

Coastal & River

MANAGEMENT UNIT (MU)	ISSUE/IMPORTANCE	OBJECTIVE	ACTION/STRATEGY	RESPONSIBLE AGENCIES
MU14	Eroding Cat 2	<ul style="list-style-type: none"> Periodically assess the elevation and stability of the bunds to ensure they are functioning as intended To maintain a safe level and making sure that the bunds are in good condition. Ensure the ongoing effectiveness and integrity of coastal bunds by regularly assessing their condition. Quickly address any issues with bunds to maintain their protective function and prevent flooding. Educate stakeholders and the public about the role of coastal bunds and their limitations to promote effective use and maintenance. Ensure that bunds are adequately elevated when mangrove cover is insufficient to provide effective natural flood protection. Implement additional protective measures on bunds when mangrove cover is critically low to ensure continued effectiveness 	<ul style="list-style-type: none"> Develop Comprehensive Setback Guidelines, i.e., Conduct scientific assessments & develop flexible setback guidelines Incorporate Adaptive Setback Practices, i.e., Design setback areas with buffers & Implement zoning regulations. <ul style="list-style-type: none"> Muddy Shoreline <ul style="list-style-type: none"> With existing bunds; <i>Coastal setback follows the alignment of the bund.</i> In already developed areas; <i>Setback is defined by the seaward edge of the development.</i> In undeveloped mangrove areas: <i>Setback is established at the landward boundary of the mangroves.</i> Sandy Shoreline <ul style="list-style-type: none"> Erosion occurs at a slower rate. In unprotected areas: <i>Setback can be reduced to 30 meters.</i> Where roads or critical 	JPS Melaka JPS Daerah
	<ul style="list-style-type: none"> Setback 			

			<p>infrastructure exist: <i>Setback may be positioned seaward of existing structures.</i></p> <ul style="list-style-type: none"> › In areas with revetments: <i>Setback should align with the revetment line.</i> › Setback lines in this study have been adjusted to allow for existing infrastructures and predicted movement of shorelines. • Integrate Natural Erosion Control Measures, i.e., Restore and protect natural habitats & Plant native vegetation • Enhance Shoreline Monitoring and Management, i.e., Conduct periodic shoreline surveys & Adjust setback requirements • Promote Sustainable Development Practices, i.e., Encourage low-impact development techniques & Limit construction activities • Educate and Engage Stakeholders, i.e., Conduct outreach and education programs & Involve stakeholders in planning and decision-making • Implement and Enforce Regulations, i.e., Enforce setback regulations & Review and update regulations regularly • Setback determination shall be guided by the recommendations provided in the Decision Support System (DSS). 	
	<ul style="list-style-type: none"> • Coastal Bund <ul style="list-style-type: none"> › Insufficient information on the bund levels, for reaches that have coastal bunds. 	<ul style="list-style-type: none"> • Periodically assess the elevation and stability of the bunds to ensure they are functioning as intended • To maintain a safe level and making sure 	<ul style="list-style-type: none"> • Frequent observation • Installation of coastal where areas are inundated 	

	<ul style="list-style-type: none"> › Mangrove cover fronting the bund is important in preventing bunds from overtopping and damage from wave action. › Mangrove cover of less than 50m means that the bunds is under threat of overtopping protection works on the bund must be carried out. 	<p>that the bunds are in good condition.</p> <ul style="list-style-type: none"> • Ensure the ongoing effectiveness and integrity of coastal bunds by regularly assessing their condition. • Quickly address any issues with bunds to maintain their protective function and prevent flooding. • Educate stakeholders and the public about the role of coastal bunds and their limitations to promote effective use and maintenance. • Ensure that bunds are adequately elevated when mangrove cover is insufficient to provide effective natural flood protection. • Implement additional protective measures on bunds when mangrove cover is critically low to ensure continued effectiveness • Prevent damage to bunds caused by heavy vehicle loads to ensure their long-term stability and effectiveness. 		
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Marine Habitats and Biodiversity

The proposed development management strategies for marine habitats and biodiversity at MU14 are as follow.

