POST-2020 NATIONAL STRATEGY FOR MARINE AND COASTAL PROTECTED AREAS (MCPAs) AND OTHER EFFECTIVE AREA-BASED CONSERVATION MEASURES (OECMs) IN THE MEDITERRANEAN COAST OF EGYPT: DIAGNOSIS REPORT

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ملخص تنفيذي

في إطار التعاون بين جهاز شئون البيئة / قطاع حماية الطبيعة ومركز الأنشطة الإقليمية للمناطق المتمتعة بحماية خاصة (SPA/RAC) وتحت مظلة المشروع الإقليمي "نحو تحقيق الوضع البيئي الجيد لبحر المتوسط والساحل من خلال شبكة للمناطق البحرية المحمية المتماسكة بيئياً والمدارة والخاضعة للرصد بكفاءة (IMAP-MPA) والممول من الاتحاد الأوروبي تم الاتفاق على وضع استراتيجية وطنية لشبكة المحميات البحرية لساحل البحر الأبيض المتوسط في مصر.

بالرغم من الخطوات الكبيرة التي خطتها مصر في مجال الصون وحماية التنوع البيولوجي والمحميات الطبيعية إلا أن ساحل البحر الأبيض المتوسط لم ينل الاهتمام الكافي مقارنة بساحل البحر المتوسط وعلى الرغم من إعلان 5 محميات طبيعية إلا أنه هناك قصور واضح على مستوى التخطيط الاستراتيجي للتنوع البيولوجي للساحل، وخلال السنوات العشر الماضية دعم مركز الأنشطة الإقليمية للمناطق المتمتعة بحماية خاصة (SPA/RAC) العديد من الأنشطة التي تهدف إلى تطوير عمليات إدارة وصون التنوع البيولوجي البحري والساحلي على طول ساحل البحر الأبيض المتوسط.

هذا التقرير هو بمثابة النواة الأولية لإعداد الاستراتيجية الوطنية لشبكة المناطق البحرية المحمية (MPA) المحمية لما بعد عام 2020 لساحل البحر الأبيض المتوسط المصري والتي تساهم في حماية وصون وإدارة المناطق المحمية البحرية والساحلية (MCPAs) وغيرها من المناطق الخاضعة لتدابير الصون الفعالة الغير معلنة كمحميات طبيعية (OECMs).

يمتد ساحل البحر الأبيض المتوسط في مصر لمسافة 1000 كم (1100 كم تقريباً)، ويتم تقسيمه مورفولوجياً إلى ثلاث مناطق تختلف في خصائصها المنطقة الغربية والتي يبلغ طولها حوالي 550 كم ومنطقة ساحل الدلتا النيلية والمنطقة الوسطى والتي يبلغ طولها حوالي 250 كم وأخيراً المنطقة الشرقية والتي تمتد لمسافة 200 كم تقريباً، ويضم ساحل البحر المتوسط 5 محميات طبيعية وهي الأحراش، الزرانيق، البرلس، أشتوم الجميل، السلوم وتم إعلانها لصون وحماية العديد من البيئات والموائل المنتشرة على ساحل البحر، كما تحتوي المنطقة على العديد من المناطق الهامة للتنوع البيولوجي بالإضافة للمحميات الطبيعية تتمثل في سواحل الدلتا النيلية على البحر المتوسط والبحيرات الضحلة قليلة الملوحة من الشرق للغرب وهي مريوط، إدكو والبرلس والمنزلة وتعتبر تلك المناطق موطناً آمناً للعديد من الطيور المهاجرة والمهدد بعضها بالانقراض وهي ذات اهتمام عالمي كبير وذلك نظراً لاعتبارها أحد أهم طرق هجرة الطيور في العالم.

فعلى سبيل المثال نجد أنه من بين أكثر من 2000 نوع من النباتات في مصر، يوجد حوالي 1000 نوع على بعد 30 كم من ساحل البحر الأبيض المتوسط (IUCN، 2003). ومع ذلك فقد أصبح عددًا كبيرًا من النباتات في مصر نادرة محليًا أو انقرض بسبب تدمير الموائل والرعي الجائر، والإفراط في الحصاد. وتضم محافظة مطروح والمناطق المحيطة بها أكثر من 50٪ من النباتات الطبية والعطرية البرية الموجودة في مصر، أي أكثر من 1000 نوع بري. يتم حاليًا إساءة استخدام هذه الثروة وحصدها بشكل مفرط من قبل السكان الذين يستخدمونها في الطب الشعبي ورعي الحيوانات، مما يعرض النباتات لخطر الانقراض.

إن التنوع البيولوجي لساحل البحر الأبيض المتوسط في مصر ذو أهمية عالية بالنسبة للعديد من الأنواع، وهي موطن لمجموعة واسعة من النظم الإيكولوجية والحياة البرية والطبيعية نظراً لموقعها الجغرافي الفريد في

المقابل للسواحل البحر الأبيض المتوسط الشمالية. ويعد الساحل الشمالي لمصر غير متجانس للغاية من حيث القيمة البيئية، ويرجع ذلك أساسًا إلى التأثيرات البشرية التي أثرت على الموائل الساحلية، ففي كثير من الحالات قضت على العديد من الأنواع تاركة مناطق إيكولوجية قاحلة مع عدد قليل من الموائل الطبيعية المجزأة. وعلى الرغم من أهمية التنوع البيولوجي لسواحل البحر الأبيض المتوسط الا ان ما يتبقى يمثل سوى عدد قليل من الأنواع الموصوفة من قبل من أجل تحديد حالة حفظها. ويساهم التنوع البيولوجي لسواحل البحر الأبيض المتوسط في الاقتصاد ويدعم رفاهية الإنسان. ويرتبط جزء كبير من الناتج المحلي الإجمالي في مصر ارتباطاً مباشراً باستخدام الموارد البيولوجية، مثل الزراعة وصيد الأسماك والسياحة.

على الرغم من هذه المكاسب الاقتصادية الواضحة من التنوع البيولوجي، تشير الاتجاهات المستمدة من المؤشرات المتاحة إلى أن حالة التنوع البيولوجي آخذة في الانخفاض، وأن الضغوط عليه آخذة في الازدياد، على الرغم من الجهود الوطنية والدولية المبذولة لحفظ التنوع البيولوجي واستخدامه المستدام. ويتدهور التنوع البيولوجي في سواحل البحر الأبيض المتوسط على مستوى النظم الإيكولوجية والأنواع؛ كما أن التنوع الجيني آخذ في الانخفاض وترجع الخسائر إلى مجموعة من التهديدات تتمثل في فقدان الموائل وتشتتها، والاستغلال والاستخدام غير المستدام للموارد الطبيعية، والتلوث، والأنواع الغازية. كما ساهمت الموارد البشرية والمالية المحدودة في فقدان التنوع البيولوجي وتستمر هذه الضغوط في الازدياد مدفوعة بمجموعة من الدوافع الاجتماعية والاقتصادية، لا سيما التزايد في عدد السكان والموارد البشرية والمالية المحدودة.

ومن شأن تغير المناخ أن يعمل على التآزر مع تهديدات أخرى ذات عواقب وخيمة على التنوع البيولوجي.

ويشكل فقدان المباشر للموائل تهديدا رئيسيا للنظم الإيكولوجية البرية والبحرية والساحلية. وتتأثر النظم الإيكولوجية للمياه العذبة بشدة بالتجزؤ بفعل استصلاح الأراضي والتحضر والأنشطة الصناعية وتدمير وتغير الموائل الطبيعية الحرجة إلى جانب الحياة النباتية والحيوانية.

ويسهم الرعي الجائر وصيد الأسماك الجائر في تدهور التنوع البيولوجي ويعد الاستخدام للحياة البرية في سواحل البحر الأبيض المتوسط غير منظم في معظمه، كما أن الصيد الجائر يعرض عددا من الحيوانات البرية للخطر فضلا عن عدة أنواع من الطيور المقيمة والمهاجرة. وتشمل المجموعات الرئيسية المستغلة: النباتات الطبية، والثدييات من أجل اللحوم، والصيد الترفيهي، وصيد الطيور من أجل الغذاء، وتجارة الحيوانات الأليفة، والبرمائيات من أجل الطب التقليدي والغذاء.

يتسبب التلوث وتفتيت وتدهور الموائل الحرجة في فقدان الأنواع. ومن الأمثلة الملموسة على ذلك الأراضي الرطبة في الدلتا. كما يتسبب الاستخدام المفرط للمبيدات الحشرية وسوء استخدامها في فقدان الأنواع النادرة بما في ذلك الأنواع التي تعمل كملقحات وعوامل المكافحة البيولوجية الطبيعية.

ولا تزال الأنواع الغازية تشكل تهديدا كبيرا لجميع أنواع النظم الإيكولوجية والأنواع في مصر بشكل عام وسواحل البحر الأبيض المتوسط بشكل خاص. ولا تزال المعلومات المتاحة حاليا عن الأنواع الغازية غير كافية أو غير متوفرة بسهولة. وجهود مكافحة واستئصال الأنواع الغازية القائمة على منع إدخال أنواع جديدة، لا تزال محدودة على الرغم من أن الأنواع الغازية تشكل تهديدا حقيقيا للنظم الإيكولوجية المصرية والاقتصاد وصحة الإنسان وتتجاوز مكافحة الأنواع الغازية الإمكانات الحالية للبلد من حيث الموارد البشرية والمالية والتقنية وتتطلب مشاركة جميع الجهات والمؤسسات المعنية.

ومن المرجح أن يؤدي تغير المناخ إلى تفاقم العديد من المخاطر السابق ذكرها وإلى الحد من الخيارات المتاحة فرادى وواضعي السياسات وثمة حاجة إلى تقييمات كمية ومنهجية للتكاليف التي تسببها التغيرات في التنوع البيولوجي على توفير خدمات النظم الإيكولوجية، أو كيفية تأثير إنتاج خدمات النظم الإيكولوجية على التنوع البيولوجي..

ويؤثر فقدان التنوع البيولوجي في نهاية المطاف على وظائف النظم ا ة، وعلى قدرتها على تقديم السلع والخدمات ا ساسية. ونتيجة لذلك، من المتوقع أن تترتب على ذلك آثار اجتماعية واقتصادية وتقنية وإيكولوجية خطيرة. إن التدهور المستمر في التنوع البيولوجي يضع خدمات النظم ا ة الهامة على المحك، مما يؤثر في نهاية المطاف على رفاهية المصريين.

ويتناول هذا التقرير:

- *المعلومات ا ساسية لمنطقة الدراسة*
- *خصائص البيئات الساحلية*
- *شرح واضح للحالة الراهنة للتنوع البيولوجي البحري والساحلي، وسير المواقع ذات ا ة للحفظ بما في ذلك ال- MCPAs و OECMs المحتملة في ساحل البحر ا بيض المتوسط في مصر*
- *عرض وتقييم التحديات التي تواجه حماية وحفظ التنوع البيولوجي البحري والساحلي، والمواقع ذات ا ة للحفظ بما في ذلك ال- MCPAs و OECMs المحتملة في ساحل البحر ا بيض المتوسط في مصر.*
- *ا او التهديدات الحالية*
- *تحديد قيم التنوع البيولوجي*
- *تحليل ا ضاع البيئية والاجتماعية والاقتصادية والقانونية (المعوقات والمشاكل وا ثار وا مكانيات(؛*
- *جرد للمواقع ذات ا همية للحفظ التي تكون جزءًا من شبكة ل- MCPAs و OECMs في ساحل البحر ا بيض المتوسط في مصر وتعيين حدودها (باستخدام تقنيات رسم الخرائط القائمة على نظام المعلومات الجغرافية(*
- *قترح رؤية وأهداف إستراتيجية ستراتيجية الوطنية التي تم تبنيها حسب ا وية على أساس*
- *نتائج التقييم والتشخيص والتحديات ذات ا وية المحددة*

وقد تم جمع المعلومات والبيانات الموجودة في التقرير من مصادر مختلفة، وقد تم مراجعتها وإجراء تحليل شامل لهذه البيانات لتحديد عناصر التشخيص كمرحلة أولى لوضع ا ستراتيجية الوطنية.

يستخدم هذا التقرير لتحديد ا جراءات التي يمكن أن تتعامل مع المواقف التي تعتبر مهمة وعاجلة وتحديد إجراءات وآليات تنفيذ في إطار تطوير وإدارة المواقع المختارة.

ومن ل ورش عمل الخبراء والمعلومات التي تم تجميعها وعمليات المشاركة مع الجهات ذات الصلة، تم وضع الب التوجيهية وأنشطة ومنهجية إعداد ا ستراتيجية بما في ذلك تقييم الوضع الحالي المتعلق بالحماية البحرية والساحلية للبحر ا بيض المتوسط في مصر ورسم خريطة أصحاب المصلحة وتحديد أدوارهم في إدارة واستدامة الموارد الطبيعية في المحميات المعلنة.

هذا وقد تمت تحليل المعلومات وإجراء تحليل لنقاط القوة والضعف والفرص والمهددات وهو ما أوضح الرؤية للوضع القائم وساعد في وضع الخطوط والمبادئ ا طار ا ستراتيجية، كما تم إعداد قائمة تعرف على أصحاب المصلحة المحتملين لمنطقة محل الدراسة وتم تحديد العديد من ا جتماعات معهم وهو ما أتاح الفرصة لتحديد فرص إدارة وصون المناطق البحرية الساحلية المحمية (MCPAs)/المناطق الخاضعة لتدابير الصون الفعالة القائمة على المناطق غير المعلنة كمحميات طبيعية (OECMs)، مثل استخدامات ا راضي المحتملة وخطط التنمية ومستويات التنمية الحالية وا نشطة الاقتصادية المؤثرة على المحميات الطبيعية وطرق عيش

السكان المحليين والدول الفاعلة والمرأة والشباب في صون وحماية التنوع البيولوجي بما في ذلك صيد الأسماك والرعي وصيد الطيور وجمع النباتات الطبية والصيد البري لغرض التجارة.

تم إجراء العديد من الزيارات الميدانية واللقاءات والاجتماعات مع المسؤولين الحكوميين والسكان المحليين من خلال اجتماعات فردية والمناقشات الجماعية المركزة والتي استهدفت عينات من مجموعات محددة من المجتمعات المحلية (الصيادين والمزارعين والرعاة والمرأة).

من خلال ورشة العمل التشاورية الأولى (الاستهلالية) تم الاتفاق على نتائج المرحلة الاستهلالية وتم تنقيح البيانات /المعلومات المقدمة من قبل الفريق الاستشاري عن منطقة الدراسة وتم توزيع استبيان على السادة المشاركين لاستيضاح العديد من النقاط الخاصة بمنطقة الدراسة.

تبع هذه الورشة وبناء على المعلومات والبيانات المقدمة من السادة الحضور بورشة العمل الاستهلالية تم مراجعة المستندات والدراسات السابقة وتحليل نقاط القوة والضعف وتحديد الفرص والمهددات وتحديد النظام الحالي لإدارة المحميات الطبيعية الموجودة بمنطقة الدراسة وكذلك الطرق والأساليب المتبعة لصون وحماية التنوع البيولوجي بطول ساحل البحر الأبيض المتوسط في مصر، كما تم تقييم الجوانب الطبيعية والقانونية والمؤسسية والاجتماعية والاقتصادية.

من أجل هذا فقد تم استعراض كافة التقارير والدراسات السابقة لمنطقة المشروع وتم وصف السمات الطبيعية والحيوية والخصائص الإدارية (القانونية والمؤسسية، والاجتماعية والاقتصادية) للمناطق المحمية الساحلية والبحرية (MCPAs) وتدابير الحفاظ الفعالة الأخرى (OECMs)، كما تم وصف الوضع الحالي لمنطقة الدراسة تتضمن الخصائص الطبيعية للحياة الساحلية والبحرية بالإضافة للجوانب الإدارية والخصائص الاجتماعية وتحليل كافة القوانين واللوائح والاتفاقيات الدولية ذات الصلة بالتنوع البيولوجي والمحميات الطبيعية مع الوضع في الاعتبار التحديات المحتملة لاستدامة الحماية والوصول للمناطق المحمية البحرية والساحلية وغيرها من تدابير الحفاظ الفعالة.

تم تحديد الموضوعات ذات الأولوية التي يتم تناولها من خلال الاستراتيجية الوطنية المقترحة للمناطق المحمية البحرية والساحلية (MCPAs) وتدابير الحفاظ الفعالة الأخرى (OECMs) في ساحل البحر الأبيض المتوسط.

ومن الجدير بالذكر أن هذا التقرير أعتمد على المواءمة مع المعايير العالمية والإقليمية ذات الصلة وخاصة اتفاقية التنوع البيولوجي ومعايير إدارة المناطق المتمتعة بحماية خاصة في دليل المناطق البحرية المتوسطية الذي اعتمدته اتفاقية برشلونة COP 22، والمعايير المشتركة لاختيار المناطق البحرية والساحلية المحمية التي يمكن إدراجها في قائمة المناطق المتمتعة بحماية خاصة ذات الأهمية المتوسطية (SPAMI).

وتعد مصر أول دول في البحر المتوسط تقوم بإعداد استراتيجية تتوافق مع استراتيجية البحر المتوسط لما بعد 2020 والإطار العالمي للتنوع البيولوجي.

الخلاصة

من خلال تحليل البيانات تبين وجود تغيرات بيئية جذرية في الساحل الشمالي لمصر على مدى العقود الماضية، نتيجة تدخلات بشرية مكثفة لاستغلال عناصر البيئة الطبيعية فضلاً عن النمو السكاني وما يرتبط به من تدهور بيئي حيث تؤدي التنمية البشرية إلى فقدان سريع للموائل نتيجة لذلك تغيرت العديد من الأنواع وتوزيعها أو اختفت تمامًا.

ستؤثر التغييرات البيئية في الحدود وتشتت السياسات المحلية والوطنية وأشكال التنمية المستقبلية. ويؤدي عدم وجود تشريع كاف للحفاظ على استخدام الأراضي إلى تفاقم هذه المشاكل.

وتعد أهم تلك المشاكل

1. حرث الأراضي لأغراض الزراعة والتحضر وبناء الطرق والتي تعد السبب الرئيسي في فقدان الموائل وتعديلها وتجزئتها. كما أدخلت الزراعة أيضًا أنواعًا نباتية غريبة تم إدخالها عن غير قصد مثل النباتات المتجانسة، أو عن طريق الأنواع التي تم إدخالها عمداً مثل أشجار الكينيا والكازوارينا.
2. استخدام المبيدات أدت الزراعة المكثفة واستخدام المبيدات إلى القضاء على العديد من الحيوانات المحلية في المنطقة. قد تصل هذه الملوثات أخيرًا إلى الأنواع الرئيسية عبر السلسلة الغذائية بما في ذلك الأنواع المحمية مثل الطيور الجارحة. لذلك فإن المبيدات لها آثار ضارة على التنوع البيولوجي، وخاصة الطيور.
3. الرعي وتشمل حيوانات الرعي الأغنام والماعز والأبقار والجاموس والحمير. يؤثر الرعي الجائر للأغنام والماعز على النباتات المحلية مع تأثيرات على الحيوانات التي تعتمد عليها بالقص غير المتكرر للغطاء النباتي المستساغ ويميل الرعي إلى إزالة الأكثر من النباتات المعمرة الغنية بالمواد الغذائية التي ترعى الأغنام والماعز بكثافة، في حين أن النباتات الحولية تنبت بكثافة. علاوة على ذلك، قد يؤدي ازدحام الحيوانات الأليفة إلى ضغط التربة والتأثير على الأنواع الأرضية وتدمير الجحور والأوكار.
4. الحيوانات البرية حيث تتنافس الكلاب والقطط المشردة على الموارد الغذائية مع آكلات اللحوم البرية المحلية وقد تؤثر على الأنواع المهددة بالانقراض. فقد أشارت التقارير أن الذئب الأفريقي البري في تراجع في المناطق التي تتنافس فيها مع الكلاب الضالة المحلية.
5. صيد الأسماك وتربية الأحياء المائية تتأثر مصايد البحيرات الشمالية بممارسات الصيد غير القانونية بما في ذلك الصيد الجائر بالقرب من البواغيز. كما أن النمو السريع لاستزراع الأسماك له تأثيرات عديدة على البحيرات بسبب ممارسات غير صحية كتغذية الأسماك على مخلفات الدواجن واستخدام الهرمونات والمضادات الحيوية. علاوة على ذلك، يمكن أن تؤثر الأسماك الهاربة من المزارع السمكية على الأسماك المحلية بسبب المنافسة الغذائية وانتقال الأمراض والتغيرات الوراثية نتيجة التزاوج المحتمل بين الأفراد البرية والأسرى.
6. التأثيرات على قنوات الري والمصارف يرجع تلوث قنوات الري والمصارف بشكل أساسي إلى التخلص من الفضلات المنزلية وتصريف مياه الصرف الصحي. كما يستخدم السكان المحليون قنوات الري لغسيل الملابس والأطعمة وأدوات المطبخ، بالإضافة إلى ذلك يؤثر الري الفضلات المنزلية والصلبة والسائلة التي تتراكم في المسطحات المائية على الخصائص الفيزيائية والكيميائية والبيولوجية للنظام البيئي المائي، مما يؤدي إلى استنفاد جودة المياه، وإدخال الكائنات المسببة للأمراض في البيئة المائية وعرقلة مجاري المياه. يتأثر بشكل حاد النظام البيئي المائي سلبًا ويمكن أن يتراوح التأثير من تقليل التكاثر وأيضًا انخفاض إجمالي عدد النباتات والحيوانات المتنوعة إلى انقراض عدد قليل من الأنواع التي يمكنها البقاء في البيئة المتغيرة. يؤدي إثراء المجاري المائية بالمغذيات إلى زيادة كبيرة في إنتاجية النباتات المائية، وهو ما يعرف بالإثراء الغذائي "التخثث" الذي ينتج زيادة في إنتاجية النباتات المائية، تتم إضافة المزيد من المواد العضوية إلى النظام، والتي تموت وتتحلل في النهاية وتنتج المادة العضوية المتحللة روائح كريهة وتستنفد إمدادات الأكسجين التي تتطلبها الكائنات المائية يمكن أن تؤدي النباتات

الطولة من تركيزات الأكسجين المذاب المنخفضة التي تبلغ 2 ملجم/لتر أو أقل إلى مجاري مائية نائية".

7. الأنواع الغازية: تعد الحشائش واحدة من الأنواع الغازية في المنطقة. أخطر هذه الأنواع وأكثرها انتشارًا هو هفير الماء (*Eichhornia crassipes*)، الذي تم إدخاله في الأصل إلى مصر من أمريكا الجنوبية. يمثل هفير الماء أحد أخطر المشاكل البيئية التي تهدد البحيرات الدلتا، وخاصة بحيرة المنزلة التي تعد أكبر البحيرات وواحدة من أسوأ حالات هذه الأنواع الغازية المعروفة في العالم، وربما الأخطر في الشرق الأوسط/شمال أفريقيا. وعلاوة على ذلك فهو يساهم في زيادة المغذيات وتسريب هذه الأراضي الرطبة، مما يؤثر على حياة الحياة البرية ويعيق المصايد، مما يؤثر على سبل عيش الصيادين المحليين. ويلاحظ أيضًا أن هفير الماء يشكل مشكلة على طول نهر النيل وفي شبكة الصرف الصحي والقنوات.

8. إزالة النباتات المائية: تعتبر إزالة القصب وغيره من النباتات المائية ممارسة شائعة في الأراضي الرطبة للريف في مصر، سيطرة القضاء على أنواع النباتات الغازية المدخلة (مثل هفير الماء) التي تقلل مستوى الأكسجين المذاب وتكون مسؤولة عن التدهور في الأراضي الرطبة. ومع ذلك فإن إزالة الموائل الطبيعية للغطاء النباتي هي ممارسة غير انتقائية تقضي أيضًا على الحيوانات الفقارية (مثل القواقع والديدان) وأسماك الصغيرة واللافقاريات المائية الأخرى، مما يؤثر على الحيوانات المفترسة المائية والأرصدة السمكية.

9. الصيد والاتجار الحياة البرية: إن الاتجار هو أحد أهم التهديدات على سبيل المثال الأخرى في المناطق الساحلية المصرية من غرب البحر المتوسط في مصر. كما لوحظ ارتفاع معدل فوق الحد للبحيرة على طول سواحل البحر الأبيض المتوسط وحيرات البردويل؛ الأسباب غير معروفة على الرغم من أن بعض الصيادين عرفوا ذلك بالحد من مصدر المعيشة للمتضررين من ضعف تطبيق القانون. كما أن صيد الطيور يشكل خطورة خاصة في محافظة دمياط وبأكثر من أي محافظة أخرى في البحيرة، وتوجد العديد من التجمعات من شبكات الصيد على مدار العام، ويتم تشكيل شباك العشوائية مع الطيور القوية التي يتم اصطيادها وكذلك الزوارق وأماكن الشتاء والهجرة للبط والطيور المائية.

يتم اصطياد الطيور من أواخر أغسطس إلى أوائل سبتمبر بشكل أساسي على طول ساحل البحر الأبيض المتوسط، ويعتبر السمان (Corturnix coturnix) أحد الأنواع المستهدفة الرئيسية لصيد طيور الخريف، ولكن يتم احتجاز جميع أنواع الطيور وربما في ذلك Corncrake والطيور المغردة والطيور الجارحة في شمال سيناء، حيث تشارك 500 أسرة في شباك السمان لكل موسم، من المحتمل أن يكون لهذا النشاط تأثير كبير على مجموعات الطيور قارنة بمناطق الشباك الأخرى في مصر، يتم احتجاز الطيور الصغيرة عرضيًا كطيور غير مستهدفة في شباك السمان التي تصيد الطيور والطيور المائية في بحيرة المنزلة من الخريف إلى الربيع، مع موسم الصيد الرئيسي في فصل الشتاء في حين أن البط هو من أكثر الأنواع المرغوبة التي يبحث عنها الصيادون فإن الشباك تصطاد جميع أنواع الطيور ويبدو أنها تبقى طوال الوقت.

يُعد اصطياد الصقور غير القانوني لاستخدام الحمام الحي (كطُعم ممارسة شائعة على طول ساحل البحر الأبيض المتوسط وحظر سابقًا. كما تتم ممارسة محاصرة الطيور الجارحة على طول ساحل البحر الأبيض المتوسط في SinAIII تعتبر من منطقة شمال سيناء بموقعها على طرق الهجرة الرئيسية من أفضل المناطق في مصر، إن لم يكن في الشرق الأوسط بأكمله، لصيد الصقور ويتم مرور موسم

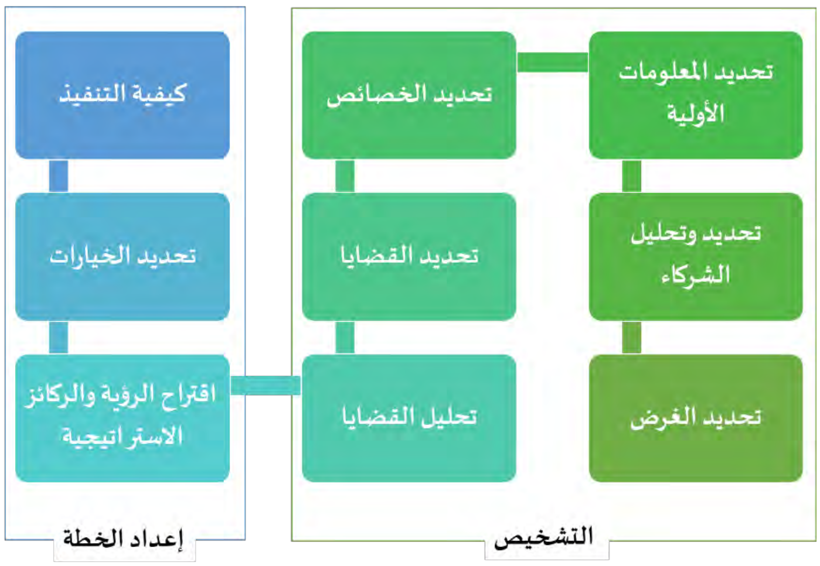
... حوالي 45 يومًا خلال شهري أكتوبر ونوفمبر. الصقور الكبيرة هي الهدف الرئيسي لهذا النشاط، مثل الحر (Falco biarmicus)، الصقر (Falco cherrug)، والشاهين (Falco peregrinus)، النوع الأخير هو الأكثر طلبًا وتقديرًا من قبل الصقارين الأغنياء من دول الخليج العربي.

إطار التخطيط الاستراتيجي

كما تناول التقرير ملخص إطار التخطيط الاستراتيجي المتبع لإعداد الاستراتيجية الوطنية لما بعد 2020 للمناطق البحرية والساحلية المحمية وغيرها من تدابير الحفظ الفعالة الأخرى.

منهجية إطار التخطيط الاستراتيجي

يعتبر التخطيط الاستراتيجي أحد الأدوات التي تستخدم من قبل المنظمات لتحديد استراتيجياتها واتجاهاتها على المدى الطويل ويعرض شكل 1 ملخص لمرحلتي وخطوات التخطيط الرئيسية.



شكل 1: منهجية التخطيط الاستراتيجي

تتضمن مرحلة التشخيص الجزء الأكبر من أنشطة التخطيط، وتهدف في مجملها إلى تعريف وتحديد وتحليل القضايا التي يجب أن تتناولها ووضع الأهداف والإجراءات لحلها.

وطبقًا للمنهجية (شكل 1) يجب في البداية تحديد الغرض، وهو في حالتنا إعداد استراتيجية وطنية لما بعد 2020 تتميز بأنها طموحة وقابلة للتطبيق للمناطق المحمية البحرية والساحلية بالإضافة إلى تدابير الحفظ الفعالة الأخرى القائمة على المناطق على ساحل البحر المتوسط في مصر.

وبناء على ذلك فقد تم تحديد وتقييم قائمة مبدئية بالشركاء الرئيسيين، والمعروضة بالكامل في تقرير المرحلة التشخيصية بالإضافة إلى ذلك فقد تم التشاور أثناء ورشة العمل التشاورية التي أقيمت في شهر أكتوبر 2022 لهذا النشاط على قائمة الشركاء الرئيسيين، وذلك بغرض تحديد أهمية وتأثير كافة الشركاء، وكذلك تحديد أي شركاء إضافيين. وقد أسفر ذلك عن تحليل ورسم خرائط الشركاء، والتي من خلالها تم تقسيمهم إلى ثلاث مجموعات، ومن ثم أمكن وضع تصور لكيفية تواصلهم والتشاور خلال مرحلتي التشخيص وإعداد الاستراتيجية.

كما أجري أيضا تحديد المعلومات الأولية عن المنطقة الجغرافية التي تشملها الاستراتيجية وتحديد كافة المحميات البحرية والساحلية فيها وكذلك المواقع المحتملة لتدابير الحفظ الفعالة الأخرى القائمة على المناطق.

ب ا فلذلك فقد تم تحديد الخصائص البيئية والطبيعية والاجتماعية والاقتصادية في كل قطاعات منطقة الدراسة.

تحديد القضايا

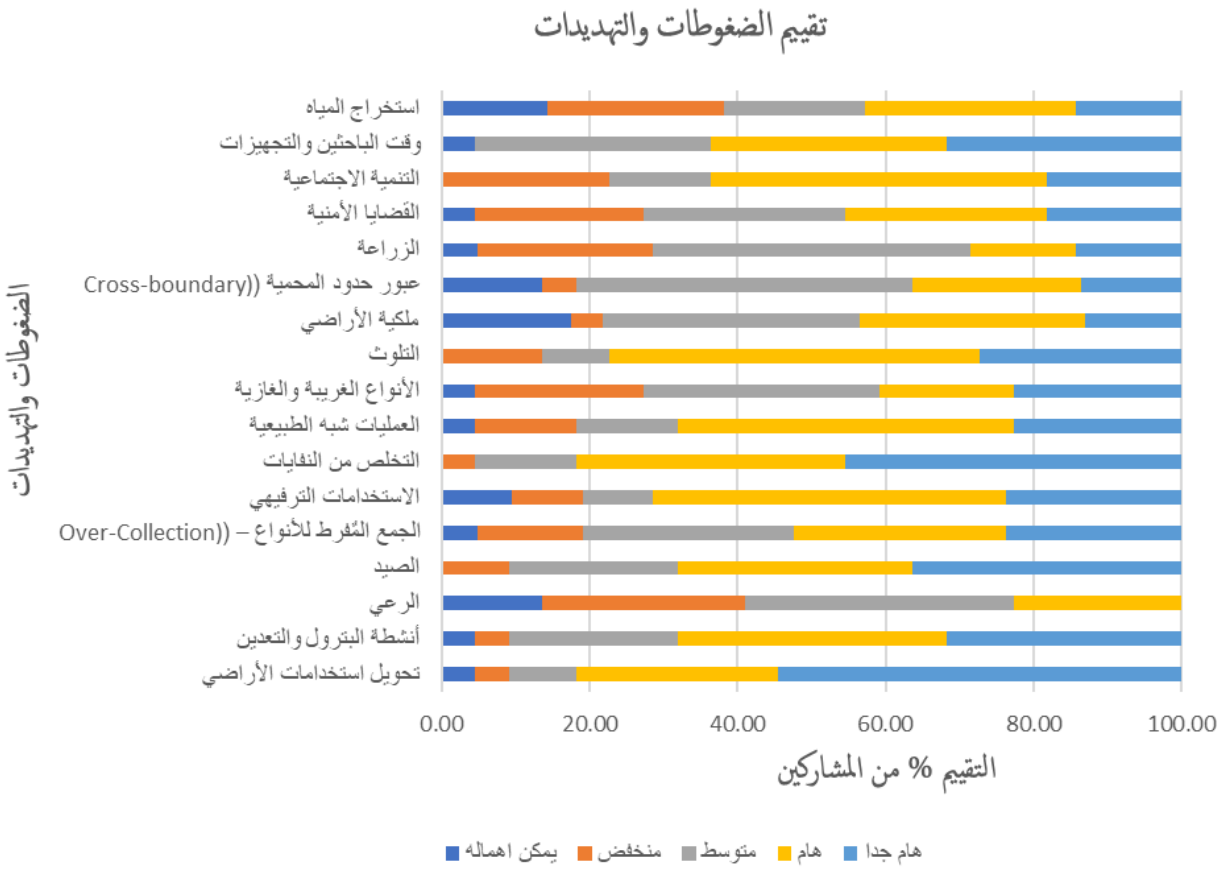
يعتبر تحديد تحليل القضايا جوهر عملية وضع الخطط أو التخطيط والبيئي التشخيص الجيد خطة جيدة. وقد خلصت دراسة الخصائص إلى تحديد قائمة شاملة لكافة القضايا والموضوعات التي تواجه التنوع البيولوجي في البحر المتوسط المصري، والتي تم مراجعتها وتنقيحها من قبل فريق ا شاري وتشمل أهم القضايا للضغوطات والتهديدات والتحديات الموضحة في الجدول التالي:

جدول 1: قائمة الضغوطات والتهديدات والتحديات

الضغوطات والتهديدات	التحديات
تحول استخدامات ا راضي	قلة الوعي البيئي
الفقريات (المخلفات)	عدم وجود خطط إدارة
التلوث	عدم وجود تنسيق
الاكتشافات البترول	نقص الموارد المالية
ح ا راضي	عدم وجود إطار للشراكة
عمليات الشواطئ الطبيعية	نقص القدرة المؤسسية
التنمية ا جتماعية	ا ر السياسية
ا خدام الترفيهية	قصور ا طار المؤسسي
الجمع المفرط نواع	قصور ا طار القانوني
ا نواع الغازية	التمكين الفعلي للمرأة
القضايا ا نية	
القضايا العابرة للحدود الجمية	
الفقر البيئي	
تغير المناخ البيئية	

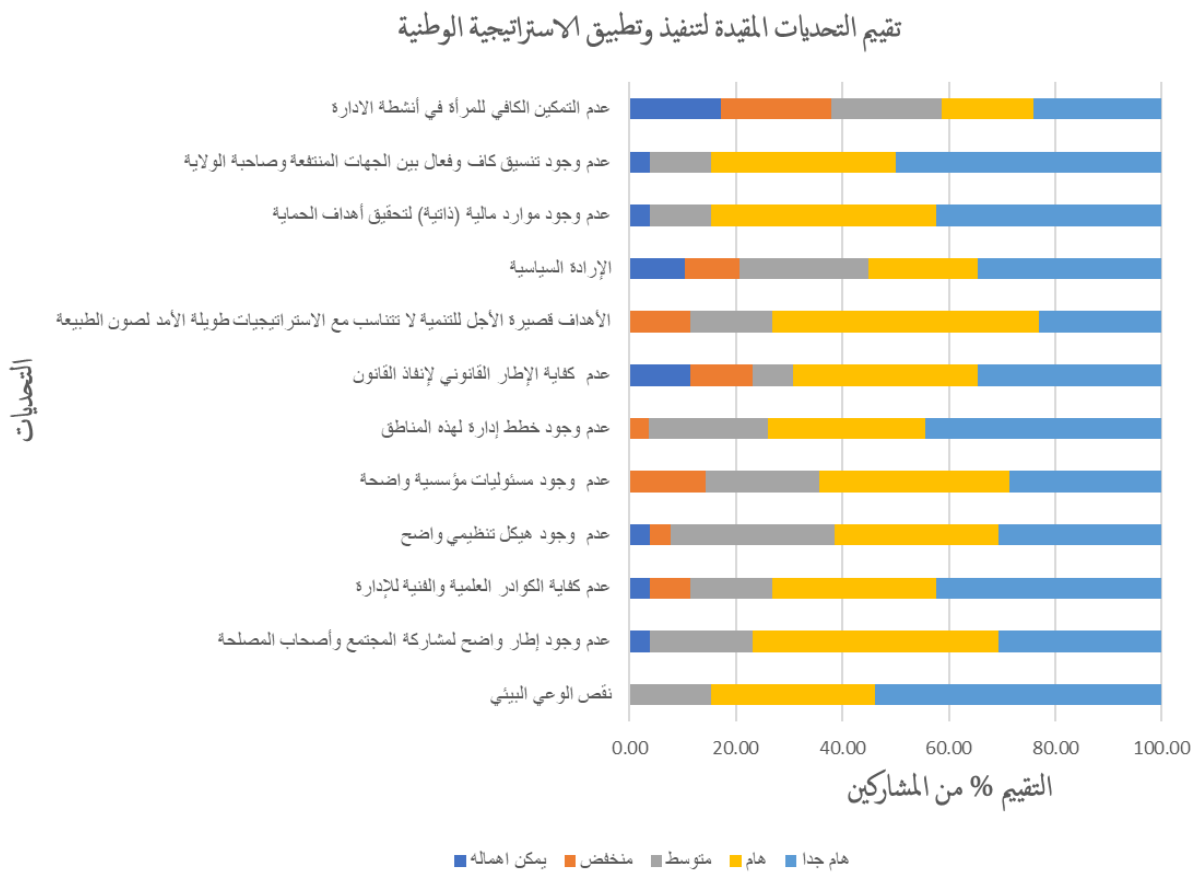
تقييم وتحليل القضايا

يعتبر تقييم وتحليل القضايا أمرا هاما لعلاج الحلول التي تحدد الدوافع وا ب، وكذلك فهم ا ار البيئية والاجتماعية والاقتصادية التي يترتب عنها القضايا. وهناك العديد من الطرق التي تستخدم في تقييم وتحليل القضايا، منها التحليل القطاعي والتحليل المكاني والتحليل الجغرافي والتحليل التي يمكن منها والتحليل التغيرات المتاحة التحليل الرباعي (SWOT) لنقاط القوة والضعف، والفرص والمهددات وتحليل الدوافع والضغوط والحالة والتأثير وا الاستجابة وتحليل بستيل (PESTEL) وتحليل ا اب الجذرية.



شكل 2: تقييم المشاركين للضغوط والتهديدات التي تواجه التنوع البيولوجي في البحر المتوسط المصري

وعلى سبيل أخر فقد تم خلال ورشة العمل تحليل تقييم التحديات التي من الممكن أن تتعرض لها التنوع البيولوجي في البحر المتوسط المصري من قبل الشركاء على نفس المقياس العددي المستخدم في التقييم السابق. وقد شملت أهم التحديات نقص الوعي البيئي وعدم وجود تنسيق كاف بين الجهات المعنية وصعوبة الو ة، وعدم وجود خطط إدارة المحميات، وعدم وجود الموارد المالية والكوادر البشرية.



