OIL DISPERSANT USE POLICY FOR KENYA

This policy shall be followed as closely as possible, although it has not provided for every possible contingency that might occur. Deviations from this policy are only authorized when necessary in the best interest of safety or protection of resources.

All comments and requests for revision shall be directed to the Director General, Kenya Maritime Authority.

December 2008

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001	Kenya Ports Authority	2
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017	OSMAG - Chairman	1
018	OSMAG- Secretary	1
019	Coast Development Authority	1
020	Mombasa Coast Tourist Association	1
021	Kenya Wildlife Services	1
022	Kenya Railways Corporation	1
023	National Environment Management Authority (NEMA)	1
024	Alba Petroleum	1
025	Triton	1

026	Gulf Stream	1
027	Techaflex	1
028	Fisheries	3
029	KMFRI	1
030	Mombasa Municipal Council	1
031	Lamu local council	1
032	Kilifi local council	1
033	Kwale local council	1
034	Malindi local council	1
035	Coast PC	1
036	DC-Mombasa, Kilifi, Malindi, Tana Delta, Tana River, Lamu, Kwale, Kilindini	1 each
037	Ministry of Tourism	3
038	Meteorological dept. Mombasa	1
039	Intoil Ltd	1
040	Hashi Empex Ltd	1

AMENDMENTS PAGE

NO	AMENDMENT DATE	DESCRIPTION (PAGE & DETAILS)	MADE BY (NAME/ DESIGNATION)

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LIST OF FIGURES

ACRONYMS

KMA	Kenya Maritime Authority
NOSC	National On-Scene Commander
KNMOSRCP	Kenya National Marine Oil Spill Response Contingency Plan
OSMAG	Oil Spill Mutual Aid Group
OSRAT	Oil Spill Response Action Team
KN	Kenya Navy
CDA	Coast Development Authority
KPRL	Kenya Petroleum Refineries Limited
KMFRI	Kenya Marine and Fisheries Research Institute
FiD	Fisheries Department
NEMA	National Environment Management Authority
KPA	Kenya Ports Authority
API	American Petroleum Institute
SCA	Special Consideration Areas
EEZ	Exclusive Economic Zone
EDAs	Environment and Dispersant Advisors
MSDS	Material Safety Data Sheet
DiC	Dispersant Coordinator
EA	Environment Advisor
WA	Wildlife Advisor

DEFINITIONS OF TERMS

'***Sensitive areas***' refers to geographically defined areas, of national, regional and/or global socio-economic or bio-diversity significance which are threatened with degradation, either because of sensitivity of the receptor or the nature of socio-economic activities taking place in the site.

'***Dispersant***' refers to a chemical formulation containing non-ionic surface active agents that lower the surface tension between oil and water and enable oil film to break up more easily and disperse within the water with natural or mechanical agitation

'***Oil slick***' refers to thick film of crude or refined petroleum oil floating on the surface of ocean or sea. This happens when a freight ship carrying several tons of fuel is involved in an accident. Since oil and water don't mix, the oil spreads out into a layer that hovers, as one mass, on top of the ocean.

'Clean up' refers to actions taken to confirm the presence of an oil spill, stop its flow from the source, contain it, collect it, protect areas from damage by it, mitigate its effects on the environment, and clean up wildlife and areas contaminated by it.

'Contingency plan' refers to a plan for action prepared in anticipation of an oil spill. It consists of guidelines and operating instructions intended to increase the efficiency and effectiveness of clean up operations and to protect sensitive areas.

'Site oil spill contingency plan' refers to a plan prepared for land based site or offshore installation which specifies the measures to be taken in respect of oil spill.

'Territorial sea' is a belt of coastal waters extending at most twelve nautical miles (12nm) from the the mean low-water mark as given by the Law of the Sea Convention and the Maritime Zones Act, Cap 371.. The territorial sea is regarded as a sovereign territory, although foreign ships (both military and civilian) are allowed innocent passage through it; this sovereignty also extends to the airspace over it and the seabed below it.

'Internal waters' defined by the Law of the Sea Convention and the Maritime Zones Act, Cap 371 refers to all water and waterways on the landward side of the baseline from which territorial waters is defined.

'Exclusive Economic Zone (EEZ)' refers to the sea zone within which, a country has the sovereign right to explore and exploit, conserve and manage living and non-living resources in the water column and on the seafloor, as defined by the Law of the Sea Convention and the Maritime Zones Act, Cap 371.. Generally a state's EEZ extends to a distance of 200 nautical miles out from its coast.

INTRODUCTION

The idea of applying the well known principle of removing a greasy substance by mixing it with a dispersing agent (soap, detergent) and washing it with water was first proposed for dealing with oil on beaches in U.K. in the early sixties. Mixtures of detergents and hydrocarbon solvents (already used by the industry as industrial cleaners or degreasing agents for engines or tank cleaning) proved efficient in emulsifying stranded or floating oil. Even though these products were known to be highly toxic, their continued use relied on high dilution capacity of the sea which was expected to reduce their concentration into sublithal levels to marine life.

The first extensive use of these early dispersants was in response to the "Torrey Canyon" oil spill off the English coast in March 1967. Unfortunately, it demonstrated that the dispersant toxicity was much too high and that devastating impact on marine life outweighed their efficiency as pollution clean-up agents. Very soon after the "Torrey Canyon" accident, new formulations appeared on the market. They were made of less toxic surfactants and toxic aromatic solvents were replaced by much less toxic (1000 times) low-aromatic or non-aromatic hydrocarbons (e.g. low aromatic kerosene or high boiling solvents containing branched saturated hydrocarbons). Although their efficiency was lower than that of the first 'detergents', very low toxicity rendered their use, even on a large scale, environmentally acceptable. These new products became known as 'second generation' dispersants and are still in use to date.

Dispersants of 'the third generation' often referred to as "concentrates" appeared by the mid seventies. These mixtures of emulsifiers, wetting agents and oxygenated solvents have a much lower toxicity than "the second generation" dispersants and can be used either pre-diluted with sea-water or neat. Third generation formulations are much less toxic such that the toxicity associated with dispersed oil droplets is essentially a function of the toxicity of the oil itself. Introduction of "concentrates" with higher concentrations of active components and less solvents, made possible the use of aircraft in spill response operations. Most of the products in the market today belong to this category.

Nomenclature of dispersants

The nomenclature of dispersants is based on three dispersant classification systems,

- Type I - Conventional hydrocarbon based - used neat at sea or on foreshores-(2nd generation)

- Type II - Water diluted concentrate - diluted prior to use (up to 1:10) with water.(3rd generation)
- Type III - Concentrate - used neat from aircraft and vessels or on foreshores.(3rd generation)

Environmental considerations

As a general guideline, dispersants should not be used in the areas with poor water circulation, near fish spawning areas, coral reefs, shellfish beds, wetland areas, and industrial water intakes. When such a general policy has been adopted in advance, a final decision on the use of dispersants in a spill situation will have to be taken only on the basis of given circumstances (type of oil, conditions, availability of material and personnel, etc.).

Scientific studies over the past several years have shown that the new generations of dispersants, in themselves, exhibit low toxicity even at application concentrations ten times those prescribed. Studies have also shown that the concentration of dispersed oil in the water column drops off significantly at depths below three meters and, given reasonable flushing, dispersed oil does not remain in the area of application for any significant length of time as it is distributed and diluted by the currents. More or less, aggressive use of dispersants may be warranted.

New Considerations Due to Research Advances

Recent research on dispersant effects and advances in dispersant technology have changed the overall picture on dispersants enough that officials may need to reconsider the conventional guidelines followed in the dispersant decision-making process. It is now suggested that perhaps the window of opportunity for dispersant use is not as small as once believed. Decisions based on oil type may also need to be reconsidered. Prohibitions against nearshore use have been based on concerns over inadequate dilution in shallow water. But modern dispersants require less mixing energy. Currently, researchers are addressing concerns over nearshore dilution and exposure effects on the fauna. Similarly use of dispersants in mangroves may also need to be re-evaluated. The lesson here is that once an oil spill occurs any decision that officials make, whether it is to apply dispersants, to mount a full-force mechanical containment and recovery effort, or to do nothing is dynamic.

SECTION I: PURPOSE, SCOPE AND AUTHORITY

PURPOSE

This policy addresses the authorization and approval of the use of chemical dispersants for the purpose of responding to oil spills in the coastal waters of Kenya, as a means of reducing the overall impact of such spills on coastal habitats and marine fauna and flora.

SCOPE

This policy covers the marine waters off the coasts of Kenya, extending seaward of the high water line to the outermost extent of the Exclusive Economic Zone (EEZ).

AUTHORITY

KMA as the Lead Agency will be responsible for approval of dispersant use in the marine waters off the coasts of Kenya. This is pursuant to the mandate of Kenya Maritime Authority, a body corporate established under the Kenya Maritime Authority Act No. 5/2006.

POLICY REVIEW

This policy, and in particular the Special Consideration Areas in Appendix III will be reviewed by an *ad hoc* task team to be set up under the auspices of the Kenya Maritime Authority as and when necessary.

