



From legal designation to adaptive performance: an IMET assessment of Al Hoceima National Park

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Abstract. Legal designation is a necessary foundation for protected-area governance, but it does not demonstrate whether authority, resources and implementation generate measurable conservation gains. This study assessed management effectiveness at Al Hoceima National Park, a 48,460-ha mixed terrestrial-marine protected area on Morocco's Mediterranean coast, using the Integrated Management Effectiveness Tool (IMET). The 2024 assessment combined documentary review, two facilitated workshops, semi-structured interviews, field observations and consensus validation. Six components of the IUCN-WCPA management cycle were scored on a 0–100 scale. Because only aggregated component scores were available, analysis was deliberately descriptive. The unweighted mean was 53.7, with values ranging from 42.2 to 59.3. Outcomes (59.3), planning (59.0) and processes (57.4) were above the site mean; context scored 55.2, whereas outputs (49.0) and especially inputs (42.2) were below it. The 16.8-point planning–input gap identifies a designation-to-performance discontinuity: legal recognition and strategic planning are more developed than the human, financial and technical capacity required to implement and verify conservation action. The relatively high outcomes score requires caution because it includes stakeholder-informed qualitative evidence while ecological time series remain incomplete. IMET therefore provides a management baseline rather than a causal estimate of ecological impact. We translate the profile into seven actions: budget-linked targets, a marine-capacity plan, an integrated evidence register, formalized co-management, risk-based surveillance, diversified finance and repeated assessment. The case demonstrates how periodic self-assessment can become an accountable adaptive-management cycle when scores are linked to evidence, resources and explicit decision rules.

Keywords: adaptive management, IMET, management effectiveness, marine protected area, Morocco.

Introduction. Protected areas are central to global biodiversity policy, but area-based targets can obscure the difference between legal coverage and effective conservation. A designation establishes boundaries, authority and formal objectives without necessarily ensuring sufficient staff, finance, enforcement, monitoring or institutional learning. This distinction is especially important in coastal and marine systems, where ecological connectivity, mobile resource users and overlapping jurisdictions complicate implementation. Global analyses consistently associate protected-area performance with management capacity, enforcement and adequate resourcing rather than formal status alone (Edgar et al., 2014; Gill et al., 2017; Coad et al., 2019; Maxwell et al., 2020).

Management-effectiveness assessment examines the chain connecting context, planning, inputs, processes, outputs and outcomes. The IUCN World Commission on Protected Areas framework treats these six components as a management cycle rather than independent administrative categories (Hockings et al., 2006). The Integrated Management Effectiveness Tool (IMET), developed through the BIOPAMA programme, operationalizes that cycle through structured indicators, evidence prompts, participatory

scoring and narrative diagnosis. Its application can organize fragmented management information and promote institutional learning, although interpretation remains dependent on evidence quality, facilitation and the composition of participating stakeholders (Bialowolski et al., 2023).

Al Hoceima National Park (PNAH) is an informative case. Created in 2004 on Morocco's Mediterranean coast and listed as a Specially Protected Area of Mediterranean Importance in 2009, it integrates terrestrial, coastal and marine ecosystems within one administrative unit. Its legal status and 2019-2029 management plan provide a substantial formal foundation. At the same time, marine surveillance, specialized staffing, predictable finance, ecological monitoring and the operational participation of resource users remain persistent challenges. This raises a practical question: how far has mature legal designation translated into the capacity, implementation and evidence needed for adaptive management?

This study aims to: (1) establish a transparent baseline across the six components of the International Union for Conservation of Nature (IUCN) - World Commission on Protected Areas (WCPA) management effectiveness framework; (2) identify discontinuities between planning, operational capacity, delivered outputs and evidenced outcomes; and (3) translate the diagnostic into a sequenced adaptive-management agenda. We intentionally avoid categorical performance thresholds and inferential claims that cannot be supported by six aggregated values. The contribution lies in separating management performance from ecological impact and making evidentiary uncertainty part of the diagnosis. In this context, "discontinuities" refers to gaps between what is planned, the operational resources available, the activities actually delivered, and the evidence demonstrating outcomes.

Material and Method

Study area and institutional setting. PNAH is located on the northern Mediterranean coast of Morocco. Its official profile reports 48,460 ha, including 19,600 ha of marine area, and approximately 50 km of coastline (SPA/RAC, n.d.). The mixed protected area encompasses semi-arid terrestrial landscapes, cliffs, islets, rocky reefs, seagrass habitats and other coastal-marine systems. It overlaps with artisanal fishing, tourism, settlements and infrastructure interests, making coordination and stakeholder engagement integral to management.

The park was created by Decree No. 2-04-781 of 8 October 2004 and entered the SPAMI List in 2009. Morocco's Law No. 22-07 on protected areas was promulgated in 2010 and its implementing decree adopted in 2021 (Royaume du Maroc, 2004, 2010, 2021). The National Agency for Water and Forests is the management authority. The 2019-2029 management plan was the principal planning instrument considered in the assessment. Legal milestones were treated as enabling conditions, not evidence of implementation or ecological effect. The management plan cited here is the 2019-2029 plan issued by the Agence Nationale des Eaux et Forêts (ANEF, 2019).

