Dredging and the Marine Environment

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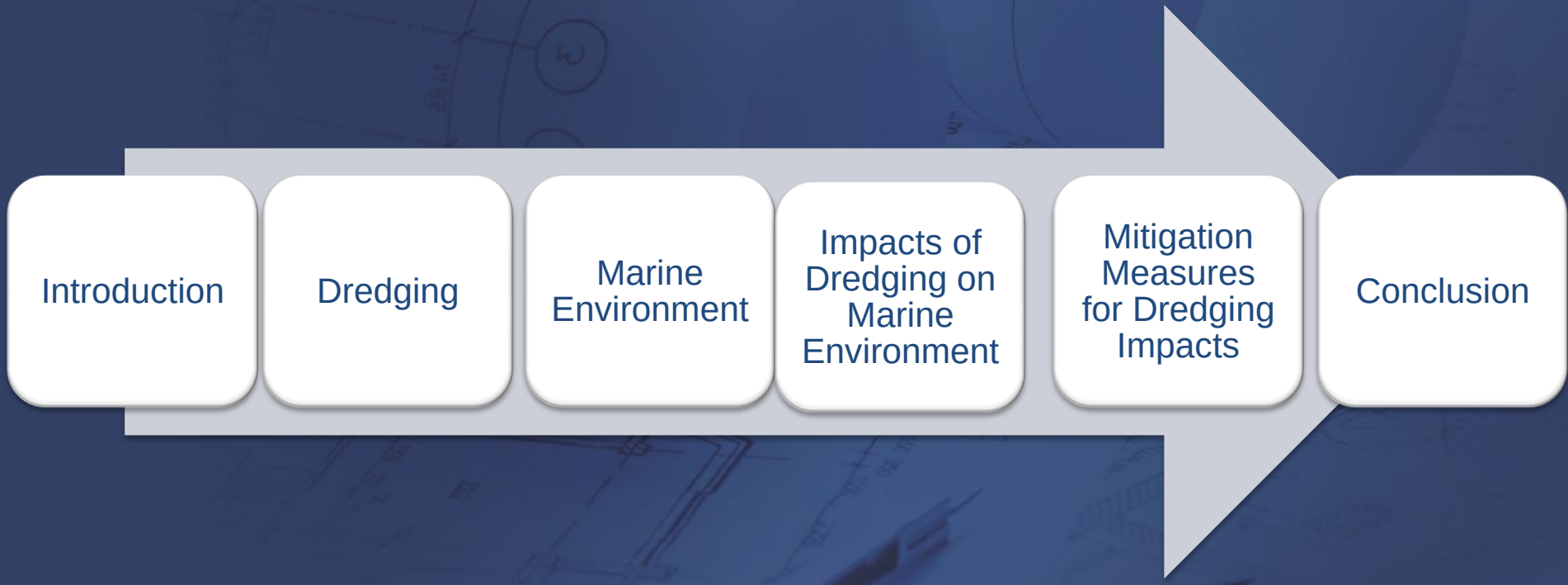
Outline



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Multi-disciplined
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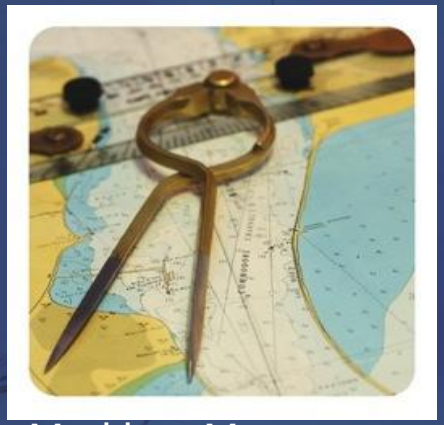
Focus on Africa:

Global Expertise;
Local Presence

Our Key Services

Environment

Engineering



Maritime Management & Operations

Water Resources

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Dredging

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Dredging is the underwater movement of soils and rock from the banks or sides of a water body.
BREYDEL