MANAGEMENT UNIT (MU) (LOCATION)	MANAGEMENT OBJECTIVES	MANAGEMENT STRATEGIES	ISSUE/IMPORTANCE/REASON	RESPECTIVE/ RESPONSIBLE AGENCIES
<ul style="list-style-type: none"> MU14 (Sempang to Merlimau) 	Mangroves <ul style="list-style-type: none"> To protect, conserve and rehabilitate the mangrove areas. To facilitate mangrove regeneration by implementation of appropriate tools and methods. 	<ul style="list-style-type: none"> Gazettement of mangrove areas as Permanent Forest Reserve at state land mangrove forests. 	<ul style="list-style-type: none"> Mangroves serves various ecological importance such as providing protection and habitat for a wide diversity of aquatic species of different taxonomic groups. 	<ul style="list-style-type: none"> Department of Forestry,
<ul style="list-style-type: none"> MU14 (part of HS Paya Laut Merlimau) 		<ul style="list-style-type: none"> Prohibit land use conversion within permanent forest reserve into other development projects. 	<ul style="list-style-type: none"> Protected mangrove areas (Permanent Forest Reserve) i.e., Hutan Paya Laut Merlimau. 	<ul style="list-style-type: none"> Department of Forestry,
<ul style="list-style-type: none"> MU14 (Serkam to Merlimau) 		<ul style="list-style-type: none"> Rehabilitation, restoration and replanting of suitable mangrove species. No land reclamation projects allowed fronting the mangrove areas off Serkam to Merlimau. 	<ul style="list-style-type: none"> Degradation of mangrove areas along the Melaka coastline due to coastal erosion and aquaculture developments 	<ul style="list-style-type: none"> Department of Forestry, Developers.
<ul style="list-style-type: none"> MU14 (Serkam to Merlimau) 	Mudflats <ul style="list-style-type: none"> To protect and conserve the mudflat areas. 	<ul style="list-style-type: none"> Protect mudflat areas due to its importance as mussel farming areas. 	<ul style="list-style-type: none"> Mudflat areas are important for mussel farming off Sempang. 	<ul style="list-style-type: none"> Department of Fisheries.
		<ul style="list-style-type: none"> Minimize coastal developments that affects mudflat areas. No land reclamation projects allowed at mudflats areas off Serkam to Merlimau. 	<ul style="list-style-type: none"> Degradation of mangrove areas along the Melaka coastline due to coastal erosion and aquaculture developments. 	<ul style="list-style-type: none"> Department of Fisheries, Department of Environment, Department of Town and Planning, Developers.
<ul style="list-style-type: none"> MU14 (part of HS Paya Laut Merlimau) 	Wildlife in Mangrove Forest <ul style="list-style-type: none"> To protect and conserve important wildlife habitats. 	<ul style="list-style-type: none"> Prohibit land use conversion at permanent forest reserves into other development projects. 	<ul style="list-style-type: none"> Mangroves serves various ecological importance such as providing protection and habitat for a wide diversity of terrestrial fauna species of different taxonomic groups. 	<ul style="list-style-type: none"> Department of Forestry.

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<ul style="list-style-type: none"> MU14 (Sempang) 	<ul style="list-style-type: none"> To ensure the safety of public beaches from wildlife attacks (e.g. crocodile). 	<ul style="list-style-type: none"> Promote awareness, education and safety programme about crocodile behaviour and habitats. Installation of warning signboard (e.g. crocodile habitats) at respective beaches/ river. 	<ul style="list-style-type: none"> The presence of crocodiles in coastal areas, especially recreational beaches pose a significant risk to tourism and public safety. 	<ul style="list-style-type: none"> PERHILITAN, Majlis Bandaraya Melaka Bersejarah (MBMB), NGOs.
<ul style="list-style-type: none"> MU14 (Sempang to Merlimau) 	<ul style="list-style-type: none"> To reduce impact on human-wildlife conflicts. 	<ul style="list-style-type: none"> Promote sustainable coastal development at mangroves area. Development of human-wildlife conflict management plan. 	<ul style="list-style-type: none"> Presence of wildlife (small mammals & avifauna) in mangroves. Presence of crocodiles in coastal areas especially at recreational beaches pose a significant risk to tourism and public safety. Development activities could affect mangrove habitats and thus can cause potential human-wildlife conflicts. Human-wildlife conflict can result in the decline and potential loss of species due to habitat degradation, while communities can suffer from financial losses (ecotourism) and threats to public safety, livelihoods and property. 	<ul style="list-style-type: none"> PERHILITAN, Majlis Bandaraya Melaka Bersejarah (MBMB), Department of Town and Planning, Developers. NGOs.

Fisheries and Aquaculture

The proposed development management strategies for marine capture fisheries and recreational fisheries at MU14 are as follow.

