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Local Plant and Insect Conservation Evaluated with Organizational Identity Theory

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Abstract: With a range of programs focused on local plant and insect conservation, the Cincinnati Zoo & Botanical Garden works with partners and our communities to restore landscapes and thriving ecosystems for wildlife and people. We used organizational identity theory (OIT) to evaluate the current strategies and practices of five programs and determine opportunities for adaptation to better achieve our organizational conservation goals. Case studies ranged from habitat restoration of wetlands and gardens to community engagement to encourage individual gardeners and the reintroduction of endangered plants and insects. We present program characteristics and how collaborative partnerships facilitate opportunities for zoos to lead the conservation of local flora and fauna. The OIT framework reveals components critical to strategy implementation and best practices relevant to other zoos, aquariums, and botanical gardens when evaluating their collaborative conservation initiatives.

Keywords: zoos; local wildlife; conservation; collaborative partnership; habitat restoration; pollinator garden; community engagement; reintroduction

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1. Introduction

Human changes to landscapes are driving the biodiversity crisis for plants and animals and the decline of functional ecosystems [1–4]. Biodiversity degradation is more concentrated in urban areas with higher intensities of human modifications to the landscapes [5]. However, people can also provide solutions; communities can be mobilized to reduce threats and support conservation [6].

Insects and plants are sensitive to human-caused stressors and ecosystem changes [7–9]. In the last 30 years, terrestrial insect populations have declined by 24% [4]. While many people are underinformed or unaware of the complex issue of declining insect populations [10], we need people to identify, implement, and embrace interventions that support insect populations, which are critical for ecosystem health, services, and resilience [11–13]. Plants are also at great risk of biodiversity loss, with an estimated 40% of plant species at risk of extinction due to threats such as climate change, habitat loss, and invasive species [14]. The tendency for organizations to focus on animal conservation can result in plants being ignored and their conservation underfunded, despite having the most species on the endangered species list [15,16]. Many plant species have dispersal mechanisms that make them unable to adapt to quickly changing environmental conditions and threats, and as a result both in situ and ex situ conservation methods are often recommended [17]. Zoos, aquariums, and botanical gardens can lead their communities to embrace and implement plant and insect conservation efforts. Conservation research has historically focused on larger, intact natural areas, yet scientists have identified urban and suburban landscapes as settings for biodiversity conservation through landscape interventions, such as diverse plant installations and gardens [18]. Residential lawns engulf almost 40% of the total area of the United States [19], yet these monocultures or "green deserts" provide little food or

habitat for insects or other wildlife [20]. Only 18% of a typical yard includes more diverse plants, trees, and shrubs that could provide habitat or resources [21].

Plant restoration can create welcoming landscapes for wildlife [22–24]. For example, diverse plants in urban gardens have a strong, positive influence on insect populations [25–29]. Insect conservation programs recommend a diversity of native plant species to increase viable landscapes [4,30–33]. Community members in residential areas, no matter if they have a sprawling area in their yard or just a few flowerpots, can have a positive impact on insect populations [34]. With more diverse green spaces and corridors, cities can provide vital refuges for wildlife [35].

1.1. Collaborating with Communities

Conservation issues are complex. From economic and political decision-makers to the ecological drivers, social conditions, and characteristics of the communities, the factors that influence environmental conservation are diverse, nuanced, and often connected to each other (e.g., PESTLE analysis in Maynard et al., 2022 [36]). However, engaging diverse communities and organizations can support impactful change with more perspectives present and empowered to share creative solutions [37]. These challenges have shifted how organizations use community-based approaches to create sustainable actions through diverse partnerships and networks [38]. We predict that more organizations, individuals, and communities involved in conservation efforts will lead to more potential for conservation impact through resource-sharing and coordination [39,40].

Furthermore, zoos and aquariums can work together to lead their millions of visitors and nearby communities to participate in conservation [40]. In recent years, zoos have invested more active staff involvement in conservation projects to step into this leadership role [41]. While zoos have historically branded themselves separately for individual conservation projects [42], complex conservation issues exceed one organization's reach, so collaborative partnerships are vital for success [40].

To combat the biodiversity crisis, conservation organizations must improve leadership strategies to better serve communities and meet organizational goals [43]. Vision, values, and partnership-building are critical components in conservation leadership and the resources invested to influence the environment [44]. This study investigates the unclear relationship between organizational leadership and the success of conservation goals [45,46].

Conservation initiatives need community support to combat complex challenges [47]. Over the past few decades, conservation organizations have focused more on localized, community-based work [48,49]. When organizations work, serve, and support communities, a positive and transferable leadership presence can be cultivated to reinforce their reputation [50]. Community involvement can amplify awareness of environmental issues while supporting research project needs [51].

Adaptive management based on scientific evaluation is critical for conservation efforts within dynamic communities and landscapes [52]. Community Science (CS) promotes efficient data collection for program evaluation alongside local audience engagement [53]. CS allows people to be intricately involved in science through organized mobilization to collect data and support research projects [54]. CS programs need collaborative engagement, organized structure, and relevance to be considered successful [55].

When done well, CS programs can provide high volumes of accessible data collection through volunteer participation. The annual estimate of CS participants ranges from 1.3–2.3 million volunteers who donate up to USD 2.5 billion in kind [56]. The growth within these community programs and a stronger focus on leadership strategies [44,52] highlight the need for conservation programs to evaluate their effective connections to their communities and regional landscapes [57].