SECTION II: DISPERSANT AUTHORIZATION POLICY

The waters addressed in this policy, as defined above, will be delineated into three zones.

Conditional Approval Zone – Zone 1

Waters within which any of the following conditions apply will require approval under the methods and restrictions set forth in this policy:

(a) Has a mean low water depth of less than 10meters;

(b) Any waters designated as marine reserves and parks, national marine sanctuaries, proposed or designated critical habitats;

(c) The waters are in mangrove or submerged algal beds and submerged seagrass beds or directly over living coral communities, which are in less than 10 meters of water.

Pre-Authorized Zone – Zone 2

The use of chemical dispersants in response to an oil spill in the coastal waters of Kenya which have a mean low water depth of greater than 10 meters is pre-authorized under the supervision of the Dispersants Coordinator (see organogram in Appendix IX) with restrictions as per zone 1 above.

Special Consideration Areas – Zone 3

Special Consideration Areas (SCA's) may be described and proposed in writing by a concerned party.

Special Consideration Areas will consist of restrictions imposed on the use of chemical dispersants for a specific geographic area to be described in this policy. These restrictions may range from outright prohibition to a requirement for consultation prior to deployment of the chemicals. They may be spatial, seasonal or species-specific in nature. Each Special Consideration Area submitted by a party shall describe the specific restrictions to be applied on the use of chemical dispersants, including, as applicable, primary and alternate point-of-contact telephone numbers.

Changes to any aspect of the Special Consideration Areas will be submitted, in writing, to the Director General, KMA. Upon receipt, the Director General shall constitute a task team for policy review. Copies of these changes shall be forwarded, as soon as practical, to the circulation list.

SECTION III: PROTOCOLS FOR USE OF DISPERSANT

The following requirements apply to the application of any dispersants under any provision of this policy:

1. Only those products that have undergone laboratory testing as described in Appendix IV and therefore listed in the KNMOSRCP Product Schedule as dispersants will be considered for use during dispersant application operations.
2. A product being newly introduced has to undergo a toxicity assessment in accordance with Appendix IV
3. Dispersants will only be used when they are expected to prevent or minimize substantial threat to the public health or welfare, or to mitigate or prevent environmental damage.
4. The National On-Scene Commander (NOSC) has the responsibility to authorise the use of chemical dispersants in an oil spill incident. This decision will be based upon the advice of the Environmental and Dispersants Advisors (EDAs).

   The advice will always consider:

   - oil type (persistent or evaporative),
   - location of the slick,
   - spread of the oil,
   - movement of the slick,
   - proximity of the oil to sensitive environments,
   - wildlife priorities,
   - safety concerns,
   - water depth,
   - water exchange in the area,
   - whether the oil is amenable to dispersant application, etc.
5. If the NOSC believes dispersants should be applied within Zone 1, a request for authorization must be made to the Environment and Dispersant Advisors (EDAs). The information contained on the documentation/application form in appendix VII must be provided to the EDAs members. The NOSC is only granted authority to conduct dispersant operations in the Zone 1 when concurrence has been given by the EDAs. Response to the NOSC's request for authorization should be received within 30 minutes. If a decision cannot be reached within 30 minutes, the NOSC should make a final decision. Application of dispersants within the Zone 1, if approval is granted, will be conducted in accordance with the appropriate and relevant Protocols outlined in this section. Additionally, the NOSC will make every reasonable effort to continuously evaluate the application of dispersants within the zone, and will liaise with EDAs.

6. If a decision has been made to use dispersants under the provisions of this policy, the NOSC will immediately notify the KMA. Notification will include a copy of the Material Safety Data Sheet (MSDS) of the dispersant product chosen if the MSDS is not already included in annex VII. Additionally, notification will include, at a minimum:
   - Date, Time and Location of the incident
   - Type and amount of oil discharged;
   - Area affected;
   - The projected area of impact of the oil if not dispersed;
   - Reasons why mechanical or physical removal of the oil is not feasible, or will not on its own provide the optimal response method.
   - Dispersant to be used.
   - On-scene weather, wind, and forecasted weather
7. When a dispersant is being applied, it is required that the method and rate of application is in accordance with the manufacturer's specifications
8. Field testing of dispersants on the spilt oil may be required by the Dispersant Coordinator (DiC) or the Environment Advisor (EA) before the decision to proceed with dispersant spraying operations is made.
9. The NOSC must comply with Occupational Health and Safety Act 2007, and other legislative requirements.
10. Barring any unforeseen circumstances (such as time constraints, safety considerations, or logistical concerns) the NOSC will make every reasonable effort to provide designated representatives from the KWS, FiD, NEMA, KMFRI, NMK, CDA with an opportunity to observe dispersant application operations. An inability to provide this opportunity will not, however, be cause for immediate cessation of dispersant application operations.
11. Monitoring will be conducted as feasible in order to help evaluate the decision to continue dispersant application and to document results.

12. Prior to commencing application operations, an on-site survey will be conducted by WA, to determine if any threatened or endangered species are present in the projected application area or otherwise at risk from dispersant operations. Measures will be taken to prevent risk of any injury to wildlife, especially endangered or threatened species. Additional and ongoing survey flights in the area of application will be conducted as appropriate.
13. Any use of dispersants requires that a post-incident report be provided by the NOSC for distribution to the KMA, within 45 days of dispersant application operations.

14. Information on the Documentation/Application Form in appendix VIII shall be completed for all dispersant applications and provided to KMA in a timely manner for documentation and information purposes.
15. The dispersant use decision elements contained in appendix VIII shall be reviewed by the NOSC and used to help guide the decision to use or request the use of dispersants.
16. In order to establish an updated list of dispersants stockpiled in Kenya, each Company/Agency holding dispersant stocks shall be required to submit to the Kenya Maritime Authority the quantity, size of storage containers, brand name, type, handling and disposal, location of storage, and shelf life. Updated information will be submitted for insertion in Appendix VI of this document and duly dated.

SECTION IV: MONITORING AND EVALUATION

Determination of Effectiveness

(a) National On-Scene Commander will determine the effectiveness of the dispersant during the time of application. This effectiveness test will be conducted visually and qualitatively by the use of qualified and trained oil spill observers. If it is determined by the NOSC, based on the report of the observers mentioned above, that the chemical dispersant is having minimal effect, application of that chemical dispersant will cease.

(b) If an authorized chemical dispersant application has been halted and conditions change which contribute positively to the effectiveness of re-application (for example, if a new release event occurs or weather conditions change), the NOSC, following consultation with his or her scientific support team, may attempt a new application of the chemical dispersant. This new application will be subject to the same effectiveness monitoring as described above.

Post incident evaluation

If chemical dispersants are used as described in this policy or for the protection of human life, the NOSC will hold a post incident debriefing within 14 days after dispersant application to gather information concerning the effectiveness of the chemical agent used and to determine whether any changes to policy is necessary. This debriefing should include, but is not limited to the Incident Command Team. The results of the debrief will be included in the NOSC report.

Dispersant Monitoring Protocol

As soon as practical, a post-application environmental monitoring plan will be developed by EA and will be implemented routinely following the use of dispersants. KMA shall make every attempt to implement this plan as soon as practical.

SECTION V: GENDER, EDUCATION AND AWARENESS

This policy recognises education as key to improving the decision-making process on dispersant use.

In order to improve scientific and technical skills of all the stakeholders KMA shall organise educational workshops. The workshops may address the following broad areas including dispersant application, logistics, marine ecology, research and development on dispersants.

It is recognised that all persons potentially affected by use of dispersants in Kenya have the right to information on dispersants and the dispersant policy. Therefore all activities on education and awareness shall be designed to target all sections of the society including women, and children.

