

The Zoo & Aquarium Green Guide:
Suggestions for Beginning or Expanding a
Sustainability Program



Created by the
AZA Green Scientific Advisory Group

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Purpose:

AZA-accredited zoos and aquariums know that conservation of wildlife requires conservation of natural resources. This Guide can help zoos and aquariums to “walk the talk” as it offers a collection of categorical suggestions, provided by the AZA Green Scientific Advisory Group, which should be considered when initiating or expanding a sustainability program.

This Guide is a dynamic document and should be considered a work in progress. Details on how these suggestions can reduce your institution’s annual utility expenditures and in turn, greenhouse gas emissions, are not included in this first edition. However, the sustainability categories and suggestions presented are based on the AZA Green Award guidelines.

If you would like more information, including additional resources or contacts to help you pursue sustainability at your organization, please contact any of the Guide’s authors linked above.

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Energy

General Recommendations

- Create an annual energy use report to establish a baseline. Compile a full year's worth of data that includes details about the following:
 - Your organization's energy source(s), e.g. diesel, natural gas, electricity, etc.
 - Total energy consumption and energy consumption by square foot, which will help you compare your energy usage to other zoos and aquariums
 - Total energy costs and energy costs by square foot, which will help you compare your energy costs to other zoos and aquariums
- Invest in an energy audit to better understand your facilities' energy usage. See the section on audits below. For a more comprehensive approach, consider doing a full utility audit that covers energy, water and waste.
- Create a strategic energy reduction plan with clear, stated goals such as "Reduce overall energy usage by 30% by 2014" or "Source 50% of energy from renewable sources by 2018". Be sure to include key decision makers from across the institution, including representatives from animal, finance and facilities areas.
- Be sure to quantify your energy and financial savings. Be transparent with costs incurred or setbacks to document a complete history of your organization's efforts that others can learn from.

Program-Specific Recommendations

Audits

- Many local electric utilities and energy office technical assistance programs, as well as some universities and environmental nonprofits, offer low or no-cost energy audits. Investigate possibilities before attempting to go it alone or funding a private audit.
- Work to determine the areas or buildings that use the most energy. Submeters are helpful here, but it's also possible to use staff's existing knowledge of the energy system; Facilities/operations personnel can often identify which areas are energy intensive and/or have the greatest potential to become more efficient.
- If your institution does not have submeters, consider incorporating their purchase and installations into the organization's capital plans and require them to be part of individual renovation projects.
- Prioritize your largest buildings or those suspected of the highest energy use for your audit.

Alternative Energy

- Consider investigating feasible, fundable alternative energy sources for your institution.
- Some zoos have found funding through becoming a demonstration site for new technologies. A great resource for alternative energy funding and incentive opportunities is DSIRE: www.dsireusa.org.
- Site characteristics are a significant factor in choosing an alternative energy technology. There are many early questions to consider when investigating alternative energy. For example:
 - Do you have the elevation necessary to install wind turbines?
 - Are you in a cloudy location that could benefit from solar hot water heating but not solar electricity?
 - Would drilling for geothermal energy destabilize your property?

Carbon Offsets/Renewable Energy Credits (REC)

- First, consider reduction of usage (see Energy, Water and Waste recommendations) before offsetting your greenhouse gas emissions with RECs or other means.
- When looking for carbon offset programs, understand how much of your dollar actually goes to renewable energy infrastructure and where the infrastructure is located. Beware of programs that invest only small percentages of your money in actual renewable energy generation.

Operations

- Reduce energy demand through efficiency measures such as:
 - IT projects: set automatic sleep and shutoff modes on all equipment.

- Purchasing: mandate that future appliance purchases be Energy Star rated.
- Improve insulation.
- Pursue LEED certification for new construction and existing buildings.
- Install variable frequency drives (VFD's) on any motor over 5 HP.
- Ensure that your water filtration systems are functioning as designed. Poorly operated water systems not only waste water, but they waste an incredible amount of energy.
- Replace appliances more than 15 years old with Energy Star appliances.
- Look for opportunities to automate machinery, including timers and automatic shut-off settings.
- HVAC projects
 - Upgrade any boiler that is older than 20 years.
 - Upgrade any water heater that is older than 10 years.
- Install a building management system to allow better controls over the temperatures in your facilities. i.e., allow you to do nighttime temperature set backs.
- Install VFDs on larger exhaust fans and air handling motors over 5 HP.
- Lighting projects
 - Replace all T-12 lamps and outdated ballasts with T-8's.
 - Replace ALL incandescent bulbs with higher efficiency alternatives, e.g., CFLs or LEDs.
 - Install motion sensors in places like storage closets and offices.
 - When replacing bulbs, be sure to safely recycle them through a respected facility that operates in the U.S. Avoid sending the bulbs to landfills, incinerators or recyclers who operate overseas.