IMET framework. The assessment followed IMET Web version 2.1. Context addresses values, pressures, stakeholders and the management setting; planning examines objectives, design and strategic instruments; inputs cover human, financial, technical and infrastructural resources; processes examine governance, administration, enforcement, participation and monitoring; outputs record delivery of planned activities; and outcomes consider changes associated with objectives and stakeholder benefits. Each component was expressed on a 0-100 scale. Scores were retained as continuous diagnostic values and no unvalidated performance class was imposed.

Evidence assembly. The assessment was conducted from March to May 2024 using a participatory case-study design. Evidence included the management plan, activity reports, partnership agreements, ecological diagnoses and previous assessments. Two facilitated workshops in Al Hoceima brought together categories of actors involved in management, including managers and technicians, public authorities, civil society, artisanal fishers and

researchers. Participants examined indicators and reconciled differences through consensus. Workshop judgments were triangulated with field observations and semi-structured interviews, followed by plenary validation before entry into IMET Web.

The available article dataset consists of institutional consensus scores rather than individual questionnaire responses. Individual ratings and a verified attendance count were not retained; inter-rater reliability, stakeholder-group contrasts and response distributions could therefore not be calculated.

Analysis. The overall value was calculated as the unweighted arithmetic mean of the six component scores. The range and deviation of each component from the mean were used to locate relative bottlenecks and strengths. Contrasts between linked components, particularly planning versus inputs and planning versus outputs, were interpreted diagnostically but not causally. No regression, significance test or confidence interval was calculated because six aggregated scores are insufficient for inferential analysis.

Ethical approach. The assessment used institutional management information and aggregated consensus scores. No names, personal responses or sensitive participant data are reported. It was a management assessment rather than a biomedical or experimental study.

Results and Discussion

Overall profile. The six-component mean was 53.7 and the range was 42.2-59.3. Outcomes had the highest score (59.3), followed by planning (59.0), processes (57.4) and context (55.2). Outputs (49.0) and inputs (42.2) were below the mean. The profile is therefore neither uniformly weak nor uniformly strong; it is a compressed mid-range pattern with a clear operational bottleneck. The component scores and their diagnostic interpretation are summarized in Table 1.

Table 1

IMET component scores and interpretation

<i>Component</i>	<i>Score</i>	<i>Difference from mean</i>	<i>Interpretation</i>
Context	55.2	+1.5	Core values and legal recognition are established; pressure information requires updating.
Planning	59.0	+5.3	A strategic framework exists, but targets, responsibilities and budgets are not consistently operationalized.
Inputs	42.2	-11.5	Human, financial, technical and marine-specific capacities are insufficient relative to the mandate.
Processes	57.4	+3.7	Administration and coordination function, while surveillance, monitoring and documented learning remain uneven.
Outputs	49.0	-4.7	Education and routine administration are delivered more consistently than restoration and ecological monitoring.
Outcomes	59.3	+5.6	Perceived benefits and partnerships contribute positively, but ecological verification is incomplete.
Overall	53.7	-	Unweighted mean; range 42.2-59.3.

Legal and planning strength did not remove the capacity bottleneck. Context and planning scores reflect an established institutional identity, national and regional recognition and a strategic basis for action. However, climate adaptation, ecosystem-service information and

pressure trends were not consistently translated into updated targets and operational indicators. Inputs were 16.8 points below planning and 11.5 points below the mean. This was the largest discontinuity in the management chain. The assessment identified shortages in personnel, marine expertise, equipment and stable finance, alongside dependence on time-limited projects. Plans therefore exceeded the capacity reliably available for implementation.

Processes were functional but incompletely converted into outputs. Administrative procedures and inter-institutional relations offered a functioning platform, but the process score masked weaker surveillance, systematic monitoring, shared decisions and traceable learning. The output score was 10 points below planning and 8.4 points below processes. Environmental education, visibility and routine administration were more consistently documented than ecological restoration, sustained marine surveillance and completed monitoring cycles. This pattern is compatible with a capacity-constrained implementation mechanism, although the cross-sectional design cannot establish causality.

The outcomes score was relatively high but weakly verified. Stakeholder-informed evidence associated the park with awareness, legitimacy, partnerships and livelihood or tourism opportunities. These are meaningful outcomes. Nevertheless, aggregated outcome scoring combines social benefit, governance acceptance and ecological condition, each supported by different types of evidence. Long-term, spatially consistent ecological datasets remain incomplete. The separation between high outcomes and low inputs should consequently be treated as an evidentiary signal, not proof that ecological performance is independent of capacity.

The diagnosis supports seven linked actions. Each is formulated as a management control for the next cycle rather than as a result already achieved. The seven actions, operational indicators and proposed time horizons are summarized in Table 2.

