UTF SAU/048/SAU

Strengthening and supporting further development of aquaculture in the kingdom of Saudi Arabia

SITE SELECTION FOR CAGE AQUACULTURE IN KSA

A summary of the work done

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Technical Workshop on Marine Cage Culture in the Islamic Republic of Iran
Tehran, 26-29 September 2016

Summary

- Introduction: Cage aquaculture in KSA
- Introduction: the project UTF/SAU/048/SAU
- Site selection criteria guidelines
- GIS activity in the JFRC
- Using GIS for site selection
- How to use the Atlas
- Conclusions and discussion points

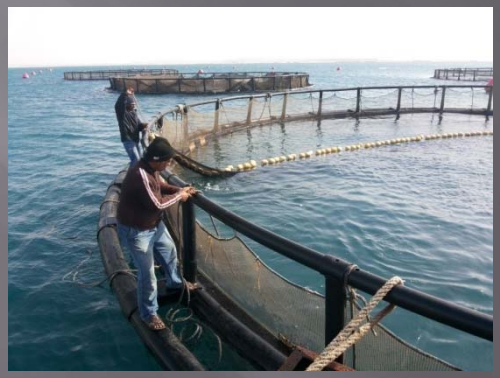
Introduction: cage aquaculture in KSA

NAQUA - Sharma

Tabuk Fisheries

Jana farm

Al Refaei



NAQUA – Al Lith

Introduction: cage aquaculture in KSA

Fishery Sector Development Plan

Target for total aquaculture production -> 770 000 tonnes by 2024

Assumptions:

- Preliminary broad GIS study results & 19% CAGR (lower than Chile & Norway)

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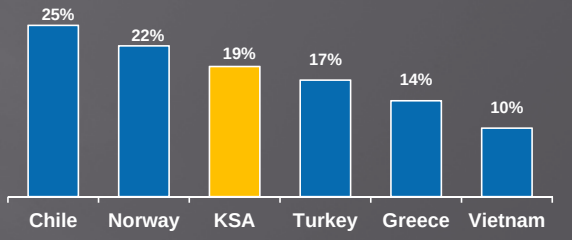
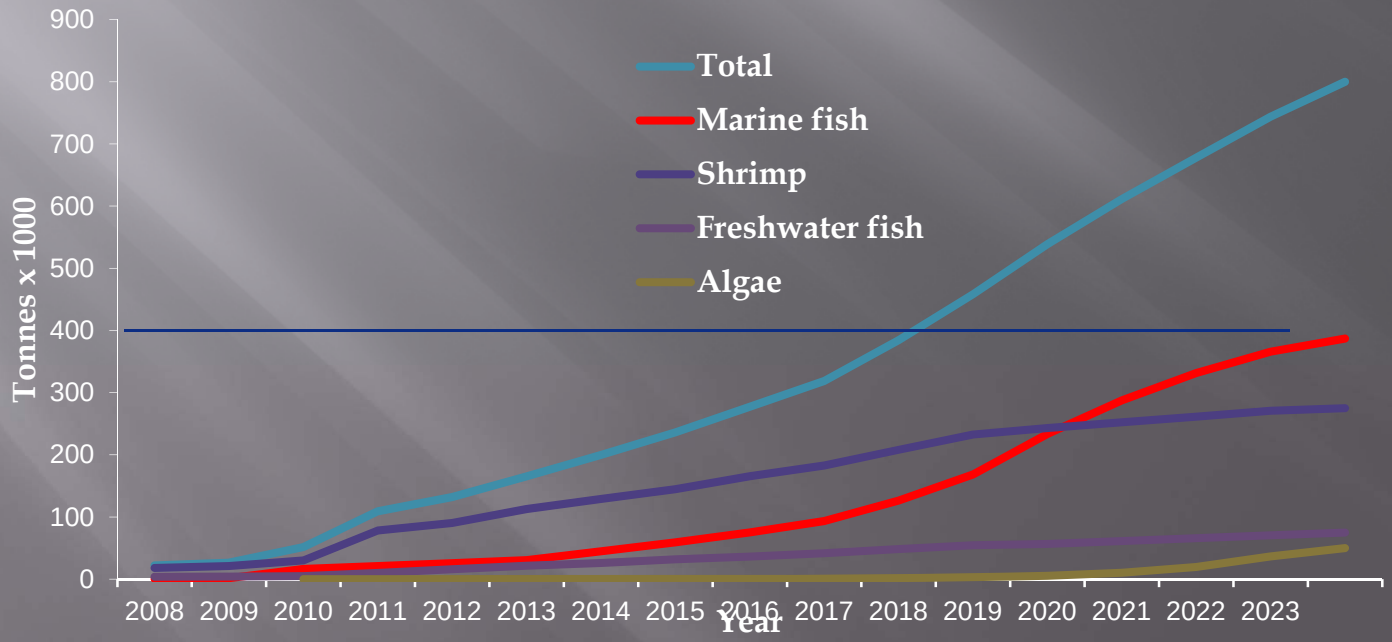
Marine fish production: 387 520 tons x year by 2024





Introduction: the UTF/SAU/048/SAU

Strengthening and supporting further development of aquaculture in the kingdom of Saudi Arabia

OUTPUT 1:

Facilitate the sustainable development of marine cage culture

OUTPUT 2:

Support development of marine hatchery technology

OUTPUT 3:

Strengthened national aquaculture research and development programmes

OUTPUT 4:

Staff capacity building in support for responsible aquaculture development.

Introduction: the UTF/SAU/048/SAU

OUTPUT 1:

Facilitate the sustainable development of marine cage culture

- Undertake a nation-wide rapid assessment of potential offshore aquaculture cage zones and identify the most promising zones for long-term mariculture development

- Screen aquaculture production carrying capacity models and choose appropriate model for offshore aquaculture in Red Sea coast

- Screen different marine cage culture technologies and business models for small to medium enterprises

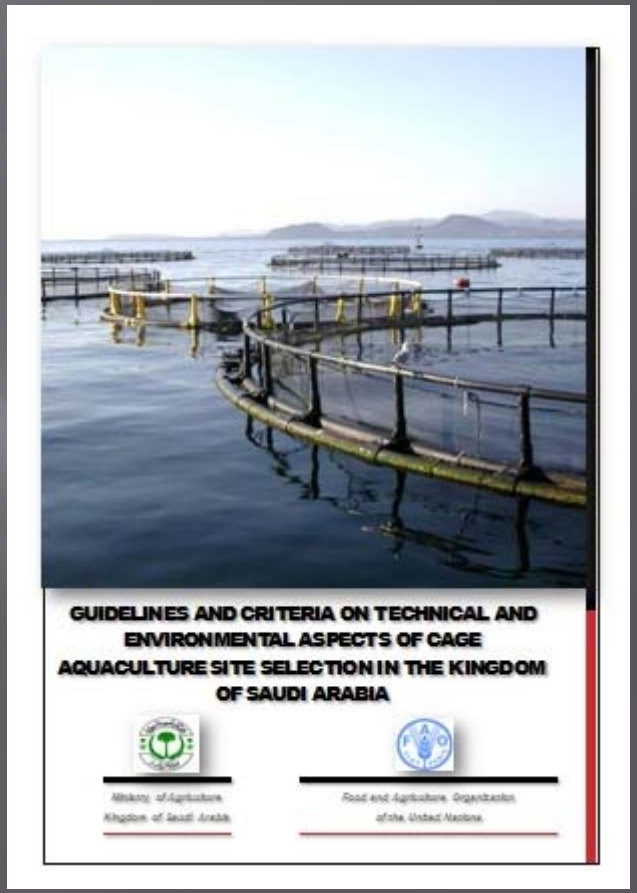
- Develop guidelines, codes of conduct/practice, BMPs, SOPs

- Implementation of the environmental impact assessment (EIA) and regular environmental monitoring programme