Water

General Recommendations

- Keep track of your water usage. Talk with your municipality to ensure you are receiving full usage information, regardless of whether you pay a water bill or not. Work with your municipality to conduct a water audit to help understand where your reduction opportunities may exist.
 - Install water submeters in key locations to better understand and manage usage.
- Make changes in operational practices. For example, use less water for cleaning (add natural substrates in animal exhibits, sweep pathways instead of hosing) and reduce flow of water in water features, such as animal pools and fountains. Just turning a valve down can cut your usage significantly.
- Implement a leak detection program and make improvements in infrastructure, including replacing worn valves, repairing underground cracks/breaks and repairing leaking pools/fountains.
- Install high efficiency plumbing fixtures that, at minimum, meet the 1992 Energy Policy Act standards. Some examples include dual flush toilets, compost toilets, waterless urinals, low-flow and ultra low-flow fixtures, motion sensors for sink faucets and aerators. The dual flush and high efficiency fixtures use 1.28 gallons per flush or less. Keep in mind that local building codes need to be consulted before implementing some of these technologies (i.e. waterless urinals). Consult your staff experts or a trusted contractor to advise on some of the challenges that might arise, such as the need for certain types of drain pipes with waterless urinals.
- Many water projects could fall under long-term capital planning, such as replacing your steamer with an Energy Star rated boiler-less steamer.

Program-Specific Recommendations

Animal Care

- If you have multiple water-based exhibits, investigate to see whether water can be recirculated within systems, particularly for activities that require a source of running water, such as enrichment sprays for cetaceans.
- Investigate the possibility of reusing “waste” water from one exhibit as “fresh” water in another based on animal care requirements.
 - Aquatic systems can often be reconfigured to clean filters using a backwash system.
- After cleaning, the water can be sent to a dirty basin and filtered into a clean basin for recirculation—leaving only a small amount of water to be disposed. Depending on the size of your systems, backwash filtration can save millions of gallons.
- Watch what you wash: use facility clothes washers for full loads only, fill buckets to wash equipment instead of using running water, and install foot pedals at sinks that make it easy for staff to turn water on and off.

Food Services

- Budget for high efficiency dishwashers, sinks and kitchen appliances during the next remodel. Look for those with the Energy Star label.
- Set policies to thaw out animal and people food overnight in the refrigerator, instead of running items under hot water.

Landscaping

- Reduce the need for landscape irrigation by installing native plants or xeric (adapted to a dry environment) landscaping.
- Develop a landscape and irrigation policy. If irrigation is required, use captured rain water (if permitted in your state) or recycled waste water. Ensure irrigation occurs at night to reduce evaporation and that irrigation heads are positioned properly to avoid watering paved surfaces.
- During major construction/renovation projects remove dump and fill water features and replace them with ones that recycle filtered water.

Stormwater Management

- Capture stormwater for reuse as “gray water” in toilets and/or irrigation. Gray water can be

collected in rain barrels or cisterns both below and above ground. You could also assess your rooftop to see whether a rainwater collection system could be installed there. Check with state agencies to be sure gray water reuse is permitted.

