Accounting for Wildlife: Financing Zoos' Contributions to the SDGs 2025

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Abstract

Zoological institutions increasingly present themselves as engines of biodiversity conservation, climate action and public education, yet few explain—in financial terms—how their activities advance the United Nations Sustainable Development Goals (SDGs). This integrative review examines whether contemporary accounting tools can make zoo contributions to the SDGs transparent, comparable and investable. Searches of Scopus, Web of Science and Google Scholar identified 143 documents published between 2007 and 2024; 56 met inclusion criteria after relevance and quality filtering. Four recurring weaknesses emerge: fragmented sustainability reporting, reactive budgeting dominated by gate-receipt volatility, limited adoption of environmental-management accounting (EMA) and a pronounced skills gap between finance and conservation staff. Counter-examplessuch as Al Ain Zoo's GRI-aligned sustainability disclosure-demonstrate operational benefits ranging from lower utility costs to measurable gains in donor confidence. We synthesise the evidence into a five-step accounting framework that maps every expenditure to SDG targets, embeds EMA in daily operations, and mandates cross-disciplinary training. Rigorous accounting can transform zoos from well-intentioned stewards into data-driven partners in the global SDG agenda before 2030.

Keywords: biodiversity accounting, conservation finance, environmental-management accounting, SDG 2030, zoo sustainability reporting, ESG disclosure

Introduction

Global biodiversity is declining at a pace unrivalled in human history: the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services warns that one million species now face extinction, many within decades (IPBES 2019). Because healthy ecosystems regulate climate, secure food systems and buffer human health, the United

Nations embedded "Life on Land" (SDG 15) and "Climate Action" (SDG 13) at the core of the 2030 Agenda for Sustainable Development (United Nations 2015). Delivering those goals demands that conservation actors shift from ad-hoc, project-based interventions toward evidence-driven, financially sustainable programmes whose performance can be tracked year-over-year.

Zoological gardens, aquaria and wildlife parks—hereafter "zoos"—occupy a unique niche in that effort. Collectively, the world's accredited zoos welcome over 700 million visitors each year (Gusset & Dick 2011), a reach that eclipses the combined annual attendance of every top-flight football league on the planet. They channel this public attention into education, research and in-situ conservation, spending approximately USD 350 million annually on field projects (Gusset & Dick 2011; WAZA 2024). Surveys consistently show that the public trusts zoo messaging on biodiversity more than information from government or media sources (PGAV Destinations 2016; Knology 2024). Consequently, zoos are strategically positioned to advance SDG 4 (Quality Education) through visitor programmes, SDG 12 (Responsible Consumption and Production) through procurement reforms, and SDGs 13 and 15 through direct conservation finance (Moss, Jensen & Gusset 2015).

1.1 The Financial Fragility of Conservation Ambition

Despite this potential, the sector's economic foundation is fragile. Gate receipts provide 60–80 % of operating income for many institutions (Association of Zoos and Aquariums 2023). When the COVID-19 pandemic forced prolonged closures, revenues in North America and Europe fell by 20–50 %, precipitating furloughs, cancelled research projects, and deferred habitat upgrades (Axios 2020; AZA 2023). These shocks revealed a structural over-reliance on ticket sales and the absence of reserve funds earmarked for long-term conservation obligations. Even in more stable years, tight margins often compel managers to prioritize immediate animal-care costs over field-project commitments, undermining claims of sustainable impact (Emerton 2017).

More fundamentally, most zoos lack integrated information systems that trace how each dollar raised translates into measurable biodiversity outcomes. Sustainability reports—where they exist—tend to highlight visitor numbers or anecdotal success stories ("number of keeper talks") but seldom express metrics such as "cost per successful species reintroduction" or link expenditures to specific SDG targets (WAZA 2024). This opacity hinders donor scrutiny,

complicates cross-institutional benchmarking, and weakens the sector's collective bargaining power when seeking public or philanthropic funds.

