National Guidelines

Nature Play & Learning Places

Creating and managing places where children engage with nature

ROBIN C. MOORE
with ALLEN COOPER

Foreword by **HOWARD FRUMKIN**

NLI NATURAL LEARNING INITIATIVE
NATIONAL WILDLIFE FEDERATION
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What leaders in the field of children and nature, policy, landscape design, child development, and parks and recreation are saying about *Nature Play & Learning Places*

"Robin Moore, a leader in the children and nature movement, long praised for his design of natural play spaces, offers a distillation of years of research and practice to prescribe a new American landscape—no, make that an international landscape—for children's nature play and learning. This pivotal book provides every educator, mayor and pediatrician with an inspiring blueprint for a long-overdue revolution."

— **Richard Louv**, author of *The Nature Principle* and *Last Child in the Woods*; Chairman Emeritus, Children & Nature Network.

"These innovative guidelines will help improve children's health by connecting families with our public lands and at the same time encourage learning about natural systems."

— **Fran Mainella**, Chair, Children & Nature Network; former Director, U.S. National Park Service.

"It is more important than ever that we work in every community to reconnect people with wildlife and nature. *Nature Play & Learning Places* will help conservationists, educators, and recreation professionals work on that shared goal."

— **Collin O'Mara**, President and CEO, National Wildlife Federation.

"For landscape professionals, Robin Moore provides a vital tool and meticulously organized guidelines to help communities implement healthy living environments through urban park investments and cost-effective grassroots interventions."

— **Paul Morris**, former President, ASLA; President and CEO of Atlanta Beltline.

"This well-written, compelling, comprehensive book eliminates for advocates any excuse for not knowing what to do or how to start a nature play and learning project. All the steps are there, supported by lovely photographs and architectural renderings."

— **Marcy Guddemi**, PhD, Executive Director, Gesell Institute of Child Development.

"With these guidelines in hand, park and recreation departments can design, build and maintain successful nature play areas in any type of community for all people to enjoy."

— **Barbara Tulipane**, President and CEO, National Recreation and Park Association.

"Bridging the growing divide between children and the natural world is crucial so that communities and our nation can gain from the positive environmental values shaped by these early experiences. *Nature Play & Learning Places* is a must-have, pragmatic guide for those dedicated to making a difference in how children relate to the natural world."

— **Tom Underwood**, Executive Director, American Horticultural Society.

NC STATE Design

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ABOUT

Founded in 2000, the **Natural Learning Initiative** (NLI) is a research, design assistance, and professional development unit at the College of Design, NC State University, Raleigh, NC. The long-term mission of NLI is "Creating environments for healthy human development and a healthy biosphere for generations to come." This mission is implemented by engaging children and families with the natural world in the places of daily life (home, school, neighborhood) through participatory environmental design, action research, education, and dissemination of information. A key aim is to create, translate, and apply evidence to developing policies affecting children's everyday experience in the built environment. To this end, NLI works with systems in child development, schools, parks and recreation, urban planning, public health, and nonformal education (nature centers, botanical gardens, zoos, and museums). NLI works with government, nongovernment, and private sectors in communities across North Carolina, and at national and international levels, including with landscape architecture firms.

Robin Moore is Professor of Landscape Architecture, NC State University, and Director of the Natural Learning Initiative. He grew up in the south of England and holds degrees in architecture (London University) and urban planning (MIT). For most of his career he has worked in the field of landscape architecture as an educator, researcher, and consultant. Moore is an international authority on the design of children's play and learning environments, user needs research, and participatory design in the urban public realm.

Founded in 1936, the **National Wildlife Federation** (NWF) is America's largest conservation organization with 49 affiliated organizations and more than 4 million members. NWF's mission is to inspire Americans to protect wildlife for our children's future. Our award-winning Ranger Rick magazine has brought the wonders of nature to generations of American children, and our Schoolyard Habitats program, begun in 1996, has engaged more than 4,000 schools across the country in the creation and use of outdoor classrooms to help children understand and appreciate the natural world. In 2008, NWF was designated as the U.S. host for the international Eco-Schools program and, to date, NWF has registered 3,000 K-12 schools in its Eco-Schools USA program, which focuses on greening the school grounds, buildings, curriculum, and student experience.

