Wedding Venue Sustainability

Reducing the Environmental Impacts of Weddings Through the Creation of an Eco-Wedding Association and Venue Sustainability Certification

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Summary

As weddings continue to evolve into more elaborate and extravagant events, the resulting environmental impacts increase as well. The goal of this thesis project is to help wedding venues become more sustainable by developing requirements for a certification administered by an eco-wedding association. After identifying the key areas of impact for wedding venues, the final outcome is a checklist of relevant criteria venues need to meet in order to receive one of three levels of venue sustainability certification and join the eco-wedding association. The combination of the certification and association closes the sustainability gap in modern US weddings, increasing awareness around the social, economic, and environmental benefits gained through this industry transformation.

“The great time we had today can leave an aftermath of problems for tomorrow.”

- ISO 20121 Product Guide[1]

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Introduction

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INFLUENCE OF CONSUMERISM ON WEDDINGS

Recognized as one of the most special and momentous days in a couple's life together, weddings include a great deal of celebration and traditions. It is often an event where little expense is spared as family and friends gather to commemorate the couple's commitment.

The US wedding industry expanded significantly over the past few decades, following national trends of increased consumerism. In 2016, the average wedding cost hit a new high at over $35,000 per event in contrast to $15,000 in 1990[2], despite the average number of guests decreasing to 141 individuals[3].

ENVIRONMENTAL IMPACT OF WEDDINGS

Weddings in the United States pose significant sustainability challenges. A typical wedding produces CO_2 emissions equivalent to the emissions of four individuals for a full year[4]. With over two million weddings annually in the US[5], environmental impacts add up quickly. Couples who live more sustainably on a daily basis may abandon those practices as they inherit customs passed down by older generations and align with current societal trends.

The wedding industry has an important opportunity to:

- **improve and redesign mainstream operations to reduce the environmental impacts generated throughout the planning, execution, and clean-up of each event**
- **educate the public on alternatives, directing couples to more sustainable wedding approaches.**

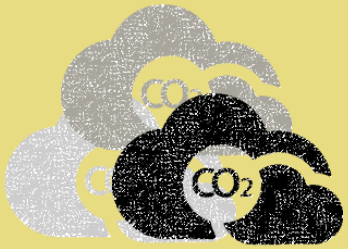
A SINGLE WEDDING PRODUCES:

705 lbs
of garbage per wedding

78 tons
of CO_2 per wedding

A YEAR OF WEDDINGS IN THE US PRODUCES:

1.52 Billion lbs
of garbage annually for US weddings



169 Million tons
of CO_2 annually for US weddings

Fig 1 & 2. US Wedding Garbage Output & CO_2 Emissions[1,2]
See Appendix B for waste and CO_2 estimate calculations

Sustainability Challenge

LACK OF WEDDING CERTIFICATIONS

Green certifications are becoming more prevalent and expanding across industries. More widely recognized examples include LEED (Leadership in Energy and Environmental Design) building certification, USDA Organic certification, and Green Seal product and service certification.

Individual venues and wedding planning agencies are beginning to market themselves as "eco-friendly," such as Chicago-based Naturally Yours Events, but **there are not green wedding certifications established to verify or formalize these efforts.**

WHY IS A CERTIFICATION NEEDED?

Certifications serve an important role in:

◊ **Building consumer awareness and ease of access**
Certifications with strong brand recognition benefit consumers by highlighting product and service choices that adhere to regulations and more responsible management.

◊ **Establishing consistency across products and services**
Certifications hold businesses accountable for meeting and maintaining a specific standard, providing direction on best practices for industry sustainability. They also eliminate uncertainty for businesses by providing trustworthy direction and feedback.

THE GREEN BRIDE GUIDE

In 2008 Kate L. Harrison wrote *The Green Bride Guide* and started the Green Wedding Professional Certification[6], with courses on the history of green weddings, greenwashing, and green marketing techniques[7]. After being sold a couple of times, the Green Bride Guide's main website was shut down. Harrison's book remains one of the more well-known sources for planning a sustainable wedding; however, without active and ongoing development, or plans to revitalize the effort, Green Bride Guide lost its original momentum.

Fig 3. Certified Green Wedding Professional[3]

◊ **Raising the bar and establishing a new norm**
Certifications challenge businesses to understand best practices in the industry and continuously strive to achieve even higher standards.

◊ **Revealing false claims of sustainability**
Conscientious consumers increase demand for lower impact products and services. Greenwashing, or guaranteeing more environmental benefit than is delivered, increases as companies note the benefit of promoting "eco" and "green"[8]. Reputable certifications require verified proof of sustainability efforts to counter exaggerated assertions.

Demand for Sustainability

MARKET FOR ECO-WEDDINGS

Established techniques and certifications don't exist for weddings, but consumer behavior shows demand for an industry shift. The National Marketing Institute (NMI) segments US consumers into five sustainability categories, three of which prioritize environmentally-conscious options.

The segmentation shows 65% of US consumers are more likely to select lower impact, more efficient, healthier options given the choice.

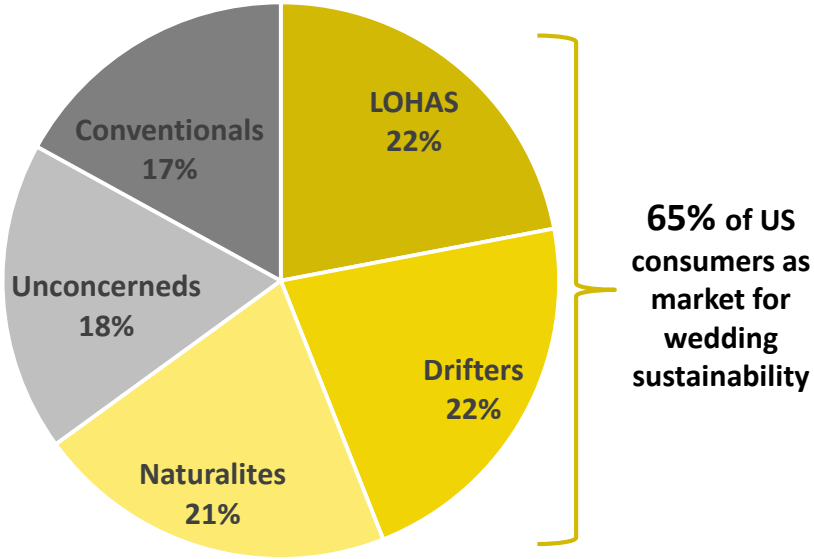


Fig 4. Sustainability Segmentation of US Consumers

LOHAS® (Lifestyles of Health and Sustainability)- 22%

- "Active environmental stewards"[9]
- LOHAS® couples may choose not to plan a traditional wedding because of the environmental impacts, or if they do plan a more traditional wedding, they actively prioritize sustainability.

Drifters®- 22%

- "Green followers"[10]
- Drifters® may not fully alter their wedding plans to be the lowest impact, but when opportunities arise they gladly make a switch to improve their celebration sustainability.

Naturalites®- 21%

- **"**Personal health drivers greater than planetary health"[11]
- Naturalites® may be drawn in more with sustainable wedding elements pertaining to less chemical use on flowers and grounds, and organic food options.

Unconcerneds® and Conventionals®- 18% and 17%

- "Less concerned about the environment and society; Practical and rational, driven by cost savings"[12]
- Both populations have a low investment in sustainability. Couples may not seek environmentally-conscious wedding options, but will nonetheless benefit from an industry transformation.

Wedding sustainability has a strong and established target market. The next step is making it easier for couples to identify and compare the more sustainable options.

Project Focus & Thesis

FOCUS ON VENUES

While couples and wedding professionals plan the wedding and can incorporate sustainability, wedding venues may limit those efforts based on their operational and management priorities. Integrated wedding venue sustainability has the potential to create a greater and longer-term impact by holding employees, couples and guests to the same standard regardless of whether they individually pursue environmentally-conscious options.

THESIS STATEMENT

This project seeks to address the absence of systematic and credentialed sustainability in the US wedding industry by creating a **Wedding Venue Sustainability Certification** based on a set of criteria intended to mitigate environmental impacts throughout the wedding event cycle.

It will also design a plan for an **Eco-Wedding Association** connecting environmentally-conscious venues across the United States.

Scope & Goals

STAKEHOLDERS

Venues

Couples

Guests

Environment

Fig 5 - 8. Sustainable Wedding Stakeholders[4,5,6,7]

THESIS SCOPE

◊ This project focuses on the elements of a wedding managed by the wedding venue and its vendor supply chain.

- It excludes aspects individually-organized and purchased by couples and their wedding guests, including clothing and jewelry, save-the-dates and invites, gifts and wrapping, and guest transportation.

◊ This project addresses issues of environmental sustainability, without as in-depth of analysis on broader issues of social justice and fair trade, though this may be a future opportunity.

◊ This project doesn't seek to eliminate existing wedding traditions, but rather rethink the approaches and techniques for executing them in order to minimize environmental impacts.

PROFESSIONAL GOALS

◊ Gain more experience:

- identifying and researching a pertinent sustainability issue and
- designing a holistic solution backed by data and true customer need.

◊ Develop tactics for supporting customer's emotional ties to an experience or product, while challenging their perspectives to incorporate sustainability.

- There are misconceptions that reducing impacts of a process or object requires a "sacrifice" of what individuals want; emphasizing the ways in which sustainability creates the same or greater meaning is essential.

Execution

Project Objectives

◊ Understand the current processes and priorities of wedding venues, evaluating the overlap with sustainability challenges for those items.

◊ Define measurable sustainability goals and scaled criteria for venue business management and operations, creating a multi-level certification to encourage ongoing development and improvements.

◊ Outline the value of sustainability and engaging in a certification process from a business perspective beyond the moral implications of protecting and preserving the planet.

◊ Create a plan for an eco-wedding association, identifying main benefits and resources to offer venues as a result of their membership.

Proposed Process

EXPLORE

Explore relevant event sustainability standards and certifications to draw from the approaches currently available.

IDENTIFY

Identify the environmental impacts of wedding venues, noting strategies for reducing unnecessary resource use and waste and pollution generation.

DEFINE

Define the categories and criteria of the sustainability certification levels for wedding venues, detailing the requirements for each area of focus in an easy-to-use checklist.

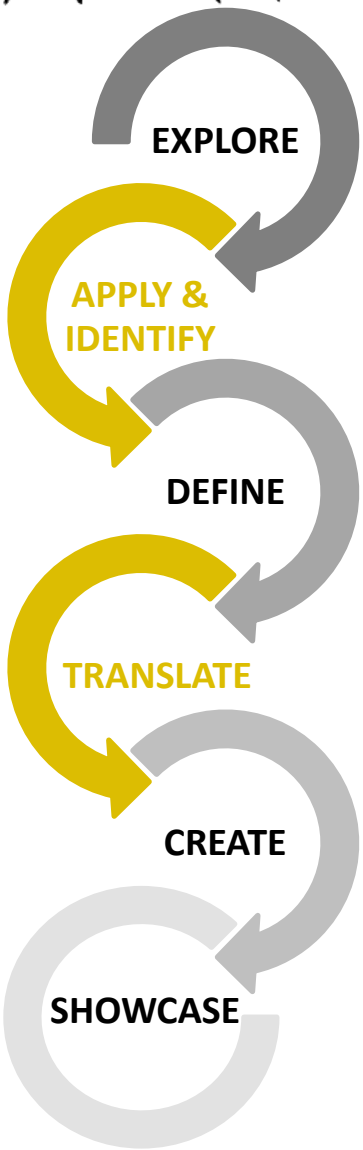
CREATE

Create a plan for an eco-wedding association that builds a network of sustainable wedding venues for couples to search and compare, ultimately choosing a venue actively working to reduce the impact of their wedding.

SHOWCASE

Showcase a top-level certified venue and the operational and management strategies needed to achieve that status.

Actual Process



Explore relevant event sustainability standards and certifications to draw from the approaches currently available.

Apply systems thinking to identify the inputs and outputs of the wedding event phases (operational, pre-wedding, wedding event, and post-wedding).

Define the broader environmental categories that each input/output relate back to in order to show the true impact.

Translate the inputs/outputs and environmental impact categories to accessible business terminology for the criteria of the sustainability certification in an easy-to-use checklist.

Create a plan for an eco-wedding association that builds a network of sustainable wedding venues for couples to search and compare, ultimately choosing a venue actively working to reduce the impact of their wedding.

Showcase a top-level certified venue and the operational and management strategies needed to achieve that status.

Throughout the project research, exploration, and execution, different limitations or new discoveries alter the process and require modifications in order to continue progressing.