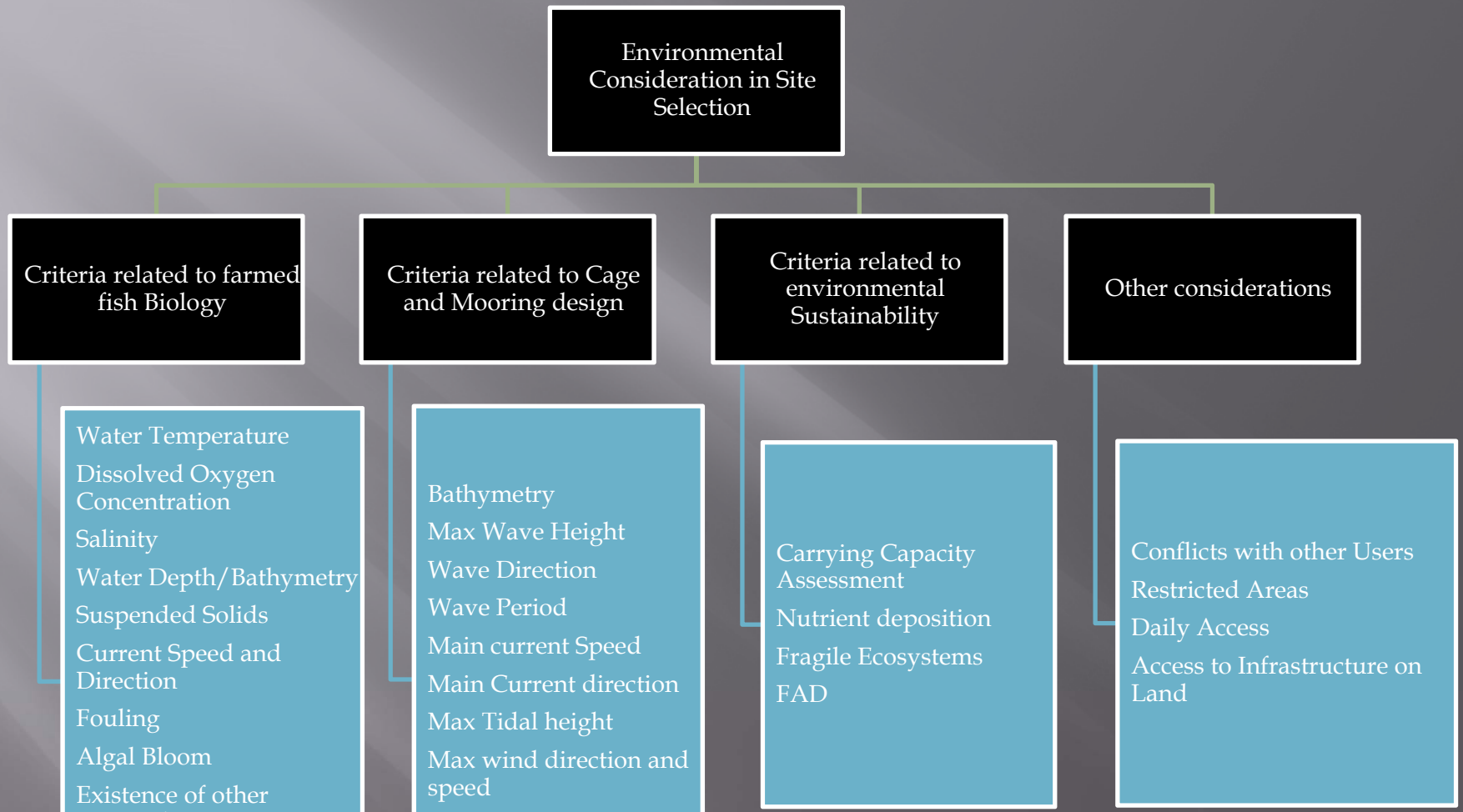
Site selection criteria guidelines

➢Develop guidelines, codes of conduct/practice, BMPs, SOPs

- The site selection process in cage aquaculture aims to identify areas or zones where ventures can be established ensuring the economic viability, the social acceptability and the environmental sustainability of the sub sector development.
- Guidelines for site selection criteria for cage aquaculture in KSA have been developed through the support of the UTF project
  - Background document for GIS analysis
  - Training document for MoA staff
  - Tool for aquaculture stakeholders

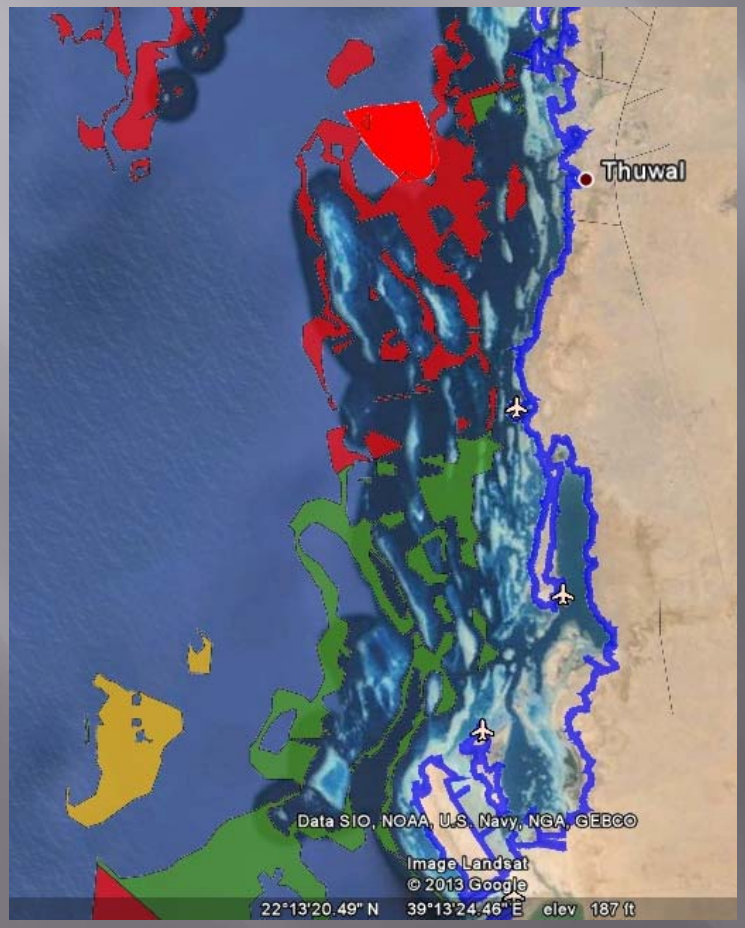


Site selection criteria guidelines



GIS activity in the JFRC

➢Undertake a nation-wide rapid assessment of potential offshore aquaculture cage zones and identify the most promising zones for long-term mariculture development



Establishment of a GIS working group and training

GIS Database improvement:

- Geo-referred database of active farms
- Upgrade and update of the existing datasets
- Research for additional data to improve the database

Revision and definition of criteria for site selection both for technical and environmental issues

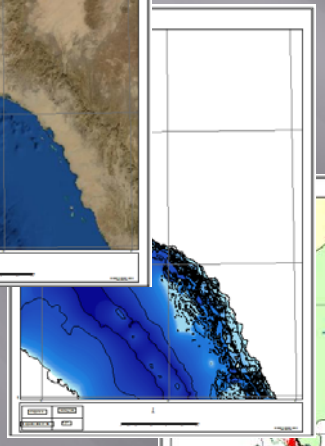
Site identification and

Red Sea Map of suitable areas for cage aquaculture

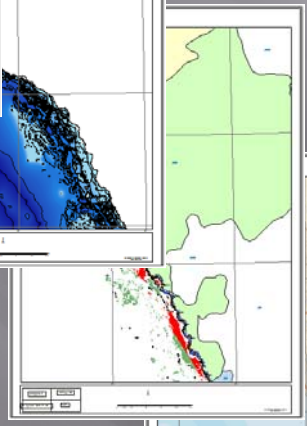
Using GIS for site selection

Administration

Satellite

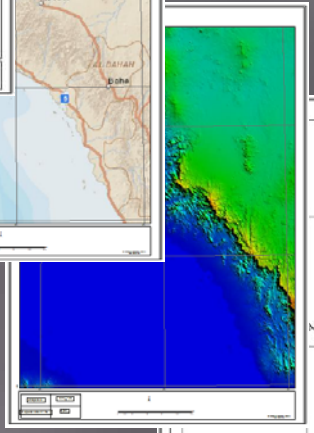


Bathymetry

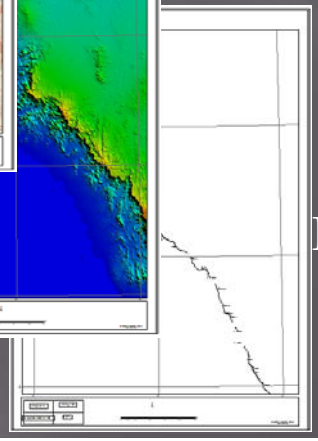


Landuse / Habitat

Infrastructure



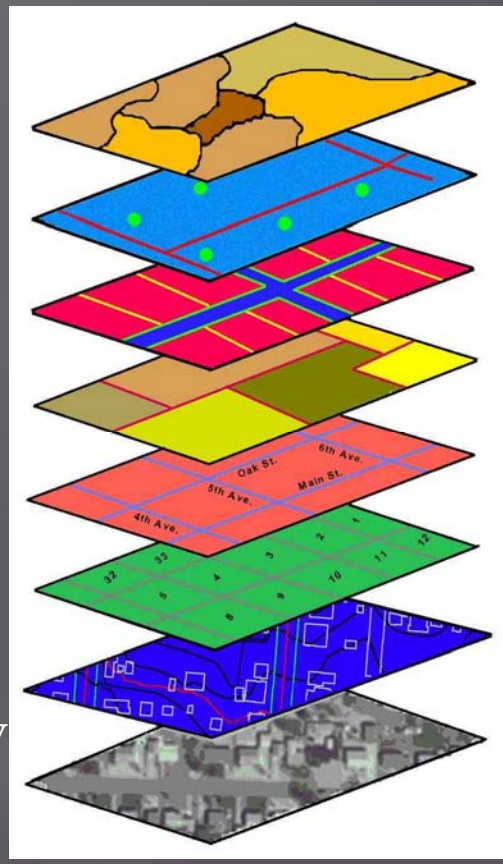
Topography



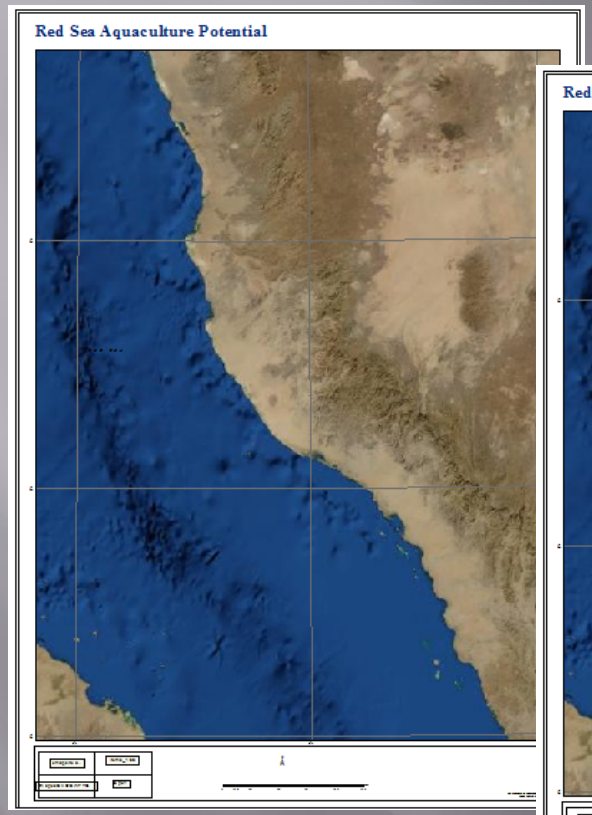
Points of Interest

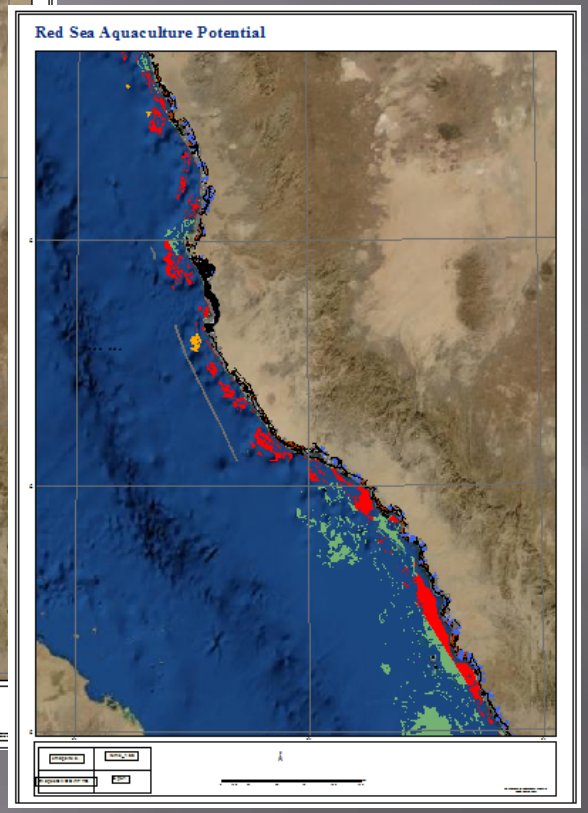
A **geographic information system** (GIS) is a system designed to capture, store, manipulate, analyze, manage, and present all types of geographically referenced data