SECTION VI: APPENDICES

APPENDIX I Emergency Response Contacts

Director General

Kenya Maritime Authority

Telephone contacts: 041-2318398/9

020-2381203/4

0724-319344

0733-221322

Maritime Safety Department

Kenya Maritime Authority

Telephone contacts: 0722-269431

0733-728796

Pollution Control Office

Kenya Maritime Authority

Telephone contacts: 041-2112235/2131108

0721-364081

Regional Maritime Rescue Coordination Center

Telephone Contacts: 041-2131108/2112930

0721-368313

0737-719414

APPENDIX II: Zone maps

ZONE 1 – AREAS

Figure 1: The port area of Mombasa

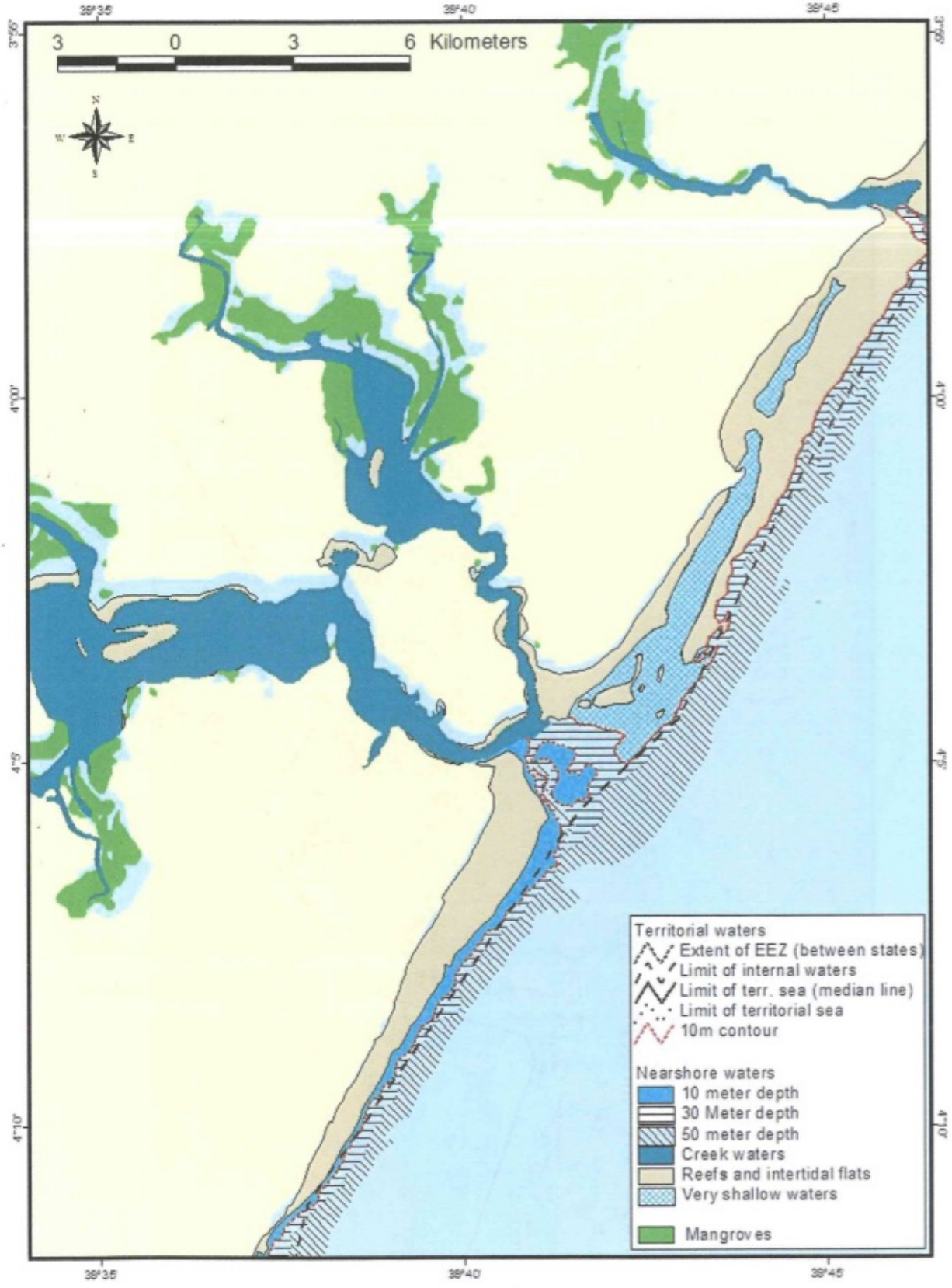

Figure 2: Internal waters and the creek around Mombasa

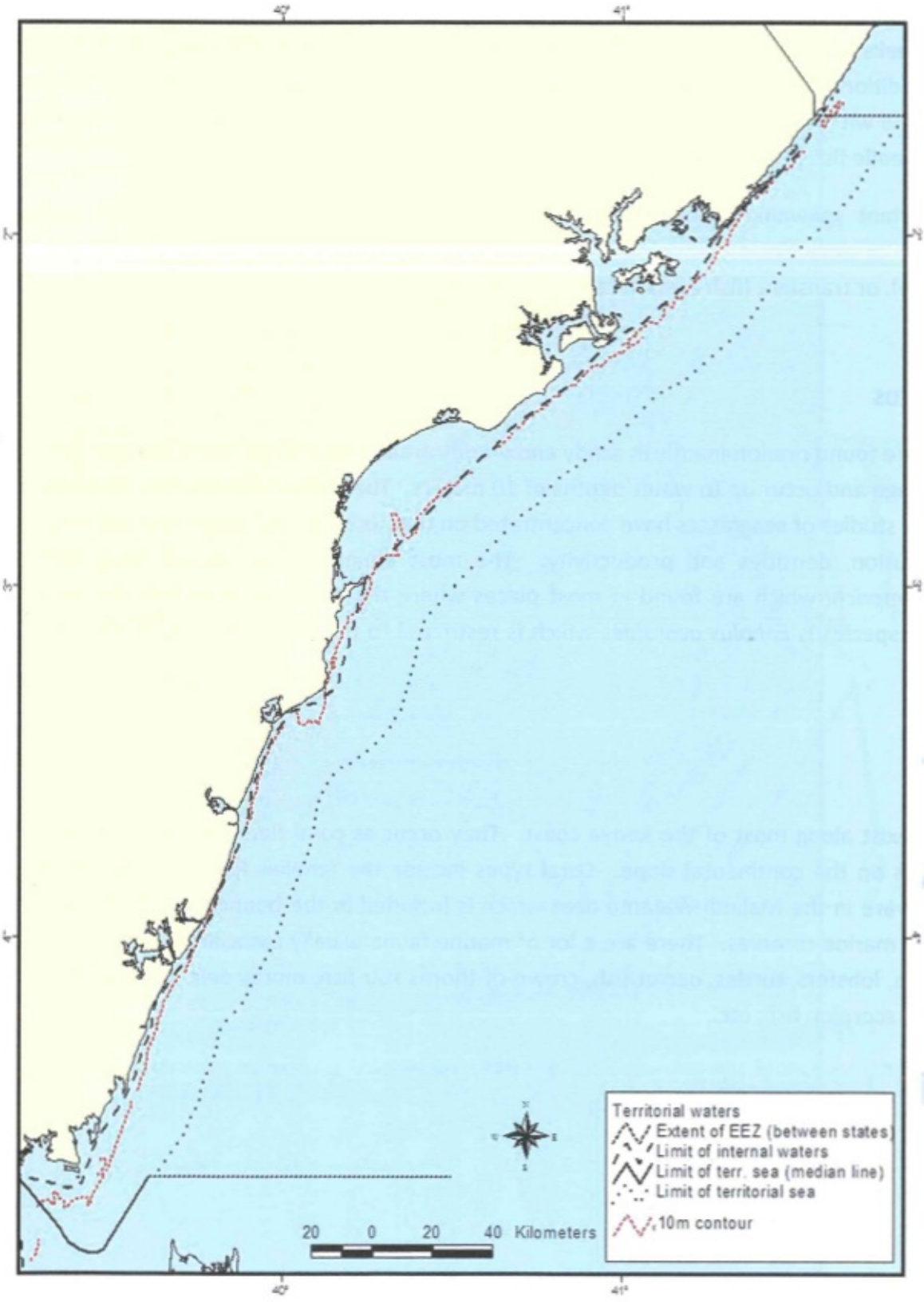

Figure 3: Delienations showing territorial waters

FISH SPAWNING, BREEDING AND NURSERY AREAS

Estuaries, creeks and bays are particularly important for both breeding and nursery grounds, as they tend to combine conditions of high nutrients and sheltered water (e.g Gazi Bay, Ungwana Bay). These are usually also associated with mangrove and sea grass ecosystems which also provide high nutrient/energy conditions for larval/juvenile fish growth, as well as shelter.

Other important spawning areas are found around landmarks and features such as underwater reef promontories or pinnacles-coral rocks. These spawning aggregation sites may be permanent (visited every years/season), or transient (fish aggregate around features.

SEA GRASS BEDS

Seagrasses are found predominantly in sandy and muddy areas where there roots can penetrate and provide easy anchorage and occur up to water depths of 10 meters. They provide habitat for a variety of important fishes. Most studies of seagrasses have concentrated on their ecology and taxonomy and very little work on their distribution, densities and productivity. The most abundant species are *Cymodocea ciliate* and *Thalassia hemprichi* which are found in most places where the substrate is rock or old coral. Other less conspicuous species is *Enhalus acoroides* which is restricted to the Lamu area and Mida creek and *Zostera capensis*.

CORAL REEFS

Coral reefs exist along most of the Kenya coast. They occur as coral flats, lagoons, reef platforms and as fringing reefs on the continental slope. Coral types include the families Portidae and Faviidae. The best known reefs are in the Malindi-Watamu area which is included in the boundaries of the two marine parks and the two marine reserves. There are a lot of marine fauna usually associated with coral including giant sea anemone, lobsters, turtles, parrot fish, crown-of-thorns star fish, moray eels, damselfishes, acanthurida, cardinal fish, scorpion fish, etc.