Gaps in Current Event Standards

ISO 20121

Inspired to improve the environmental efforts of the London Olympic Games, the International Organization for Standardization (ISO) created ISO 20121 in 2012 as a worldwide sustainability standard for event management[13]. ISO 20121 emphasizes it is not a reporting framework or a checklist, but rather an event sustainability management system[14]. Highly customizable, it is intended to provide the guidance events and businesses need to establish sustainability into their system following a sequential process of:

PLAN ➡ DO ➡ CHECK ➡ ACT

Fig 9. ISO[8]

ISO 20121 IN ACTION

Fig 10. Balélec[9]

The Balélec Music Festival at the École polytechnique fédérale de Lausanne (EPFL) in Switzerland draws 15,000 visitors, offering over 30 concerts, numerous food stalls, bars, and waste facilities. After three years of ISO 20121 certification, Balélec has:

- ◊ collected 400,000kg of food and waste for recycling
- ◊ replaced 1,500 lights with motion-sensing LED lights
- ◊ donated 3,000kg of unconsumed food to charity
- ◊ had staff participate in 62 community programs[15].

LEVERAGING ISO 20121

Several elements can be leveraged from ISO 20121 for the Wedding Venue Sustainability certification and Eco-Wedding Association including:

- ◊ a framework with planning, monitoring, and follow-up
- ◊ a team that engages in evaluations of events throughout the complete event cycle
- ◊ an association that allows venues without certification to join while offering the option to take courses and pursue certification with venue improvements

MODIFICATIONS NEEDED FOR WEDDINGS

The tailored design of ISO 20121 is valuable when a single venue or a single event invests in a personalized management system instead of an entire industry. Areas to modify in the new certification and association include:

- ◊ set criteria (checklist) as opposed to unique criteria for each venue - venues won't approach the requirements in the same way, but each location will be assessed on and held to the same standards
- ◊ multiple certification levels based on venue achievement of the defined criteria, providing couples a means to quickly and easily compare venues

Gaps in Current Event Standards

APEX/ASTM ENVIRONMENTALLY SUSTAINABLE EVENT STANDARDS

Developed by APEX (Events Industry Council's Accepted Practices Exchange) and ASTM (certified international standard development organization), the standards address nine sectors of event or meeting management[16]:

1. Audio Visual/Production
2. Accommodations
3. Communications
4. Destination Selection
5. Exhibits
6. Food & Beverage
7. Meeting Venue
8. Onsite Office
9. Transportation

Within each sector, eight categories of environmental and social topics are evaluated[17]:

- **Energy**
- **Water**
- **Staff Management & Environmental Policy**
- **Air Quality**
- **Procurement**
- **Communication**
- **Waste Management**
- **Community Partners**

events industry council sustainability

Fig 11. EIC[10]

LEVERAGING APEX/ASTM

Several elements can be leveraged from APEX/ASTM for the Wedding Venue Sustainability certification and Eco-Wedding Association including:

- a multi-category standards set addressing multiple areas of operational sustainability
- specific and measureable criteria for evaluation
- a tiered system of first party, second party, and third party certification

MODIFICATIONS NEEDED FOR WEDDINGS

Areas to modify in the new certification and association include:

- publicly available certification categories to raise awareness and encourage adoption, instead of requiring purchase of each individual category standard
- set criteria that establishes consistency across venues for ease of comparability

LIMITATIONS OF ISO 20121 AND APEX/ASTM

Selecting a wedding venue is a highly personalized process in which many couples tour at least five venues as a part of their search[18]. **Without a clear focus on weddings or an easy way for couples to compare options**, ISO 20121 management systems or APEX/ASTM standards alone are unlikely to catalyze a wedding industry transformation. **Both have valuable components that combine well together for a more holistic approach** – one offers the necessary flexibility and strong framework, while the other provides detailed and comprehensive categories that result in tiered certifications.

Applying Sustainability Frameworks

FRAMEWORK

Systems Thinking

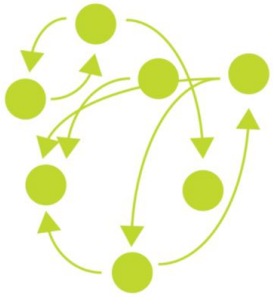


Fig 12. Systems[11]

Systems thinking, or "contextual thinking[18]," is an approach to understand the complexities and relationships of an issue product or process. As opposed to traditional techniques focusing on individual pieces, systems thinking encompasses the whole picture.

Okala Impacts & Eco-Design Wheel

Fig 13. Design Wheel[12]

The *Okala Practitioner's Guide* includes an overview of the main environmental impact categories threatening the earth. After exploring wedding venue systems, the next step is determining how inputs and outputs to the system align with environmental impacts and the risks they present.
Okala also provides an Eco-Design Wheel, created to "help designers and system developers imagine new opportunities… to reduce ecological impact(s) of a product, service or system[19]." The strategies span across the life cycle stages and can be applied individually or in multiples to improve wedding venue sustainability.

APPLICATION

Wedding System

◊ Map and examine the wedding system, noting inputs and outputs for each stage of the event

Wedding Sustainability Strategies

◊ Identify the subsequent environmental impacts throughout the system and cycles in order to target areas for improvement

◊ Incorporate eco-design concepts into the Venue Sustainability Certification to recommend strategies for meeting the sustainability criteria.

See Appendix C for the complete Okala Eco-Design Strategy Wheel

System Identification

WEDDING SYSTEM & STAGES

The first framework used to understand the full scope of wedding venue sustainability throughout each stage of the event cycle is systems thinking. From operations, to pre-wedding, to the wedding event, and finally to post-wedding, systems maps help show the input and output flows and related environmental impacts.

While focus is often most heavily weighted towards the 'use phase,' or the actual wedding event, **all stages of a wedding contribute significantly to the overall sustainability of the event cycle.**

Fig 14. Stages of the Wedding Event Cycle

All products have life cycles, starting with raw materials extraction through end-of-life management. For this project the mapped inputs and outputs are limited to the end products entering the wedding system boundaries, and not the full life cycle prior to that point.

Venue Operations

System Function: Keep the venue operational through building and grounds maintenance, business operations, and employee management.

System In & Out Flows:

- Energy
- Water
- Sourcing
- Solid Waste
- Air Emissions & Land / Water Pollution

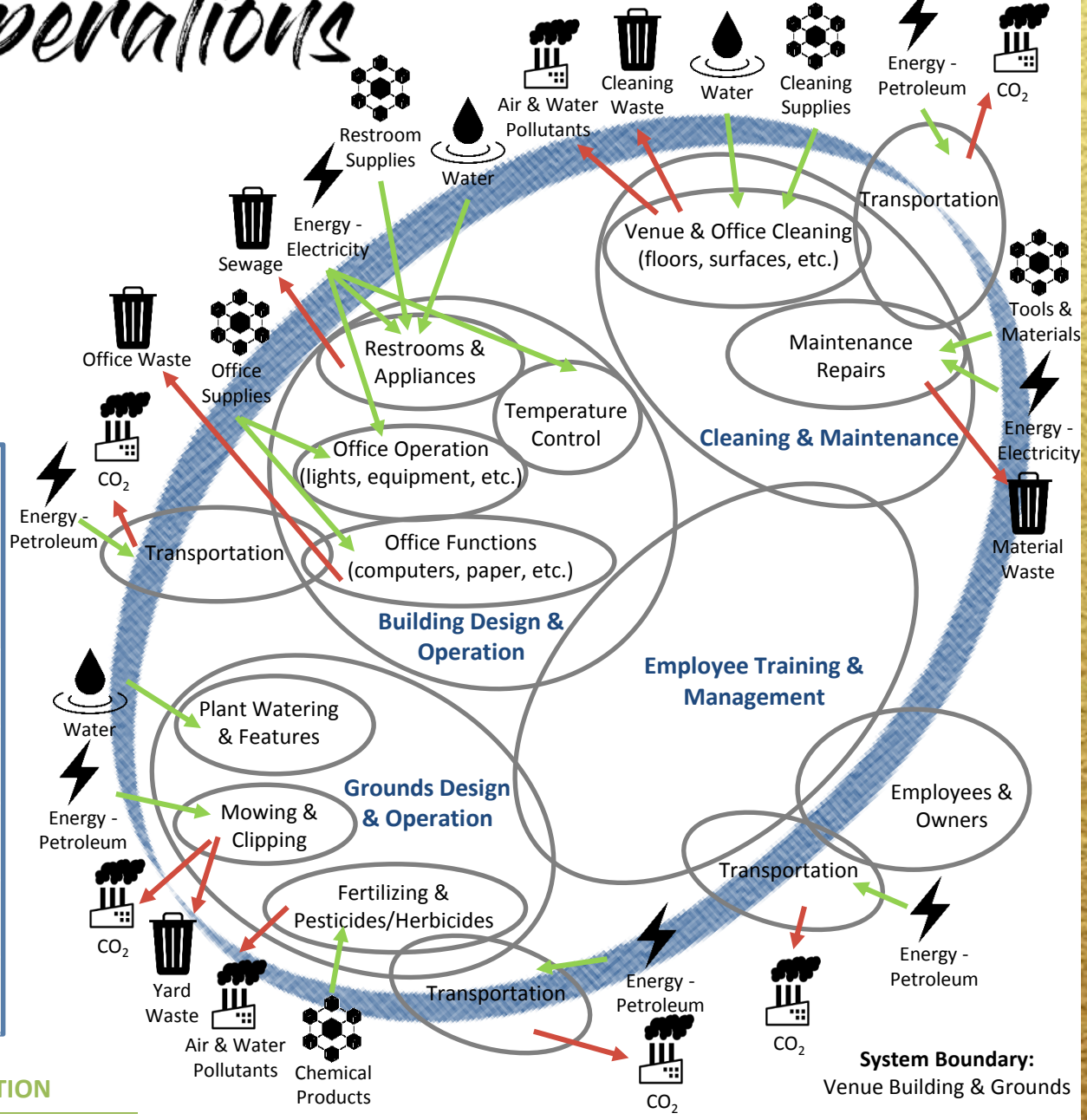


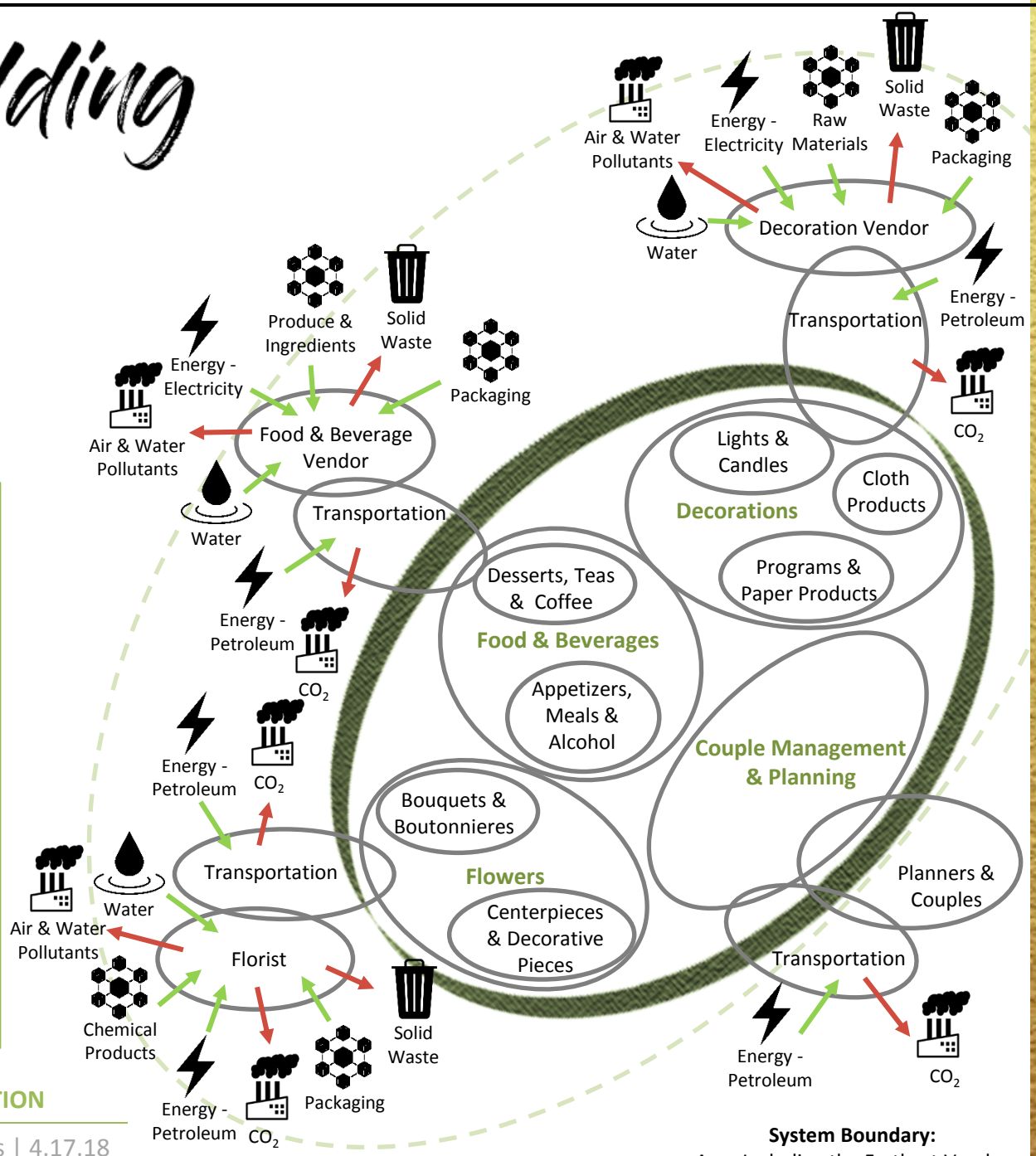
Fig 15 - 19. System Inputs & Outputs[13,14,15,16,17]

Pre-Wedding

System Function: Preparing the venue and determining the selection and sources of items. Vendor choices are key as they determine the upstream impacts.