- Install rain gardens, bio-swales, green roofs and pervious pavement to divert rainfall back to the ground, rather than draining into the sewer system.
- Decrease impervious surfaces by reducing paved areas. Introduce pervious pavement and other permeable materials, such as cobblestones, in place of impervious concrete and asphalt.
- Increase green space by reducing hardscape footprint. Increase use of mulch/dirt/gravel for pathways and driveways.
- For those institutions in cold climates, salt is often used to melt snow and ice. Salt (sodium chloride) can have adverse environmental impacts on waterways and drinking water. Sand, sawdust, corn processing byproducts (e.g. Bare Ground), sugar beet extract (e.g. Geomelt), alfalfa meal and calcium magnesium acetate are some safer alternatives.
- Implement operational Best Management Practices that help maintain storm drains by reducing debris. Examples include picking up waste on a regular basis on lawns, sweeping paved areas of debris, and composting landscape waste.
- Implement a spill response procedure. Train employees on the appropriate response in the event of a spill to protect materials from entering the drain.
- Label storm drain inlets to use them as an education opportunity with visitors, and incorporate the signs into education programs.

Wastewater Management

- Even black water (wastewater from toilets, etc.) can be filtered and reused on-site. These systems are usually more elaborate and expensive than gray water filtration, but they are another tool that can be used to reduce wastewater if it's permitted in your organization's area.

Chemicals

General Recommendations

- Complete an inventory of the chemicals you currently have on-site including:
 - The quantities, volumes and physical locations of chemicals.
 - Information about chemical purchasing practices (amounts, vendors, guidelines for bringing chemicals on-site, etc.).
 - Potential hazards associated with each chemical.
 - Details about how chemicals are used in all departments, as well as those used on-site by outside contractors. This information will help you identify areas where chemicals can be switched to a greener alternative or eliminated altogether.
- Request that chemical manufacturers supply MSDSs (see glossary) along with each shipment of chemicals delivered or used on site.
- Establish a leadership team to develop and implement program-specific chemical management recommendations. Team members could include representatives with decision-making authority from purchasing, facilities, animal health, safety/ security, and sustainability/conservation.
- Maintain records in accordance with all regulatory requirements. Types of records may include: waste disposal records, purchasing records, and chemical approval records.

Program-Specific Recommendations

Chemical Management Plan

- Develop a Chemical Management Plan or Policy that specifically outline your organization's best practices for controlling onsite chemical activities.
 - Review current policies or contracts your organization may have regarding chemical management (i.e. hazard communication, contract language with custodial, etc).
 - Consider all applicable regulatory requirements associated with chemical handling, storage, use and disposal.
 - Outline your organization's plans for pollution prevention and green chemistry; the general management of chemicals and products already present; chemical inventories; the purchasing and tracking of chemicals; the storage and handling of chemicals; personnel training and hazard communication; and chemical spills, cleanup, and disposal protocols.
 - Consider establishing a policy that chemical inventories be conducted or updated on a set frequency (this may be dependent on local regulatory requirements).
 - If you need help, contact a trained professional or your local or state environmental health department to conduct a walk-through inspection of potential hazards. Many states have assistance programs available at no charge.

Purchasing

- Your purchasing policy should consider chemical need, use, safety, environmental factors, and lifecycle costs. Things to consider for your policy:
 - Focus on reducing purchase or entry of chemicals that pose a risk to health and the environment.
 - Assign responsibility for ordering materials, screening products and managing inventory and disposal.
 - Create guidelines for contracted services (pest control, custodial, concessions, etc.) that include expectations for green alternatives and disposal.
 - Establish a chemical screening process to ensure that all chemicals and products containing chemicals have been screened for environmental, health, and safety hazards prior to purchase, thus reducing and/or eliminating hazardous chemicals. Identify chemicals and rank based on most effective and least impact on the environment.
 - Develop a "Do Not Purchase" list of prohibited chemicals (i.e. PCBs, chemical fertilizers, high flash point solvents).
 - Promote green chemistry, recycled paint, low volatile organic compounds chemicals, and determine whether certain chemicals can be reduced in quantity or eliminated entirely.

- Establish procedures for employees to submit chemicals they wish to purchase for approval.

