Application of a Novel, Mega-event Environmental Impact Assessment Critique Framework: The 34th America's Cup Races Case Study

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Abstract

Environmental impact assessments have a primary goal of balancing anthropogenic development with environmental protection. While critique methodologies for standard impact assessments are well-established, existing frameworks often fall short in addressing the unique challenges posed by large-scale, temporary events. Thus, this report introduces a novel framework designed for critiquing environmental impact assessments specific to mega-events on their use of science and analysis, adaptation to location and event specific impacts, attention to legacy impacts, and thoroughness of mitigation actions. The 34th Americas Cup Environmental Impact Assessment is then used as a case study to demonstrate the framework's applicability.

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Introduction

Environmental Impact Assessments

Environmental Impact Assessments (EIAs) are used to assess, and in turn mitigate, impacts proposed projects may inflict upon an environment. Since their conception, governments of over 100 nations globally have adopted legal requirements and standards for EIAs as a method of scrutinising the development of projects to reduce their negative environmental impacts (El-Fadl *et al.* 2004). Within existing literature, there is ongoing debate over defining the effectiveness of an EIA. For the purposes of this paper, effectiveness refers to how well an EIA functions in achieving a primary goal of environmental stewardship (Caro-Gonzalez *et al.* 2023).

34th America's Cup

In 2010, San Francisco was selected to host the 34th America's Cup (AC34). While the San Francisco Bay has been developed into one of the largest economic gateways to the US, ideal for hosting such a large-scale event. It is also home to a diverse marine ecosystem (National Parks Service *et al.* 2012). The America's Cup can provide host cities with a range of economic benefits through race sponsors, domestic and international tourism, and global media exposure, however, the increased anthropogenic event activity and temporary infrastructure required to host hundreds of thousands of visitors can present severe negative impacts on marine ecosystems (Kahane 2021; National Parks Service *et al.* 2012). Following the initial event proposal, federal government agencies have produced a 'mega-event EIA' to help balance human use with environmental protection. The present study introduces a novel framework to critique mega-event EIAs on their performance and will use the AC34 EIA as a case study for its application.

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Methods

Mega-event projects are unique in their temporary nature. Event EIAs are often less robust, only considering impacts occurring directly during or leading up to an event, and failing to address event specific activities (Toniolo *et al.* 2017). Additionally, mega-events often rotate to multiple parts of the world, where EIA standards differ (Pölönen *et al.* 2019). A generalised mega-event EIA critique framework is therefore not readily available. The novel framework presented in this study has been developed by collating and adapting previously used frameworks and implementing new critique components.

Results and Discussion

Framework Components

To create a framework that can be applied to different mega-event EIAs, five primary components have been proposed to reflect the necessary aspects of a successful EIA (Table 1). A set of criteria is linked to each component to aid in the assignment of a performance score. The components, criteria, and scoring system have been developed through the consultation of various mega-event EIAs (e.g., AC34, AC36 and London Olympics) as well as an established body of non-event EIA-critique literature to determine the most important components to be added to the framework.

Component A: 'Science and Analysis' assesses the quality and scope of information incorporation, analysis of impacts, and mitigations in an EIA. This component is based on a previously established generalised framework (Emerson *et al.* 2022). Regardless of the specific project for which an EIA is developed, the use of robust scientific data as well as both expert and local consultation is essential to ensuring effective impact management (Singh *et al.* 2020). This component is directly applicable to mega-event EIAs and is therefore incorporated into the current critique system.

Component B: 'Adaptation to Event Location' addresses the challenge of critiquing event EIAs due to the transient nature of mega-events. An event-specific framework must consider both unique local legislation and ecosystems in different locations which may impact their overall performance (Retief *et al.* 2025). Further, local government regulations may inhibit an EIAs performance. In the context of the AC34, event activities spanned across numerous federal organisations and privately owned areas. Federally mandated action was therefore limited to certain areas (National Parks Service *et al.* 2012). By emphasising location-specific factors, this component ensures that an EIA effectively addresses the unique challenges posed by the local environment, ensuring that the event's environmental footprint is properly managed within the context of the legal and ecological system of the host city.