Allen Cooper is Director of State Education Advocacy at the National Wildlife Federation, where he develops state and municipal policy to connect people with nature. Allen Cooper grew up in southern West Virginia and holds degrees in public policy (Princeton University) and law (University of Texas at Austin).

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Executive Summary

Nature Play & Learning Places: Creating and managing places where children engage with nature *offers a set of guidelines for those who create, manage or promote development of nature areas in the everyday environments of children, youth, and families, especially in urban/suburban communities. The goal is to attract kids and families outdoors to interact directly with nature.*

Children must spend more time outdoors—for their good health and the health of our planet. If children don't move enough, their bodies will not develop in a healthy manner. If children don't grow up engaged with nature, chances are they will never understand human dependency on the natural world.

Nature play is defined as a learning process, engaging children in working together to develop physical skills, to exercise their imaginations, to stimulate poetic expression, to begin to understand the workings of the world around them.

The guidelines focus on design and management of physical settings that facilitate direct, hands-on engagement with nature in the everyday lives of children and families. As defined by the national steering committee, a nature play and learning place is:

> **A designated, managed area in an existing or modified outdoor environment where children of all ages and abilities play and learn by engaging with and manipulating diverse natural elements, materials, organisms, and habitats, through sensory, fine motor and gross motor experiences.**

Nature Play & Learning Places is a tool for those working in the field including advocates, policy makers, system managers, site managers, educators, program specialists, design professionals, urban planners, and developers. Seven chapters cover the following:

1. Why nature play and learning summarizes why nature play and learning is important for health and human development at the global, population, and individual levels and describes the historical precedents of community-based, children's outdoor facilities dedicated to free play and learning. The chapter provides guidance for creating and managing nature play and learning places in many contexts with community participation as a key element. Professionals who plan, design, and manage community environments are encouraged to include space for nature play and learning.

2. Nature play, learning, and education demonstrates how playing with and learning through nature can be a vehicle for environmental literacy and a means to advancing educational missions focused on conservation, health, stewardship, and multidisciplinary learning across science, humanities, and the arts. Stages of child development from birth to 18 are summarized and discussed in relation to design and management responses, including volunteer youth helping to manage and run programs.

3. Locating nature play and learning places discusses the idea of nature play and learning as an

integral part of urban green infrastructure, at residential neighborhood level and beyond, including city, county, and regional parks; school grounds; child development centers; non-formal education institutions, including nature centers, museums, zoos, and botanical gardens; and state and federal lands.

4. Designing nature play and learning places is the core chapter and introduces affordance, activity setting, and territorial range as useful concepts, along with creation of a design and management program as a key implementation tool. Descriptions of activity settings include entrances, pathways, plants (trees, shrubs, native perennials, permanent edible landscape, vegetable gardens), natural surfacing, loose parts, natural construction, permanent play structures, multipurpose lawns, meadows, landforms/topography, animals, aquatic settings, sand/dirt settings, gathering places, program bases/outdoor storage, signage, and boundaries.

5. Managing nature play and learning places defines effective management as a tradeoff between the needs of children to engage in exuberant play and protection of natural resources from excessive wear and tear. Projects are defined as either renovation or new construction or a mix of both, often combined with ecosystem restoration. Management should be driven by ecosystem thinking to focus attention on the quality of water, soil, and plants. Depending on context (for example, public park versus botanical garden) nature play and learning places can be designed as open or controlled access offering varied ranges of play and learning programming. Governmental or nongovernmental organizations or a mix of both may manage spaces. Development may occur in phases over time as resources become available.