System In & Out Flows:

- Energy Source & Use
- Water Source & Use
- Material Sourcing
- Waste Generation
- Waste Disposal
- Emissions & Pollution Management



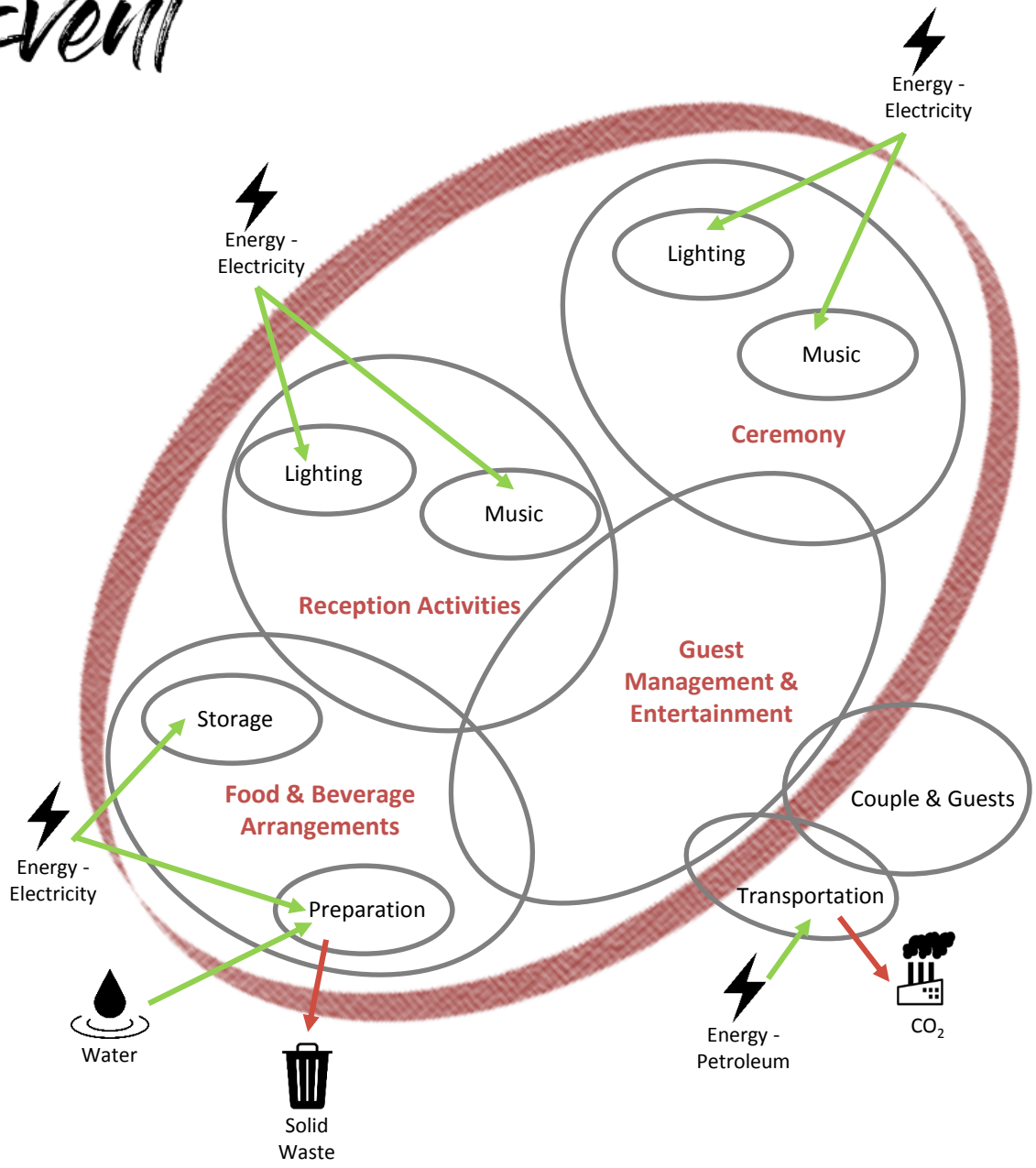
System Boundary:
Area Including the Farthest Vendor

Wedding Event

System Function: Hosting a celebration, including ceremony and reception activities, and guest management.

System In and Out Flows:

- Energy Use
- Water Use
- Waste Generation
- Emissions Management



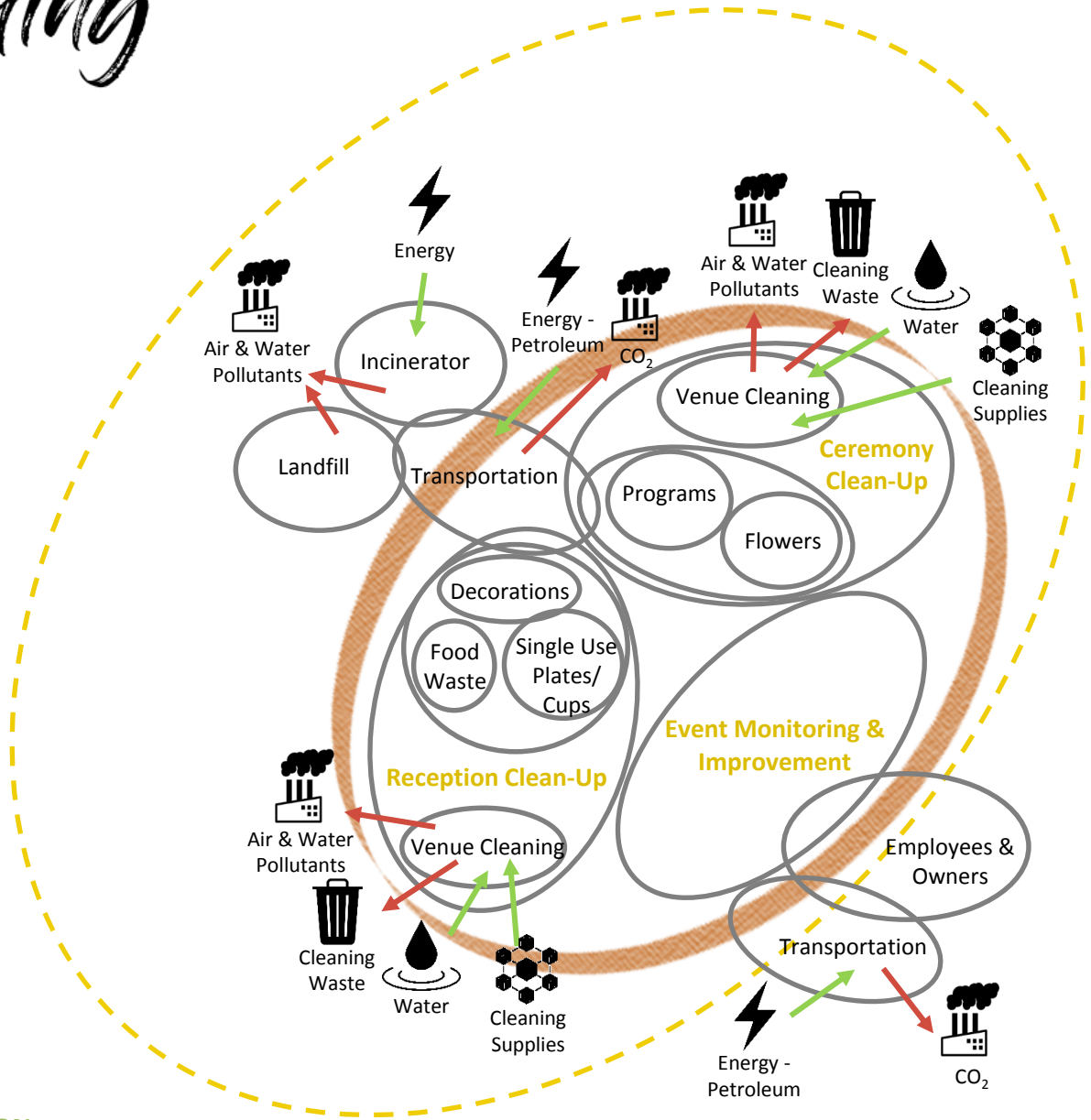
System Boundary:
Venue Building & Grounds

Post-Wedding

System Function: End-of-life management for materials used throughout the wedding and waste generated in each stage of the event cycle.

System In & Out Flows:

- Energy Source & Use
- Water Use
- Material Sourcing
- Waste Generation
- Waste Disposal
- Emissions & Pollution Management



System Boundary:
Area Including Waste Management Facilities

Environmental Impacts

ECOLOGICAL DAMAGE	HUMAN HEALTH DAMAGE	RESOURCE DEPLETION
Climate Change	Photochemical Smog & Air Pollutants	Fossil Fuel Depletion
Ozone Depletion	Health Damaging Substances	Fresh Water Depletion
Acid Rain	Carcinogens, Mutagens, & Teratogens	Mineral Depletion
Water Eutrophication		Topsoil Depletion
Habitat Alteration		
Ecotoxicity		

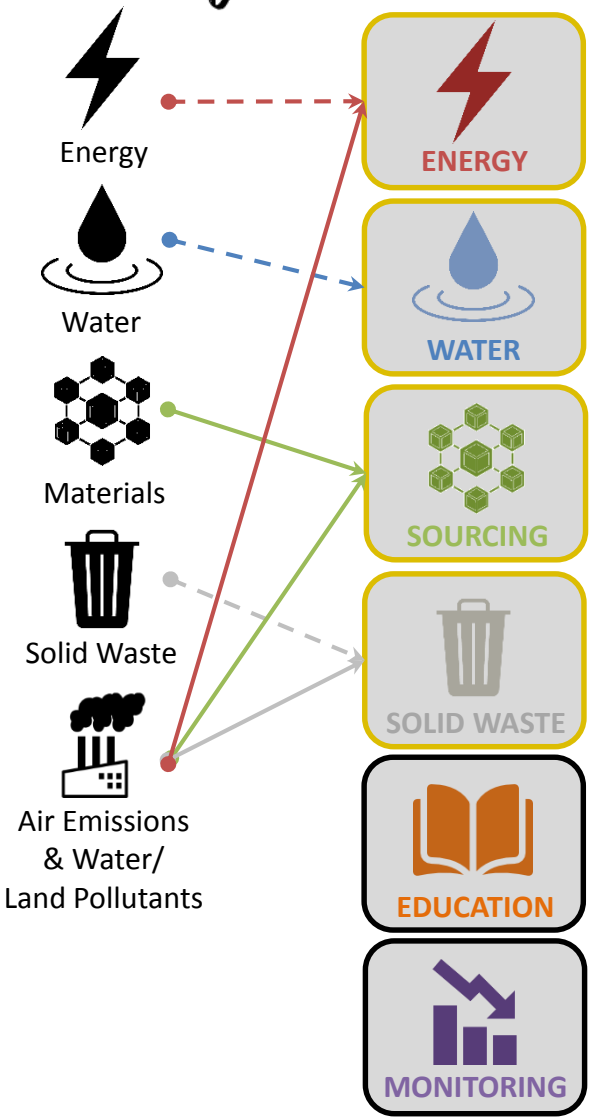
MAPPING INPUTS & OUTPUTS TO ENVIRONMENTAL IMPACTS

The inputs and outputs of each stage in the wedding event cycle map to environmental impacts of ecological damage, human health damage, and resource depletion[20]. These connections underline the complexity and severity of exploiting resources and subsequently generating excessive waste and pollution. **Wedding venues need to implement strategies to alter, minimize, and/or remove environmental risks and harms based on their operational and management tactics for each input and output.**

See Appendix D for Okala descriptions for the Environmental Impacts

KEY: ENERGY | WATER | MATERIALS | SOLID WASTE | EMISSIONS & POLLUTANTS

Certification Criteria Categories



TRANSLATING INPUTS & OUTPUTS TO CERTIFICATION CRITERIA CATEGORIES

APEX/ASTM MULTI-CATEGORY EVALUATION

Drawing from the APEX/ASTM Standards, the Wedding Venue Sustainability Certification includes multiple required categories. While each venue will approach the criteria differently, in order to establish consistency and a baseline for comparison the certification includes required categories and subcategories.