Onsite Management, Handling and Storage

- First and foremost, be sure to follow all current state-mandated chemical management guidelines as your baseline management plan.
- To support compliance with your state's regulations, establish guidelines that address how chemicals should be properly stored, labeled, and secured, as well as who should have access to these chemicals.
- Consider chemicals during site design. As part of the construction process for a new exhibit or building, consider how the area will be maintained or cleaned, and how future chemical needs can be minimized.
- Keep chemicals out of public areas.
- Ensure all containers of hazardous chemicals are properly labeled with the identity of the hazardous chemical(s) and appropriate hazard warnings.
- Segregate all incompatible chemicals for proper storage of chemicals by hazard class.
- Store flammable materials in an approved, dedicated flammable materials storage cabinet or storage room. Keep cabinet doors closed.
- Store liquids in unbreakable or double-contained packaging. The storage cabinet should have the capacity to hold the contents if the container breaks.
- Store highly toxic or controlled materials in a locked, dedicated poison cabinet.
- Keep readily available first aid supplies, emergency phone numbers, eyewash and emergency shower equipment, fire extinguishers, spill cleanup supplies and personal protective equipment. Train personnel to use these materials in the event of a chemical spill.
- Store compressed gas cylinders, including empties, in a compressed gas cylinder storage area or secured.
- Keep all stored chemicals, especially flammable liquids, away from heat and direct sunlight.
- When using a secondary container to apply bulk chemicals, make sure to label the container for contents and hazards.
- Work with a local chemical supplier to ensure you have MSDS information for all chemicals on site. Hazardous chemicals should be stored in accordance with MSDS specifications. At a minimum, MSDS information should be located in all chemical storage rooms and cabinets and in a central place within your institution.
- Assign responsibility to a particular individual to manage chemical storage area, providing them with appropriate training.
- Maintain appropriate applicator licenses for employees on site to apply pesticides and herbicides.
- Develop cleaning Standard Operating Procedures. Follow instructions for proper use and dilution of chemicals, keeping minimal water usage in mind.

Chemical Disposal

- Establish chemical disposal procedures that address how unused and outdated chemicals and products containing chemicals should be properly removed, including materials generated from the cleanup of spills.
- Train employees to determine whether outdated or unneeded chemicals are solid or hazardous waste, or provide a point of contact for employees to notify when expired or unused chemicals need to be disposed of. The point of contact should be trained in procedure for hazardous waste determinations and waste management procedures for your location.
- Triple-rinse containers that previously contained pesticide, fertilizer or herbicide chemicals before you recycle them. Capture the rinse water and store as a dilution of the chemical to be used at a later time, therefore reducing chemical purchasing.
- Make sure your procedures comply with regulations regarding the management, transport, and disposal of hazardous waste. (Example: Subtitle C of RCRA regulates hazardous waste generators, and EPA provides definitions of each generator category and its specific requirements at: http://www.epa.gov/epaoswer/osw/gen_trans/generate.htm).
- Consult state waste management and disposal resources for more guidance.

Waste

General Recommendations

- Create a waste management team that includes decision makers from facilities/operations, conservation, food services and other relevant departments to develop site-wide goals targeting a specific waste reduction number and a specific recycling/composting rate increase.
- Establish a baseline by organizing a waste audit. Waste audits can be as simple as organizing staff or a volunteer green team to survey a sample of your organization's trash, or as complex as hiring an outside contractor to perform a detailed audit. Consider checking with local municipalities and universities to see whether they offer free audits.
- Develop data collection procedures to easily assess your waste stream and develop long-term strategies for reduction and recycling. Be sure to fully document all costs, savings and monitoring data.
- Review bills to understand how your waste management rate structures work. In some municipalities, recycling costs less than landfilling.
- Perform a financial analysis to understand how different waste management scenarios affect your bottom line.
- Investigate whether there are opportunities to profit from the waste you generate such as cash-for-scrap programs, using waste to generate energy, etc. When your recycling contracts expire, shop around for a company that will pay you for your waste.
 - Identify potential local and state organizations that can help you meet your goals.
- Some government agencies have funding available for waste reduction while other organizations may happily take your old program materials.

Program-Specific Recommendations

Purchasing

- Implement an environmental purchasing policy to reduce overall consumption.
- Institute bulk buying policies that reduce packaging and be clear with vendors that you do not want items shipped with excessive or non-recyclable materials such as Styrofoam.
- Consider adopting a mandatory recycled content standard of at least 30% for new items.
- Require incoming office furniture to be refurbished instead of brand new. Before discarding or buying new office items, check with other departments to see if they could use or supply the items.
 - Establish an office surplus site for supplies no longer needed but still in good condition.
 - Set the expectation that departments should check this site before ordering new items.
- Develop employee equipment sharing policies, such as office cubicles and furniture for part-time employees.
- Reduce office paper usage through automatically setting printers and copiers to print double sided. Investigate electronic software programs that provide document sharing to limit printing.
- Reduce food waste by purchasing only what you need for department meetings and internal events. Create surplus food sharing policies to encourage interdepartmental waste reduction.