1.2 Why Accounting Matters

The accounting literature offers both diagnostic insight and practical tools for closing this transparency gap. Environmental-management accounting (EMA) expands conventional ledgers to include physical resource flows-energy, water, raw materials-teaching organizations ecological financial to see impacts in terms (IFAC 2021). Sustainability-reporting frameworks such as the Global Reporting Initiative (GRI 2021) and integrated reporting require organizations to present environmental, social, and governance (ESG) data alongside audited financials. In the corporate world, such transparency lowers capital costs and strengthens investor confidence (Burritt & Schaltegger, 2010). For nonprofits, robust accounting improves governance and aligns spending with mission priorities (Anthony & Young, 2003).

Yet uptake among zoos remains piecemeal. A 2022 desktop scan found that fewer than 15 % of WAZA-affiliated institutions publish GRI-aligned disclosures (WAZA 2024). One of the few positive outliers, Al Ain Zoo in the United Arab Emirates, reports utility use, greenhouse-gas emissions, and conservation grants in a single GRI-compliant document (Al Ain Zoo 2024). Early evidence suggests that such transparency correlates with increased restricted donations and lower operating costs, but systematic analysis is sparse.

1.3 The Human-Capital Constraint

Financial tools alone are insufficient if the people who must use them lack relevant skills. Studies of nonprofit governance show that conservation professionals often feel unprepared to interpret balance sheets, while finance staff rarely understand biodiversity metrics (Christensen & Ebrahim, 2006). In zoos this cultural divide manifests as parallel silos: curators set conservation priorities without robust cost data, and accountants compile budgets without ecological context (Milne & Gray 2013). Bridging this divide is critical because integrated teams can identify low-hanging efficiency gainse.g., energy retrofits with <3-year payback—freeing funds for field conservation.

1.4 Research Questions and Review Scope

Taken together, these observations expose a paradox: zoos command vast public goodwill and increasingly ambitious conservation agendas, yet the financial scaffolding needed to

prove and scale their impact lags a decade behind best practice in sustainability accounting. Addressing this paradox requires answers to three inter-related questions:

- Adoption: To what extent have zoological institutions implemented modern sustainability-accounting tools such as EMA and GRI reporting?
- Effectiveness: How do existing budgeting and disclosure practices enable—or hinder—the delivery of SDG-aligned conservation outcomes?
- **Path Forward:** What accounting framework could render zoo contributions to the SDGs transparent, comparable, and investable across diverse geographic and financial contexts?

To answer these questions, we conducted an integrative review of peer-reviewed studies, professional guidelines, and grey literature published between 2007 and 2024. By synthesizing 56 qualified sources, we identify recurring weaknesses—fragmented reporting, revenue volatility, underutilization of EMA, and a pronounced skills gap—alongside emerging success stories. We then distill a five-step accounting framework tailored to the operational realities of zoos and aquaria.

By repositioning accounting as a strategic conservation tool rather than a compliance afterthought, this review aims to equip zoo leaders, policymakers, and donors with a roadmap for converting mission statements into auditable, SDG-driven impactbefore the 2030 deadline closes the window for decisive biodiversity action.

Literature Review

2.1 From Menagerie to Mission-Driven Institution

The modern zoo has travelled far from its Victorian origins as a curiosities menagerie. Content analysis of 217 mission statements revealed that education (87%) and conservation (82%) now dwarf entertainment (24%) as declared institutional purposes (Patrick et al. 2007). Parallel visitor-attitude research confirms the shift: guests increasingly judge zoos by their conservation credibility rather than exhibit novelty (Moss, Jensen & Gusset, 2015). Yet rhetoric outpaces practice. Patrick et al. (2007) also found that fewer than half of the sampled zoos articulated quantitative conservation targets, foreshadowing the measurement gap that still characterizes the sector.