Component C: 'Adaptation to Unique Event Activities' looks to approach the challenges posed by event-specific activities, which differ significantly from those of a typical EIA due to their temporary and specific nature. Existing literature has shown that the specificities of event activities need to be considered within an EIA to accurately predict and mitigate the potential environmental impacts (Toniolo *et al.* 2017). For example, the AC34 resulted in both generalised event impacts, such as spectator infrastructure, in addition to much more specific impacts, such as increased recreational and commercial boat traffic. Targeted mitigation approaches for specific activities are therefore required (National Parks Service *et al.* 2012). Temporary developments, such as the construction of spectator infrastructure, are common for events, but have not been previously considered in standard EIA critiques (Núñez *et al.* 2009). This component has been developed to address these event-specific, often temporary, developments to ensure that the EIA effectively captures and mitigates the diverse range of impacts unique to mega-events.

Component D: 'Attention to Legacy Impacts' evaluates the ability of an event EIA to address the long-term, post-event impacts. This component builds on a previously proposed EIA methodology, which was used for the London Olympics, to highlight significant environmental impacts that can occur during the 'legacy phase' of an event (Parkes *et al.* 2016). While an event may only last for weeks, legacy impacts can span decades after an event ends. Literature has established the importance of scrutinising the legacy phase for social and economic effects, but a more developed framework is needed to adequately critique the environmental consequences (Collins *et al.* 2009). This component and its associated criteria have been tailored to critique the comprehensiveness of environmental considerations throughout the full life cycle of an event.

Component E: 'Thoroughness of Mitigation Actions' is based on an established critique framework, and evaluates how effectively an EIA achieves its primary goal of preventing and reducing environmental

Framework Component	Associated Criteria
A. Science and Analysis (30%)	A.1 Incorporation of credible, existing knowledge: Does the EIA use scientific literature and previous research to support claims? Is the information from a reputable source?
	A.2 Incorporation of local knowledge: Does the EIA incorporate a public consultation process? How well are local and traditional knowledge perspectives considered in the identification of impacts and proposal of mitigations?
	A.3 Consideration of knowledge gaps: Does the EIA highlight any knowledge gaps in the impact identification process (i.e., lack of information on species behaviour that may put them at risk)? Does the EIA attempt to close such gaps?
	A.4 Use of robust methods: If an EIA attempts to close gaps, or collect further information to support claims are the methods used robust and backed by scientific literature?
B. Adaptation to Event Assessment Location (10%)	B.1 Consideration of location-specific vulnerabilities: Does the EIA address unique sensitive ecosystems, specific species, or critical habitats which may be susceptible to event-related activities (e.g. identifying endangered species that may require further mitigation action to reduce impacts)?
	B.2 Integration of local regulatory frameworks: Does the EIA consider local regulatory constraints in the mitigation of impacts (e.g., acknowledging specific boundary of jurisdiction). The assessor should also consider how the local regulatory system may impact the quality of an EIA. While all assessments should be held to a high standard it is important to acknowledge some governments may limit funding to environmental management and protection.
C. Adaptation to Unique Event Activities (10%)	C.1 Assessment of temporary infrastructure: Does the EIA consider the lifespan of temporary construction projects? Is the decommissioning and post-event process for event venues addressed and considered?
	C.2 Evaluation of event-specific activities: Does the EIA address event-unique activities? Beyond development processes, what further impacts may a mega-event pose on an environment (e.g., large crowd, increased traffic, loud noise disturbances, light pollution).
D. Attention to Legacy Impacts (20%)	D.1 Consideration of long-term, post-event impacts: Does the EIA define a 'legacy period' after the event ends? Does the EIA address what impacts may occur during this period? Does the EIA consider impacts that will occur during the event that may have long-term effects on the environment (e.g., emissions)?
	D.2 Incorporation of a post-event monitoring strategy: Does the EIA include a comprehensive monitoring strategy for the 'legacy phase' of an event? Is the strategy comprehensive, yet feasible, is funding considered?
E. Thoroughness of Mitigation Actions (30%)	E.1 Clear geographic scope of mitigation actions: Does the EIA define the exact geographical location of proposed mitigation actions. Do they only occur within the primary 'footprint' of an event, or do they support spillover benefits?
	E.2 Clear temporal scope of mitigation actions: Does the EIA define how long mitigation actions will occur? Are they primarily focussed on impacts during an event, or will they last into an event 'legacy phase'?
	E.3 Specific actions towards vulnerable species/habitats: Do mitigation actions target specific vulnerabilities? To what extent are mitigations generalised (e.g., ecosystem level, habitat level, species level)?
	E.4 Consideration of mitigation feasibility: Does the EIA provide specific actions for the mitigation process? Are funding estimates provided, are specific organisations highlighted to undertake certain actions?