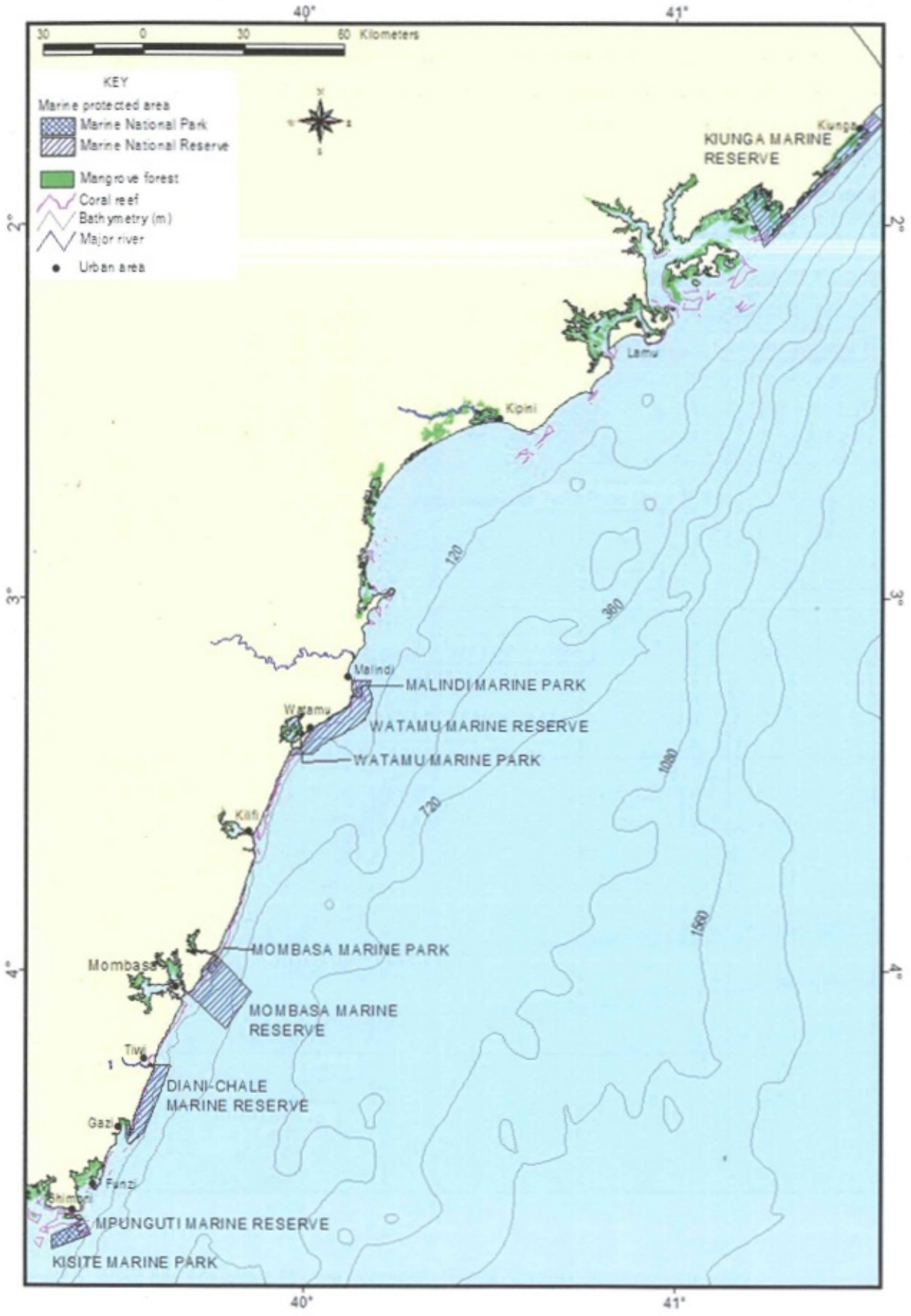

Figure 4: Marine Parks, Reserves and mangroves

MARINE PROTECTED AREAS

The marine protected areas are primarily designed to conserve Kenya's coral reefs which run along most of the coastline and which are important areas of biodiversity. There are four marine national parks – Malindi, Watamu, Kisite and Mombasa. Fauna and flora in these parks are fully protected. There are five marine national reserves – Malindi, Watamu, Mpunguti, Mombasa and Kiunga. Traditional fishing is allowed within the boundary of the reserves.

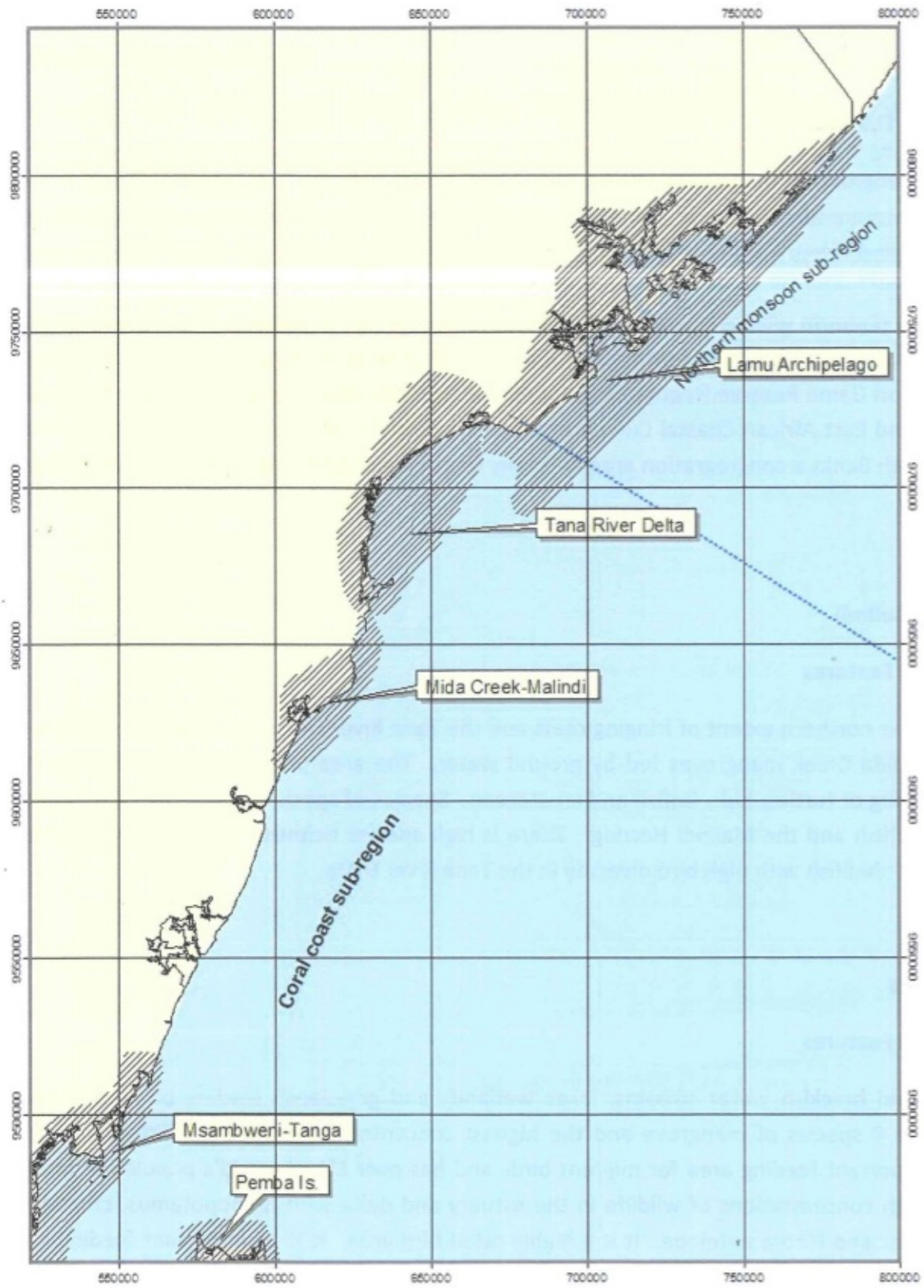

Figure 5: WWF Eastern Africa Marine Ecoregion (EAME) priority conservation areas

WWF Eastern Africa Marine Ecoregion (EAME) priority conservation areas

Name: Lamu Archipelago

Outstanding Biological Features

There are extensive mangrove formations in adelta, creeks and basins (345 km^2) of which 160 km^2 are in pristine condition. There are also extensive and diverse seagrass beds that are important feeding sites for Olive Ridley, Hawksbill and Green Turtles and Dugong (also breeding). The site has the most northerly coral reefs known in the region and as an ecotone has the possibility of unique coral and fish communities. Humpback, Sei, pilot and sperm whales migrated offshore. A colony of 8,000 Roseate Terns breed on the small islands and islets that are also important breeding sites for Ospreys and Pelicans. Wild Hunting Dogs from the adjacent Dodori Game Reserve frequent the dunes and beaches. Nutrient enrichment through the mixing of the Somali and East African Coastal Currents makes it a highly productive area. This productivity make the adjacent North Banks a congregration area for many large pelagic particularly Black Marlin and the Pacific Sailfish.

Name: Mida Creek - Malindi

Outstanding Biological Features

The coral reef marks the northern extent of fringing reefs and the Tana River Delta has extensive mangrove formations with the Mida Creek mangroves fed by ground water. The area provides important sites for feeding, resting, breeding of turtles, bids, finfish and crustacean. Species of special concern include Turtles, Whales Sharks, and Billfish and the Malindi Herring. There is high species richness for corals, mangroves, seagrasses, turtles, and shellfish with high bird diversity in the Tana River Delta.