Reuse/Recycle/Compost

- Utilize local resources in your community that may be able to use your waste materials.
 - For example, local schools may be able to use your old education and program supplies, while Earth 911 is a great resource for local reuse and recycling options: www.earth911.com.
- Rather than pay multiple recycling contracts, see if there is a single stream recycler in your community that can pick up several materials at once.
- If you have specialty items to recycle such as electronics or Styrofoam, investigate resources like Earth 911, U.S. EPA or your local or state environmental regulatory resources for leads.
- Consider contracting with a bio-diesel vendor to recycle your cafeteria waste oil.
- Consider implementing other unique recycling programs like nylon collections for use in filtration systems or canvas banners can be remade into satchels and purses for sale in your

- gift shops.
- Establish a compost program for food and horticulture waste either by contracting with an offsite compost facility or providing space for composting onsite.
- Develop a simple system for guests and employees to sort waste, including convenient, well-marked bins.
- Become familiar with relevant universal standards, such as the ISO standards for certified compostable products.
- If possible, assign food service staff to sort food service waste including recyclables and compost.
- If possible, assign custodial staff to sort trash before municipal pickups.

Solid Waste Management

- Establish a waste management area that provides ease of management and sorting and assign roles and responsibilities to individuals for this area, including access.
- Establish protocols to identify unknown waste items in order to determine proper management.
- Ensure adequate storage for items to be held until they can be properly disposed. For example, be sure to have a secure storage space for electronics to be held between e-waste pick-ups so these items are not accidentally thrown out.

Alternative Waste Management Strategies

- Reach out to other zoos and aquariums that have successfully implemented alternative waste management strategies such as gasification and biogassing.

Staff and Guest Culture

- Institutional waste reduction is only successful to the extent that employees take pride in and ownership of programs. Have a clear plan for building waste reduction and recycling efforts into staff culture.
- Consider developing staff empowerment strategies (incentives, competitions, etc) to boost your early diversion rates and program compliance. Plan ahead to reinforce or mandate waste practices after the incentives end; many organizations have seen original behaviors return once the incentives were gone.
- Offer brief waste orientation programs for new staff as part of the standard employee orientation process, as well as regular “status update” trainings to share any program changes (such as new recyclable materials) with current staff. Be sure to include contract and vendor staff in these trainings, as appropriate.
- Provide regular staff updates on waste diversion efforts and results to build pride in the program.
- Consider removing individual wastebaskets in exchange for centralized bin area in every department space. For convenience, individual staff might still have small recycling bins that they empty themselves. Advantages include:
 - Less custodial time needed
 - Fewer garbage bags needed
 - Increased diversion rate
 - Decreased pest problem from food waste in individual baskets

Public/External

- Talk with other zoos and aquariums about methods they have found effective for successful guest recycling and composting programs.
- Be sure there is easy public access to bins for landfill, recycling and compost at ‘waste stations’.
- Encourage proper sorting at ‘waste stations’. Some options are:
 - Volunteers at high volume areas to help with sorting.
 - Custom signage with bold visuals.
 - Shadow boxes – using actual examples of items in 3D signage.
 - Running looped instructional videos at waste stations.

Purchasing

General Recommendations

- Establish an Environmental Purchasing Policy for your organization that specifies purchasing criteria such as 30% recycled content, Energy Star Rated equipment, bulk purchasing, etc.
- Consider screening vendors for their green practices as part of your contract decisions.
- Do the company's green values and practices mirror your own? Build green standards into all purchasing contracts.
- Request minimal packaging for all deliveries.
- Buy used, post-consumer, or repurposed items wherever possible (e.g. educational books, animal enrichment toys, office furniture, etc.).
- Look into local "Freecycle" type networks for picking up free or cheap used supplies.
- Choose local vendors and suppliers wherever practical to reduce emissions and conserve energy.
- Transition away from new plastic in all areas: move to compostable plastics, recycled content plastic or buy used items. At a minimum, choose plastic items that can be recycled by your waste management service.
- Considering pooling purchasing with neighboring entities. This will increase your leverage on pricing on sustainable options.
- The EPA's Environmentally Preferable Purchasing website has a wealth of information about sustainable purchasing standards: <http://www.epa.gov/epp/>.