شكل 3: تقييم التحديات المقيدة لتنفيذ وتطبيق الاستراتيجية الوطنية لإدارة المناطق المحمية في جزر المالديف

شكل 4: لدوفاع ولضغوط ولحالة ولتأثير وا ستجابة تطبيق على لبحر لمتوسط لمصري

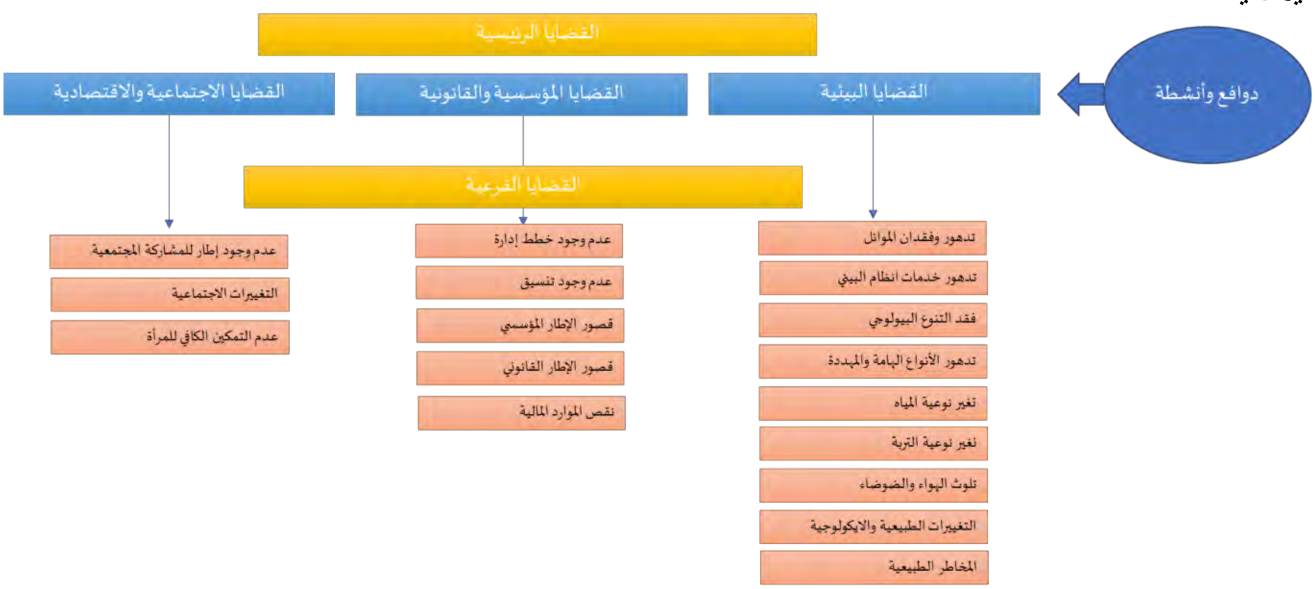
تم تحديد الأنشطة والاستخدامات في البحر المتوسط المصري، كما تم مراجعة الضغوط الناشئة والتهديدات المحتملة عن هذه الأنشطة أخذاً في الاعتبار تقييم الشركاء الذي تم من خلال التشاور.

ويمكن تلخيص التحليل الرباعي كالآتي:

- *أن هناك تنوع بيولوجي فريد على ساحل البحر المتوسط المصري،*
- *هذا التنوع البيولوجي معرض لفقدان نتيجة الضغوط، وأهم من ذلك نتيجة عدم كفاءة الأطر القانونية والمؤسسية وضعف المشاركة المجتمعية وقصور التنسيق والتعاون بين الجهات.*

تحليل القضايا

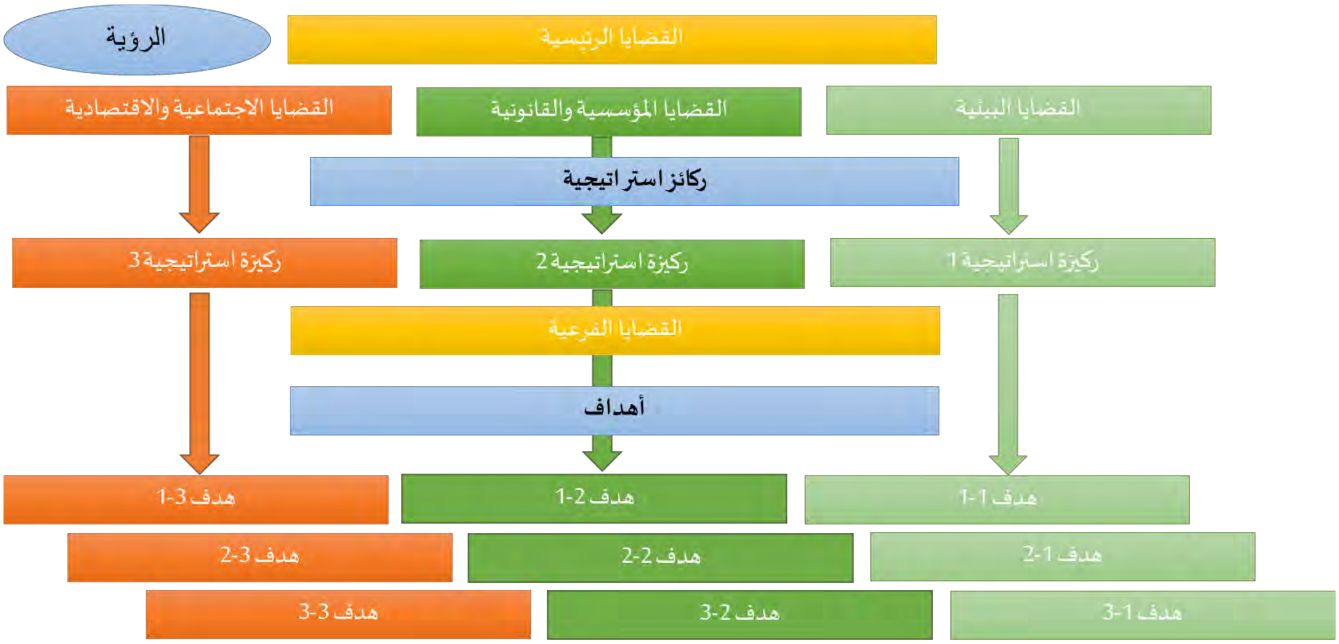
يمكن من خلال استخدام طريقة التحليل الرباعي والتقييم السابق استنتاج أن هناك عدد من القضايا الرئيسية المتعلقة التي تؤثر على حالة التنوع البيولوجي والتي ينتج عنه قضايا فرعية ويعرض الشكل التالي القضايا والقضايا الرئيسية.



شكل 5: القضايا الرئيسية والفرعية

الإطار الاستراتيجي

يعتمد الإطار الاستراتيجي على 3 مستويات رئيسية قابلة للقياس في إطار البرامج الخاصة التي يتم عرضها في التقرير الملحق. المستوى الأول هو الرؤية والتي تحدد من خلال تناول وحل القضايا الرئيسية، أما المستوى الثاني فيشمل الركائز الاستراتيجية بينما يشمل المستوى الثالث الأهداف.



شكل 6: الإطار الاستراتيجي

مقترح للرؤية

في نهاية جلسة النقاش تشاور المشاركون في مقترحات للرؤية وتم الاتفاق على الرؤية التالية.

نظم بيئية في البحر المتوسط المصري مصونة وبحالة جيدة وتدار بشكل فعال من خلال شبكة متواصلة وممثلة ايكولوجيا من المحميات البحرية والساحلية وتدابير الحفظ الأخرى لتحقيق أهدافها التنموية المستدامة ورفاهية الإنسان والحد من آثار التغير المناخ.

مقترح للركائز الاستراتيجية

تتناول الركائز الاستراتيجية القضايا الرئيسية والتي تم اقتراح 3 ركائز استراتيجية هي:

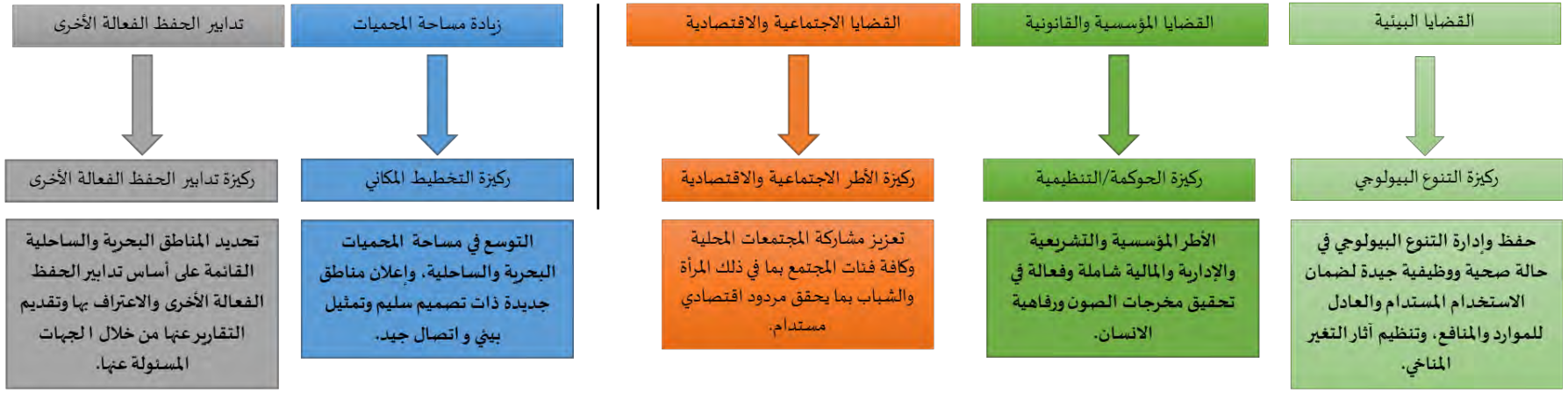
- *ركيزة التنوع البيولوجي*
- *ركيزة الحوكمة التنظيمية*
- *ركيزة الأطر الاجتماعية والاقتصادية*

ولكي تكون الاستراتيجية الوطنية متوافقة مع الاستراتيجيات الإقليمية فقد تم إضافة ركيزتان هما:

- *ركيزة التخطيط المكاني والتي تتيح أماكن لتوسيع قاعدة المحميات البحرية والساحلية.*
- *ركيزة تدابير الحفظ الفعالة الأخرى والتي تتناول تدابير الحفظ الفعالة الأخرى القائمة على أساس المناطق.*

وقد تم أثناء عقد ورشة العمل التشاورية الثانية في مارس 2023 التشاور بشأن هذه الركائز الاستراتيجية، حيث عرض الفريق الاستشاري الركائز المقترحة وتم فتح باب النقاش حول الركائز الاستراتيجية.

ويعرض الشكل التالي الركائز الاستراتيجية كما تم التوافق عليها مع الشركاء.



1. BACKGROUND

The report present gathered compiled, reviewed and analyzed existing knowledge, information and data from various sources. A thorough analysis and synthesis of these data has been carried out to determine the diagnosis elements as first phase to elaborate the national strategy. This report shall be used to identify measures which could deal with situations deemed to be important and urgent, and to define the procedures and mechanisms for their implementation within the framework of the development and management of the concerned sites.

The assessment-diagnosis report includes:

- An executive summary;
- A clearly explained current state of the situation of marine and coastal biodiversity and in particular the sites of conservation interest, including MCPAs and potential OECMs, in the Mediterranean coast of Egypt;
- Analysis of the environmental, socio-economic and cultural situations (constraints, problems, impacts and potentialities);
- Presentation and evaluation of the challenges for the protection and conservation of the marine and coastal biodiversity, the sites of conservation interest including MCPAs and potential OECMs in the Mediterranean coast of Egypt;
- An inventory of the sites of conservation interest to be part of the network of MCPAs and OECMs in the Mediterranean coast of Egypt and their delimitation (using geographic information system-based mapping techniques);
- A proposal for a vision and strategic objectives for the national strategy, which are prioritized on the basis of the as
- Assessment-diagnosis results and the identified priority challenges;
- Bibliography.

2. ECO-REGIONS OF THE NORTHERN COAST OF EGYPT

The Northern Coast of Egypt is widely diverse in morphological, ecological, physical and socioeconomic characteristics; therefore, it can be broadly divided into four main eco-regions lying on a west-east axis; as follows:

1. *The Western Mediterranean Coastal Desert, sub-divided into:*
    a. *a Western Province from El Sallum to Ras El Hekma and*
    b. *an Eastern Province from Ras El Hekma to Alexandria;*
2. *The Deltaic Mediterranean Coast;*
3. *The Eastern Mediterranean Coastal Desert; and*
4. *The Mediterranean Coastal Desert of Sinai.*

The ICZM scopying studycarried out by adaptation to climate change in the nile delta through integrated coastal zone management project divided each eco-region into several Coastal Units (CUs), for a total of 14 CUs covering the entire Northern Coast of Egypt from El Sallum at the Libyan borders in the west to Rafah at the Gaza borders in the east (IH Cantabria, 2016), as shown in Figure 1.

Annex I provide the details of each Coastal Units Characteristics, biodiversity values and current impacts

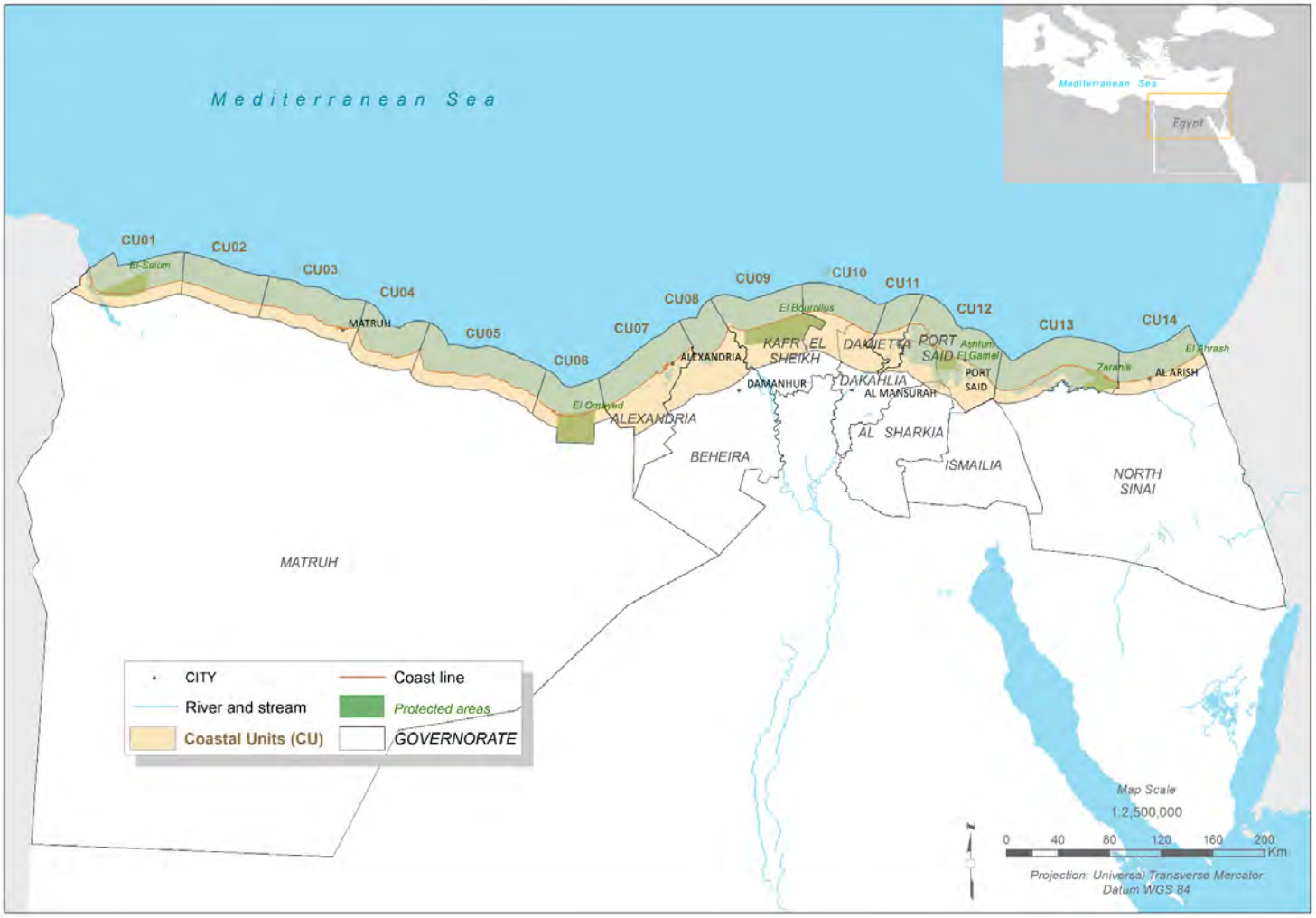


Figure 1: Coastal Units of the Mediterranean Coast of Egypt

2-1 The Western Mediterranean Coastal Desert

The Western Mediterranean Coastal Desert is the northern part of the wider Western Desert eco-region. It includes seven CUs (CU01 to CU07). This coastal belt stretches from Sallum in the west to Alexandria in the east, bounded by the shoreline on the north and the Qattara Depression to the south. It is less arid than the rest of the western desert and its distinctive feature is the relatively high, and more consistent, rainfall (about 150-180 mm/year) and low temperature compared to the rest of Egypt. However, the rainfall decreases very rapidly inland from the coast, giving this zone a maximum width of 50 km along its 600 km length (Hoath, 2003; EEAA/UNEP, 1993).

This region may, on geomorphologic grounds, be divided into two parts:

- *A western province between Salloum and Ras El-Hekma (CU01 to CU04); and*
- *An eastern province between Ras El-Hekma and Alexandria (CU05 to CU07) (Selim, 1969 in EEAA/UNEP, 1993).*

In general, the coastal belt comprises a coastal plain and a tableland. In the western province the coastal plain is narrow or missing and the limestone inland tableland reaches the shoreline. This plateau is traversed a number of drainage systems (wadis) that run northwards to the sea. In the eastern province, the coastal plain is wide and characterized by a series of long ridges (bars) alternating with long depression all running parallel to the coast. In certain parts, nine limestone ridges may be noted; they represent a Pleistocene sequence of shoreline bars (EEAA/UNEP, 1993).

2-1-1 Habitats

Habitat types and plant growth relate to physiographic conditions. In the eastern province, the shoreline is fringed by bodies of coastal sand followed by a series of ridges alternating with furrow-like depression. The first (northeast) depression is partly occupied by the westward extension of Lake Mariout (CU07). It is a saline depression while inland depressions are not saline. Further inland is the limestone plateau. The coastal dunes and associated near-shore ridges provide room for fig and olive orchards; the non-saline depressions provide room for barley cultivations in year of good rain, while the rest are rangelands for herds of sheep and goat (EEAA/UNEP, 1993).

2-1-2 Flora

Of the over 2000 species of plants in Egypt, about 1000 occur within 30 km of the Mediterranean coast (IUCN, 2003). However, a large number of Egypt's plants have become locally rare or extinct, due to habitat destruction, overgrazing, and over-harvesting.

The eastern province may be ecologically organized into five main groups, representing a sequence of zones lying on a north-south axes starting from the shoreline. These zones as well as their principal floral characteristics are herein presented (EEAA/UNEP, 1993).

a. Coastal Dunes

Ammophilia arenaria is found on active baby dunes at the shoreline, while the plant is associated with *Euphorbia paralias* and *Lotus polyphyllos* on partly stabilized sand

dunes near the shoreline. Stabilized sand dunes support *Pancratium maritimum* and *Thymelaea hirsuta* while *Pituranthos turtuosus* and *Echiochilon fruticosum* are present on coastal limestone ridge.

b. Inland Dunes

In inland dunes, plant life is dominated by *Urgina maritima* and *Thymelaea hirsuta*.

c. Inland Ridges

In inland ridges, the following sub-divisions are recognized:

- Summits of ridges (rocky sites) with chasmophytes and lythophytes including *Thymus capitatus*, *Globularia arabica* and *Helianthemum lippii*;
- Intermediate slopes with *Gymnocarpos decandrum* and *Reaumeria vermiculata*;
- Lower slopes with *Plantago albicans*, *Asphodelus microcarpus* and *Salvia lanigera*.

d. Saline Depression

This is a habitat of a variety of salt marshes communities; habitat types vary in relation to depth of the saltwater level and often show zoned pattern that seem to depend on ground level and surface accumulation of deposits (e.g., phytogenic mounds). Most common dominant species include *Arthrocnemum macrostachyum*, *Halocnemum strobilaceum*, *Sarcocornia fruticosa*, *Suaeda vermiculata* and *Limoniastrum monopetalum*. Sites with surface salt crusts are usually sterile.

e. Non-saline Depressions

Plant communities seem to differ in relation to the nature (such as texture, depth and chemistry) of the surface deposits. Accordingly, the following plant communities are dominant:

- *Anabasis articulata* and *Echiochilon fruticosum* on sandy soils;
- *Plantago albicans* and *Noaea mucronata* on calcareous (often saline) soils;
- *Asphodelus microcarpus*, *Thymelaea hirsuta* and *Artemisia monosperma* on soft (fine textured) soils;
- *Stipagrostis ciliata* and *Hammada scoparia* in the more arid (inland) areas.

The area is also important for medicinal and aromatic plants, which are either wild or cultivated. On the other hand, virtually all trees seen in semi-urban environments are exotic, and, in rural areas, the ubiquitous Eucalyptus spp. is an import from Australia. Casuarina trees are widely used as wind-breakers and to border fields while Ficus sp. is commonly used as ornamental plant.

A recent study was made aiming at assessing the flora and vegetation of the Western Mediterranean sand dunes, a threatened habitat in North Egypt. It aimed also to evaluate the threats upon species and habitats in the study area. One hundred and ten species were recorded, therophytes were the most represented life form followed by chamaephytes, while parasites were the least. One endemic (*Zygophyllum album*) and four near endemics (*Centaurea alexandrina*, *Centaurea glomerata*, *Onopordum alexandrinum* and *Plantago crypsoides*) were recorded, in addition to 9 species of unique occurrence to this habitat in the study area. Two trends of multivariate analysis

(TWINSPA and DCA) were applied to the floristic composition of 124 stands and led to identify 24 vegetation groups at level six and 8 vegetation groups at level three: group **I** (*Echinops spinosus* - *Launaea fragilis* subsp. *fragilis*) characterized the partially stabilized dunes, groups **II** (*Echinops spinosus* - *Allium erdelii*) and **V** (*Echinops spinosus* - *Thymelaea hirsuta*) the stabilized dunes, group **III** (*Ammophila arenaria* - *Ononis vaginalis*) the embryonic dunes and group **IV (***Crucianella maritima* - *Erodium crassifolium***)** the coastal ridges. In addition, group **VI** (*Launaea nudicaulis* - *Thymelaea hirsuta*) characterized the embryonic and stabilized dunes as well as the salt affected parts, group **VII (***Lygeum spartum* - *Nitraria retusa***)** the partially stabilized dunes, salt affected parts and coastal ridges and group **VIII (***Ammophila arenaria* -*Crucianella maritima*) the embryonic and stabilized dunes and the coastal ridges. Ninety two species suffer from at least one type of threats, 66 species suffer from habitat loss due to the construction of summer resorts, 64 species from over-collecting and over-cutting to be used for medicinal and fuel purposes, while only 10 species suffer from disturbance by cars or trampling. On the other hand, 10 species suffer from one type of threats, 29 species from two threats, 31 species from three threats, while only three species from six types of threats.

2-1-3 Fauna

- *Amphibians and Reptiles*

The Western Mediterranean Coastal Desert possesses one of the richest herpetofauna in Egypt. A total of 32 species of reptiles and two species of amphibians have been recorded from this area. The Green Toad (*Bufotes viridis*) is capable of tolerating very dry conditions. One reptile, the Mediterranean Hooded Snake (*Macroprotodon cucullatus*), has been recorded only from this habitat in Egypt (EEAA/UNEP, 1993). Saleh (1997) collected several specimens of this reptile at El-Hammam, Dabaa and Sidi Kreir. Characteristic species of this habitat type include the Moorish Gecko (*Tarentola mauritanica*) and Starred Agama (*Laudakia stellio*) in rocky areas, Changeable Agama (*Trapelus mutabilis*), Nidua Lizard (*Acanthodactylus scutellatus*), Javelin Sand Boa (*Eryx jaculus*), Lesser Cerastes Viper (*Cerastes vipera*) and the Egyptian Tortoise (*Testudo kleinmanni*) in sandy areas, Bosc's Lizard (*Acanthodactylus boskianus*), Gold Skink (*Eumeces schneiderii*), Eastern Montpellier Snake (*Malpolon insignitus*), Schokari Sand Snake (*Psammophis schokari*), Clifford's Snake (*Spalerosophis diadema*) and European Chameleon (*Chamaeleo chamaeleon*) in mixed rocky and sandy habitats (Flower, 1933; Marx 1968; Saleh and Saber, 1992 *in* EEAA/UNEP, 1993; Saleh, 1997).

Figure 2: Green Toad, Borg El Arab (CU07)

The Egyptian Tortoise, once very common, has been mostly eradicated from the region due to commercial over-exploitation and habitat destruction (Saleh, 1997). In an attempt to verify its status in the North Coast, Baha El

Din and Baha El Din (1994) undertook an exhaustive survey of the region, but no animals were found, nor was there any evidence of their existence (scats, tracks or dead animals) in any of the surveyed areas.

- *Birds*

  Concerning birds, at least 38 species are known to breed in the Western Mediterranean Coastal Desert. One resident species, the Common Raven (Corvus corax) is known only from this habitat in Egypt. Characteristic resident bird species include the Cream-colored Courser (*Cursorius cursor*), the Bar-tailed Desert Lark (*Ammomanes cincturus*), the Hoopoe Lark (*Alaemon alaudipes*), the Crested Lark (*Galerida cristata*) and the Goldfinch (*Carduelis carduelis*) (EEAA/UNEP, 1993; Tharwat, 1997; Baha El Din and Atta, 2002; Bruun and Baha El Din, 2002). It should be noted that the resident population of the Houbara Bustard (*Clamydotis undulata*) has been subjected to a very severe hunting pressure, which has driven the species near to extinction. Besides several birds of prey such as the Common Kestrel (Falco *tinnunculus*) and the Barn Owl (*Tyto alba*) are regularly seen in the area and its hinterland.

  During the autumn and spring migrations, Western Mediterranean Coastal Desert receives vast numbers of palearctic migrants. The region provides the first available resting and feeding area for huge numbers of individuals of many species after their Mediterranean crossing. Most famous of these are the Quail, (*Coturnix coturnix*) and the Golden Oriole *(Oriolus oriolus*).

- *Mammals*

  Thirty-eight species of mammals have been recorded from this eco-region. Three species of rodents, namely the Lesser Molerat (*Spalax ehrenbergi*), the Four-toed Jerboa (*Allactaga tetradactyla*) and the Lesser Short-tailed Gerbil (*Gerbillus simoni*) are restricted to this habitat type, with the latter two found only in littoral salt marshes (EEAA/UNEP, 1993). Characteristic mammals also include the Long-eared Hedgehog (*Hemiechinus auritus*), Ethiopian Hedgehog (*Paraechinus (aethiopicus) deserti*), Cape Hare (*Lepus capensis*), Anderson's Gerbil (*Gerbillus andersoni*), North African Gerbil (*Gerbillus campestris*), Shaw's Jird (Meriones shawi), Fat Sand Rat (*Psammomys obesus*) and Greater Egyptian Jerboa (*Jaculus orientalis*). The Jungle Cat (*Felis chaus*) is found in areas with thick cover such as farmlands, marshes and reed beds, while the Wild Cat (*F. silvestris*) inhabits dryer areas with cover. The Golden Wolf (*Canis anthus*)[1] and, particularly, the Red Fox (*Vulpes vulpes*) occupy a variety of habitats though they are not true desert species, while the Striped Weasel (*Poecilictis libyca*) is found in sandy but vegetated desert and semi-desert (Hoath, 2003; EEAA/UNEP, 1993).

Figure 3: Lesser Molerat

[1] The Golden Wolf was previously erroneously reported as a subspecies of the Golden Jackal (*Canis aureus*) and listed [illegible] as a distinct species, representing the first new species of Canidae found in 150 years (Koepfli *et al.*, 2015; Arnold, 2015).

2-2 The Deltaic Mediterranean Coast

The Deltaic Mediterranean Coast is located in the middle part of the Mediterranean Coast of Egypt. It includes three CUs (CU08 to CU10).

Few parts of the world have been subjected to such a prolonged and intensive human influence, and, except for some few parts of the delta coast, the modern Nile environs are a product of this influence turning it into an essentially man-made ecosystem (Hoath, 2003). On the other hand, parts of the Deltaic coastal area and related habitats as well as Lake Burullus (CU09) represent one of the few remaining fragments of wilderness of the Nile Delta.

2-2-1 Habitats

From a bio-geographical perspective, the northern Nile Delta represents a unique meeting point for biological elements from three bio-geographical regions: the Mediterranean (extending along the coastal zone), the Saharo-Sindian (relicts isolated in the sand dunes) and the Afro-tropical (extending northwards along the Nile Valley). The main habitats of the Deltaic Mediterranean Coast can be classified as follows:

- *Beach;*
- *Sabkha;*
- *Salt marshes;*
- *Sand formations;*
- *Cultivations;*
- *Man-made wetlands (irrigation canals and drains);*
- *Natural wetlands (Lake Idku, Rosetta Nile Branch and Lake Burullus)*
- *Towns and villages*

2-2-2 Flora

Mashaly (1987 in FAO, 2005) recorded 225 species from the Deltaic sector (FAO, 2005). The rich Mediterranean coastal vegetation has been mostly eradicated, with only degraded patches remaining. Coastal dunes are dominated by *Zygophyllum aegyptium* with *Calligonum comosum*, *Salsola kali* and *Tamarix tetragyna* co-dominants whilst halophytes (i.e., *Halocnemum strobilaceum*, *Nitraria retusa* and *Arthrocnemum macrostachyum*) dominate coastal saltmarshes (WWF, 2001; EEAA, 2004)

The following plant species were recorded in the Idku area (CU08):

The leeward slopes of the loose dunes support only a small number of species, such as *Elymus farctus* and *Ifloga spicata*. The fixed dunes exhibit a richer habitat, with common perennials such as *Echinops spinosissimus*, *Echium sericeum*, *Ephedra alata* and *Artemisia monosperma*, and annuals such as *Rumex pictus*, *Ifloga spicata*, *Daucus litoralis*, *Centaurea glomerata* and *Plantago squarrosa brachystachys*. New sand depositions cover vast saltmarsh areas and are co-dominated by *Stipagrostis lanata* and *Inula crithmoides*. Common annual species include *Ifloga spicata*, *Ononis serrata* and *Erodium gruinum*. The maritime saltmarshes extend from the foot of the youngest dunes to the seashore to the true sabkha and are co-dominated by *Arthrocnemum macrostachyum*, *Halocnemum strobilaceum*, *Juncus acutus* and *Salicornia fruticosa*. The most common annuals are *Halopeplis amplexicaulis*, *Spergularia marina* and *Senecio desfontainei*. The inland saltmarshes are co-dominated by *Schanginia aegyptiaca* and *Salicornia fruticosa*.

Figure 4: Flora of the dune slope south of Baltim resort (CU10)

There are 197 species of plants recorded from the Burullus wetland (CU09), divided into 100 annuals and 97 perennials, including 12 hydrophytes. Reedbeds within Lake Burullus are estimated to cover about 7,000 ha and represent one of the most important reedbeds in the Mediterranean region (Shaltout and Khalil, 2005). *Pancratium maritimum* is restricted to the area of Tell El Aqoula.

Three main sub-habitats are recognized along the coastal sand dune formations of: the top of the dune, the slopes and the interdunal sand sheets. A total of 69 plant species (27 perennials and 42 annuals) were recorded along the different sub-habitats. The interdunal sand sheets have the highest vegetation cover (ranging from 50 to 80%) and 21 species were recorded exclusively from this sub-habitat such as *Herniaria hemistemon*, *Limbarda crithmoides* and *Solanum nigrum*. They were followed by the dune slope (vegetation cover: 25 to 35% on the north-facing slopes; up to 70% on the south-facing slopes), with three species recorded only from this sub-habitat: *Cyperus capitatus*, *Frankenia pulverulenta* and *Nicotiana glauca*. The top of the dunes has the lowest vegetation cover (25-35%), with *Calligonum*

Figure 5: *Pancratium maritimum*, Tell El Aqoula

polygonoides, *Plantago squarrosa* and *Schismus barbatus* being recorded only from this sub-habitat. Cultivations are also present in interdunal areas.

2-2-3 Fauna

- *Amphibians*

  Characteristic amphibians include the Square-marked Toad (*Amietophrynus regularis*), the Mascarene Frog (*Ptychadena mascareniensis*) and Lake Frog (*Rana bedriagae*)[2]. Besides, the endemic Nile Delta Toad (*Amietophrynus kassasii*) is also widespread in the area.

- *Reptiles*

  The Loggerhead (*Caretta caretta*) and the Green Turtle (*Chelonia mydas*) are present in coastal waters and live Loggerhead individuals were seen in the Alexandria Central Fish Market (Sarwat, 1999). Bosc's Lizard (*Acanthodactylus boskianus*) is very common and widespread all over the dunes and is closely associated with densely or sparsely vegetated sand dunes. The presence of Nidua Lizard (*Acanthodactylus scutellatus*) is reported from the area by Saleh (1997) and Shaltout and Khalil (2005). Other common terrestrial reptiles include the Turkish Gecko (*Hemidactylus turcicus*), the Eyed Skink (*Chalcides ocellatus*), the Flowered Snake (*Coluber florulentus*) and the Egyptian Cobra (*Naja haje*). The Bean Skink (*Mabuya quinquetaeniata*), the African Chameleon (*Chameleo africanus*), the African Beauty Snake (*Psammophis sibilans*) and the Diced Water Snake (*Natrix tessellata*) are restricted to this habitat in Egypt (EEAA/UNEP, 1995). The Eastern Montpellier Snake (*Malpolon insignitus*) is found in sandy areas of the northern Delta, around vegetated saltmarshes and in cultivated lands (Saleh, 1997).

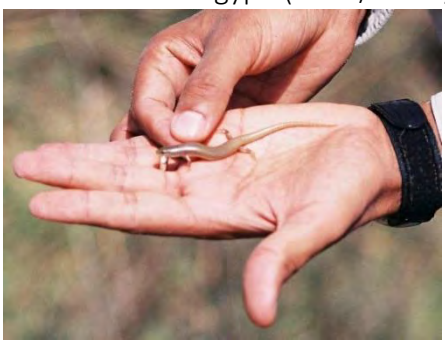


Figure 6: Eyed Skink collected from the sand dunes south of Baltim resort (CU10)

- *Birds*

  Prominent seabirds of the area include the Black-headed Gull (*Larus ridibundus*), the Yellow-legged Gull (*L. cachinnans*), the Little Tern (*Sterna albifrons*) and the Lesser Crested Tern (*S. bengalensis*) (Tharwat, 1997; Baha El Din and Atta, 2002; Bruun and Baha El Din, 2002). Also, The Pied Kingfisher (*Ceryle rudis*), Little Egret (*Egretta garzetta*), Little Tern (*Sterna albifrons*) and Kentish Plover (*Charadrius alexandrinus*) are known to breed in the area. The Spur-winged Lapwing (*Vanellus spinosus*) is common and frequently encountered in the backshore area.

  Characteristic species of the Delta include the Black-shouldered Kite (*Elanus caeruleus*), the Black Kite (*Milvus migrans*), the Common Kestrel (*Falco tinnunculus*), the Painted

[2] Vast numbers of *Rana bedriagae* are collected every year for export as frog legs. The figure of three tons annual product has been mentioned casually. It is not known if these animals are reared for the purpose or collected from the wild. The impact of this business is not clear (Baha El Din, 2006).

Snipe (*Rostratula benghalensis*), the Palm Dove (*Streptopelia senegalensis*), the Senegal Coucal (*Centropus senegalensis*), the Barn Owl (*Tyto alba*), the Little Green Bee-eater (*Merops orientalis*), the Crested Lark (*Galerida cristata*), Barn Swallow (*Hirundo rustica*), the Egyptian Wagtail (*Motacilla flava*), the Graceful Warbler (*Prinia gracilis*), the Hooded Crow (*Corvus corone*), the House Sparrow (*Passer domesticus*) and others (EEAA/UNEP, 1995; 1997). The Cattle Egret (*Bubulcus ibis*) is strongly associated with human activities and is omnipresent in agricultural fields, gardens and even in waste dumping areas. Very prominent aquatic avifauna is found in Lake Burullus.

The North Delta coast is an important migration route for birds, particularly during the autumn migration season when birds are in transit between breeding grounds in Europe and Asia and winter quarters in Africa. Hundreds of millions of birds cross the Mediterranean Sea into Egypt during the autumn, the numbers swelled by recently fledged nestlings. Historical migration surveys on the North Coast using radar have calculated that in the peak 60 days of September to October, there is an average of 325,000 birds passing per night over every kilometer of the Egyptian coastline. It was estimated that half the migrating birds, after having flown non-stop across the sea, land on Egypt's Mediterranean coast to feed and rest before departing the next evening to continue their journey south.

- *Mammals*

Common commensal animals of agricultural and urban areas include the House Mouse (*Mus musculus*), the Brown Rat (*Rattus norvegicus*) and the House Rat (*R. rattus*). It is interesting to note that the Egyptian Weasel (*Mustela subpalmata*) is an almost entirely urban animal in Egypt (Hoath, 2003). Other mammals include the Long-eared Hedgehog (*Hemiechinus auritus*), the Giant Shrew (*Crocidura flavescens*), the Nile Rat (*Arvicanthis niloticus*) and Anderson's Gerbil (*Gerbillus andersoni*). Bats are common in the region and inhabit old monuments, caves and abandoned buildings. Predators comprise the Golden Wolf (*Canis anthus*), the Red Fox (*Vulpes vulpes*), the Egyptian Mongoose (*Herpestes ichneumon*) and the Wild Cat (*Felis silvestris*). Wild carnivores have suffered a great deal of decline in the recent years as a result of intense urban development and secondary poisoning with pesticides widely used to control *Arvicanthis niloticus* and other rodent pests (EEAA/UNEP, 1995; 1993; Hoath, 2003). The Jungle (Swamp) Cat (*Felis chaus*) inhabits areas with thick cover such as agricultural lands, marshes and reed beds. Shrews such the Egyptian Pigmy Shrew (*Crocidura religiosa*) and Flower's Shrew (*C. floweri*), populate fields near current water and drains banks. However, the first is very rare and the latter, an endemic species, is close to extinction.

2-3 The Eastern Mediterranean Coastal Desert

The Eastern Mediterranean Coastal Desert is located in the eastern part of the Northern Coast of Egypt, separated from North Sinai by the Suez Canal. It includes two CUs (CU11 and CU12).

2-3-1 Habitats

The farmlands, fields, canals and drains provide habitat for a variety of plant and animal species. However, due to the intense human impact within this sector, most biodiversity of concern tends to concentrate in and around Lake Manzala, which is a particularly important wetland for avian fauna. Sparse vegetation is found in the Port Said area, while very little flora and fauna exist at the Damietta area due to extensive urbanization and industrial activity. Vegetation cover is sparse and mainly limited to marginal vegetation and reed plants. The following habitat types were recognized in this sector:

- *Bare sandy beaches and sandy flats with or without shell fragments and gravel;*
- *Sand formations (sand flats, mounds and dunes);*
- *Salt marshes*
- *Sabkha flats;*
- *Swamps with reeds and aquatic vegetation*
- *Man-made wetlands (irrigation canals and drains);*
- *Natural wetlands (Damietta Nile Branch and Lake Manzala);*
- *Towns and villages*

2-3-2 Flora

This sector is characterized by a sparse vegetation cover composed mostly of coastal, obligate and halophytic shrubs. The latter are mostly found in sand hammocks scattered on the backshore sabkha flats. This shrub vegetation cover traps wind-drifting sands and act as a barrier against sand encroachment on the Port Said to Damietta Road during active northerly and northwesterly winds. Major plant communities recorded in June 2002 at Port Said area were (ERM, 2003):

- *Arthrocnemum macrostachyum community, occurring within the Sabkha flats and vegetated sand sheets;*
- *Halocnemum strobilaceum community, forming the vegetation cover of the sand sheets and sand drifts;*
- *Zygophyllum sp. community, a succulent shrubby halophyte occurring in a narrow belt that runs parallel to the coastline;*

Figure 7: Dead Wild Cat found on the seashore near Burg El Burullus

Figure 8: Carcass of Anderson's Gerbil on the International Coastal Road (CU10)

- *Inula crithmoides community, dominating the saltmarshes along the shore of Lake Manzala;*
- *Tamarix nilotica community, occurring within the coastal sand drifts;*
- *Bushes of Juncus rigidus associated with J. acutus, growing on the shore of Lake Manzala;*
- *Bushes of Bassia indica, growing densely along the roadside.*

Figure 10: Salt flat with dense vegetation cover, south west of Ras El Barr (CU11)

Figure 9: Halophytic coastal vegetation

2-3-3 Fauna

- *Amphibians*

  Amphibian species are associated with freshwater and brackish water environments. Freshwater species include the Square marked Toad (*Amietophrynus regularis*), Lake Frog (*Rana bedriagae*) and Mascarene Frog (*Ptychadena mascareniensis*). Species more commonly associated with brackish water include the Green Toad (*Bufotes viridis*).

- *Reptiles*

  The Loggerhead Turtle (*Caretta caretta*) and the Green Turtle (*Chelonia mydas*) have been recorded west of Port Said (Saleh, 1997). The National Institute of Oceanography and Fisheries reported in 1992 the presence of turtle breeding sites in the area between Ashtoum El Gamil and Damietta. During an ecological walkover carried out in 2002, local inhabitants at El Mansra village informed that sea turtles used to nest on the beach extending from Astoum El Gamil to El Deeba before 1967. After 1975, sea turtle nests disappeared due to increased human activities (ERM, 2003).

  A number of reptiles have been recorded around Lake Manzala (Osborn and Helmy, 1980 *in* ERM, 2003; Saleh, 1997). These included the Turkish Gecko (*Hemidactylus turcicus*), Egyptian Gecko (*Tarentola annularis*), Pale Agama (*Trapelus pallida*), Savigny's Agama (*Trapelus flavimaculatus*), Bosc's Lizard (*Acanthodactylus boskianus*), Egyptian Leopard Lizard (*Acanthodactylus pardalis*), Red Spotted Lizard (*Mesalina rubropunctata*), Eyed Skink (*Chalcides ocellatus*), Audouin's Sand Skink (*Sphenops sepsoides*), Bean Skink (*Mabuya quinquetaeniata*), European Chameleon (*Chamaeleo chamaeleon*), Flowered Snake (*Coluber florulentus*), Eastern

Montpellier Snake (*Malpolon insignitus*), Schokari Sand Snake (*Psammophis schokari*) and African Beauty Snake (*Psammophis sibilans*). However, these data are not recent and the increasing anthropogenic influence in the region is likely to have further affected species distribution and abundance, making species scarcer in number and diversity lower.