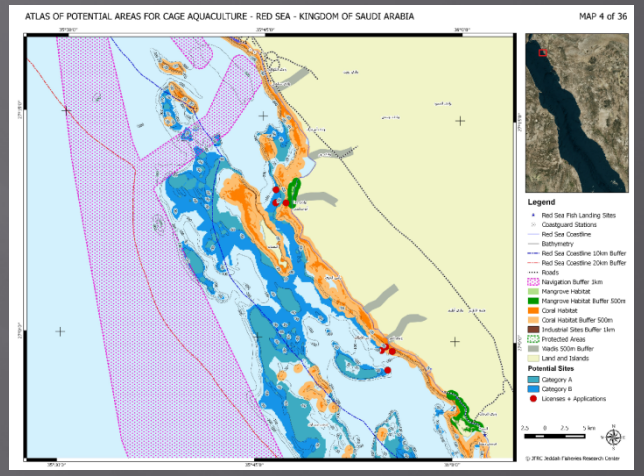
GIS Layers

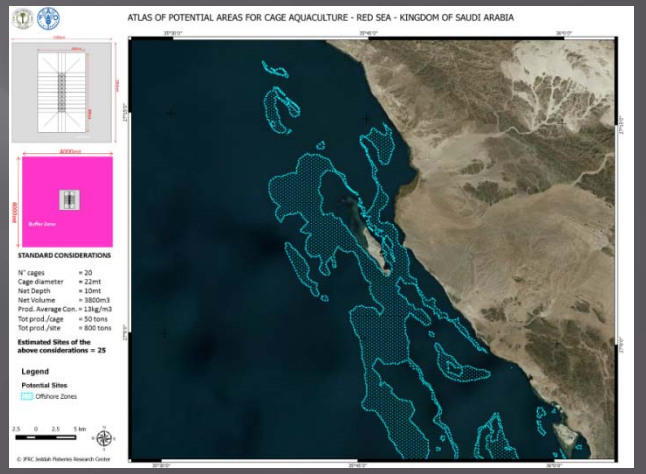


Using GIS for site selection









Satellite Imagery → Interpretation, integration with existing data, analysis → Results

Using GIS for site selection

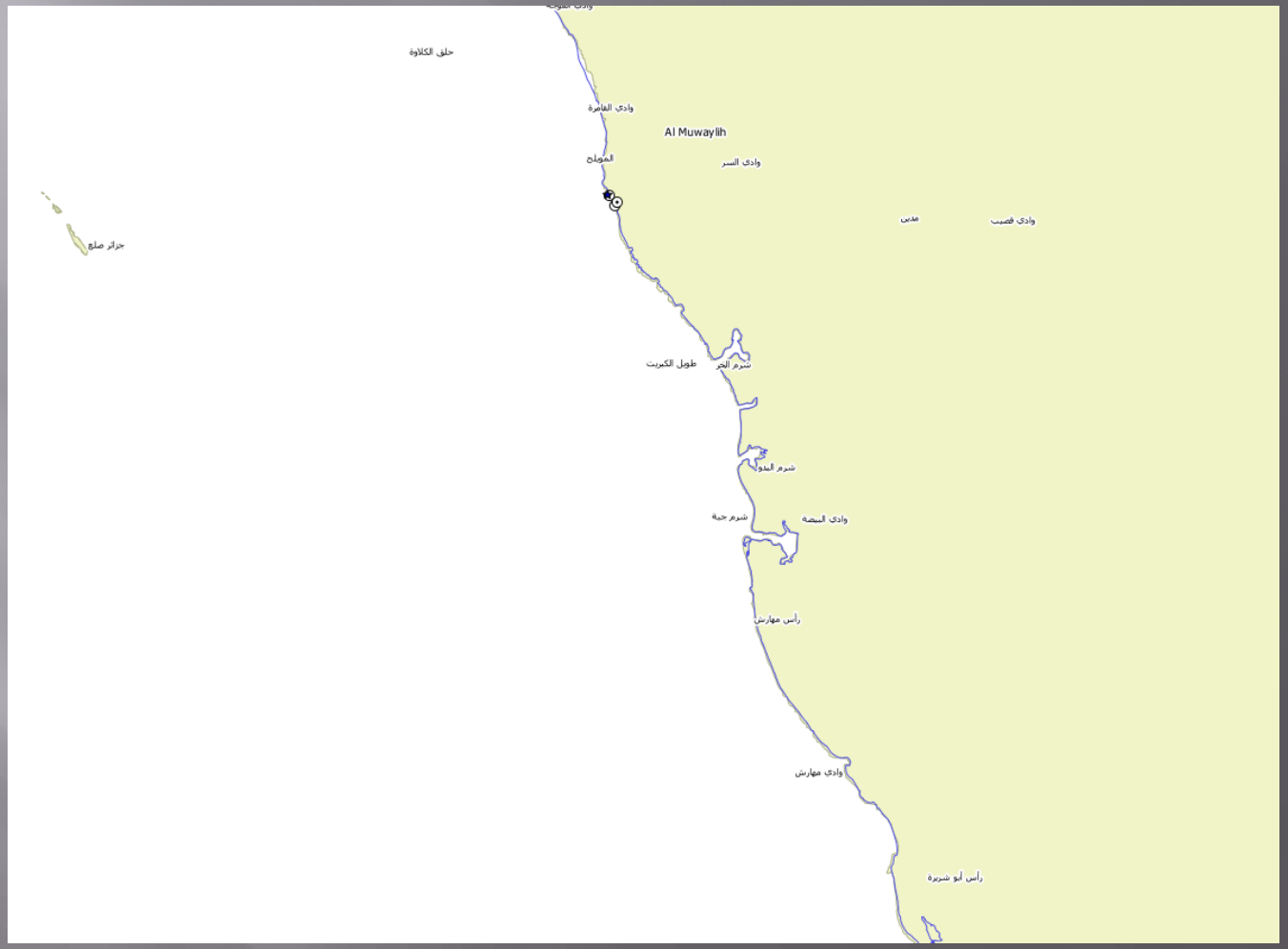
MAIN SITE SELECTION CRITERIA

- Bathymetry 25m to 50m depth (small scale cage farms)
- Bathymetry 30m to 80m depth (medium to large scale cage farms)
- Protected Areas (PME designated sites) – outside protected areas
- Corals - 500m distance buffer from corals
- Mangroves – 500m distance buffer from mangroves
- Wadis - 500m distance buffer from wadis
- Industrial sites – 1km distance buffer from industry
- Travelling distance – 10km and 20km distance from shoreline
- Navigation routes, shipwrecks, moorings, etc. (1.5km from navigation, 1km from fixtures)
- Urban areas – away from major urban areas
- Exposed areas – away from northerly winds, exposure, etc.
- Coast Guard stations (buffer 1 km)

CRITERIA/CONFLICTS NOT INCLUDED IN THIS PRELIMINARY ANALYSIS

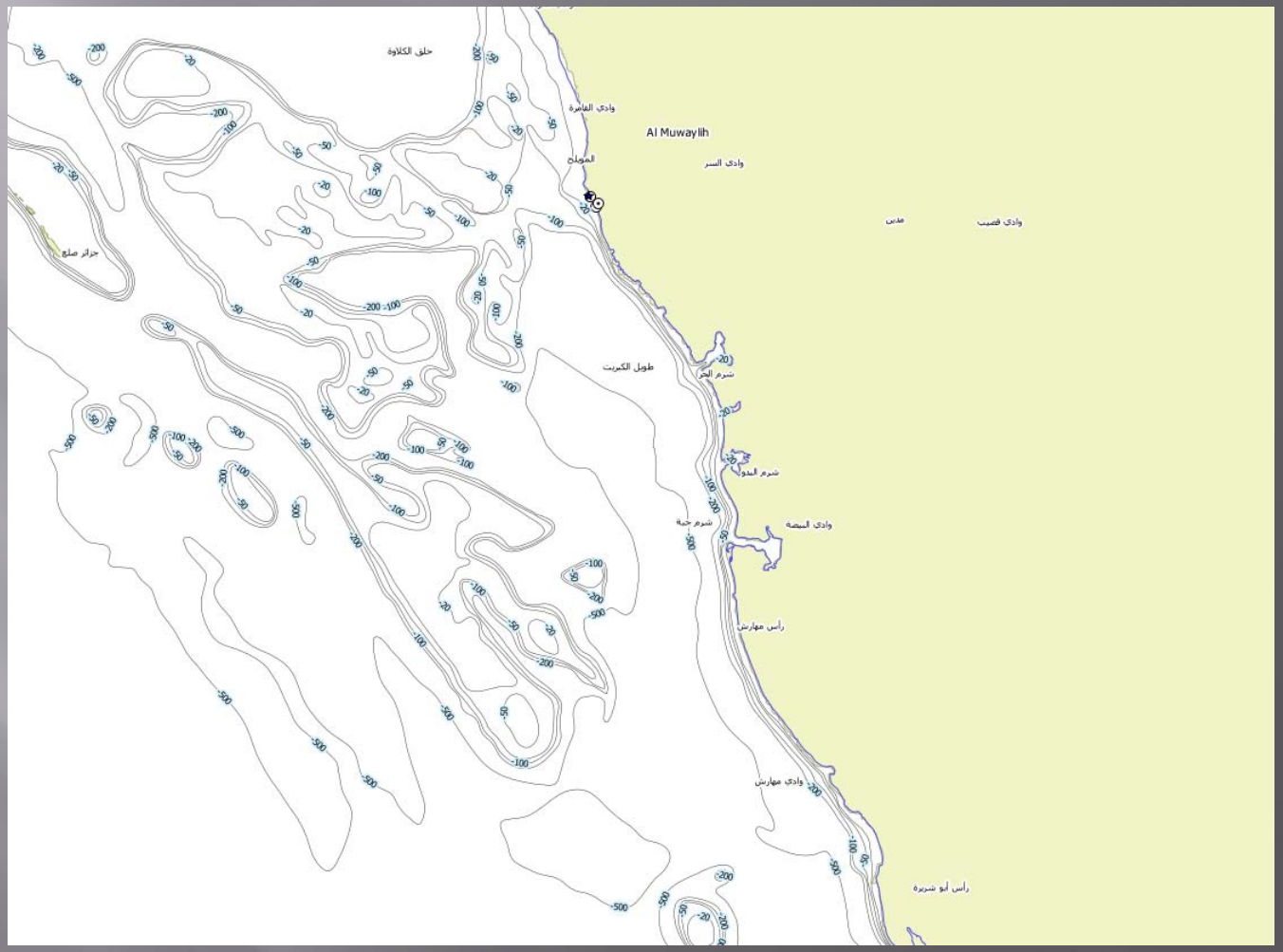
- Coast Guard restrictions
- Current speed
- DO
- Salinity
- Temperature
- Traditional Fishing grounds
- Military