Dredging can be…

Capital Dredging

- Relocation of large quantities of material
- Compact soil
- Undisturbed soil layers
- Low contaminant content
- Non repetitive dredging activity

Maintenance Dredging

- Variable quantities of material
- Weak to well consolidated soil
- Contaminant Content possible
- Repetitive activity
- Occurs in navigation channels and harbours

Remedial Dredging

- Small previously dredged quantities
- High contaminant content
- Weak to well consolidated soils
- Non repetitive (if the problem is effectively controlled)

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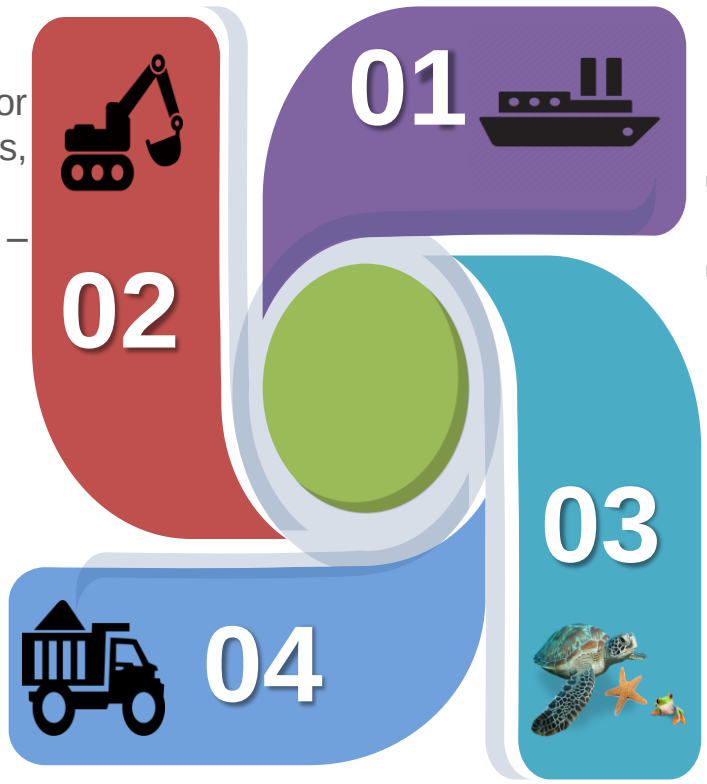
Main Purpose of Dredging

CONSTRUCTION AND RECLAMATION

- Sediment removal for construction projects – bridges, docks and piers.
- Provide construction materials – sand, gravel etc.



NAVIGATIONAL PURPOSES

- Creating new waterways (channels, harbours etc.);
- Restoring waterways to their original depth.

ENVIRONMENTAL REMEDIATION

- To remove pollutants and improve water quality.
- As a corrective measure

WILDLIFE PRESERVATION AND ECOSYSTEM MAINTENANCE

- By removing trash, sludge and dead vegetation, dredging helps protect the wildlife's ecosystems.
- Helps remediate eutrophication.