Based on the systems analysis and environmental impact analysis, the **Wedding Venue Sustainability Certification consists of six different criteria categories**:

◊ While wedding venues have the ability to control most of the inputs and outputs to their system, there are limitations based on the contracted vendors. Accounting for this the Certification criteria categories roll up "Material" inputs and "Air Emissions and Water/Land Pollutants" to a single "Sourcing" criteria category.

◊ The Certification criteria categories also include two additional focuses of "Education" and "Monitoring" as both are key elements to successful sustainability integration with their staff, couples, and guests. Without education, the impact may be isolated to the wedding event instead of conveying the value of sustainability to other areas of staff, couples, and guests' daily routines. Additionally, without monitoring of environmental impacts and sustainability efforts, it is difficult to identify new opportunities for development and track a wedding venue's progress.

Fig 20 - 21. Education & Monitoring Criteria Categories[18,19]

Outcome

Certification & Association

OVERVIEW

The mission of the **Eco-Wedding Association (EWA)** is to embed sustainability into the industry by systematically modifying the management and operations of wedding venues. Building a network across the United States, the Association actively supports businesses invested in reducing the negative ecological effects of wedding ceremonies and receptions while creating beautiful, special events.

Venues can join the Association and gain access to the reputable and tangible business benefits available through the partnership. Once aligned to the Association, venues can advance their efforts in sustainability by working with a third-party certification team to determine if they meet the criteria of the **Wedding Venue Sustainability Certification** and become a certified venue.

Certification Process

ISO 20121 FRAMEWORK

PLAN ⇨ DO ⇨ CHECK ⇨ ACT

Using ISO 20121 as a starting framework, **the Wedding Venue Sustainability Certification expands to a five step cyclical process.**

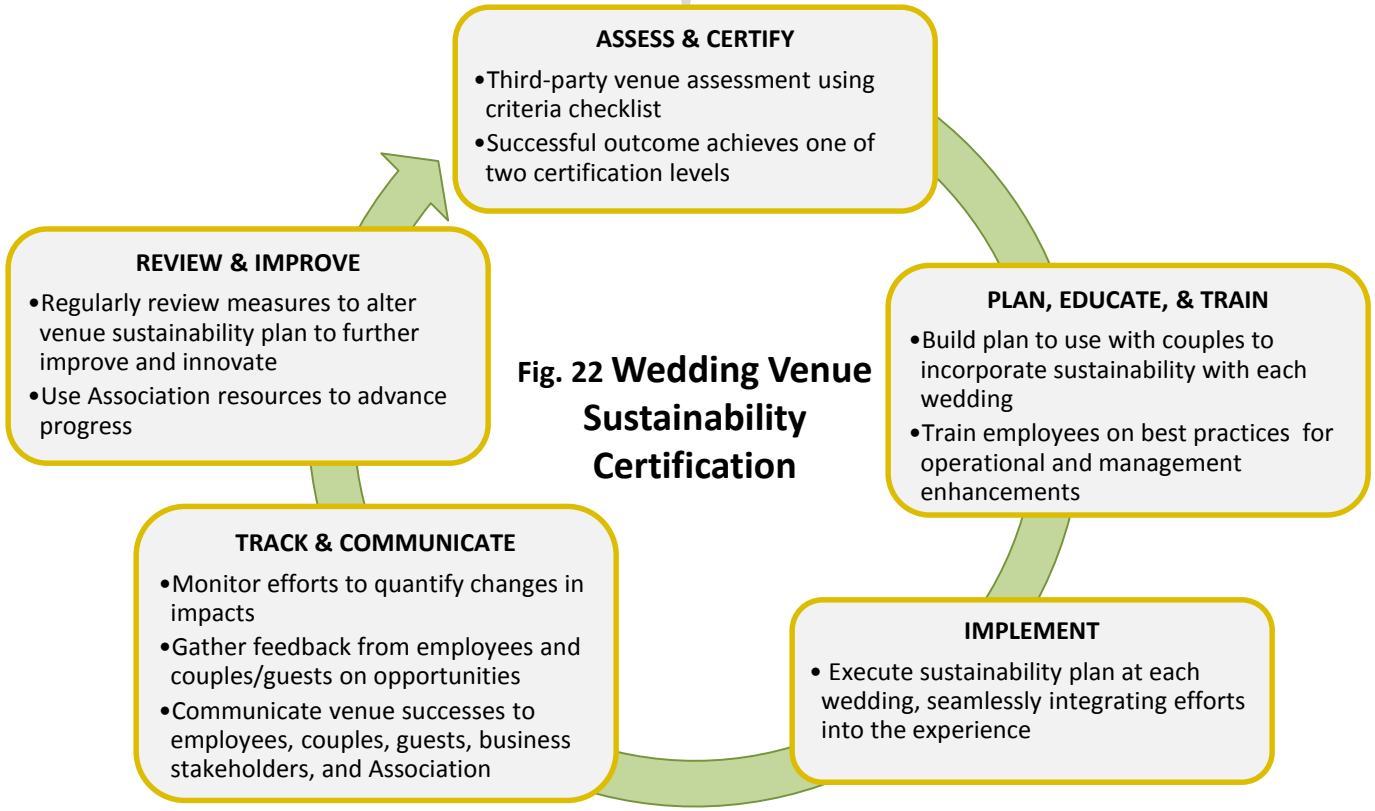


Fig. 22 Wedding Venue Sustainability Certification

Certification Levels

In addition to joining the EWA as a member, venues can pursue two different levels of third-party verified sustainability certifications.

Venue meets the criteria for Two Ring Sustainability Certification. This top level certification was verified through formal review by the Eco-Wedding Association.

Two Ring Venue Sustainability Certification

◊ Second level of the third-party verified certifications
◊ Venue is committed to sustainability and circular frameworks at every stage of the wedding
◊ Venue gains access to development opportunities to continue advancing as a sustainability leader in the wedding industry.

Venue meets the criteria for One Ring Sustainability Certification. This first level certification was verified through formal review by the Eco-Wedding Association.

One Ring Venue Sustainability Certification

◊ First level of the third-party verified certifications
◊ Venue shows strong commitment to more efficient and conscientious operations and management
◊ Venue gains access to development opportunities to continue advancing to the next level of certification.

Association members have a commitment to transforming the wedding industry to reduce its environmental impact. Members have self-reported sustainability efforts they adhere to within their business.

Eco-Wedding Association Membership

◊ Not an official third-party verified certification
◊ Venue meets minimum required criteria through self-reported measures
◊ Membership introduces venues to the Association and development opportunities within venue sustainability, including options to pursue certification

Fig 23 - 24. Certification Level Icons[20,21]

Venue Benefits

Becoming an Eco-Wedding Association member and sustainably-certified venue includes a series of benefits.

	Association Membership	One Ring EWA Certified	Two Ring EWA Certified
Annual Membership	*X – Full Fees*	*X – Discounted Fees*	*X – Discounted Fees*
Association Conferences, Trainings, & Tools	*X*	*X*	*X*
Communications on New & Modified Sustainability Legislation	*X*	*X*	*X*
Association Support & Efforts to Improve the Industry	*X*	*X*	*X*
Shared Knowledge & Subject Matter Expertise	*X*	*X*	*X*
Membership Promotion on Venue Materials (Logo)	*X*	*X*	*X*
Showcase on Association Website	*X*	*X*	*X*
Improved Marketability and Competitive Advantage	*X*	*X*	*X*
Certification Promotion on Venue Materials (Logo)		*X*	*X*
Prioritization on Searchable Association Website		*X*	*X*
Featured Venues at Wedding Expos & Bridal Shows			*X*

Fig 25. Association & Certification Benefits

Certified Venue Promotions

Venues are featured on the Eco-Wedding Association website, allowing couples to easily search, compare, and find their dream venues.

Venues promote their sustainability achievements with the certification logo on their personal website and marketing materials.

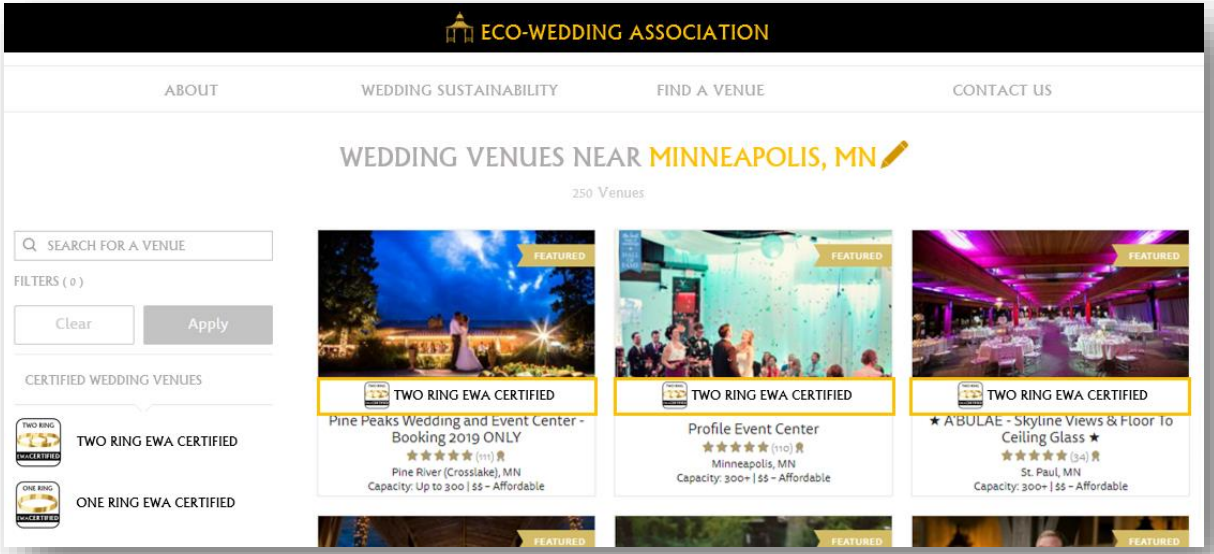


Fig 26. Eco-Wedding Association Website

Fig 27. Solar Arts Certification Example[22]

Certification Criteria Sub-Categories

DIVIDING CHECKLIST CRITERIA INTO SUB-CATEGORIES

Each criteria category is further divided into sub-categories in order to narrow focus on more sustainable sources and more conscientious actions through reduction, reuse, recycling, education, and monitoring.

PHYSICAL

- ◊ **SOURCE** renewable energy
- ◊ **REDUCE** energy use & impacts

- ◊ **REDUCE** water use & impacts
- ◊ **REUSE** water (grey water)
- ◊ **RECYCLE** water (filtration to maintain and improve quality)

- ◊ **SOURCE** with environmentally-conscious vendors (purchasing policy)
  - Materials from renewable resources, locally-made & fair trade production, durable & reusable products, management of material health & toxicity, organic & locally-sourced food/beverages), conscious energy/water/waste management
- ◊ **REDUCE** new sourcing & purchasing

- ◊ **REDUCE** solid waste production
- ◊ **REUSE** materials (upcycle, repurpose)
- ◊ **RECYCLE / COMPOST** to divert from landfill & incineration

NON-PHYSICAL

- ◊ **TRAINING & COMMUNICATION**
  - Staff training & communication, couple training & communication, and guest training & communication

- ◊ **TRACKING & DEVELOPMENT**
  - Monitor sustainability efforts to drive future improvement & development

Certification Checklist

EWA MEMERSHIP: SELF-REPORTED TACTICS

Venues interested in joining the EWA need to self-report efforts regarding lower-impact operations and management. Joining the association is a simpler process without third-party verification requirements, and the process is a helpful introduction to sustainability for venues that may be earlier in their transformation to becoming more environmentally-conscious.

ONE & TWO RING CERTIFIED: THIRD-PARTY VERIFIED TACTICS

Other venues may be farther along in their efforts and decide to immediately pursue certification, which gives them membership status by default. To achieve a One Ring or Two Ring EWA Certification, venues must meet required scores in each of the six criteria categories (Energy, Water, Sourcing, Solid Waste, Education, Monitoring) for each of the four event phases (Venue Operations, Pre-Wedding, Wedding Event, Post-Wedding).