Score	Description
5 - Exceptional	Significant and thoughtful consideration has been put into framework criteria. The EIA goes beyond 'checking boxes' and works to better environmental management and protection.
4 - Good	Criteria are all considered to a greater extent, but further information could be elaborated upon to provide depth to the report.
3 - Average	This represents the baseline for EIA performance, all criteria are mentioned and considered. Enough detail is present for the assessor to understand the EIA has made a clear attempt to address this component.
2 - Poor	Criteria is mentioned, but are overall lacking, undeveloped, or not considered to a significant degree. Limited information has been provided.
1 - Unacceptable	The criteria are not present in the EIA.

Table 1: Five components labelled A-E make up the proposed critique framework. Each component has been broken down into supporting associated criteria to aid in the assessment process. Each component has been weighted and is aggregated to produce a final performance score.

impacts through mitigation (Nisbet *et al.* 2022). All EIAs must be assessed on their ability to protect the environment while balancing sustainable use (Alberts *et al.* 2021). Therefore, this component has been modified and the criteria adapted to specifically address the uniqueness of event-based EIAs.

Calculating a Score

Previous EIA critiques have proposed letter systems in which each framework component is equally considered when assigning a performance grade (Nisbet *et al.* 2022). While these systems have shown some success, they are limited by precision and broader grade bounds which fail to capture subtle variations in performance. The current framework employs a quantitative system, one through five, where 'one' represents an unacceptable standard and 'five' represents an exceptional standard of EIA effectiveness (Table 1). The classification boundaries have been based off previously assessed EIAs and corresponding frameworks (Barker *et al.* 2013; Loomis *et al.* 2018; Veronez *et al.* 2024).

To determine an overall EIA performance score, each of the criteria will be individually assessed using this numerical system. The score will be based on the presence of the criteria within the EIA and the extent to which it has been adequately addressed. The criteria and score requirements have been further described in detail in Table 1 to create a robust, replicable system to minimise assessor interpretation bias and variation. The integration of weighted scoring indices, in addition to the use of multiple assessors (e.g., event organisation committees), has been highlighted as a further method to reduce subjectivity (Chang *et al.* 2013). The individual criteria scores are then averaged to give each component a score. The component scores are then aggregated according to their respective weighting to produce an overall EIA performance rating. Component weightings have been determined based on consultation with the EIAs and established frameworks stated previously.

Framework Application: AC34 Case Study

Based on each component score and respective weighting, the AC34 EIA achieved an overall rating of 3.2. The component breakdown is as follows:

- Component A: 3
- Component B: 4
- Component C: 3
- Component D: 2
- Component E: 4

This rating demonstrates the present EIA is only slightly above an average performance, and highlights multiple, specific, EIA aspects for improvement.

For Component A the AC34 does use credible, existing knowledge and makes effort to address knowledge gaps, however, there is a distinct lack of local knowledge incorporation. In contrast, the 36th AC in New Zealand achieved a 5 in this criterion. The EIA incorporates Māori culture and knowledge throughout the wider event plan to ensure awareness and proper action would be taken to protect sensitive areas (Fresh Info New Zealand 2021). The AC34 received the lowest score in Component D due the absence of a post-event monitoring strategy. Conversely, the 2012 London Olympics developed a Legacy Master Plan Framework, outlining environmental quality monitoring procedures to provide lasting benefits, giving an example of a well-developed monitoring strategy that successfully achieved its set sustainability goals (Gold *et al.* 2015; Greater London Authority 2012).

While the current framework makes effort to acknowledge and reduce variation in assessor interpretation, future work could seek to eliminate this by employing qualitative data analysis software (e.g., NVivo). This method could provide quantitative data on the percentage coverage of a framework component within an EIA to support performance scoring. This framework could be further applied to past and future event EIAs to enhance standardisation and prove both its replicability and value as a method for maintaining a high standard of EIA effectiveness and environmental management. The framework presented in this study could be adopted for broader use, offering a standardised approach to assessing and improving mega-event EIAs across various industries and regions, leading to greater accountability in environmental management practices.

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