2.2 Accounting Evolutions Relevant to Zoos

2.2.1 Triple-Bottom-Line and Integrated Reporting

Elkington's triple bottom line (TBL) concept first codified the principle that organizations must account simultaneously for people, planet, and profit (Elkington 1997). Building on that logic, the Global Reporting Initiative (GRI 2021) and the International Integrated Reporting Council'sFramework provide disclosure templates now trusted by investors, regulators, and NGOs. Meta-analysis shows that corporations adopting these standards enjoy lower capital costs and stronger stakeholder trust (Burritt & Schaltegger , 2010). Yet uptake among zoos remains low: a 2022 survey found that only 52 of 370 WAZA members produced any ESG-style report, and <15 % mapped disclosures to SDG targets (WAZA 2024).

2.2.2 Environmental-Management Accounting (EMA)

EMA expands conventional ledgers to track physical flows of energy, water, and materials, translating ecological externalities into financial terms (IFAC 2021). Manufacturing case studies show EMA regularly uncovers hidden resource costs equal to 3–8% of turnover, freeing cash for sustainability projects (Schaltegger et al. 2020). In zoos, utilities often consume >25% of non-salary operating expenses (Norton & Lovell 2012), suggesting considerable savings potential. Despite this, a recent European Association of Zoos and Aquaria survey reported EMA adoption at barely one-quarter of participating institutions (EAZA 2023).

2.3 Accounting and Governance in Non-profit Conservation

Mission-driven organizations must integrate management-control systems or risk drift (Anthony & Young 2003). In a study of 130 NGOs, Christensen & Ebrahim (2006) linked donor retention directly to financial transparency, with organizations able to demonstrate social return on investment securing 27% more multi-year funding. In conservation, Milne & Gray (2013) advocate hybrid models that pair financial accounts with ecological indicators such as species population trends or habitat hectares restored. Bebbington & Larrinaga (2014) extend the idea, calling for biodiversity metrics to be embedded in audited statements rather than relegated to side reports.

2.4 Conservation Finance and Funding Volatility

Zoos fund conservation primarily through three channels: gate receipts, philanthropy, and government grants (Emerton 2017). Revenue concentration in admissions renders budgets vulnerable; pandemic closures slashed visitor income by up to 50% across North America and Europe (Association of Zoos and Aquariums 2023), forcing program cuts and staff furloughs (Axios 2020). Conservation-finance scholars propose diversification via

endowment funds, social-impact bonds, and payments for ecosystem services (Parker et al. 2012; Emerton 2017). All such instruments, however, demand robust investor-grade reporting—again spotlighting the accounting capability gap.

2.5 Empirical Assessments of Zoological Accounting Practice

Published empirical work remains thin. Norton & Lovell (2012), studying five UK zoos, found accounting systems focused almost exclusively on ticket revenue and payroll, with conservation grants tracked in off-ledger spreadsheets. Gusset & Dick (2011) estimated global zoo conservation spending at USD 350 million yet noted "remarkable opacity" in cost attribution. Tilt (2018), interviewing 22 Australian zoo executives, identified cultural resistance as the chief barrier to adopting sustainability accounting: biology staff perceived finance metrics as distractions, while accountants were unfamiliar with ecological data. A rare success story comes from Al Ain Zoo, whose GRI-aligned report links each dirham spent to outcomes such as Arabian oryx releases and SDG 15 indicators; the zoo credits the report with attracting an AED 30 million restricted conservation grant (Al Ain Zoo 2024).

2.6 Synthesis and Gap Identification

The reviewed literature converges on three insights. First, mission evolution outstrips measurement evolution: zoos proclaim conservation leadership yet seldom quantify cost-to-impact relationships. Second, proven accounting frameworks exist—TBL, GRI, EMA—but adoption in zoological settings is minimal. Third, funding volatility exposes the cost of opacity: without credible financial-impact data, zoos struggle to cushion shocks or attract innovative capital. Scholars call for integrated systems blending financial and ecological metrics (Milne & Gray 2013; Bebbington & Larrinaga 2014), yet offer limited operational guidance tailored to live-animal institutions.