6. Risk management offers a risk management protocol for nature play and learning places that accomplishes the dual goals of providing a stimulating nature play environment while ensuring that children are not exposed to unreasonable risk of harm. Concepts of hazard, risk, injury, and standard of care are defined and discussed. A risk management assessment protocol for nature play and learning spaces is presented as an eight-step process emphasizing engagement of risk managers and insurers, implementation of an inspection routine, elimination of hazards that may cause serious injury, documenting and evaluating all incidents, maintaining records of inspections and incident reports, and regular staff evaluations and systematic records of responses.

7. Implementing nature play and learning places emphasizes community-based approaches to achieving sustainability. Tools include community surveys and stakeholder workshops as the main source of project content along with participation of children in the design process. Institutions that may sponsor nature play and learning spaces are described, including parks agencies, childcare and school systems, nonformal educational institutions, and state and federal agencies. The importance of community diversity and engagement is emphasized.

Case studies gathered from across the nation illustrate the feasibility of implementing nature play and learning spaces economically through community processes across a range of contexts.

Nature Play & Learning Places is coordinated by the National Wildlife Federation in partnership with the Natural Learning Initiative, NC State University, who are responsible for production of the publication. The project was supported by a grant from the U.S. Forest Service, Community Forestry Section, award # 11-DG-11132540-334.

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Foreword

Decoding the human genome was impressive. The Internet has been transformative. Big data are amazing. But a child playing in the woods? That simple, time-honored image is at once magical, and powerful, and inspiring.

We face enormous challenges—in our communities, as a nation, across the globe. While many health outcomes are improving, many are trending in the wrong direction. Asthma and allergies, anxiety and depression, autism-spectrum disorders, obesity and diabetes…these and other conditions bedevil us, and for the first time in history, today's children may not live as long as their parents.[1] At the same time, the planet itself is ailing. The impact of human activity on earth systems has been so profound, that the modern era is known as the "anthropocene"[2]—an era marked by frightening rates of species extinctions,[3] galloping climate change, disruptions of natural nitrogen cycles, and other dangerous and unsustainable trends.[4]

How do we halt and reverse these trends? Part of the answer lies in connecting with the natural world. This deceptively simple prescription offers far-reaching benefits. Nature contact promotes human health and well-being in many ways; the evidence of these benefits is now too compelling to ignore.[5] Nature contact promotes better stewardship of the environment;[6] how can we care for what we do not know and cherish? And better stewardship of the environment, from the individual choices we make each day to the policies our governments promulgate, will in turn result in a healthier planet—a fundamental requirement for healthy people, now and in coming generations.

So while this may seem to be a book about play spaces for children, it is much more. At the risk of bloviating, I would call it a book about saving the world. It offers essential guidance for designing places we need.

We need to provide our children with natural settings in which to play, learn, and thrive. We need to help them form emotional bonds with the abounding beauty of flowers and trees, rivers and streams, critters and clouds. We need them to be fascinated by these things, to grow into close and careful observers of the world around them, to feel not only appreciative but protective, and to be prepared to live their lives accordingly. This is a public health strategy, an environmental strategy, and an educational strategy…and a path to the future we want.

Howard Frumkin, M.D., Dr.P.H.
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01

Why nature play and learning

"For a child to understand something he must construct it for himself, he must reinvent it ... if future individuals are to be formed who are capable of creativity and not simply repetition."
—Jean Piaget

Children's time outdoors and contact with nature are in sharp decline. Negative consequences include children's reduced physical health, lack of knowledge about nature, and related misconceptions about human dependence on the natural world. The World Health Organization now recognizes the interdependence of human health and ecosystem health.[1] The positive, innate bond between human well-being and nature is supported by environmental health science.[2] Childhood engagement with nature is the key to cementing this relationship for generations to come.[3] Learning in and through nature is an educational imperative[4] that urgently calls for new ways to safely attract children into local, natural settings to re-integrate the experience of nature into childhood. Such action will help to set the stage for a new generation of healthy, active children growing up both loving nature and understanding human dependence on healthy ecosystems. Childhood engagement with nature is more likely to produce conservation-minded citizens willing to care for the planet, to protect our natural resources, and to recognize them as our most precious economic asset. To achieve this end, playing and learning in nature go hand-in-hand,[5] beginning in the first year of life and extending through the several stages of childhood and youth.[6] As Frances Kuo has emphasized,[7] two strategies can be pursued: bringing nature to where children are and bringing children to where nature is.