1.2. Conservation Identity Evaluation

Conservation strategies require evaluation and adaptive management to ensure their goals are being achieved [58]. We conducted this study to evaluate the current activities

and impact of the Cincinnati Zoo & Botanical Garden's (CZBG) local programs to restore landscapes for plants and insects while inspiring community involvement. We assessed five programs that include different species and activities to examine our progress toward our local wildlife coexistence goals.

Organizational identity theory (OIT) [59] provided the framework for the evaluation in this study. OIT outlines components of an organization's strategic plans across six constructs to enable constructive evaluation. From the foundations of identities and desired outcomes to the application of intentions into active projects and invitations for stakeholders to join in, the six constructs highlight connections between abstract aspirations and their application on the ground [59]. (1) The central construct defines the core features and missions of an organization. (2) The enduring construct explores how long an identity has endured, and even strengthened, over time to understand how an organization has prioritized this identity over other possible strategies [59]. (3) The distinctive construct highlights what makes an organization and its activities unique. (4) The goal-oriented construct assesses whether the organization set deliberate intentions as important precursors to organization's decision-making for future activities [60]. (5) The responsibility construct examines how an organization creates legitimacy when it influences its stakeholders toward acting in support of its mission [60]. (6) The performance construct facilitates the formative evaluation of current performance against the organization's goals to promote reflection on opportunities for improvement [60].

OIT is similar to a logic model framework of inputs, outputs, and outcomes, yet OIT aids the evaluation to dig deeper by adding factors of the strategic intentions of the organization [61]. By including leadership's perspectives and reflections on goals and calls-to-action, OIT enables a thorough evaluation across the organization's initiatives with many perspectives considered [60].

Organizations seeking to promote a cause and mobilize their community can use OIT to design and monitor their strategies [62]. Organizations are more likely to achieve their goals when they reflect on and manage their identities [63]. The intentional activities and impact desired by organizations are informative components of their identities, and through reflective evaluation new opportunities can be revealed to increase their effectiveness.

Zoos and aquariums historically participated in conservation by distributing revenue to other organizations, yet their staff could feel disconnected from conservation [6]. Creating opportunities for staff to be directly involved in a conservation project beyond the walls of the organization's grounds allows diverse individuals throughout the organization to connect with the identity by participating in the larger community and landscape. Looking outside of the organization, the formation of collaborative partnerships on the projects extends the identity to other organizations throughout the community for additional resources and individuals to join in and expand the project's reach. These are key components of the distinctive construct for OIT.

Applying the OIT framework can aid zoological institutions and botanical gardens to compare their goals against their activities and progress. The OIT framework organized our review of CZBG's strategies and activities to document both successes and opportunities for conservation identities to be strengthened [64,65]. OIT helps to assess the relationships between organizational intentions and the characteristics of identities in practice [59]. We invited project leaders across the five zoo case studies to participate in the collaborative evaluation, as OIT predicts that leaders of an organization and project team know and use their organizational identity to guide project decisions toward their goals [60]. If zoos strive to lead communities to participate in wildlife conservation [66], then this assessment of the local plant and insect conservation programs at CZBG will provide relevant example methods of formative evaluation by using the OIT framework.

1.3. Project Goals

Conservation strategies for local species, such as insects and plants, can be led by nonprofit organizations with proactive and extensive collaborations and communications

throughout their communities [67]. This study builds on similar evaluations of collaborative conservation initiatives (e.g., Maynard et al., 2022 [36]), which assessed whether organizational activities both connect directly to the threats species face and mobilize more people to take action to increase efficient resource-sharing, thereby creating a movement beyond the reach of one organization. Organizational identity theory provides the framework for evaluating the local conservation programs at CZBG.

2. Methods

2.1. Project Site

CZBG is located in the city of Cincinnati, OH, USA. With a population of approximately 300,000 within the city and 2 million people in the region [68], approximately 1.7 million people visit CZBG annually. Urban landscapes surround CZBG, but we engage our visitors in conservation activities to restore diversity through native plants and pollinator habitats. CZBG has several programs to promote local plant and insect conservation, with the goal of facilitating increased biodiversity and vibrant landscapes and mobilizing our audiences. This study will contrast our local conservation activities against our organizational identity and goals to assess effectiveness.

Understanding the conservation impact strategic plan for the organization provides critical context before jumping into evaluating the local conservation case studies. Coexistence between wildlife and people is the foundation of the CZBG conservation impact strategy. The four coexistence goals of (1) impact, (2) mobilize, (3) elevate, and (4) justice are mechanisms for measuring progress for all projects implemented under this strategy. The research team used these four coexistence goals to contextualize and interpret identity evaluation using OIT constructs.

The organizational conservation impact strategy at CZBG includes the following statements:

The goal of the CZBG conservation impact strategy is to activate our staff, visitors, stakeholders, and audiences to be inspired by wildlife to actively participate in conservation. Our Conservation Impact initiatives are unique, with our focus on coexistence and proactive calls-to-action for every project and every audience member.