This review, therefore, positions accounting as the missing infrastructure for scaling zoo conservation impact. The following sections analyze current practice more deeply and advance a sector-specific framework designed to

- Standardized sustainability reporting,
- Embed EMA for resource efficiency, and
- Build cross-disciplinary literacy that aligns finance and biodiversity objectives.

3 | Conceptual Framework

3.1 Grafting Conservation Logic onto the Triple Bottom Line

Conservation projects are often planned with a simple input \rightarrow activities \rightarrow outputs \rightarrow outcomes chain (Margoluis & Salafsky, 1998). We overlay that chain with Elkington's triple bottom line (TBL):people, planet, and profit, to ensure that every financial decision a zoo makes is evaluated for ecological and social as well as monetary return (Elkington 1997). In practice:

Logic-model stage	TBL lens	Typical zoo data points
Inputs	Profit + Planet	Ticket sales, grants, endowment income, energy (kWh), water (m ³), live-animal collections
Activities	People + Planet + Profit	Animal husbandry, visitor education, vet research, field-project transfers
Outputs	Planet + People	Individuals bred, students taught, hectares of habitat restored
Outcomes	SDG targets	 ↑ wild-population indices (SDG 15.5), ↑ environmental literacy scores (SDG 4.7)

3.2 Accounting as the Translational Layer

Traditional ledgers capture only monetary inputs; they do not show how a kilowatt-hour saved, or a conservation grant spent, progresses the SDGs (EAZA 2023). Two accounting mechanisms, therefore, bridge each step of the chain:

- Environmental-Management Accounting (EMA) tracks physical flows of energy, water, and waste, then assigns them monetary values, exposing hidden ecological costs (IFAC 2021). Manufacturing case studies report efficiency gains worth 3–8 % of turnover once EMA data are fed into decision-making (Schaltegger, Friese & Kübelböck 2020).
- **SDG-mapped ledger codes** every transaction in the general ledger receives a tag linked to one or more SDG targets, a practice encouraged by the GRI 2021 Universal Standards and its forthcoming biodiversity sector supplement (GRI 2021). Tagging allows real-time dashboards that trace dollars to conservation or education metrics.

3.3 Feedback Loops for Mission-Aligned Control

- **Operational loop:** Quarterly EMA reports flag resource "hotspots" (e.g., unusually high-water use in reptile houses), prompting retrofits whose payback periods and carbon savings are calculated within the same financial system.
- Strategic loop: Annual integrated reports aggregate SDG-tagged expenditures to produce cost-impact ratios, for example, "USD 1.8 million delivered a 12 % increase in partner-site orangutan populations." Boards and donors can then redirect resources toward the highest-value programs, echoing Anthony & Young's (2003) argument that mission alignment requires hard numbers.

3.4 Enablers and Boundary Conditions

The framework presumes:

- **Robust data capture** at least 90 % of direct costs and resource flows are recorded in the accounting system.
- **Outcome verification** partner NGOs supply population or habitat data within acceptable lags.
- **Cross-disciplinary literacy** finance staff learn biodiversity basics and curators learn budgeting; a need emphasized by Tilt (2018).

Where these conditions hold, as at Al Ain Zoo, whose GRI-aligned report links Emirati dirham spent to Arabian-oryx releases (Al Ain Zoo 2024), mission rhetoric becomes auditable, investor-grade evidence. Where they do not, the framework pinpoints which capacities, data quality, software integration, or staff skillsmust be strengthened before SDG claims are credible.

Methodology

4.1 Review Design

We carried out an integrative literature review, a method selected for its ability to combine empirical studies, professional guidelines, and grey literature in one analytic narrative (Whittemore & Knafl, 2005; Torraco, 2016). The protocol followed the PRISMA 2020 reporting checklist to ensure transparency in search, screening, and synthesis (Page et al. 2021).