Depending on the effort required and potential environmental impact for the sustainability tactic, weights of 1-5 are assigned (e.g. recycling office paper is a lower weight [2] than installing solar panels on-site [5]). Each of the event phases have point totals that are combined to give a venue their certification score and determine their achievement level.

EXAMPLE

Total Available Points: **145**

- ◊ Minimum Points for Two Ring Certification: **125***
- ◊ Minimum Points for One Ring Certification: **100***
- ◊ Minimum Points for Association Membership: **50**

**Third-Party Verified*

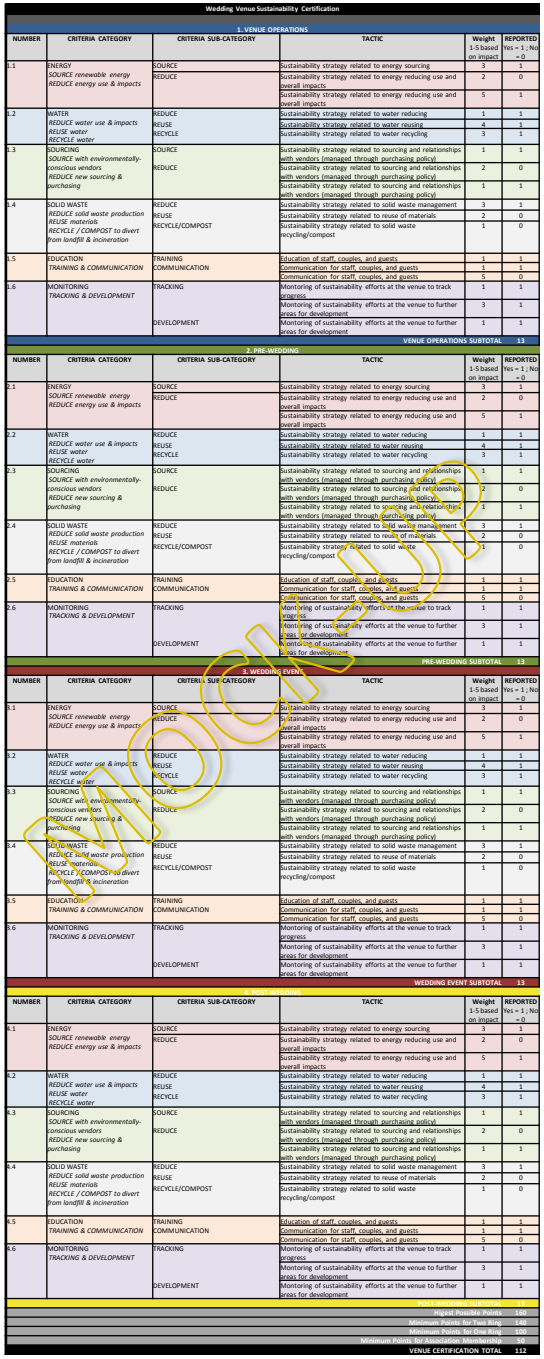


Fig 28. Certification Checklist Example

Certification Sample

Wedding Venue Sustainability Certification

1. VENUE OPERATIONS

NUMBER	CRITERIA CATEGORY	CRITERIA SUB-CATEGORY	TACTIC	Weight 1-5 based on impact	REPORTED Yes = 1 ; No = 0
1.1	ENERGY	SOURCE	[Example 1] Install wind turbines on-site to power venue	5	1
		REDUCE	[Example 2] Install motion sensor lights in secondary spaces (hallways, staircases, storage areas)	3	0
			[Example 3] Purchase renewable energy credits (RECs) to offset impact	1	1
1.2	WATER	REDUCE	[Example 4] Use non-hazardous cleaning supplies to reduce toxins in water output	1	1
		REUSE	[Example 5] Use grey water, or wastewater from bathroom sinks, showers, dishwashers, and clothes washers, to flush toilets	4	1
		REDUCE	[Example 6] Install low-flow appliances and facilities (inc. dishwashers, washer machines, toilets, etc.)	4	1
		REDUCE	[Example 7] Gather rainwater for watering grounds and gardens to reduce freshwater use	3	1
1.3	SOURCING	SOURCE	[Example 8] Require all vendors to sign and adhere to a purchasing policy with required sustainability actions and priorities	3	1
		REDUCE	[Example 9] Partner with a tool & equipment library in order to not purchase new	4	0
1.4	SOLID WASTE	RECYCLE/COMPOST	[Example 10] Recycle all office paper materials	2	1
		RECYCLE/COMPOST	[Example 11] Compost all grounds and gardening waste on-site (lawn clippings, leaves,etc.)	4	1
1.5	EDUCATION	TRAINING	[Example 12] Require all new employees complete sustainability onboarding	3	1
		COMMUNICATION	[Example 13] Communicate sustainability metrics to stakeholders each quarter	2	1
			[Example 14] Publicly post operational sustainability metrics on website and marketing materials	3	1
1.6	MONITORING	TRACKING	[Example 15] Track energy use, water use, and solid waste generation using a formal system and/or software	5	1
		DEVELOPMENT	[Example 16] Set new goals each quarter to push progress	3	1
				Available Points	**50**
				VENUE OPERATIONS SUBTOTAL	**43**

NOTE – The complete checklist will include more tactics for each category. This example serves as a representation of the certification, initial tactic options, and the weighted scoring system.

Certification Sample

2. PRE-WEDDING					
NUMBER	**CRITERIA CATEGORY**	**CRITERIA SUB-CATEGORY**	**TACTIC**	**Weight** 1-5 based on impact	**REPORTED** Yes = 1 ; No = 0
2.1	ENERGY	REDUCE	[Example 17] Plan meals with fresh food (not processed or frozen) to reduce energy needed to store and prepare	2	1
		REDUCE	[Example 18] Establish an on-site bicycle fleet for pick-ups/deliveries to reduce use of fossil fuel-powered vehicles by staff	5	0
2.2	WATER	REDUCE	[Example 19] Use gathered rainwater for live flower centerpieces to reduce freshwater use	1	1
2.3	SOURCING	SOURCE	[Example 20] Source locally and organically-grown flowers for centerpieces, bouquets, and bouttenieres	2	1
		SOURCE	[Example 21] Ensure all paper materials and products are sourced with a Forest Stewardship Council (FSC) certification	3	1
		REDUCE	[Example 22] Establish a decoration rental through the venue for couples to rent photo frames, vases, labels, etc. instead of purchasing new individually	5	1
2.4	SOLID WASTE	REUSE	[Example 23] Save and reuse packaging containers (e.g. boxes, crates, etc.) from vendors	1	1
		RECYCLE/COMPOST	[Example 24] Route all food scraps from the kitchen to composting (either on-site or off-site collection)	3	0
2.5	EDUCATION	TRAINING	[Example 25] Provide a sustainability handbook to couples that gives recommendations on incorporating sustainability in their tasks (rings & jewelry, clothing, invites, etc.)	3	1
		TRAINING	[Example 26] Provide couples with a wide variety of sustainability options with metrics indicating the level of impact reduction with each choice they make (e.g. local, organic flowers vs. rented fake flowers)	4	1
		COMMUNICATION	[Example 27] Provide a complete venue overview to couples that explains sustainability efforts on-site, including short and long-term impacts	2	0
2.6	MONITORING	TRACKING	[Example 28] Track transportation miles for all goods not produced on-site	1	1
			[Example 29] Weigh all packaging materials (recyclable and trash)	3	1
				Available Points	**35**
				PRE-WEDDING SUBTOTAL	**25**

NOTE – The complete checklist will include more tactics for each category. This example serves as a representation of the certification, initial tactic options, and the weighted scoring system.

Certification Sample

3. WEDDING EVENT					
NUMBER	**CRITERIA CATEGORY**	**CRITERIA SUB-CATEGORY**	**TACTIC**	**Weight** 1-5 based on impact	**REPORTED** Yes = 1 ; No = 0
3.1	ENERGY	REDUCE	[Example 30] Promote daytime weddings to reduce energy use needed for evening/night activities	3	1
			[Example 31] Use live music for ceremony and receptions to reduce energy use needed for equipments, speakers, etc.	3	0
3.2	WATER	REDUCE	[Example 32] Use self-serve water stations instead of service to reduce unnecessary filling	2	1
3.4	SOLID WASTE	REDUCE	[Example 34] Use smaller plates and self-serve food stations instead of full service to reduce excess food waste	3	1
		RECYCLE/COMPOST	[Example 35] Set up waste, recycling, and compost stations throughout venue with clear signage on what waste should go in each receptacle	4	0
		RECYCLE/COMPOST	[Example 36] Station staff members alongside waste stations to direct on what waste should go in each receptacle	5	1
3.5	EDUCATION	TRAINING	[Example 37] Hang signs throughout venue communicating sustainability efforts (operational and specified by each wedding couple) and the relevant impact of those efforts	3	1
		COMMUNICATION	[Example 38] Offer guest educational materials on climate change, sustainability, wedding sustainability, and personal opportunities	3	1
3.6	MONITORING	TRACKING	[Example 39] In addition to displaying couple timelines (e.g. first date, engagement, etc.), display wedding sustainability metrics based on couple's decisions	4	1
				Available Points	**30**
				WEDDING EVENT SUBTOTAL	**25**

NOTE – The complete checklist will include more tactics for each category. This example serves as a representation of the certification, initial tactic options, and the weighted scoring system.

Certification Sample

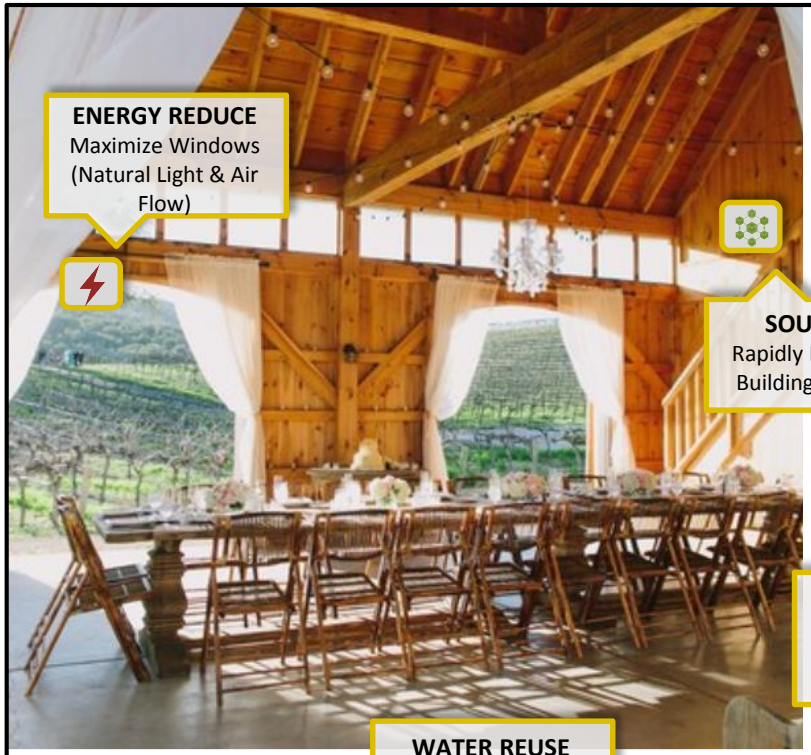
4. POST-WEDDING					
NUMBER	**CRITERIA CATEGORY**	**CRITERIA SUB-CATEGORY**	**TACTIC**	**Weight** 1-5 based on impact	**REPORTED** Yes = 1 ; No = 0
4.1	ENERGY	REDUCE	[Example 40] Use vehicle fleet powered by renewable energy to transport donations, recycling, compost, & waste	5	1
4.2	WATER	REUSE	[Example 41] Gather unconsumed water from guests for watering grounds and gardens to reduce freshwater use	2	1
4.3	SOURCING	SOURCE	[Example 42] Partner with vendors using renewable energy to power waste, recycling, and compost processing	3	0
4.4	SOLID WASTE	REDUCE	[Example 43] Donate uneaten food to homeless shelters in the area instead of composting or disposing of leftovers	3	1
		REDUCE	[Example 44] Donate food scraps to local farms for animal/livestock food	2	1
		REUSE	[Example 45] Encourage couples that don't rent decorations and furniture to donate their purchases to the venue for reuse with future couples	1	0
		RECYCLE/COMPOST	[Example 46] Establish compost sharing with local farms and neighbors for gardens	4	1
4.5	EDUCATION	COMMUNICATION	[Example 47] Send couples and guests final sustainability metrics to show the impact of their environmentally-conscious choices and thank them for their efforts	3	1
			[Example 48] Publicly post each wedding sustainability metrics on website and social media outlets to raise awareness	2	1
4.6	MONITORING	TRACKING	[Example 49] Weigh all solid waste prior to final disposal	3	1
		DEVELOPMENT	[Example 50] Review sustainability outcomes for each wedding, noting lessons learned, and future opportunities with staff at regular venue meetings	2	1
				Available Points	**30**
				POST-WEDDING SUBTOTAL	**26**
				Total Available Points	**145**
				Minimum Points for Two Ring (third-party verified)	**125**
				Minimum Points for One Ring (third-party verified)	**100**
				Minimum Points for Membership (self-reported)	**50**
				VENUE CERTIFICATION TOTAL	**119**