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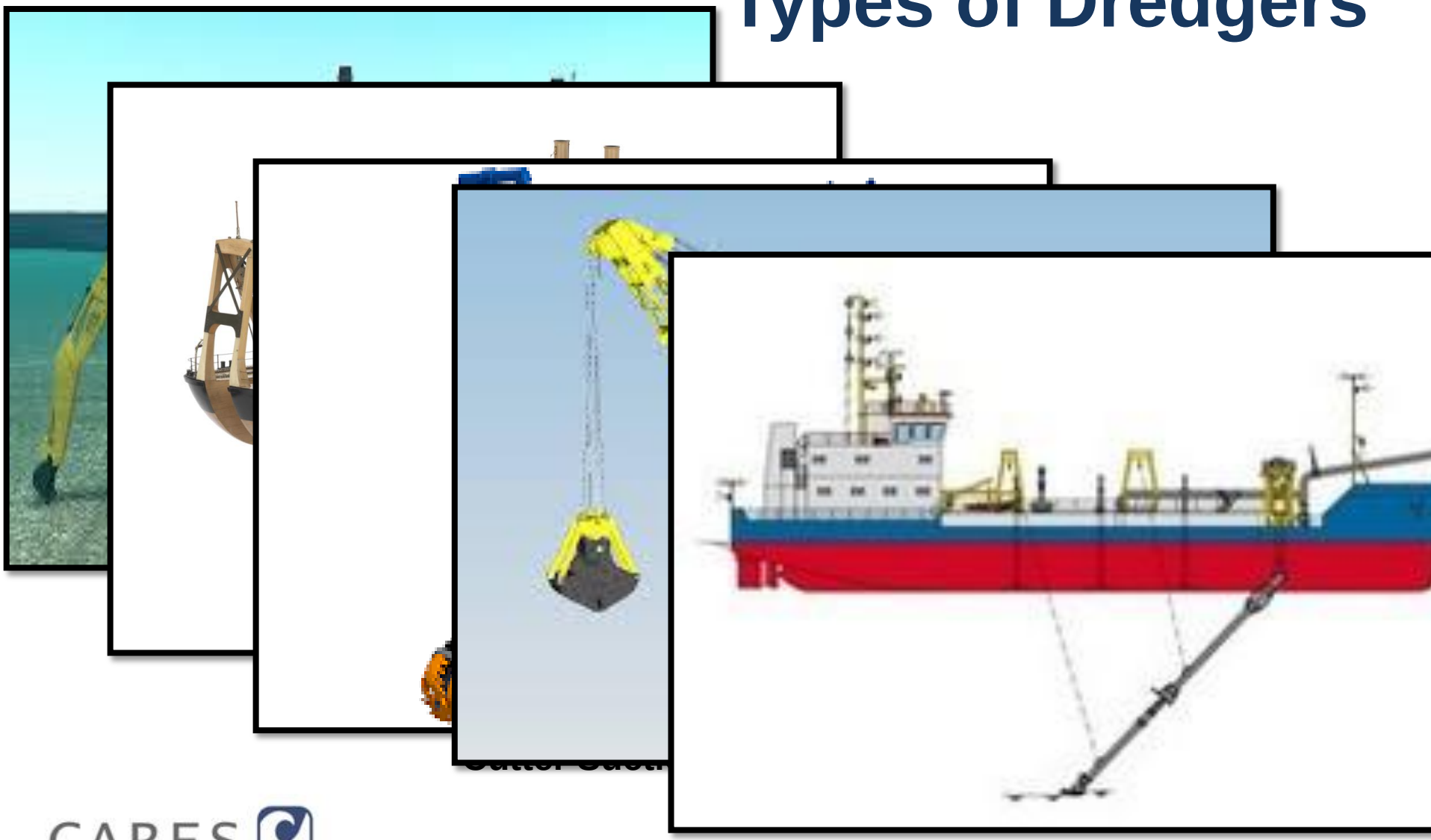
Types of Dredgers