Using GIS for site selection



Coastline

Using GIS for site selection

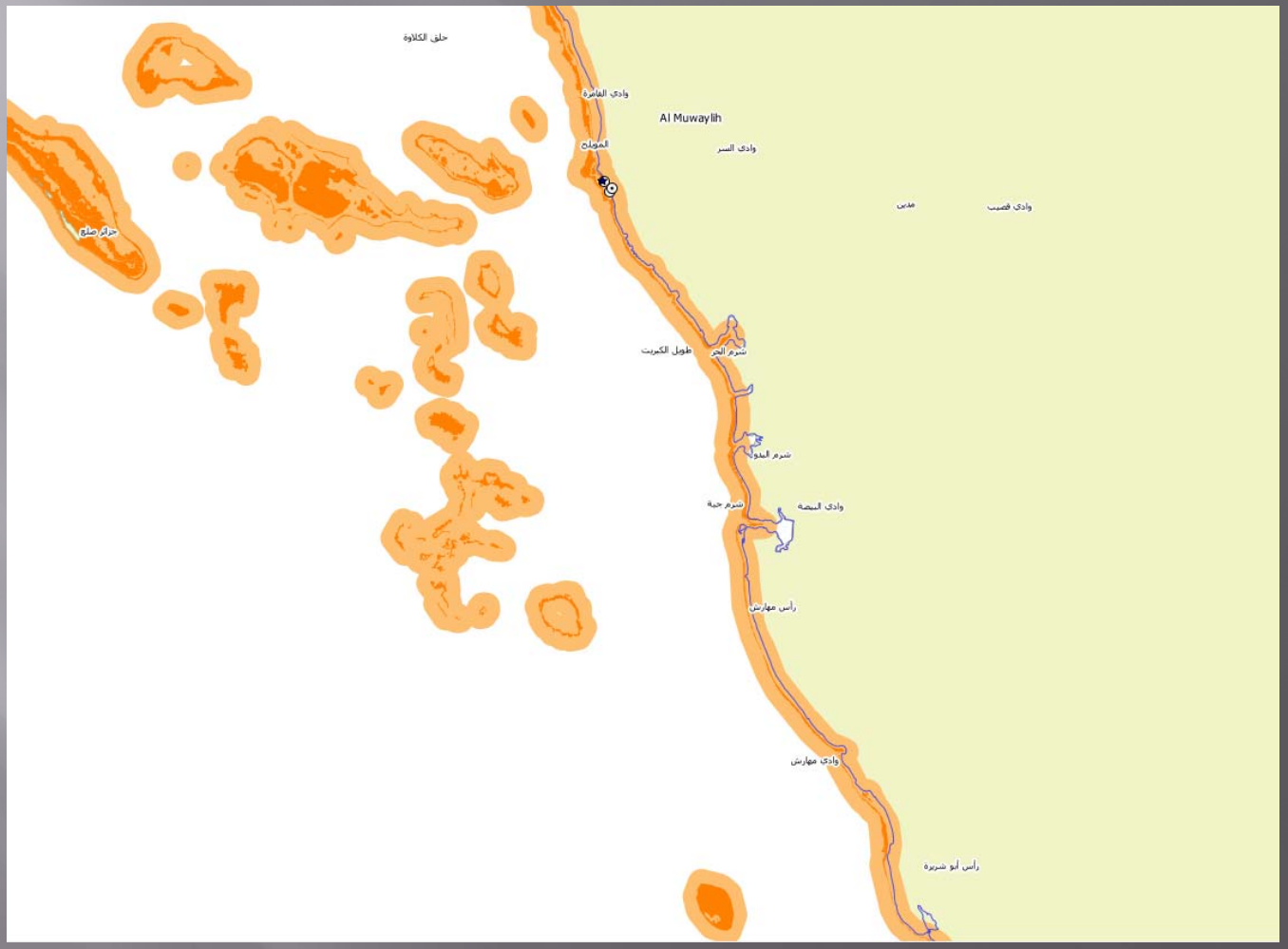


Bathimetry

Using GIS for site selection

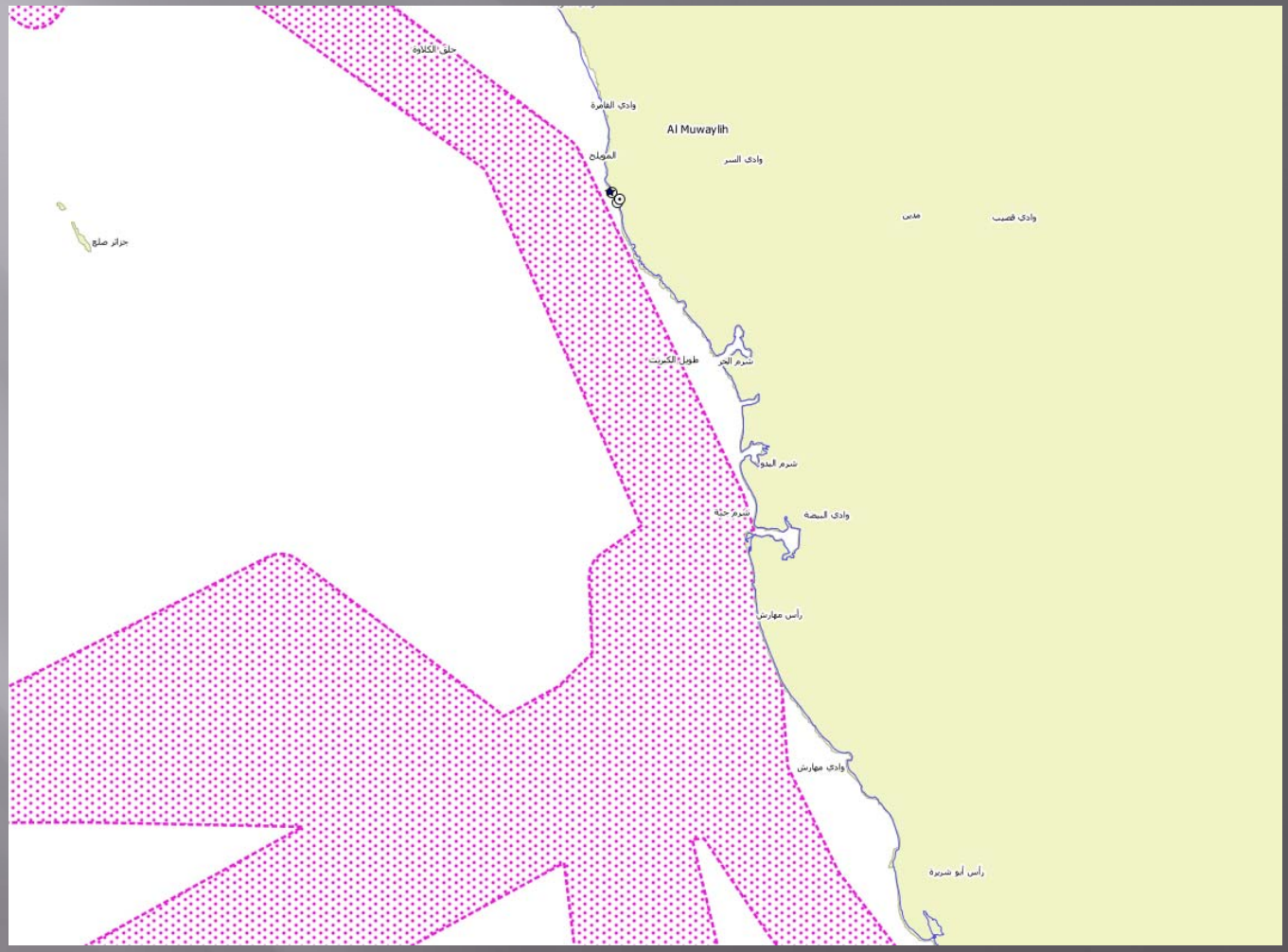
Wadis + 500m buffer

Using GIS for site selection



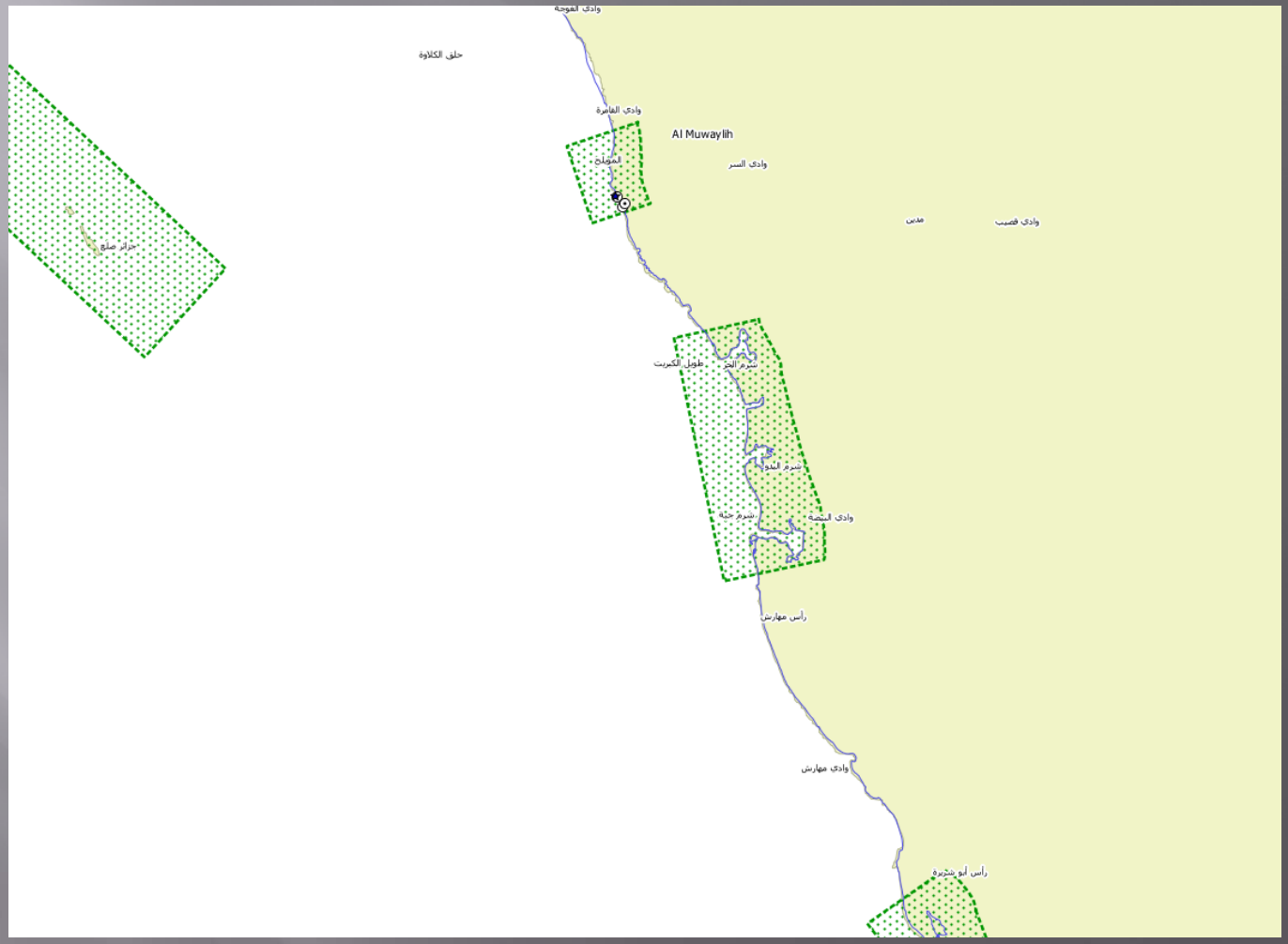
Coral + buffer 500m