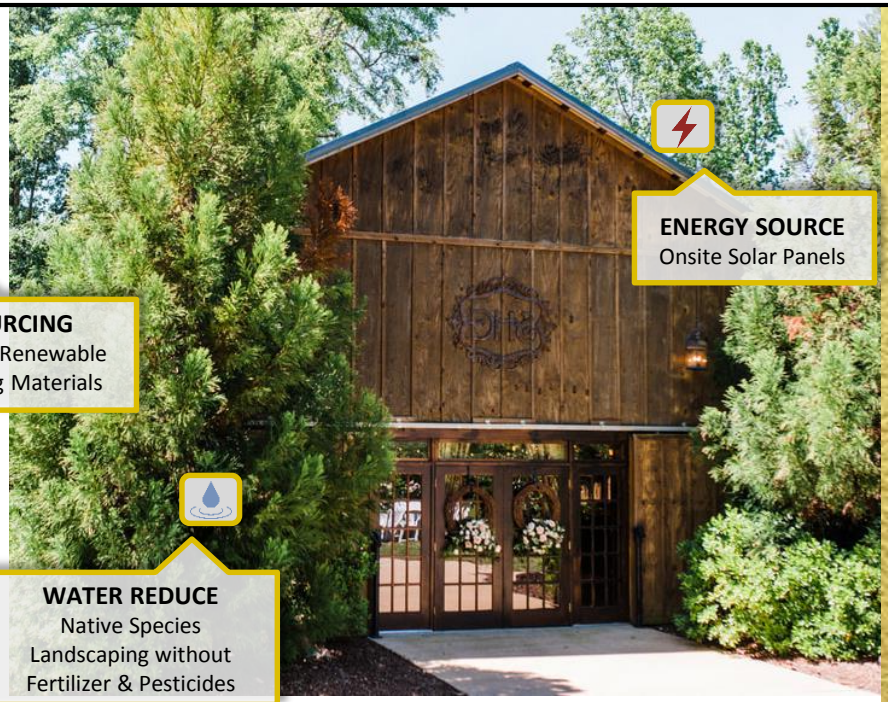
NOTE – The complete checklist will include more tactics for each category. This example serves as a representation of the certification, initial tactic options, and the weighted scoring system.

Venue Sustainability Showcase

INTEGRATING ENVIRONMENTALLY-CONSCIOUS APPROACHES & TECHNIQUES

The following venue examples showcase tactics that wedding venues can use to achieve sustainability and meet the required categories of the EWA Wedding Venue Sustainability Certification. This is a compilation of many venues across the United States; however, if a single venue adopted all of these tactics, it would achieve the highest level of certification as a Two Ring EWA Certified Venue.





Venue Operations

HOW DOES THIS REDUCE ENVIRONMENTAL IMPACTS?

◊ Sourcing renewable energy and reducing energy use helps to reduce the depletion of fossil fuels, reduce creation of air pollutants and subsequent acid rain, reduce ozone depletion, and slow the current progression of climate change.

◊ Building with rapidly renewable materials lowers the risk of habitat alteration by harvesting resources faster than they can regrow/regenerate.

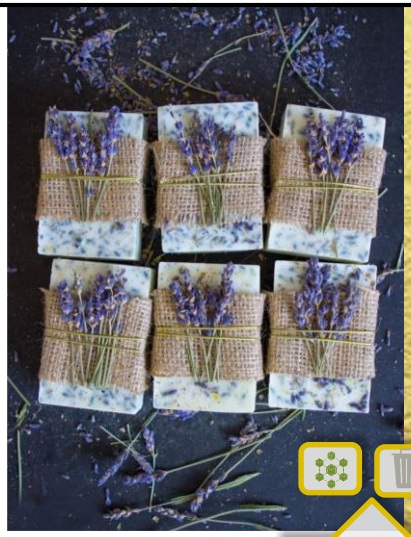
◊ Gathering water, designing to reduce water use, and reducing water run-off helps to decrease water eutrophication and protect against fresh water depletion.

Fig 29 - 32. Venue Operations Tactics[23,24,25,26]

SOURCING & WATER REDUCE
Organic, Water-Conscious Food Grown Onsite and Locally

SOURCING
Eliminate Single-Use Printed/Paper Materials

ENERGY REDUCE
Fresh Food Instead of Processed or Frozen



SOURCING & SOLID WASTE REDUCE
Sustainably-Produced, Local Gifts for Guests with Limited/No Packaging

Pre-Wedding

HOW DOES THIS REDUCE ENVIRONMENTAL IMPACTS?

◊ Sourcing organic, water-conscious food and flowers reduces harmful pesticide and fertilizer use that is damaging to human health, and nutrient run-off that contributes to water eutrophication. It also reduces depletion of fresh water.

◊ Sourcing locally reduces transportation miles that deplete fossil fuels, contribute to air pollution and subsequent acid raid, contribute to ozone depletion, and advance climate change. Limited or no packaging also reduces the amount of waste generated as a lot of gift wrapping, like plastic wraps, aren't recyclable or compostable.

◊ Fresh foods require less energy to preserve and prepare, which helps to reduce the depletion of fossil fuels, reduce creation of air pollutants and subsequent acid rain, reduce ozone depletion, and slow the current progression of climate change.

◊ Sourcing durable, reusable furniture and decorations eliminates the need for new items at each wedding. It lowers the risk of habitat alteration by harvesting resources faster than they can regrow/regenerate. It also reduces the production of health-damaging substances (inc. carcinogens) with the manufacturing of new materials and products.

SOURCING
Durable, Reusable Furniture & Table Settings for Couples to Rent

Fig 33 - 36. Pre-Wedding Tactics[27,28,29,30]

Wedding Event

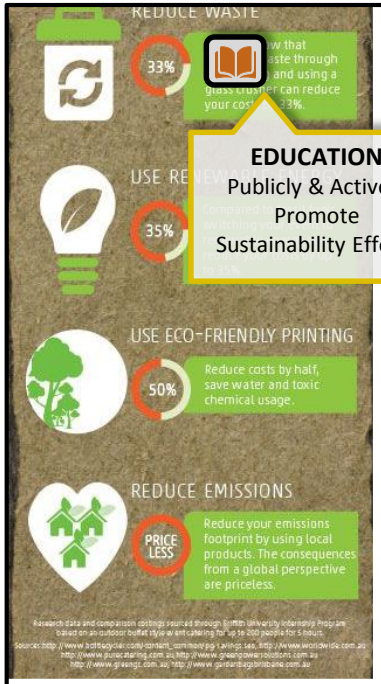
HOW DOES THIS REDUCE ENVIRONMENTAL IMPACTS?

◊ Reducing energy use through live music and outdoor activities helps to decrease the depletion of fossil fuels, decrease the creation of air pollutants and subsequent acid rain, decrease ozone depletion, and slow the current progression of climate change.

◊ Separated waste, recycling, and compost bins can be attractive, useful, and informative for guests. It also effectively diverts waste from landfills and incinerators that contribute to ecotoxicity, air pollution and acid rain, and health-damaging substances (inc. carcinogens).

◊ Smaller, self-serve portions for food discourage guests from getting more food than they want with full-service, reducing food waste that can otherwise be donated. It diverts waste from landfills and incinerators that contribute to ecotoxicity, air pollution and acid rain, and health-damaging substances (inc. carcinogens).

Fig 37 - 40. Wedding Event Tactics[31,32,33,34]



EDUCATION
Publicly & Actively Promote Sustainability Efforts

SOURCING & EDUCATION
Establish Compost Sharing with the Community

SOLID WASTE COMPOST
Compost Waste Onsite for Grounds & Gardens

EDUCATION & MONITORING
Review Sustainability Efforts & Metrics at Every Staff Meeting

Post-Wedding

HOW DOES THIS REDUCE ENVIRONMENTAL IMPACTS?

◊ Internal and public communication around sustainability and highlighting examples of successful transformations reduces all environmental impacts by bringing necessary attention to the risks and needs.

◊ Onsite composting and compost sharing divert waste from landfills and incinerators that contribute to ecotoxicity, air pollution and acid rain, and health-damaging substances (inc. carcinogens).

Fig 41 - 44. Post-Wedding Tactics[35,36,37,38]

Project Conclusion

WEDDING INDUSTRY TRANSFORMATION

The goal of this project was to create an association and certification that addresses the gaps in current event standards and catalyzes a change across the wedding industry. The next steps for the Eco-Wedding Association and Venue Sustainability Certification will be securing the venue network needed to drive this scale of transformation. Adoption of the new Certification is essential for it to become a valuable resource for couples searching for wedding venues, and for it to build a strong support system and network of environmentally-conscious venues. The recognition of green certifications in other industries combined with the willingness of over 50% of consumers to purchase sustainably shows promise for the wedding industry and the movement towards a paradigm shift.

Revisiting the original US wedding garbage output and CO_2 emissions statistics, the improvements of the Eco-Wedding Association and Venue Sustainability Certification can be put to theoretical numbers to show the potential for improvements. **If one quarter of the US weddings celebrated were hosted at sustainably-certified venues redirecting 90% of their garbage and cutting CO_2 emissions in half, annual wedding garbage would decrease by 28% and annual wedding CO_2 emissions would decrease by 15%.**

A YEAR OF WEDDINGS IN THE US PRODUCES:

1.52 Billion lbs
of garbage annually for US weddings

169 Million tons
of CO_2 annually for US weddings

A YEAR OF WEDDINGS IN THE US WITH 1/4 HOSTED AT SUSTAINABLY-CERTIFIED VENUES PRODUCES:

28% Reduction of Garbage

1.18 Billion lbs
of garbage annually for US weddings

15% Reduction of CO_2

147 Million tons
of CO_2 annually for US weddings

US Wedding Garbage Output & CO_2 Emissions with Wedding Venue Sustainability Certifications

See Appendix B for waste and CO_2 estimate calculations

Project Conclusion

IMPROVED VIABILITY THROUGH PARTNERSHIP

Existing frameworks like ISO 20121 and the APEX/ASTM Standards can be used with wedding venues, but haven't been successful in gaining widespread adoption in the wedding industry. However, an opportunity for the EWA and Venue Sustainability Certification could be to partner with an existing framework, leveraging their resources and name recognition while offering the necessary wedding-focused option. Alternatively, this project could gain traction by partnering with a smaller association, like Chicago's Green Wedding Alliance, piloting the certification with vendors already in the network before expanding nationally.

IMMEDIATE NEXT STEPS

The focus of this project was directed towards defining the structure of the Eco-Wedding Association and Venue Sustainability Certification, and defining the main categories of evaluation for certification. Using this groundwork, the main next step is to assemble a team of experts to evaluate and define the more granular details, measures, and goals for each tactic, further developing and formalizing the system.

OPPORTUNITIES TO EXPAND

Beyond the environmental impacts of wedding venue operations and management, a venue isn't truly sustainable without also addressing issues of fair trade and social justice. As part of the ongoing research and development of this Association and Certification, these topic areas need to be incorporated into the evaluations of wedding venues and their associated vendors.

INSIGHTS & PERSONAL DEVELOPMENT

◊ Sustainability themes are similar across industries, but an important and challenging hurdle is defining categories and tactics to evaluate and drive progress in the wedding industry.
◊ Analysis has to extend through each phase of a system to adequately account for and lower environmental impacts holistically.
◊ Programs and certification can be well-executed, but will lose traction if there isn't strong monitoring and promotion of the efforts.
◊ When integrating environmentally-conscious practices into a system, the role of the sustainability professional is to understand the traditions and emotional ties aligned to current approaches in order to work within some of those frameworks that are special to individuals. Incremental changes can still have notable impacts when scaled across an industry.