MANAGEMENT UNIT (MU) (LOCATION)	MANAGEMENT OBJECTIVES	MANAGEMENT STRATEGIES	ISSUE/IMPORTANCE/REASON	RESPECTIVE/ RESPONSIBLE AGENCIES
<ul style="list-style-type: none"> MU14 (Serkam Pantai and Sempang) 	Marine Capture Fisheries <ul style="list-style-type: none"> To ensure high standards of fish quality, enhanced food safety and nutritional value through provision of better fisheries infrastructures and facilities. 	<ul style="list-style-type: none"> Upgrade the fisheries infrastructures at Serkam Pantai and Sempang fish landing points. 	<ul style="list-style-type: none"> Lack of fisheries infrastructures at Serkam Pantai and Sempang fish landing points. 	<ul style="list-style-type: none"> Department of Fisheries. LKIM. Melaka State Government.
	<ul style="list-style-type: none"> To improve the navigation of fishing vessels at Serkam Pantai. 	<ul style="list-style-type: none"> Undertake maintenance dredging at Sg. Serkam. 	<ul style="list-style-type: none"> Siltation issues prevented safe passage for fishing vessel during low tides. 	<ul style="list-style-type: none"> Department of Drainage and Irrigation.
	<ul style="list-style-type: none"> To ensure food security and safety. 	<ul style="list-style-type: none"> Rehabilitation, restoration and replanting of suitable mangrove species Deployment of artificial reefs and Fish Aggregating Devices (FADs). Promote sustainable coastal development through enhancement of fisheries habitat (eco-engineering structures). No coastal reclamation projects allowed from Sg. Serkam to Sg. Merlimau. 	<ul style="list-style-type: none"> Coastal development such as reclamation can cause adverse impacts on fisheries resources and fishermen income. 	<ul style="list-style-type: none"> Department of Forestry, Department of Fisheries, Developers.
<ul style="list-style-type: none"> MU14 (Tedong and Sempang) 	Aquaculture <ul style="list-style-type: none"> To minimize the potential of water quality degradation to aquaculture activities. To promote sustainable aquaculture practices. 	<ul style="list-style-type: none"> Provision of water treatment facilities, sewage treatment plants (STPs) or other appropriate structures at the aquaculture farms to reduce discharge of untreated water directly into the river. Regular maintenance of treatment ponds. 	<ul style="list-style-type: none"> Degradation of water quality due to the untreated wastewater discharge from brackishwater pond culture. 	<ul style="list-style-type: none"> Department of Fisheries, Department of Environment.

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		<ul style="list-style-type: none"> Encourage culturists to obtain MyGAP certification. 		
<ul style="list-style-type: none"> MU14 (off Sempang) 	<ul style="list-style-type: none"> To ensure food security and safety 	<ul style="list-style-type: none"> Promote sustainable coastal development. 	<ul style="list-style-type: none"> Harmful Algae Blooms (HAB) can affect mussel farming activities undertaken off Sempang. 	<ul style="list-style-type: none"> Department of Fisheries, Department of Environment, Melaka State Government.
<ul style="list-style-type: none"> MU14 (Tedong) 	<ul style="list-style-type: none"> To promote sustainable aquaculture practices. 	<ul style="list-style-type: none"> Promote programmes related to the restoration and replanting of suitable mangrove species. Prohibit new development plans within mangrove areas. Restoration of abandoned farms as an alternative to minimize the development of new aquaculture farms. Reforestation of abandoned shrimp farms. 	<ul style="list-style-type: none"> Aquaculture activities or coastal modification contributes to mangrove degradation and erosion. 	<ul style="list-style-type: none"> Department of Fisheries, Melaka State Government, Aquaculture Operators.
<ul style="list-style-type: none"> MU14 (Serkam Pantai) 	Recreational Fisheries <ul style="list-style-type: none"> To improve recreational fisheries infrastructures and facilities. 	<ul style="list-style-type: none"> Upgrade the recreational fisheries infrastructures. Upgrade/Provision of septic tanks/toilets. 	<ul style="list-style-type: none"> Limited recreational fisheries infrastructures and facilities. 	<ul style="list-style-type: none"> Melaka State Government MOTAC Melaka Majlis Bandaraya Melaka Bersejarah (MBMB).
<ul style="list-style-type: none"> MU14 (Serkam Pantai and Sempang) 	<ul style="list-style-type: none"> To promote good fishing practices in recreational fishing activities. 	<ul style="list-style-type: none"> Provision of sufficient garbage bins and portable toilets at the recreational beaches. Promote public awareness by organizing environmental talks on coastal cleanliness and protection of coastal habitats. 	<ul style="list-style-type: none"> Lack of solid waste disposal infrastructures and portable toilets. 	<ul style="list-style-type: none"> Department of Fisheries, Melaka State Government NGOs