Through an empowering alliance promoting benefits for all, we can collaborate, advance science toward impact, enhance solutions and reduce conflict, and sustain healthy landscapes and resources for wildlife and people. By leveraging the zoo and botanical garden's deep expertise and celebrating our unique animals and plants, we are building a brighter future for wildlife and people.

Our coexistence goals are:

1. Impact—Increase our direct impact on threats to wildlife and field partners' needs, with zoo staff on the ground co-developing projects with our partners.
2. Mobilize—Increase our mobilization of zoo staff, visitors, and local communities in strategic action for sustainable resource use and wildlife coexistence.
3. Elevate—Increase our team's expertise, external presence, reputation, and credibility by training future conservation leaders and leading collaborations.
4. Justice—Increase our active inclusion, equity and justice efforts by investing in and supporting diverse, indigenous experts with proactive partnerships.

2.2. Screening Criteria

To evaluate whether the organizational conservation identity of CZBG is developed in our local conservation projects, we assessed five case studies of local plant and insect conservation projects using the OIT framework (Figure 1). The case studies were selected from a complete census of CZBG's local conservation projects. Screening criteria required the projects to have zoo staff directly involved in the projects' activities rather than zoo funds being used by other partner organizations. All five local conservation programs revealed in the census were selected for the study as they met the screening criteria.

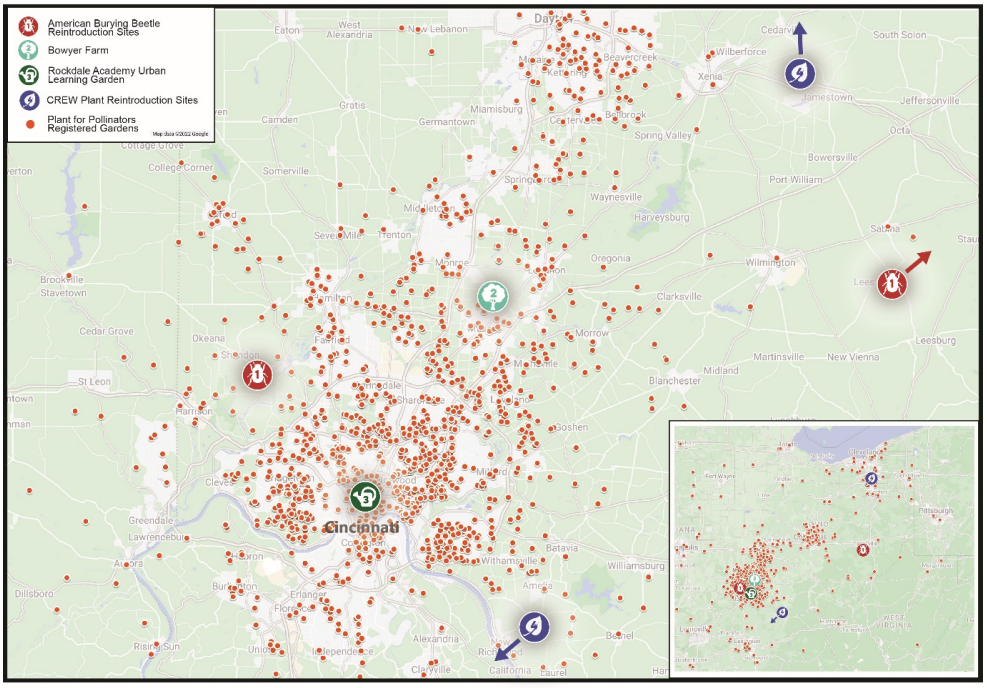

Figure 1. A map depicting the approximate location of the five CZBG local conservation case studies across Ohio, as well as parts of Kentucky and Indiana. These widespread programs create an abundance of vibrant landscapes by mobilizing community members in CS, allowing for greater outcomes from staff engagement. Program icons are defined in the top left key. The bottom-right square depicts the zoomed-out scope of projects across Ohio and the surrounding states. The reintroduction sites for (1) ABB and (4) CREW are approximately marked with an arrow to indicate direction without identifying specific locations of the highly sensitive, endangered species.

2.3. Organizational Identity Theory Constructs

We used OIT as the deductive framework for our evaluation. We explored the features of the projects as potential evidence of CZBG's conservation identity by sorting details into the six constructs in the OIT framework for each case study (Figure 2). OIT has three core constructs that describe the projects' (1) central, (2) enduring, and (3) distinctive characteristics as they establish legitimacy and recognizability [2]. OIT then includes three constructs to assess the identity's application attributes and success in practice, which are (4) goal statements, (5) activations of responsibility, and (6) perceptions of current performance [69,70]. By categorizing the components of OIT, the constructs organized our qualitative content analysis into a formative evaluation of the strategic goals of our organization.

Central: The central construct of what is core to the conservation efforts is the foundation for an organizations' identity and strategies [61]. Evaluating an organizations' programs and initiatives can reveal their potential impact represented by their active identity, which is more informative than reviewing their mission statements and brands [6]. The evaluation of each case study separately will use the central construct to uncover the core characteristics of the programs.

Enduring: The programs' enduring identity is impacted by their age and the growth of their activities over time.

Distinctive: An organization makes itself distinctive by emphasizing its identity with calls to action and exemplary messages to both internal staff and external stakeholders [71].