Using GIS for site selection



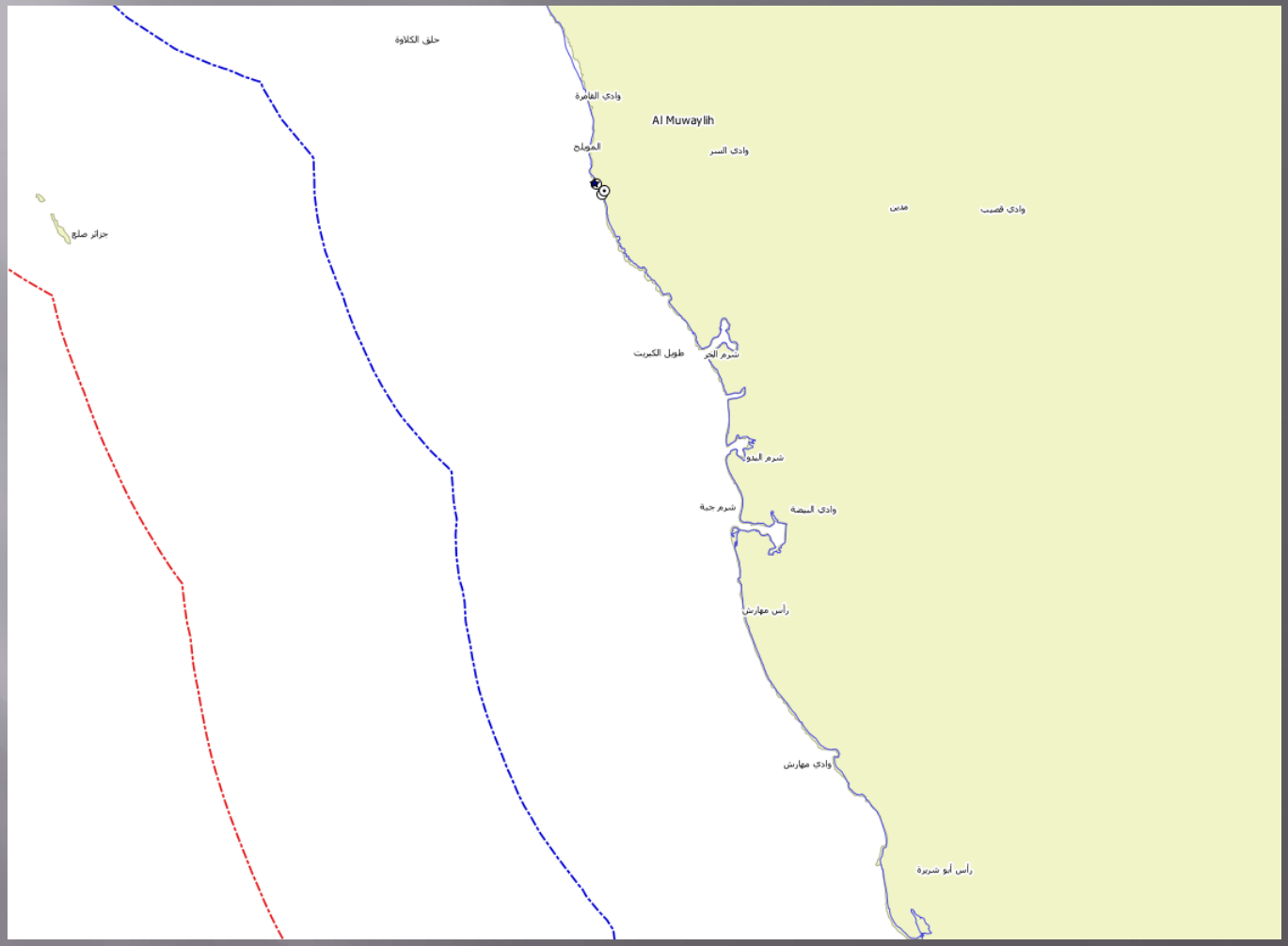
Navigation + buffer 1000m

Using GIS for site selection



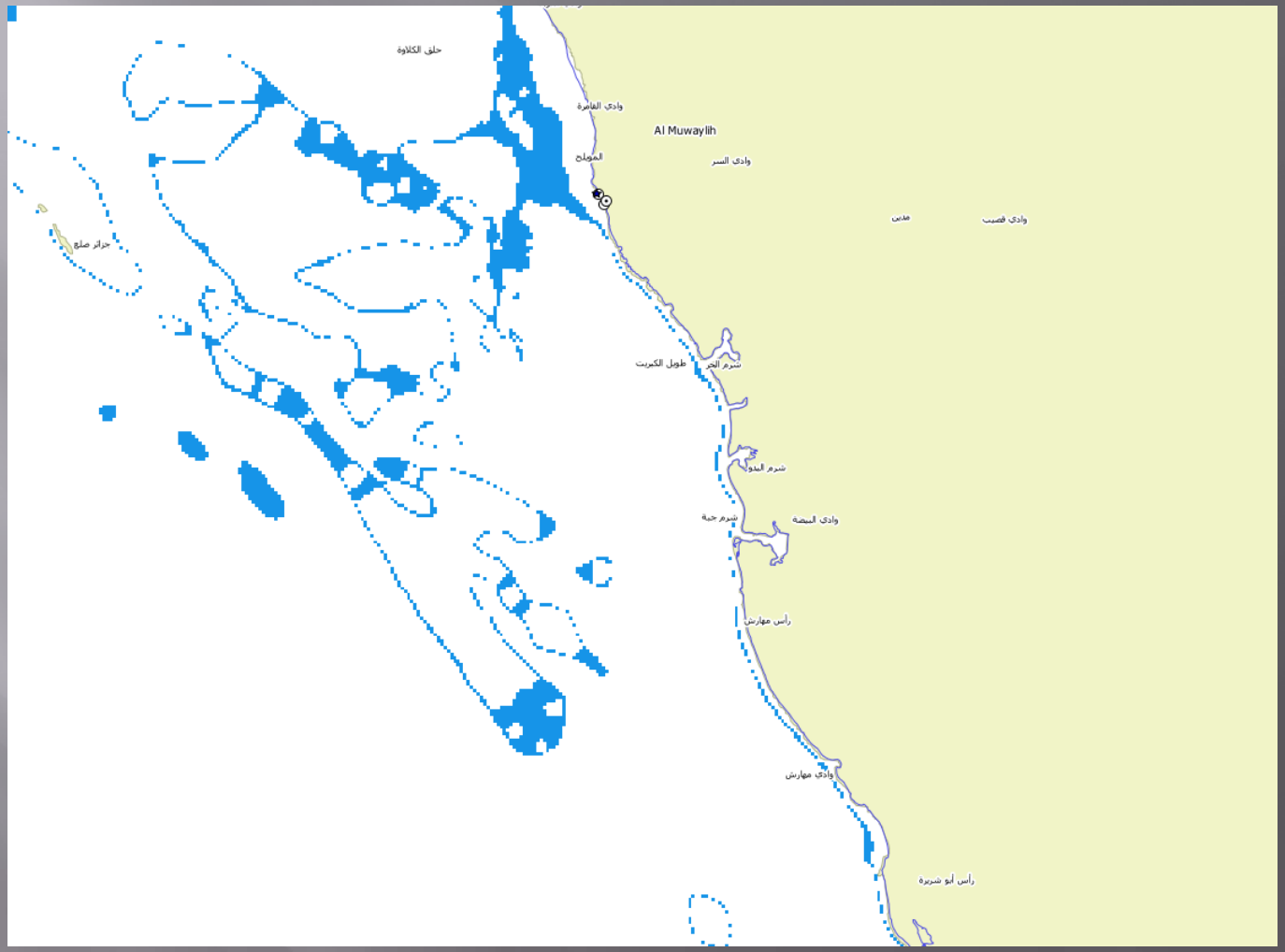
Proposed marine protected areas

Using GIS for site selection



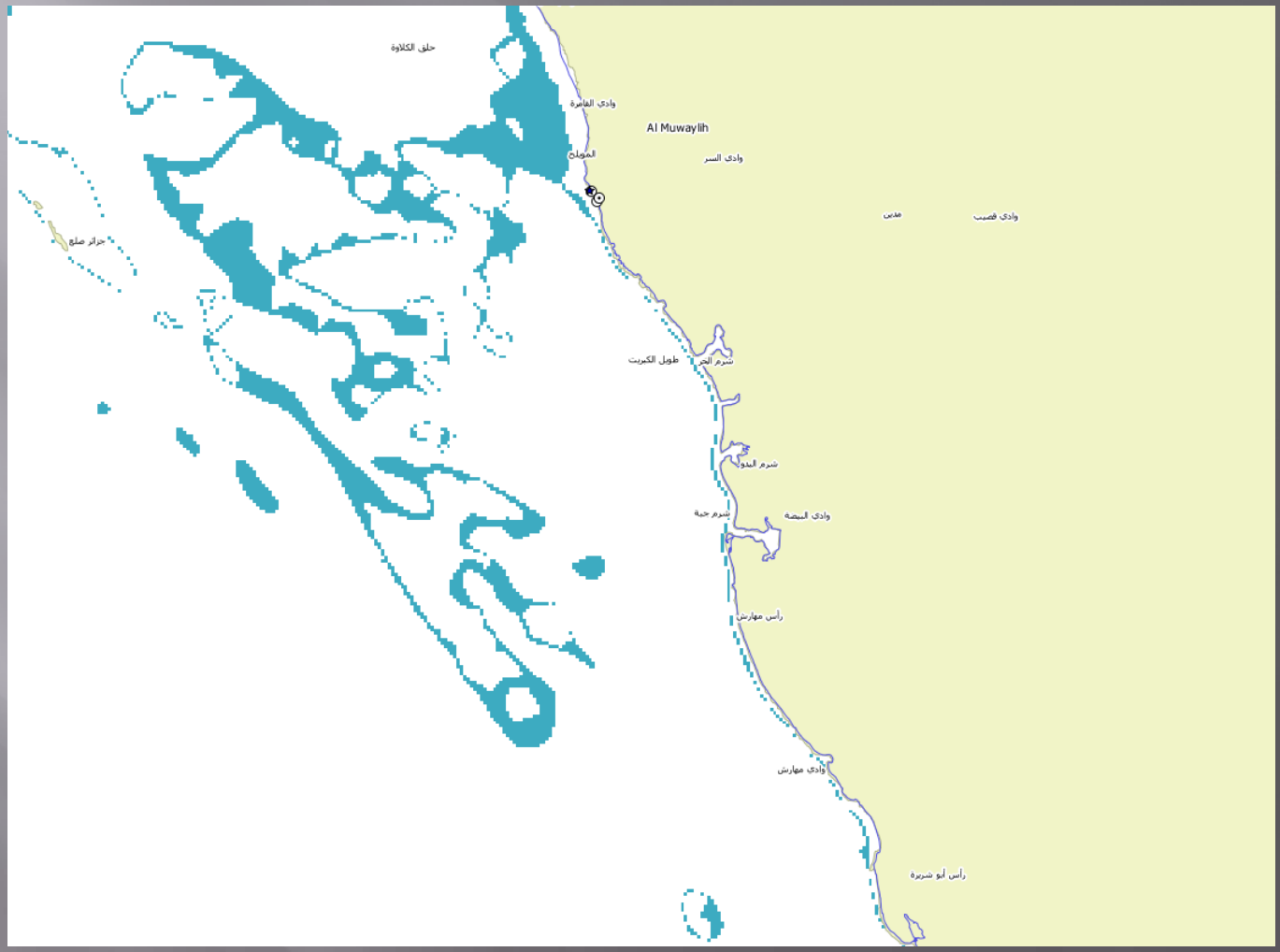
10 km and 20 km distance from the coastline