Trailing Suction Hopper Dredger

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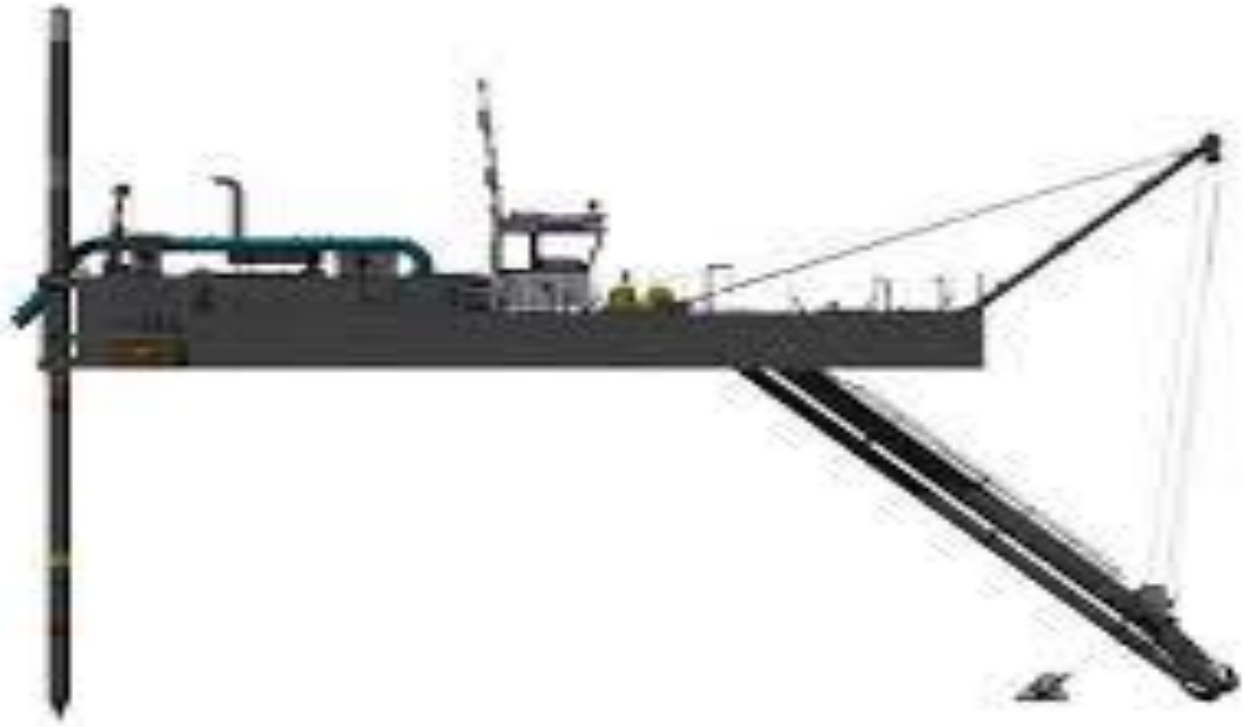
Factors to Consider during Dredging Process



Dredging Site
Open
Confined
Sediment

Dredge Material
Rock
Clay/Silt
Sand

Dredger
Type
Size
Dredging Depth
Productivity

Sediment Transport
Barge Transport
Pipeline
Combined
Rainbowing
Fall Pipe Vessels

Sediment Disposal
Open Sea Disposal
Confined Disposal
Beneficial Reuse

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Marine Environment

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Marine Environment

Marine is a word that describes waterbodies that are classed as salty

It constitutes deep oceans, coral reefs, coastal ecosystems (estuaries, lagoons, swamps, rocky and sandy shores) from mudflats to sea grass beds,

Marine Environment covers approximately 71% of the Earth's surface and provide us with food, oxygen and jobs.

The marine environment provide us with essential services such as: Carbon capture for climate mitigation; and Renewable energy and protection from storm surges.

Dredging and Marine Environment

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How does Dredging affect the Marine Environment (Negative)

Turbidity
Shading from released sediments can result in reduced light penetration
Light required for photosynthesis

Changes to the bathymetry and hydrographic flow
Changes to energy and water flow due to the altering of the pathway

Noise Impacts
Fish with low flight response

Contamination Spread
Dredging of contaminated materials will cause the harmful particles to regroup and spread to a larger area in the water body
Contamination of water and undredged soil by loosened soil

Disturbance of Habitats
Disturbance of benthic habitats and communities
Disturbance of spawning/nursery areas
Disturbance of sensitive receptors

Destruction/Loss of Habitat
Reclamation of wetlands
Disposal of excavated materials in biologically sensitive zones

Overall, impact on biodiversity of the water. Body due to increased human activity that will follow