Name: Tana River Delta

Outstanding Biological Features

A complex of fresh and brackish water streams, lakes wetlands and grasslands leading on to a deltaic mangrove system with 9 species of mangrove and the highest concentration of *Heritiera littoralis* in the ecoregion. It is an important feeding area for migrant birds and has over 1% of world's population for 13 species. There are high concentrations of wildlife in the estuary and delta with hippopotamus, crocodile, elephant, lion, bushbuck and Hirora antelope. It is a highly rated bird area. It is an important feeding and resting area for Dugong and turtles with some nesting of the latter.

Name: Msambweni - Tanga

Outstanding Biological Features

There is high reef diversity due to the presence of three different reef types with two distinct coral communities for fringing and patch reefs. Species diversity is high with over 55 coral genera (including black corals) 9 species of mangrove, 12 species of seagrass and diverse reef fish assemblages including an endemic grouper. The small inlands have populations of the endangered coconut crab and Maziwe Island before its loss was a major green turtle nesting site. Five species of turtle have been recorded in the area with the southern area adjacent to Maziwa Island still having significant nesting at adjacent beaches for Green and Hawksbill Turtles. Five species of dolphin have been recorded including resident pods of humpback Dolphins. It is also an important feeding area for crab plovers supporting over wintering for 15% of the global population. A small number of dugongs have been sighted in the area.

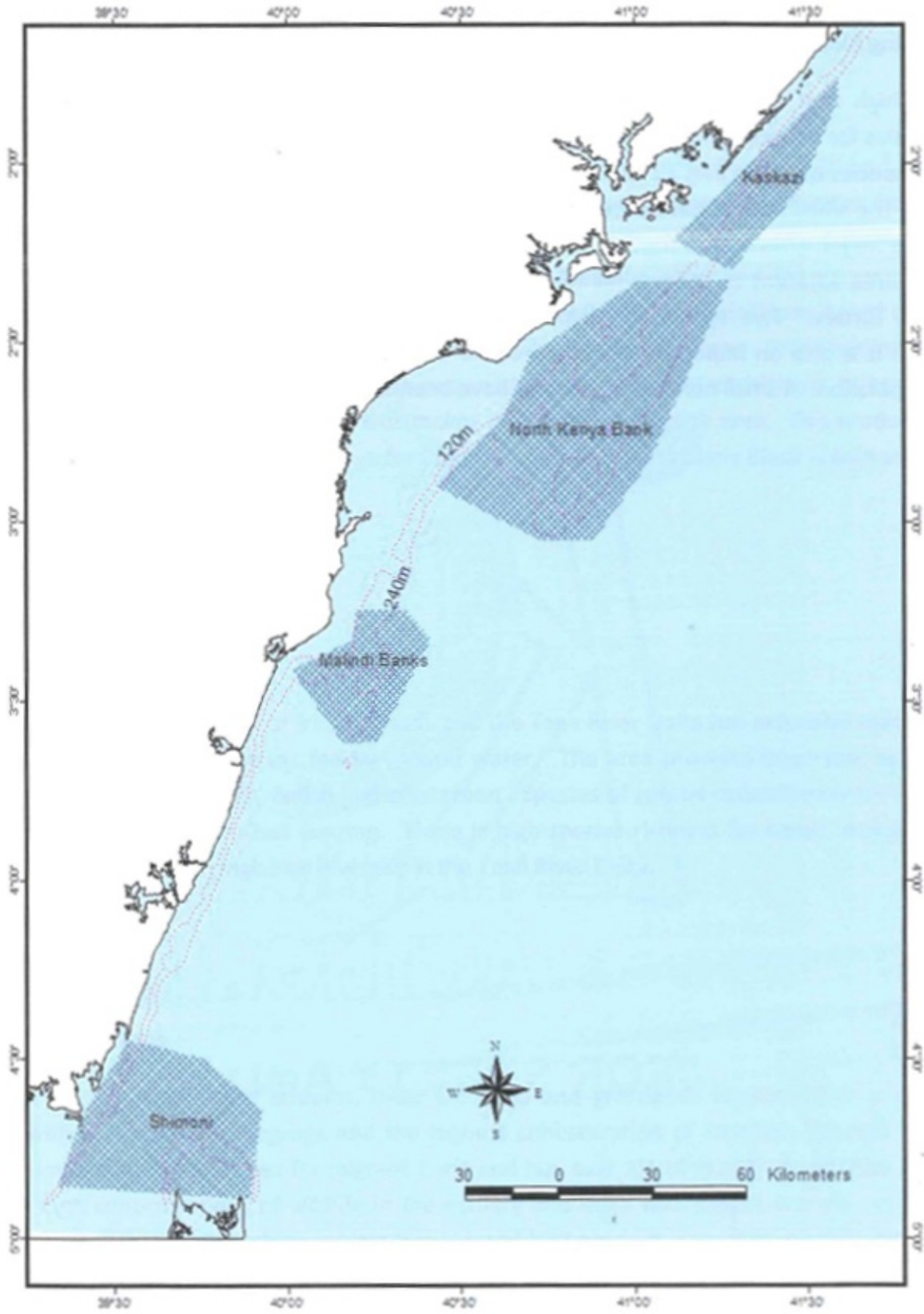

Figure 6: Sport fishing areas off the coast of Kenya

Figure 7: Turtle nesting sites, sightings, threats and foraging grounds – Kwale District

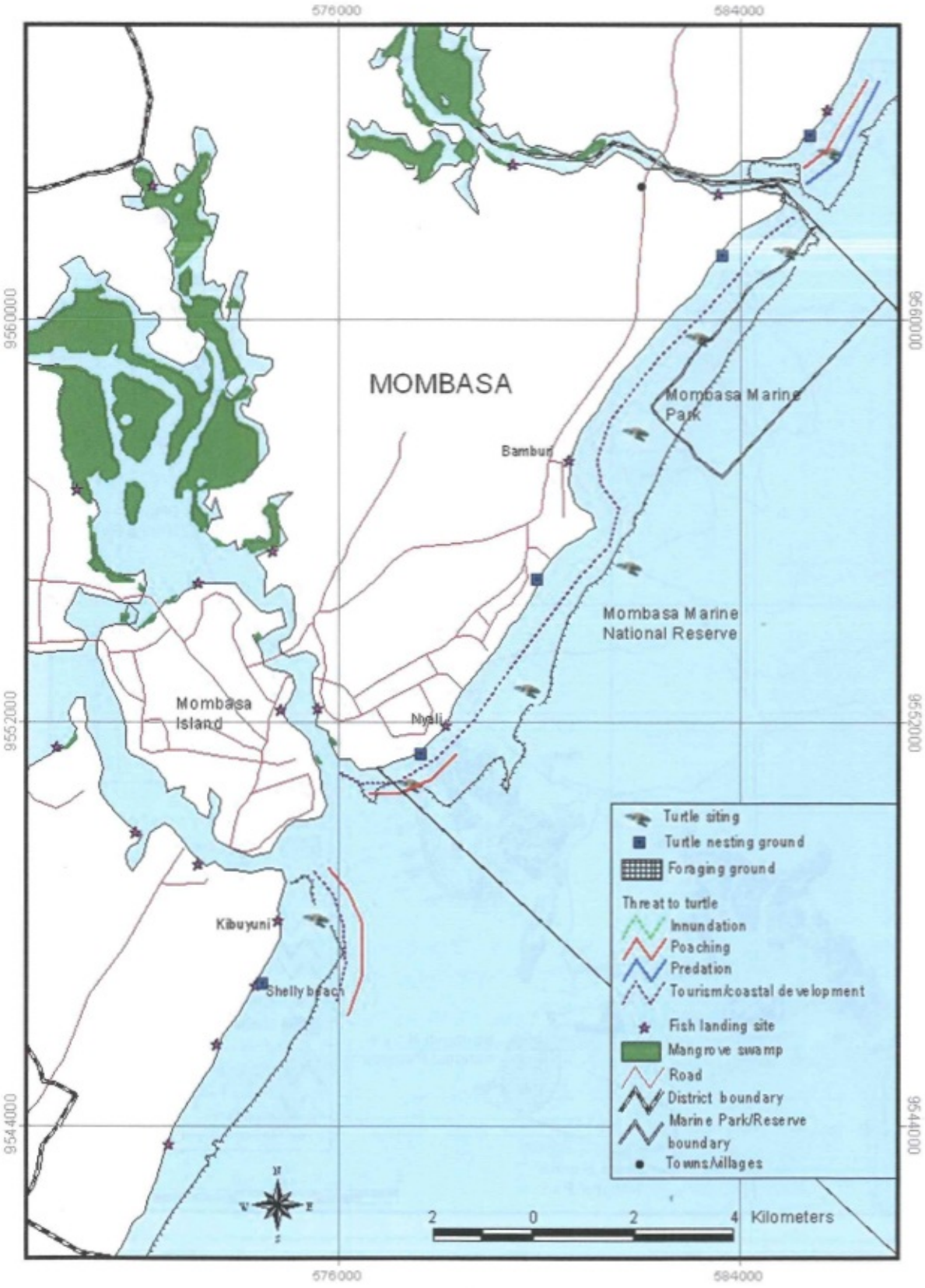

Figure 8: Turtle nesting sites, sightings, threats and foraging grounds – Mombasa District