- *Birds*

Few numbers of birds are observed in the coastal area. There were no observations of nesting or breeding birds, probably due to the thin vegetation cover. On the other hand, Lake Manzala plays an important role as bird habitat. It is also likely that birds frequent the Port Said coastal area to feed in coastal waters.

Figure 11: Little Egret (*Egretta garzetta*), Lake Manzala

- *Mammals*

The main recorded species belonged to rodents and included the Black Rat (*Rattus rattus*), the Norway Rat (*R. norvegicus*) and the House Mouse (*Mus musculus*). However, many mammal species have been previously recorded around Lake Manzala and included the Long-eared Hedgehog (*Hemiechinus auritus*), the Fat Sand Rat (*Psammomys obesus*), Anderson's Gerbil (*Gerbillus andersoni*), Henley's Gerbil (*Gerbillus henleyi*), Golden Wolf (*Canis anthus*), Jungle Cat (*Felis chaus*), Red Fox (*Vulpes vulpes*), Egyptian Weasel (*Mustela subpalmata*) and the Egyptian Mongoose (*Herpestes ichneumon*).

An assessment for the flora and vegetation of the Western Mediterranean sand dunes, a threatened habitat in North Egypt has been carried out by Dalia A. Ahmed, *et al* in 2014. Assessment evaluated the threats upon species and habitats in the study area. One hundred and ten species were recorded, therophytes were the most represented life form followed by chamaephytes, while parasites were the least. one endemic (*Zygophyllum album*) and four near endemics (*Centaurea alexandrina*, *Centaurea glomerata*, *Onopordum alexandrinum* and *Plantago crypsoides*) were recorded, in addition to 9 species of unique occurrence to this habitat in the study area. Two trends of multivariate analysis (TWINSPAN and DCA) were applied to the floristic composition of 124 stands and led to identify 24 vegetation groups at level six and 8 vegetation groups at level three: group I (*Echinops spinosus - Launaea fragilis* subsp. *fragilis*) characterized the partially stabilized dunes, groups II (*Echinops spinosus - Allium erdelii*) and V (*Echinops spinosus - Thymelaea hirsuta*) the stabilized dunes, group III (*Ammophila arenaria - Ononis vaginalis*) the embryonic dunes and group IV (*Crucianella maritima - Erodium crassifolium*) the coastal ridges. In addition, group VI (*Launaea nudicaulis - Thymelaea hirsuta*) characterized the embryonic and stabilized dunes as well as the salt affected parts, group VII (*Lygeum spartum – Nitraria retusa*) the partially stabilized dunes,

salt affected parts and coastal ridges and group VIII (*Ammophila arenaria - Crucianella maritima*) the embryonic and stabilized dunes and the coastal ridges. Ninety two species suffer from at least one type of threats, 66 species suffer from habitat loss due to the construction of summer resorts, 64 species from over-collecting and over-cutting to be used for medicinal and fuel purposes, while only 10 species suffer from disturbance by cars or trampling. On the other hand, 10 species suffer from one type of threats, 29 species from two threats, 31 species from three threats, while only three species from six types of threats.

2-4 The Mediterranean Coastal Desert of Sinai

The Mediterranean Coastal Desert of Sinai consists of wide, sand-covered plains, gradually sloping northward. In comparison to the Western Mediterranean Coastal Desert, the region is not as distinctive, receives less rain, is more sparsely vegetated and is mostly low and featureless. Aeolian sand dunes are common throughout the region. The northward-flowing Wadi El Arish, a very large wadi with numerous tributaries drains extensive areas of the Central Sinai highlands and is one of the major geomorphologic features of the region. Lake Bardawil, a shallow lagoon bordering the Mediterranean coastline of Northern Sinai, is another important geomorphologic feature of the region. Rainfall is generally higher along the Mediterranean coast than in the inland plateau. Within the coastal land, it is lowest at the western end (Port Said, 75 mm) and highest in the eastern bend of Rafah (200 mm).

2-4-1 Habitats

The coastal belt of North Sinai can be broadly divided in Mediterranean sands and salt marshes. This belt includes:

(1) the sandy shoreline with date palm beaches in the El Arish area;

(2) bodies of coastal dunes in the eastern part;

(3) bodies of saltmarshes associated with Lake Bardawil (a particularly important wetland site); and

(4) series of inland sand dunes with lows in between.

The delta of Wadi El Arish, a drainage system with an extensive catchment area, crosses this belt east of the city of El Arish.

Figure 12: Inland sand dunes, El Arish

IBA Categories Applying to Lake Bardawil

A1 Globally Threatened Species
Corncrake (VU)
Fairly common migrant during autumn
Pallid Harrier (NT)
Regular migrant and winter visitor

A4i 1% or more of Population
White-breasted Cormorant (5,000 – 30,000 wintering)
Greater Flamingo (13,000 wintering)
Little Tern (1,200 pairs breeding)
Kentish Plover (1,900 pairs breeding)

2-4-2 Flora

Plant growth in the sand dunes shows an in-landward sequence dominated by *Zygophyllum album*, *Artemisia monosperma*, *Thymelaea hirsuta* and *Stipagrostis scoparia*. The salt marshes of Lake Bardawil, its islands and shores have vegetation types dominated by *Halocnemum strobilaceum*, *Arthrocnemum macrostachyum* and *Suaeda aegyptiaca*. On less moist saline areas *Nitraria retusa* abounds.

2-4-3 Fauna

Herpetofauna of this region includes 24 species and is dominated by those specially adapted to sandy substrates. Amphibians recorded from this region are the Green Toad (Bufotes viridis)[3], Levant Water Frog (Pelophylax bedriagae) and Middle East Tree Frog (Hyla savignyi), with the last species being recorded only from this region in Egypt. Reptiles include Leopard Fringe-fingered Lizard (Acanthodactylus pardalis), Nidua Lizard (A. scutellatus), Olivier's Sand Lizard (Mesalina olivieri), Ocellated Skink (Chalcides ocellatus), Schneider's Skink (Eumeces schneideri), Sandfish (Scincus scincus), Mediterranean Chameleon (Chameleo chameleon), Desert Monitor (Varanus griseus), Diademed Sand Snake (Lytorhynchus diadema), Schokari Sand Racer (Psammophis schokari) and Negev Tortoise (Testudo werneri)[4].

At least 27 bird species are known to breed in the Mediterranean Coastal Desert of SinAIII. One resident species, the Syrian Woodpecker (Dendrocopos syriacus), is known only from this habitat type in Egypt (Goodman et al., 1989 in EEAA/UNEP, 1993). Characteristic resident birds include Cream-coloured Courser (Cursorius cursor), Turtle Dove (Streptopelia turtur), Bar-tailed Desert Lark (Ammomanes cinctura), (Alaemon alaudipes), Greater Hoopoe-lark (Galerida cristata), Red-rumped Wheatear (Oenanthe moesta), Eurasian Blackbird (Turdus merula), and European Goldfinch (Carduelis

[3] The status of the Green Toad in Sinai is currently unclear, and it is possible that these populations should be included within either *Bufotes variabilis* or *Bufotes boulengeri* pending further review (Aghasyan *et al.*, 2016).
[4] Sinai populations formerly assigned to T*estudo kleinmanni*

carduelis). During the autumn and spring migrations the Mediterranean Coastal Desert of Sinai receives vast populations of Palearctic migrants.

Mammals of the Sinai Mediterranean Coastal Desert include a total of 20 species (Osborn and Helmy, 1980 in EEAA/UNEP, 1993). Characteristic species of northern Sinai sandy plains include Cape Hare (*Lepus capensis*), Anderson's Gerbil (*Gerbillus andersoni*), Lesser Egyptian Gerbil (*G. gerbillus*), North African Gerbil (*G. campestris*), Fat Sand Rat (*Psammomys obesus*), Lesser Egyptian Jerboa (*Jaculus jaculus*), Crested Porcupine (*Hystrix cristata*)[5], and Fennec Fox (*Vulpes zerda*)[6]. Three species, Buxton's Jird (*Meriones sacramenti*), Tristram's Jird (*M. tristrami*) and Marbled Polecat (*Vormela peregusna*)[7], are recorded only from this region in Egypt (Osborn and Helmy, 1980 in EEAA/UNEP, 1993).

3. OVERALL ASSESSMENT

3-1 Status of Coastal Units

3-1-1 Selection of Indicators

In order to carry out an overall assessment of the whole Northern Coast of Egypt, CU status indicators have been selected from a set of guidelines (Government of Catalonia, 2007; OECD, 2003; UNESCO, 2003; UNESCO, 2006) and adapted to the current study. Selection of indicators has been subjected to a set of criteria, as follows:

- Be simple and easy to interpret;
- Based on available supporting data;
- Supporting data should be adequately documented and of known quality;
- Have a numerical value as a basis for comparison;
- Provide a representative picture of ecological conditions and pressures on biodiversity.

Accordingly, the following indicators have been selected:

- *Indicators to highlight the status of biodiversity*
- Extension of natural habitats
- Loss of natural habitats
- Existence of protected areas
- Extension of protected areas
- Existence of IBAs:
- Existence of Ramsar Sites:
- Number of endemic/threatened species
- Number of protected species
- *Indicators to highlight the status of natural water bodies*
- Pollution and contaminants

[5] Possibly extinct in Egypt (Grubb *et al.*, 2010)
[6] This species has been included in the genus *Fennecus* (e.g., Coetzee 1977), but is retained in *Vulpes* by the IUCN following Wozencraft (2005).
[7] Two localities in the northern part of the Sinai Peninsula (south-east of Bir El Abd and just north of Gabal El Maghara) constituted the first records from Egypt (Saleh and Basuony, 1998).

- *Indicators to highlight the importance of natural resources*

- Inland fisheries stocks
- Species with potential use:

3-1-2 Value of Indicators

The following indicators are categorized into High, Medium, Low, and Not Applicable and each category has been given a numerical value (where High = 3; Medium = 2: Low = 1 and NA = 0):

- Extension of natural habitats
- Extension of protected areas
- Number of endemic/threatened species
- Number of protected species
- Inland fisheries stocks
- Species with potential use:

The following indicators are categorized into High, Medium and Low and each category has been given a numerical value (where High = 1; Medium = 2 and Low = 3)

- Loss of Natural Habitats
- Pollution and contaminants

As the absence of natural water bodies does not decrease the value of a CU, in case the "Pollution and contaminants" criterion is NA it is not counted in the assessment.

The following indicators are categorized into Yes and No and each category has been given a numerical value (where Yes = 3 and No = 0):

- Existence of protected areas
- Existence of IBAs:
- Existence of Ramsar Sites:

3-1-3 Coastal Units Ranking

Based on the previous numerical values, a simple Ranking Matrix has been developed to assess the ecological value of the 14 coastal units and to rank them in a descending order, from the most valuable to the least valuable (Table 1).

- A value ranging from 0 to 1 indicates a Low Ecological Value of the CU. This applies to CU11, CU07 and CU08.
- A value ranging from 1 to 2 indicates a Medium Ecological Value of the CU. This applies to CU04, CU03, CU05, CU02, CU06, CU10, CU01, CU12 and CU14.
- A value ranging from 2 to 3 indicates a High Ecological Value of the CU. This applies to CU09 and CU13.

The results also indicate that CU13 and CU09 are the most valuable coastal units. CU13 is located in North Sinai and includes Lake Bardawil, which is the most pristine lake among the Egyptian coastal lakes and a Ramsar Site. Moreover, this coastal unit includes Zaranik Protected area, two IBAs and important sets of threatened and protected species.

CU09 is located on the Delta coast and includes Lake Burullus which is a Protected Area, an IBA, Ramsar Site, and an IPA and includes rare sets of endemics, threatened and protected species. Moreover, the Protected Area covers the majority of this coastal unit.

On the other hand, CU11 is the least valuable coastal unit, as it is mostly developed and includes Ras El Barr, Damietta Port, New Damietta and Gamasa, with very few natural habitats remaining.

It should be noted that the results of the Ranking Matrix provide a simple qualitative and indicative assessment of the different coastal units. Therefore, although some coastal units are classified as habitats of Medium Ecological Value (due to the absence of protected areas, IBAs and/or Ramsar sites), some of these require consideration as they are characterized by other important ecological features. This applies in particular to CU10 and CU14 and CU01.

CU10 has a high percentage of natural habitats and includes the Burullus sand dune belt north of the coastal road (known as “Black Sands”). These sand dunes represent a relict desert habitat confined in the Nile Delta and contain substantial genetic divergence and rare sets of floral and faunal communities and distinct endemic subspecies which have not been documented yet.

CU14 includes El Ahrash Reserve which is a protected area of small dimensions, but large parts of this coastal unit are still pristine and undeveloped with species characteristic of areas located beyond the Egyptian northeastern borders and recorded only from this region in Egypt.

Similarly, CU01 includes the recently established El Sallum Protected Area which is mainly a marine protectorate and covers only few fragments of coastal habitats, although it contains species characteristic of areas located beyond the northwestern borders of Egypt.

Table 1: Coastal Units' Ranking Matrix

CU Indicators	Coastal Mediterranean Eco-regions													
	Western Mediterranean Coast							Deltaic Mediterranean Coast			Eastern Mediterranean Coast		Sinai Mediterranean Coast	
	Western Province				Eastern Province									
	01	02	03	04	05	06	07	08	09	10	11	12	13	14
Biodiversity														
Extension of natural habitats	3	3	2	2	3	2	1	1	3	3	1	2	3	3
Loss of natural habitats	2	3	2	2	2	1	1	1	2	1	1	1	3	3
Existence of protected areas	3	0	0	0	0	3	0	0	3	3	0	3	3	3
Extension of protected areas	1	0	0	0	0	2	0	0	3	1	0	1	2	1
Existence of IBAs	0	0	0	0	0	0	3	3	3	0	0	3	3	0
Existence of Ramsar Sites	0	0	0	0	0	0	0	0	3	0	0	0	3	0
Number of endemic/threatened species	3	2	2	2	2	2	1	1	3	3	1	2	3	3
Number of protected species	3	2	2	2	2	2	1	1	3	3	1	2	3	3
Natural Water Bodies														
Pollution and contaminants	NA	NA	NA	NA	NA	NA	1	1	1	NA	1	1	3	NA
Natural Resources														
Inland fisheries stocks	0	0	0	0	0	0	1	2	3	0	1	3	3	0
Species with potential use	3	3	3	3	3	3	1	2	3	3	1	2	3	3
Overall Value	**1.8**	**1.3**	**1.1**	**1.1**	**1.2**	**1.5**	**0.9**	**1.0**	**2.7**	**1.7**	**0.6**	**1.8**	**2.9**	**1.9**
Rank	**5**	**8**	**10**	**11**	**9**	**7**	**13**	**12**	**2**	**6**	**14**	**4**	**1**	**3**

High: 3; Medium: 2: Low: 1, Not Applicable (NA): 0; Yes: 3: No: 0

Loss of Natural Habitats: High: 1; Medium: 2; Low: 3

Pollution and contaminants: High: 1; Medium: 2; Low: 3; if NA: not counted in the assessment

3-2 Biodiversity Value

The Northern Coast of Egypt is very heterogeneous in terms of ecological value, mainly due to anthropogenic impacts that have affected the coastal habitats and, in many cases, eradicated several species leaving entire eco-regions with few spots of fragmented natural habitats. The main species of concern mentioned in the present report are herein presented.

3-1-1 Flora

Of the over 2000 species of plants in Egypt, about 1000 occur within 30 km of the Mediterranean coast (IUCN, 2003). However, a large number of Egypt's plants have become locally rare or extinct, due to habitat destruction, overgrazing, and over-harvesting.

Helianthemum sphaerocalyx is a rare species found in the coastal dunes of the Western Mediterranean Coast. In the Deltaic Coast, *Sonchus macrocarpus* (DD) and *Sinapis allionii* (locally EN) are also endemic. *Zygophyllum aegyptium* is found in Egypt and three other countries (Tunisia, Libya and Cyprus). Its presence in Egypt is currently confirmed only along the coast of Baltim (CU10). Three perennial species have a distribution restricted to the Nile Delta: *Ipomoea carnea*, *Vossia cuspidata* and *Ranunculus marginatus* and there are 18 rare perennials and 15 annuals. The presence of a Papyrus (*Cyperus papyrus*) stand downstream of the Damietta Branch of the Nile was reported in literature (EEAA, 2004); however, the exact location of this stand is not specified. Six threatened species are recorded in Lake Bardawil four of which are categorized as EN (*Astragalus camelorum, Bellevalia salah-eidii, Biarum olivieri* and *Salsola tetragona*). One species is indeterminate (*Lobularia arabica*), while another one is rare (*Iris mariae*). In addition, 5 species are endemic: *Zygophyllum album, Astragalus camelorum, Allium papillare, Bellevalia salah-eidii* and *Iris mariae*.

Several plants have commercial and social applications. Matrouh Governorate and surroundings count for more than 50% of the wild medicinal and aromatic plants existing in Egypt, i.e., more than 1000 wild species (ESDF, 2002). This floral wealth is currently misused and over-harvested by residents who use them for folk medicine, human nurturing and animal grazing, thus subjecting the plants to the risk of extinction. The Date Palm is native to Egypt and possesses adventitious roots which do not penetrate deep into the soil, which makes its presence without much stress on the deeper levels of the soil and allow side cultivations. Palm Groves are man-made valuable biotopes. In addition to forming spectacular and attractive landscapes, the dense vegetation of the Date Palm Groves contributes to the natural protection of the habitat. In particular, they avoid soil erosion and form a natural barrier against desertification.

3-1-2 Fauna

This section presents an account on the status of faunal species of concern. In addition, Table 2 provides a brief description of the ecology, status and potential presence of these species in the different eco-regions / coastal units.

- *Amphibians*

Although amphibians seem to be not particularly affected by anthropogenic activities, at least four species are of concern.

Green Toad (*Bufotes cf. viridis*)

Egyptian populations of the Green Toad were formerly included in the genus *Bufo* but have now been moved to *Bufotes*. However, the status of the Green Toad in Sinai is currently unclear, and it is possible that these populations should be included within either *Bufotes variabilis* or *Bufotes boulengeri* pending further review (Aghasyan et al., 2016). Both *Bufotes viridis* and *B. boulengeri* are listed as LC by the IUCN, while *B. variabilis* is listed as Data Deficient (DD).

Nile Delta Toad (*Amietophrynus kassasii*)

The endemic Nile Delta Toad (*Amietophrynus kassasii*) is reported from the Delta and is widespread in stagnant freshwater bodies. It is listed as Least Concern (LC) by the IUCN, because although its Extent of Occurrence is less than 20,000 km^2, the species is adapted to cropland and does not appear to be facing any serious risk (Mills and Baha El Din, 2004)

Sudan Ridged Frog (*Ptychadena schillukorum*)

The Sudan Ridged Frog (*Ptychadena schillukorum*) is apparently common where it occurs, but is patchily distributed. Although this species is reported from a very wide area in Africa, there are very few records from most of its range, and it has not been recorded from many countries where it is likely to occur. It is listed as LC by the IUCN in view of its very wide distribution, its tolerance of a broad range of habitats and its presumed large population. There are still no clear indications of its local abundance and status in Egypt. Apparently, it is localized and rare in Egypt where it is currently only known from two specimens. Its populations (localities in the Nile Delta and El Fayoum) appear to be genuinely isolated. Given the fact that the species has remained undocumented for such a long time, it is likely to be a localized and rare inhabitant of wetlands of Lower Egypt (Baha El Din, 2005, 2006; IUCN, 2013).

Middle East Tree Frog (*Hyla savignyi*)

It is listed as Least Concern (LC) by the IUCN in view of its wide distribution, tolerance of a broad range of habitats, presumed large population, and because it is unlikely to be declining fast enough to qualify for listing in a more threatened category. However, it has restricted range in Egypt as it is recorded only from this region where it was first recorded in the early 1990s (Sergius *et al*., 2009).

- *Reptiles*

Reptiles are among the most affected taxa by human activities, mainly due to habitat loss and commercial exploitation for the pet trade.

Egyptian Tortoise (*Testudo kleinmanni*)

This species is possibly EX in Egypt and listed as CR by the IUCN, although it was previously assessed as CR in Egypt and EN by the IUCN. However, northeastern populations that were previously assigned to *T. kleinmanni* recently have been accepted as a separate species, *T. werneri* (Perälä, 2001). The species' extent of occurrence

covered an estimated area of 123,610 km² less than three generations ago. Today it is estimated at around 16,600 km². Within the same period population sizes are estimated to have reduced by over 85% from around 55,600 to 7,470 individuals, of which approximately 5,000 are mature individuals. This figure is less than the number of animals recorded from the illegal pet trade in the 1990s alone. Fairly good habitat patches still exist in Libya but the global population of *T. kleinmanni* could realistically face extinction in less than 20 years or around one generation if degradation of landscape and trade cannot be stopped (Perälä, 2003). *T. kleinmanni* was very heavily affected by the (eventually illegal) national and international pet trade that began using the Libyan stock after Egyptian subpopulations were harvested to extinction (Baha El Din, 1994). The species is included in CITES Appendix I.

Mediterranean Hooded Snake (*Macroprotodon cucullatus*)

It is listed as LC by the IUCN in view of its wide distribution, tolerance of a degree of habitat modification, presumed large population, and because it is unlikely to be declining fast enough to qualify for listing in a more threatened category (Corti *et al*., 2009). In Egypt, *M. cucullatus* is significantly threatened and is considered to be EN (Baha El Din, 2005). The species is threatened by commercial collection for the international pet trade, urbanization and development of tourism, overgrazing, collection of firewood and quarrying. There is a need to develop national legislation to protect this species and to create new protected areas (Corti *et al*., 2009).

Leopard Fringe-fingered Lizard (*Acanthodactylus pardalis*)

The species is listed as Vulnerable (VU) by the IUCN because of a serious population decline, estimated to be more than 30% over the last three generations, inferred from observed shrinkage in distribution and habitat destruction and/or degradation. The species has an extent of occurrence of less than 20,000 km², with few fragmented populations present in the Egyptian part of its range. The population of this species in Egypt has significantly declined (possibly by 80%) since the 1970s, and it is now known only from a few localities. However, the status of populations in Libya is unclear and it is difficult to determine what percentage the global population has declined by. It has almost certainly declined by 30%, but it is uncertain if it has declined by 50% or more over the last 10 years or three generations. If the species has recently declined in Libya to the extent that it has in Egypt, then the species will qualify for Endangered (EN) or possibly CR. Further studies are urgently needed for this species (Böhme and Baha El Din, 2006).

Eastern Montpellier Snake (*Malpolon insignitus*)

The eastern population of Montpellier Snake (*Malpolon insignitus*) was formerly allocated to *M. monspessulanus* but is now included by the IUCN within *M. insignitus*, following Carranza *et al*. (2006). As *M. monspessulanus*, it was formerly considered common but rather localized at the local level and listed by the IUCN as LC. However, the local and global statuses of *M. insignitus* have not been evaluated yet. It is threatened by commercial over-exploitation for the pet trade.

Desert Monitor (*Varanus griseus*)

The Desert Monitor (*Varanus griseus*) is mostly found in desert plains and large wadis with some vegetation. Large numbers are collected for the pet trade and occasionally for leather. According to Baha El Din (2006) it is Near Threatened (NT) in Egypt. Its global status has not been evaluated by the IUCN. It is listed under CITES Appendix I.

Mediterranean Chameleon (*Chamaeleo chamaeleon*)

Generally, it does not penetrate more than 30 km from the coast. It is widespread and fairly common, but subjected to heavy collection by animal dealers (Baha El Din, 2006). At the global level, the species is classified as Least Concern (LC) by the IUCN in view of its wide distribution, tolerance of a degree of habitat modification, presumed large population, and because it is unlikely to be declining fast enough to qualify for listing in a threatened category (Vogrin *et al*., 2012). It is listed under CITES Appendix II.

African Chameleon (*Chamaeleo africanus*)

The African Chameleon (*Chamaeleo africanus*) is restricted to the Nile Delta and lower Nile Valley. It is fairly common in the northern Delta. It is a popular pet animal in trade. Until 2006, Baha El Din reputed the impact of collection on this species not significant, but numbers collected appeared to be larger than the past and classified the animal as Vulnerable (VU) in Egypt (Baha El Din, 2006). It is also probably threatened by the reclamation of wetlands in the northern Nile Delta. An updated targeted study is required to be able to assess the current local status of the animal. The animal is listed as LC by the IUCN in view of its wide distribution, presumed large population, and because any declines are likely to be localized (Wilms *et al*., 2014). It is listed under CITES Appendix II.

Negev Tortoise (*Testudo werneri*)

Populations east of the Nile Delta in Egypt and in Israel were formerly assigned to the Egyptian Tortoise (T*estudo kleinmanni*) but have been shown to encompass a separate species, *Testudo werneri*, according to Perälä (2001). As T*estudo kleinmanni*, the species was listed as Critically Endangered (CR) at the global and local levels. According to the new taxonomic classification, the status of *Testudo werneri* requires assessment, while *T. kleinmanni* is possibly extinct in Egypt. On the other hand, Baha El Din (personal communication, 2016) deems T*estudo kleinmanni* and *T. werneri* too much similar at the genetic level to be considered as two separate species and could be at most regarded as subspecies of the same animal.

- *Birds*

Several migrating birds including birds of prey are severely affected by hunting and commercial exploitation. Anthropogenic impacts on coastal lakes also constitute a threat to wintering and resident waterbirds.

Moreover, all Falconiformes (falcons) and Strigiformes (owls) are protected species, included in CITES Appendices I or II. Most birds of agricultural areas (although common and widespread) are protected as useful to agriculture as listed in Ministerial Decree 28

of 1967 issued in accordance to Article 117 of Law 53 of 1966 (known as "The Law of Agriculture").

Houbara Bustard (*Clamydotis undulata*)

North African populations may be sedentary or partially migratory, moving relatively short distances to find recent plant growth. It is listed as VU by the IUCN and included in CITES Appendix I. Although this species showed a steady decline of c.25% in the 20 years preceding 2004, this trend may since have been reversed by a captive breeding and release programme in eastern Morocco and western Algeria, and the overall population of *C. undulata* is said to be increasing. However, research is required into the efficacy of such releases at improving the demographic trends of the entire population without compromising its genetic integrity (BirdLife International, 2016b).

Pallid Harrier *(Circus macrourus)*

The Pallid Harrier (*Circus macrourus*) is an uncommon migrant and rare winter visitor of Lake Manzala (Baha El Din, 1999), listed as Near Threatened (NT) by the IUCN, as the species is known to be undergoing steep population decline in Europe, although numbers in its Asiatic strongholds are thought to be more stable. Thus, it is probably experiencing a moderately rapid population decline overall (BirdLife International, 2016b). This raptor is listed under CITES Appendix II and CMS[8] Appendix II.

Corncrake (*Crex crex*)

The Corncrake (*Crex crex*) is a fairly common migrant during autumn (Baha El Din, 1999). It was previously listed as Vulnerable (VU) by the IUCN but it is currently classified as LC. This is justified by the fact that data from monitoring in Russia (which holds the vast majority of the global population) indicate that the predicted declines have not taken place and that numbers have remained stable since 2002 or are even increasing. On the other hand, in Egypt, thousands of migrating birds (0.5-2.7% of the European population) are susceptible to capture each autumn in nets set for the Quail (*Coturnix coturnix*) with which they often migrate (Birdlife International, 2016b). The Corncrake is listed under CMS Appendix II.

Turtle Dove (*Streptopelia turtur*)

This species has been listed as VU by the IUCN. It has undergone rapid declines in much of its European range whilst in Russia and Central Asia it is thought to have experience more severe declines. Declines are thought to be driven by a number of factors including loss of foraging and nesting sites as well as disease and hunting along its migration (Birdlife International, 2016b). It is also included in CMS Appendix II.

- *Mammals*

Several mammals have disappeared from the Northern Coast of Egypt or are on the verge of extinction as a result of habitat loss and fragmentation.

Jungle Cat (*Felis chaus*)

The Jungle Cat (*Felis chaus*) is listed under CITES Appendix II, but classified as LC by the

[8] Convention on the Conservation of Migratory Species of Wild Animals, Bonn, 1979

IUCN, as the species is widespread, and common in some parts of its range, particularly India (Duckworth *et al*., 2008). However, population declines and range contraction are of concern elsewhere, particularly in Egypt. Basuony *et al*. (2010) have classified this felid as LC at the national level, but with need of population studies and monitoring. *Felis chaus* is found in the Burullus area where it inhabits areas with thick cover such as agricultural lands, marshes and reed beds in and around Lake Burullus. Globally, it has a broad but patchy distribution. In Africa, it is found only in Egypt, along the Nile River Valley south to Aswan, and in El Fayum, Farafra, Dakhla and Kharga oases (Glas, in press). Reclamation and destruction of natural wetlands, ongoing throughout its range but particularly in the arid areas, poses a threat to the species, as density in natural wetlands is generally higher (Nowell and Jackson, 1996).

Wild Cat (*Felis silvestris*)

The Wild Cat (*Felis silvestris*) is the most common and widely distributed wild felid, and thus listed as LC by the IUCN. However, introgressive hybridization with domestic and feral cats is considered extensive and taking place across almost the entire range, potentially resulting in cryptic extirpations of some populations (Nowell and Jackson, 1996; Macdonald *et al*., 2004, 2010; Driscoll *et al*. 2007, 2011). This introgression with domestic cats makes an estimation of Wild Cat population size very difficult. The animal is listed under CITES Appendix II.

African Golden Wolf (*Canis anthus*)

The African Golden Wolf (*Canis anthus*) was previously erroneously reported as a subspecies of the Golden Jackal (*Canis aureus*)[9] and listed as LC by the IUCN, but this canid is currently classified as a distinct species, representing the first new species of Canidae found in 150 years (Arnold, 2015). Moreover, there is a confused situation between this species, feral dogs, Wolf (*Canis lupus*) and intermediates, which could be hybrids (Basuony *et al*., 2010). As the IUCN's Golden Jackal page has not been updated since 2008, it has yet to recognize the distinctiveness of the African Golden Wolf; thus, its conservation status has not been evaluated, and no reliable population estimates are available.

Egyptian Weasel (*Mustela subpalmata*)

The Egyptian Weasel (*Mustela subpalmata*) is endemic to Egypt. However, it is listed as LC by the IUCN as, although it has a restricted distribution in the Nile Delta of Egypt, the species is common and adaptable, widespread in the Delta urban and semi-urban environments, commensal with humans, and there are currently no known major threats (McDonald and Hoffmann, 2008). On the other hand, Basuony *et al.* (2010) consider the species VU because of its small distribution area (EOO: 16,470 km^2; AOO: 84 km^2), but very common and not likely to be at risk

Giant Red Musk Shrew (Crocidura olivieri)

[9] *Canis aureus aureus* (in the Nile Valley, Delta and Western Desert) considered rare and with a narrow range, and *Canis aureus lupaster* (widespread) considered common but near-endemic (Basuony *et al.*, 2010).

The Giant Red Musk Shrew (Crocidura olivieri) is listed as LC by the IUCN in view of its wide distribution, presumed large population, and because it is unlikely to be declining fast enough to qualify for listing in a more threatened category (Baxter, 2008); but the species is considered VU at the national level (Basuony et al., 2010). Hoath (2003) calls this shrew Crocidura flavescens but this is now the valid name of a species restricted to South Africa (Hutterer, 2005; Basuony et al., 2010).

Egyptian Pigmy Shrew (Crocidura religiosa)

The Egyptian Pigmy Shrew (Crocidura religiosa) is very rare and only two specimens are known from the British Museum; these were collected from the neck of the Nile Delta and further down the Nile. Mummified specimens have also been found further south. It is possibly found in degraded habitat, based on Hoogstraal (1962). However, specific habitat preferences, current population size and trends are unknown. More information is needed on population status, ecology, range, and potential threats to be able to assess C. religiosa in a category other than Data Deficient (DD) (Hutterer et al., 2008). Basuony et al. (2010) have assessed the national status of the species as Vulnerable

Flower's Shrew (Crocidura floweri)

Flower's Shrew (Crocidura floweri) is endemic to Egypt. It has been recorded from Giza and the southern region of the Nile Delta, as well as records from Wadi El Natrun, and from the Upper Nile Valley. It has an EOO of 27,541.3 km2 and an AOO of 16.38 km2 (Basuony et al., 2010). Very little is known about the habitat requirements of this shrew, although it is found in man-made habitats in the Nile Valley. The population may have been impacted by environmental pollution caused by the widespread use of agricultural insecticides during the 1960s and 1970s, which is known to have had a very adverse effect on the Nile Valley wildlife. It is also possible that its habitat has changed drastically since the Aswan dam was built; this has had a great impact on small mammal species, partly due to the increased prevalence of pest rats. However, such an effect on *C. floweri* is undetermined (Saleh and Hutterer, 2008). Moreover, Flower's Shrew appears to have a restricted range, although M. Saleh (*in* Saleh and Hutterer, 2008) believes that this may be due to the restricted sampling range of the commercial collectors from the village of Abu Rawash in Giza, from whom many of the specimens have originated. The species apparently has a very small population, although it may not be as rare as it currently appears to be. According to Saleh and Hutterer (2008), there is insufficient information regarding distribution and population numbers available to assess Flower's Shrew in a category other than DD. Surveys may reveal this species to be more widely distributed and common than previously thought. However, it is also possible that surveys will confirm the restricted range of this species, and it may be classifiable as Critically Endangered (CR) or Endangered (EN). On the other hand, Basuony *et al*. (2010) classify this endemic species as EN.

Anderson's Gerbil (*Gerbillus andersoni*)

Anderson's Gerbil (*Gerbillus andersoni*) is listed as LC by the IUCN as it is reported as common in suitable habitats with no serious threats known at present, although the

animal has a restricted global range and overgrazing may be a problem in some parts of its range. On the other hand, the animal is listed as VU at the national level by Basuony *et al*. (2010) due to its narrow range (North Sinai, Delta, Mediterranean Coast and Siwa Oasis), with an Extent of Occurrence (EOO)[10] of 157,924.3 km^2 and an Area of Occupancy (AOO)[11] of 289.8 km^2 and a possible decline in occurrence after 1950.

Buxton's Jird (*Meriones sacramenti*)

There has been a 15% decline in extent of available habitat over a fifteen-year period since 1990 (G. Shenbrot, pers. comm.). The species' EOO is less than 20,000 km² and has been assessed precautionarily as VU by the IUCN, but the extent of fragmentation and the number of locations needs to be assessed (Hutterer *et al*., 2008). Its AOO is assessed at 8.4 km^2. Its status in Egypt needs assessment (DD) and the animal should be probably classified as EN (Basuony *et al*., 2010).

Crested Porcupine (*Hystrix cristata*)

Globally, this species is very widespread, although it is a favoured food item for humans in many parts of its range, and there should be some investigation into harvest levels in these areas (e.g., North and West Africa). It is therefore listed as LC by the IUCN. On the other hand, the species may have been extirpated in Egypt since 1980 (Grubb *et al*., 2010). According to Basuony *et al*. (2010) the species is not a resident and might be considered as an accidental visitor of the country.

Fennec Fox (*Vulpes zerda*)

This species is listed as LC by the IUCN as it is relatively widespread in the sandy deserts and semi-deserts of northern Africa to northern Sinai, and there are currently no known major range-wide threats believed to be resulting in a population decline that would warrant listing in a threatened category. It is listed in CITES Appendix II and is legally protected in Egypt (Wacher *et al*., 2015). On the other hand, Basuony *et al*. (2010) list the animal as EN in Egypt. Its EOO is 348,659.6 km^2 and its AOO is 176.4 km^2, with the last record of the animal occurring in North Sinai in 2005 at El-Quseima (Basuony *et al*., 2010).

[10] EOO is defined as the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon, excluding cases of vagrancy (IUCN 2001 Categories & Criteria, version 3.1).
[11] AOO is defined as the area within its EOO (see footnote above) which is occupied by a taxon, excluding cases of vagrancy (IUCN 2001 Categories & Criteria, version 3.1).

Table 2: Main faunal species of concern of the Northern Coast of Egypt

Common Name	Scientific Name	Habitat	Status in Egypt	Global Status		Eco-region & Potential CUs	Comments
				IUCN	CITES		
Amphibians							
Nile Delta Toad	*Amietophrynus kassasii*	An adaptable species, living in cropland, including rice fields, swampy areas and floating vegetation.	LC	LC	NL	Deltaic Mediterranean Coast (08, 09, 10) Eastern Mediterranean Coast (11, 12)	Endemic to the Nile Valley and Delta of Egypt, extending as far south as Luxor. Restricted range (less than 20,000 km^2)
Sudan Ridged Frog	*Ptychadena schillukorum*	Swampy habitats with shallow waters. Found in grassland, partially flooded rice fields and dry yam fields. Often seen near rivers and lakes.	DD	LC	NL	Eastern Mediterranean Coast (12)	A rare species in Egypt, known from only two records, one of which in the Nile Delta on the western margin of Lake Manzala.
Middle East Tree Frog	*Hyla savignyi*	Vegetation in and near wetlands; also in gardens, orchards and cultivations in close proximity to wetlands.sometimes found quite a long distance from water.	VU	LC	NL	Sinai Mediterranean Coast (13, 14)	Recorded only from North Sinai in Egypt. Uncommon and localized. Habitat available is locally very limited and could be easily lost.
Green Toad	*Bufotes cf. viridis*	Semi-desert with some scattered mesic microhabitats, oases, cultivations on the desert margin. Found in wells, cisterns and brackish marshes. Capable of tolerating very dry conditions and	NE	LC	NL	Western Mediterranean Coast (01, 02, 03, 04, 05, 06, 07) Eastern Mediterranean Coast (11, 12)	Status and taxonomy currently unclear

Common Name	Scientific Name	Habitat	Status in Egypt	Global Status		Eco-region & Potential CUs	Comments
				IUCN	CITES		
		it is the only amphibian in much of the Egyptian deserts.				Sinai Mediterranean Coast (13, 14)	
Reptiles							
Loggerhead Turtle	*Caretta caretta*	Warm and temperate marine waters. Undergoes extensive migrations from and to nesting beaches, feeding grounds and seasonally to escape low temperatures.	Uncommon, declining, but still widespread	VU	App. I	Western Mediterranean Coast (01, 02)	The commonest marine turtle in the Egyptian Mediterranean, with few records from the Red Sea. Used for human consumption when caught
Green Turtle	*Chelonia mydas*	Warm marine waters. Use a wide range of broadly separated localities and habitats during their lifetimes. Nesting evidence found near Zaranik, North Sinai	Uncommon, localized and declining	EN	App. 1	Sinai Mediterranean Coast (13)	Known from both the Mediterranean and Red Sea. Used for human consumption when caught
Leatherback Turtle	*Dermochelys coriacea*	Highly pelagic, spending much of its life far offshore, but often close to shore.	NE	VU	App. 1	Sinai Mediterranean Coast (13)	Recorded from the Mediterranean and Red Sea
Egyptian Tortoise	*Testudo kleinmanni*	Inhabits fairly arid and semi-arid deserts fringing the Mediterranean coast, largely within 50 km from the coast. Previously found in awide range of habitats, from vegetated coastal dunes, to sandy and stony steppe and even hilly country.	CR (EX?)	CR	App. I	Western Mediterranean Coast (01?)	Mostly eradicated by commercial over-exploitation. Imported from Libya after Egyptian stocks have been harvested to extinction

Common Name	Scientific Name	Habitat	Status in Egypt	Global Status		Eco-region & Potential CUs	Comments
				IUCN	CITES		
Negev Tortoise	*Testudo werneri*	Associated with desert and semi-desert habitats characterized or dominated by compact sand and gravel plains with scattered rocks and shallow sandy wadis, although populations are also known to occur in or adjacent to coastal salt marsh habitats.	CR	NE	App. I (listed as *Testudo kleinmanni*)	Sinai Mediterranean Coast (13, 14)	North Sinai populations formerly assigned to *Testudo kleinmanni* (CR)
Mediterranean Hooded Snake	*Macroprotodon cucullatus*	Mediterranean sub-deserts, usually within the coastal zone. Found in fairly mesic stony or rocky areas with light scrub.	EN	LC	NL	Western Mediterranean Coast (01, 05, 06, 07) Sinai Mediterranean Coast (13, 14)	Uncommon and declining as a result of habitat degradation and destruction.
Leopard Fringe-fingered Lizard	*Acanthodactylus pardalis*	A lowland species restricted to semi-arid regions, in steppes with hard clay soils, adjacent to saline coastal areas.	CR	VU	NL	Western Mediterranean Coastal Desert (01, 02, 03, 04, 05, 06) Sinai Mediterranean Coastal Desert (13, 14)	Restricted to the Mediterranean coastal region of northern Egypt and northeastern Libya
Desert Monitor	*Varanus griseus*	Mostly found in desert plains and large wadis with some vegetation cover but also in regions almost	NT	NE	App. I	Deltaic Mediterranean Coast (08)	Large numbers are collected for the pet trade and occasionally for leather.