4.2 Search Strategy

Between January and March 2024, we searched Scopus, Web of Science, Google Scholar, and ProQuest Dissertations using the Boolean string:

(zoo OR aquarium OR "wildlife park") AND (accounting OR "financial

report" OR "environmental management accounting" OR EMA OR "sustainability report" OR GRI) AND (biodiversity OR conservation OR SDG* OR "sustainable development goal")

Reference lists of retrieved papers and key portals, WAZA, AZA, EAZA, and IFAC, were hand-searched to capture grey documents.

4.3 Inclusion and Exclusion Criteria

A record is qualified if it:

- Was published 2007 2024 (capturing the post-GRI growth period);
- Was in the English-language.
- Discussed accounting, finance, or formal reporting in a zoological or wildlife-conservation context.
- Linked that discussion to at least one SDG-relevant theme (education, climate, biodiversity, resource use).

We excluded editorial opinion pieces without data, articles focused solely on veterinary economics, and conference abstracts lacking full text.

4.4 Screening and Coding Procedure

The search produced 143 unique records. Two reviewers double-screened titles and abstracts; disagreements were resolved by discussion. Fifty-six documents met all criteria and advanced to full-text analysis.

Full texts were imported into NVivo 14. We applied deductive codes reflecting the conceptual framework (e.g., "EMA adoption", "GRI reporting", "SDG mapping") alongside inductive codes for emergent themes. Inter-coder reliability on a 20 % sample yielded Cohen's $\kappa = 0.78$, indicating substantial agreement (McHugh 2012). Coded data were matrices to link accounting practices with reported conservation outcomes or organizational impacts.

4.5 Data Synthesis and Quality Appraisal

Documents were stratified by type: peer-reviewed empirical study (n = 21), professional guideline (n = 15), and institutional report (n = 20)—and appraised for methodological rigor using a simplified tool adapted from the Joanna Briggs Institute checklist. Scores below 4/10 triggered sensitivity analysis; excluding those records did not materially change thematic conclusions. Quantitative results (e.g., percentage revenue drops, cost-saving estimates) were standardized to 2023 USD for comparability. Qualitative evidence was synthesized

narratively and cross-tabulated against the four recurrent weaknesses that emerge in Section 5.

4.6 Validity and Limitations

We strengthened validity by searching multiple databases, employing dual screening and coding with kappa verification, including grey literature to mitigate publication bias, and triangulating across document types. Limitations include restricting the review to English-language sources and relying on publicly available reports, which may under-represent institutions without formal disclosure cultures. Findings should therefore be interpreted as conservative estimates of accounting practice across the global zoo community. **Findings**

5.1 Sustainability Reporting: A Landscape Still Dominated by Narratives

Only 52 of 370 WAZA-member institutions produced any sustainability report in 2022 (WAZA 2024). Fewer than 15 percent linked disclosures to GRI indicators or SDG targets, echoing Norton & Lovell's (2012) earlier observation that "storytelling eclipses accounting" in most zoo publications. Where reports do exist, they favor qualitative highlights—"first successful panda birth," "community clean-up events" over audited metrics. Al Ain Zoo represents a rare outlier: its GRI-aligned report converts energy, water, and waste flows into CO₂-equivalent figures and ties each conservation grant to either SDG 15 (Life on Land) or SDG 13 (Climate Action) (Al Ain Zoo 2024). The document states that transparent metrics helped secure an AED 30 million restricted pledge from the Abu Dhabi Environment Agency, suggesting a direct funding benefit.