References & Appendix

References

1. International Standardization Organization. “Sustainable events with ISO 20121.” Accessed October 12, 2017. https://www.iso.org/files/live/sites/isoorg/files/archive/pdf/en/sustainable_events_iso_2012.pdf.
2. Parker, Bethany. “Probing Question: How has the American wedding changed?” *Penn State News,* September 8, 2008. http://news.psu.edu/story/141364/2008/09/08/research/probing-question-how-has-american-wedding-changed.
3. XO Group Inc. "Cost of US Weddings Reaches New High as Couples Spend More Per Guest to Create an Unforgettable Experience, According to The Knot 2016 Real Weddings Study.” February 2, 2017. http://xogroupinc.com/press-releases/theknot2016realweddings_costofweddingsus/.
4. Harrison, Kate. “Green Bride Guide Metrics Sourced from the Carbon Fund & DVGreen (Danielle Venokur – event planner who measured wedding waste from the events her business planned).” Interview by Annika Bergen. October, 2017.
5. The Wedding Report. “Wedding Statistics for the United States.” Accessed July 21, 2017. https://www.theweddingreport.com/.
6. Wedding Planning Institute. “Become a Green Wedding Planner.” Accessed July 21, 2017. https://weddingplanninginstitute.com/online-courses/green-wedding-planning/.
7. Green Wedding Professional. “The Green Wedding Professional Certification Course Online.” Accessed September 14, 2017. https://www.greenweddingprofessionals.com/.
8. Dahl, Richard. “Greenwashing: Do You Know What You’re Buying?” Environmental Health Perspectives (ehp). June 1, 2010. https://ehp.niehs.nih.gov/118-a246/#r1.
9. NMI Sustainability. “NMI's Sustainability Segmentation.” Accessed January 5, 2018. http://www.nmisolutions.com/index.php/syndicated-data/segmentation-algorithms-a-panels/lohas-segmentation.
10. NMI Sustainability, “NMI's Sustainability Segmentation.”
11. NMI Sustainability, “NMI's Sustainability Segmentation.”
12. NMI Sustainability, “NMI's Sustainability Segmentation.”
13. International Standardization Organization. “ISO 20121 Event sustainability management systems — Requirements with guidance for use.” Accessed October 13, 2017. https://www.iso.org/obp/ui#iso:std:iso:20121:ed-1:v1:en.
14. Coca-Cola. “London 2012: A guide to ISO 20121 Sustainable Event Management For The Coca-Cola Company.” Accessed February 10, 2018. https://www.coca-cola.co.uk/content/dam/journey/gb/en/hidden/PDFs/iso-workbook.pdf.
15. 37^{E} Festival Balelec. “Développement durable.” Accessed October 14, 2017. http://www.balelec.ch/propos/developpement-durable.
16. Events Industry Council. “APEX/ASTM Sustainable Event Standard Overview.” Accessed March 7, 2018. http://www.eicsustainability.org/page/APEX.
17. Events Industry Council, “APEX/ASTM Sustainable Event Standard Overview.”
18. WeddingWire. “Discussions - How many reception venues did you visit?” October 17, 2010. https://www.weddingwire.com/wedding-forums/how-many-reception-venues-did-you-visit/a99c13a6c358d345.html.
19. Capra, Fritjof. *The Web of Life.* New York: Anchor Books, 1996.
20. White, Philip et al. *Okala Practitioner – Integrating Ecological Design.* Phoenix: Okala Team, 2013.

Appendix

21. XO Group Inc, "Cost of US Weddings Reaches New High as Couples Spend More Per Guest to Create an Unforgettable Experience, According to The Knot 2016 Real Weddings Study.”
22. XO Group Inc, "Cost of US Weddings Reaches New High as Couples Spend More Per Guest to Create an Unforgettable Experience, According to The Knot 2016 Real Weddings Study.”
23. Harrison, interview.
24. The Wedding Report, “Wedding Statistics for the United States.”

References

25. XO Group Inc, "Cost of US Weddings Reaches New High as Couples Spend More Per Guest to Create an Unforgettable Experience, According to The Knot 2016 Real Weddings Study."
26. White, *Okala Practitioner – Integrating Ecological Design.*
27. White, *Okala Practitioner – Integrating Ecological Design.*

Images

All Pages – Calligraphy Font Headings

"Gloss and Bloom." Stereotype. Accessed February 18, 2018. https://www.dafont.com/theme.php?cat=604&.

All Pages – Greenery

"Watercolor Greenery Set." Fotolia. Accessed October 10, 2017. https://us.fotolia.com/id/133890799.

1. Garbage Icon (Fig 1)
   Sewell, Blaise. "Garbage Bag." The Noun Project. Accessed September 21, 2017. https://thenounproject.com/term/garbage-bag/77796/.
2. CO_2 Icon (Fig 2)
   "CO2 Cloud." flaticon. Accessed September 21, 2017. https://www.freepik.com/free-icon/co2-cloud_733468.htm.
3. Green Wedding Professionals Icon (Fig 3)
   "Green Wedding Professionals." The Green Wedding Professional. Accessed November 13, 2017. https://www.greenweddingprofessionals.com/.
4. Archway Icon (Fig 5)
   ProSymbols. "Wedding Arch." The Noun Project. Accessed September 21, 2017. https://thenounproject.com/term/wedding-arch/557967/.
5. Love Birds Icon (Fig 6)
   "Couple of love birds." flaticon. Access September 21, 2017. https://www.flaticon.com/free-icon/couple-of-love-birds_38417.
6. Guest Icon (Fig 7)
   "Dancing Celebration Icon." ShareIcon. Accessed September 21, 2017. https://www.shareicon.net/humanpictos-fun-birthday-and-party-people-party-dancers-dancing-celebration-799510.
7. Earth Icon (Fig 8)
   Ali, Jafri. "Globe." The Noun Project. Accessed September 21, 2017. https://thenounproject.com/term/globe/16430/.
8. ISO Icon (Fig 9)
   "ISO." International Organization for Standardization. Accessed February 5, 2018. https://committee.iso.org/sites/tc176sc2/home/page/iso-9001-auditing-practices-grou.html.
9. Balélec Festival Image (Fig 10)
   "Balélec Music Festival." International Organization for Standardization. Accessed November 15, 2017. https://www.iso.org/news/2015/05/Ref1962.html.
10. Events Industry Council Icon (Fig 11)
    "Events Industry Council Icon." Green Meeting Industry Council. Accessed March 10, 2018. http://www.eicsustainability.org/?page=APEXRegistry.
11. Systems Thinking Icon (Fig 12)
    "Systems Thinking." Kindling. Accessed February 27, 2018. http://kindling.xyz/next-systems/systems-thinking-complex-world/
12. Eco-Design Wheel (Fig 13)
    Okala. "Eco-Design Strategy Wheel." Okala Practitioner Guide. Accessed February 1, 2018. http://okala.net/Okala%20Ecodesign%20Strategy%20Guide%202012.pdf.

References

13. Energy Icon (Fig 15)
    "Energy Icon." Free Icons. Accessed March 5, 2018. http://www.pvhc.net/Energy-Icon20kxvyeoiy/.
14. Water Icon (Fig 16)
    "Icon-water-blue." Wikimedia Commons. Accessed September 15, 2017. https://commons.wikimedia.org/wiki/File:Icon-water-blue.svg.
15. Sourcing Icon (Fig 17)
    "Supply Chain."Accessed February 14, 2017. https://thenounproject.com/term/leaf/6496/.
16. Trash Can Icon (Fig 18)
    "Trash Icon." Share Icon. Accessed September 15, 2017. https://www.shareicon.net/trash-89587.
17. Pollution Icon (Fig 19)
    Kim, Esther. "Air Pollution." The Noun Project. Accessed September 15, 2017. https://thenounproject.com/term/air-pollution/447632/.
18. Education Icon (Fig 20)
    "Open Book Icon." FlatIcon. Accessed March 6, 2018. https://www.flaticon.com/free-icon/open-book_171322.
19. Tracking Icon (Fig 21)
    "Downward Trend Icon." Free Icon Shop. Accessed March 6, 2018. https://freeiconshop.com/icon/downward-trend-icon-glyph/.
20. Ring Icon (Fig 23)
    "Ring." Pinart. Accessed August 4, 2017. http://moziru.com/explore/Ring%20clipart%20transparent/.
21. Gazebo Icon (Fig 24)
    "Gazebo." Pinart. Accessed August 4, 2017. http://moziru.com/explore/Gazebo%20clipart%20simple/.
22. Chowgirls Website (Fig 27)
    "Solar Arts." Chowgirls. Accessed March 18, 2018. http://solararts.chowgirls.net/.
23. Rain Barrel Image (Fig 29)
    "Rain Barrel." Go Green Blog. Accessed March 17, 2018. http://thegogreenblog.com/product-of-the-week-rain-barrels/.
24. Permeable Driveway Image (Fig 30)
    "Permeable Grass Pavers." Treeline Boulder. Accessed March 17, 2018. https://treelineboulder.com/2016/04/07/permeable-grass-pavers-sustainable-alternative-traditional-concrete-paving-methods/.
25. Open Barn Image (Fig 31)
    "Vineyard House." Hammer Sky Vineyards. Accessed March 17, 2018. http://www.hammersky.com/Events/Special-Occasions.
26. Rustic Barn Image (Fig 32)
    "Rustic Barn." Southern House & Garden. Accessed March 17, 2018. http://www.southernhouseandgarden.com/barn.html.
27. Meat & Greens image (Fig 33)
    "Chowgirl Catering." Chowgirls. Accessed March 17, 2018. https://www.weddingwire.com/biz/chowgirls-killer-catering-minneapolis/409f4c59e2920574.html.
28. Chalk Board Image (Fig 34)
    "Wedding Board." Etsy - CountryBarnBabe. Accessed March 17, 2018. https://www.etsy.com/listing/175724204/large-wedding-chalkboard-rustic-wedding?gpla=1&gao=1&utm_campaign=shopping_us_CountryBarnBabe_sfc_osa&utm_medium=cpc&utm_source=google&utm_custom1=0&utm_content=7121568&gclid=EAIaIQobChMI6e-gruP22QIV9hXTCh2JEwdXEAkYBCABEgLznvD_BwE.
29. Head Table Image (Fig 35)
    "Table Set-up." Rustic Oats. Accessed March 17, 2018. http://www.rusticoaks.net/#!/{weddings}.

References

30. Appetizer Food (Fig 36)
    "Pirmasis Lietuvoje gastronominis žurnalas mini du jubiliejus Skaitykite daugiau." Shutterstock. Accessed April 3, 2018. https://www.delfi.lt/gyvenimas/receptai/pirmasis-lietuvoje-gastronominis-zurnalas-mini-du-jubiliejus.d?id=64623121.
31. Live Music Image (Fig 37)
    "Wajjo Drummers." Catalyst Wedding Co. Accessed April 3, 2018. http://www.catalystwedco.com/blog/2017/8/15/real-couples-a-traditional-canadian-wedding-with-caribbean-and-african-flare-julie-kevin.
32. Yard Games Image (Fig 38)
    "Yard Games." Whimsical Wonderland Weddings. Accessed March 17, 2018. https://whimsicalwonderlandweddings.com/monks-barn-wedding.html.
33. Sustainable Gift Image (Fig 39)
    "Lavender Lemon Honey Soap." Sisoo. Accessed March 17, 2018. http://sisoo.com/2015/02/09/how-to-make-lavender-honey-lemon-soap/.
34. Recycling Image (Fig 40)
    "Recycling Bin." Millie B Photography. Accessed March 17, 2018. http://www.bymilliebphotography.com/.
35. Sustainability Infographic Image (Fig 41)
    "Infographic." Logistiks. Accessed March 17, 2018. http://www.climatewave.com/green-events/4-ways-reduce-event-management-costs/.
36. Team Meeting Image (Fig 42)
    "Team Meeting" Origen Arts. Accessed March 17, 2018. https://origenarts.com/36-disenadores-graficos-contemporaneos-mexicanos/.
37. Compost Sharing Image (Fig 43)
    "Compost." Urban Food Loop. Accessed March 17, 2018. http://www.theurbanfoodloop.com/.
38. Compost Bin Image (Fig 44)
    "Compost Bin." Renoirs Red Cedar 3-Compartment Compost Bin. Accessed March 17, 2018. http://www.fifthroom.com/renoirs-red-cedar-3compartment-compost-bin/6275/?gclid=CL-Q3bm128UCFciIfgodaaIAcw.

Appendix Images

40. Wedding Icons (Fig 45 - 49)
    "Destination Wedding Icon Set." istock Photo. Accessed September 21, 2017. http://media.istockphoto.com/vectors/destination-wedding-ceremony-black-white-vector-icon-set-vector-id165806859.

Appendix - A

Fig 45 - 49. Top US Wedding Costs[40]

While the actual marriage remains top priority, according to *The Knot,* a unique guest experience is an essential focus for most couples[21] – from themed invites and guest gifts, to multiple venues and entertainment options, weddings continue to become more and more elaborate.