Common Name	Scientific Name	Habitat	Status in Egypt	Global Status		Eco-region & Potential CUs	Comments
				IUCN	CITES		
		completely devoid of vegetation, in fairly humid coastal salt marshes and dry cultivated areas.				Sinai Mediterranean Coastal Desert (13, 14)	
Mediterranean Chameleon	*Chamaeleo chamaeleon*	Arboreal species found on trees and bushes, when food becomes scarce, they move away, even on the ground. It also occurs on vegetation in sparsely vegetated open gravel plains. Fairly common in coastal areas, generally not penetrating more than 30 km from the coast.	NE	LC	App. II	Western Mediterranean Coast (01, 02, 03, 04, 05, 06, 07) Sinai Mediterranean Coastal Desert (13, 14)	Threatened due to commercial over-exploitation
African Chameleon	*Chamaeleo africanus*	Cultivated areas, orchards, often near or at the margin of wetlands. Seems to prefer short dense trees and reeds.	VU	LC	App. II	Deltaic Mediterranean Coast (09, 10)	Threatened due to commercial over-exploitation
Birds							
Thekla Lark	*Galerida theklae*	Inhabits stony and hill grounds with some bushes or small trees	LC	LC	NL	Western Mediterranean Coast	Restricted to the Western Mediterranean Coastal Desert. Common resident but declining
Thick-billed Lark	*Ramphocoris clotbey*	Inhabits stony deserts, grassy wadis, rocky slopes and marginal ploughed land	LC	LC	NL	Western Mediterranean Coast	Restricted to the Western Mediterranean Coastal Desert although Tharwat (1997) locates the species in Cairo, Suez Road and Sinai. Rare and irregular passer and winter visitor

Common Name	Scientific Name	Habitat	Status in Egypt	Global Status		Eco-region & Potential CUs	Comments
				IUCN	CITES		
Houbara Bustard	*Chlamydotis undulata*	Inhabits sandy and stony semi-desert and is specialised to arid conditions where trees are absent and both shrub cover and herb layer are sparse	CR	VU	App. I	Western Mediterranean Coast	North African populations may be sedentary or partially migratory, moving relatively short distances to find recent plant growth
Quail	*Coturnix coturnix*	Cultivated land, grassland and untilled fields.	VU	LC	NL	Western Mediterranean Coast (01, 02, 03, 04, 05, 06) Deltaic Mediterranean Coast (08, 09, 10) Eastern Mediterranean Coast (12) Sinai Mediterranean Coast (13, 14)	Scarce resident, common passer and uncommon winter visitor. One of the main target species of autumn bird trapping along the Mediterranean coast
Short-toed Snake Eagle	*Circaetus gallicus*	Inhabits scrubby vegetation, not very wooded open terrain, woods with large clearings and rocky reliefs.	Rare	LC	App. II	Deltaic Mediterranean Coast (09, 10)	Rare resident. Fairly common passer
Stone Curlew	*Burhinus oedicnemus*	Stony and sandy areas, barren hills, areas with sparse vegetation, marshlands and cultivated areas.	Fairly common	LC	NL	Deltaic Mediterranean Coast (10)	Atypical for the Nile Delta; generally found in desert areas. Recorded (2006) in the sand dunes east of Burg El Burullus. Elsewhere, fairly common resident and winter visitor

Common Name	Scientific Name	Habitat	Status in Egypt	Global Status		Eco-region & Potential CUs	Comments
				IUCN	CITES		
Lesser Short-toed Lark	*Calandrella rufescens*	***Calandrella rufescens nicolli*** found in saltmarshes of the Nile Delta	Common	LC	NL	Deltaic Mediterranean Coast (09, 10)	Common resident. Sub-species *nicolli* is endemic
Corncrake	*Crex crex*	Meadows, grasslands, cultivated fields and marshlands with plenty of plants.	VU	LC	NL	Sinai Mediterranean Coast (13, 14)	Scarce passer; fairly common migrant during autumn
Pallid Harrier	*Circus macrourus*	Found in open natural grasslands in plains and dry steppe and close to lakes and marshlands. A native non-breeding species in Egypt	VU	NT	App. II	Sinai Mediterranean Coast (13, 14)	Uncommon migrant and rare winter visitor
Turtle Dove	*Streptopelia turtur*	Uses a wide variety of woodland types, as well as steppe and semi-desert, all with agricultural areas nearby for feeding. It tolerates humans but does not breed close to towns or villages	NE	VU	NL	Deltaic Mediterranean Coast (09, 10) Sinai Mediterranean Coast (13, 14)	Strongly migratory wintering south of the Sahara from Senegal east to Eritrea and Ethiopia
Syrian Woodpecker	*Dendrocopos syriacus*	Found in shrublands in Mediterranean-type shrubby vegetation, arable lands and plantations	NE	LC	NL	Sinai Mediterranean Coast (13, 14)	Restricted to North Sinai in Egypt
Mammals							
Four-toed Jerboa	*Allactaga tetradactyla*	Found in sparsely vegetated plains near the coast	EN	VU	NL	Western Mediterranean Coast (01,02, 03, 04, 05)	Localized range (AOO: 46.2 km^2; EOO: 2,245.5 km^2). Facing serious habitat loss. Latest records in Marsa Matrouh, Ras El Hekma and El Dabaa. Near endemic (Libya and Egypt)

Common Name	Scientific Name	Habitat	Status in Egypt	Global Status		Eco-region & Potential CUs	Comments
				IUCN	CITES		
Lesser Short-tailed Gerbil	*Gerbillus simoni*	Found in littoral saltmarshes in salty sandy loam with halophytic vegetation, olive groves, barley fields and on clay soil with *Thymelaea* and *Anabasis* vegetation.	VU	LC	NL	Western Mediterranean Coast (02, 03, 04, 05, 06)	Uncommon and localized (AOO: 58.8 km^2; EOO: 3,443.6 km^2). Affected by habitat loss.
Anderson's Gerbil	*Gerbillus andersoni*	Sandy areas, palm groves, cultivated semi-deserts and coastal deserts. Prefers grazing in open areas eating green parts of shrubs.	VU	LC	NL	Western Mediterranean Coast Deltaic Mediterranean Coast (09, 10)	Restricted world range.
Pale Gerbil	*Gerbillus perpallidus*	Generally sandy areas from coastal dunes to sandy margins in stands of *Thymelaea hirsuta*, to agricultural areas. In Wadi Natrun, recorded from sandy and muddy lake shores with vegetation.	Uncommon	LC	NL	Deltaic Mediterranean Coast (08)	Narrow range (AOO: 88.2 km^2; EOO: 31,558 km^2). Endemic to the Western Desert of Egypt but also recorded from the Idku sandy biotopes.
Flower's Shrew	*Crocidura floweri*	Collected from fields.	EN	DD	NL	Deltaic Mediterranean Coast	Endemic to the Nile Delta of Egypt
Giant Red Musk Shrew	*Crocidura olivieri*	Recorded from moist areas including canal embankments, irrigated fields, cultivated areas and gardens	VU	LC	NL	Deltaic Mediterranean Coast	*Crocidura olivieri* is the valid name for large African shrews previously known as *C. flavescens* (now restricted to South Africa).

Common Name	Scientific Name	Habitat	Status in Egypt	Global Status		Eco-region & Potential CUs	Comments
				IUCN	CITES		
Fat Sand Rat	*Psammomys obesus*	Saline soils and salt marshes with stands of succulent halophytic plants such as *Anabasis articulata*.	Uncommon	LC	NL	Deltaic Mediterranean Coast	Narrow range, Eastern and Western Desert and North Sinai; mainly along the coastal area (AOO: 310.8 km^2; EOO: 80,173.7 km^2). Local EN status could apply according to IUCN regional criteria, as AOO is small and population fluctuates; by this downgraded by the possibility of migration from other countries (Basuony *et al.*, 2010).
Jungle Cat	*Felis chaus*	Areas with thick cover such as agricultural lands, marshes and reed beds. Also recorded from sea cliffs along the north coast.	LC	LC	App. II	Deltaic Mediterranean Coast	Probably the cat species that has adapted best to the disturbed habitats created by human activities. Subspecies *nilotica* endemic to Egypt.
Wild Cat	*Felis silvestris*	Dry areas with cover including cultivated land; also, rocky areas in mountains.	LC	LC	App. II	Deltaic Mediterranean Coast	Status difficult to ascertain because of confusion with domestic and feral cats. Hybridization with the feral cat is considered to present the biggest threat to the species and it is unlikely that pure populations exist around areas of human activities.
African Golden Wolf	*Canis anthus*	Desert, farms and gardens. Scattered in the Western Desert and Delta	NE	NE	NL	Western Mediterranean Coast	Previously reported as a subspecies of the Golden Jackal (*Canis aureus*), but currently classified as a distinct

Common Name	Scientific Name	Habitat	Status in Egypt	Global Status		Eco-region & Potential CUs	Comments
				IUCN	CITES		
						Deltaic Mediterranean Coast (09)	species. Represents the first new species of Canidae found in 150 years. Confused situation between this species, feral dogs, Wolf (*Canis lupus*) and intermediates, which could be hybrids. The distinctiveness of the species has not been recognized yet by the IUCN; its conservation status has not been evaluated and no reliable population estimates are available.
						Eastern Mediterranean Coast (12)	
Egyptian Weasel	*Mustela subpalmata*	Commensal with humans, and often trapped in human habitations, including underground larders and even in cars	VU	LC	NL	Western Mediterranean Coast (07)	Endemic to the northern Nile Valley and Delta of Egypt
						Deltaic Mediterranean Coast (08, 09, 10)	
						Eastern Mediterranean Coast (11, 12)	
Buxton's Jird	*Meriones sacramenti*	Lives in coastal dunes with limited vegetation cover in small family groups. Also reported to be more generalist, inhabiting clay and sandy deserts, bush country, arid steppes, low plains, cultivated fields, grasslands, and mountain valleys.	DD (EN?)	VU	NL	Sinai Mediterranean Coastal Desert (14)	Endemic to the Negev and the coastal region of northern Sinai (Egypt) and Israel, including Palestine.

Common Name	Scientific Name	Habitat	Status in Egypt	Global Status		Eco-region & Potential CUs	Comments
				IUCN	CITES		
Crested Porcupine	*Hystrix cristata*	Inhabits dry Mediterranean shrubland, maquis, abandoned farmland, steppe, forest and dry rocky areas	NE (EX?)	VU	NL	Sinai Mediterranean Coastal Desert (13, 14)	Possibly extirpated in northern Egypt; little information from southern parts of Egypt.
Fennec Fox	*Vulpes zerda*	Lives in arid sand dunes spending daylight hours in small tunnels. Able to live without access to water.	EN	LC	App. II	Western Mediterranean Coast (06) Sinai Mediterranean Coast (13, 14)	Hunted and trapped for trade
Mediterranean Monk Seal	*Monachus monachus*	Once hauled out on open beaches but today they use marine caves with sea entrances for hauling out	CR (EX?)	EN	App. I	Western Mediterranean Coast (01?)	One of the most endangered pinniped species in the world

EX: Extinct; CR: Critically Endangered; EN: Endangered; VU: Vulnerable; NT: Near Threatened; LC: Least Concern; DD: Data Deficient; NE: Not Evaluated; NL: Not Listed.

3-3 Current Impacts and Threats on Biodiversity

Drastic ecological changes have taken place on the Northern Coast of Egypt over the past decades, as a direct result of intensive human interventions and manipulation of the natural environment, as well as a growth in population and associated environmental deterioration. Human development is leading to a rapid loss of habitat. As a result, many species have either changed their distribution or disappeared completely.

Ecological changes continue to occur as a result of local and national policies and corresponding development activities. The lack of effective conservation or land use legislation compounds these problems.

3-1-1 Agriculture and Urbanization

Land reclamation for agriculture, urbanization and road construction is the main cause of habitat loss, modification and fragmentation and has transformed natural habitats into agricultural fields or urban centers not suitable for their original inhabitants. Agriculture has also introduced exotic floral species that were inadvertently introduced and have now become naturalized, or by deliberately introduced species such as *Eucalyptus* and *Casuarina* trees. Accordingly, many native animals are being replaced by commensal, more adaptable pest species, such as mice and rats. Garbage and human refusal disposed along canal banks and natural wetlands, and open dumping areas near villages attract not only several opportunistic species such as Cattle Egrets, Red Foxes and feral animals but also numerous pests and disease vectors such as rodents, flies and mosquitoes.

An example of intensive development is given by the coastal area west of Alexandria (CU06 – CU07). In a continuous band for 120 km, the coast has been totally transformed into intensive summer resorts, surrounded by continuous walls which block public access to the beach, and interactions between the sea and the coastal lands. Further west (CU01 – CU05), summer resorts decrease and are intersected by areas of natural habitats. However, this trend still continues and additional resorts are built every year.

3-1-2 Use of Pesticides

Intensive cultivation and the use of pesticides have eliminated many of the native animals of the region. These pollutants may finally reach apex species via the food chain, including protected species such as raptors. Pesticides have, therefore, detrimental impacts on biodiversity, particularly birds. During the 1980s, due to the widespread misuse of rodenticides, a sharp decline in bird populations occurred throughout the arable lands of Egypt. While the Ministry of Agriculture has made great strides in reducing the use of pesticides, particularly toxic substances, pesticides harmful to the environment continue to be applied.

3-1-3 Impacts on Coastal Wetlands

Although it is considered the healthiest wetland in Egypt, considerable ecological changes have occurred to Lake Bardawil (CU13) due to the extension of salt extraction and the constant formation of sand bars (siltation), which close the channels connecting the lagoon with the sea. Moreover, all indications are that the Delta lakes are wetlands in distress. The

lakes are subjected to a host of human activities that have cumulative impacts that are difficult to assess.

Major environment problems affecting the Delta lakes include:

- A reduction in size due to land reclamation, land fill, fish farming, garbage disposal and road construction;
- Pollution, which is contaminating the lake with heavy metals, pesticides and other harmful substances.
- A reduction in the carrying capacity of the lakes to treat pollution[12].
- Increasing sedimentation of the lakes and siltation of the *Boughaz* and channels;
- Changes in the water circulation and salinity regime due to the siltation of the *boughaz*, construction of roads, reduction of fresh water into the lakes and partitioning of the lake into pans for fish farming;
- Proliferation of reed beds, Water Hyacinth and other invasive species;
- A decline in the diversity and number of water birds indicating that the health of wetlands has deteriorated;
- Coastal erosion which moves the lakes' sand bars inland; and
- Deteriorating water quality, leading to eutrophication.

Figure 14: Sheep's and goats grazing in the grasslands of the Burullus area (CU10)

The net impact of these threats undoubtedly affects the lakes' economic productivity.

Figure 13: Fish farms at Lake Manzala (CU12)

3-1-4 Grazing

Grazing animals include sheep, goats, cows, buffaloes and donkeys. Over-grazing of sheep

[12] For example, industries, agriculture and municipalities in Damietta discharge untreated wastewater into Lake Manzala and other wetlands contributing to water pollution. The pollution also originates from sources further south; for example, the Bahr El Bakar Drain, the largest drain on the lake, discharges untreated industrial and domestic wastewater from Cairo.

and goats affects native vegetation with subsequent impacts on small herbivorous animals. Annual vegetation is more affected by grazing than dominant woody perennials which are not browsed heavily by sheep and goats, while annuals are heavily browsed. Moreover, over-crowding of domestic animals may result in soil compaction, impacts on fossorial species, and in the destruction of burrows and dens.

3-1-5 Feral Animals

Feral dogs and cats compete for food resources with local wild carnivores and may affect threatened species. The African Golden Wolf is reported to decline in areas where it competes with local feral dogs. Feral cats abound in towns and villages, but the degree to which they interact with the populations of Wild Cats in Egypt is not known. The two animals are very similar and difficult to differentiate and some authors claim that they interbreed, although there is no confirmed record of wild/feral hybrid specimen from Egypt. In Sub-Saharan Africa, hybridization with the feral cat is considered to present the biggest threat to the species and it is unlikely that pure populations exist around areas of human activities (Hoath, 2003).

Figure 15: Stray dog cubs near El Sheikh Mobarak Village, El Burullus area (CU10)

3-1-6 Fishing and Aquaculture

The Delta lakes' fisheries are affected by illegal fishing practices, including fry catches near the *boughaz*. The fast growth of fish farming also has numerous impacts on the lakes and their biota due to fish feeding practices, dispersion of resulting waste and the use of hormones and antibiotics. Moreover, fish escaping from fish farms could affect indigenous fish due to food competition, disease transmission and genetic changes as a result of potential mating between wild individuals and captive ones (Younes, 2000). Individual fishing is also practiced along the seashore and in irrigation canals and drains. Catches in canals and drains are almost exclusively composed of Cichlidae (*Oreochromis* and *Tilapia* spp.) and catfishes from the Families Clariidae (*Clarias gariepinus*) and Bagridae (*Bagrus bayad* and *Bagrus docmac*). Fishing risks from these canals are mainly related to the consumption of fish contaminated by pesticides which tend to bioaccumulate in the tissues of aquatic organisms. In addition, protozoan parasites are reported to infect *Clarias gariepinus* in Dakahleya Governorate (El-Tantawy and El-Sherbiny, 2010).

Figure 16: Fishing activities in Bahr Mortada Drain, near Burg El Burullus

Figure 17: Sea fishing near Burg El Burullus

3-1-7 Impacts on Irrigation Canals and Drains

Pollution of irrigation canals and drains is mainly due to disposal of solid waste and discharge of sewage water. Irrigation canals are also used by locals for bathing and washing laundry, food and kitchen utensils, in addition to irrigation. Solid and liquid wastes that accumulate in water bodies affect the physical, chemical and biological characteristics of the aquatic ecosystem, resulting in depleted water quality, introduction of pathogenic organisms into the aquatic environment and obstruction of water courses. The life form in the aquatic ecosystem is adversely affected and the impact can range from less reproduction and also reduction in total population of various plants and animals to the extinction of a few species which cannot survive in the changed environment. Nutrients enrichment of aquatic courses results in a dramatic increase of aquatic plant productivity, a process referred to as "eutrophication". As a result of increased aquatic plant productivity, more organic material is added to the system, which eventually dies and decays. The decaying organic matter produces unpleasant odors and depletes the oxygen supply required by aquatic organisms. Prolonged episodes of depressed dissolved oxygen concentrations of 2 mg/L or less can result in "dead" watercourses.

Figure 19: Mechanical removal of aquatic vegetation from Hammad Canal, El Burullus area (CU10)

Figure 18: Water Hyacinth infesting Abu Qir Drain (CU08)

3-1-8 Invasive Species

Several invasive species occur in the area. The most serious and prevalent of these is the Water Hyacinth (*Eichhornia crassipes*), which was originally introduced into Egypt from South America. Water Hyacinth represents one of the most serious environmental problems threatening the Delta lakes, particularly Lake Manzala. The infestation at the lake is one of the worst cases of this invasive species known in the country and perhaps even in the Middle East/North Africa. Furthermore, it is contributing to the eutrophication and sedimentation of this wetland affecting its viability. Fishing is severely obstructed by the plant, affecting the livelihoods of local fishermen. Water Hyacinths are also noted to be a problem along the Nile River and in the canal-drainage network.

3-1-9 Removal of Aquatic Vegetation

Mechanical removal of aquatic vegetation is a common practice in Egyptian irrigation

wetlands, particularly to eliminate invasive introduced invasive plant species (such as the Water Hyacinth) that decrease the dissolved oxygen content and are responsible of wetland eutrophication. However, mechanical removal of vegetation is an unselective practice which also eliminates the invertebrate fauna (such as snails and worms), juvenile fish and other aquatic organisms, thus affecting aquatic predators and fish stocks.

Figure 21: Bait pigeon, Idku area

3-1-10 Hunting and Commercial Exploitation of Wildlife

Commercial exploitation is the most significant threat facing herpetofauna. The Egyptian Tortoise has disappeared from the Western Mediterranean Coast of Egypt. The Mediterranean Chameleon, African Chameleon, Javelin Sand Boa and Eastern Montpellier Snake are heavily collected for pet trade, particularly by professional collectors from Abu Rawash. Other wildlife is probably being caught for commercial sale, but the status of these practices is difficult to ascertain.

A high sea turtle mortality rate has been noticed along the Mediterranean shores of Lake Bardawil (CU13); the causes are unknown although some fishermen admitted to deliberately kill turtles profiting of poor law enforcement.

Bird hunting is a serious problem particularly in Damietta Governorate (CU11), perhaps more so than any other Governorate in the country. Damietta is unique in the fact that bird hunting takes place year around and is indiscriminate with resident birds being hunted as well as winter visitors and passage migrants.

Bird trapping takes place from late August to early September primarily along the Mediterranean coast. Quail (*Corturnix coturnix*) is one of the main target species of autumn bird hunting, but all species of bird including the Corncrake, song birds and birds of prey are trapped. In North Sinai, where 500 families are involved in quail netting every season, the activity has probably a most economic value compared with the other netting areas in Egypt. Small birds are trapped accidentally as non-target birds in the trammel quail nets (Shaltout and Khalil, 2006). Waterbird hunting takes place at Lake Manzala from autumn into spring, with the main hunting season during winter. While ducks are among the most desirable species sought by the hunters, the nets catch all species of birds and appear to be raised all the time.

Figure 20: Quail net, Idku area (CU08)

Illegal falcon trapping using tied pigeons (*Columba livia domestica*) as baits, is a common practice along the Deltaic Mediterranean Coast and has been previously observed. Trapping birds of prey is also practiced along the Mediterranean Coast of SinAIII. North Sinai with its position on the major migration routes is considered as one of the best areas in Egypt, if

not in the whole Middle East, to trap falcons. The trapping season lasts approximately 45 days during October and November (Baha El Din and Salama 1991 *in* Shaltout and Khalil, 2006). Large falcons are the main target of this activity, such as Lanner (*Falco biarmicus*), Saker (*Falco cherrug*), and Peregrine (*Falco peregrinus*), the latter species is the most demanded and valued by the rich falconers from the Arab Gulf States (Shaltout and Khalil, 2006).

4. MARINE ENVIRONMENT

The Mediterranean Coast of Egypt is located on the eastern Mediterranean Sea. Given the mobility of fish and other large marine organisms that travel great distances, such as marine mammals and turtles, it is virtually impossible to categorize the marine biodiversity according to coastal sectors and/or units. Locations of some specific habitats and/or records of particular species are sometimes available, based on accidental records and planned surveys carried out for specific projects such as the study for the declaration of Sallum Marine Protected Area covering the Sallum offshore area (CU01), the West Nile Delta Gas Development Project (ERM/Environics, 2013) covering the offshore Abu Qir Bay area (CU08), and the East Nile Delta Gas Development Project (ERM/Environics, 2015) covering the area offshore of Damietta/Ras El Barr and Port Said (CU11/CU12).

4-1 Marine Habitats

The updated list of habitat types in the Egyptian Mediterranean Sea published in 2019, list includes the following habitats:

- Infralittoral Sandy Mud
- Circalittoral Sandy Mud
- Deep Circalittoral Mud
- Circalittoral Mixed Sediments
- Maerl Beds Maerl
- Infralittoral Rocks
- Seagrass Meadows
- Deep Sea Ecosystems

A brief account on each of these habitats is herein presented;

4-1-1 Infralittoral Sandy Mud

This biotope is present is in the shallow waters in the offshore Abu Qir Bay area (CU08) and is expected to be present along most of the Egyptian Mediterranean coastline. Although, this biotope does not typically support high diversity communities its benthic fauna may provide food for a number of commercially important fish species. This biotope may provide important feeding and nursery grounds for marine birds and fish. It is listed as endangered natural habitat type in the Council of Bern Convention Resolution no. 4 (1996): *Sublittoral soft seabeds* (code 11.22)[13] (Salomidi *et al*.; 2012).

4-1-2 Circalittoral Sandy Mud

This biotope is widespread across the offshore Abu Qir Bay area and the only epifauna identified was one mantis shrimp. Other sites in the Mediterranean with this biotope are known to support a variety of species, which includes a rich epi- and infauna. Species composition at a particular site may relate, to some extent, to the proportions of the major

[13] Salomidi, I, Katsanevakis,S., Borja, A., Braeckman, U., Damalas, D., Galparsoro, I., Mifsud, R., Mirto, S., Pascual, M., Pipitone, C., Rabaut, M., Todorova, V., Vassilopoulou, V. and Vega Fernandez, T. (2012) Assessment of goods and services, vulnerability, and conservation status of European seabed biotopes: a stepping stone towards ecosystem-based marine spatial management, Mediterranean Marine Science, 13/1 49-88.

sediment size fractions. Greater quantities of stones and shells on the surface may give rise to more sessile epibenthic species, some of which are important in the diets of many commercially important fish and invertebrate predators. Circalittoral biotopes may be less susceptible to human impacts related to coastal alteration when they occur at large distances from the shore. However, due to the relatively stable conditions that characterise this biotope, recovery from disturbances may be particularly slow. It is listed as endangered natural habitat type in the Council of Bern Convention Resolution no. 4 (1996): *Sublittoral soft seabeds* (code 11.22) (Salomidi *et al*.; 2012).

4-1-3 Deep Circalittoral Mud

Although no epifauna were identified during the survey offshore of Abu Qir Bay, the epi- and infauna of this biotope may be rich and diverse and may serve as food for several demersal fish species. Circalittoral biotopes may be less susceptible to human impacts when they occur at large distances from the shore. However due to the relatively stable conditions that prevail in these biotopes, they may show slow recovery in the case of serious disturbance. They are commonly subjected to disturbance from trawling activities. It is listed as endangered natural habitat type in the Council of Bern Convention Resolution no. 4 (1996): *Sublittoral soft seabeds* (code 11.22) (Salomidi *et al*.; 2012).

4-1-4 Circalittoral Mixed Sediments

The presence of benthic invertebrates in this biotope increases habitat complexity through the creation of tubes and burrows. Few marine sedimentary habitats have been thoroughly sampled and it has been argued that the biological diversity of this biotope is often underrepresented since it appears to support a relatively diverse and abundant benthic fauna Particularly, the high densities of infaunal polychaete and bivalve species that exist here have been attributed to the relatively low rate of natural physical disturbance and the heterogeneity of the habitat. It is listed as endangered natural habitat type in the Council of Bern Convention Resolution no. 4 (1996): *Sublittoral soft seabeds* (code 11.22) (Salomidi *et al*.; 2012).

4-1-5 Maerl Beds

Maerl is a slow growing coralline alga which aggregates to form beds. Maerl is long-lived and is associated with localised increased biodiversity and is the most sensitive habitat identified within the West Nile Delta area, offshore of Abu Qir Bay (CU08). Live maerl beds consist of a top layer of live maerl where photosynthesis occurs and beneath the live maerl the beds normally consist of dead maerl. The calcareous structures that remain once the maerl is dead provide substrate for colonisation by invertebrates and shelter. Accordingly, dead maerl beds also provide important habitat on the seabed. The extensive beds (live and dead) are slow growing so are sensitive to physical damage and they are considered to be of ecological importance due to the very high diversity of associated organisms. Maerl beds are found throughout the Mediterranean Sea, and in Egyptian waters maerl beds have been recorded off the Nile Delta on the outer shelf between the Damietta and Rosetta (Rifaat, 2005). Moreover, maerl beds were identified at a number of locations

during marine surveys carried out in 2009 and 2012 offshore of Abu Qir Bay by Fugro Survey Limited (ERM/Environics, 2013). The survey samples that contained maerl were taken between 60-200 m depth contours. The survey identified areas of live and dead maerl. The marine survey identified areas of dead maerl where it is assumed the top layer of live maerl is also dead. Seabed photography indicated that the maerl is patchy in distribution and it is likely that the patchiness will exist across the entire maerl area.

4-1-6 Infralittoral Rocks

Hard substrate on a predominantly sandy seabed creates complexity in the benthic environment and attracts colonising organisms by providing niches for species to inhabit. The faunal communities colonising the rocky surfaces will enhance biodiversity by attracting predators and species that can use the structure as shelter. Stable rocky surfaces within this biotope were densely covered with epilithic sessile fauna such as sponges and hydroids. Two areas of rocky seabed were recorded offshore of Abu Qir Bay (ERM/Environics, 2013). These areas contrasted strongly to the surrounding soft sediments and are thought to be cemented sand features. Large polychaetes (Eunicidae) were also regularly seen.

4-1-7 Seagrass Meadows

Seagrass is an important habitat, providing food and shelter for a wide diversity of flora and fauna, including young turtles, prawns and fish. Some turtle species, including Loggerhead Turtle (*Caretta caretta*) also use seagrass meadows as nurseries. Seagrass is also important as a primary producer providing food for plant grazers and detrivores both in the local area and through sediment transport, offshore. Since seagrass beds have not been systematically mapped in Egyptian waters, there are no definitive data on their distribution. Generally, seagrasses are most commonly found in water depths to 20 or 30 m. Seagrass meadows have not been identified during the surveys carried out offshore of Abu Qir Bay (CU08) and Ras El Barr (CU11/CU12). On the other hand, large parts of the seabed in El Sallum Bay (CU01) are covered with seagrass. These include *Posidonia oceanica*, which is reported at 6-26 m depth forming monospecific aggregations, as well as *Cymodocea nodosa*. Both are found on sandy or rocky substrates.

4-2 Marine Biodiversity

4-2-1 Phytoplankton

Within the Delta area, phytoplankton concentrations are greatest in winter and lowest in the summer. Concentrations and diversity decrease considerably offshore, the greater values being found closer to shore and near to discharges such as the river Nile.

Offshore of Abu Qir Bay (CU08), the near shore community is characterised by high densities of the coastal species *Skeletonema costratum* and species of the genus *Chaetoceros*. The offshore community is dominated by dinoflagellates of the genus *Gymnodinium*; dinoflagellates display a competitive advantage over diatoms in nutrient-limiting environments (ERM/Environics, 2013).

Samples from a 2009 survey offshore of Ras El Barr (CU11/CU12) included 15 species of diatom and dinoflagellates from the genera *Ceratium* (*Ceratium fusus*, *C. macrooceros*, *C. tripos*, *C. contartum*), *Ornithocercus*, *Scrippsiella*, *Amphisolenia* and *Gymnodium*. Diatoms dominated samples, ranging from 62 to 100% of the total, dinoflagellates making up the rest (NIOF, 2009; ERM/Environics, 2015).

The phytoplankton assemblage is not particularly sensitive and can adapt to minor changes to the physical properties of the water column and nutrient concentrations relatively readily. However, extreme changes over a large area may result in large increases or decreases in primary productivity.

4-2-2 Zooplankton

In the offshore survey of Abu Qir Area (CU08), the zooplankton community was found to comprise predominantly representatives of the phylum Crustacea. As observed in zooplankton communities worldwide, copepod crustaceans were both numerically and taxonomically dominant comprising seven of the ten most abundant taxa throughout the survey area. The juvenile calanoid copepods (copepodite) were the most dominant taxa throughout the survey area, which is characteristic of oligotrophic seas such as the Mediterranean, which typically comprise juveniles and small zooplankton. Zooplankton communities throughout the site generally displayed fairly high evenness and diversity, with calanoid copepodites, calanoid copepods of the family paracalanidae and cycopoida copepodites all occurring in 100% of samples.

Zooplankton communities were also sampled during a 2009 survey offshore of Ras El Barr (CU11/CU12). Within the study area the zooplankton community, in terms of species, was represented by 27 Copepoda, one Ostracoda, 11 Protozoa, 6 Appendicularia, 2 Cnidaria, 2 Polychaeta, 2 Mollusca species and one species of Chaetognatha. Copepoda were the most dominant group in the study area and represented 87.94% of the total zooplankton population in the study area.

4-2-3 Benthos

Benthic organisms play an important role in the food web of marine communities and provide another important link from primary production to higher trophic levels. These organisms feed mostly upon detritus, sedimentary phytoplankton, zooplankton and / or other members of the benthic community. In addition, they also provide an important source of organic matter to other organisms that prey on them, particularly fish. Planktonic larval stages of benthic organisms serve as food for Planktonic organisms and some pelagic fish species. They comprise a diverse number of animal groups, including polychaete worms, crustaceans and molluscs. Most of them serve as a diet for many species of fish.

Figure 22: Sponges collected from El Sallum Bay (CU01)

Posidonia oceanic meadows are one of the most important subtidal communities in the Mediterranean Sea and are very rich in micro and macrofauna. The present study investigated the associated polychaetes with P. oceanica from Salloum Marine Protected Area that extends along the northwestern coast of the Egyptian Mediterranean Sea from autumn 2018 to summer 2019. A total of 37 species of

polychaete species were recorded, within 33 genera belonging to 18 families and 6 orders. Order Phylloida was the dominant, represented by 14 species (37.84 % of all species) within 11 genera and 6 families (33.33% of all families). It was followed by orders Eunicida and Terebellida; each was represented by 4 families and 7 species. The results showed that families Nereididae, Syllidae, Serpulidae, and Terebellidae were dominant; each comprised four species and were represented together by 16 species of 43.24 % of all recorded polychaetes. Out of the recorded species, 30 were recorded at sites S1 and S2, declined into 19 and 17 species at S3 and S8, respectively. The abundance of collected polychaetes showed spatial and seasonal fluctuations. A total of 879 individuals of recorded species were obtained. The highest number of individuals was 352 (40.05 %), collected at S1 and declined to 295 at S2 and reached the lowest (117 and 115 individuals) at S3 and S8, respectively. Seasonally, winter had the highest number of individuals (283) and declined sharply to 144 individuals in autumn. These results showed that sites S1 and S2 were characterized by the highest number of species and individuals than the eastern sites, S3 and S8.

Thus, there are 31 infaunal species, living either in permanent burrows or temporarily buried in the soft bottom around seagrasses compared with only 6 sessile or sedentary species, living attached to or fixed on *P. oceanica* parts.

The benthos of the eastern Mediterranean Sea, particularly the southeast, is relatively impoverished when compared to the western Mediterranean Sea. The fact that nutrient-rich floodwaters no longer enter the area since the construction of the Aswan High Dam is thought to have reduced productivity in this region.

Cold seep biological communities relying on methane and associated with mud volcanoes and faults have recently been discovered north of the Egyptian coast, near the border between Egypt and the Gaza Strip, where communities of polychaetes and bivalves have been found at depths of 500-800 m (IUCN, 2004).

Analysis of the infaunal (organisms that live within the seabed sediment) abundance (per 0.1 m^2) from the sediment grabs taken during the 2009 and 2012 offshore and nearshore surveys of Abu Qir Bay (CU08) indicate that values are low across the majority of the survey area.

Detailed information on offshore benthos is limited; however more data are available closer to the Egyptian coast. A 1999 study (EIMP, 2000) found a clear correlation between the abundance and numbers of species and the silt/clay content of the sediment, and a trend for increasing numbers of species when moving westwards along the coast. Highest species abundance was recorded around El Burg and Port Said (CU12), where there is a greater proportion of silts and sands in the sediment.

In El Sallum Bay (CU01), recorded benthic organisms included the following taxa: Porifera (9 species), Cnidaria (1 species), Annelida (8 species), Mollusca (16 species), Crustacea (7 species), Echinodermata (10 species) and Ascidiacea (6 species).

4-2-4 Crustaceans

The whole area off the Nile Delta, to a depth of at least 100 m, is likely to be important for shrimp spawning, with the main spawning period from April to September. Larger and more valuable prawns may migrate into deeper water to breed but this has not been investigated. The Red Shrimp (*Aristeus antennatus*) is present in the entire Mediterranean Sea (except the Adriatic). It is found at depths of between 100 and 200 m off the Egyptian coast, but elsewhere may be found down to 3300 m. Abundance is greatest between 600 and 800 m, where fishing takes place. The growth rate of *A. antennatus* is much lower than that of other penaeids as are estimates of natural mortality. Hence, *A. antennatus* is a typical deep-sea species of low productivity.

There are 7 penaeid shrimp species in eastern Egyptian coastal waters. These are *Penaeus japonicus*, *Penaeus semisulcatus*, *Penaeus kerathurus*, *Metapenaeus monoceros*, *Metapenaeus stebbingi*, *Parapenaeus longirostris* and *Trachypenaeus curvirostris*. Several species (*P. japonicus*, *P. semisulcatus* and *T. curvirostris*) reached the Egyptian and Turkish coasts through the Suez Canal and are currently only found in this area of the Mediterranean Sea. *P. kerathurus*, *M. monoceros*; *M. stebbingi* and *P. longirostris* are found throughout the Mediterranean Sea and are native species (Holthuis, 1980).

After the regulation of the Nile flow following the construction of the Aswan dam, small sized shrimp species dominated the landed catch. Three species; *M. stebbingi*, *T. curvirostris* and *P. longirostris*, contribute the main bulk of shrimp yield.

4-2-5 Molluscs

Cuttlefish and squid are also important resources within the Egyptian waters of the Mediterranean Sea. The Common Cuttlefish (*Sepia officinalis*) is the most common cephalopod in catches, followed by the European Squid (*Loligo vulgaris vulgaris*). *S. officinalis* is found throughout the Mediterranean Sea on sandy to muddy bottoms from the coastline to about 200 m depth.

L. vulgaris vulgaris is found throughout the coastal waters of the Mediterranean Sea. It generally lives at depths between 40 and 550 m. Between November and April spawning occurs in shallow waters where the eggs are attached to macroalgae, rocks and bottom substrates. The diet includes algae, bivalves, other cephalopods, crustaceans, polychaetes and fish[14]. European Squid (*L. vulgaris vulgaris*), Common Octopus (*Octopus vulgaris*) and cuttlefish (*S. officinalis*, *S. pharaoni* and *S. prashadi*) are all caught offshore of Ras El Barr (CU11/CU12) (ERM, 2015). The Common Cuttlefish and the European Squid are also among the common catches in El Sallum Bay (CU01).

4-2-6 Fish

The Mediterranean Sea is host to approximately 830 marine species of fish belonging to more than 170 families (Frause and Pauly, 2014). The fish community is a diverse

[14] www.cephbase.utmb.edu

assemblage characterised by Atlantic elements, endemic Mediterranean elements and Lessepsian[15] migrants from the Red Sea. Historically, the eastern Mediterranean Sea, particularly around the Nile Delta, has been characterised by large populations of pelagic species, especially small clupeids, sardines and their relatives. The construction of the Suez Canal has led to invasions of Red Sea species and the Aswan High Dam has led to reduced nutrient flux to the sea and has negatively affected fish stocks as a consequence. Thus, the fish populations in the eastern Mediterranean Sea have been subjected to a number of changes, and continue to be exploited by fisheries.

Fish species off the Egyptian coast can be divided into four main groups, namely:

- Small pelagic[16] species;
- Large pelagic species (tuna and billfish);
- Demersal (bottom dwelling) species; and

- *Small Pelagic Fish Species*

  The small pelagic fish stocks off the Mediterranean coast of Egypt are a major resource for fisheries, particularly non-commercial fisheries. The main pelagic species found in Egyptian waters are as follows:

  - Anchovy (Engraulis *encrasicolus*);
  - Sardine (Sardina *pilchardus*); and
  - Sardinella (Sardinella *aurita*, *Sardinella maderensis*).

  A number of other pelagic species are also caught in much smaller numbers but are nonetheless important to local fisheries. These include Bogue (*Boops boops*), Narrow-barred Spanish Mackerel (*Scomberomorus commerson*), Chub Mackerel (*Scomber japonicus*), Mediterranean Horse Mackerel (*Trachurus mediterraneus*), the carangid *Trachinotus ovatus*, small tunas such as Bullet Tuna (*Auxis rochei*), Frigate Tuna (*Auxis thazard*) and Atlantic Bonito (*Sarda sarda*).

- *Large Pelagic Species*

  Within the Mediterranean Sea the main large pelagic species are tunas and billfish and include:

  - Atlantic or Northern Bluefin Tuna (*Thunnus thynnus*);
  - Swordfish (*Xiphius gladius*); and
  - Albacore (*Thunnus alalunga*).

- *Demersal Species*

  A number of demersal species are also present in the Mediterranean and are also important commercial species for inshore fishermen. These include the Red Mullet (*Mullus barbatus*), Grey Mullet (*Mugil cephalus*), Saprids or Sea Bream, particularly *Sparus aurata* and *Pagrus caeruleostictus*, Sole (*Solea solea*), Egyptian Sole (*Solea aegyptiaca*) and Atlantic lizardfish (*Synodus saurus*). The Picarel (*Spicara smaris*) is a benthic species

[15] Movement of species from the Red Sea to the Mediterranean as a result of the Suez Canal linking the two (refer to Section 5.3)

[16] Pelagic species spend most of their life swimming in the water column with little contact with or dependency on the bottom

preferring offshore water, especially in winter; over muddy or vegetated bottoms in water depths between 15 and 170 m. The Common Pandora (*Pagellus erythrinus*) is an important food fish inhabiting inshore waters, on various bottom types (rock, gravel, sand and mud) up to 200 m deep but during winter populations migrate to deeper waters

4-2-7 Sea

Figure 24: Little Terns on the seashore (CU11)

Figure 24: Spur-winged Lapwing (CU11)

Turtles

Three species of sea turtle are known to inhabit the southeastern Mediterranean Sea: The Green Turtle (*Chelonia mydas*) EN, the Loggerhead Turtle (*Caretta caretta*) VU and the Leatherback Turtle (*Dermochelys coriacea*). *Chelonia mydas* is listed as EN, while *Caretta caretta* and *Dermochelys coriacea* are listed as VU in the IUCN Red List.

During a study along the Mediterranean coast of Egypt 22 dead turtles were found along the stretch of coast between Alexandria and Port Said. In addition, east of Port Said evidence of nesting turtles was seen, particularly between Bardawil Lagoon and the town of El Arish (Nada and Casale, 2008). This information suggests that turtles may be moving along the Mediterranean Coast of Egypt to reach nesting beaches on the Sinai Peninsula.

4-2-8 Seabirds

Prominent seabirds include the Black-headed Gull (*Larus ridibundus*), Yellow-legged Gull (*L. cachinnans*), Little Tern (*Sterna albifrons*) and Lesser Crested Tern (*S. bengalensis*) (Tharwat, 1997). Also, the Little Tern (*Sterna albifrons*) and Kentish Plover (*Charadrius alexandrinus*) are known to breed in coastal area but are more likely to be found closer to the shore. The Spur-winged Lapwing (*Vanellus spinosus*) is common and frequently encountered in the backshore area. Audouin's Gull (*Larus audouinii*) is an endemic seabird to the Mediterranean Basin.