A growing body of research demonstrates the negative health consequences of children's increasing sedentary, indoor lifestyle. The most obvious result is the rapid rise in childhood obesity rates and related diseases, partly because children are not moving enough.[8] Dire consequences for health costs and negative economic impacts are projected.[9] If these health trends continue unchecked, children today may be the first generation with a shorter life expectancy than their parents.[10] On the other

hand, research supports the many health benefits of contact with nature,[11] including reducing stress,[12] decreasing symptoms of ADHD,[13] and protecting against myopia.[14] Simply walking in a park[15] or engaging with nature hands-on can have a positive effect.[16] Exposure to native plants can boost the immune system.[17] In summary, time in nature offers broad, measurable health benefits for children and, indeed, for people of all ages.

Decline in child well-being and lack of understanding about nature are not inevitable! Getting kids outdoors engaged with nature is a key health promotion initiative for people and planet that can make a major impact across the United States if the "outdoor professions" act together. *Nature Play & Learning Places* is a tool to help. By stimulating full-body engagement, nature play extends a child's gross motor activity repertoire, encourages exploration and therefore more walking and running, which increases physical activity and vigorous movement.

Nature Play & Learning Places is a cultural call to reframe childhood and nature, to create new types of places where children can enjoy nature play. Viewed as a genetically driven process of learning about self and surroundings across the millennia of human history, such experiences can be considered a childhood right.[18] Natural settings for children's play that previous generations took for granted must now be deliberately created.

1.1 Nature play and learning occurs when natural objects can be moved around and experimented with "to see what happens." Movable rocks in flowing water is a classic activity setting that offers the sensory delight of bare feet in water. Notice the cooperation of boys and girl working together as they carry out their "plan." Off-camera parents are enthusiastically watching from a distance. Imagine the parallel learning to this play. *Nature PlayScape,* Cincinnati Nature Center, OH. (Case Study 6).

1.2 Nature play and learning places can be created anywhere, as here in the heart of Manhattan. Success requires the creative skills of professional landscape designers who understand that activity settings need to be comfortable and engaging to accompanying adults as well as children; here, all are immersed in a constructed landscape, where children can run ahead and explore around the next corner. *Teardrop Park,* NYC (Case Study 3).

1.3 Activity settings such as multipurpose lawns, where children can run and roll, add value to nature play and learning places. Undulations increase play opportunities, including rolling. Notice how the "loose part" colored streamers prompt activity. Can we hunt for similar colors in the natural surroundings? *Shepherd's Way Day School,* Asheboro, NC.

Nature Play & Learning Places provides a tool for anyone promoting, designing, and managing outdoor spaces for children and families, including the rapidly growing group of professionals who believe that motivating kids to get outdoors to play and learn is crucial for their health and for the health of the planet.

In 2005, Richard Louv's *Last Child in the Woods*[19] initiated a children and nature movement and called for new ways to integrate nature into childhood to help us move from an ego-centric to an eco-centric society. *Nature Play & Learning Places* is a response. Daily opportunities for nature play and learning can help children become agents of change by applying their collective experience and understanding as a vital force for cultural realignment.

1.4

1.5

1.6

DEFINITION

The project steering committee defined a nature play and learning place as:

A designated, managed location in an existing or modified outdoor environment where children of all ages and abilities play and learn by engaging with and manipulating diverse natural elements, materials, organisms, and habitats, through sensory, fine motor, and gross motor experiences.