Trends[22]

90% Use smartphones for wedding planning activities	**48%** View a reception venue with a scenic backdrop as a top priority	**47%** Spend more money than originally planned	**22%** Incorporate technology into their wedding day	**20%** Travel significant distances for a destination wedding

Appendix - B

Assumptions:

- A wedding of 100-120 guests produces 400-600 lbs of garbage and 66 tons of CO_2[23]
- There were an estimated 2,162,416 weddings in the US / year[24]
- The average US wedding is 141 guests[25]

$$\frac{600 \text{ lbs}}{120 \text{ guests}} = \frac{X}{141 \text{ guests}} \rightarrow \boxed{705 \text{ lbs}}$$

$$\frac{66 \text{ tons}}{120 \text{ guests}} = \frac{X}{141 \text{ guests}} \rightarrow \boxed{78 \text{ tons}}$$

705 lbs * 2,162,416 weddings → **1.52 billion lbs**

78 tons * 2,162,416 weddings → **169 million tons**

Appendix - B

Assumptions including a sustainably-certified venue:

- A wedding of 100-120 guests produces 400-600 lbs of garbage and 66 tons of CO_2
  - A wedding of the same size at a sustainably-certified venue disposes of only 60 lbs of garbage and produces 33 tons of CO_2 (sustainably-certified venue that redirects 90% of its garbage and cuts CO_2 emissions in half)
- There were an estimated 2,162,416 weddings in the US / year
  - 25% were hosted at a sustainably-certified venue, or 540,604 weddings
- The average US wedding is 141 guests

$\frac{60 \text{ lbs}}{120 \text{ guests}} = \frac{X}{141 \text{ guests}}$ → **70.5 lbs**

$\frac{33 \text{ tons}}{120 \text{ guests}} = \frac{X}{141 \text{ guests}}$ → **38.78 tons**

70.5 lbs * 540,604 weddings → **38.11 million lbs**

38.78 tons * 540,604 weddings → **20.96 million tons**

$\frac{600 \text{ lbs}}{120 \text{ guests}} = \frac{X}{141 \text{ guests}}$ → **705 lbs**

$\frac{66 \text{ tons}}{120 \text{ guests}} = \frac{X}{141 \text{ guests}}$ → **77.55 tons**

705 lbs * 1,621,812 weddings → **1.14 billion lbs**

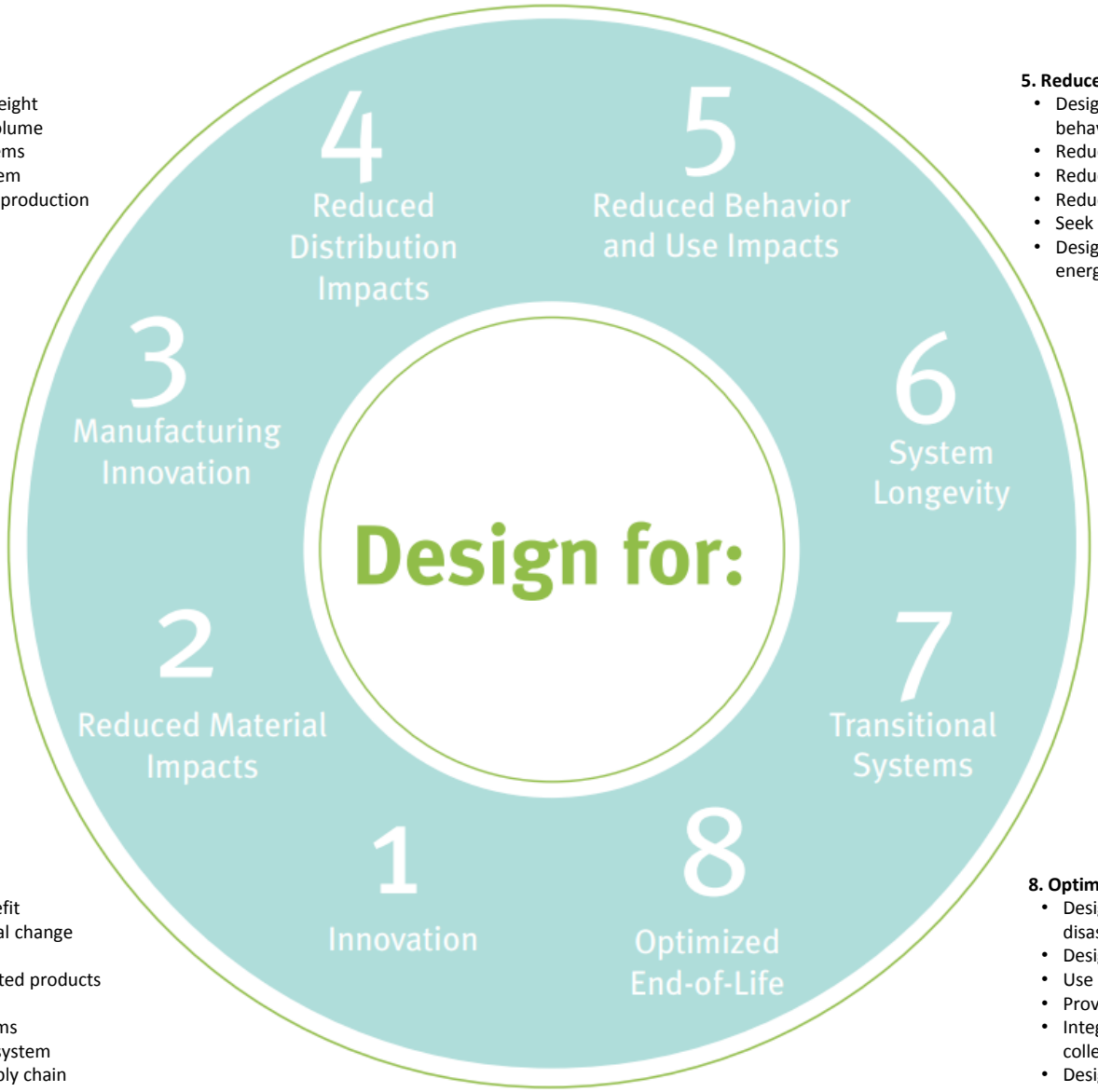
78 tons * 1,621,812 weddings → **126.5 million tons**

1.18 billion lbs

146.73 million tons

Appendix - C

OKALA ECO-DESIGN STRATEGY WHEEL[26]



4. Reduced Distribution Impacts
- Reduce product and packaging weight
- Reduce product and packaging volume
- Develop reusable packaging systems
- Use lowest-impact transport system
- Source or use local materials and production

3. Manufacturing Innovation
- Minimize manufacturing waste
- Design for production quality control
- Minimize energy use in production
- Use carbon-neutral or renewable energy sources
- Minimize number of production steps
- Minimize number of components/materials
- Seek to eliminate toxic emissions

2. Reduced Materials Impacts
- Avoid materials that damage human or ecological health
- Avoid materials that deplete natural resources
- Minimize quantity of materials
- Use recycled or reclaimed materials
- Use renewable resources
- Use materials from reliable certifiers
- Use waste byproducts

1. Innovation
- Rethink how to provide the benefit
- Design flexibility for technological change
- Provide product as service
- Serve needs provided by associated products
- Share among multiple users
- Design to mimic biological systems
- Use living organisms in product system
- Create opportunity for local supply chain

5. Reduced Behavior and Use Impacts
- Design to encourage low-consumption behavior
- Reduce energy during use
- Reduce material consumption during use
- Reduce water consumption during use
- Seek to eliminate toxic emissions during use
- Design for carbon-neutral or renewable energy

6. System Longevity
- Design for durability
- Foster emotional connection to product
- Design for maintenance and easy repair
- Design for reuse and exchange of products
- Create timeless aesthetic appeal

7. Transitional Systems
- Design upgradable products
- Design for second life with different function
- Design for reuse of components

8. Optimized End-of-Life
- Design for fast manual or automated disassembly
- Design recycling business model
- Use recyclable non-toxic materials
- Provide ability to biodegrade
- Integrate methods for used product collection
- Design for safe disposal

Appendix - D

OKALA ENVIRONMENTAL IMPACTS[27]

ECOLOGICAL DAMAGE	HUMAN HEALTH DAMAGE	RESOURCE DEPLETION
Climate Change *Climate change results from the addition of greenhouse gases to the atmosphere through burning fossil fuels, agricultural practices, and industrial practices, which raise the average global temperature of the Earth's atmosphere. Rising temperatures accelerate the intensity and irregularity of storms, desertification, the range of tropical diseases, melting glaciers and polar ice, rising sea levels, acidification of marine ecologies and possible changes to ocean currents.*	**Photochemical Smog & Air Pollutants** *Photochemical smog is caused by the emissions of nitrogen oxides and volatile organic compounds (VOCs) that generate ground level ozone in the presence of sunlight. Smog and air pollutants increase the incidence of asthma in humans and reduce the ability of plants to perform photosynthesis.*	**Fossil Fuel Depletion** *Humans currently consume fossil fuels (oil, natural gas, various types of coal) at a rate millions times faster than geological processes can replenish the reserves. As dense deposits such a petroleum become rare, lower grade deposits requiring more extraction energy are used with techniques like hydraulic fracturing. Hydraulic fracturing, or pumping water, sand and reactive chemicals underground at high pressure to rupture rock formations that contain oil and nature gas, poses elevated risks of polluting ground water and disturbing geological formations.*
Ozone Depletion *Stratospheric ozone layer depletion is caused by emissions of aggressive gaseous compounds, leading to regions with little to no protective ozone layer, primarily above the North and South poles. Ozone loss increases the amount of solar ultra-violet light falling to Earth's surface, increasing the incidence of cancers and cataracts in animals and humans, and reduces the productivity of plants and marine algae.*	**Health Damaging Substances** *Non-cancer causing substances can include skin irritants, allergens, growth inhibitors, toxic substances and hormone disrupting chemicals. Potential toxic effects include transient irritation, physical or mental disability, inhibition of physical or mental development, temporary or permanent disability or death. Human toxicity is one of the most intensively researched topics in the world; however, the vast majority of chemical substances have not been extensively studied for their potential toxic effects on humans.*	**Fresh Water Depletion** *Water is the most abundant substance on the surface of the planet, covering 71% of its surface in the form of unusable ocean saltwater. Fresh water is only 2.5% and is essential for terrestrial organisms and human activities such as agricultural irrigation. Fresh surface water or fresh groundwater is often consumed at a rate that cannot be replenished by rain and mountain snow cover. The depletion of rivers, streams, and aquifers (naturally occurring subterranean water reservoirs) seriously harms habitats and makes safe drinkable water access scarce.*
Acid Rain *Caused by the release of acidic gases such as sulfur dioxide and nitrous oxide, primarily created by burning fossil fuels. The acids dissolve metals from soils to the level at which they can become toxic to plants and aquatic organisms. It dissolves cement and minerals in the built environment as well.*	**Carcinogens, Mutagens, & Teratogens** *Carcinogens are cancer-causing substances – both the creation of cancer cells and the ability of the body to manage the cancer cells can be reduced by exposure to carcinogenic substances. Mutagens are substances that can mutate organism genes. Teratogens are substances that can cause defects in developing fetuses and growing organisms, retard growth or kill the organism.*	**Mineral Depletion** *Extracted mineral ores are converted into materials that are eventually oxidized or dispersed as waste that is often not recycled. Availability is not the primary indicator for measuring mineral depletion. It can be measured by the amount of surplus energy required to extract the ore from the earth and refine the mineral from the ore. As high grade ores become rare, lower grade ores requiring more energy are used.*

Appendix - D

ECOLOGICAL DAMAGE	HUMAN HEALTH DAMAGE	RESOURCE DEPLETION
Water Eutrophication *Caused by the addition of excess nutrients to fresh and sea water leading to reduction of available oxygen. Nitrogen and phosphorous compounds from municipal wastewater and agriculture pollute surface waters, which results in algal blooms that lower the quality of dissolved oxygen, killing fish and other aquatic organisms ("dead zones").*		**Topsoil Depletion** *Topsoil is directly linked to habitat alteration. Agricultural, ranching and forestry practices can erode topsoil at a rate faster than biotic processes replenish it. Each year, 75 billion tons of soil erode globally, a rate that is approximately twenty-two times as fast as the natural rate of erosion. Thoughtful agricultural and forestry practices maintain topsoil and build humus (carbon) content in the soil, which increases water retention, sequesters carbon and supports soil fungi and diverse microbiota that maintain healthy plant development.*
Habitat Alteration *Also referred to as land use or land occupation is the physical modification or destruction of natural habitats to provide for agriculture, roads, and urban growth. Habitat alteration is the primary cause of the loss of biological diversity on the planet. It is easier to measure habitat damage than loss of biodiversity, so habitat alteration is the closest method for estimating species extinction.*		
Ecotoxicity *Ecotoxicity is the effect of toxic substances on plants, animals, and other biota in the biosphere. The range of potential substances, toxic exposure pathways, affected tissues, and possible effects are manifold. Methods of assessing ecotoxocity impacts are still developing and will continue to improve for several decades.*