5.2 Budget Volatility and the Gate-Receipt Dependence

Financial statements from 18 AZA-accredited North-American zoos show admissions revenue covering 63 ± 11 % (mean \pm SD) of operating costs in 2018–2019 (AZA 2023). When pandemic closures hit, monthly receipts plunged by 20–50 percent, forcing nine institutions to furlough animal-care staff and six to suspend field-project payments (Axios 2020). European data are similar: EAZA (2023) reports a 39 percent median revenue drop in 2020, with only 12 percent of members holding conservation endowments big enough to buffer the shock. These numbers validate Emerton's (2017) argument that over-reliance on single-stream income undermines long-term biodiversity commitments.

5.3 Environmental-Management Accounting: Proof of Concept but Limited Diffusion EMA pilots at Chester Zoo (UK) and Burgers' Zoo (NL) tracked electricity, gas, and water at

exhibit level for 24 months (Schaltegger, Friese & Kübelböck 2020). Retrofit actions—LED lighting, heat-recovery ventilation, grey-water recycling, cut utility bills by 14–18 percent, and yielded payback periods under three years. Both institutions redirected a fixed fraction of the savings (average EUR 210,000 yr¹) into field-conservation grants, illustrating Gray's (2010) thesis that eco-efficiency can finance biodiversity protection. Despite these successes, an EAZA member survey found EMA uptake at just 23 percent in 2022 (EAZA 2023), citing a lack of staff skills and software integration costs.

5.4 Cross-Disciplinary Literacy Gap

Across the 56 documents reviewed, 17 reported formal surveys or interviews with staff (Christensen & Ebrahim, 2006; Tilt, 2018). Collectively, they paint a consistent picture:

- 58 percent of curators lacked confidence reading a cash-flow statement.
- 74 percent of finance officers could not explain IUCN threat categories.
- Inter-departmental budget meetings were often "token" or "rare" (Tilt 2018).

This skills asymmetry reinforces Anthony & Young's (2003) contention that mission drift follows when operational staff and accountants speak different languages. Al Ain Zoo's leadership tackled the gap by pairing a financial analyst with each conservation officer during the GRI roll-out; exit interviews reported a 38-percent rise in staff self-assessed literacy across both domains (Al Ain Zoo 2024).

Discussion

The evidence confirms that conservation rhetoric has outpaced measurement practice. Patrick et al. (2007) noted this gap almost two decades ago, and it persists: few zoos can show a documented trail from dollars spent to SDG progress achieved. Low uptake of GRI reporting and EMA means that expenditures remain siloed from ecological outcomes, making it hard for donors, regulators, or boards to judge value for money. Cultural factors compound the lag.Curators worry that "bean counting" might override welfare needs; accountants view biodiversity metrics as soft or subjective (Tilt 2018). In the absence of shared key-performance indicators, institutions default to what is easiest to count, visitor numbers and new births, rather than what matters most for sustainable development.

Yet the minority of zoos that integrate accounting with conservation strategy illustrate the upside. Al Ain Zoo and the two European pilots demonstrate three consistent advantages.

• First, transparent reports boost donor confidence, attracting restricted multi-year grants that are shielded from downturns.

- Second, EMA uncovers quick efficiency wins that finance new field projects without raising ticket prices.
- Third, data-driven governance allows boards to allocate resources by cost-impact ratios rather than tradition or anecdote, fulfilling Anthony & Young's (2003) vision of mission-aligned control.

Barriers cluster into skills, systems, and mindset. The skills problem is solvable through targeted cross-training; Chester Zoo reports that a one-week workshop raised staff self-rated literacy in both finance and biodiversity by more than thirty percent. System barriers—legacy software that cannot store EMA or SDG tags, requires modest investment; Chester's half conversion cost under of of annual one percent turnover (Schaltegger, Friese & Kübelböck 2020). Mindset is the hardest nut: leadership must frame accounting not as bureaucratic overhead but as conservation infrastructure. External incentives could help; accrediting bodies now require rigorous safety audits, and they could apply the same logic to sustainability disclosure.

A Five-Step Accounting Framework for SDG-Ready Zoos

A practical roadmap emerges from the review.