Goal-oriented: The goal-oriented construct links an organization's core missions with the strategies they later implement by defining their desired outcomes [64].

Responsibility: Using this responsibility to promote new participation in activities, an organization progresses toward its goals and amplifies more resources for the project [64].

Identity-performance: This construct is measured by reviewing existing outputs and metrics for desired outcomes to assess current trajectory and opportunities for intentional adaptation.

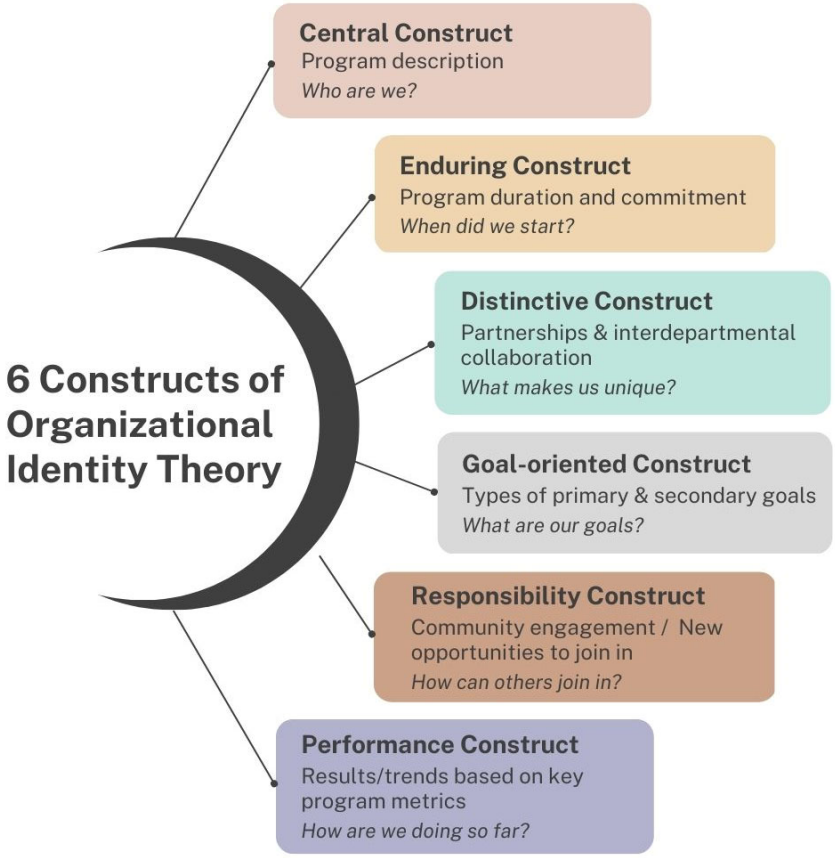

Figure 2. Descriptions and important components of the six constructs of organizational identity theory.

2.4. Data Collection and Analysis

We conducted a collaborative content analysis with project partners from the five case studies to review the progress reports, project management documents, activities, and metrics for each project. The research team met with the case study partners to document details about each program. OIT is an internal evaluation tool that uses inward-looking criteria to evaluate program effectiveness and reveal opportunities to strengthen organizational identity and program alignment. This is why the partners who were interviewed did not include anyone outside the organization.

The research team compiled details about each case study and categorized the materials into tables for the six constructs from OIT. We used an iterative process of reviewing and discussing the data categorizations to reach consensus from the research team and collaboratively incorporated perspectives from the projects' partners [72].

We used purposive sampling to identify project partners as participants for the case study reviews (n = 10). Screening criteria for project partners to participate in the collaborative content analysis discussions included having worked on that project for at least one year to ensure their understanding of the project details, their availability for review meetings, and their willingness to discuss their perspectives and project activities. The research team acknowledged the potential for bias toward positive comments from participants due to their involvement in the projects and their investment in its success; however, we framed the evaluation around the value of identifying opportunities for improvement to encourage participants' honesty.

This collaborative content analysis evaluated each project's features across the six constructs of their organizational conservation identities. We discussed these details and assessed their level of activation to achieve this piece of the identity development. We also highlighted any less developed constructs as opportunities for enhanced identity development to achieve greater potential impact.

The research team initially tried using an online survey and email inquiries to collect details about the projects, yet the simplified questions did not elicit rich qualitative details about the programs. After adapting to in-person meetings and co-reviewing documents and reports, the collaborative process of including participants in collecting the program details helped the research team to document the projects during the evaluation process.

3. Case Studies

In the following section, we evaluate each local conservation program by highlighting its relevant components within the six organizational identity constructs with illustrative details and examples. The three core constructs present the foundation of the programs, while the three applied constructs reveal their identity in practice [64]. The case studies had some well-developed identities and some with incomplete components, emphasizing different features and leadership decisions. The less established constructs reveal opportunities for adaptive management and growth for these case studies to better achieve their local conservation goals.

Organizations' leaders represent and guide the organization's identity into its tangible strategies and projects [73]. By conducting a collaborative content analysis with the leaders (n = 10) of five local conservation programs at the Cincinnati Zoo & Botanical Garden, we had the most informed participants share essential details regarding their current activities, their goals, and opportunities for improvement.