Program-Specific Recommendations

Office Supplies

- Institute resource reallocation programs such as supply swaps or a supply surplus area and set the expectation that those options should be checked before purchasing.
- Transition to all electronic catalogs.
- Make all purchases online and centralize purchasing so all orders are sent out together on a prescheduled basis and shipments all arrive on the same truck.
- Because green office supplies can be more expensive, ask your company if they would consider a green product discount in exchange for making the vendor your exclusive supplier.
- Negotiate bulk discounts on green products in exchange for a commitment to limit purchasing to those specific items. For example, restrict all file folder purchases to the one (or more) negotiated item versus allowing staff to pick from a catalog.
- Receive and pay bills electronically
- Request minimal packaging for all deliveries. Organizations have had success with asking their office supply vendors to deliver goods in reusable crates rather than in cardboard boxes filled with packing materials.
- Ask whether the company uses Styrofoam packaging or more sustainable (compostable or easily recycled) materials. Request they provide packaging that you will be able to reuse and recycle on-site, or send back to them for reuse.
- Look into newer, non-traditional alternatives to virgin paper for printing jobs.

Education Supplies

- Purchase used books instead of new.
- Buy in bulk for programs to reduce packaging and freight emissions.

Gardens and Landscaping

- Choose native plant species that require little-to-no watering.
- Choose organic lawn care products.
- Rely on compost rather than fertilizer.

Food and Catering

- Set a target to remove all bottled water from restaurants and vending machines.
- Purchase human and animal food supplies from local farms where possible.
- Mitigate the cost of organic and sustainable food options by minimizing waste through bulk

condiments, reusable service ware, removal of extraneous wasteful items (such as cup lids and plastic straws), and recycling of items such as cooking oil and wine corks.

- Implement a composting program for postconsumer food scraps through a local waste management provider or onsite.
- If you have a composting program in place or in development, purchase compostable cups, utensils, plates and napkins for when disposables are needed.
- Alternately, purchase reusable dining ware for your staff and guest use. Consider installing efficient dishwashing equipment for these items if you do not current have those facilities.

Animal Diet, Supplies and Enrichment

- Follow Seafood Watch recommendations whenever possible for animal diet decisions.
- Look into local suppliers for meat and produce.
- Consider growing a modest amount of produce on site for diets and/or enrichment.
- Implement a live foods program for small items that can be grown onsite, such as algae, crickets, shrimp, rotifers, etc. Reach out to other organizations who have successfully established live foods programs for tips on getting started.
- Investigate if appropriate food service waste can be incorporated into animal feed.
- With proper veterinary clearance, household and office items can often be reused as animal enrichment. For example, cardboard tubes and boxes can be fashioned into puzzle feeders or used to create shelters and hide boxes. Old sheets and towels can be used as animal bedding. Yogurt cups and other plastic containers are options for creating frozen treats.
- When purchasing new items, investigate packaging to avoid buying items that come in excess wrapping.

Gift Shops

- Include green expectations in the gift shop vendor contract, including the creation and implementation of a strategic plan with specific goals, as well as any mandatory limitations. For example, an aquarium might not allow any coral products to be sold onsite.
- Develop a strategic plan to green your gift shops:
 - Review current stock to identify “green” products and products that contradict the institution’s mission (such as palm oil candy or electronic gadgets with components that are mined in sensitive natural areas).
 - Work with the gift shop managers to identify first steps and build out a multistage plan to transition towards greener products. Don’t be discouraged by high- revenue trinkets such as magnets and plush. Focus on more flexible items, instead.
 - Publicize green gifts: feature them in shop windows, at entry points, and tell engaging stories to interest guests.
 - Offer a reusable bag for sale in your gift shop that provides a 5 to 10% discount to guests when they use it again on site.
 - Track the sales of green items to measure the actual impact against your established goals.