- **First**, adopt the GRI 2021 Universal Standardsand the biodiversity sector supplement when final, so every zoo speaks the same disclosure language.
- Second, modify the enterprise-resource-planning system so every transaction carries an SDG tag: concessions under SDG 12, solar-panel installs under SDG 13, field-project transfers under SDG 15. This tagging turns static ledgers into live dashboards.
- **Third**, embed EMA: meter energy, water, and waste at exhibit level, translate flows into costs, and integrate them into monthly accounts (IFAC 2021).
- Fourth, ring-fence at least half of all efficiency savings for external conservation grants, following the Chester and Burgers template; this keeps staff motivated and donors informed about reinvestment.
- **Fifth**, run annual cross-training, "Finance for Conservation" for curators, "Biodiversity 101" for finance officers, and tie a slice of manager bonuses to published SDG metrics (Tilt 2018; Al Ain Zoo 2024).

Collectively, these steps operationalize Elkington's (1997) triple-bottom-line vision and Gray's (2010) call for full sustainability accounting, turning aspirational mission statements into verifiable progress before the 2030 deadline.

Implications for Practice and Policy

8.1 For Zoo Executives and Boards

Integrated accounting offers a management tool, not merely a compliance burden. Real-time dashboards that link every outlay to an SDG code allow boards to see which programs deliver the highest ecological return per dollar. That clarity supports strategic decisions such as retiring an energy-intensive exhibit to fund an off-site habitat corridor, moves that previously relied on intuition. Early adopters report that donors respond to such precision with larger, multi-year gifts because restricted funds can be audited against published metrics (Al Ain Zoo 2024).

8.2 For Donors and Impact Investors

Philanthropic foundations increasingly demand evidence of social return on investment (Christensen & Ebrahim, 2006). GRI-aligned reports and EMA data satisfy that requirement, positioning zoos to compete with other sustainability ventures for green bonds or blended-finance instruments (Parker et al. 2012). Impact investors also gain a tangible metric, cost per species reintroduction, for example, on which to base funding decisions.

8.3 For Accrediting Bodies and Regulators

Accreditation criteria already cover welfare, safety, and education. Adding a requirement for transparent, SDG-mapped accounting would nudge lagging institutions without the friction of new legislation. Regulators could reinforce the signal by tying public subsidies or tax concessions to the publication of an integrated report that meets minimum disclosure thresholds (Burritt & Schaltegger, 2010).

Limitations and Future Research

This review analyzed English-language sources and publicly available documents, so practices in regions where disclosure is uncommon or not published in English may be under-represented. Because the five-step framework is derived from secondary evidence, its cost–benefit ratio has yet to be tested across multiple organizational contexts. Longitudinal trials, matching zoos that adopt the framework with control institutions, could quantify real-world impacts on donor behavior, operating costs, and biodiversity outcomes. Researchers might also explore how accounting integration affects internal culture: do cross-

trained teams innovate faster, or does added reporting create burnout? Finally, future work should evaluate whether the model scales to aquaria, wildlife-rescue centers, and in-situ conservation NGOs, sectors that share many of the same funding and transparency challenges (Milne & Gray 2013).

Conclusion

The pathway from the exhibition park to a credible conservation actor runs through the accounting department. Without auditable links between money spent and biodiversity gained, zoos risk eroding public trust and forgoing the capital needed to scale their impact. The literature shows that tools already exist, GRI standards, EMA, SDG tagging, and pilots prove they work in practice, yielding efficiency savings and larger restricted grants. The five-step framework offered here translates that evidence into a practical roadmap any medium-sized zoo can follow at modest cost. Implementing it will not only satisfy donors and regulators; it will let zoos demonstrate, in black-and-white financial terms, how they help the world meet the 2030 Sustainable Development Goals. In a decade that may decide the fate of thousands of species, that level of accountability is not optional, it is existential.

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