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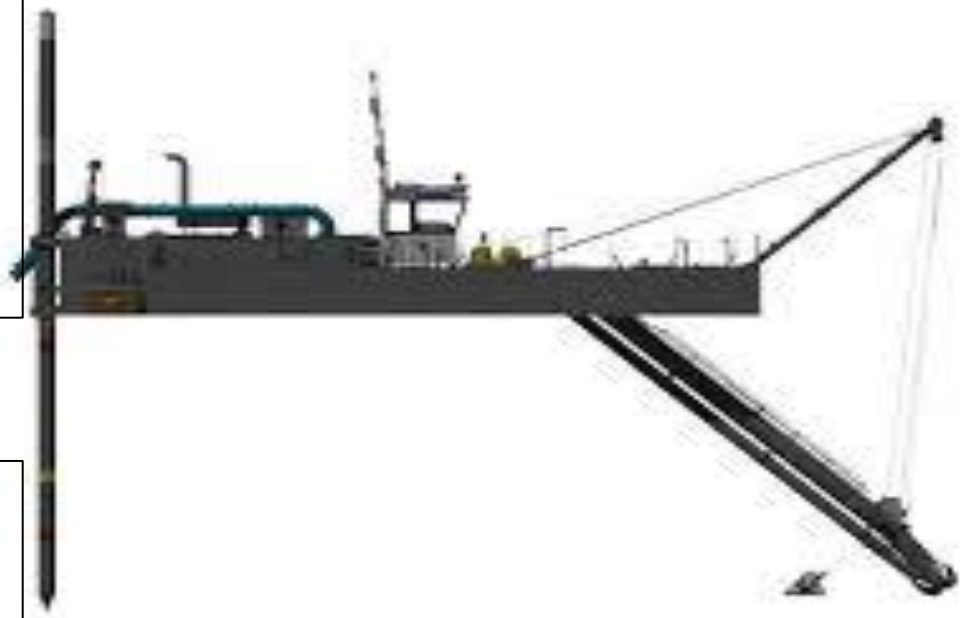
How does Dredging affect the Marine Environment (Positve)

Increased Turbidity
This could also increase protection against visual predators, which will find it harder to hunt.
Visibility may be improved by removing easily resuspended sediments or improving sediment conditions.



Removal of Toxic compounds
New habitats are established either directly un the dredged area as a result of improved bed conditions or by the introduction of new habitats on the slopes of a reclaimed area

Extension of the Marine Ecosystem
Increased salinity in areas close to the coast which originally have low salinity levels

Enhances diversity
Enhances diversity and abundance of benthic fauna near dredged channels thus, increasing food availability temporary to marine mammals.

Creation of New habitats
New habitats are established either directly un the dredged area as a result of improved bed conditions or by the introduction of new habitats on the slopes of a reclaimed area

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Some Possible Mitigation Measures of Dredging Impacts

Engineering Design

- Specially designed cutterheads to reduce spillage and creation of suspended sediments
- Dragheads that improve suction efficiency
- Specially designed grabs to limit losses during raising
- Green valves to reduce the turbidity

Operational Parameters

- Timing of dredging activities (during migration periods)
- Limit speed to reduce generation of suspended sediments and turbidity
- Reduce navigation speed of laden barges
- Careful navigation
- Tidal restriction for underwater placement
- Use of absorbent or impermeable liners

Applicable Environmental Management Plan

- Prior to dredging activity, an EMP should be produced to create a framework on identified impacts and applicable mitigation measures.

Environmental Monitoring

- Environmental surveys (assessments) should be conducted pre and post capital dredging activities to determine

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Conclusion

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Although it promotes regularity in marine traffic, **dredging possesses a huge threat to the marine environment** and is **required to be carried out quite carefully,** aided only with the help of the right dredgers and dredges.

Adverse impacts from **dredging can be limited by implementing applicable mitigation measures**, such as the use of environmental windows which ensure that dredging activities do not occur in important habitats.

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