IT and Appliances

- Purchase Energy STAR rated items where available: <http://www.energystar.gov/>.
- Use EPEAT to find green electronics: <http://www.epeat.net/>.
- When old electronics and appliances are replaced, be sure to recycle them responsibly. For electronics, choose an ISO 14001 certified recycler and visit their site, if possible, to ensure that your electronics are being recycled domestically.
 - Be sure to track the amount of e-waste you recycle.

Awareness

General Recommendations

- When creating a sustainability-related position, a Green Team, or sustainability-focused Department, care should be taken to outline purpose, authority and expectations. Without a clear tie-in to the larger organizational strategic plan and stated expectations, an organization may find their green efforts quickly marginalized or forgotten.
- Ensure your Green Team includes many upper-level managers who can facilitate institutional buy-in and funding.
- Transparent annual reports should be made available to the public including challenges and achievements.

Program-Specific Recommendations

Green Position/Green Team/Green Department

- Clarity of purpose, expectations and authority should be established early by the organization's leadership and consistently supported thereafter.
- The expectation of range and depth of sustainable improvements should be established before the planning process.
- The green position/team/department should have decision-making authority or report to an Executive champion/department head that has decision-making authority.
- Green initiatives don't succeed in a vacuum: any programs or projects should be done in collaboration with other departments. Lay the groundwork for cooperation up front by recognizing and consulting the expertise of individual departments and staff members who are best suited to identify green opportunities within their program areas. The green team or department is a great resource to get the job done, but other departments will be the key to establishing what that job is.
- A Green Team should be held to the same standards as other operational teams (e.g., not treated as a staff interest group).
- Designating funds into a dedicated green budget or setting clear expectations for contributions from departmental budgets is a key step towards moving sustainability initiatives forward.

Employee Awareness Programs

- Develop and implement a required orientation to sustainable practices and expectations for all new staff members.
- Develop and implement efforts to increase staff literacy on sustainability topics that connect to your organization's programs, such as energy, waste management, food systems, water conservation, purchasing, etc.
- Invest the time and resources needed to integrate sustainability into existing staff responsibilities. The green position/team/department should take the time necessary to become familiar with departmental and individual goals and responsibilities to determine how sustainability initiatives can help fulfill them.
- Create and implement processes to gather sustainability initiative ideas and input from staff on a regular basis.
- Include progress on sustainability goals in performance appraisals.
- Be sure that executive leadership regularly communicates organizational standards and expectations to all staff.

Contractor/Vendor Awareness Programs

- See Purchasing section for more information on setting standards for vendor and contractor considerations.
- When possible, include contract/vendor staff in employee awareness and training programs. Consider tailoring programs for specific contract/vendor areas, such as food, gift shops or cleaning services.

- Communicate to contractors (including building and construction) all protocols and procedures your organization has in place regarding waste management, water use, etc.
- Be sure to post appropriate signage and messaging in areas of contract/vendor work, e.g., “No Idling” signs on a loading dock.

Guest Awareness Programs

- Signage and graphics are great first steps to guest awareness. Be sure to highlight your organization’s efforts and translate these into opportunities for guests to make similar efforts at home.
- Be transparent with challenges, as well as achievements. Avoid greenwashing at all costs! Review “The Seven Sins of Greenwashing” to ensure your organization does not make false claims: http://www.terrachoice.com/files/6_sins.pdf.
- Consider incorporating green into programming, not just as content, but also through modeling how to green the event itself. For example, if a program involves coffee service, be sure to have reusable dishes and tap water rather than disposables and bottled water.
- Be consistent! For example, if you are sharing recycling success stories, make sure you have recycling bins available for guests. If you are asking guests to consider buying palm oil-free candy and sustainable seafood, be sure that you are not selling items that contradict those messages in your restaurants or gift shops.

Innovation

General Recommendations

- Every institution or organization is unique; “innovation” will be different for each depending on the opportunities within your community.
- Develop a systematic, organization-wide approach to identifying and managing environmental impacts, such as an Environmental Management System (e.g. ISO14001), that provides a framework for identifying, evaluating, managing and improving your organization’s environmental performance.
- Develop partnerships (private, local or state institutions/organization) that make your environmental programs stronger, increase their impact, and reach more of your community. Look to the Biomimicry Institute and EPA Greener Venues programs for examples.