Water Quality

MANAGEMENT UNIT (MU) (LOCATION)	MANAGEMENT OBJECTIVES	MANAGEMENT STRATEGIES	ISSUE/IMPORTANCE/REASON	RESPECTIVE RESPONSIBLE AGENCIES
MU14	<p>Fertilizers and Pesticides</p> <ul style="list-style-type: none"> Control the usage of synthetic fertilizers and chemical pesticides. <p>Waste Control</p> <ul style="list-style-type: none"> Solid waste and Scheduled Waste Control <p>Erosion and Sediment Control</p> <ul style="list-style-type: none"> Control the sedimentation <p>Sewage Discharge</p> <ul style="list-style-type: none"> Control of sewage discharge 	<ul style="list-style-type: none"> Promote the use of environmentally friendly and biodegradable fertilizers and pesticides. Enhance the implementation of biological control for pest control. New activities that fall under the Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 2015 must submit the EIA report to the Department of Environment for approval. New activities that do not fall under the Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 2015 shall submit their development proposal to the Local Authority and conditions on discharge should be imposed on the operators. Provision of Erosion and Sediment Control (ESCP) for land clearing activities Submission of the ESCP plan to the Department of Irrigation and Drainage (DID) for approval prior to start of land clearing and earthwork activities Provision of septic tanks in remote areas Upgrading of existing sanitary facilities Compliance to Malaysian Marine Water Quality Standard Compliance to Standard Kebangsaan Kualiti Air Rekreasi Semulajadi dan Garispanduan bagi Pemantauan Air Rekreasi Semulajadi Compliance with Environmental Quality (Sewage) Regulations 2009 Environmental Quality (Scheduled Waste) Regulations 2005 	<ul style="list-style-type: none"> Agriculture is the largest land use in MU14, covering 179.297 hectares, with paddy as the main crop. Key settlements include Kg Serkam Pantai, Kg Serkam Darat, Kg Tedong Pantai, and Kg Tanjung Pinang. 	<ul style="list-style-type: none"> Department of Environment Local Council and Authorities Indah Water Konsortium (IWK) National Water Services Commission (Suruhanjaya Perkhidmatan Air Negara, SPAN)

Land Use

MANAGEMENT UNIT (MU) (LOCATION)	MANAGEMENT OBJECTIVES	MANAGEMENT STRATEGIES	ISSUE/IMPORTANCE/REASON	RESPECTIVE/ RESPONSIBLE AGENCIES
Human Settlement				
MU14	<ul style="list-style-type: none"> To manage and control any land use changes along the coast 	<ul style="list-style-type: none"> Define coastal zoning categories (including residential, commercial, conservation, and mixed-use areas). Establish zoning regulations Control the allowable density type for any development along the coast. Limit land conversion and approval for TOL permit 	<ul style="list-style-type: none"> Increase of population along the coastline may impact the existing infrastructure (including road, utilities, and traffic) 	<ul style="list-style-type: none"> MPJ PTD Jasin PTG Melaka JKR JPS IWK SAMB TNB
	<ul style="list-style-type: none"> To prevent and control erosion. To ensure compliance with environmental regulations regarding hydraulic impact assessments and erosion control. 	<ul style="list-style-type: none"> Construct proper erosion control structures such as retaining walls and sediment control barriers. Conduct regular hydrological studies to identify high-risk erosion zones. Enforce guidelines for land development near water bodies to minimize erosion risks. 	<ul style="list-style-type: none"> Impact from the hydraulic can cause erosion to the settlement 	<ul style="list-style-type: none"> JPS
	<ul style="list-style-type: none"> To reduce environmental impact caused by the construction activities on the site 	<ul style="list-style-type: none"> Prepare an Environmental Impact Assessment (EIA) for any major projects along the coast (based on the DOE requirements). Manage thorough evaluations of EIA before approving construction projects. Adhere to the Environmental Managing Plan (EMP) recommendations as part of the mitigation major. Conduct periodical inspection during and after construction. 	<ul style="list-style-type: none"> Any changes to land use due to construction may affect the environment. 	<ul style="list-style-type: none"> MPJ DOE
	<ul style="list-style-type: none"> To monitor coastal development 	<ul style="list-style-type: none"> Conduct periodical inspection. 	<ul style="list-style-type: none"> Coastal development within Melaka 	<ul style="list-style-type: none"> MPJ