No.	Scientfic name	English name	Status
1	*Calonectris diomedea*	Scopoli's Shearwater	migrant, very rare
2	*Puffinus yelkouan*	Yelkouan Shearwater	migrant, very rare
3	*Puffinus mauretanicus*	Balearic Shearwater	migrant, very rare
4	*Hydrobates pelagicus melitensis*	Mediterranean Storm-petrel	migrant, rare
5	*Phalacrocorax aristotelis desmarestii*	Mediterranean Shag	WV, rare
6	*Phalacrocorax pygmeus (Microcarbo pygmaeus)*	Pygmy Cormorant	migrant, rare
7	*Pelecanus onocrotalus*	White Pelican	WV, rare
8	*Pelecanus crispus*	Dalmatian Pelican	WV,very very rare
9	*Phoenicopterus roseus*	Greater Flamingo	WV & FB, uncommon
10	*Pandion haliaetus*	Osprey	WV & FB, uncommon
11	*Charadrius leschenaultii columbinus*	Greater Sand Plover	WV & could be MB
12	*Charadrius alexandrinus*	Kentish Plover	RB & WV, common
13	*Numenius tenuirostris*	Slender-billed Curlew	WV, very rare
14	Sterna albifrons (Sternula albifrons)	Little Tern	MB & WV, common
15	Sterna nilotica (Gelochelidon nilotica)	Gull-billed Tern	RB & WV , common
16	Sterna caspia (Hydroprogne caspia)	Caspian Tern	WV, common
17	Sterna sandvicensis (Thalasseus sandvicensis)	Sandwich Tern	WW, common
18	Sterna bengalensis emigrata (Thalasseus bengalensis)	Lesser Crested Tern	PV, rare
19	Larus genei	Slender-billed Gull	RB & WV ,common

20	Larus melanocephalus	Mediterranean Gull	WV, , uncommon
21	Larus audouinii	Audouin's Gull	PV,rare
22	Larus armenicus	Armenian Gull	WV, uncommon
23	Halcyon smyrnensis	White-throated Kingfisher	RB & WV , common
24	Ceryle rudis	Pied Kingfisher	RB & WV, very common
25	Falco eleonorae	Eleonora's Falcon	PV, rare
Status of bird at Egyptian Mediteranain coast is based on persoanl suervey from 2009 till 2016			

4-2-9 Marine Mammals

Egypt made the first national action plan on the marine mammals, based on monitoring, research, and surveying marine mammals; capacity building; and CEPA(communication, education and public awareness). This was followed by intensive training of Egyptians from different institutions including the National Institute of Oceanography and Fisheries, universities, research institutions, and Fisheries cooperatives. Equipment were provided by ACCOBAMS Secretariat.

This was followed by executing for the first time a national survey using two research boats where more than 20 Egyptian scientists and university students, where we have covered a considerable areas of the Egyptian Mediterranean. Meanwhile, public were encouraged to report on any sighting of marine mammals, that were documented in our database, and public were very interested in participating in our marine activities. The following are the main findings:

Of the 11 cetacean species represented by populations regularly occurring in the Mediterranean Sea, only eight can be presumed to be regularly occurring in the coastal and pelagic waters adjacent to the Egyptian Mediterranean coasts (Notarbartolo di Sciara and Birkun 2010). These include one Mysticete species, the fin whale Balaenoptera physalus, and seven Odontocetes: the sperm whale *Physeter macrocephalus,* the Cuvier's beaked whale Ziphius cavirostris, the Risso's dolphin Grampus griseus, the common bottlenose dolphin *Tursiops truncatus*, the rough-toothed dolphin *Steno bredanensis*, the striped dolphin *Stenella coeruleoalba*, and the short-beaked common dolphin *Delphinus delphis*. The three remaining species which regularly occur in parts of the Mediterranean (the killer whale *Orcinus orca*, the long-finned pilot whale *Globicephala meals*, and the harbor porpoise *Phocoena phocoena*) are unlikely to be regularly found in Egyptian Mediterranean waters. The first is being limited to Gibraltar Strait waters, the second to the western basin, and the third to the Northern Aegean Sea.

The monk seal *Monachus monachus*, the only pinniped found in the Mediterranean Sea, once regular throughout most of the region's coasts, until very recently was considered extinct in Egypt, at least since the 20th century (Anon. 2006). It was only in early 2011 that proof of its occurrence in Egypt, in the vicinity of the city of Marsa Matrouh, was evident.

The Egyptian Action Plan for Conservation of Marine mammals in the Mediterranean Sea which was prepared in corporation with SPA/RAC aimed to "Achieving and maintaining the favorable conservation status of marine mammals living in the Egyptian Mediterranean waters". One of its objectives is "Collect and expand knowledge on the status of marine mammal populations in the Egyptian Mediterranean". This objective targeted to: Collect basic information about population ecology (abundance, distribution and structure) of marine mammal species present in the EMW, in addition to Collect basic information on existing anthropogenic pressures in the EMW known to potentially impact on marine mammal populations.

A recent study by Rabia and Attum 2019 on the shoreline encounter and stranding rates of cetaceans in North Sinai, Egypt has confirmed 55 encounters of the common bottlenose dolphin in 20 groups with an average of 2.5 individuals seen per group, one striped dolphin, one common dolphin, and probably Cuvier`s beaked whale from several kilometers from the shore. They also observed 6 stranded common bottlenose dolphins, with a rough average of of standing occurrence every 10 days. The authors suggested that there are resident summer populations and that the eastern basin of the Mediterranean may not be as biologically poor in cetacean populations as originally thought. Similar observations of about 10 years confirmed the presense of marine mammals in many parts of the Egyptian waters. Recent marine survey in 2019-2020 reoreded 9 species of marine mammals and other iconic species as follows:

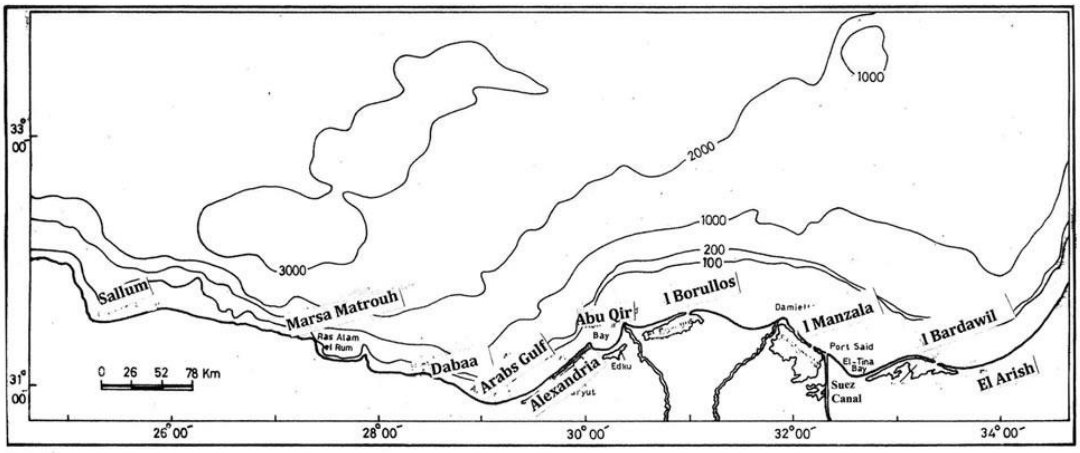
TABLE: RESULTS OF THE SURVEY ON MAMMALS AND OTHER SPECIES IN 2019.

Ser.	Items	Rec. frequency	Notes/No. in each recording
1	Common bottlenose dolphin	16	Group
2	Common dolphin	4	Group
3	False killer whale	1	First recorded by Egyptian team (1)
4	Risso's dolphin	3	Group
5	Rough-toothed dolphin	2	Group

6	Striped dolphin	8	Group
7	Cuvier's beaked whale	1	Two
8	Sperm whale	2	Two in each recording
9	Fin Whale	2	Female with 2 calves
10	Loggerhead turtle	4	One
11	Basking shark	3	Individual or two
12	Great white shark	9	Individual or 2 or more
13	Japanese flying squid	1	First record in Mediterranean

4-3 Fishing and Fisheries

There are nine fisheries centers along the Egyptian Northern Coast with four developed fishing ports: Alexandria (CU07), El Maadiya (CU08), Damietta / Izbet El Borg (CU11/CU12) and Port Said (CU12). The busiest ports in the region are Izbet El Borg and Port Said. The fishing industry has a relatively minor direct role in the Egyptian economy. However, domestic fish production makes a valuable contribution to the national food supply and traditional ways of life, in which fish eating plays an important role. It is also a significant source of food for the tourist industry.

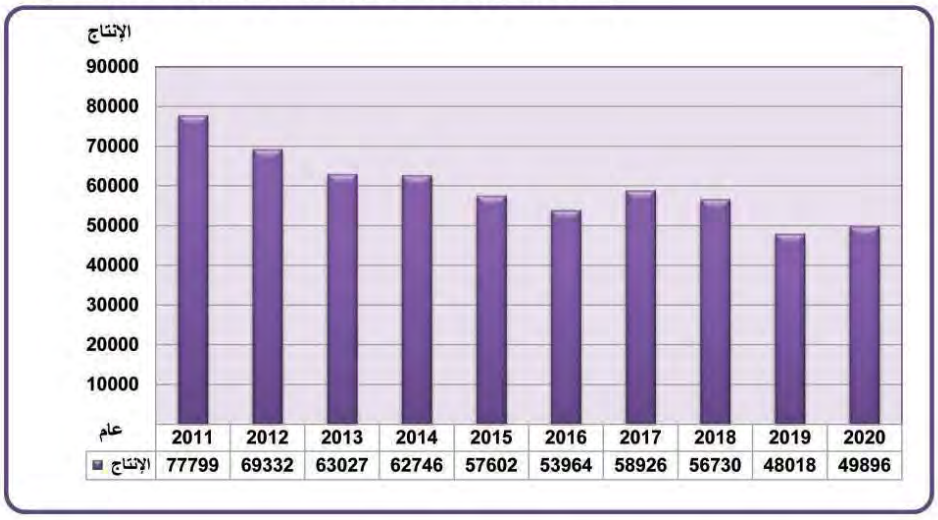


Main fishing ground and ports along the Egyptian Mediterranean coast.

Fishery production in the Arab Republic of Egypt is derived from three main sources: offshore, inshore and aquaculture. The fishing grounds along the Egyptian Northern Coast can be split into four regions: Western, Eastern, Damietta, and the Nile Delta.

Annual landing was estimated as 49896 tonnes in 2020 in the Egyptian Mediterranean region (GAFRD, 2020), the reported amount looks under-estimated, actual catch by

Egyptian fishing fleet may be more than that due to miss recording by fisheries observers in fishing ports, where the fish landing is allowed along the day time with shortage in the number of observers, while catch of artisanal and recreational fishing are almost absent. The rate of Indo-pacific fish species in the Mediterranean Sea has been increased considerably passing through the Red Sea. Some of these alien species were very successful and have established large populations in the eastern Mediterranean. During last decade immigrant fishes are regularly captured and constitute an important share of commercial catches (e.g. *Nemipterus japonicus, Siganus rivulatus and Etrumeus teres*).



Catch trend of Mediterranean Sea / MT (2011 - 2020)

Source: GAFRD 2020

The number of stock assessments for several demersal species and some pelagic species conducted in Egypt has increased in the past ten years, with most being undertaken by the National Institute of Oceanography and Fisheries (NIOF) and recently by EastMed project (FAO-UN). Although assessments do not cover the entire Egyptian Mediterranean coast, almost all of them show a state of overexploitation. Most of the assessments recommend a reduction of fishing mortality by 30 to 45% with suggesting some management measures, such as decrease the number of fishing boats, improving trawl selectivity by increasing net mesh sizes, identifying and protecting of nursery and spawning areas, announcing a minimum distance from the coast within which trawlers may not operate, dredging of coastal lagoons inlets, improving their circulation and water quality, and closed areas or seasons.

Fishermen are usually targeting more than one fish species at the same time. Thus, it could be affirmed that fishing fleet operating in the Mediterranean region are oriented toward catching a high variety of species, up to one hundred different demersal fish species, crustaceans and some small or large pelagic species. Target species are depending on the distance from the coast to the fishing grounds, water depth, bottom characteristics and the different season of the year. Fisheries production is of high economic value as the catch

is generally sold fresh in local markets or directly to private consumers or restaurants. In some fisheries, parts of the high quality catch are exported (FAO EastMed., 2014). Bottom trawling in Egyptian Mediterranean water is multispecies fishery. All over the year, trawlers target mainly shrimps (*Penaeus* spp., *Metapenaeus* spp., *Marsupenaeus* spp., *Parapenaeus* spp. and *Aristaeomorpha* spp.), blue crab (*Portunus pelagicus*) and common cuttlefish (*Sepia officinalis*), and some fish species like red mullet (*Mullus* spp.), lizard fish (*Saurida undosquamis*), family sparidae species like sea breams and porgies (*Diplodus spp., Pagrus spp., Pagellus spp.* and *Sparus spp.*) and European hake (*Merluccius merluccius*). Many other commercial species are considered as by-catch, while discards are mainly composed of small-sized fish and species with no commercial value, including some invertebrates. So far, information available on discard fish is very limited, and this requires detailed studies as done in other countries in the Mediterranean Sea. Purse seiners are targeting mainly small and medium pelagic species Sardine (*Sardinella aurita*), bogue (*Boops boops*), blue fish (*Pomatomus saltatrix*), barracudas (*Sphyraena* spp.) and recently large pelagic species like Atlantic bluefin tuna (*Thunnus thynnus*) while hooks and nets (gill and trammel) are used to target various pelagic and demersal species according to seasonal abundance such as albacore tuna (*Thunnus alalunga*) Tuna like species (eg. *Euthynnus alletteratus*), Narrow-Bared Spanish mackerel (*Scomberomorus commerson*), groupers (*Epinephelus* spp.), common sole (*Solea* spp.), cuttlefish (*Sepia* spp.), blue crab (*Portunus pelagicus*) and various shrimp species (*Penaeus* and *Metapenaeus* spp.).

Figure 25: Izbet El Borg Port

The rate of Indo-pacific fish species in the Mediterranean Sea has been increased considerably passing through the Red Sea. Some of these alien species were very successful and have established large populations in the eastern Mediterranean. During last decade immigrant fishes are regularly captured and constitute an important share of commercial catches (e.g. *Nemipterus japonicus*, *Siganus rivulatus* and *Etrumeus teres*).

Fishing fleet is usually exploiting the entire marine species living off the Nile Delta region, extending to the eastern region rather than to the western one. Artisanal fishers typically exploit inshore areas off fishing ports along the Egyptian Mediterranean coast, while

trawlers are not restricted to geographic boundaries along the coast. No vessel monitoring system (VMS) is in used by the Egyptian fleet, consequently it is impractical to link the official landed fish species to certain fishing ground or definite geographic area (Aly, et al., 2019). Few research surveys and experimental fishing could use as an indicator for fishing activities and fishing ground or fish abundance (Mehanna et al., 2011).

With increased technology, coastal fisheries have been under significant pressure off Nile delta region of Egypt which is heavily exploited, recently semi-industrial fishing vessels have increasingly turned to exploiting deep-sea species which appeared to be the solution to this economic distressing, where it must extract enough fish to compensate for the costs of these challenging conditions. EU market demands for red deep sea shrimps encouraging the developing of this fishery in Egypt.

Otter bottom trawl catch the deep sea red shrimp from the deep area off Arab bay west of the Nile Delta (-500- 900m water depth) and also off Alexandria governorate. Shrimps of the family Aristeidae comprise one of the most valuable deep-water fishing resources, where at least two species (Aristaeomorpha foliacea and Aristeus antennatus) sustain highly profitable fisheries for about 80 fishing boat (>20m LOA). The density of the major shrimp species ranges between 95 and 101 kg/km2, of which 55–74kg/km2 are deep water shrimp. This suggests a good shrimp potential for 500–700 m depth stratum (Ibrahim et al.2011).

The number of tuna boats operating in Egypt is not precisely known, but estimated at 20 to 30 boats with an average length of 17 m and operating with pelagic longlines, they identified the deep water off Lake Burullus (about -500m water depth) are fishing potential, seasonally they targeting albacore (Thunnus alalunga), swordfish (Xiphias gladius) and dolphinfish (Coryphaena hippurus). The catch of albacore by off shore long line ranged between 28 to 100 fish /day and between 258 to 950kg /day (Gabr and El-Haweet (2012).

Purse-seine using light had been developed to catch pelagic fishes that were found off shore off Alexandria, the average annual catch per unit effort (CPUE) was 1.7 tones/boat/night (Farrag et.al. 2014).

Off-shore fishery was developed last ten years reached up to 80 Km from the coast and water depth up to -1000m at different fishing ground along the coast near the present survey. A new law 146/2021 for the protection and development of lakes and fisheries was issued last year, established a new agency called “Agency for Protection and Development of Lakes and Fisheries”. The new agency is an independent economic authority with high powers and follows the Egyptian Cabinet directly. It has a board of more than 20 ministers and representatives from many authorities to reduce conflict of interests of various ministries and work in one team under the supervision of the Prime Minister (including the Ministry of Environment).

While the new agency is based on regulations that aim to protect aquatic resources, through prohibition of land reclamation, dumping into the lakes, and many other regulations. However, it does not deal with the conservation of biodiversity, sustainable

fisheries, and rehabilitation of the lakes. Furthermore, the new law also does not deal with new trends in marine and coastal resources such as blue economy. While its positive to have a strong agency that seeks to address the complex nature of wetland management and coordinate amongst the many stake holders, the representation of protected area objectives is potentially going to be weak, unless the protected area has a strong imprint from the initial phase, to distinguish Lake Burullus from other wetlands under the domain of the Agency for Protection and Development of Lakes and Fisheries. Any future management planning for Burullus needs to be fully acknowledged by the new Agency in order to ensure compliance of the various members on the board of the Agency, this would hopefully be an effective way to mainstream the protected area objectives on the long run.

4-4 Marine species of concern

Some threatened species have been recorded from El Sallum Bay (CU01). These include the sponges *Hippospongia communis*, *Spongia zimocca* and *Spongia officinalis* (Porifera), in addition to *Ophidiaster ophidianus* (Echinodermata) and *Pinna nobilis* (Mollusca).

4-5-1 Fish and Shellfish

The area off the Nile Delta, to a depth of at least 100 m, is likely to be important for shrimp spawning. Spawning extends between April and September, with the peak spawning period occurring between May and August. Shrimps are available all year, however peak fishing activity occurs in spring.

Sardine spawning occurs throughout the area between May and August, with the peak spawning season occurring in June and July. From an ecological perspective, the summer months, in particular June and July, are the most sensitive months for these species.

Under Egyptian fisheries law, the use of nets, including trawl nets, is prohibited from 1st April to 15th May.

4-5-2 Turtles

Sea turtles are known to feed in Egyptian coastal waters during the summer months (May to September). Late May to mid-September is the main turtle nesting season in the eastern Mediterranean Sea, when turtles may be closer inshore and on beaches to nest and lay eggs. The majority of nesting activity is to the east of Port Said. However, this means that turtles may be in the offshore area while they migrate to or from their nesting beaches from other parts of the Mediterranean.

5. SAP BIO post 2020

Bacelona Convention COP 21 requested to prapre in 2020-2021 the `Post 2020 Strategic Action Programme for the conservation of Biodiversity and Sustainable Management of Natural Resources in the Mediterranean Region` (Post-2020 SAP BIO), aligned with the SDGs, and harmonised with the Post CBD-2020 Global Biodiversity Framework (GBF) through the optic of the Mediterranean context.The request was based mainly on the recommendations of the evaluation of the implementation of the SAP BIO during the period 2004-2018. SPA/RAC shall (i) carry out a bottom up participatory process at the national level to identify their ***needs*** *and* ***priorities****, (ii) identify the subregional priorities and orientations based on the diagnosis made at the national level, (iii) develop the draft document of the Post-2020 SAP BIO, and drive the process of its adoption in late 2021.*

Based on the proposed national contribution of Egypt towards SAP BIO elabortion of 2020-2021. National analysis of marine and coastal biodiversity situation was made and involved national institutions and the relevant stakeholders consultation. The purpose is identify clear and realistic objectives and priority actions needed to acheive the objectives, aligned with SDGs and Post-2020 GBF, and supported by the Integrated Monitoring and Assessment Programme (IMAP). In addition, it promotes mainstreaming of biodiversity in all relevant environmental policies as well as for the sustainable use of marine resources.

This report was prepared in accordance with SPA/RAC request that include sections on: Marine and coastal status; Pressures and impacts; Current response measures; Assessment of marine and coastal status; Pressures and impacts; Assessment of national priority needs and response action; Funding problems and opportunities; and Conclusions and recommendations. In addition, a special section was added on the contribution of Egypt's contribution to the visions, goals and indicators of the draft Post-2020 GBF and the Barcelona Convention (UNEP / MAP) and NBSAP.

Our present state of knowledge of the biodiversity of Egypt is reasonably adequate. Species lists covering most animal and plant groups are available. Numerous publications covering taxonomic, distributional and ecological aspects of the biodiversity of the country are well documented. However, the levels of available information vary considerably among taxonomic groups, geographical areas and types of habitat. Therefore, our information on biodiversity of the Mediterranean marine environment is less than complete. Considerable information on marine habitats and biota is also available, but these data are far from being geographically comprehensive.

Systematic lists of phytoplankton as well as a number of studies of seasonal variations have shown phytoplanktons are represented by at least 661 species. A general character of the phytoplankton population is the high species diversity and the comparatively small number of individuals of each species; a character which classifies the region among oligotrophic environments.

The composition, distribution and seasonal variations of zooplankton populations have been thoroughly investigated. Copepods represent the most abundant zooplankton element, consisting of more than 200 species. Copepods and Tintinnids were the most dominant zooplankton. However, the abundance of copepod was higher than that previously found in the coastal waters of the same area; this may be due to the fact that the coastal zone suffers from the human activities. Zooplankton also include large proportion of Indo-Pacific and other circumtropical species which have successfully settled and proliferated in this environment due to lessepsian migration. Many studies have shown similar patterns of temporal and spatial differences and introduction of many zooplankton species from various sources.

Macro benthic fauna include many phyla, where Annelida, Mollusca and Echinodermata are most abundant. Arthropoda, Brachiopoda, Ascidians, Nemertini and Sipunculida are much less abundant. Brachiopoda are only restricted to offshore waters. The structure of the macrobenthic community is greatly influenced by depth. In the inshore zone (10 to 50m depth parallel to the coastline), macrobenthic fauna is numerically dominated by molluscs, echinoderms, and polychaetes. In the offshore zones that extend to a depth ranging between 50 and 100m, macrobenthic fauna is dominated by polychaetes, mollusks and echinoderms. The remaining macrobenthic phyla are mostly restricted to deeper, off shore waters. Diversity for microbes is substantially underestimated, and the deep-sea are still poorly known. In addition, the introduction of alien species is a crucial factor that will continue to change the biodiversity of the Mediterranean, due to the warming of the Mediterranean Sea.

Of the 11 cetacean species represented by populations regularly occurring in the Mediterranean Sea, only eight species are regularly occurring in the coastal and pelagic waters. Recent observations confirmed the presence of marine mammals in many parts of the Egyptian waters, indicating marine mammals are either resident or migrating in the Egyptian Mediterranean Sea.

Marine turtles are represented by 3 endangered species: Loggerhead *Caretta caretta*, Green *Chelonia mydas* and Leatherback *Dermochelys coriaca*. While the loggerhead remains relatively abundant, it seems to have almost deserted in the western northern coast. Nesting sites for both species exist along the Sinai coast in Zaranik Protected area. The leatherback and green turtles are becoming increasingly rare except for Bardawil

where recent changes led to growth in their numbers, perhaps because of the increase of their favorite food (shrimps and crabs). Additionally, the Bardawil Lake has become an attractive wintering ground for turtles due to the closed fishing season (January – April).

The 25 bird species in SPA/RAC Annex are present, some are common such as Pied Kingfisher and slender-billed Gull, little term; others are rare such as Mediterranean shape, and still some very rare such as Scopoli`s Shearwater, and Yelkouan Shearwater. However, very little is known about their geographical distribution, ecology, and reproductive biology.

The Mediterranean Sea has seen successive waves of introductions. Its biota consists of a mosaic of formally alien species of different biogeography affinities, reflecting its eventual geological history. Non-Indigenous Species (NIS) continues to be a major threat to the coastal and marine ecosystems and species in Egypt. Several attempts have been made to record different taxonomic groups of NIS, however, most of them did not apply or acknowledge the appropriate international criteria used to evaluate them. Available information about NIS in Egypt is still insufficient and exerted efforts are still limited. Three major works on NIS have been completed in Egypt during the last 6 years: preparing a national action plan for marine alien invasive species in the Mediterranean Sea, a survey of 2 years on alien invasive species in the Gulf of Suez and the eastern Mediterranean, and engineering work of diverting the agricultural drainage water and freshwater sources from better lakes into Sinai via a tunnel under the Suez Canal. In addition, several interesting works on the biology and ecology of NIS were published recently. Many publications are available on new records and distribution of NIS in Egypt.

Fishery is one of the socio-economic activities practice in the coastal zone of Egyptian Mediterranean coat. Capture fisheries are important for local coastal communities, providing employment opportunities and a major pillar in food security and economic-social development. The landed fish catch at 2018 was about 57000 tones (declined by about 30 %) caught by about 15000 fishermen used 4100 fishing vessels with different size and engine power. Several fishing gears and methods are used to catch demersal or pelagic fish from different ecosystem types and water depths (up to -1000m) along the Egyptian coast. Many of immigrant Indo-Pacific species are playing important role in raising fish production after the depletion or overfishing of some endemic fish stock which revealed the need for management plan for these resources. Cartilaginous fishes represent about 2.5 % of the fish catch, and their diversity had declined in recent years. Available information on discarded fish is very limited. However, aquaculture (freshwater, brackish and marine) has progressed significantly during the last 3 decades and currently contributes more than 80 % of all fish in Egypt. Extensive and semi intensive marine aquaculture share about 10 % of all cultured fish (about 150 000 tones). Impacts of

aquaculture are within the permissible level, with minimum effects on the marine biodiversity.

Available information on important marine habitats representing shallow (muddy, sandy and rocky) and deep areas (Nile Delta Fan) are provided. One of the typical marine ecosystem along the Egyptian Mediterranean Sea is the *Posidonia oceanic* ecosystem, which form large meadows in the infra littoral zone. Along the western part are the sea grass that predominate, along with patches of *Zostra*. Belts of the sea grass *Posidonia oceaica* along with strands of the brown algae *Sargassum spp.* And patches of the green algae *Caulerpa prolifera* occur in the inshore water of that part of the Egyptian coast. The green algae *Caulepra Codium, Halimeda* and *Udotea* also occur in that area. Other species of *Padina* and *Halimeda* are quite rare.

Red algae, particularly calcareous species of *Lithothamnion* and *Lithophyllum* frequently occur in the offshore waters. Other less abundant red algae species include the genera *Grateloupia, Vidalia, Gigartina, Peyssonnelia, Botryocladia* and *Opuntiella.* Algal growth generally increases during spring and summer. Information of the coralligenous habitats and also deep-sea habitats are almost lacking.

The main transboundary issues are: fishing and marine aquaculture, Non-Indigenous Species, maritime transport, cruising and pleasure boating, coastal tourism, energy production, extraction of marine aggregates, offshore oil and gas industry, and sub-marine telecommunication and electric cables. A number of recommendations are proposed to mitigate and eventually avoid the negative impacts of economic activities on the marine environment, local communities and the country as a whole. Those include ensuring the integration of environmental as well as social considerations in economic activities, and the adoption of sustainable practices and measures in many economic sectors.

The main gaps needed for scientifically sound based conservation are; interactive information system on the Egyptian coastal and marine ecosystem; Integrated Monitoring and Assessment Program (IMAP), Effective Protected Areas; Mainstreaming of marine biodiversity into all development sectors; Stakeholder Engagement; Institutional Reform of Nature Conservation Sector; Paradigm Shift in Scientific Research; Revising the Current NBSAP; and Financial, Technical and Human Resources.

Negative impacts include: tourism, over-exploitation beyond sustainable limits, NIS, maritime activities, chemical contamination, coastal development and sprawl, eutrophication, changed hydrographic conditions, status of biodiversity, sea-floor integrity, and marine noise. The impacts of these activities resulted in increased air and sea pollution, pressure on the ecosystem, degradation of biodiversity and local habitats.

This is mainly attributed to unsustainable physical development along the coast associated with many activities.

Important vulnerable ecosystems are: *Pocidonia medaws*, Coralline algae habitats, Depleted fisheries in all Egyptian Mediterranean Sea, Coastal lagoons connected to the sea (where fish fries are caught for aquaculture purposes), Deep sea ecosystem particularly Nile Delta Fan, Sea bird habitats, marine mammals and marine turtles habitats, and, hypersline coastal habitats such as Bardawil Lake, important coastal habitats exposed to erosion, and human urbanisation (salt marshs, sandy, rocky and muddy beaches, and sand dunes).

One of the most important emerging issues is the impact of climate change where the Mediterranean is one of the region's most sensitive to climate. Climate change and sea level rise threaten low lying areas, biodiversity and vulnerable ecosystems causing degradation, and fragmentation. A warming trend of about 1.6°C and a rise in the frequency of extreme events are provided by scientific institutions. So far, none establishment of a model tries to assess Mediterranean Biodiversity. A debate still exists on the possible adaptation measures to restrict the negative impacts by reducing the ecosystem 's vulnerability, and to exploit the positive aspects or opportunities in the best possible way. Other emerging issues that need to be considered are the recent activities in the EEZ: nature-based solution; marine spatial planning; and technological advancement (geoengeering, synthatic biology). Ongoing project "Enhancing Climate Change Adaptation in the North Coast of Egypt" funded by GCF, aims to protect densely populated low-lying lands in the Nile Delta, which have been identified as highly vulnerable to climate change induced sea-level rise. The project is being implemented by the Ministry of Water Resources and Irrigation with a total budget of US$ 31.4 million over seven years.

The coastal and marine protected areas along the Egyptian Mediterranean Sea (Salloum, Omayed, Brullus, Ashton El Gamil, and Zaranik) have not received enough financial and technical support to improve their performance, except those provided by SPA/RAC and ACCOBAMS on certain issues such as marine mammals action plan and survey, management plan, socioeconomics, and communication strategy of El Salloum MPA, marine turtles survey, capacity building and awareness campaign, action plan for marine vegetations, Egypt's national action plan for the Mediterranean Non- Indigenous Species, and national monitoring program for biodiversity and non-indigenous species in Egypt. However, the existing MPAs are not well representing the different marine ecosystems. In addition, local communities need to be developed for better and good governance of MPAs. Emphasis be focused on the role of women and NGOs. More protected areas need to be declared, developed and well-managed with emphasis on the marine environment, fisheries and ecotourism.

Thus, critical problems still exist, including inability to retain trained staff, under funding, lost opportunities to generate substantial revenues, and adapt to and manage rapid and multi faced systems, complexity and changes. Proposed correction actions include transform from bureaucratic management culture to objective-oriented performance culture; from centralized planning and budgetary to develop financially and technically; from personalized (ad-hoc) decision making to decisions guided by policy and regulations; and from financial dependent to financially self-sustaining.

National Institutions / organizations responsible for coastal and marine ecosystems along the Egyptian Mediterranean Sea include Ministries of Environment, Agriculture and Land Reclamation, Transport, Coastal Governorates, Universities and research centers (National Institute of Oceanography and Fisheries). Defense, Interior, Health, Water Resources and Irrigation, The Bibliotheca Alexandrina, Justice, Arab Academy for Marine Transport, NGO's, Diving Centers, Fisheries Cooperatives, and many others. The main legislation includes the new fishieries law in 2021, Egyptian Constitution (2014), law 102/1983 for Protectorates, law 4/1994 amended in 2009 for Environmental Protection, Law 48/1983 for Protection of Water Bodies, amended in 2019, and international and regional conventions.

Major threats to marine ecosystems are unsustainable economic activities e.g. unregulated tourism, exploitation of marine resources, overfishing and fishing in illegal areas (e.g. breeding grounds) and coastal pollution, oil spills from maritime activities and accidents, pesticides and chemical fertilizers used in agricultural activities, and aquaculture activities. At present, 20% of Egyptians live in coastal areas, which are also visited annually by millions of tourists. In addition, more than 40% of industrial activity occurs in the coastal zone. Enhanced visual counting technique coupled with combustion analysis and differential scanning calorimetry (DSC) was applied to assess microplastics (MPs) contamination in fish digestive tracts from Eastern Harbor, Egypt, to provide a simple and economic method for MPs assessment. This was the first study in Egypt to quantify MPs in fish. Plastic particles were detected in all fish samples, represented by seven thermoplastic polymers. The average number of MPs was at its highest level in Siganus rivulatus, Diplodus sargus, and Sardinella aurita (7527, 3593, and 1450MPs fish^{-1}, resp.) and the lowest in Sphyraena viridensis and Atherina boyeri (46 and 28MPs fish^{-1}, respectively). The average weight of MPs as measured by combustion ranged from 302mg kg^{-1} in S. rivulatus to 2mg kg^{-1} in Terapon puta. In compliance with IMAP metadata for monitoring and assessment of marine litter indicators, a national programme for "regular monitoring and assessment of marine litter in the Northern beaches of Egypt" was prepared by EEAA.

Global Biodiversity Outlook 5 (CBD, 2020) made it clear that Aichi Biodiversity targets are not yet, fully achieved, though 6 targets have been partially achieved (Targets 9, 11, 16, 17, 19 and 20). This, in turn, will threaten the achievement of Sustainable Development

Goals. The COVID 19 Pandemic has further highlighted the importance of the relationship between people and nature.

Biodiversity impacts of climate change include shifts in species distribution and range, and the impacts of mitigation activities and facilitates the spread and establishment of many alien species and creates new opportunities for them to become invasive. There is also concern that existing protected area networks may not be adequate for biodiversity conservation in a time of changing climate. Moreover, the Mediterranean Sea is becoming warmer; its salinity is increasing, and the rise in sea level is accelerating. In addition, the increase of precipitation levels, extreme events and sea acidity are witnessed recently. The Nile Delta is considered one of the most vulnerable sites due to climate change impacts.

One of the major difficulties facing the management and conservation of marine-biodiversity in the Egyptian Mediterranean Sea is the lack of detailed, geographically comprehensive database. In addition, information available on marine species, habitats and ecosystems are not consistent, perhaps due to unclear spatial and temporal patterns. Meanwhile, human activities in the coastal and marine environment have made considerable changes leading to depletion of fish stocks, pollution in all different forms (oil pollution, debris, plastics, noise), fragmentation of habitats, increase of number of invasive species, and the possible impacts of climate change.

Therefore, a detailed, geographically comprehensive database on marine habitats, ecosystems and biota is required to develop a sound management plan for marine biodiversity. This will require field surveys on marine biodiversity to gather information on the geographical distribution, status, and exploitation levels of marine habitats, ecosystems and species. The collected data will be assessed into a GIS database, which will be accessible to biodiversity managers and decision makers. Targets include: 1) establish a marine database on the basis of recent, geographically comprehensive field-collected data; 2) develop and implement an integrated marine biodiversity management plan; and 3) develop economic valuation methodologies for ecosystem services of coastal ecosystems.

Although many institutions hold knowledge on marine biodiversity, decision makers have difficulties to find the type of answers they need. This situation can be challenged by representing a one-entry for questions and collecting all available knowledge in the best possible manner (depending on means and timeframe). The network will integrate available knowledge and process it in a sound and reliable way to provide answers to decision makers in a format that they can readily use. Thus, creating better links between knowledge holders and users will bring significant changes to the way short and long-term impact on marine biodiversity changes are tackled.

The following are the main gaps needed for scientifically sound based conservation. These are; Interactive information system on the Egyptian coastal and marine ecosystem; Integrated Monitoring and Assessment Programme (IMAP), Effective Protected Areas; Mainstreaming of marine biodiversity into all development sectors; Stakeholder Engagement; Institutional Reform of Nature Conservation Sector; Paradigm Shift in Scientific Research; Revising the Current NBSAP; and Financial, Technical and Human Resources.

Priorities include: Effective MPAs management and declaration of more MPAs, integrated monitoring and assessment, NIS, climate change, sustainable fisheries, mainstreaming of biodiversity in all relevant sectors, tourism, ICZM, public awareness, Strategic EIA, and law enforcement and more legislation.

Financial resource mobilization for biodiversity conservation in Egypt is lagging behind due to the huge funding gaps in spending. Reasons for such wide gaps are not only insufficient finance, but also ineffective institutional entity and limited effective partnerships. There are needs for innovative financing mechanisms, focusing on the direction and scale of investment flow with the support for all partners at national, regional, and international level.

Eight opportunities to fulfill this gap are identified based on priorities for Egypt's NBSAP (2015-2030). These are increase domestic funding, increase revenue for protected areas, enhance partnership, harmonize direct and indirect biodiversity expenditures, institutional reform, enhancing efficiency in expenditures, reduce future needs, and incentives reform. It is concluded that establishing partnerships are the most successful tool that has been utilized during the last five years. It is recommended that efforts must be mobilized to increase spending on biodiversity, diversify and increase protected areas revenue, coordinate efforts with other biodiversity related institutions and establish the Nature Conservation Authority.

Egypt's contribution to the visions, goals and indicators of the draft Post-2020 GBF and the Barcelona Convention (UNEP / MAP) is based on:

- *Global visions, goals and targets (only coastal and marine).*
- *SDGs indicators*
- *UNEP / MAP / IMAP (ecological objectives and indicators)*
- *Egypt's NBSAP (only indicators related to the coastal and marine environment of the Mediterranean Sea*

Emphasis is given to the national analysis of the coastal and marine ecosystem (status, pressures, threats, impacts and conservation efforts). It identifies gaps, objectives and priorities.

Proposed national Post-2020 SAP Bio Vision is "By *2030 coastal and marine biodiversity in Egypt is valued, mainstreamed, maintained for the good livelihoods and conserved for the sustainable use of future generations*".

Proposed national Post-2020 SAP Bio Mission is "*Egypt takes effective and innovative actions to reduce the loss of biodiversity to ensure that by 2030 marine ecosystems continue to provide their services to all Egyptian and also ensure pressures on biodiversity are reduced; biological resources are sustainably used and benefits arising out of utilization of genetic resources are shared in a fair and equitable manner; biodiversity issues and values mainstreamed and appropriate policies are effectively implemented in a participatory approach*."

Regarding the objectives and priorities fror Egyptian Post-2020, we propose efforts be made in the next negotiation meetings to include oceans and seas as separate goals, targets and indicators. The global 2030 targets be in line with Regional Sea Programmes (e.g. UNEP / MAP) commitments. These should clearly address the drivers of biodiversity loss and be specific, measurable, actionable, relevant and time-bound.

For Egypt, IMAP is mostly appropriate and valid in terms of GES, ecological objectives and indicators that deal with coastal and marine ecosystems (biodiversity, and NIS) and pollution. Responses indicators include many elements that reflect global, regional and national needs. Out of the 11ecological objectives of GES, the following are the most relevant ones for Egypt: 1, 2, 3, 5, 9, and 11.

A total of 121 marine and coastal indicators from the global goals and targets of the draft Post-2020 GBF, SDG, UNEP / MAP / IMAP and NBSAP were thoroughly investigated. To reduce the total numbers of indicators, a comparison of indicators from all sources were made, and the shared ones were put into one national indicator to suit the national requirements and capacities. A total of 26 national indicators are proposed and can be implemented as baseline data is mostly available at national, regional and global levels.

During the last year, several major events, relevant to this diagnosis report, took place. These included the approval of the new SAP BIO Startegy ny the Barcelona Convention in 2021; CBD COP 15 in 2022 where the Global Biodiversity Framework (GBF) was adopted including 23 indicators; and the CITES COP 19 in 2022 where many marine species of sharks and rays were included in the appendix II.

6. Physical Coastal Diagnosis

In this section, the physical coastal diagnosis will be discussed and analyzed in more details. A brief description of the analyzed impacts is given as follows:

Erosion: Coastal erosion is especially high in vulnerable exposed sandy beaches with high potential of shoreline retreat, located in an area of strong sediment transport. Cliffy areas with rocky beaches are however less affected at present, but the situation can change in the future if artificial beaches are created.

Flooding: The level (degree) of flooding in a coastal stretch is closely related to the mean sea level observed during stormy conditions and to the topographic characteristics of the area. The highest flooding will be registered in the low-lying areas (e.g., Nile Delta areas or sabkhas) when high energetic waves and storm surge coincide leading to extreme values of sea levels.

Saltwater intrusion: Sea level rise and saltwater intrusion are closely linked since the former is expected to further exacerbate the latter, significantly affecting groundwater supplies for the region.

Abiotic stress: Abiotic stress has been characterized based on the rate at which *Posidonia oceanica* meadows can decline due to climate change.

Port downtime: Port downtime is expressed based on the water agitation inside the port and on the overtopping over the port structures. Large values of agitation and overtopping prevent the port operability.

Siltation: Siltation due to sediment deposition is a recurrent problem in the northern Egyptian coast in harbours and navigation channels, and in drainage channels. The strongest problems occur in area with strong longshore sediment transport.

The data gathered in this section to develop the Physical Coastal Diagnosisis refernced under the citation of the Scoping study of the (Integrated Coastal Zone Management in The Northern Coast of Egypt, 2016).

The Integrated Coastal Zone Management in Egypt – a Scoping Study foucused on identifying the major present and future challenges of the coastal area from an integrated approach. These challenges define the scope for subsequent stages of ICZM planning in the Northern Coast. This study was conducted by the partnership IHCantabria (Spain) – Environics (Egypt) and lasted five months, between July and December 2016.

The assessment of physical coastal diagnosis has been developed for 14 coastal units from CU 01 to CU 14.

Annex II provides the details of each Coastal Unit physical diagnosis.