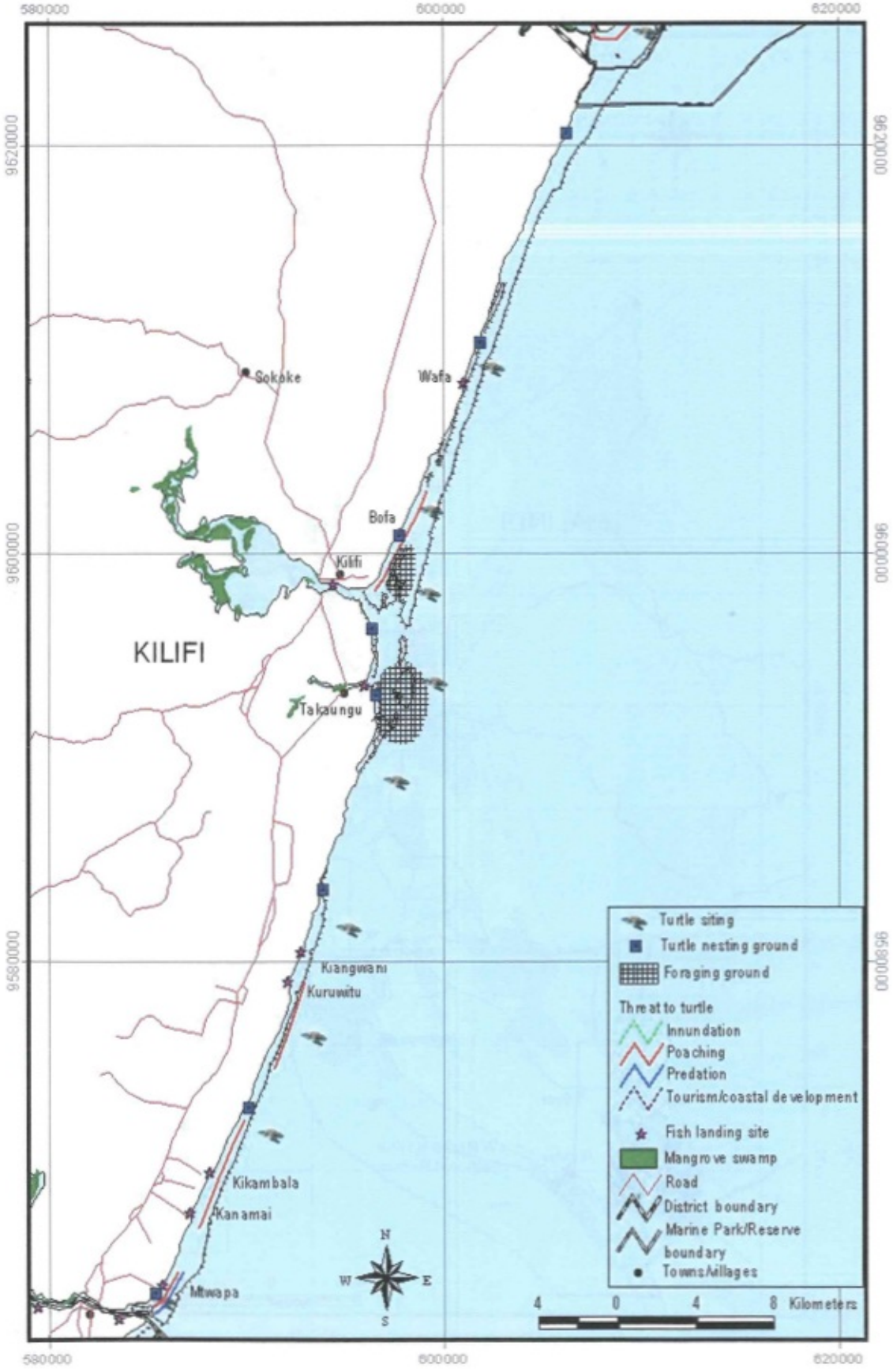

Figure 9: Turtle nesting sites, sightings, threats and foraging grounds – Kilifi District

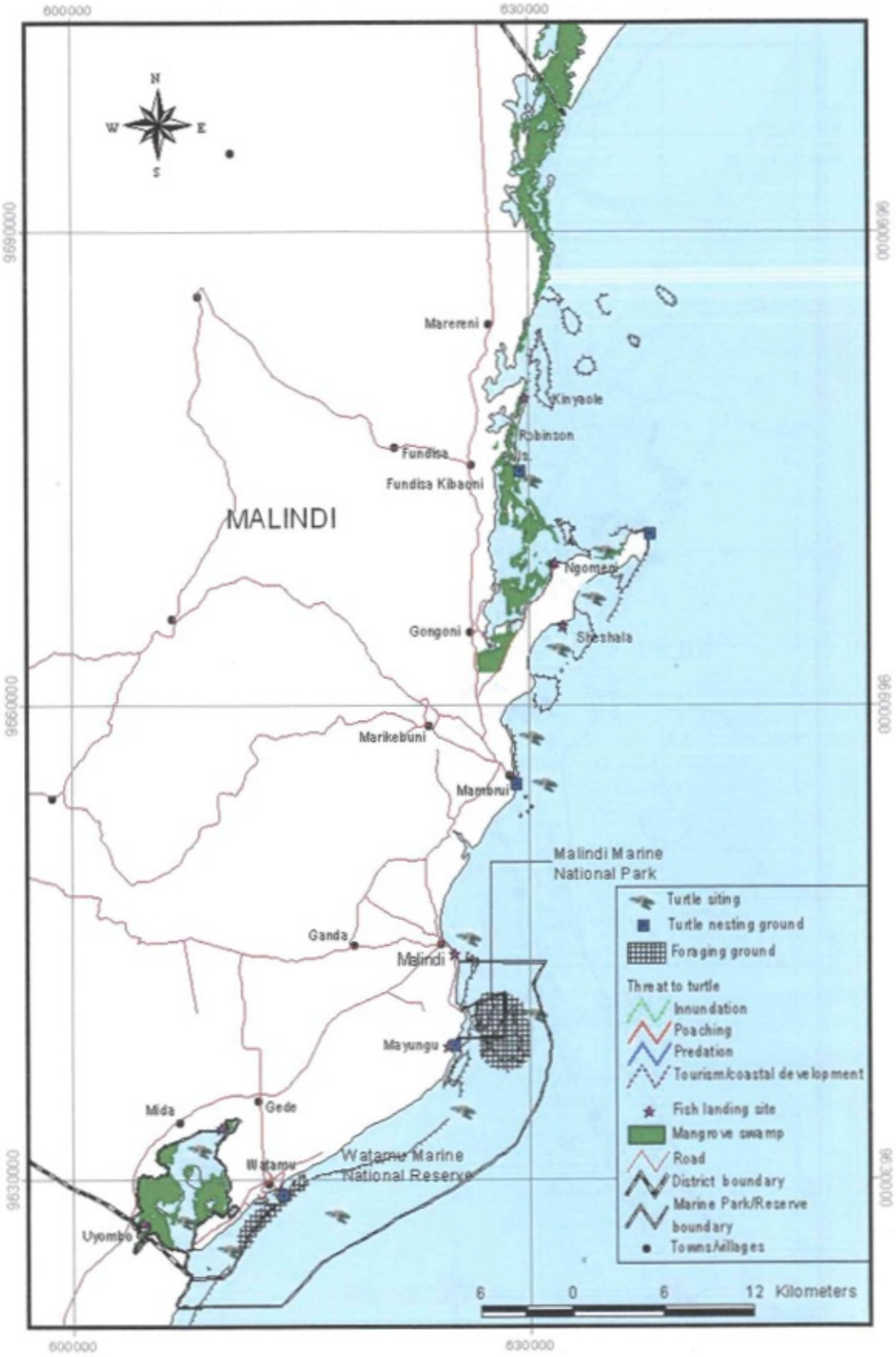

Figure 10: Turtle nesting sites, sightings, threats and foraging grounds – Malindi District