3.1. American Burying Beetle (ABB)

Central: This project involves captive breeding, reintroductions, and presence/absence surveys in Ohio of the ABB. The recovery of this state endangered and federally threatened species relies upon collaboration between multiple organizations and government agencies. Each summer, founders are collected by CZBG World of the Insect Keepers from the sandhills of Nebraska with the help of Nebraska Game and Parks Commission, the USFWS, and The Wilds and brought to Ohio. Those beetles and their offspring are bred at CZBG and The Wilds to produce a large release population for the following summer. Reintroductions have been held at The Fernald Preserve with cooperation from the Department of Energy and at The Wilds, which is partially supported through a grant with the Ohio Department of Natural resources and in-kind support from the CZBG.

Enduring: The ABB program started over 30 years ago, with CZBG participating in ex situ breeding of the endangered species. The program's identity has endured and evolved with the additional active participation in local reintroduction efforts starting in 2011.

Distinctive: This project involves diverse staff in the field activities implementing the interventions and monitoring the target species, such as when zoo staff create field equipment for the ABB releases. Collaborations with external partners drives the program forward with regular communications between organizations, shared project management, coordination of activities, and collaborating on fundraising. The ABB reintroduction team noted that open knowledge sharing of best practices between partners involved in breeding and reintroduction efforts has been vital to the success of this initiative.

Goal-Oriented: The goal of this project is to support the recovery of this state endangered species through collaboration between multiple organizations and government agencies for beetle breeding in CZBG care and reintroduction efforts locally. When reflecting these project goals against the four coexistence goals for the CZBG strategic plan, the case studies prioritized different facets of the coexistence goals for documenting progress (Table 1). This project was built around the priority of impact for specific species and habitats. Other coexistence goals could be considered for future growth of the program.

Table 1. Program details for the five case studies representing the enduring, distinctive, goal, and responsibility constructs from OIT.

Enduring Construct		Distinctive Construct		Goal Construct		Responsibility Construct	
CZBG Program	**Age of the Project (Years)**	**Types of Partners**	**Inter-Departmental Collaboration Across CZBG Outside of the Project Team?**	**Priority Coexistence Goal**	**Secondary Coexistence Goal**	**Call-to-Action for Community Involvement?**	**Number of Partner Organizations**
American Burying Beetle (ABB)	31	Federal government agencies, state fish and wildlife agencies, other zoos, state and local parks	Yes	Impact	Elevate	No	8
Bowyer Farm	10	Federal government agencies, scientists and universities, extension agents, plant nurseries, restoration specialists and contractors	Yes	Impact	Mobilize	Yes	10
CREW plant reintro-ductions	10	Federal government agencies, scientists and universities, state and local parks	No	Impact	Elevate	No	10
Plant for Pollinators (P4P)	3	Individual participants, sponsors and donors	Yes	Mobilize	Impact	Yes	19
Rockdale Urban Learning Garden (ULG)	2	City public schools, local community organizations, sponsors and donors	Yes	Justice	Impact	Yes	5

Responsibility: The calls-to-action for zoo audiences vary in strength across the projects (Table 1). The ABB program does not communicate a call-to-action for participation in the program. The reintroduction-focused projects are handling endangered species and do not provide a call-to-action for the public to get involved. This may be due to the endangered species being rare, so community members would rarely see them to participate in community science. The programs are described and celebrated on the zoo's social media to raise awareness and indirect support for conservation action, but they do not convey direct ways for zoo audiences to get involved in protecting these plants and insects. However, communications could improve with messages beyond awareness raising about ABB to include ways to create habitat for other native insects important for our ecosystems.

Performance: 1833 ABB released into the wild from CZBG population since 2013. Twenty-four beetles recaptured to check survivability, 20 offspring captured to check the next generation's success, and an estimated 2630 larvae produced in the wild. Overall, the ABB species was down-listed federally so progress is being made, though it is still listed as endangered in the state of Ohio.

3.2. Bowyer Farm

Central: Bowyer Farm is over 600 acres (243 hectares) and supports a variety of projects including wetland reclamation started in partnership with the US Department of Agriculture. Initial habitat restoration focused on rebuilding a vernal pool from altered soy and corn fields to create habitat for amphibians, and over time additional habitat features have been restored for other wildlife species. This farm was willed to the CZBG under the guideline that it could not be developed unless doing so would further the mission of CZBG. The farm also grows native plants for public sale and planting in CZBG pollinator gardens, as well as browse growth for zoo animals and animal enrichment. Bowyer is also the location for an upcoming solar panel installation (size = 25 MW) that will help CZBG move from net-zero to net-positive energy usage.

Enduring: The older programs have endured and grown from their original goals to add additional activities to the sites and new species to the conservation management efforts. The conservation program at Bowyer Farm started with a focus on recreating a vernal pool for amphibians, but over time additional habitats have been restored to provide year-round water for other species, including plants, waterfowl, migratory birds, and other amphibians. This program has endured and grown over time, enhancing CZBG's commitment to the conservation identity.

Distinctive: This project involves diverse staff in the field activities of habitat restoration and plant nursery maintenance. For example, diverse zoo staff join wildlife observation events at Bowyer Farm to monitor bird, insect, amphibian, and reptile species in the restored landscapes.