6-1 Main Findings – Phyical Coastal Diagnosis

1. Key Issues Related to Coastal Risks: related to the negative consequences that physical impacts may have on economic activities:

- Coastal erosion
- Coastal flooding

- Channel siltation
- Port downtime

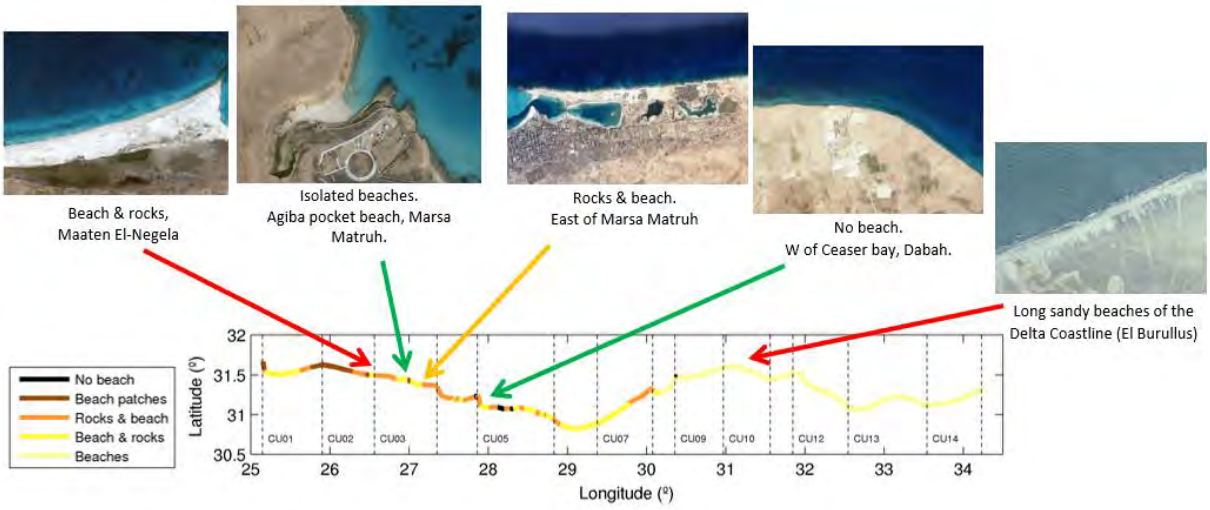
2. **Key Issues Related to Environmental and Land Use Conflicts:** conflicts on land-use policies that créate competitive demans for the use of territory, causing negative impacts on other uses or on the coastal environment:

- Impacts on coastal ecosystems
- Land-use conflicts

- **Coastal Erosion**

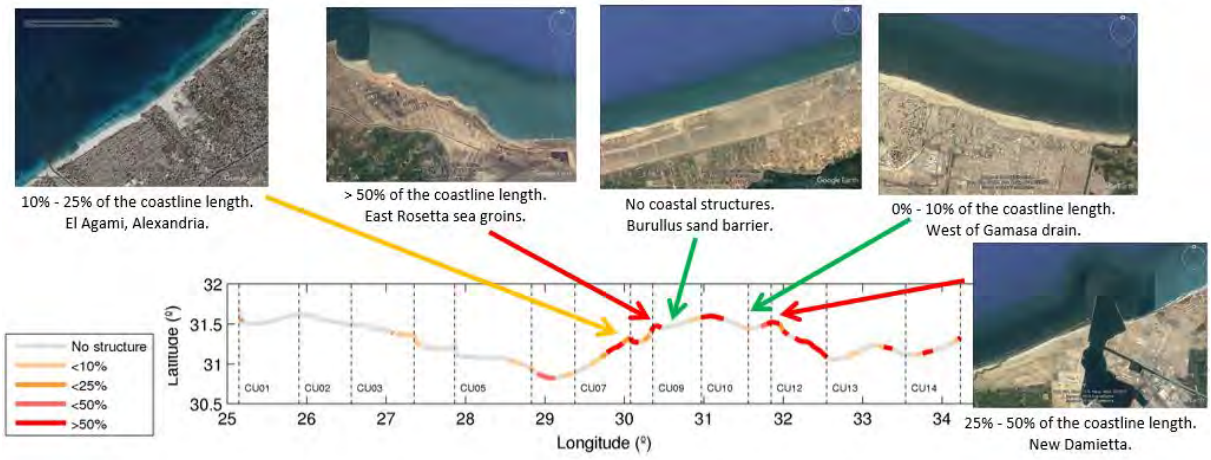
Coastal Characterization

- The beach type indicator is a to represent that sandy beaches are more vulnerable to flooding and erosion than rocky coastline (less vulnerable).

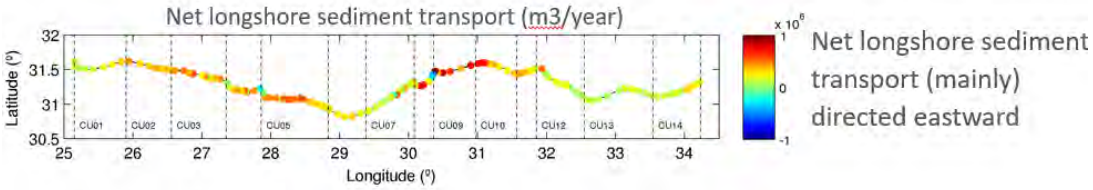


Coastal protection structure map: A Human Disturbance Indicator is designed to indicate that high anthropized coastline is more vulnerable to flooding and erosion than low anthropized coastline.

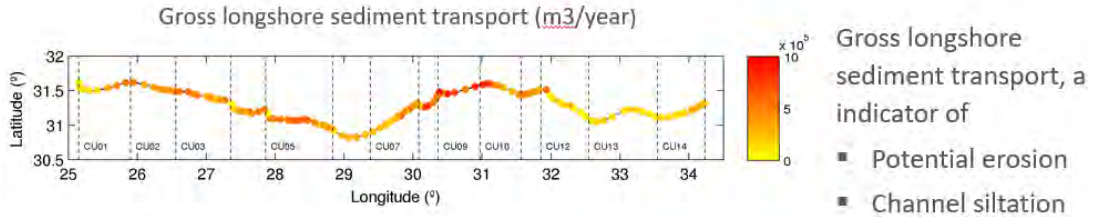
Particularly, major coastal structures are seen to affect neighbouring coastal stretches, and exacerbate flooding / erosion problems.



Coastal Dynamics – Present situation



Net longshore sediment transport (mainly) directed eastward



Gross longshore sediment transport, a indicator of

- Potential erosion
- Channel siltation

Gross longshore sediment transport range (m3/year)	0 – 150 000	150 000 – 300 000	300 000 – 500 000	500 000 – 750 000	750 000 – 1 000 000
Indicator level	very low	low	medium	high	very high

Coastal Erosion – Present Situation

- North West: the lowest erosion
- Nile Delta: The strongest erosion with high vulnerable sandy coastline, strong sediment transport, strong past shoreline retreat and coastal structures inducing side effects.
- North Sinai: Medium to high erosion

Urban Areas with High Levels of Erosion

- CU07: Alexandria corniche.

- CU09: small urban areas surrounding Rashid.
- CU10: Al Burj and Jamasa.
- CU11: Ras El Bar.
- CU12: Port Said Port Fouad.
- CU14: El Arish and spared settlements near Rafah.

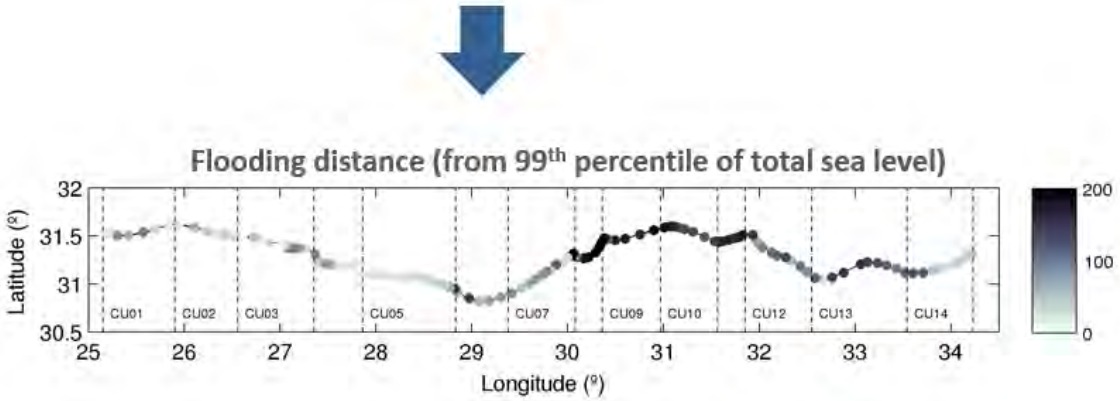
Resort Areas with Medium Level of Erosion – Northern Coast

- CU03: resort area close to Ras Umm El Rakham dune area.
- CU04: Jarawlah zone, Jaz Oriental and Jaz Almaza resorts.
- CU05: the whole unit present medium level of erosion affecting spared resorts.
- CU06: El Alamein coastal area is completely covered by resorts.
- CU07: the western part of Alexandria Governorate is dedicated to tourism activities.

- Coastal Flooding

Coastal flooding assessment: sea level and flooding distance

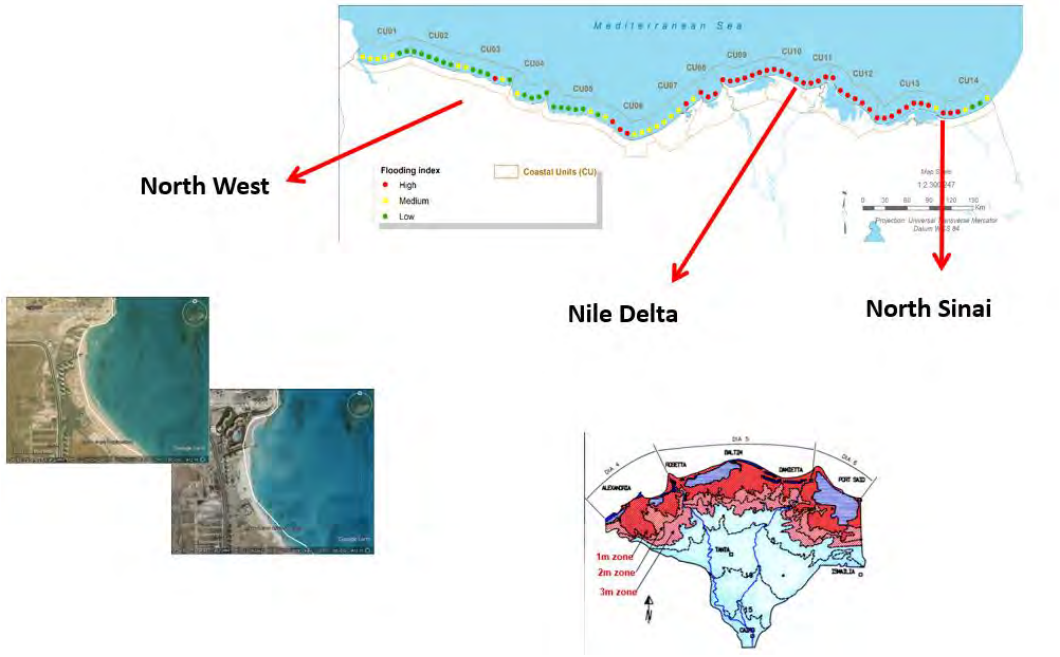
- Spring-tide tidal range (m), GOT database.
- Wave setup (m), from GOW database (propagated).
- Storm surge (m), GOS database.
- Total sea level (m), 99th percentile.



Flooding distance	0	40	70	100	> 150
	40	70	100	150	
Indicator level	very low	low	medium	high	very high

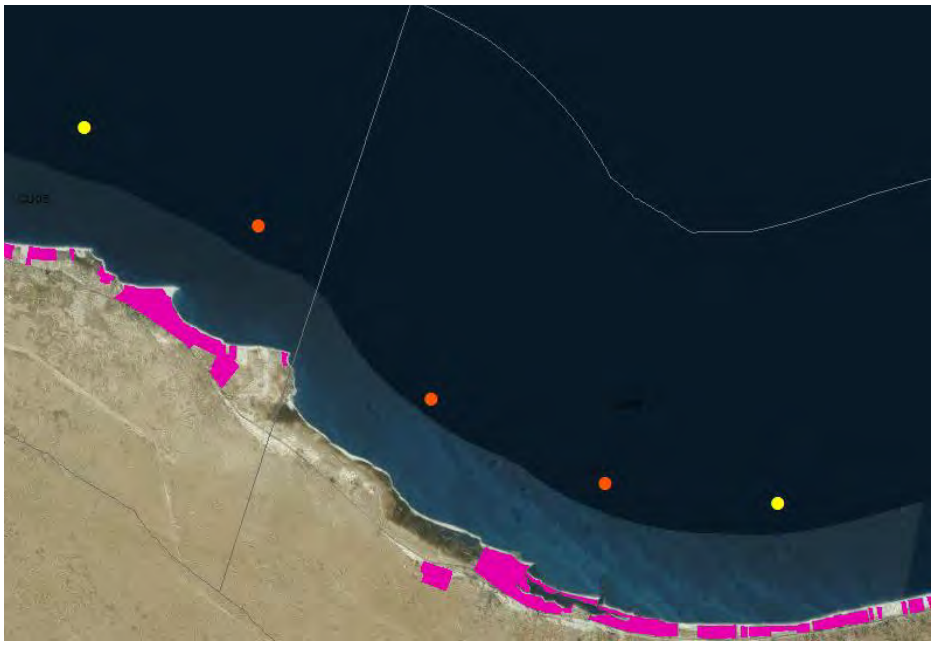
Coastal Flooding – Present Situation

- North West: high flooding in sabkhas areas and high flooding in short coastal set-backs areas.
- Nile Delta: The highest flooding, low-lying topographies, high flooding levels (exposed coast) and strong erosion exacerbate flooding problems.
- North Sinai: high flooding in low lying topographies (not anthropized).



Resorts In Areas with High Level of Erosion

- Cu05: high flooding levels in the eastern part of the cu, near marassi resort.
- CU06: western part of El Alamein CU presents high level of flooding



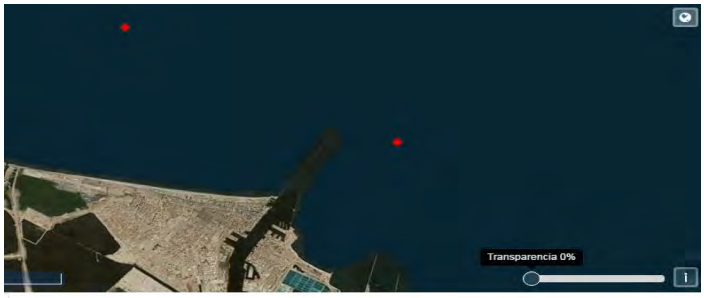
Urban Areas with High Levels of Erosion

- CU07: Alexandria city has high levels of flooding.

- CU09: surrounding urbanized areas of Rashid.
- CU10: Al Burj and Jamasa.
- CU11: Ras El Bar.
- CU12: Port Said and Port Fouad urban areas
- CU14: El Arish

Alexandria during the extreme events November 2015

Siltation



Ports with higher siltation levels:

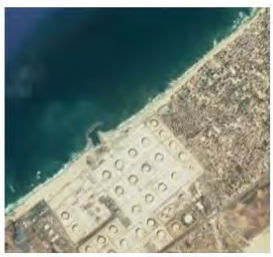
- El Dekhiela and Alexandria ports
- El Maadiya Petroleum port and El Maadiya Fishing port
- Burullus fishing port.

followed by:

- Damietta comercial port
- Port Said ports
- El Hamra

- Port Downtime

- CU07: high overtopping levels in SUMED and Alexandria commercial ports.
- CU11: high overtopping level in Damietta port.



7. Governance and Knowledge Generation Socio-economic Evaluation of Maritime Activities

This section is providing a socio-economic assessment of marine ecosystems with the primary objective of enhancing knowledge and identifying potential impacts of human and economic activities on the ecosystem and cost of environmental degradation on the economy.

Eight sectors were identified to be the main focus of the study. These were sectors that mainly depend on the Mediterranean Sea for their activities, and with deteriorating conditions of the Mediterranean Sea, the sustainability of these activities would be directly affected. Main socio- economic activities identified for the study are: fishing and marine aquaculture, maritime transport, cruising and pleasure boating, coastal tourism, energy production, extraction of marine aggregates, offshore oil and gas industry, and sub-marine telecommunication and electric cables.

Located in the northern corner of Africa, Egypt has the entire northern part of the country bordering the Mediterranean Sea. The Egyptian coastline extends over 1,550 km from Rafah to Sallum. The main Egyptian cities overlooking the Mediterranean are Alexandria, Port Said, North Sinai and Marsa Matruh. The northern coastal zone of Egypt consists of three geographically distinct regions: the Nile Delta Coast, which stretches from Alexandria eastwards to Port Said; and the North Eastern Coast stretching from Port Said to the border with Gaza.

More than 20% of Egypt's total population lives along the northern coastal zone of the country, with more than 40% of its economic activities concentrated along the coast. Main economic activities in the northern coastal area include industry, agriculture, tourism, petroleum and mining activities, and urban development. Information regarding the exact contribution of the sub region to the national economy is unfortunately not available.

The north coast is home to several cities, towns and villages. Main population concentrations are in Alexandria, Port Said, Sallum, Marsa Matruh, El Dabaa, Damietta and many more. The largest Egyptian city on the Mediterranean is Alexandria. It hosts around 4.7 million inhabitants. Other large cities in the region are Damietta (1.3 million), the Beheira Governorate (5.6 million inhabitants with about 1 million spread across the Mediterranean coast), the Kafr el-Sheikh Governorate (3.1 million with about 800mn on the coast), Port Said governorate (654,000), and Al Arish (165,000) (CAPMAS, 2014). This figure increases by about 1 million during the summer season due to local visitors to the north coast. With population growth rates at the national level estimated at 1.6% (World Bank, 2013), and with the government policy to develop the northern coast to absorb population growth, it is expected that the north coast will experience higher levels of population growth rate exceeding the national level. This necessitates the adoption of sustainable development policies and programmes that do

not negatively impact the Mediterranean coastal zone and impair socio-economic activities that depend on its integrity and wellbeing.

The methodology adopted in this study followed the "Methodological Guidance for the National Case Studies" developed by Blue Plan for this project. It has also benefited from the work of national experts who carried out similar assessments in Lebanon, Morocco, and Tunisia. Activities undertaken to complete the study included: identifying the priority socio-economic sectors that have the most significant impact on the Egyptian Mediterranean coast; main institutions, resources persons and stakeholders to be consulted, and experts to be mobilized for the study. It also included meeting with senior administrators, and gathering and analyzing data from existing studies. A large part of the study focused on assessing the impact of priority socio- economic activities carried out along the Egyptian Mediterranean coast on environmental degradation and pollutions, and on local habitats and marine ecosystems.

The Egyptian coastline of the Mediterranean is considered to be between arid and hyper-arid marked by scarce water resources and limited sporadic periods of rainfall. Twelve major habitats were identified in the northern Mediterranean, these are: coastal dunes, sand formation, Sallum plateau, salt marshes, saline depression, non-saline depression, inland ridges, inland plateau, wadis, cultivated lands, road sides, and summer resorts. The Mediterranean coast of Egypt is one of the richest areas in biodiversity in the entire country. Twenty endemic and twenty-one near endemic species are recorded in the western Mediterranean Desert. Fifty-three species in the Western Mediterranean Desert were recorded in the Red Data List of the vascular plants of Egypt. The Mediterranean coastal belt of the western sector represents the richest herpetofauna. There are around 170 resident and migratory bird species that exist in the Mediterranean coastal area and desert, 48 of them occur in the western coastal belt. Mediterranean marine life is characterized by its low biomass and high diversity, and clearly reflects the prevailing abiotic, environmental features particularly the nutrient deficient water, low tidal amplitude and temperature regime. A range of human activities threatens the biodiversity of the Mediterranean Basin. Among the most endangered marine vertebrate species are the Mediterranean monk seal; common bottlenose dolphin, short-beaked common dolphin, striped dolphin, sperm whale, green turtle, leatherback turtle, loggerhead turtle, and cartilaginous fishes (sharks, rays, and chimaeras). Negative impacts on the Northern Mediterranean coast of Egypt include over-exploitation beyond sustainable limits, chemical contamination, coastal development and sprawl, eutrophication, invasive non-indigenous species, changed hydrographic conditions, state of biodiversity, sea-floor integrity, and marine noise.

The Mediterranean Sea and the area surrounding it represent the grounds for the majority of fishing activities taking place in Egypt. In addition to the coastal belt along the Mediterranean Sea in the north of Egypt, there are a number of Egyptian Mediterranean brackish water lakes and lagoons situated along the Nile Delta, those are

Manzala, Borollus, Edku and Mariout, and to the east of the Suez Canal, Port-Fouad and Bardawil.

Tourism is one of the more important sectors in Egypt contributing 11.3% of GDP and with 12.6% of the total labour force employed in the sector in 2013. Tourism in the Egyptian Mediterranean is characterized by the dominance of internal tourism as opposed to foreign tourism. Apart from the traditional destination cities such as Alexandria, Port Said, Matrouh and Al-Arish, the north coast extending from Alexandria to Matrouh has emerged as a main attraction for local tourism during the last two decades. About two million Egyptians visit the north coast in the summer season extending from May to September. This has been accompanied by extensive developments of resorts along the Mediterranean coast thus representing an increased pressure on the coastline and the ecosystem. It is the intention of the Government to further develop the north coast to absorb the future population growth in the country and to make it an attraction for foreign tourists and investors. With the stabilization of the political situation in Egypt, it is expected that foreign tourism will even exceed the figures prior to 2011 levels of 14.7 million tourists. However, environmental degradation of the northern coastal areas will be a discouraging factor for foreign tourists to visit main Egyptian Mediterranean cities. The environmental impacts on coastal areas will be further exacerbated by increased levels of urbanization, volume of transport and consequently fuel consumption and CO_2 emissions, cruising and pleasure boating, as well as increased levels of ground water consumption and wastewater and solid waste generation and disposal.

In 2014, the agriculture, irrigation and fisheries sector contributed 14.7% to GDP up from 13.4% in 2012. The contribution to GDP from the fisheries sector in both 2012 and 2014 was 0.4%. Average GDP growth for the years 2012 and 2014 was estimated at 2.1% in both years. More than 250,000 fishermen are employed in the fisheries sector in Egypt. A disruption in the sector is therefore likely to have an impact on direct and indirect employment.

Agricultural exports constitute about 10% of total export activities in Egypt[1]. Data for fisheries contribution to the sector is included in figures for the agriculture sector and is not disaggregated. In recent years Egypt has experienced a boom in fish production, where it has increased from 790,000 tonnes in 2001 to 1.4 million tonnes in 2012. This increase in fish production has been mainly attributed to the expansion of aquaculture, which represented 74% of the total catch in 2012. This is in comparison to a decline in fish catch from other sources, with a percentage decrease from 55% in 2001 to 26% in 2012. Expansion in aquaculture in Egypt in recent years can be linked to the reduction of fish catch from the Mediterranean (88,900 tonnes in 2008 to 69,3000 tonnes in 2012). Main reasons for the decline in fisheries from other sources (excluding aquaculture) have been identified as over fishing, illegal fishing, overlap between

coastal and offshore uses, lack of planning, pollution, and lack of regulations regarding fishing periods to take into account breeding seasons and the use of non-selective fishing gear. This is in addition to other unsustainable fishing practices, including the use of trawls and other mobile bottom gear, the use of dynamite and poison, and the disposal of debris such as food containers and plastics, and vessel debris. It should be pointed out that the size of four of the northern lakes, namely Manzala, Burullus, Edku, and Mariout have drastically declined reaching up to 95.5% reduction in size in some cases, as is the case for lake Edku. Moreover, the northern lakes have been exposed to serious environmental degradation due to the disposal of industrial and agricultural waste, as well as municipal waste. Climate change is also expected to impact fisheries in Egypt as a result of the potential increase in seawater temperature and pH.

Based on the figures available from Central Agency for Public Mobilization and Statistics (CAPMAS), average decline in fish catch for the years 2010-2012 from the Mediterranean Sea and the northern lakes was estimated that the decline in fish catch from the Mediterranean and the northern lakes to be between 700 -1000 tonne/annually over the next 10 years. If we use the average cost per tonne of LE. 20,000 this would amount to between LE. 140 million – LE. 200 million over the next ten years.. This figure is likely to be much higher due to the increasing environmental deterioration of the Egyptian Mediterranean waters and the northern lakes and increased cost of fish.

Maritime Transport represents another import sector in Egypt. The strategic location of Egypt and with the Suez Canal connecting the Mediterranean Sea with the Red Sea linking East to West attracts a great deal of maritime traffic along the Egyptian Mediterranean coastal zone. Major ports in Egypt are located in Alexandria, New Damietta and Port Said. These ports also have oil and natural gas terminals. Smaller fishing ports are located at a number of designated fish landing facilities in addition to most major ports. Naval port facilities are also found along the Mediterranean coast. Egypt has 6 commercial ports on the Mediterranean out of a total of 15 ports, 3 petroleum ports out of the total 11 and 3 out of the 4 fishing ports. There are no mining or tourist ports on the Mediterranean.

Oil shipping through the Suez Canal and along with the Egyptian oil terminals makes the Egyptian Mediterranean coast among the most important oil shipping routes in the Mediterranean basin. The importance of this facility is expected to be further enhanced with the completion and inauguration of the new parallel canal in August 2015. Seaports are considered to be the backbone of the state's foreign trade and its access to the world. About 7% of total employment in Egypt in 2013 is in the transportation sector. However, there are no data available on the total number employed by the sector in the Egyptian Mediterranean coast. Based on the share of ports in the Mediterranean coast, number of workers employed in the Mediterranean maritime transport sector is about 2000 workers. The number of ships passing through the Suez Canal in 2014 has reached

16,774, down from 21,080 in 2008 before the financial crisis had its impact on world trade. Regarding the contribution of the sector to the national economy, though there is no data specifically available for maritime transport, the transport sector as a whole has been a positive contributor to GDP, with an average share of 5% in the past several years. There have been however, negative impacts on the ecosystem due to maritime transport and pleasure boating. Some of these causes are more specifically, illegal dumping of waste, marine accidents, ship and vessel maintenance resulting in changes in water quality, introduction of alien and invasive species, and sound pollution to name a few.

Increased maritime transport due to an increase in the volume of trade and tourist activities is likely to further increase pressures on the Egyptian coastal areas, if necessary measures are not introduced. It is therefore essential that the Egyptian Government introduce necessary measures to address the negative impacts resulting from maritime activities. These include the introduction of standards, monitoring and enforcement measures with respect to CO_2 emissions, the disposal of waste, oil spills and other harmful chemicals and waste. Moreover, the local capacity in terms of personnel and equipment need to be enhanced to adequately monitor, control and manage the sector.

It is evident that from current and expected future urban development in general and that which is associated with tourism along the Egyptian Mediterranean coast, that if proper measures and actions are not introduced, environmental damage to the coastal zone will continue with irreversible damage to some of the natural ecosystem. Policies therefore need to be developed and implemented to promote sustainable and ecotourism that recognizes the importance of the environment and natural resource as being the backbone for the economic viability and further development of the sector and the economy.

As for the offshore oil and gas industry, the most significant contribution the sector has made to the economy was in 2006. During the years when the Egyptian economy was steadily growing from 2006 to the financial crisis in 2009, the sector averaged a contribution of 0.75%. Starting 2012 the sector began contributing negatively to GDP growth, averaging a contribution of -0.3%, reaching -0.9% in the financial year 2014. The Egyptian Mediterranean coast though offers promising ground for gas discoveries, particularly in deep waters. Most activities of the sector are not located in the Mediterranean or the Delta, with only 7% of the rigs in Egypt located in the Mediterranean or the Delta and the majority located in the Western Desert.

With increased stability in the country accompanied by the payment of arrears to foreign petrol companies, explorations have resumed with 53 exploration agreements signed. Fourteen of those explorations are in the Mediterranean Sea: West El Arish off shore, east Port Said, north Rommana, north Ras El Esh, west El Temsah, south Tennin, north El Hammad, and east Alexandria. Linked to the oil industry is the petrochemical

industry, with plans to expand activities in this sector. The Government has plans to increase the production of lighter products, petrochemicals and higher-octane gasoline by expanding and upgrading existing facilities and promoting new projects.

Environmental safeguards should be introduced to ensure that exploration activities as well as operations and petrochemical activities do not represent a hazard to the environment. Oil and gas companies operating throughout Egypt should follow strict environmental standards that require the use of appropriate technologies and procedures to ensure the protection of the environment and the ecosystem. Contingency plans should be put in place in order to deal with oil spills and accidents related to explorations, drilling and oil and gas transport.

The significance of the energy sector in Egypt to GDP is represented in its support to the different economic activities, particularly the industry sector that contributes 37.5% to GDP. In 2013, the electricity sector employed 226,200 workers across Egypt, of these, 3,000 were employed in the Damietta governorate, 400 in Port Said, 12,500 in the Alexandria governorate, 3,600 in the North Sinai governorate and 2,300 in the Matrouh governorate. The importance of this sector as far as the environment is concerned is with regards to the type of fuel used to generate electricity. Heavy reliance on fossil fuels for energy generation represents a problem in Egypt. Increased CO_2 emissions resulting from the burning of fossil fuels and their impact on climate change and sea level rise and the potential negative implications on coastal areas and the Delta is of particular concern to Egypt.

Due to its strategic location, Egypt is a hub for submarine cables. Cables passing through Egypt connect Asia with Europe and North America. There are four main landing locations for cables in Egypt: Zaafarana, Suez, Abu Talaat and Alexandria. The Egyptian Ministry of Communications and Information Technology (MCIT) is working on adding more cables and improving the already existing ones. Contribution of this activity to GDP is minimal. In terms of employment, the sector as a whole employs a total of 189,300 workers, which represents about 0.8% of the total employed in the economy in 2013. No specific data is available on the Mediterranean submarine telecommunications sector. Main environmental problems associated with the sector is the risk associated with the installation of the cables. However, this does not represent a significant problem for the Egyptian Mediterranean coast.

When it comes to the extraction of marine resources in Egypt, there is little or no data available specific to activities in the Mediterranean coast. It is safe to state that when it comes to the Mediterranean Sea, extraction activities with serious environmental implications are negligible. There are though a number of activities along the Mediterranean coast that have negative environmental impacts on the marine ecosystem. These include, mining and quarrying, and drilling related activities.

It is apparent from the assessment that the identified socio-economic activities do have negative impacts on the Egyptian Mediterranean coast. This is mainly represented in increased air and sea pollution, pressure on the ecosystem, degradation of biodiversity and local habitat. This is mainly attributed to unsustainable physical development along the coast associated with internal tourism, the dumping of agricultural, industrial and municipal waste and urban encroachment on the northern lakes, increased surface and maritime transport, offshore and onshore drilling and oil and gas explorations and operations. Other environmentally negative practices include overgrazing, overfishing, hunting of wild animals, illegal bird hunting, over collection of plants, and the impact of invasive species.

The Egyptian Government realizing the importance of protecting the environment has in 2002 supported a World Bank study on the cost of environmental degradation. The study has estimated the cost of environmental degradation at 4.8% of GDP. Coastal zone degradation alone was estimated at LE. 0.6-1.2 billion or 0.2 - 0.4% of GDP. According to the World Bank study, environmental degradation if not adequately addressed is likely to impact current and future generations, with the poor suffering the most.

In order to estimate the cost of environmental degradation resulting from the key identified maritime related socio-economic activities the cost-based method was used in this study. This mainly involved estimating costs related to the protection of the marine environment and costs imposed on uses of the marine ecosystem due to its degradation. Though cost of CO_2 emissions resulting from surface transport to north coast destinations are not directly related to maritime activities, they were found to be significant. Cost to the economy was estimated at around LE. 10 billions annually. Other costs included cost of installing catalytic converters to curb car emissions resulting from surface transport of local tourists to the north coast was estimated at LE. 500,000,000.

According to the study annual costs are those related to loss of foreign tourists estimated at LE.2.295 billion, costs related to loss of fisheries from the Mediterranean Sea and the northern lakes, estimated at LE. 20 million, costs of dealing with solid waste generated by urban centres along the coast estimated at LE. 134, 685, and cost related to the management and operations of coastal areas estimated at 23.5 million

A number of recommendations are proposed to mitigate and eventually avoid the negative impacts of economic activities on the marine environment, local communities and the country as a whole. Those include ensuring the integration of environmental as well as social considerations in economic activities, and the adoption of sustainable practices and measures in tourism, fisheries, and marine transport sectors as well as in other activities such as urban development, industry, and agriculture. There is also a need to have in place a good governance system in order to ensure the strict adherence to environmental regulations, and an adequate and effective monitoring system that ensures compliance and adherence to environmental standards and regulations. Policy

and decision makers should be made aware of the real cost to society and the economy of unsustainable economic activities and the need to ensure that environmental and social considerations are fully taken into account in the design and implementation of economic activities. Moreover, local capacities in the assessment and monitoring of marine related socio- economic activities and their potential impact on the marine ecosystem should be further strengthened. The table below provides a brief general description of the sectors analyzed, key economic indicators, and the importance of the sectors to the country.

8. Inventory of the sites of conservation interest to be part of the network of MCPAs and OECMs

In this section, inventory of sites of conservation interest to be part of the network of MCPAs and OECMs will be dicussed in the provided factsheets. These sites have been categorized as the following;

- Present Protected Areas – From Factsheet (01) to Factsheet (06).
- Future Potential Protected Areas – From Factsheet (07) to Factsheet (08).
- The propsed OECMs Candidates – From Factsheet (09) to Factsheet (14).

A. Present Protected Areas

The Egyptian Mediterranean coast contain 6 declared protected areas will be addressed in the following factsheets:

- Factsheet (01): El Ahrash Protected Area.
- Factsheet (02): El Omayed Protected Area.
- Factsheet (03): Zaranik Protected Area.
- Factsheet (04): El Sallum Marine Protectorate.
- Factsheet (05): El Burullus Protected Area.
- Factsheet (06): Ashtum El-Gamel Protected Area.

Code (01): El Ahrash Protected Area

FactSheet (01): El Ahrash Protected Area

Overview	
Eco-Geographic Location	Located in the northeastern corner of Egypt near the Mediterranean coast of Rafah, North Sinai Governorate.
Geo-Location	**Please Insert the Geo-Location Map**
Declaration Date	1985.
Declaration Decision	Prime Minister's Decree No. 1429 of 1985, as amended by Decree No. 3379 of 1996, in accordance with the provisions of Law No. 102 of 1983.
Type	Developing resources protected area.
Total Area	8 km^2.
Biological Environment	

Habitats	- Area of marshes characterized by sand dunes, of approximately 60 m height above sea level.	
	- The area includes important resources for pasture and timber and constitutes a shelter for wildlife.	
Flora	The most common four dominants' trees in El Ahrash include the following species: - Acacia Saligna - Tamarix Articulata - Eucalyptus Citridora - Cupressus Pyramidalis The annual plants recorded within the area include the following species: - Centaurea Palleacens - Xanthium Spinosun - Nicotiana Glauca - Silene Vulgaris - Marrubium Vulgare - Artemisi Monosperma - Bromus Madritensis - Polygonum Senegalense	
Fauna	13 species of reptiles have been monitored and recorded in the protected area include the following: - starred agama or the roughtail rock agama (Lavdakia stellio) - Yellow-spotted agama (Trapelus flavimaculatus) - Mediterranean house gecko (Hemidactylus turcicus) - Bosc's fringe-toed lizard (Acanthodactylus boskianus) - Olivier's sand lizard (Mesalina olivieri) - ocellated skink (Chalcides ocellatus) - Sinai Chameleon (Chamaeleo musae) - Coluber rogersi - diadem snake (Spalerosophis diadema) - Sahara sand viper (Cerastes vipera) - Field's horned viper (pseudocerastes fieldi)	
	6 different species of mammals have been monitored and recorded within the area of protectorate: - Fennec fox (Fennecus zerda) - Sand cat (Felis margeruta) - The long-eared hedgehog (Hemiechinus auritus) - Lesser Egyptian gerbil (Gerbillus gerbillus) - Fat sand rat (Psammomys obesus) - Bats	
Avifauna	25 species of resident and migratory birds have been monitored in the	- Crested lark - Common blackbird

	protectorate are include the following: - Common Kestrel - Osprey - Levant sparrowhawk - Lesser spotted eagle - Hoopoe - Common quail - Corn crake - Barn owl - Hooded crow - Brown-necked raven	- Gray pied wagtail - Stock pigeon - Penduline tit - Palestine sunbird - European greenfinch - Gold finch - Common corn bunting - Woodpecker.
The value of the Area	- The area captures the attention of tourists by the diversity of its wildlife and the lovely natural scenes.	

Code (02): El Omayed Protected Area

FactSheet (02): El Omayed Protected Area

Overview	
Eco-Geographic Location	Matrouh Governorate, the center and city of Hammam, extends in front of the 70 km mark on the Alexandria-Matrouh coastal road, with a length of 30 km to the west and a depth of 23.5 km from the shore of the Mediterranean Sea to the south.
Geo-Location	**Please Insert the Geo-Location Map**
Declaration Date	1986.
Declaration Decision	- Declared by the Prime Minister's Decree No. 671 of 1986 and amended by Decree No. 3276 of 1996. - Prime Minister's Decree No. 909 of 2021, Amending the Boundaries of the El omayed protected Area.
Type	Desert Area and Vital Peripheral – Terrestrial.
Total Area	300 Km.
Biological Environment	
Habitats	- The site embraces a diversity of habitat types: coastal dunes of oolitic sand, a series of ridges that run parallel to the shoreline in an inland ward sequence, the inland ride merges with the limestone desert plateau. In between ridges depressions are either saline or non-saline.
	There are three major physiographic systems in Omayed Protected Area as well as in the northwestern Mediterranean coast of Egypt - coastal system which covers a small part of the territory, including the beach and the coastal sand dunes,

	- ridges and depressions system which constitutes the main part of the territory including the ridges, their gentle slopes and the more or less large depressions between them, and - inland plateau system which is close to the inland desert.
Flora	251 species of natural plants have been monitored and recorded in the reserve, including: - about (70) species with medical and therapeutic uses, - about (40) species of environmental importance, - (60) species of economic importance and can enter into some small industries, and - about (40) species with pastoral value, in addition to that the number of threatened species has been limited to (17) species.
Fauna	The most common monitored Amphibians and reptiles within the protected area include the following: - Moorish Gecko (Tarentola mauritanica) - Endangered sp. - Egyptian tortoise (Testudo kleinmanni) - Endangered sp. - The loggerhead sea turtle (Caretta caretta)
	Only (11) mammal species have been observed and recorded so far in the protected area. Most species are fairly common in the protected area and in Egypt. - Rodents - Pale gerbil (Gerbillus perpallidus) - Palestine mole-rat (Spalax ehrenbergi aegyptiacus) - Fat sand rat (Psammomys obesus)
Avifauna	The Resident Species observed within the protected area include the following: - Palm dove - Rock dove - Egyptian wagtail - Crested lark - Corn Crake – Endangered Sp.
The value of the Area	- Omayed PA is situated on one of the internationally important flyways for birds migrating between Eurasia and Africa, with the greatest numbers and species diversity occurring in the autumn when millions of migrants PAs through the region.
	- The site is endowed with a notable diversity in habitats and microhabitats attributed mainly to the prominent geological, geomorphological, topographic and edaphic spatial variations.
	- The Protectorate define as one of 20 Important Plant Areas (IPA) in Egypt by IUCN (Radford et al. 2011).
	- It is internationally recognized as a Biosphere Reserve among the Man and Biosphere (MAB) programme of UNESCO.

Code (03): Zaranik Protected Area

FactSheet (03): Zaranik Protected Area

Overview		
Eco-Geographic Location	It is located in the eastern part of Lake Bardawil, about 30 km west of Al-Arish	
Geo-Location	**Please Insert the Geo-Location Map**	
Declaration Date	1985.	
Declaration Decision	Prime Minister's Decree No. 1429 of 1985 in accordance with the provisions of Law 102 of 1983 on natural reserves.	
Type	Wetland protected area and a natural restricted area for birds.	
Total Area	300 Km^2.	
Biological Environment		
Habitats	- Salt lagoon, seagrass, salt marshes, sand, mud sabkhas/silt sabkhas, sand dunes, islands and shore plain.	
Fauna	11 different mammal species have been detected and recorded in Zaranik protected area, including the following: - Lesser Egyptian gerbil (Gerbillus gerbillus) - Fat sand rat (Psammomys obesus) - Long-eared hedgehog (Hemiechinus auritus) - The fennec fox (Fennecus zerda) - Sand cat (Felis margarita)	
	22 species of reptiles were monitored and recorded, the most important of which are the following; - Long Fringe-fingered Lizard (Acanthodactylus longipes) - common sandfish (Scincus scincus) - The wedge-snouted skink (Sphenops sepsoides) - Olivier's sand lizard (Measlina olivieri) - Savigny's agama (Trapelus savignii) - common chameleon (Chamaeleo chamaeleon)	- The desert monitor (Varanus griseus) - crowned leafnose snake (Lytorhynchus diadema) - Anderson's short-fingered gecko (Stenodactylus petrii) - Sahara sand viper (Cerastes vipera) - Egyptian tortoise (Testudo kleinmanni) - The loggerhead sea turtle (Caretta caretta)
Avifauna	More than 270 species of birds, mostly migratory waterfowl, have been identified and recorded, including;	

	- Garganey (Anas querquedula) - White pelicans - Flamengo - Different Species of Herons - White storks - Hoopoe
Marine Environment	Zaranik protected area includes several marine environments represented in the waters of the Mediterranean Sea and the eastern part of Lake Bardawil where different forms of organisms live, such as; - Molluscs - Crustaceans - Shellfish - Fishes - Marine turtles - Dolphins
	Fish is an important resource in the protected area; - The gilt-head (sea) bream (Sparus aurata) - Bouri Family (Mugil sp.) - Karous oroubi (Dicentrarchus labrax) - Common Soul (Solea solea)
The value of the Area	- This region represents one of the main keys to bird migration in the world, as studies have proven the importance of the region and its unique location that connects the continents of Asia, Africa and Europe, and the region represents it as a bridge for migratory birds between these continents, especially in the autumn and spring of each year.
	- Lake Bardawil has been declared by the Egyptian government as one of the important sites within the Ramsar International Convention for the Protection of Important Wetlands for Waterfowl due to its privileged location and rich natural environment on which very large numbers of migratory waterbirds depend, especially in the Zaranik area. Birdlife International has also listed the area as one of the important bird areas in the world IBA where many species of endangered birds and highly sensitive species are protected.
	- An area of Special Conservation Areas under the Barcelona Convention for the Protection of the Mediterranean and Specially Conservation Areas.