Genuine nature play and learning spaces contain mainly natural materials such as plants (trees, shrubs, vines, ground covers), stones, water, dirt piles, fallen trees, hollowed-out logs, and a multitude of other natural elements designed to encourage hands-on manipulation and discovery. Natural materials provide inspiration, allowing children to shape their environment and at the same time exercise fine motor skills. Local play traditions and cultural meanings can be expressed in natural forms: tropical leaves, dirt, adobe, water, sand, snow and ice according to region.

Each season presents new, stimulating opportunities as children learn the affordances of local ecology. Sticks, grass, twigs, stones, seeds (pine cones, acorns, maple "helicopters," honey locust and catalpa pods) amplify play opportunities, motivate cooperation through socio-dramatic play, encourage social interaction in unscripted nature games, and offer raw materials for natural building. Play in and with nature helps children learn about their inherited world. Nature play is good for children and good for planet Earth.

Nature play spaces are living systems. They add value with each passing season. They demonstrate nature's regenerative power and the ability to recover from damage, including the impact of children's own activities. They help children understand, appreciate, and value the ecosystem services offered by nature.

1.4 Earth or "dirt" play, sometimes interpreted as genetically embedded "recapitulation" of human manual interaction with the surface of the planet. Notice here the child is using a "helping stone" as early *homo sapiens* did.

1.5 Green play will happen wherever opportunities arise; here, beside the sidewalk, bright yellow flowers attract sibling attention. *Wrightsville Beach, NC.*

1.6 Water play has the strongest universal attraction to children and can be designed and managed according to age group and context. Here, a group of teens have walked the *Riverside Park* trail to their favorite spot to fish and enjoy the green infrastructure. *Spruce Pine, NC.*

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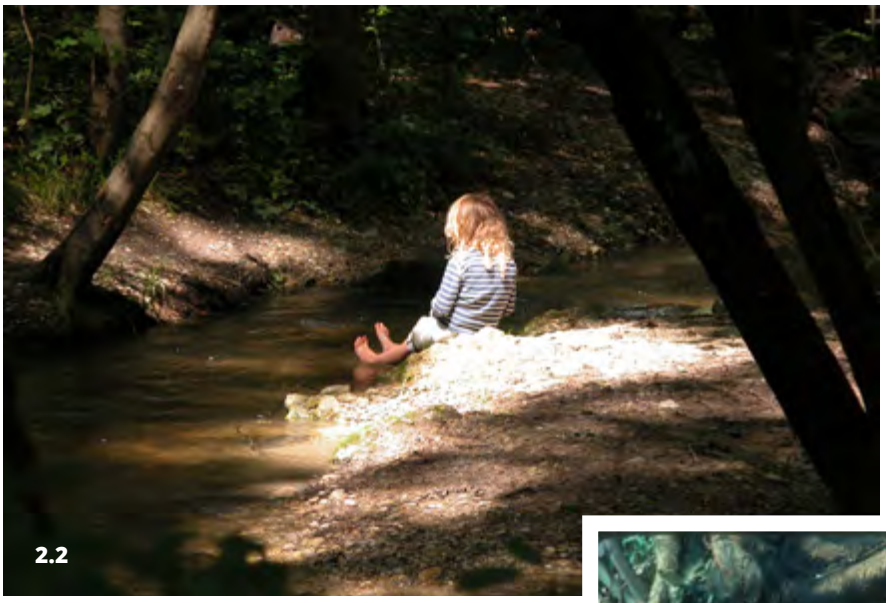
02

Nature play, learning, and education

"Education is the point at which we decide whether or not we love the world enough to assume responsibility for it."
—Hannah Arendt

2.1 Middle childhood (8-12 years) embraces the halcyon years when children are fully competent to engage with nature from every perspective—from the aesthetic to the scientific, the literate to the dramatic, the intimate to the grandiose. Here, two boys observe a box turtle in a forest preserve. *Alligator River National Wildlife Refuge, NC.*