Goal-Oriented: The goal of the project is to restore habitats from farmland back into wetlands, forests, and prairie and manage the landscape for as much diversity in plants, birds, amphibians, and reptiles as possible. Later on, additional goals were established, such as creating a native plant nursery, hosting events, and welcoming external partners to conduct research. These goals start with a focus on the impact for specific species and the habitats restored across the landscape, with additional coexistence goals acknowledged around ways to mobilize audiences at the farm and elevate the zoo as a conservation leader and host in the space. However, Bowyer Farm has an opportunity to grow into the untouched goal of how to promote environmental justice in nearby underserved communities.

Responsibility: Bowyer Farm offers some volunteer events to support habitat restoration activities, but it is not open to the public every day. However, on the Saturdays when the farm is open, an average of two thousand people come to purchase native plants and learn from the horticulture team.

Performance: 205 bird species, 13 amphibian species, and 7 reptile species have been observed onsite at the Bowyer Farm, demonstrating the viable habitat welcoming diverse species from the prior corn and soy farm fields. Additionally, the CZBG horticulture

team have grown over 300 native plant species and sold 12,522 individual native plants, documenting the extent of increased supply of native plants provided by the Bowyer Farm.

3.3. CREW Plants

Central: This project focuses on producing plants for habitat restorations through in situ reintroduction and preserving plants in long-term storage so they can be used in future restorations. Scientists in the Plant Research Division at the Lindner Center for Conservation and Research of Endangered Wildlife's (CREW) form critical partnerships with other leading conservationists and governmental and non-governmental organizations to achieve CREW's mission to Save Species with Science. CREW plant scientists are actively involved in local conservation for endangered species. In partnership with the US Fish & Wildlife Service, other federal and state government agencies, parks, and nonprofit organizations, the CREW team propagates endangered plants for reintroduction to restore the biodiversity of landscapes (Figure 1). For example, plants propagated at CREW for a federally endangered sandwort in the project scope have been sent back to managers with the Daniel Boone National Forest for use in restorations [74].

Enduring: This program was created 10 years ago. The CREW endangered plant research and reintroductions have added new species over time, including species from across the United States and rare Hawaiian species, further solidifying this organizational identity with this long-term commitment.

Distinctive: Unique external partnerships with the government agencies and other partners are the driving force behind this important program for endangered species. However, interdepartmental collaboration outside of the project team was present for all the case studies, except for the CREW endangered plant reintroductions (Table 1). This specific program focuses on staff propagation of the plants, but CZBG staff do not lead the reintroduction activities and so cannot invite others to participate.

Goal-Oriented: The goal of the CREW endangered plant program is to reproduce and distribute target species to partners for reintroduction and habitat restoration efforts. This prioritizes the impact coexistence goal for the specific species, and the active support of government agencies and partners supports the coexistence goal of elevating the zoo as a conservation leader.

Responsibility: The CREW endangered plant research does not communicate a call-to-action for zoo visitors, community members, or other staff to get involved in the program. Due to the endangered species, direct participation is restricted. However, this program can enhance its proactive communication using these species as inspiration for plant conservation and promoting diverse plants in our landscapes.

Performance: Nine plant species were reproduced in the CREW plant lab, and over 1400 individual plants were reintroduced by being planted in the wild.

3.4. Plant for Pollinators

Central: Plant for Pollinators (P4P) is a public engagement and action campaign to increase pollinator habitat in the Greater Cincinnati region and beyond by (1) connecting both new and experienced gardeners to resources regarding planting for pollinators, and (2) encouraging people to register their new or existing pollinator gardens through the P4P challenge so that we can track the expansion of pollinator habitat across the region and country. The P4P program is a cross-departmental partnership with input from our Administrative, Horticulture, Insect, Conservation, and Education departments. P4P is also cross promoted with the Zoo's annual native plant sales, which seek to raise money for the Zoo while also increasing native plant habitat across the tristate region. P4P is sponsored by Simple Truth and supported by over 20 local partners, whose funds enable the creation of promotional materials and overall sustainability of the program.

Enduring: This newer project began in 2019. It reinforces CZBG's previous commitment to plant and insect conservation by promoting our knowledge from our accredited

botanical garden but needs more time to display its influence on the zoo's identity as it strengthens and evolves over time.

Distinctive: Diverse staff are involved in the gardening kit development, promotions, and gardening events for P4P. Staff and external partners are also invited to get involved and register their gardens with the P4P challenge. With a long list of partners and sponsors, this program has created a network of collaborators to promote creating pollinator habitat in the region.

Goal-Oriented: The goal of this project is to create more pollinator-friendly habitats and increase community involvement to mobilize individuals to plant diverse plants for pollinators and register their gardens. The primary coexistence goal prioritized by this program focuses on mobilizing communities to join the P4P program, and subsequently addresses impact for species and habitats. Additional goals for leadership elevation and environmental justice by supporting underserved communities are opportunities for future growth of this program.

Responsibility: Plant for Pollinators has the most accessible public participation opportunity of the case studies, because inviting any individual to plant and register their gardens is the focus of the program. The mobilization of individuals to coordinate efforts ensures a network of gardens is created in urban habitats and subsequently addresses the impact goals of habitat creation for pollinators.

Performance: Over 2979 individuals' gardens were registered in the challenge (Figure 1), over 70 pollinator kits were sold for individuals' gardens, and over 3000 people were reached in pollinator-focused horticulture talks.