Using GIS for site selection



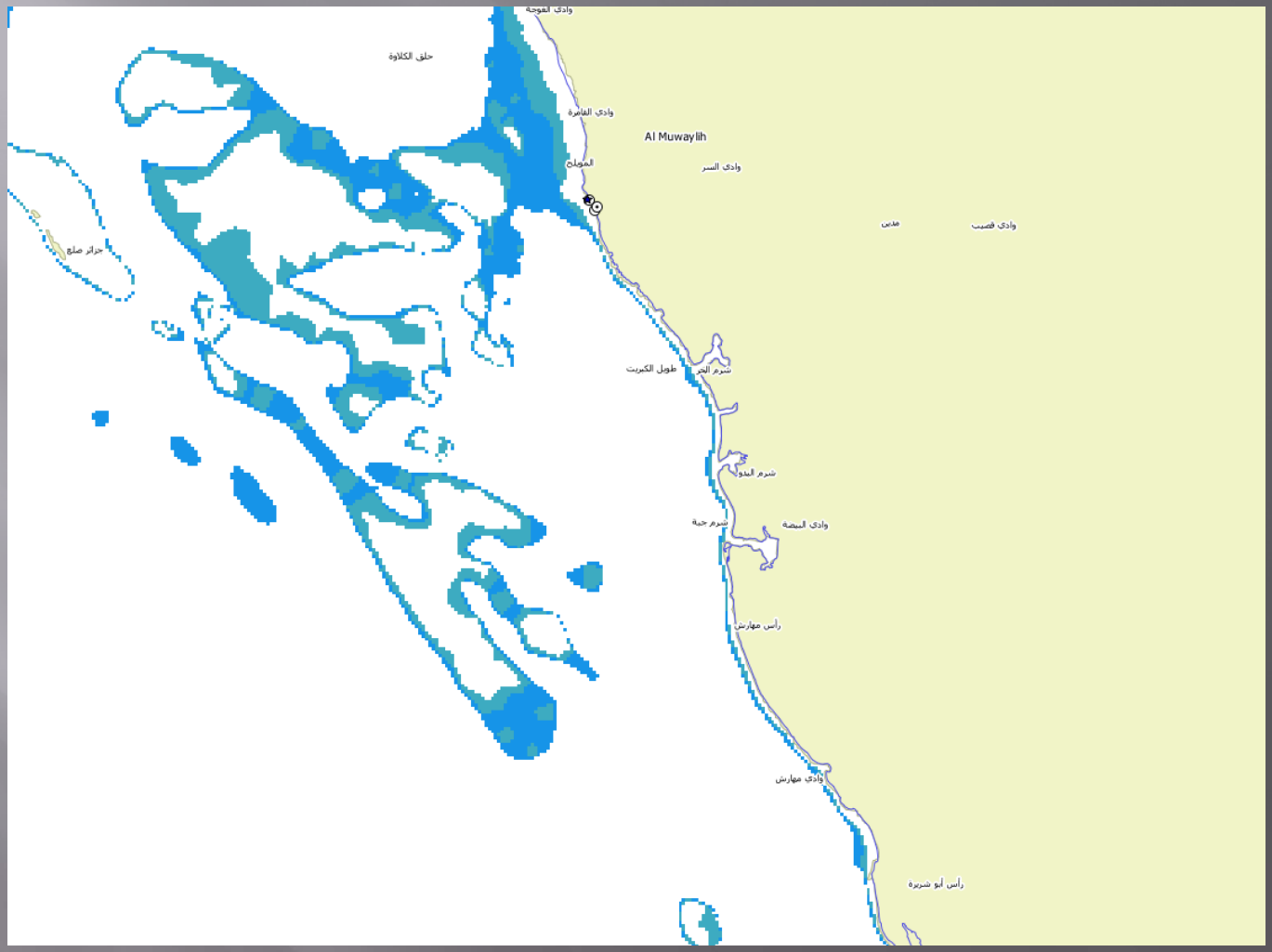
Depth range 25-50 meters

Using GIS for site selection



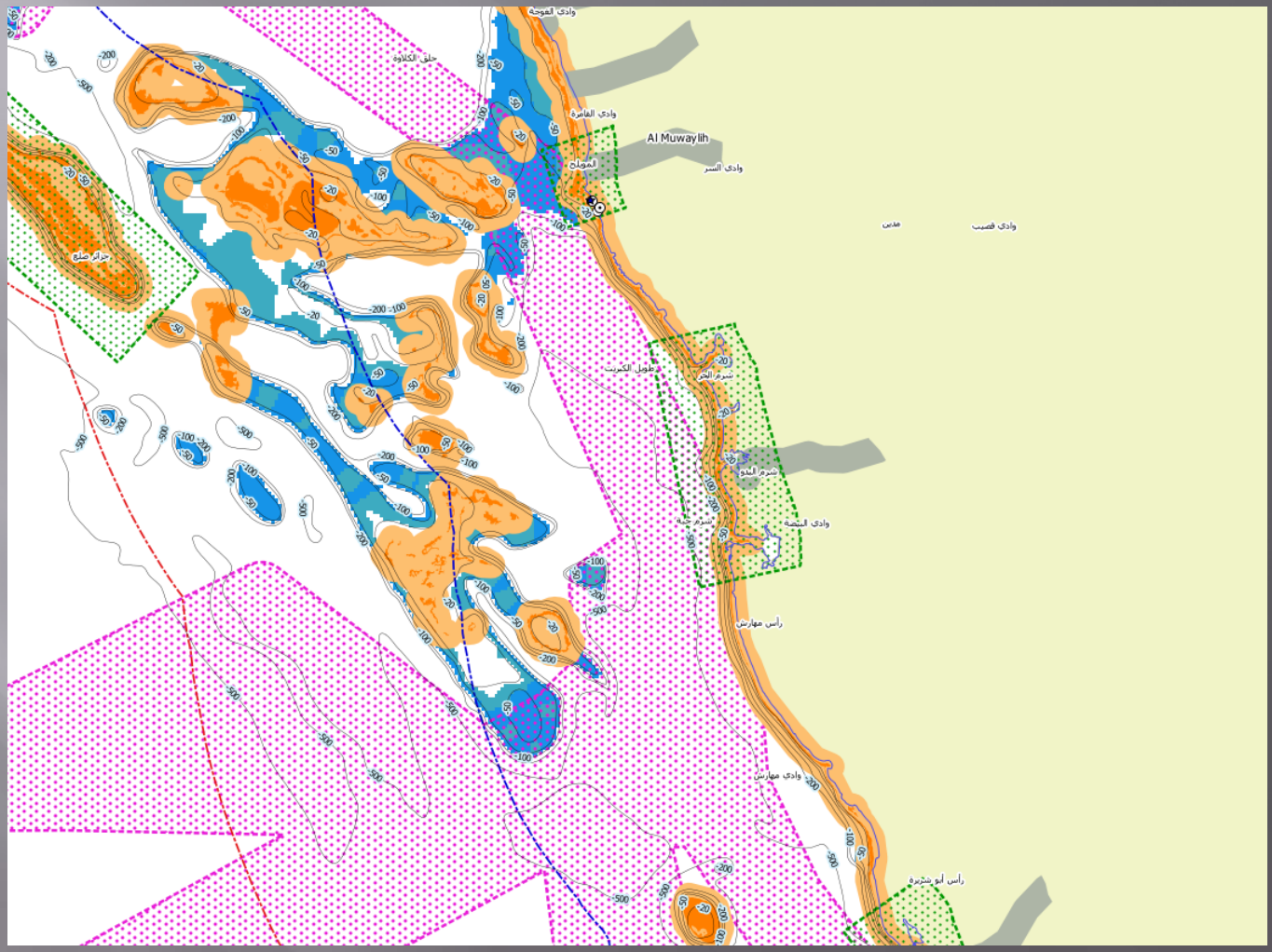
Depth range 50 – 80 meters

Using GIS for site selection



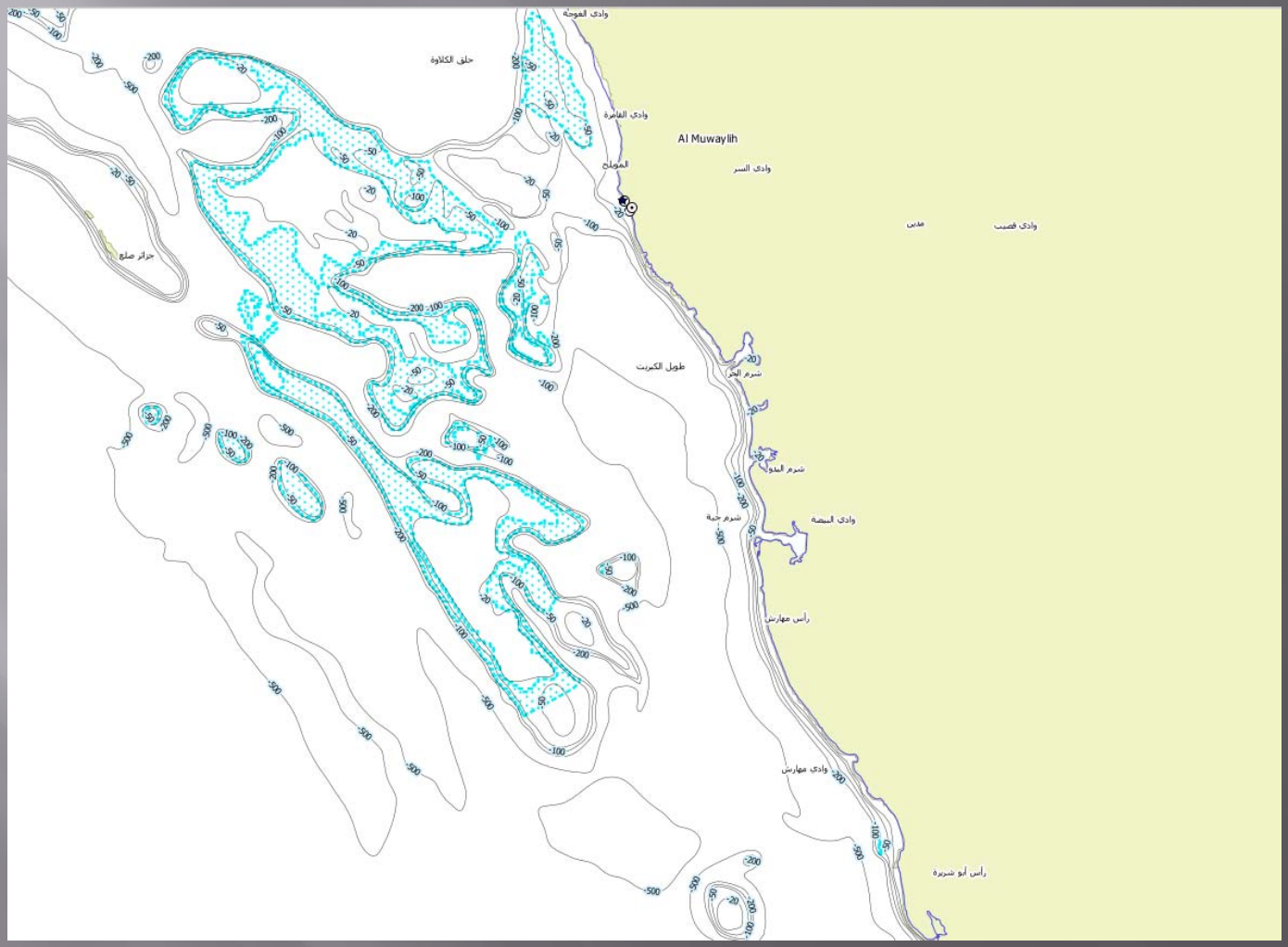
Depth range 25 – 80 meters

Using GIS for site selection



Potential Area + conflicts

Using GIS for site selection

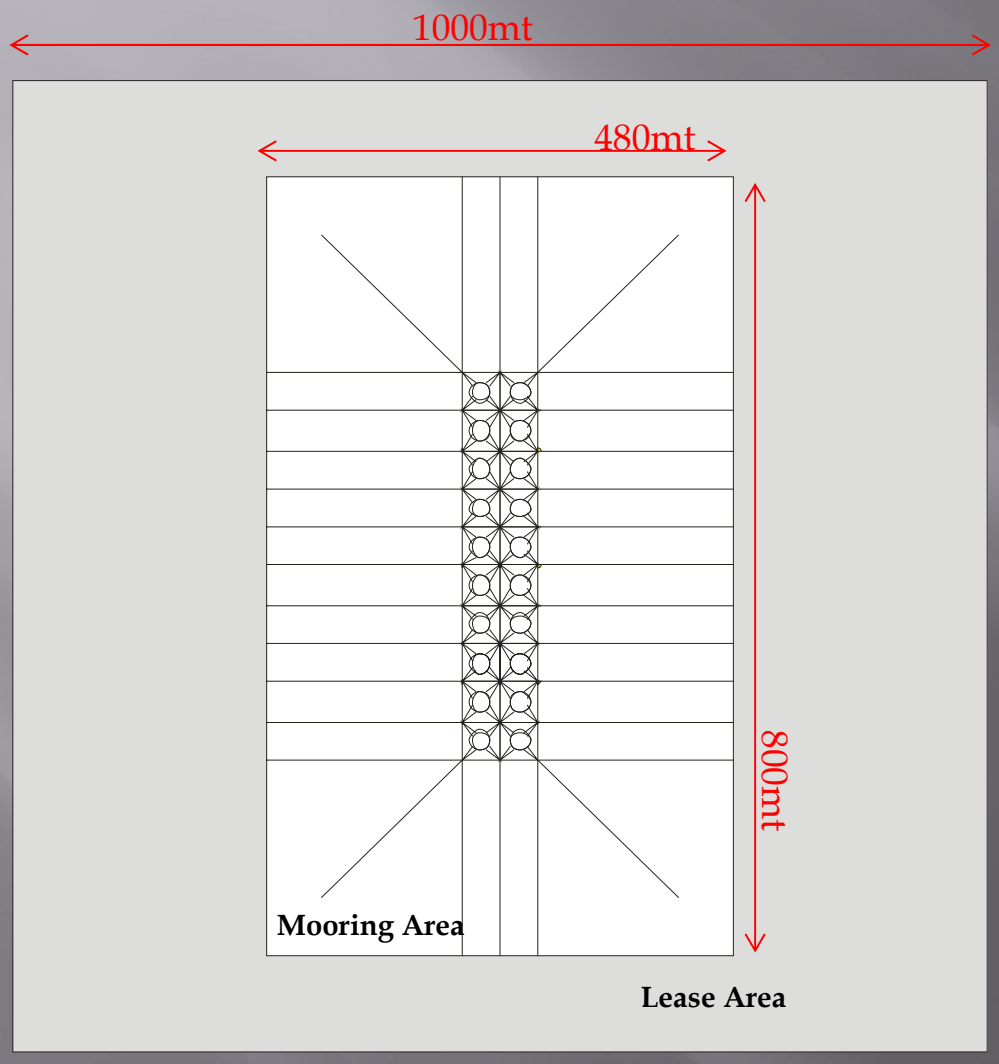


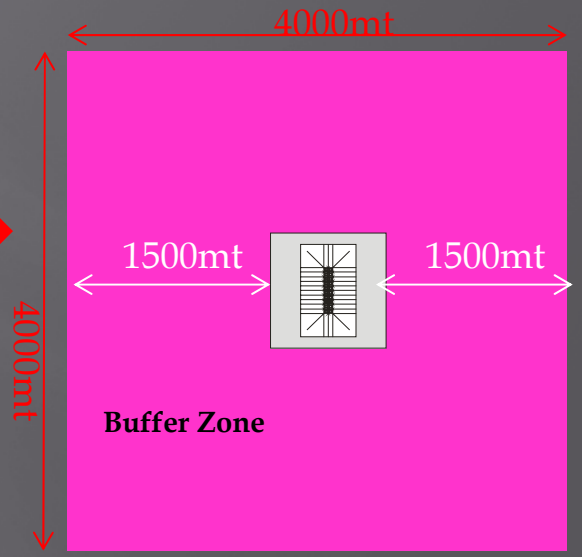
Depth range 25 – 80 meters

Using GIS for site selection

Depth range 25 – 80 meters

Using GIS for site selection





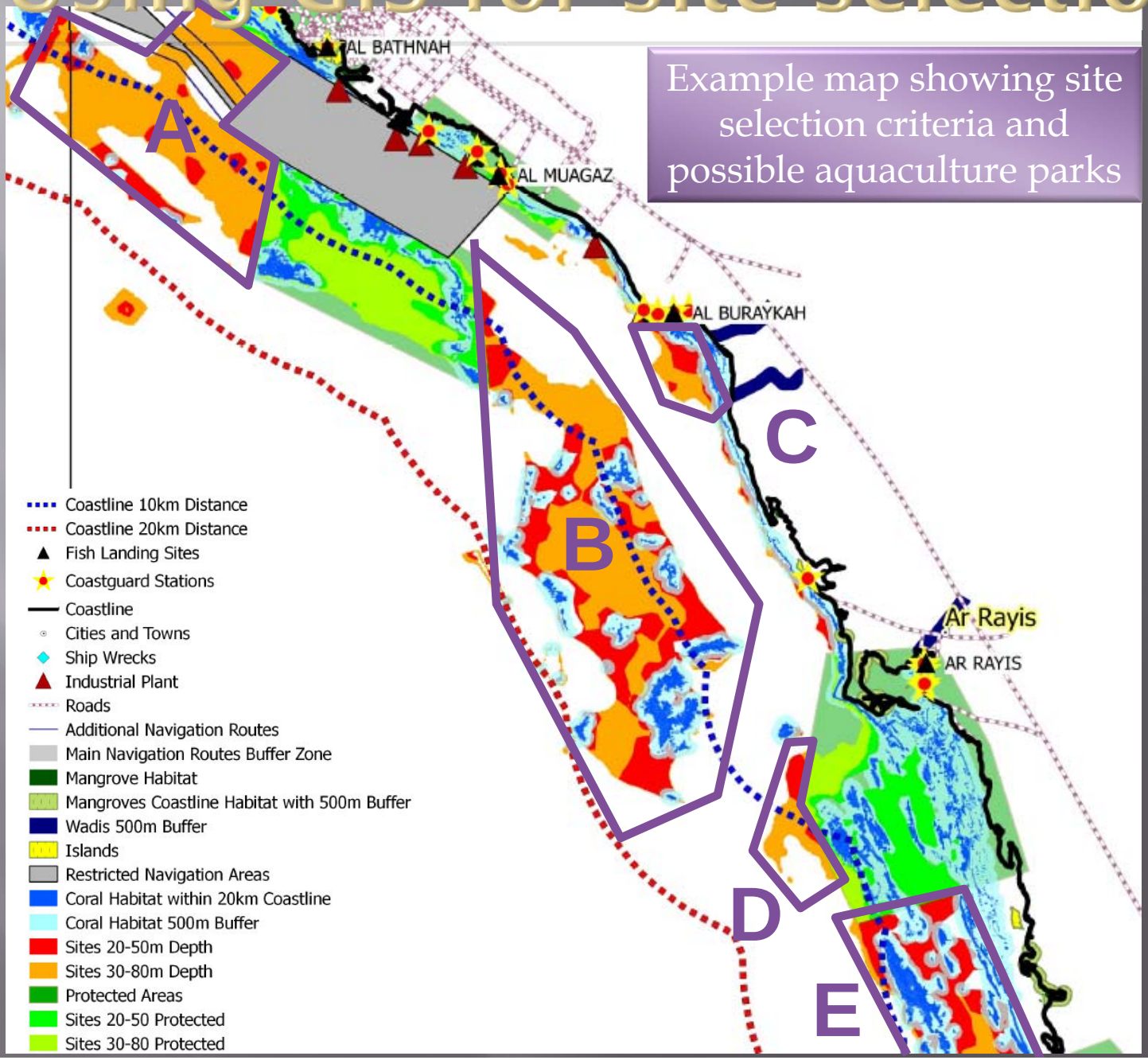
STANDARD CONSIDERATIONS

N° cages = 20
Cage diameter = 22mt
Net Depth = 10mt
Net Volume = 3800m3
Prod. Average Con. = 13kg/m3
Tot prod./cage = 50 tons
Tot prod./site = 800 tons

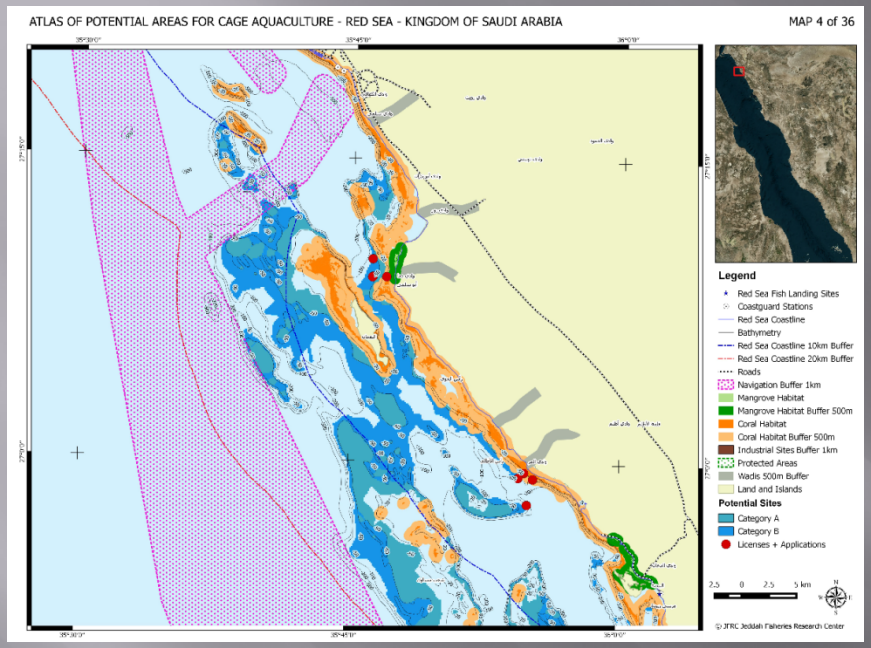
Using GIS for site selection