Table 2

Adaptive-management actions derived from the IMET diagnosis

<i>Action</i>	<i>Operational indicator</i>	<i>Time horizon</i>
Budget-linked annual scorecard	Percentage of priority actions with baseline, target, responsible unit and committed budget	0-12 months
Marine-capacity plan	Filled specialized posts, trained staff and operational patrol or monitoring days	0-18 months
Integrated evidence register	Percentage of priority indicators updated on schedule and quality-controlled	0-18 months
Formal co-management platform	Percentage of agreed decisions assigned and completed by deadline	0-12 months
Risk-based marine surveillance	Coverage, verified incidents and response time	6-18 months
Multi-year financing strategy	Percentage of core costs covered by predictable finance	6-24 months
Institutionalized review	Quarterly dashboard, annual review and repeat IMET assessment	Annual; IMET in 3-5 years

From designation to performance. PNAH shows why designation and effectiveness must be assessed separately. Legal protection, SPAMI recognition and a management plan create legitimacy and an institutional basis for coordination. Their contribution is visible in the components positioned above the mean. Yet low inputs and outputs reveal a break between authority and delivery. This interpretation aligns with wider evidence that protected-area outcomes depend on staffing, finance, enforcement and fit between rules and local conditions (Edgar et al., 2014; Gill et al., 2017; Coad et al., 2019). The MPA Guide similarly separates stage of establishment, level of protection and enabling

conditions (Grorud-Colvert et al., 2021). This governance interpretation is also consistent with work emphasizing institutional diversity and good-governance principles in protected-area management (Lockwood, 2010 ; Jones et al., 2013).

Closing the planning–implementation gap requires more than a general call for resources. A capacity plan should connect each conservation target with a responsible unit, required skills, staff time, operating costs, equipment, partners and minimum monitoring effort. This would make the IMET result usable in annual budgeting and distinguish core statutory functions from complementary project-funded activities.

Building an evidence register. Future outcome ratings should be accompanied by an evidence register specifying the management objective, indicator definition, baseline, spatial unit, method, sampling frequency, data custodian, quality-control rule and management threshold. Ecological outcomes require repeated observations of priority habitats and species; governance outcomes require decisions, compliance records and implementation follow-up. IMET can identify whether such monitoring exists, but demonstrating ecological impact generally requires time series, counterfactual comparisons or carefully justified contribution analysis. This approach is consistent with established guidance on natural and social indicators for evaluating marine protected-area management effectiveness (Pomeroy et al., 2004).

IMET as an adaptive-governance instrument. A recurring diagnostic can align the management plan, annual work programme, budget, monitoring system and partnership agenda. Participation becomes adaptive governance only when it changes decisions and can be traced. The proposed platform should define which decisions are shared, how evidence enters deliberation, how conflicts are handled and how implementation is reported. A practical rhythm would combine quarterly operational dashboards, annual review of targets and budgets, and full reassessment every three to five years using stable definitions and a versioned evidence register.

Transferability. The central lesson is relevant to protected-area policy in Morocco and the Mediterranean: reporting hectares and legal categories should be complemented by reporting capacity, implementation and evidenced outcomes. Cross-site comparison would require common definitions, consistent facilitation and documented evidence. IMET should support learning and allocation, not become a league table detached from local context.

Limitations. IMET is a facilitated self-assessment and may be influenced by participant composition, institutional incentives and consensus dynamics. The available dataset did not contain a verified participant count, individual ratings or indicator-level data. The assessment is cross-sectional; component differences are descriptive and cannot establish causal pathways. Ecological outcome evidence was incomplete, and findings from one mixed protected area should not be generalized without comparable assessments. These limitations define appropriate use of the baseline rather than invalidating it.

Conclusions. The 2024 IMET assessment places Al Hoceima National Park between legal establishment and adaptive performance. Institutional identity, strategic planning and administrative processes are real assets, but they are not matched evenly across the management cycle. Inputs are the clearest weakness, outputs remain partial and the relatively high outcomes score is not yet supported by complete ecological evidence. The appropriate response is to use the component pattern to govern the next cycle: budget measurable priorities, build marine capacity, strengthen surveillance, formalize shared decisions, establish an evidence register, diversify finance and repeat the assessment under consistent rules. IMET can thereby transform designation from a legal endpoint into infrastructure for accountable learning.

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Author contributions. SK conceptualized the study, coordinated the assessment, assembled and curated the evidence, conducted the formal analysis, prepared the visualization, and wrote the original manuscript; CP, SL, PR and AL contributed to the IMET methodology, interpretation and validation and critically revised the manuscript; HB contributed to validation and interpretation and critically revised the manuscript; HCD supervised the study, contributed to the conceptualization and methodology, and critically revised the manuscript. All authors reviewed and approved the manuscript.

Conflict of Interest. The authors declare no competing interests.

Data availability. Aggregated component scores are reported in Table 1. The indicator-level IMET dataset is subject to authorization by the competent management authority and may be requested from the corresponding author for legitimate scientific review.

Ethics statement. The study reports institutional management information and aggregated consensus scores. No personal or sensitive participant data are included, and no experimental intervention involving humans or animals was conducted.

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