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		<ul style="list-style-type: none"> Regulate the law related to any developments along the coast. Implement sustainable zoning regulations to prevent excessive land reclamation. 	coastline possesses adverse impacts towards adjacent mudflat areas.	<ul style="list-style-type: none"> PTD Jasin PTG Melaka
Forest and Mangroves				
MU14	<ul style="list-style-type: none"> To protect the coastal of the state. To protect, conserve and rehabilitate the mangrove areas. 	<ul style="list-style-type: none"> Gazettement of mangroves areas as Permanent Forest Reserve at state land mangrove forests. 	<ul style="list-style-type: none"> Mangrove serves various ecological importance such as providing protection and habitat for a wide diversity of aquatic species of different taxonomic groups. 	<ul style="list-style-type: none"> FDPM
		<ul style="list-style-type: none"> Prohibit land use conversion within mangrove areas into other development projects 	<ul style="list-style-type: none"> Extensive protected mangroves area, including the area between Umbai to Sungai Rambai 	<ul style="list-style-type: none"> FDPM
		<ul style="list-style-type: none"> Prohibition of new development plans to facilitate the regeneration of mangrove within respective areas. 	<ul style="list-style-type: none"> Regeneration and re-establishment of mangroves. 	<ul style="list-style-type: none"> FDPM
		<ul style="list-style-type: none"> Rehabilitation, restoration and replanting of suitable mangrove species at the affected areas. Facilitate mangrove regeneration by implementation of appropriate tools and methods. 	<ul style="list-style-type: none"> Degradation of mangroves area at some part within Melaka coastline due to the coastal erosion. 	<ul style="list-style-type: none"> FDPM
		<ul style="list-style-type: none"> Promote programs related to the restoration and replanting of suitable mangrove species. Provision of buffer zone between mangrove and development areas. Restoration of abandoned farms as an alternative to minimize the development of new aquaculture farms. 	<ul style="list-style-type: none"> Potential mangrove forest degradation due to coastal and aquaculture developments. 	<ul style="list-style-type: none"> FDPM
	<ul style="list-style-type: none"> To regulate human activities in order to minimize environmental impact 	<ul style="list-style-type: none"> Establish guidelines for tourism, aquaculture, and infrastructure development. 	<ul style="list-style-type: none"> Existence of the human activities within the mangrove forest, and 	<ul style="list-style-type: none"> FDPM MPJ

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		<ul style="list-style-type: none"> Enforce regulations to control pollution, illegal logging, and encroachment. 	requires proper management	
Paddy-Field				
MU14	<ul style="list-style-type: none"> To provide incentives for sustainable and high-yield rice farming. 	<ul style="list-style-type: none"> Provide training programs on modern farming techniques and sustainable practices. Ensure access to financial aid, subsidies, and agricultural insurance for small-scale farmers. 	<ul style="list-style-type: none"> Paddy field is highly importance due being one of the key food security areas for the country High involvement of the local people within these economic activities particularly in Jasin District 	<ul style="list-style-type: none"> Jabatan Pertanian Negeri Pejabat Pertanian Daerah
	<ul style="list-style-type: none"> To encourage the use of multi functions infrastructures in order to manage the non-renewable water for agriculture. To protect from non-point source of pollution as to manage non-revenue water. 	<ul style="list-style-type: none"> Establish efficient drainage systems to flush out excess salt from the soil. Introduce and cultivate salt-tolerant rice strains that can withstand higher salinity levels. 	<ul style="list-style-type: none"> Paddy field which facing the sea needs extra measures in order to prevent excessive salt water access the crops 	<ul style="list-style-type: none"> Jabatan Pertanian Negeri Pejabat Pertanian Daerah
Aquaculture				
MU14	<ul style="list-style-type: none"> To implement water management and pollution control. 	<ul style="list-style-type: none"> Encourage and promote the application myGAPs as a basis of the framework by the operators. Promote water-saving techniques, such as rainwater harvesting and efficient irrigation methods. Develop proper waste collection, treatment, and disposal systems to prevent contamination. Encourage integrated aquaculture systems, such as combining fish farming with hydroponics (aquaponics), to naturally recycle nutrients. 	<ul style="list-style-type: none"> Issues of water usage and waste disposal from the aquaculture farming which may affect the environment. 	<ul style="list-style-type: none"> Jabatan Perikanan Pejabat Perikanan Negeri Melaka