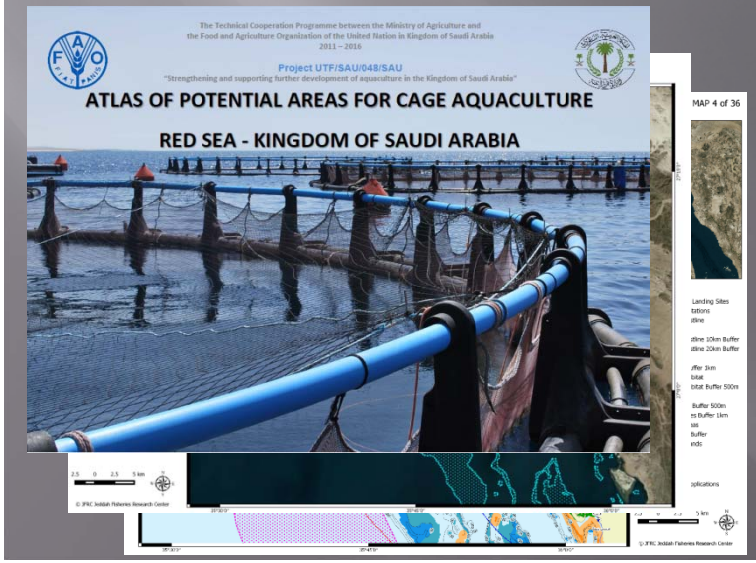
Possible distribution of 1 km2 licences with 3 km buffer

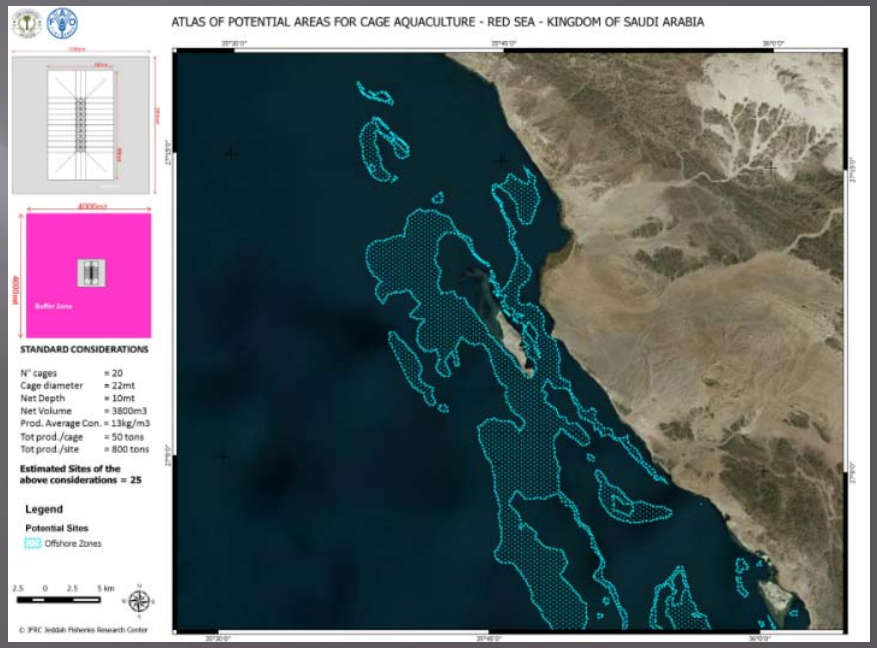
Using GIS for site selection



How to use the Atlas







ATLAS production guidance document for MoA and investors

How to use the Atlas

- Atlas provides background information for selecting the exact location of farms
- Atlas can be made available to investors and their advisors in electronic format with geo-referred areas
- The exact location of cage sites requires:
  - The cage project characteristics (target species, type of technology, target production, etc.)
  - Survey and ground thruthing of the potential area
  - Verification of additional criteria (conflicts, currents, winds, etc.)
  - Environmental impact assessments and Carrying capacity studies should support the site selection and the target production.
- JFRC can support investors in the identification of the surveying area
- Atlas can be used to enquire other coastal users (e.g. coastguard, PME, Army, ARAMCO, etc.) for enquiring them on the actual availability of the sites

Conclusion and discussion points

Next steps to improve the services to investors

- Integration of current datasets with additional available data
- Identification of main aquaculture parks
- Ground-truthing of selected parks

Next steps to use the map as a planning and management tool

- Publication and distribution of the Atlas
- Carrying Capacity analysis for selected sites/parks
- Development of a regulatory framework (regulation, protocol, etc.) to put into practice the analysis results
- Allocation of licenses according to appropriate application using spatial analysis

Thank you

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