3.5. Rockdale Urban Learning Garden

Central: Before it was transformed into a biodiverse working garden and living classroom, the Urban Learning Garden (ULG) at Rockdale Academy was an unused, one-acre field of turfgrass. As part of the 2021 Community Makeover led by CZBG, the Reds Community Fund, P&G, and Cincinnati Children's Hospital, this homogenous landscape was transformed into a one-of-a-kind learning space. The garden now hosts over 10,000 plants, made up of perennials, shrubs, fruit trees, vegetables, and herbs, as well as a greenhouse powered by solar panels that were installed on the elementary school's roof. The zoo has a full-time horticulturalist maintaining the garden with the help of volunteers, and occasionally students, who also use the space for community and after-school events. The garden is a unique example of long-term socioecological investment in that the zoo has committed to, through labor and educational programming, ensure that the garden does not fall into a familiar pattern of beautification projects that later suffer from neglect. While the community engagement components of the garden are still being explored, its installation and subsequent year of care have undoubtedly changed the environmental makeup of the urban neighborhood of Avondale by attracting more wildlife, especially a wide array of pollinators.

Enduring: This program began in 2020 and has yet to evolve into new dimensions of conservation identities for CZBG. However, since the ULG was built, many partners have visited and expressed their interest in the program; this highlights opportunities for reinforcing this conservation identity's importance as new partners join in and built onto the zoo's project.

Distinctive: Internally, diverse zoo staff have been involved in building the garden and hosting community events there. Externally, many large corporations partnered to create this unique space for a deserving underserved school and community. These diverse partners reinforce the distinctive conservation identity created by the ULG.

Goal-Oriented: The goal of this project is to nourish, educate, and inspire the children of Avondale in Cincinnati, OH through horticulture, science, and the outdoors. As such, the primary coexistence goal that drove this program's creation was to facilitate justice for the community and school through the ULG. This leadership is then followed secondarily

by the pollinator habitat created for the impact goal, the elevation of the zoo with many partners, and the opportunities to mobilize the target community in the novel space.

Responsibility: The Rockdale ULG program mobilizes a smaller scope of the local community than the P4P program by focusing on residents around the zoo in the Avondale neighborhood with events and opportunities in the community garden. However, with diverse events and educational experiences, this case study provides many different calls-to-action for people to join in.

Performance: Over 350 Pre-Kindergarten to 6th grade students and their families in the community and 60 staff from Rockdale Academy were reached with events in the Urban Learning Garden.

4. Discussion

The methods used in this evaluation were useful, informative, and provided opportunities for relationship-building. The collaborative content analysis generated detailed information regarding the case studies. Purposive sampling of project leaders and partners was well-received by the participants and led to abundant and valuable information regarding the programs. By documenting more components of each program, new details regarding their successes and growth were shared across the zoo, which created new relationships and opportunities to celebrate or even envision new collaborations.

The project team faced some challenges when gathering the diverse data regarding the wide-ranging projects. Each team and program are organized differently, so they needed to be met with in-person to gather the needed information. These conversations led to co-developing ideas for growth opportunities for the program, an important outcome created in partnership with the program leaders to facilitate their willingness to adapt their programs based on the evaluation findings. While the process took longer than an online survey with more meetings and participants involved, the outcomes were richer for the evaluation and the participatory process enabled the program leaders to prepare to use the results. Direct communication and an emphasis on identifying opportunities for improvement encouraged participants to highlight not only the program successes.

The qualitative exploration of the projects' characteristics revealed both CZBG's local conservation programs' strengths and gaps for future growth. The project leaders shared how the case studies reinforce unique conservation identities at CZBG. Each team strongly identified with their program, its unique opportunities, and pride in their conservation efforts. Furthermore, the central characteristics of the five case studies revealed foundational components and vivid details regarding the projects' development with collaborative partnerships and intentions to facilitate habitat restoration and community engagement. The five programs differ in their scope (Figure 1), but each has a clear definition of its target area and species. The case studies demonstrate CZBG commitment to partnerships and active interventions for native insects and plants. The differing geographical ranges and types of partners highlight multiple strategies for impact that influenced the creation of the programs.

4.1. Partnerships

The CZBG local conservation programs all have detailed internal and external collaborations that highlight their strong, distinctive identities. In particular, collaborations with external partners drive the five programs forward. Active partnerships across the case studies include regular communications between organizations, shared project management, coordination of activities, and collaborating on fundraising. The types of organizations that CZBG partners with to make these projects possible include federal government agencies, state fish and wildlife agencies, universities and scientists, other zoos and aquariums, other nonprofit organizations, public school districts, state and local parks, and activity specialists such as plant nurseries and habitat restoration experts (Table 1). The screening criteria for the case studies included in this study required some active zoo staff involvement in the programs, so all five programs achieve this minimum level of internal involvement. We

chose to emphasize this baseline of active partnership with staff commitment to the projects because the majority of conservation programs in zoos and aquariums do not achieve this minimum, and instead send funds to other organizations with minor staff involvement [6].

Multi-organization collaboration makes these complex conservation projects possible, no matter if they are reintroducing endangered beetles [75] or inspiring pollinator habitat restoration and community science [36]. These projects are possible due to the wide-ranging partnerships and active communications and resource-sharing between stakeholders, from the government funding of restoration at the Bowyer Farm to the many sponsors and donors for the Plant for Pollinators and Rockdale ULG.