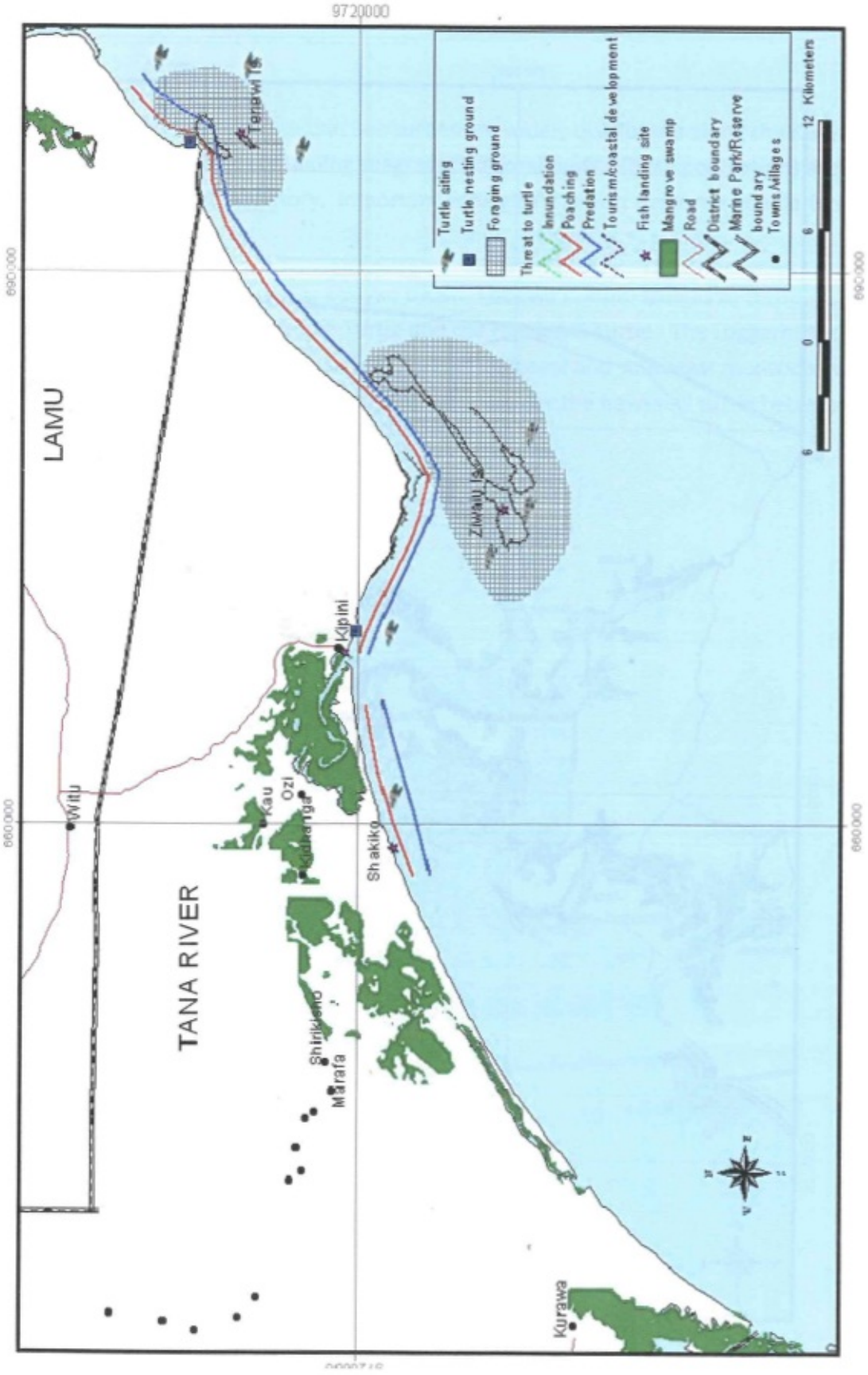

Figure 11: Turtle nesting sites, sightings, threats and foraging grounds – Tana River District

Figure 12: Turtle nesting sites, sightings, threats and foraging grounds – Lamu District

SEA TURTLES

Data obtained from KWS aerial survey, indicate that sea turtles are widely distributed along the Kenyan shoreline within the 20m isobath in areas containing seagrass and coral reefs. These populations are thought to comprise both resident and migratory. Important ecological support for turtle populations is nesting and foraging sites.

Sea turtles nest on a variety of beaches along the Kenyan coast. The two marine species of turtles that are considered endangered in Kenya are the Green Turtle and the Hawksbill Turtle. The Loggerheads turtle is classified as vulnerable. The nesting season follows the northeast and southeast monsoons with the peak of nesting for the green turtle between March and June and for the hawksbill turtle between December and January

APPENDIX III Special consideration areas

APPENDIX IV: Guidelines for Acceptance of a New Dispersant

A product being newly introduced has to undergo a toxicity assessment. All products have to pass two tests in recognition of the different environments in which they may be used; the Sea Test and the Rocky Shore Test. Dispersants must pass both tests before an approval can be granted.

Sea Test

This test is based on the premise that if oil treatment products are correctly applied to an oil slick at sea, marine organisms will be exposed to a mixture of oil and product, rather than to a suspension or solution of product alone. The test therefore compares the toxicity of oil dispersed under standard conditions of mechanical agitation, with that of the same amount of oil treated with the product in question under the same conditions of mechanical agitation. A test was developed using the brown shrimps (*Crangon*)

Rocky Shore Test

A Rocky Shore Test should only be carried out if the dispersant has already passed the compulsory sea test.

The intertidal zone is of great value both in amenity and ecological terms. Toxic effects of beached oil treatment (dispersant spraying etc.) are likely to have only limited impact on commercial fisheries e.g. cockles etc., on sandy beaches and will be relatively benign on dynamic pebble beaches where there is good drainage and a relatively impoverished species community. Therefore, for these environments (i.e. sandy/pebble amenity beaches) it is assumed that a product passing the Sea Test will be of an acceptably low risk. However, the death of grazing organisms (e.g. winkles and limpets) that inhabit rocky shores can lead to a much more significant deleterious ecological change due to extensive uncontrolled growth of seaweed. Consequently a toxicity test was developed using a typical intertidal grazing organism, the common limpet (*Nerita albicilla*). When products are used to clean oil from beaches, animals are exposed to very different conditions to that experienced at sea. Both oiled and unoiled animals may be exposed to neat product and left exposed until they are washed by the next incoming tide or the use of water hoses. The Rocky Shore toxicity test for all dispersants is therefore been based on these exposure conditions.

Pass/Fail Criteria

All the above tests are assessed on the basis of comparing the mortalities occurring in five replicate controls against those in five replicate treatments. Each set of five replicates must be subject to statistical analysis to ensure that the set is homogenous. If this is not the case for treatment or control, the test is invalid. Once it has been confirmed that the replicate groups are homogenous the two sets are compared statistically (Student's t-test, F variance ratio) for differences in their mean. If the oil toxicity is significantly greater (at the level of confidence of 95%) in the treatment than in the controls then the product has failed the test.

APPENDIX V: Toxicity Tests

SEA TEST

DISPERSANT	PASS/FAIL
Corexit 9527	PASS
Slick Gone LTSW	PASS
Slick Gone NS	PASS
Seppic Dispolene	PASS
Shell ND	PASS

ROCKY SHOW TEST

DISPERSANT	PASS/FAIL
Corexit 9527	PASS
Slick Gone LTSW	PASS
Slick Gone NS	PASS
Seppic Dispolene	PASS
Shell ND	FAIL

Pass/Fail Criteria

Based on the criteria described in appendix V, Shell ND failed toxicity test.

Recommendation

Existing stocks of these products may still be used away from shorelines in appropriate conditions.

Dated: August 2008

APPENDIX VI: Dispersant List

An inventory of dispersants in Kenya

Organization	Storage location	Grade-type	Volume (litres)
Kenya Shell/BP Ltd	Oil spill response equipment store (Shimanzi)	Shell ND (type 1)	
Kenya Petroleum Refineries	Ware house (Port-Reitz)		
Kenya Pipe Line company Ltd	Oil spill emergency response equipment store Kipevu storage facility PS14)	Slick Gone – LTSW (type 2/3)	840
Kenya Ports Authority	Pollution Control Center (KPA)	Slick Gone NS (type 2/3)	14,100
Oilibya	Ware house/ Oil Response road trailer (Shimanzi)	Corexit 9527	15,050
Mombasa Joint Terminal (MJT) Changamwe	Ware house (Changamwe)	Seppic dispolene (type 2/3)	4,500
Mombasa Joint Terminal (MJT) Shimanzi	Ware house New emergency store (Shimanzi)	Corexit 9527 (type 3)	2,000

List as at Nov 2008

APPENDIX VII: **Technical product bulletins**

APPENDIX VIII Dispersant Use Decision Elements and Documentation Forms

The Dispersant Use Decision Elements in this appendix list the basic components of a dispersant use decision; and are phrased in the form of questions to be considered and answered by the NOSC.

In some cases, the questions will be easy to answer, and the NOSC can use the "Elements" list to rapidly, confirm that each component of a dispersant use decision has been evaluated. In many cases, spill-specific considerations will require a more in-depth approach. No one document could contain all of the information which may be pertinent to a NOSC during the decision-making process. Therefore, it is highly recommended that the NOSC draw on the expertise of government agencies and officials, and any other relevant sources of information when making a dispersant-use decision.

DISPERSANT USE DECISION ELEMENTS

1. Is The Product Dispersible?

An oil generally will be dispersible if:

- API Gravity is more than 17.
- Pour point is less than 10 F (5.5 C) below ambient temperature
- Viscosity is less than 10,000 centistokes

2. Are the Environmental Benefits of Dispersing the Oil Likely to Outweigh those of not Dispersing the Oil?

3. Is the Chosen Dispersant Likely to be Effective?

The following factors may all affect the effectiveness of any given dispersant:

- effectiveness of dispersant application to the oil;
- dispersant-to-oil application ratio;
- oil slick thickness;
- distribution of oil slick on the water;
- droplet size distribution in aerial spray;
- oil viscosity;
- energy input;
- suspended particles in water (sedimentation);
- weathering of oil;
- emulsification (formation of mousse);
- oil composition;
- dispersant composition;
- water salinity;
- temperature.