Code (04): El Sallum Marine Protectorate

FactSheet (04): El Sallum Marine Protectorate

Overview	
Eco-Geographic Location	Matrouh Governorate, the centers of Sidi Barrani and Salloum, the marine part of which is located in Egyptian territorial waters, in addition to the cliffs

	north of the city of Salloum and a land part that extends for a distance of about 500 meters deep in the coastal range.
Geo-Location	**Please Insert the Geo-Location Map**
Declaration Date	2010.
Declaration Decision	Prime Minister's Decree No. 533 of 2010.
Type	Marine protected area.
Total Area	383 Km^2.
Biological Environment	
Habitats	The area encompasses marine and coastal habitats including - tidal flats, - coastal plains, - seagrass meadows, and - shallow and intermediate depth marine habitats.
Flora	- A number of (7) main types of vegetation cover have been identified in the North Coast region, each of which is distinguished by specific types, the most important of which are sand dunes, plateaus, rocky hills, salt and non-salt depressions, valleys and sand plateaus.
Fauna	Salloum protected area contains a distinctive biological diversity of reptiles and amphibians, including (34) species, the most important of which are the following: - Loggerhead Turtle (Caretta caretta) - Short-fingered Gecko (Stenodactylus mauritanicus) - Nidua lizard (Acanthodactylus scutellatus) - Bosc's fringe-toed lizard (A. boskianus) - Egyptian Fringe (Acanthodactylus pardalis) - Desert monitor (Varanus griseus) - Common chameleon (Chamaeleo chamaeleon) - Macroprotodon cucullatus - Malpolon monspessulanus - Spalerosophis diadema - Bufotes viridis
	In the western Egyptian Mediterranean, there are 33 important mammal species, or about 25% of the Egyptian wild mammals (a quarter of Egyptian mammals). The monitored mammals within the area includes the following species: - The four-toed jerboa (Allactaga tetradactyla) - The greater Egyptian jerboa (Jaculus orientalis) - The dorcas gazelle (Gazella Dorcas) - Mediterranean monk seal (Monachus monachus)

Avifauna	The number of birds that were monitored and recorded in Salloum reached (169) species according to (Bahaa El-Din, 1999), where the number of birds residing in the region reached (35) species, either from the rest of the species, they are migratory or visiting during the winter. The most common species observed and recorded include; - Mediterranean short-toed lark (Calandrella rufesce) - Cream-colored courser (Cursorius cursor) - The desert wheatear (Oenanthe deserti) - The crested lark (Galerida cristata) - Thekla's lark (Galerida theklae) - Brown-necked raven (Corvus ruficollis) - The European shag (Gulosus aristotelis) - Houbara bustard (Chlamydotis undulata) - Eurasian dotterel (Charadrius morinellus)
The value of the Area	- Important conservation area for threatened and declining species
	- The protected area represents the first protectorate with a pure marine component in the Egyptian territorial waters in the Mediterranean Sea and a coastal land part surrounding it to protect unique land and coastal systems, and this land part also serves as a protection zone for the marine component from some terrestrial activities that result in pollution.
	- Conservation of this area is achieved in joint cooperation between the various authorities (Ministry of Environment - Ministry of Defense - Ministry of Tourism - Ministry of Petroleum - Ministry of Agriculture - Ministry of Culture - Matrouh Governorate - National Center for State Land Uses).
	- The protected area falls under a set of international and regional conventions

Code (05): El Burullus Protected Area

FactSheet (05): El Burullus Protected Area

Overview	
Eco-Geographic Location	Kafr El-Sheikh Governorate, where the Protected area is located in the northern part of the Nile Delta, between the Rashid and Damietta branches, and the Protected area includes the entire Burullus Lake, including the islands inside it, in addition to a sand barrier separating the lake from the Mediterranean Sea with a length of approximately 65 km and a width ranging from 6 to 17 km.
Geo-Location	**Please Insert the Geo-Location Map**
Declaration Date	1998.
Declaration Decision	Prime Minister's Decree No. 1444 of 1998.

Type	wetlands protected area.	
Total Area	300 km^2.	
Biological Environment		
Habitats	The main habitats of the area can be classified as follows: - Sandy beaches - Sand formations - Sand dunes - Salt marshes - Sabkha - Arable lands - Man-made wetlands - Lake burullus - Lake burullus islands (There are about 30 islands inside the lake covered with dense amounts of vegetation.)	
Flora	- Burullus Protected area is one of the richest areas in the diversity of plant species and also in the distinct plant populations for different types of environments. (388) species have been monitored and recorded, including (197) types of flowering plants (97 perennials and 100 annuals), and (11) aquatic plants and one type of aquatic ferns.	
Fauna	The following are the most important species that have been monitored and recorded in the protected area (Burullus): - European green toad (Bufo viridis) - Mascarene grass frog (Ptychadena mascareniensis) - Levant water frog (Rana bedriagae) - African common toad (Amietophrynus regularis) - Nile Delta toad (Amietophrynus kassasii) - Bosc's fringe-toed lizard (Acanthodactylus boskianus) - Ocellated skink (Chalcides ocellatus) - The wedge-snouted skink (Sphenops sepsoades)	- The eastern Montpellier snake (Malpolon insignitus) - Egyptian Hissing Sand Snake (Psammophis sibilans) - javelin sand boa (Eryx jaculus) - The Egyptian cobra (Naja haje) - African chameleon (Chamaeleo africanus) - Nidua lizard (Acanthodactylus scutellatus) - Desert monitor (Varanus griseus) - The loggerhead sea turtle (Caretta caretta) - The green sea turtle (Chelonia mydas)
	Among the most famous mammals that have been observed and	- Fat Sand Rat (Psammomys obesus)

	recorded in the protected area (Burullus) are the following; - Felis chaus - African Golden Wolf (Canis anthus) - Egyptian Mongoose (Herpestes ichneumon) - Red Fox (Vulpes vulpes) - Felis silvestris - Flower's Shrew (Crocidura floweri)	- House Mouse (Mus musculus) - Egyptian Fruit Bat (Rousettus aegyptiacus) - Greater Mouse-tailed Bat (Rhinopoma microphyllum) - Kuhl's Pipistrelle (Pipistrellus kuhlii) - Anderson's Gerbil (Gerbillus andersoni) - The Pale Gerbil (Gerbillus perpallidus)
Avifauna	Among the most important birds that have been spotted in the protected area are the following: - Wiegon - Shoveler - Ferruginous Duck – Endangered Sp. - Common pochard - Red Shank - Whiskered Tern - Little Grebe - Little Bittern - Water Rail - Purple Gallinule - Little tern - Kentish Plover	- Spur-winged Plover - Collard Pratincole - Egyptian Nightjar - Pied Kingfisher - Senegal Coucal - Clamorous Reed Warbler - Merops orientalis cleopatra - Streptopelia senegalensis - Hirundo rystica savignir - Galirida cristata nigricans - Motacilla flava pygmaea - Lesser Kestrel – Endangered Sp.
The value of the Area	- Lake Burullus is a unique breeding site for waterbirds, both at the Egyptian and international levels.	
	- It represents one of the main routes for bird migration in the world, especially from Eastern Europe and Northwest Asia to Central and Southern Africa.	
	- The Burullus area is also considered one of the richest areas in Egypt in its biodiversity, which includes more than 700 species known so far, of which 11 species are endemic to Egypt and 7 species are globally endangered.	
	- Lake Burullus is a shallow lake with a number of environmental features, and is the second largest in the northern lakes in terms of size and productivity of fisheries.	

Code (06): Ashtum El-Gamel Protected Area

FactSheet (06): Ashtum El-Gamel Protected Area

Overview	
Eco-Geographic Location	It is located in Port Said Governorate, where the protected area is located in the northeastern part of Lake Manzala.
Geo-Location	**Please Insert the Geo-Location Map**
Declaration Date	1988
Declaration Decision	Prime Minister's Decree No. 459 of 1988, as amended by Decree No. 2780 of 1998.
Type	Wetlands and Natural restricted Area for birds
Total Area	180 Km^2.
Biological Environment	
Habitats	- The protected area contains a group of main habitats, each of which is characterized by containing a number of distinct species. These habitats are: salt sabkhas, sand formations, the lake and the islands inside the lake, and the shore and water of the lake.
Flora	Among the plant species that have been monitored in the protected area are the following: - Phragmites australis - Salicornia fruticose - Juncus arabicus - Tamarix nilotica - Typha domingensis - Eichhornia crassipes - Atriplix halimus
Fishes	Among the most important fishes that have been spotted in the protected area are the following: - The Nile tilapia (Oreochromis niloticus) - The mango tilapia (Sarotherodon galilaeus) - The zander (Sander lucioperca) - Bouri Family (Mugil sp.) - Karous oroubi (Dicentrarchus labrax)
Avifauna	Among the most important birds that have been spotted in the protected area are the following: - The pied kingfisher - The black-headed gull - swamp hen - The little egret - White storks - Flamengo - Raptors (birds of prey)
The value of the Area	- Considered as important Bird Area (IBA)

B. Future Potential Protected Area

Declaration of new protected areas is determined by two main factors: the inherent value of the resource and the degree of threat to which it is exposed. The value of a site is judged by its integrity, significance for biodiversity conservation, contribution to the network of features not yet represented, and the site's potential for generating direct financial benefit for the nation and society.

The Following two areas; El Shweila and also Ras El-Hekma are suggested to be a future protected area, as they satisfy the applicable cirteria for protected area selection in Egypt. They will be addresses in the following facheets.

- Factsheet (07): Ras Al-Hekma
- Factsheet (08): Al Sheweila

Code (14): Ras Al-Hekma – Future Potential Protected Area

FactSheet (07): Ras Al-Hekma – Future Potential Protected Area

Overview	
Eco-Graphic Location	located on the Western Mediterranean Coast, east of Marsa Matrouh.
Latitudes	31° 06' and 31° 15'N
Longitudes	27° 40' and 27° 54'E.
Area Accessibility	The area is accessible from Matrouh city with about 70 km to the east and extends about 15 km on both sides.
Area:	150.0 Km^2
Biological Environment	
Habitats and Landscape	Ras El Hekma is an area of outstanding natural beauty and encompasses a large diversity of habitats and features, some of which are unique in the western Mediterranean coastline of Egypt.
Biodiversity	The area holds a fauna and flora characteristic of the western Mediterranean cost of Egypt. But the area is perhaps most important for the floristic elements it supports, some of which are rare or endemic (e.g., *Ebenus armitagei*, which is only known from Ras El Hekma in Egypt El Hadidi *et. al.* 1992).
Marine Environment	The marine environment represented in the proposed Protected Area also hold characteristic elements of the Mediterranean marine fauna and flora. Marine turtles' nest in the region (Kasparek 1993).
The value of Area	- Ras El Hekma Protected Area will contribute to the diversification of land uses in the region and work as a buffer between the many planned developments in the area, providing alternative and permanent natural attractions to local tourism. - The unique biotic elements found in the area make the proposed Protected Area of significant scientific value.

Applicable Criteria for protected area selection in Egypt	Criteria applying to Ras El-Hekma are as follows: - Area supports high biological diversity (species and habitats); - Importance for endangered, endemic or restricted range species; - Value as a tool for regional planning and the promotion of sustainable development; - Value for scientific research.

Code (15): Al-Sheweila – Future Potential Protected Area

FactSheet (08): Al-Sheweila – Future Potential Protected Area

Overview	
Eco-Geographic Location	
Within the Western Desert	El Sheweila is located on the Mediterranean Coast, in the northernmost part of the wide Western Desert which covers about two thirds of the total area of Egypt.
Within the Miocene Northern Plateau	Eco-graphically located in the Miocene Northern Plateau of the Western Desert.
within the Western Mediterranean Coastal Desert	El Sheweila offset area lies about 40 km west of Marsa Matrouh and 55 km east of Sidi Barrani and is administratively located in Markaz El Negila, Matrouh Governorate.
Geo-Location	**Please Insert the Geo-Location Map**
Total Area	133.1 km^2.
Biological Environment	
Habitats	- The area includes a southern plateau which is sloping towards the direction of the sea, an increased sloping area and coastal plains and dunes
	- The land cover of the area is composed of sparse vegetation, waterlogged soil with loose and shifting sands, coastal dunes, rocky areas with a thin sand layer, croplands and salt marshes, (FAO Database).
Flora	- El Hadidi and Hosni (2000) reported that 1,060 species or 51% of the total flora of Egypt are recorded from this territory.
	- Most of the approximately 990 species of vascular plants that form the vegetation cover in the Mediterranean Coastal Desert region (Boulos, 1995) are therophytes that flourish during the rainy season giving the region the appearance of grassland desert (Zahran and Willis, 1992).
	- In the study area, 74 species (belonging to 25 families) were recorded, in addition to four rain-fed cultivated plants: fig (Ficus carica), olive (Olea europaea), date palm (Phoenix dactylifera) and barley (Hordeum vulgare). In spring (March / April) when all annuals

	are present, this number is expected to increase at least to the double.
Fauna	- The Green Toad (Bufotes viridis) is the only amphibian expected in this area. The Following reptiles were recorded within the area: - Moorish Gecko (Tarentola mauritanica) found in moist areas with rocks, cliffs and old buildings. - Northern Elegant Gecko (Stenodactylus mauritanicus) inhabiting moist Mediterranean semi-deserts in sandy and gravelly plains with some vegetation. - Changeable Agama (Trapelus mutabilis) mainly in gravely and stony plains but also near cultivations. - Small-spotted Lizard (Mesalina guttulata) in rocky areas. - Common Chameleon (Chamaeleo chamaeleon) in semi-deserts habitats with vegetation and dry cultivated areas. - Bosc's Lizard (Acanthodactylus boskianus) found in sandy areas and cultivated areas. - Nidua Lizard (Acanthodactylus scutellatus) in variety of sandy habitats with vegetation. - Ocellated Skink (Chalcides ocellatus) in cultivated areas, and Gold Skink (Eumeces schneiderii) found in areas with vegetation cover and rocks. - Olivier's Lizard (Mesalina olivieri) was recorded twice in vegetated gravel plain with rocks and vegetated gravel and boulder plain with a thin sand layer Other species known from the El Sheweila wider area include: - Turkish Gecko (Hemidactylus turcicus) which is strongly associated with man, - Adouin's Sand Skink (Chalcides sepsoides) found in sandy habitats, - Egyptian Leopard Lizard (Acanthodactylus pardalis) found in semi-deserts with annual rain. Snakes of the Western Coastal Desert include - Mediterranean Hooded Snake (Macroprotodon cucullatus) found in mesic stony areas and was previously recorded at El Dabaa. - Schokari Sand Snake (Psammophis schokari) found in sandy and rocky deserts with vegetation and annual rain. - Sahara Sand Viper (Cerastes vipera) in sandy areas. - Eastern Montpellier Snake (Malpolon insignitus) in cultivated lands, salt marshes and slightly vegetated areas. - Clifford's Snake (Spalerosophis diadema) in a wide variety of desert habitats including agricultural areas.

	- Moila Snake (Malpolon moilensis) in stony and gravelly deserts with precipitation and close to cultivated areas. - Egyptian Cobra (Naja haje) in semi-deserts in stony plains and near cultivations (EEAA/ UNDP, 2003; Baha El Din, 2006). - The Egyptian Tortoise (Testudo kleinmanni) was previously very common and widespread in arid semi-deserts along the entire Western Mediterranean Coast, inhabiting vegetated coastal dunes as well as sandy and stony areas.
	- Thirty-eight species of mammals have been recorded from the Western Mediterranean Coastal Desert (EEAA/UNEP, 1993). Three species of rodents are restricted to this habitat type include: - Lesser Molerat (Nannospalax ehrenbergi) found in sandy areas with vegetation. - Four-toed Jerboa (Allactaga tetradactyla), found in littoral salt marshes. - Lesser Short-tailed Gerbil (Gerbillus simoni), found in littoral salt marshes. Mammals of this area include the following species: - The Long-eared Hedgehog (Hemiechinus auritus) is found around human settlements, agricultural areas and coastal deserts with high vegetation. - The Ethiopian Hedgehog (Paraechinus aethiopicus; syn.: P. deserti) inhabits desert and semi-desert, rocky plains, wadis and gardens. - Anderson's Gerbil (Gerbillus andersoni) is found along sandy areas of the Mediterranean Coastal Desert. - The Fat Sand Rat (Psammomys obesus) inhabits salt marshes and sandy areas (Hoath, 2009, Basuony et al., 2010). - The Lesser White-toothed Shrew (Crocidura suaveolens) is also known to be found at various habitats including coastal plains, vegetated dunes, marshlands, gardens and at salty depressions near the coast. - Lesser Egyptian Gerbil (Gerbillus gerbillus), mainly found in sandy areas. - North African Gerbil (Gerbillus campestris) known to be found in a wide variety of habitats including cliffs, buildings and cultivated areas. - Pygmy Gerbil (Gerbillus henleyi), found in rocky vegetated wadis, vegetated desert plains, coastal marshes and cultivated areas. - The Lesser Egyptian Jerboa (Jaculus jaculus) is found in sand dunes, plains and wadis.

	- The Greater Egyptian Jerboa (Jaculus orientalis) is found at seashores and sandy deserts. - The Middle Eastern Dormouse (Eliomys melanurus) is found in mountains and cliffs along the Mediterranean coast, as well as gardens and buildings. - House Mouse (Mus musculus) & Black Rat (Rattus rattus) – invasive rodents, (Basuony et al., 2010). - Cape Hare (Lepus capensis). - The Red Fox (Vulpes vulpes) occupies a variety of habitats though is not a true desert species. - The Striped Weasel (or Saharan Striped Polecat, Ictonyx libycus) is found in sandy but vegetated desert and semi-desert habitats and was previously recorded from the Western Mediterranean Coast (EEAA/UNEP, 1993; Hoath, 2009). - Jungle Cat (Felis chaus) which is found in areas with thick cover such as farmlands, marshes and reed beds. - Wild Cat (F. silvestris) which inhabits dryer areas with cover. - The Golden Wolf (Canis anthus) occupies a variety of habitats though is not a true desert species. - The Dorcas Gazelle (Gazella dorcas) was formerly present the area and was found at coastal plains and stony areas; Bats potentially present in the area include: - Kuhl's Pipistrelle (Pipistrellus kuhlii) found in buildings, farms, caves, roofs and cracks in the wall. - Egyptian Fruit Bat (Rousettus egyptiacus), found in cultivated areas, desert margins, towns, deserted buildings and mosques. - The Arabian (Geoffroy's) Horseshoe Bat (Rhinolophus clivosus) inhabits caves which were not detected within the study area. - Rousettus egyptiacus and Rhinolophus clivosus were previously recorded in the coast of Marsa Matrouh east of El Showeila (Hoath, 2009, Basuony et al., 2010).
Avifauna	The most common recorded bird species within the area include the following: - Kentish Plover (Charadrius alexandrinus), occurs on dry mudflats and coastal beaches. - Little Tern (Sternula albifrons), the Egyptian populations of Little Tern are mainly coastal, breeding on sand or shingle beaches, but otherwise found on inland lakes and wide stony rivers. - Yellow-legged Gull (Larus michahellis), reported from the two islets facing El Sheweila area (Baha El Din, 1998). - European Shag (Gulosus aristotelis), reported from the two islets facing El Sheweila area (Baha El Din, 1998).

	Resident bird species include the following: - Cream-colored Courser (Cursorius cursor). - Bar-tailed Desert Lark (Ammomanes cincturus). - Goldfinch (Carduelis carduelis). - Hoopoe Lark (Alaemon alaudipes). - The Crested Lark (Galerida cristata). - Rock Pigeon (Columba livia). - Common Hoopoe (Upupa epops). - Common Raven (*Corvus corax*). - African Houbara Bustard (Chlamydotis undulata), near to extinction due to severe hunting pressures. Observed birds of prey include the following species: - Common Kestrel (Falco tinnunculus). - Barn Owl (Tyto alba).
Marine Environment	- The presence of marine turtle nesting sites along the sandy shores of El Sheweila. - The presence of marine caves with suitable characteristics for the Mediterranean Monk Seal (Monachus monachus). - The presence of breeding populations of Yellow-legged Gull (Larus cachinnans) and Shag (Gulosus aristotelis) on the two islets facing El Sheweila shoreline.
The value of the Area	- El Sheweila has an important value for ecotourism and recreation. It includes crystalline seawaters, clean littoral habitats, sand dunes and rocky ridges extending to the shoreline, sandy pocket beaches and sceneries of great esthetic value together with an overall healthy environment. Moreover, local food production is based on rain-fed crops and domestic animals grazing on natural pastures. Medicinal plants and bird-watching are other potential attractions to the area.
Applicable Criteria for protected area selection in Egypt	The area fulfills 10 out of 13 criteria proposed for protected area selection in Egypt's Protected Area System Plan. Criteria applying to El Sheweila are as follows: - Area supports high biological diversity (species and habitats); - Importance for endangered, endemic or restricted range species; - Presence of rare, restricted or threatened habitats; - Presence of habitats that are not, or are poorly represented in existing Protected Areas in Egypt; - Esthetic landscape value; - The area and its resources form an important part of the traditional life style of a native population; - Value for ecotourism and recreation;

	- Value as a tool for regional planning and the promotion of sustainable development; - Area offers excellent educational and public awareness opportunities; and - Value for scientific research.
IUCN Category	- The potential protected area would be managed under IUCN Category VI: Protected area with sustainable use of natural resources.

C. OECMs

In December 2019, the Conference of Parties to the Barcelona Convention (COP 21) requested the Mediterranean Action Plan of the United Nations Environment Programme (UNEP/MAP) Secretariat, through the Specially Protected Areas Regional Activity Centre (SPA/RAC), to elaborate a post-2020 strategic document to further advance and strengthen the network of MCPAs and other effective area-based conservation measures (OECMs) in the Mediterranean. It was further recognized that to achieve a comprehensive and coherent systems of well-managed MCPAs/OECMs, the strategy should be ambitious, transformational, and in line with the Post-2020 Global Biodiversity Framework of the Convention on Biological Diversity (CBD) and other regional and global processes. Central to the transformative approach will be the incorporation and integration of recognized OECMs in the region to help achieve the ambitious Post-2020 Global Biodiversity Framework relevant targets.

A list of 14 OECMs has been developed according to what discussed in the project's inception workshop and after the consultation of phase (I)workshop only the OECMs that meet the selection criteria will be a strong candidate to be declared as OECM. The Strong candidates to be declared as OECMs are discussed in the below factsheets. The following factsheets include:

- Factsheet (09): Nile Delta Fan (EBSAs) – OECM
- Factsheet (10): Fisheries Restricted Areas – OECM
- FactsheECMet (11): Marine mammal sanctuary – OECM

OECMs Candidates:

Code (03): Nile Delta Fan (EBSAs) – OECMs

FactSheet (09): Nile Delta Fan (EBSAs) – OECMs

Overview	
Geographical Reference – EBSA Region	Eastern Mediterranean Sea
Description of Location	Located in the southern Levantine Sea, the area includes the continental shelf and slope off the Nile Delta and Sinai Peninsula.

Geo-Location	
Management Body/Authority	A group of entities, the most prominent of which are the following: - Lakes & Fish Resources Protection & Development Agency. - Egyptian Naval Force (Egyptian Navy). - Maritime Transport Sector (MTS) – Ministry of Transportation. - Egyptian Border Guard Corps. - Some of Petroleum Companies.
Area Features	- Geomorphological features including highly active cold seeps, canyons (Alexandria canyon), a fan, an escarpment and a continental shelf.
	- Unique habitats related to gas hydrocarbon chemiosymbiotic communities in this area.
	- The area is home to vulnerable ecosystems composed of endemic molluscs and polychaete species.
	- Deep-sea corals communities are also predicted to be present in the area.
	- Biodiversity index in the area is quite high (38 out of 50), as the area is home to major components of pelagic and benthic communities.
	- NDF is known as one of the few spawning grounds in the Mediterranean Sea for bluefin tuna (BFT).
	- pelagic species and marine turtles aggregate in feeding grounds in the shelf portion of the area, which are also used as breeding areas for birds
Area Details – Feature Description of Area	
Cold Seeps	- Offshore northern Egypt, the mud volcanoes are clearly dominated at present by gas expulsion and sub vertical mud breccia extrusion. - The occurrence of gas hydrocarbon seeps harbor chemosymbiotic communities

	- In the area's cold seeps, new species of mollusc and polychaetes have been recently described, such as the vestimentiferan Lamellibranchia anaximandri or the Amphinomid Cryptonome. - GFCM designated a Fishery Restricted Area (FRA) due to the existence of such Vulnerable Marine Ecosystems (VMEs). According to that, bottom trawling activities were forbidden, however the last assessment of the FRAs shows a lack of enforcement in the area.
Primary productivity	- The richest marine biodiversity in the area are phytoplankton (661 species), consisting mostly on diatom, dinoflagellates and to a much lesser extent chlorophytes and cyanophytes. Marine algae and seagrasses are mostly Posidonia oceanica, Zostera sp, Sargassum sp, Caulerpa prolifera, Halimeda sp and other green algae.
	- Zooplankton is represented by 184 species, mostly copepods, whereas macro benthic fauna (annelids, mollusks, echinoderms, arthropods, ascidians) are not abundant in biomass but high in species diversity. For example, a total of 51 sponge species, 126 polychaete species, 57 crustacean species, 7 bryozoan species, more than 100 mollusk species and 350 fish species have been recorded from the coastal waters of the Mediterranean.
	- Although the Mediterranean is considered oligotrophic, some areas are more productive due to bathymetric, hydrographical and meteorological conditions, such as the presence of a wide shelf, river runoff and wind mixing.
	- These areas are important fishery zones because they are potential preferred spawning areas for many fish (Lloret et al., 2004). There is evidence showing impacts on phytoplankton blooms in the area due to the construction of man-made structures (e.g., Aswan High Dam and the Suez Canal), with potential impacts on fisheries in the area.
Posidonia and other phanerogams	- The southern limit of Posidonia along the eastern Mediterranean is associated with the delta influence of the Nile at the Egyptian coastline.
	- meadows are absent along the eastern Egyptian coast
	- In fact, along the northern African coasts (i.e., Algeria, Libya, Egypt) information on Posidonia is relatively scarce
Coralligenous	- This is an important habitat to be taken into account from the fisheries perspective but is also significant from the biodiversity point of view. According to the MEDISEH project (2013) the occurrence of coralligenous formations is predicted in the area.

Sharks and rays	- The Mediterranean Sea is a relatively overlooked area of research for blue shark and sharks in general including about 50 species of sharks and rays in the area.
Tuna-like species and small pelagics	- In the south part of the basin along the North African coast where information on small pelagic nursery grounds is generally lacking however persistent areas are indicated in the coastal waters of the Nile Delta. - According to ICCAT (2010), the Nile Delta has been identified as spawning area for Blue-fin Tuna.
Turtles	- All three of the marine turtle species occurring in the Mediterranean also regularly occur in the Egyptian Mediterranean waters.
Seabirds	- Seabirds breeding and wintering at five Important Bird Areas (IBAs) within the site, and travel from colonies to feed within the marine area, primarily within 15 km of the coast. The IBAs are the Lake Burullus Protected Area, Lake Manzala, El Malaha, Lake Bardawil, and Zaranik Protected Area.
Cetaceans	- information on cetacean species in very scarce in the Levantine Sea and it is hardly limited to few sightings off the Lebanese coast
Importance of Area	- contains very different types of ecosystems (e.g., from seagrass meadows to deep-sea chemosynthetic communities). - The area is home to vulnerable ecosystems composed of endemic molluscs and polychaete species. - GFCM designated a Fishery Restricted Area (FRA) due to the existence of such Vulnerable Marine Ecosystems (VMEs). According to that, bottom trawling activities were forbidden, however the last assessment of the FRAs shows a lack of enforcement in the area.
OECMs Applicable Criteria	- Criterion (B): Area is Governed and Managed; the management body or authority of area is (GFCM). - Criterion (D): Associated Eco-system Functions and services; the objective of the area is protecting vulnerable marine ecosystems (VMEs).

Code (04): Fisheries Restricted Areas – OECMs

Fact SheeT (02): GFCM_FRA: The Nile Delta Area Cold Hydrocarbon Seeps.

Overview	
Geographical Reference	Egyptian Mediterranean Sea.

Management Body/Authority	General Fisheries Commission for the Mediterranean (GFCM).	
Area Type	Fisheries Restricted Area (FRA).	
Total Area:	4,377.5 km^2.	
Closure Date	1st January, 2006.	
Restriction	Permanent Closure.	
Geo-Location		
Description		
General Biology	The area supports and harbors an exceptionally high concentration of unique living communities of presumably chemosynthetic organisms such as polychaetas and bivalves.	
Sea floor physiography	Cold hydrocarbon seeps. A highly concentrated region of cold hydrocarbon seeps in the south eastern Mediterranean Sea in waters off between 300 and 800 off the continental slope North Sinai (Egypt) and the Palestinian Authority Gaza strip.	
Impacts	Information about fishing activities in the area was very scarce.	
Importance		
	characterized by an exceptional concentration of cold hydrocarbon seeps which had favored the development of a unique living community and recommends that the area should be given a full protection status by avoiding demersal fishing practices.	
Measure specific to this area	Fishing with towed dredges and bottom trawl nets shall be prohibited in the areas bounded by lines joining the following coordinates: - 31° 30.00’ N, 33° 10.00’ E - 31° 30.00’ N, 34° 00.00’ E - 32° 00.00’ N, 34° 00.00’ E - 32° 00.00’ N, 33° 10.00’ E	
OECMs Applicable Criteria	- Criterion (B): Area is Governed and Managed; the management body or authority of area is (GFCM).	

	- Criterion (D): Associated Eco-system Functions and services; the objective of the area is protecting vulnerable marine ecosystems (VMEs).

9. Vision and strategic objectives for the national strategy

This section of the report presents a summary of the strategic planning framework used to develop the post-2020 national strategy for marine and coastal protected areas and other effective conservation measures.

9-1 Objective

The objective of the strategic planning framework is to establish a logical and systematic structure for strategy planning based on crystallizing the results of diagnosis and consultation and identifying and analyzing the key issues in proposing the vision and strategic pillars that will represent the cornerstone of the strategy.

9-2 Approach

Ensures the adoption of a rational planning methodology and process for long-term conservation and conservation of biodiversity. This section presents a summary of the methodology and approach used to develop the strategic planning framework.

9-2-1 Knowledge based

The integration and use of both scientific and traditional knowledge, including local and historical sources of information, contributes significantly to the identification, development and management of an effective protected areas network. Where the issues were analyzed and diagnosed on the basis of science, knowledge and experiences, and then a list of the key issues affecting the conservation of biodiversity in the Egyptian Mediterranean were extracted, where the analytical methods have been used in planning for the management of natural resources.

9-2-2 Alignment and Harmony

It has been taken into consideration that the national strategy is compatible and algin with:

- International frameworks such as the post-2020 global biodiversity framework.
- Regional frameworks such as the Post-2020 Regional Strategy for Marine and Coastal Protected Areas, and the Post-2020 Strategic Action Program for Biodiversity Conservation and Sustainable Management of Natural Resources in the Mediterranean Region.
- Relevant national frameworks such as the National Strategy for Sustainable Development, Egypt's Vision 2030, the National Climate Change Strategy 2050, and others.

9-2-3 Guiding Principles

The strategic planning framework is based on the following guiding principles:

- Integrated management: planning for a coordinated, flexible and transparent management, taking into account the joint responsibilities of governmental and non-governmental entities, community groups and others, to conserve and sustain coastal and marine resources, while complying with legislation and respecting duties and rights.
- Ecosystem Approach: This approach recognizes that ecosystems are inherently complex and interconnected and involve energy pathways among their constituent parts (water, air, organisms, etc.). This approach ensures that the linkages between the major

components of the ecosystem are considered when defining, planning and managing coastal and marine areas on a site-specific basis.

- Precautionary approach: Decisions and actions related to conservation measures can be taken without extensive scientific knowledge, as pressures, threats and challenges to the marine environment can be identified and conservation actions taken based on the best available information.
- Respect for local communities: The local community in Egypt has cultural traditions that must be respected.
- Consultation and cooperation: The need for consultation and cooperation to develop and implement the network of protected areas and their individual components, as their success depends on the extent to which the different interests are able to work together, establish mechanisms to collect information, increase public awareness, knowledge transfer, and ensure the participation of stakeholders to have a role in planning and managing protected areas. In this context, the preparation of an implementable strategy depends to a large extent on the participatory approach and consultation with all parties and partners.
- Public awareness and education: The involvement of the community in the development of coastal and marine protected areas and networks is essential to the success of the strategy. Conservation activities can contribute to building capacity, increasing public awareness, education and understanding of conservation issues, and developing institutions that support the network of protected area.
- Management effectiveness: Measuring management effectiveness depends on having specific measurable goals. Which may include ecological, administrative, social, economic and/or cultural goals, depending on the nature of the area. Therefore, appropriate indicators must be prepared to monitor and follow up the achievement of the objectives.
- Adaptive management: The adaptive management system ensures the application of new scientific knowledge to modify management systems in order to deal with emerging issues and continue achieving goals.
- Topics reviewed: The topics reviewed are those that can be included in all the objectives of the strategy, such as climate change and the women empowerment and all segments of society. The strategy should allow for the understanding and management of the topics reviewed.

9-3 Strategic Planning Framework Methodology

Strategic planning is one of the tools organizations use to determine their long-term strategies and directions. Figure 1 presents a summary of the two major planning phases and steps.

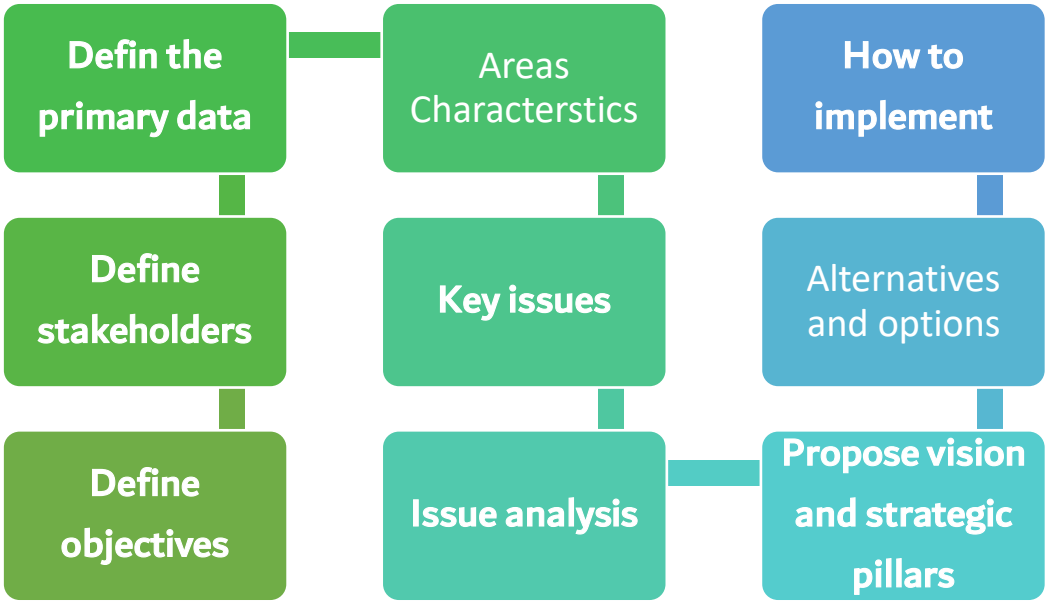


Figure 26: Strategic Planning Framework Methodology

The diagnostic phase comprises the bulk of the planning activities, and as a whole aim to define, identify and analyze the issues that need to be addressed and to set goals and actions to resolve them.

According to the methodology (Figure 26), the purpose must first be defined, which in our case is the preparation of a post-2020 national strategy that is ambitious and feasible for marine and coastal protected areas, in addition to other effective area-based conservation measures on the Mediterranean coast of Egypt.

Accordingly, a preliminary list of the main stakeholders was defined, which is fully presented in the preparatory stage report. In addition, during the inaugural workshop that was held during the month of October 2022 for this activity, a list of the main stakeholders was consulted, in order to determine the importance and impact of all stakeholders, as well as to determine Any additional stakeholders. In addition, the stakeholders were analyzed and mapped, through which they were divided into three groups, and then a protocol for communication and consultation could be developed during the two phases of diagnosis and strategy development.

Primary data on the geographical area to be covered by the strategy has also been identified, identifying all marine and coastal protected areas therein as well as potential locations for other effective conservation measures based in the area. In addition, the environmental, natural, social and economic characteristics were identified in all sectors of the study area as presented in chapter (7) of this report.

9-3-1 Key issues identification

Identifying and analyzing the key issues is the core of the scheduling or planning process, thus a good diagnosis ensures a good plan. The study of the characteristics concluded with identifying a comprehensive list of all key issues and topics affecting biodiversity in the Egyptian Mediterranean, which were reviewed and revised by the advisory group. The most important issues include the pressures, threats and challenges shown in the following (Table 3):

Table 3: List of pressures, threats and challenges

Pressures and Threats	Challenges
Land use conversions	Lack of environmental awareness
Waste	Lack of management plans
Pollution	lack of coordination
Oil and gas exploration and production	Lack of financial resources
Land Reclamation	no framework for consultation and involvment
semi-natural processes	Lack of institutional capacity
Social development	political willness
Recreational uses	Deficiency of the institutional framework
Excessive collection of species	Deficiency of the legal framework
invasive species	Insufficient empowerment of women
Security issues	
Transnational issues of the protected areas	
water scarcity	
Climate changes	

9-3-2 Evaluation and analysis of key issues

Evaluating and analyzing the key issues is critical to identify drivers and causes, as well as understanding the environmental, social and economic impacts that issues may have. There are many methods used in assessing and analyzing issues, including sectoral and integrated analysis, and modern analyzes that can address changes such as SWOT analysis (strengths and weaknesses, opportunities and threats), motives, pressures, status, impact and response analysis, PESTEL analysis, and root cause analysis. The following sections show some ways to use them:

- *Consultation: During the inception workshop, pressures and threats to biodiversity in the Egyptian Mediterranean were assessed by the stakeholders on a numerical scale from 1-5, where 5 represents a very significant pressure/threat, and 1 represents a potential pressure/threat. Neglecting it, and (Figure 27) presents the results, noting that most of the pressures and threats are significant to very important, foremost of which is the land uses conversion, waste and hunting. It did not notice that there are pressures or threats that can be neglected. For example, while about 8% of the participants in the evaluation believe*

that the issue of land ownership can be neglected, more than 80% believe that it is medium to very important.

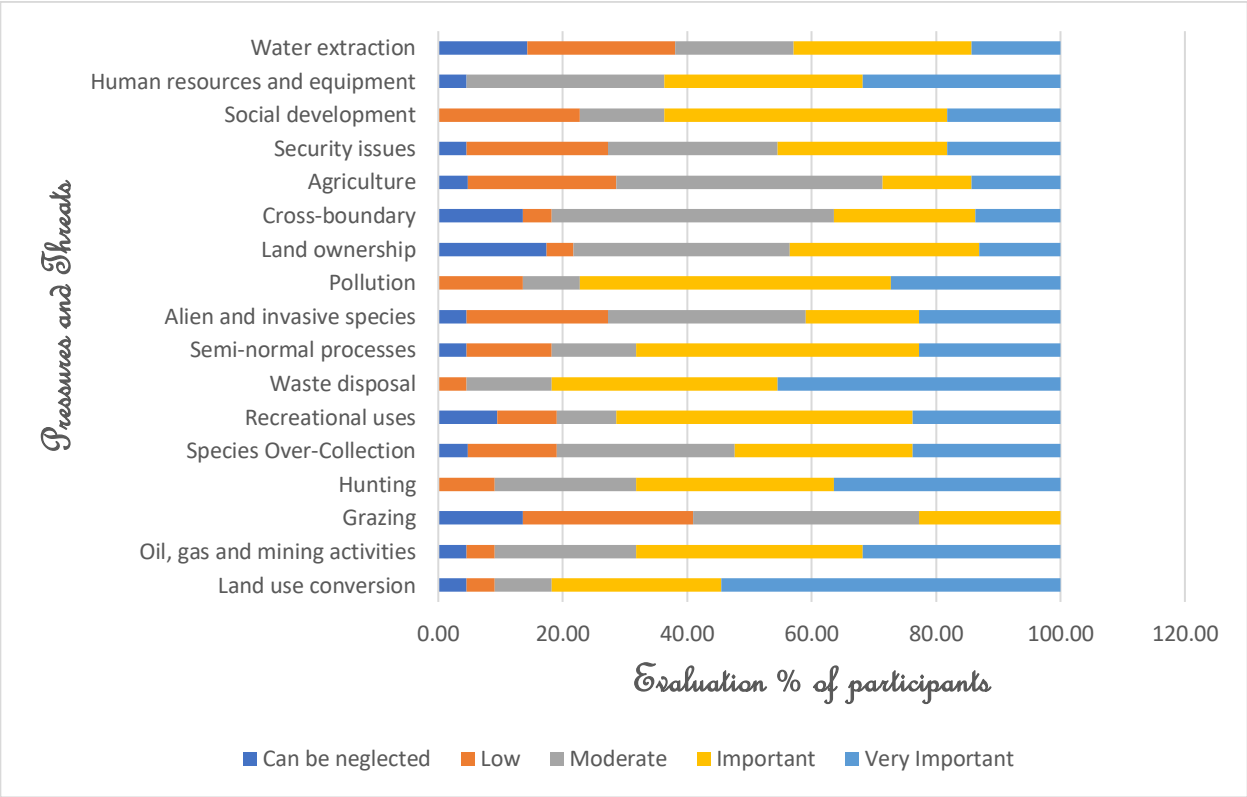


Figure 27: Stakeholders evaluation of pressures and threats to biodiversity in the Egyptian Mediterranean

For another example, during the inception workshop, the potential challenges to biodiversity in the Egyptian Mediterranean were assessed by the stakeholders on the same numerical scale used in the previous evaluation. The most important limitations included the lack of environmental awareness, the lack of adequate and effective coordination between the beneficiaries and the owners of the mandate, the lack of protected areas management plans, and the lack of financial resources and human resources.