Program-Specific Recommendations

Operations

- Incorporate holistic thinking into operational decisions and new projects.
 - Create a framework that considers the full lifecycle and environmental impacts of new projects.
 - Don’t try to start from scratch: look at existing tools to see if they can meet your needs. Concepts such as Cradle to Grave and Biomimicry could provide good direction for your work.
 - As part of the framework, leadership should be committed to weighing the environmental pros and cons of projects to make decisions with the most environmental benefits.
 - Look outside the box to ensure that one solution isn’t creating a problem somewhere else. For example, you may be able to compost more offsite than on your grounds, but are you generating more emissions than the compost saves by trucking your waste to a distant facility?
 - Create space in capital budgets for piloting new sustainability initiatives.

Education and Guest Engagement

- Invite visitors to be part of the innovation: extend recycling opportunities to guests, offer behind-the-scenes tours, ask for new ideas and suggestions through social media outlets, etc.
- Launch a demonstration project on-site and create relevant education programming for community members and partner institutions. Examples might include waste to energy facilities, aquaponic systems, rain gardens/monarch way stations, etc.
- Look for opportunities to use your reputation as a trusted environmental leader to create change within the community or local government.
- Find effective ways to link your sustainable practices to animal conservation efforts, particularly by making meaningful connections between actions that visitors can take at home and how those efforts help wildlife.

Glossary

(source U.S. EPA)

Compost: A humus or soil-like material created from aerobic, microbial decomposition of organic materials such as food scraps, yard trimmings, and manure. Material is generated through composting which is a controlled biological decomposition of organic material in the presence of air to form a humus-like material. Controlled methods of composting include mechanical mixing and aerating, ventilating the materials by dropping them through a vertical series of aerated chambers, or placing the compost in piles out in the open air and mixing it or turning it periodically.

Hazard categories: Chemicals are usually categorized into one of the following categories depending on their specific characteristics; flammables/explosives, corrosives, oxidizers/reactives, toxics, and compressed gases.

Hazardous chemicals: May include (but are not limited to) the following:

- Cleaning products utilized by custodial, cafeteria, and maintenance staff;
- Pesticides, fertilizers, and de-icers/salts/ sands used for grounds maintenance, as well as pesticides used for building maintenance;
- Paints, solvents, fuels, degreasers, and lubricants used in building operation and maintenance;
- Oils, fuels, paints, antifreeze, and other chemicals used to maintain and repair equipment for transportation, zoo maintenance; and
- Chemicals used to treat water associated pools and exhibits.

Hazardous waste: By-products of society that can pose a substantial or potential hazard to human health or the environment when improperly managed. Possesses at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity), or appears on special EPA lists.

Material Safety Data Sheets (MSDS): Comprehensive fact sheets prepared by chemical manufacturers, describe the physical properties, health effects, and other characteristics of chemicals, as well as procedures for handling, storing, and disposing of these substances.

Recycling: Minimizing waste generation by recovering and reprocessing usable products that might otherwise become waste (.i.e. recycling of aluminum cans, paper, glass, plastics, and bottles, etc.).

Specialty recycling: Minimizing waste generation by recovering and reprocessing usable materials that might otherwise become waste such as electronic waste, building materials, scrap metal, etc.

Solid waste: Non-liquid, non-soluble materials ranging from municipal garbage to industrial wastes that contain complex and sometimes hazardous substances. Solid wastes also include sewage sludge, agricultural refuse, demolition wastes, and mining residues. Technically, solid waste also refers to liquids and gases in containers.

Universal waste: A category of hazardous waste materials that EPA provided a streamlined management program to encourage resource conservation and recycling of these items that are generated by a vast community. These items include batteries, pesticides, mercury- containing equipment and fluorescent bulbs (lamps)

Waste audit: The most basic version of a waste audit will require little more than sanitary gloves, waste bags and a scale. Work with your facilities team to bring a day's worth of waste to a central location. Sort it into three categories: garbage, recycling and compost. You can estimate the percent composition visually, or use a scale for a more accurate estimate. Once you can identify the recyclable and compostable materials that show up most often in your garbage, you can target waste reduction and recycling efforts. Note: if you conduct your own waste audit, the more often you sample and sort, the more likely your audit will accurately reflect your waste stream's composition.