, the Redang Marine Conservation Group (RMCG), successfully removed approximately 140 kg of ghost nets, all found near the village jetty! The nets collected were given to the local youth of the island, who planned to recycle them into football goalpost nets.

https://www.reefcheck.org/coral-bleaching-and-ghost-nets-mark-start-of-malaysia-survey-season/



Berat (kg) jaring hantu yang diperoleh dalam tempoh 2016 dan 2022 di sekitar Pulau Tioman.

Chelliah et al. (2024)

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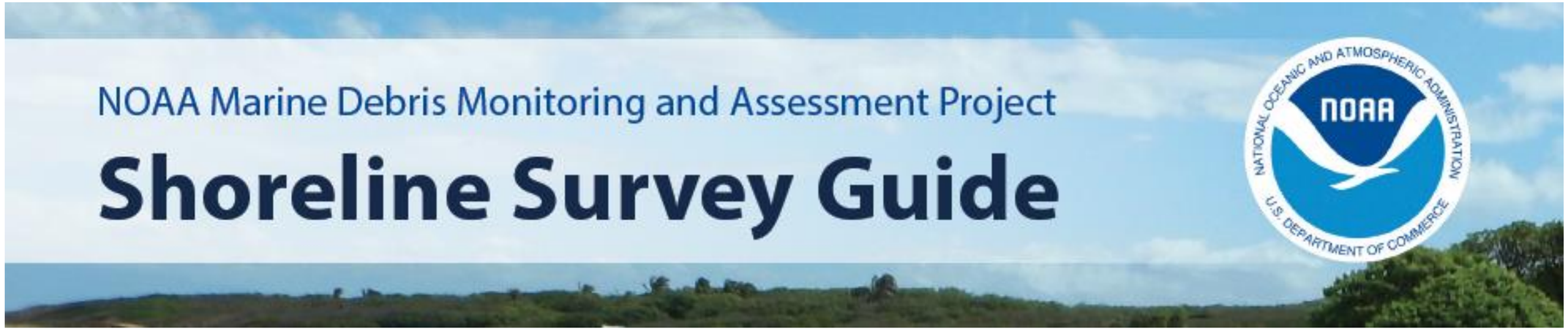
4. Aktiviti Kumpulan

Dalam kumpulan:

- Mengkategorikan sisa
- Kenal pasti item yang boleh dikurangkan, digunakan semula atau dikitar semula
- Mencadangkan penyelesaian yang realistik (cth., peralatan memancing boleh guna semula, pembungkusan eko)



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4.

Muat turun bahan bacaan di sini:
https://marinedebris.noaa.gov/our-work/monitoring/marine-debris-monitoring-and-assessment-project

MDMAP *at a glance*

Choose a site
Select a 100-meter shoreline survey site

Select transects
Randomly select four 5 meter transects

Record conditions
Record site condition information

Survey for debris
Within each transect search for and document items 2.5 centimeters or larger

Enter data
Enter data online in the MDMAP database

Repeat!
Repeat, aiming for monthly surveys at each site

Photo: NOAA

Burges et al. (2021)

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5. Pembentangan dan Perbincangan Kumpulan

Pilihan 1 (jika lawatan lapangan tersedia untuk pelajar)

Aktiviti Lembaran Kerja:

- Kenal pasti jenis sisa daripada laporan pembersihan pantai
- Mencadangkan penyelesaian pengurangan dan kitar semula untuk setiap jenis sisa

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5. Pembentangan dan Perbincangan Kumpulan

Pilihan 2 (jika lawatan lapangan tidak dibenarkan untuk pelajar)

Aktiviti Lembaran Kerja:

1. Bahagikan pelajar kepada kumpulan kecil (4–5 orang)
2. Setiap kumpulan memilih sektor (cth., pelancongan) atau wilayah (cth., pantai Malaysia/Indonesia)
3. Membangunkan cadangan atau peta jalan untuk penyelesaian ekonomi pekeliling (cth, program pembungkusan boleh guna semula untuk pusat peranginan pantai)
4. Kemukakan cadangan kepada kelas untuk maklum balas rakan sebaya
5. Refleksi mengenai cabaran kebolehlaksanaan dan pelaksanaan

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Bacaan lanjutan

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Chelliah, A.J., Chen, S.Y., Shahir, Y. & Dolorosa, R.G. (2024). Incidence of ghost nets in the Tioman Island Marine Park of Malaysia. The Palawan Scientist, 16(1): 28-37. https://doi.org/10.69721/TPS.J.2024.16.1.04

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TERIMA KASIH

JENNIE LEE

jennie@umt.edu.my

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