CZBG can reflect on the types of partners effective in one program as potential stakeholders to strengthen the other programs. For example, government agencies or other non-profit organizations interested in pollinator habitat restoration could better enhance the P4P project beyond the individual community members and donors currently participating. Additionally, the public school partners unique to the ULG might find partnering around the four other projects valuable to their educational and community engagement goals. These four projects can reflect on the learnings from the ULG team to better include educational and community partners in their activities in the future.

4.2. Coexistence Goal Assessments

These local conservation programs are driving progress toward CZBG's coexistence goals of impact, mobilize, elevate and justice. Though many of the local conservation projects at CZBG connect to each of the four coexistence goals for progress in our strategic plan, the projects' priorities were imbalanced. The older case studies focused on the impact of endangered species or habitats first. For example, the ABB and CREW projects could improve by considering how to mobilize more community and audience members to extend their reach and resources. Similarly, the Bowyer Farm project could establish new opportunities to empower nearby underserved communities and promote environmental justice through inclusion. The reordering of the priorities in the design of the newer projects to emphasize community mobilization and facilitating justice reflects the evolution of a multi-faceted definition of conservation success, and therefore can serve as a model for updating older programs. On the other hand, the newer projects of P4P and ULG while well-known locally, could better elevate CZBG by highlighting our organizational identity around conservation with intentional storytelling regarding these projects. Reflecting these coexistence goals across the projects and integrating learnings across the departments will amplify a clearer and impressive conservation identity for CZBG.

The OIT constructs also highlighted some opportunities for thew potential growth of the programs to better achieve their conservation goals. The reintroduction programs were distinctive in their absence of opportunities for other zoo staff to participate, nor did they have a clear pathway for inspired zoo audiences to join in. This highlights an area for CZBG to consider growing their programs to achieve even greater impact with additional people involved from our large audiences of zoo visitors and social media followers. Two of the case studies also lacked calls-to-action for public audience involvement. These local conservation programs are making progress toward supporting their organizational identities, but could improve by acknowledging opportunities for collective action outside of the organization.

The performance assessment construct from OIT put a spotlight on current outcomes to compare against each program's goals. We used diverse metrics as indicators of outcomes outside the control of the zoo to measure their progress. With monitoring the 1833 endangered beetles and 1400 plants reintroduced to the wild, 2979 gardens created, 350 children engaged, 300 native plant species, and 12,522 individual plants sold, and over 200 new species spotted in restored habitats, the programs are making progress toward their primary goals set as intentions for desired outcomes (Table 1). The program teams showed they are actively documenting the animals and plants reintroduced and observed, as well as the communities mobilized to participate. We are making progress for insects and plant

conservation efforts in our communities, as represented by the widespread projects in our region (Figure 1). The five case studies highlight CZBG's leadership in local flora and fauna conservation with a range of techniques and outcome metrics monitoring the species and landscapes (Table 1). These programs are ongoing, as we have yet to completely achieve the program goals; therefore, CZBG plans to use the opportunities for improving the projects highlighted by the OIT framework. For example, Bowyer Farm, Plant for Pollinators, and the Rockdale Urban Learning Garden do not have elevating the zoo as a conservation leader as a priority or secondary goal. While these projects do important work, they are not well known beyond the immediate communities. The OIT evaluation highlights which projects need better storytelling and community activation, as well as which can diversify their impact to achieve CZBG's organizational coexistence goals of helping both wildlife and people to thrive.

Future adaptive management of the programs will reflect on ways to better mobilize new participants—both internal zoo staff and external zoo visitors—as well as facilitating justice (e.g., alleviating financial barriers to individuals participating in Plant for Pollinators). More success could be found in local projects by increasing the coexistence goal of justice, such as by engaging local underrepresented experts through cooperative partnerships. Rockdale ULG is one example of a project using the coexistence goal of justice effectively. Goals stated by the Rockdale Academy Principal Jaren Finney include using the ULG to teach students "about agriculture, horticulture, and even how to be entrepreneurs" [76]. This active partnership with local diverse education experts that know and represent their community guides the way CZBG empowers their needs with equitable resources and inclusive communications. Other zoos and botanical gardens can reflect on how to integrate such methods from this justice-focused case study.

5. Conclusions

Native plant and insect projects at Cincinnati Zoo & Botanical Garden are fueled by collaborative partnerships as they work toward multifaceted coexistence goals. Through this evaluation, we show current commitments to native wildlife conservation and present opportunities for adaptive management to further enhance the activation of a clear and effective organizational conservation identity. The zoos' conservation programs grounded in local landscapes have opportunities to mobilize internal staff and external partners throughout their communities. Furthermore, programs with goals and activities supporting wildlife, community involvement, and environmental justice enable stronger conservation identities. The results of this study highlight how other zoos and botanical gardens can lead the conservation of local flora and fauna in their communities with the reflective evaluation process. Moreover, the internal collaborative evaluation methods using the OIT framework highlight components critical to strategy implementation and best practices relevant to other zoos, aquariums, and botanical gardens.

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Data Availability Statement: The data presented in this study are available on request from the corresponding author, subject to permission from study partners.

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