4. Can the Dispersant Application be 1) Safely and 2) Effectively Implemented Given Environmental Conditions?

5. **Are Sufficient Equipment and Personnel Available to Conduct Aerial Dispersant Application Operations within the Window of Opportunity?**

6. **Has a Site Safety Plan For Dispersant Operations Been Completed?**
   Responsibility for assuring site safety rests both with the OSC and the company or agency actually performing the operations.

7. **Is the Product to be Dispersed within a Pre-Approved Zone?**

8. **Are the Necessary Equipment and Trained Personnel available to Conduct the Recommended Monitoring Operations?**

9. **Has the Surveillance to Assure that Endangered Species are not in the Application Area Been Conducted?**

DOCUMENTATION FORM FOR DISPERSANT USE

The information must be recorded for documentation purposes for any use of dispersants

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Name of the Spill Incident: ----------

Responsible Party (if known): ----------

Date and Time of the Spill Incident:----------

I. OIL TYPE:

1. Spilled oil/substance name (if known): ----------

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2. Viscosity: ----------

---

3. API Gravity: ----------

---

4. Pour Point: ----------

---

5. Percent Evaporation in:

24 Hours - ----------

48 Hours – ----------

6. Did oil emulsify within the operational period? ----------

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**** Any information from visual overflights of the slick, including estimations of slick thickness, should be included here. All additional available information pertaining to physical characterization of spilled oil should be included here**

II. ENVIRONMENTAL CONDITIONS:

1. **Wind Speed:** ----------

2. Wind Direction: ----------

3. Visibility: ----------

4. Sea temperature:----------

5. Tidal Current direction and speed:----------

---

6. Sea Current and speed:----------

7. Weather condition: ----------

III. DESCRIPTION OF SPILL INCIDENT AND SPILL SITE:

Note all relevant details concerning the spill incident and spill site here. Be sure to note whether the spill was a one-time or continuous release, the amount of cargo remaining aboard the vessel, the stability of the vessel, and sensitive environmental conditions in the vicinity of the vessel. An estimated amount of oil on the water should be made, if possible, by using available information on the area of the slick and the estimated slick thickness (as indicated by the colour of the slick). Also included should be a description of the location of the spill site, including the nearest major port.

IV. DESCRIPTION OF AREA OVER WHICH DISPERSANTS WERE APPLIED:

1. Distance from Shoreline: ----------

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2. Depth of Water: ----------

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4. Zone Area :----------

V. AVAILABILITY OF PERSONNEL AND EQUIPMENT:

1. Availability of Application and Spotter Aircraft/Vessel:

Source: ----------

Point of Contact: ----------

Type: ----------

Travel Time to Spill: ----------

2. Type of Aircraft/Vessel Used: ----------

3. Aircraft/Vessel's Dispersant Load Capability: ----------

4. Availability of Qualified Personnel:

Source: ----------

Point of Contact: ----------

Travel Time to Spill: ----------

5. Time Required for Delivery to the Aircraft Staging Area:----------

---

VI INFORMATION ON DISPERSANT PRODUCT:

1. Name of Dispersant: ----------

2. Manufacturer: ----------

3. Amount Available: ----------

4. Source: ----------

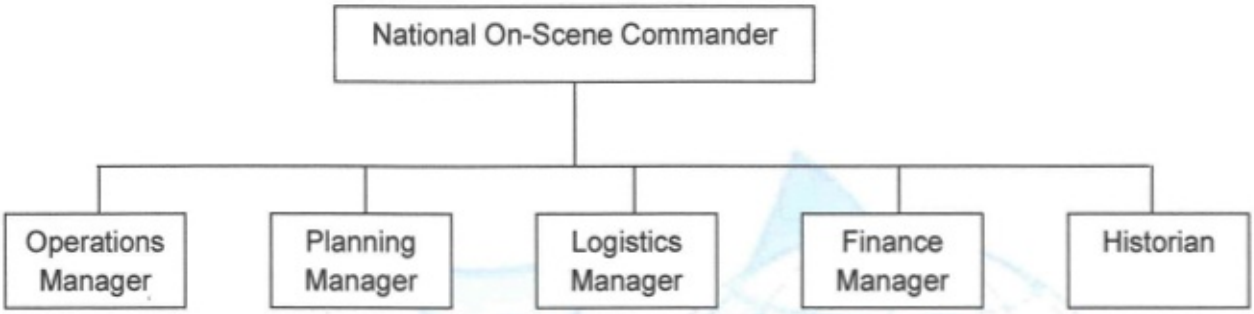
** A Material Safety Data Sheet of the Product Should Be Attached Here.

VII. IMPLEMENTATION OF RECOMMENDED MONITORING PROTOCOLS:

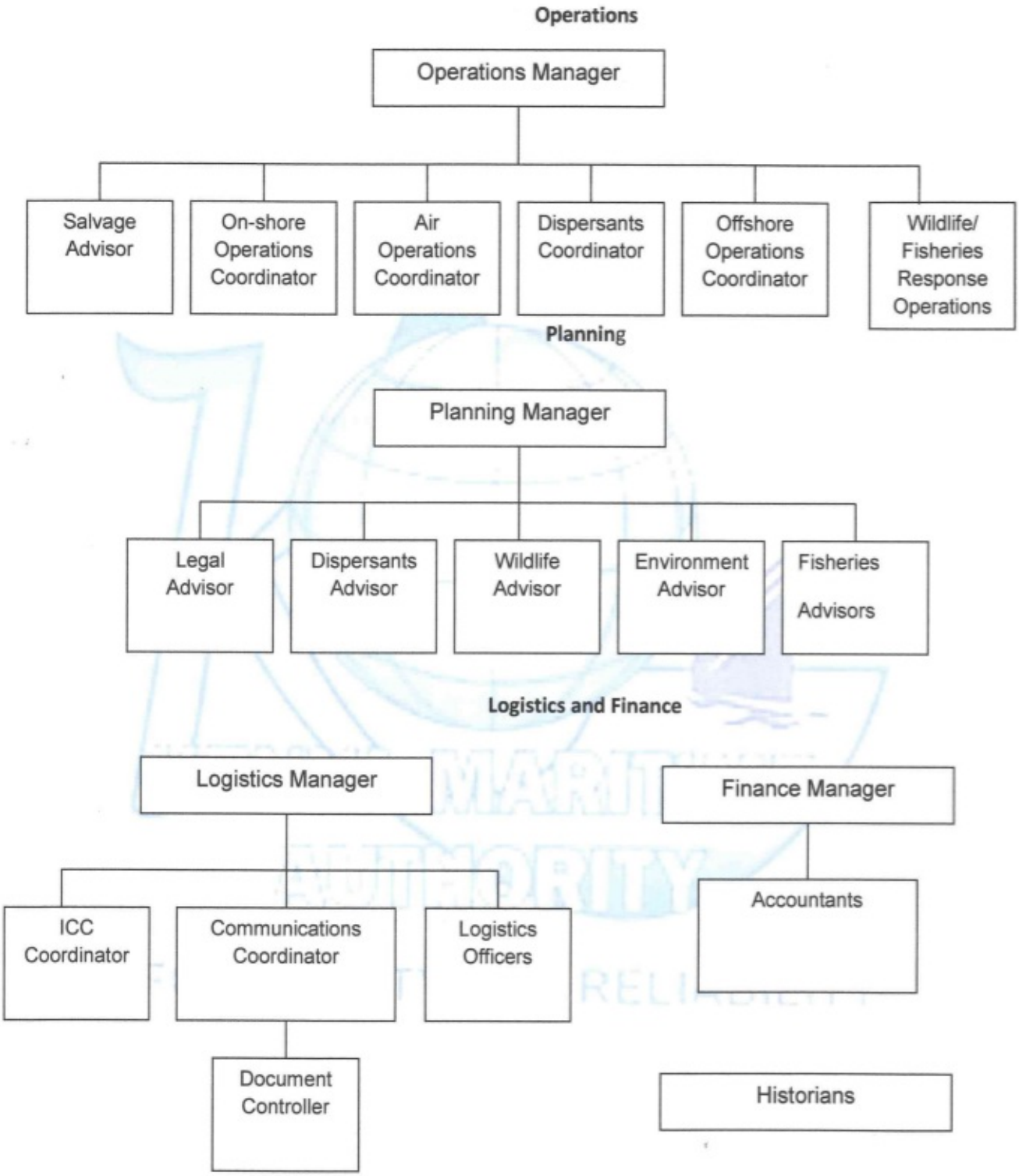
** A full report documenting the activities and results of any monitoring activities should be attached here.

Appendix IX: NMOSRCP Command Organogram

Incident Command Team Structure



Incident Command Team Management Structure



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