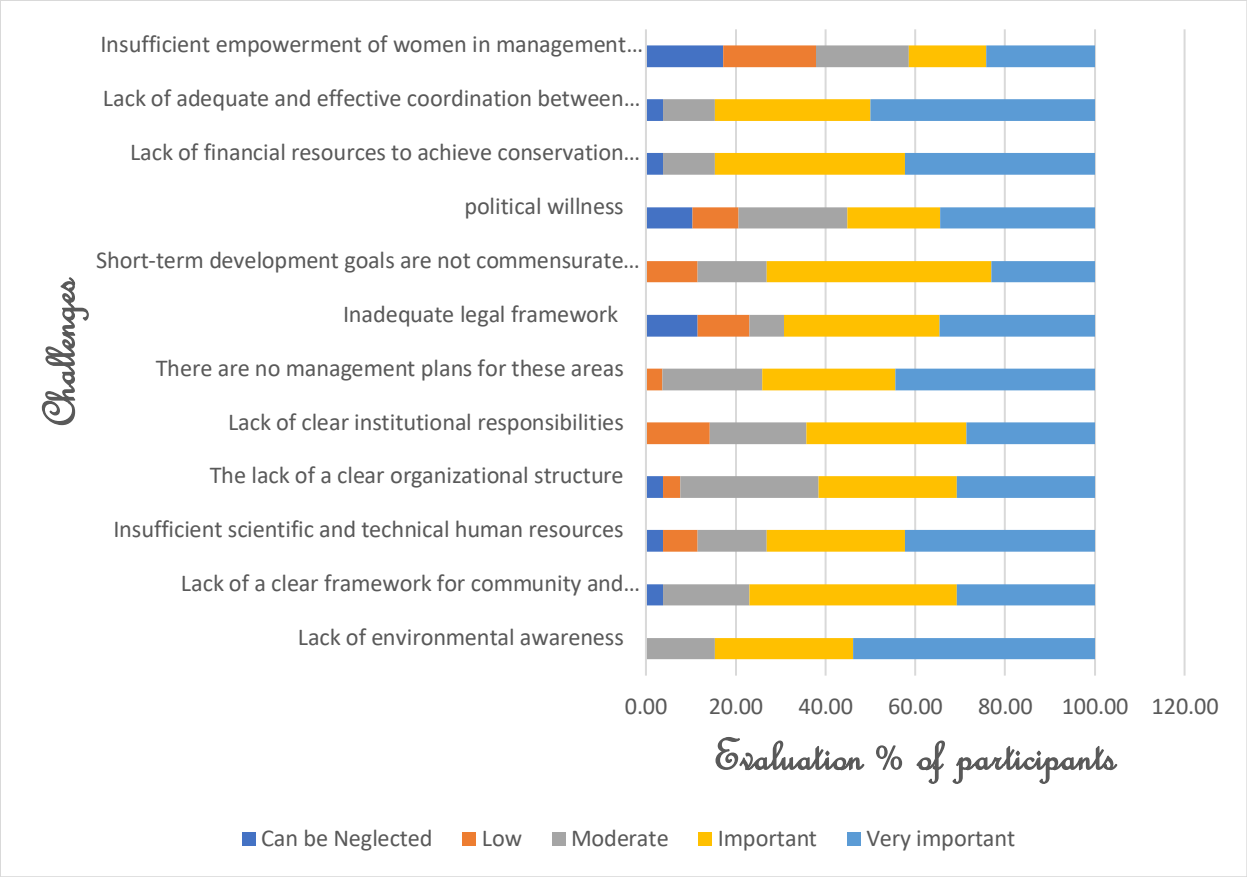


Figure 28: Stakeholders evaluation of the challenges affection biodiversity in the Egyptian Mediterranean

- *Framework of Drivers, Pressures, State, Impact and Response (DPSIR): It is one of the analysis methods developed by the European Environment Agency in 1999 (Carr 2007)17 and which is used in the analysis of regional or local ecosystems to understand what their condition becomes when exposed to external pressures or threats, or when the need to know the feedback of the impact of a policy or legislation in order to support decision-making. A summary illustration illustrates this box.*

[17] Carr, Edward & Wingard, Philip & Yorty, Sara & Thompson- Hall, Mary & Jensen, Natalie & Roberson, Justin. (2007). Applying DPSIR to sustainable development. International Journal of Sustainable Development and World Ecology - INT J SUSTAIN DEV WORLD ECOL. 14. 10.1080/13504500709469753.

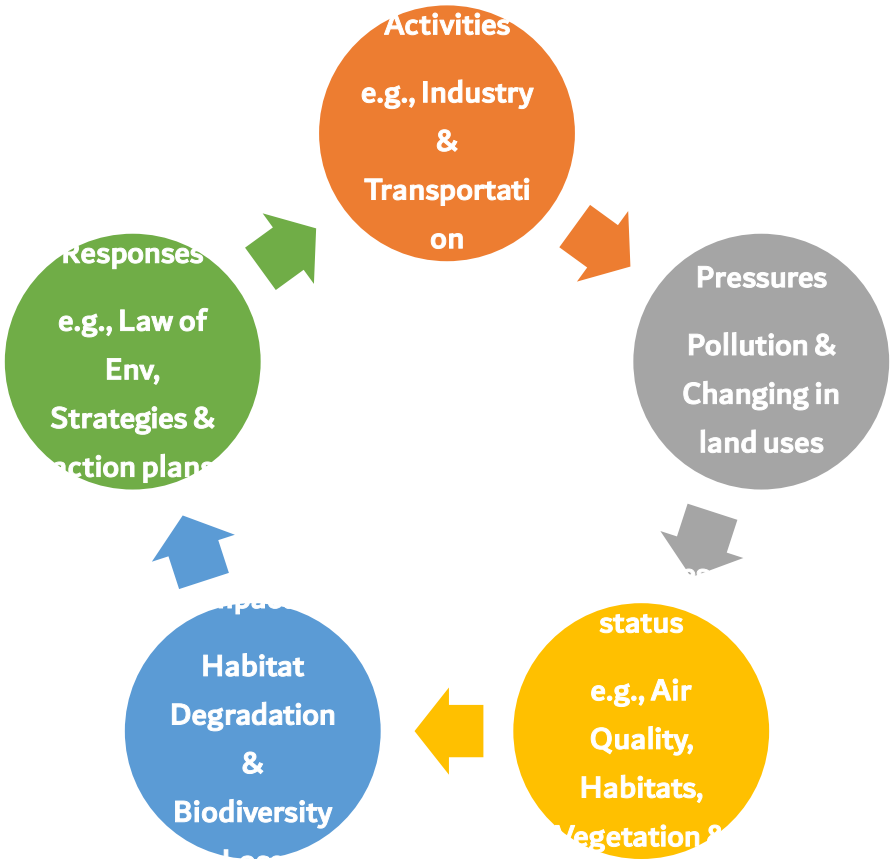


Figure 29: DPSIR Framework

The drivers, Pressures, State, Impact and Response framework was used to analyze the issues of protected areas and biodiversity in the Egyptian Mediterranean region, as illustrated in (Figure 30). While some studies that have been conducted deal with the analysis of issues of protected areas, especially marine (Martinez, et al 2009, Martinez et al 2007)18,19 The drivers are the industries that generate pressures. The consultant team preferred to separate the drivers from the activities, as the drivers are the external forces such as population and policies that may stimulate activities (industries and uses), which in turn cause pressures.

[18] [18] C., Ojeda-Martínez & Casalduero, Francisca & Bayle-Sempere, Just & P., Sánchez-Jerez & Sánchez Lizaso, José & Forcada, Aitor & Valle, Carlos & D., Fernandez. (2006). A DPSIR approach in the development of indicators to assess the effect of Marine Protected Areas. 10.13140/RG.2.2.19317.78569.

[19] [19] Martínez, Celia & Casalduero, Francisca & Bayle-Sempere, Just & Barberá, Carmen & Valle, Carlos & Sánchez Lizaso, José & Forcada, Aitor & Jerez, Pablo & Martín-Sosa, Pablo & Falcón, Jesús & Salas, Fuensanta & Graziano, Mariagrazia & Chemello, Renato & Stobart, Ben & Cartagena, Pedro & Perez-Ruzafa, Angel & Vandeperre, Frédéric & Rochel, Elisabeth & Planes, Serge & Brito, Alberto. (2009). A conceptual framework for the integral management of marine protected areas. Ocean & Coastal Management. 52. 89-101. 10.1016/j.ocecoaman.2008.10.004

Drivers	Activities	Pressures		State	Impact
Population growth	Tourism and tourism activities	Land uses conversions	Alien and invasive species	Habitats	Habitat degradation
Economic development	Mining and oil and gas	Waste	Lack of environmental awareness	Ecosystem Services	Degradation of ecosystem services
Policies and legislation	Urban development	Pollution	No management plans	Biodiversity	Biodiversity loss
Social behavior	Infrastructure	Oil and Gas exploration and production	Lack of coordination	Important and threatened species	The deterioration of important and threatened species
	Agriculture	Land Reclamation	Lack of financial resources	Water quality	Water quality change
	Industry	Lack of institutional capacity	There is no framework for participation	Soil quality	Soil quality change
	Irrigation	Semi-natural processes	Lack of institutional capacity	Air quality	Air and noise pollution
	Transportations	Social development	Political wellness	Natural processes	natural and ecological changes
	Navigation and ports	Recreational uses	Deficiency of the institutional framework		social changes
	Hunting and herding	Excessive collection of species	Deficiency of the legal framework		
		Security issues	Insufficient empowerment of women		

Cross-border issues	Climate changes
water scarcity	

Figure 30: Drivers, Pressures, State, Impact and Response - Application to the Egyptian Mediterranean

The activities and uses in the Egyptian Mediterranean were identified, and the emerging pressures and potential threats from these activities were reviewed, taking into account the evaluation of thestakeholders that was carried out through consultation.

- ***SWOT analysis:*** *SWOT analysis relies on realizing the strengths and weaknesses of a system, as well as external opportunities and threats that can be exploited or avoided to ensure the sustainability of this system. The following table shows the most important strengths, weaknesses, opportunities and threats to biodiversity in the Egyptian Mediterranean region.*

Strengths	Weaknesses	Opportunities	Threats
1. *Availability of information and studies* 2. *Diverse and accumulated experiences in managing biodiversity* 3. *The state of the ecosystems is still good* 4. *Good relations with Stakeholders*	5. *Political wellness* 6. *Sustainable development strategy and Egypt's vision 2030* 7. *Promoting green economy and nature-based tourism* 8. *Regional and international policies and strategies* 9. *COP27 outcomes*	10. *Current legal framework* 11. *Institutional and financial capacity* 12. *Community engagement* 13. *Cooperation and coordination* 14. *Management planning*	15. *Land uses* 16. *Multiple land jurisdictions* 17. *Sectoral decision making* 18. *Non-integration with local communities* 19. *Lack of environmental awareness* 20. *Economic development* 21. *Climate change* 22. *Overfishing* 23. *invasive species*

Although there are pressures and threats to biodiversity on the Egyptian Mediterranean coast, the state of the ecosystems is still good, and it is one of the strengths that can be exploited in seizing the available opportunities. The Consultant team considered that political wellness is an important opportunity, especially in light of the country's efforts to integrate biodiversity and climate change into national policies and sectoral plans.

Strengths such as the availability of information, studies and various experiences in managing biodiversity can be used to seize opportunities such as political support to reduce weaknesses, for example, legal and institutional frameworks can be developed when political support is available, and the same strength can be used to stave off threats such as lack of environmental awareness To carry out specialized programs to raise environmental awareness of issues of the environment, nature and biodiversity.

This SWOT analysis can be summarized as follows:

1. *There is a unique biodiversity on the Egyptian Mediterranean coast,*

2. *This biodiversity is at risk of being lost as a result of pressures, and more importantly, as a result of inefficient legal and institutional frameworks, weak community participation and lack of coordination and cooperation between different entities.*
3. *Issues analysis summary*
4. *Through using of the above analysis and evaluation methods, it can be concluded that there are a number of complex major issues affecting the state of biodiversity, which have resulted in sub-issues. The following figure presents the main issues and sub-issues.*

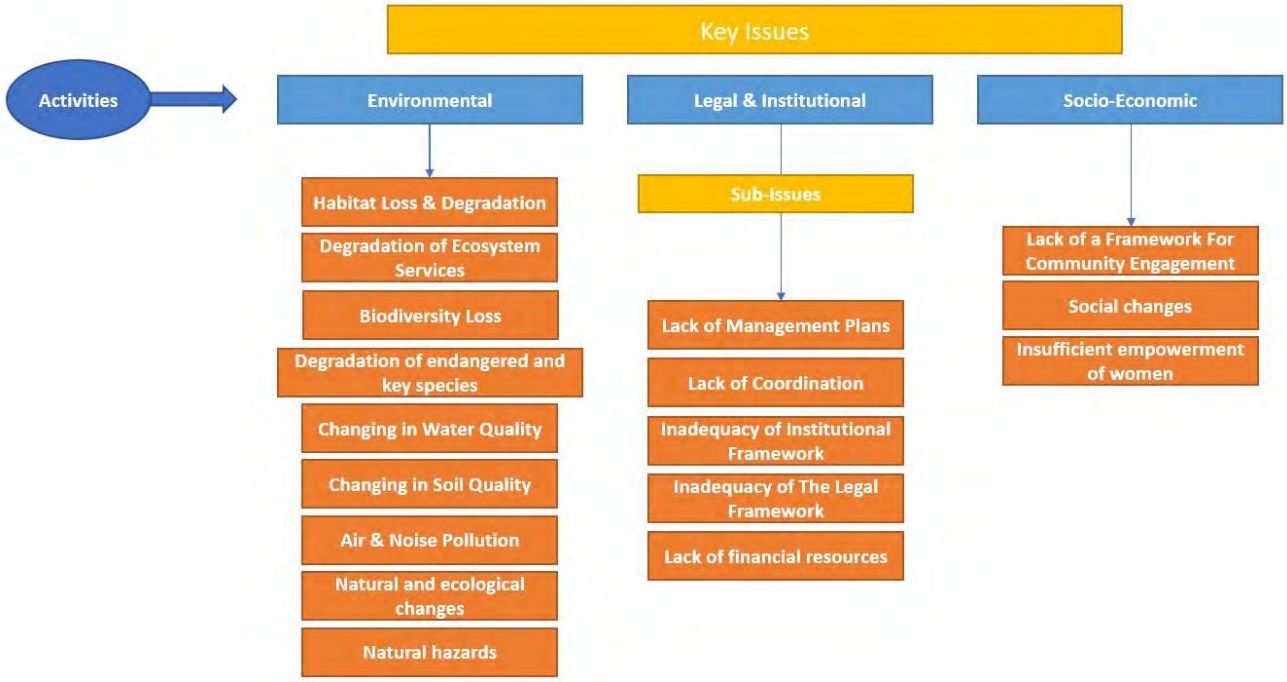


Figure 31: Main and subsidiary issues

1. Legal Farmwork

The strategic framework is based on 3 main levels in addition to the special programs that will be presented in the next report (the strategy). The first level is the vision, which we dreamed of addressing and solving key issues, the second level includes the strategic pillars, and the third level constitutes the objectives.

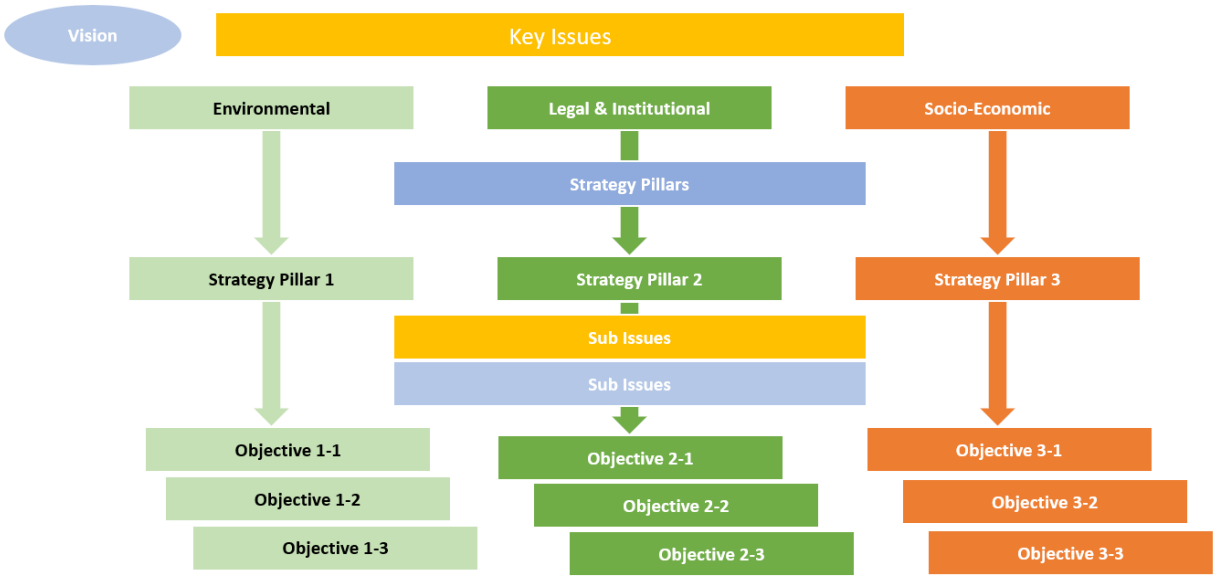


Figure 32: Legal Framework

1. Vision proposal

Setting the vision for the strategy is an important step in shaping the security and dream that we hope to see come true in the future. The vision must address key issues in a clear way, and the words of the vision must not tolerate more than interpretation. In this context, the Consultant team proposed the following vision:

"Protected areas in the Mediterranean coast entail healthy and functioning ecosystems, managed through plans based on science and knowledge, to achieve the goals of conservation, human well-being and the management of climate change impacts, with ensuring an effective framework for community participation and coordination, sustainability to achieve self-financial resources, providing scientific and technical human resources for management and empowering all members of society"

The vision put forward by the first group was:

"The Mediterranean has natural resources that are conserved and managed in a participatory approach, efficient and sustainable manner, ensuring equitable sharing and maximizing economic and social benefit and passing them on to future generations"

The vision of the second group was:

The Mediterranean environments of the Egyptian coast are safeguarded, intact and/or in good condition, preserve marine and coastal protected areas, manage effectively and support other conservation areas, and contribute to the sustainable development and well-being of the Egyptian citizen.

By the end of the session, both visions were discussed and the following vision was agreed.

Egypt's Mediterranean ecosystems are well conserved and healthy, effectively managed through a connected and ecologically representative network of marine/coastal protected

areas and other effective conservation measures, to achieve the sustainable development goals, human well-being and minimizing the impacts of climate change.

2. Strategic Pillars Proposal

The strategic pillars address the key issues, and therefore 3 strategic pillars have been proposed:

1. *Biodiversity pillar*
2. *Governance/Regulatory Pillar*
3. *Socio-economic frameworks pillar*

In order to be compatible with the regional strategy, two pillars have been added:

4. *Spatial planning pillar, which allows the possibility of expanding the area of marine and coastal PAs.*
5. *Other effective conservation measures pillar, which addresses other effective area-based conservation measures.*

During the second consultation workshop in March 2023, these strategic pillars were consulted, where the Consultant team presented the proposed pillars, opened a discussion and modified the strategic pillars.

The following figure presents the strategic pillars as agreed upon with partners.

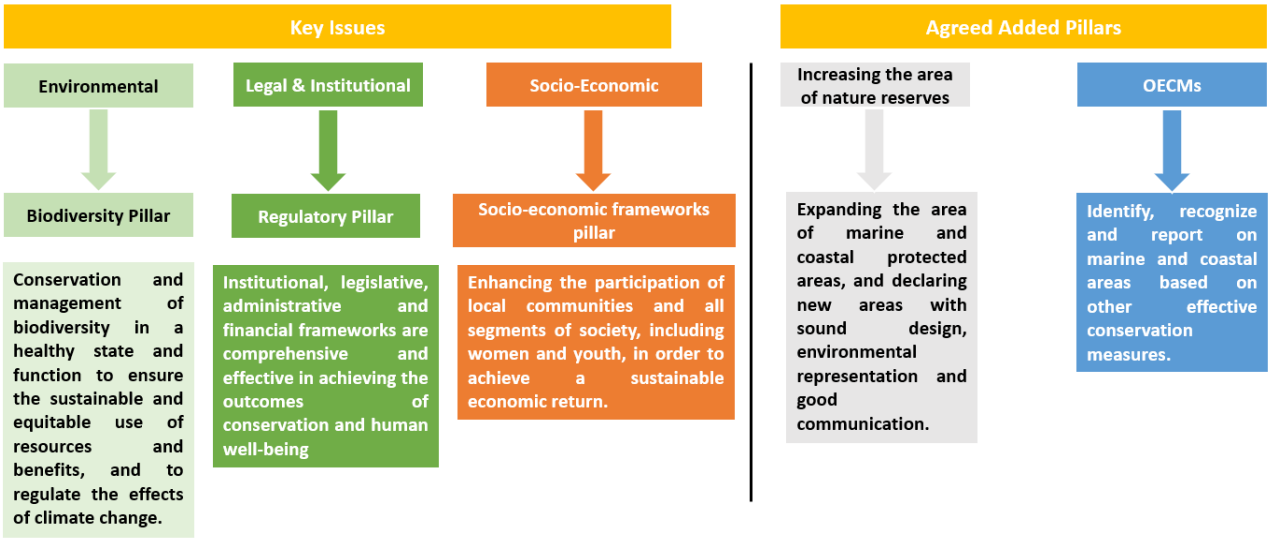


Figure 33: Strategic Pillars Proposal

10-REFERENCES

- Aghasyan, A., Avci, A., Tuniyev, B., Crnobrnja-Isailovic, J., Lymberakis, P., Andrén, C., Cogalniceanu, D., Wilkinson, J., Ananjeva, N.B., Üzüm, N., Orlov, N.L., Podloucky, R., Tuniyev, S., Kaya, U., Stöck, M., Khan, M.S., Kuzmin, S., Tarkhnishvili, D., Ishchenko, V., Papenfuss, T., Degani, G., Ugurtas, I.H., Rastegar-Pouyani, N., Disi, A.M., Anderson, S., Beebee, T. & Andreone, F. (2016). *Bufotes viridis*. The IUCN Red List of Threatened Species 2016. Downloaded on 09 August 2016.
- Ahmed, D.A.; Shaltout, K.A; and Kamal, S.A (2014). Mediterranean sand dune in Egypt: threatened habitat and endangered flora. Life Science Journal 11 (10): 946-956
- Ahmed, Dalia & Shaltout, Kamal & Kamal, Sania. (2014). Mediterranean Sand Dunes in Egypt: Threatened Habitat and Endangered Flora. Life Science Journal. 11. 946-956.
- Ahyong, S.T. and Galil, B.S. (2006) First Mediterranean record of the Indo-West Pacific mantis shrimp *Clorida* albolitura, Aquatic Invasions, vol. 1, p. 191-193
- Ali, M.M. 2010. *Sonchus macrocarpus*. The IUCN Red List of Threatened Species 2010. Downloaded on 26 May 2016.
- Arnold, C. (2015) "Meet the First New Canine Found in 150 Years". National Geographic. Retrieved 2015-08-02.
- Aulagnier, S., Schlitter, D. & Granjon, L. 2008. *Gerbillus perpallidus*. The IUCN Red List of Threatened Species. Version 2015.1. <www.iucnredlist.org>. Downloaded on 14 June 2015.
- Baha El Din, M. and Atta, G.A. (2002) *The World of Birds in Egypt*. BirdLife International/EEAA, Cairo: 44 pp. (in Arabic)
- Baha El Din, S. (1999) *Directory of Important Bird Areas in Egypt*. BirdLife International, The Palm Press, Cairo: 113 pp.
- Baha El Din, S. (2006) *A Guide to the Reptiles and Amphibians of Egypt*. The American University in Cairo Press, Cairo, Egypt.
- Baha El Din, S. and Baha El Din, M. (1994) Status of the Egyptian Tortoise in Egypt. TortoiseCare, submitted to the Turtle Recovery Program, Wildlife Conservation Society.
- Baha Eldin, S; Fouda, M.M.; and Barakat, H (2022). Status of biodiversity values and their management at Lake Burrulus Lake Protected Area. Report submitted to Hemaya Environmental Consulting and Services. 75 pages
- Basuony, M.I.; Gilbert, F. and Zalat S. (2010) Mammals of Egypt. Atlas, Red Data Listing and Conservation. Ministry of State for Environmental Affairs.
- Batanouni, K.H. (2001) Conservation and sustainable Use of Biological Resources in the North Western Desert of Egypt with the Involvement of the Local Population (Final Report). North Africa Programme, Biodiversity Conservation. Academy of Scientific Research and Technology, Egypt – IUCN – The Swiss Development Cooperation.
- Besar, M.H.A; El Sayed, A.A.M; Amer, M.A.; Abdelkhalek, A.M; and Abou-Elregal, M.A. (2023). Polychaetes associated with seagrass meadou, Posidinia oceanica at Salloum Marine Protected Area, Mediterranean Sea, Egypt. Egypt. J. Bio. Fish. 27 (2) : 509-525
- BirdLife International (2016a) Important Bird Areas
- BirdLife International (2016b) IUCN Red List for birds
- Bishai, H.M. and Khalil, M.T. (1997) Freshwater Fishes of Egypt. Publications of the National Biodiversity Unit, 9, EEAA, Cairo: 229 pp.
- Böhme, W. & Baha El Din, S. (2006). Acanthodactylus pardalis. The IUCN Red List of Threatened Species 2006. Downloaded on 09 August 2016.
- Boulos, L. (1999) Flora of Egypt. Vol. I (Azollaceae- Oxalidaceae). Al-Hadara Publishing, Cairo, Egypt: 419 pp.
- Boulos, L. (2000) Flora of Egypt. Vol. II (Geraniaceae- Boraginaceae). Al-Hadara Publishing, Cairo, Egypt: 352 pp.
- Boulos, L. (2002) Flora of Egypt. Vol. III (Verbenaceae- Compositae). Al-Hadara Publishing, Cairo, Egypt: 373 pp.

- Boulos, L. (2005) Flora of Egypt. Vol. IV Monocotyledones (Alismataceae - Orchidaceae). Al-Hadara Publishing, Cairo, Egypt: 617 pp.
- Boulos, L. (2009) Flora of Egypt: Checklist. Revised Annotated Edition. Al-Hadara Publishing, Cairo, Egypt: 410 pp.
- Bruun, B. and Baha El Din S. (2002) Common Birds of Egypt (Revised Edition). The American University in Cairo Press, Cairo, Egypt.
- Carranza, S., Arnold, E. N. and Pleguezuelos, J. M. 2006. Phylogeny, biogeography, and evolution of two Mediterranean snakes, Malpolon monspessulanus and Hemorrhois hippocrepis (Squamata, Colubridae), using mtDNA sequences. Molecular Phylogenetics and Evolution, 40 (2): 532-546.
- CITES (2016) CITES Appendices I, II and III
- CMS (2016) CMS Appendices I and II
- Corti, Claudia; Mellado, Valentin Pérez; Geniez, Philippe; Baha El Din, Sherif; Martínez-Solano, Iñigo; Sindaco, Roberto and Romano, Antonio (2009) Macroprotodon cucullatus. The IUCN Red List of Threatened Species 2009: Downloaded on 01 November 2016.
- Daoud-Bouattour, A., Gammar-Ghrabi, Z., Limam-Ben Saad, S. & Muller, S.D. (2010) Cyperus papyrus. The IUCN Red List of Threatened Species 2010. Downloaded on 28 April 2016.
- Driscoll, C., Yamaguchi, N., O'Brien, S.J. and Macdonald, D.W. (2011) A suite of genetic markers useful in assessing wildcat (Felis silvestris ssp.)- domestic cat (Felis silvestris catus) admixture. Journal of Heredity 102 (Supplement 1): S87-S90.
- Driscoll, C.A., Menotti-Raymond, M., Roca, A.L. Hupe, K., Johnson, W.E., Geffen, E., Harley, E.H., Delibes, M., Pontier, D., Kitchener, A.C., Yamaguchi, N., O'Brien, S.J. and Macdonald, D.W. (2007) The Near Eastern origin of cat domestication. Science 317: 519-523.
- Duckworth, J.W.; Steinmetz, R.; Sanderson, J. and Mukherjee, S. (2008) Felis chaus. The IUCN Red List of Threatened Species 2008. Downloaded on 17 March 2016
- Edelist, D., Rilov, G., Golani, D., Carlton, J.T., Spanier, E. (2013) Restructuring the Sea: profound shifts in the world's most invaded marine ecosystem, Diversity and Distributions 19, 69-77
- EEAA (2004) Damietta Governorate Environmental Profile. SEAM Programme, EEAA – Entec UK Ltd., ERM
- EEAA/UNEP (1993) Habitat Diversity: Egypt. Publications of the National Biodiversity Unit, 1, EEAA, Cairo: 302 pp.
- EEAA/UNEP (1995) Egypt Country Study on Biological Diversity. Publications of the National Biodiversity Unit, 3, EEAA, Cairo: 217 pp.
- EIMP (2000) Annual report of water quality data from the coastal waters of the Mediterranean Sea
- El-Tantawy, S.A.M and El-Sherbiny, H.A.E. (2010) Some Protozoan Parasites Infecting Catfish Clarias gariepinus Inhabiting Nile Delta Water of the River Nile, Dakahlia Province, Egypt. Journal of American Science 2010; 6(9):676-696
- Environics (2006) Faunal Assessment for El Burullus Black Sands Deposit (Final Report). Coastal and Environmental Services (CES), Grahamstown, South Africa.
- Environics (2016) Ecology Report for El Burullus Power Plant Site, Kafr El Sheikh Governorate (Final Report). Commissioned by ERM
- Froese, R. and Pauly. D. Editors (2014) FishBase, developed by WorldFish Centre & FAO with support from the European Commission, http://www.fishbase.org/
- GAFRD (2012) GAFRD Yearbook 2020, General Authority for Fish Resources Development, Ministry of Agriculture and Land Reclamation.
- Galal, T.M. and Fawzy, M. (2007) Sand Dune Vegetation the Coast of Nile Delta, Egypt. Global J. Environ. Res., 1(2): 74-85
- Glas, L. (In press) Felis chaus. In: J. S. Kingdon and M. Hoffmann (eds), The Mammals of Africa, Academic Press, Amsterdam, The Netherlands.

- Government of Catalonia (2007) Indicators guideline: to adopt and indicator-based approach to evaluate coastal sustainable development.
- Grubb, P., Amori, G., de Smet, K. & Bertolino, S. (2010). Hystrix cristata. The IUCN Red List of Threatened Species 2010. Downloaded on 21 July 2016.
- Halim, Y., (1990) On the Potential Migration of Indo-Pacific Plankton through the Suez Canal. Bulletin de l'Institut Océanographique, Monaco, 7: 11-27
- Hoath, R. (2003) A Field Guide to the Mammals of Egypt. The American University in Cairo Press, Cairo, Egypt.
- Holthuis, L.B. (1980) FAO species catalogue, Vol. 1. 1980 Shrimps and prawns of the world. An annotated catalogue of species of interest to fisheries. FAO Fish.Synop., (125) Vol. l:271 p.
- Hussein Abaza. (2015). Governance and Knowledge Generation Socio-economic Evaluation of Maritime Activities, GEF
- Hutterer, R. (2005) Order Soricomorpha. In: D. E. Wilson and D. M. Reeder (eds), Mammal Species of the World, pp. 220-311. Johns Hopkins University Press, Baltimore, Maryland, USA
- Hutterer, R. (2008) Crocidura olivieri. The IUCN Red List of Threatened Species 2008. Downloaded on 20 March 2016.
- Hutterer, R., Kryštufek, B., Shenbrot, G. & Yom-Tov, Y. (2008). Meriones sacramenti. The IUCN Red List of Threatened Species 2008. Downloaded on 15 August 2016.
- Iberinsa/Hamza (2006) Upgrading Cairo – Alexandria – Matrouh Desert Road to Freeway Standards, Environmental Impact Assessment Study.
- IUCN (2003) North Africa Biodiversity Program, Phase III. Internal Review. IUCN, the World Conservation Union. Report prepared by: Meg Gawler / Artemis Services for Nature Conservation and Human Development
- IUCN (2004) The Mediterranean deep-sea ecosystems
- IUCN (2016) The IUCN Red List of Threatened Species 2016.
- Koepfli, K.-P.; Pollinger, J.; Godinho, R.; Robinson, J.; Lea, A.; Hendricks, S.; Schweizer, R. M.; Thalmann, O.; Silva, P.; Fan, Z.; Yurchenko, A. A.; Dobrynin, P.; Makunin, A.; Cahill, J. A.; Shapiro, B.; Álvares, F.; Brito, J. C.; Geffen, E.; Leonard, J. A.; Helgen, K. M.; Johnson, W. E.; O'Brien, S. J.; Van Valkenburgh, B.; Wayne, R. K. (2015-08-17). "Genome-wide Evidence Reveals that African and Eurasian Golden Jackals Are Distinct Species". Current Biology 25: 2158–65.
- Kumar, B. (2013) Cyperus papyrus. The IUCN Red List of Threatened Species 2013. Downloaded on 28 April 2016
- Macdonald, D.W., Daniels, M.J., Driscoll, C.A., Kitchener, A.C. and Yamaguchi, N. (2004) The Scottish Wildcat: analyses for conservation and an action plan. The Wildlife Conservation Research Unit, Oxford, UK.
- Macdonald, D.W., Yamaguchi, N., Kitchener, A.C., Daniels, M., Kilshaw, K. and Driscoll, D. (2010) The Scottish wildcat: On the way to cryptic extinction through hybridisation: past history, present problem, and future conservation. In: D.W. Macdonald and A.J. Loveridge (eds), Biology and Conservation of Wild Felids, pp. 471-491. Oxford University Press, Oxford.

- Mashali, I.A. (2001) Contribution to the Ecology of the Deltaic Mediterranean Coast, Egypt. OnLine J. Biol. Sci. 1 (7): 628-635
- Mashaly, I.A.; El-Habashy, I.E., El-Halawany, E.F. and Omar, G. (2008) Habitats and plant communities in the Nile Delta of Egypt I. Deltaic Mediterranean coastal habitat. Pak J. Biol. Sci, 2008 Nov 15; 11(22):2532-44.
- McDonald, R. and Hoffmann, M. (2008) Mustela subpalmata. The IUCN Red List of Threatened Species 2008. Downloaded on 17 March 2016
- Meininger, P.L. and Atta, G. (1994) Ornithological Studies in Egyptian Wetlands 1989/90, FORE-report No. 94-01, the Netherlands.

- Mills Tandy and Sherif Baha El Din (2004) Amietophrynus kassasii. The IUCN Red List of Threatened Species 2004. Downloaded on 17 March 2016
- Nada, M. and Casale, P. (2008) Marine Turtles in Egypt: Threats and Conservation Priorities, WWF Italy, Rome
- NIOF (2009) Benthic Survey, Fishing, Shipping Studies. WDDM Phase VII Offshore Project. National Institute of Oceanography and Fisheries, on behalf of BP
- Nowell, K. and Jackson, P. (1996) Wild Cats. Status Survey and Conservation Action Plan. IUCN/SSC Cat Specialist Group, Gland, Switzerland and Cambridge, UK.
- OECD (2003) OECD Environmental Indicators: Development, Measurement and Use, Reference Paper. Organisation for Economic Co-operation and Development
- Parsons Brinckerhoff (2002). Egyptian LNG Facilities EIA: Environmental Statement
- Perälä, J. (2001). A new species of Testudo (Testudines: Testudinidae) from the Middle East, with implications for conservation. Journal of Herpetology 35(4): 567-582.
- Perälä, J. (2003) Testudo kleinmanni. The IUCN Red List of Threatened Species 200. Downloaded on 01 November 2016.
- Post-2020 Regional Strategy for marine and coastal protected areas (MCPAs) and other effective area-based conservation measures (OECMs) in the Mediterranean, UNEP.
- Saleh, M. A. and Basuony, M. (1998). A contribution to the mammalogy of the Sinai Peninsula. Mammalia 62: 557–575.
- Saleh, M.A. (1997) Amphibians and Reptiles of Egypt. Publications of the National Biodiversity Unit, 6, EEAA, Cairo: 234 pp.
- Salem, B. (2003) Omayed Biosphere Reserve and its Hinterland, Egypt. In: Sustainable Management of Marginal Drylands (SUMAMAD), Proceedings of the Second International Workshop, Shiraz, Islamic Republic of Iran, 29 November – 2 December 2003.
- Salomidi, I, Katsanevakis,S., Borja, A., Braeckman, U., Damalas, D., Galparsoro, I., Mifsud, R., Mirto, S., Pascual, M., Pipitone, C., Rabaut, M., Todorova, V., Vassilopoulou, V. and Vega Fernandez, T. (2012) Assessment of goods and services, vulnerability, and conservation status of European seabed biotopes: a stepping stone towards ecosystem-based marine spatial management, Mediterranean Marine Science, 13/1 49-88.
- Sarwat, A. (1999) A survey on threatened wild animals held in captivity or sold in the pet shops of Alexandria, Egypt. Alexandria Regional Branch Office, EEAA, Alexandria, Egypt
- Sarwat, A. (2005) Abu Qir Environmental Hot Spot Project: Terrestrial and Freshwater Ecology. Specialist Report, prepared for the EEAA-UNEP/MAP, Environics, Giza.
- Sergius Kuzmin, Ahmad Mohammed Mousa Disi, Gad Degani, David Tarkhnishvili, Boris Tuniyev, Max Sparreboom, Ismail H. Ugurtas, Nasrullah Rastegar-Pouyani, Steven Anderson, Riyad Sadek, Souad Hraoui-Bloquet, Avital Gasith, Eldad Elron, Sarig Gafny, U?ur Kaya. 2009. Hyla savignyi. The IUCN Red List of Threatened Species 2009. Downloaded on 15 August 2016.
- Shaltout, K.H. and Khalil, M.T. (2005) Lake Burullus (Burullus Protected Area). Publications of the National Biodiversity Unit, 13, EEAA, Cairo: 576 pp.
- Shaltout, K.H. and Khalil, M.T. (2006) Lake Bardawil and Zaranik Protected Area. Publications of the National Biodiversity Unit, 15, EEAA, Cairo: 629 pp.
- Tharwat, M.E. (1997) Birds Known to Occur in Egypt. Publications of the National Biodiversity Unit, 8, EEAA, Cairo: 204 pp.+xxi+XIX
- UNEP/WCMC (1988) Protected Areas Program. UNEP World Conservation Monitoring Center.
- UNESCO (2003) A Reference Guide on the Use of Indicators for Integrated Coastal Management – ICAM Dossier 1, IOC Manuals and Guides No. 45. UNESCO, 2003 (English)

- UNESCO (2006) A Handbook for Measuring the Progress and Outcomes of Integrated Coastal and Ocean Management. IOC Manuals and Guides, 46; ICAM Dossier, 2. Paris, UNESCO, 2006 (English)
- Vogrin, M., Corti, C., Pérez Mellado, V., Sá-Sousa, P., Cheylan, M., Pleguezuelos, J., Baha El Din, S. & Al Johany, A.M.H. (2012) Chamaeleo chamaeleon. The IUCN Red List of Threatened Species 2012. Downloaded on 23 March 2016
- Wacher, T., Bauman, K. & Cuzin, F. 2015. Vulpes zerda. The IUCN Red List of Threatened Species 2015. Downloaded on 15 August 2016.
- Wassif, K. (1995) Guide to Mammals of Natural Protectorates in Egypt. Publications of the National Biodiversity Unit, 4, EEAA, Cairo: 171 pp. (in Arabic).
- Fouda, M. M., (2017). National monitoring program for biodiversity and non-indigenous species in Egypt. United Nation Environmental Programme/ Mediterranean Action Plan - Specially Protected Areas Regional Activity Centre (UNEP/ MAP- SPA/ RAC).
- Wilms, T., Wagner, P., Chirio, L., Böhme, W., Lymberakis, P. & Baha El Din, S. (2014) Chamaeleo africanus. The IUCN Red List of Threatened Species 2014: Downloaded on 23 March 2016
- Younes, A.A. (2000). Fish farming in cages and related environmental impacts (pp. 37-43). In: First Environmental Conference in Damietta on Nile River Environment and Human Health. Mansoura University – Damietta Governorate – Egyptian Society for Fish Resources Development and Human Health Preservation (26-27 September 2000)

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