Because nature play spaces may be developed within educational institutions, play, learning, and education are considered here as a continuum of learning *through* nature. Rooted in hands-on, spontaneous play and exploration, sensory learning happens when children dam a stream, turn over rocks to find life underneath, observe sunlight dancing through swaying leaves, follow scurrying ants salvaging eggs from a disturbed ant hill, stroke the mossy surface of shady ground, bend pliable stems to roof a den, gather sticks to make a fire, smell the air following a rainstorm, watch a lizard dart across a rock, and the myriad other ways of engaging with nature. Hands-on nature play experiences such as these are retained as vivid memories, often for the rest of life.[35] They lay the groundwork for formal learning and provide motivation to study living systems.[36]



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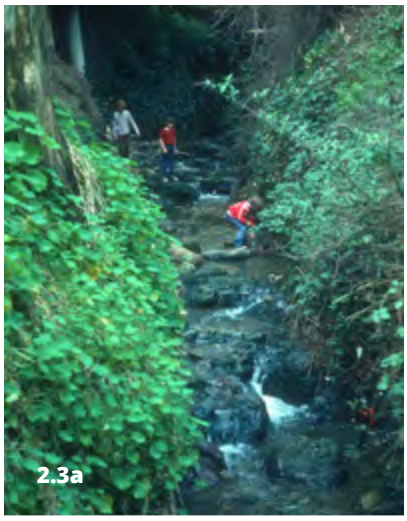


2.3a

2.3b

Science and the arts offer dozens of historical examples of the link between the unique power of direct experience of nature in childhood and a passion for nature in adulthood. E.O. Wilson in his autobiography, *Naturalist*,[37] describes how, as a 9-year-old he "pulled away the bark of a rotting tree stump" in Rock Creek Park, Washington, DC, and discovered "a seething mass of citronella ants" that "left a vivid and lasting impression on me." Wilson later became a Harvard entomologist and world expert on ants. In *Thunder Tree*,[37] naturalist Robert Pyle connects his messing around in a Denver drainage ditch to his scientific passion for butterflies.

Environmental psychologists Rachel and Stephen Kaplan developed "Attention Restoration Theory" to explain the beneficial effect of human encounters with nature. For them, the "soft fascination" of experiencing nature engages effortless "involuntary attention" that produces a sense of relaxation and promotes recovery from mental fatigue.[38] Afterward, individuals can better concentrate. What if every school had a "time out" nature play and learning space, where children could recover from pressure-cooker classroom stress and return with improved concentration for the next activity?

2.2 Opportunities for children to daydream in nature have greatly diminished over the last two generations, possibly to the point where the idea may seem archaic. Hope lies in new types of institutions offering unbounded opportunities for nature engagement. Here, a forest kindergarten child sits on a sandbank, quietly singing to herself, immersed in nature, entranced by the gentle sound of running water and the delicious sensation washing her feet. *Munich City Forest, Germany*.

2.3 Where can kids find places in the city to mess around in nature away from adult eyes? Here, a group of friends, below street level, explore the infinite play potential of an urban stream and at the same time appreciate the erosive power of water. *Berkeley, CA*.

2.4 The "Six Cs" (described to the right) provide criteria for evaluating the motivational quality of nature play and learning activity settings. Here, the damp, rocky, gravelly ground surface, with water vaguely running though, is enough to motivate all six. *Curiosity* is prompted by stones to turn over; *choice* is afforded by sizes/shapes of stones, gravel, and sand; *content* is the discovered organisms harbored underneath; *collaboration* is self-evident in the playful exploration group; the large rocks are surely a *challenge* to turn over; *context* is what the kids take away from the experience in new friendships, reinforced or new skills learned, observations made, new projects planned at home or school.

2.5 Creating a nature play and learning landscape requires design ingenuity. Here, huge boulders have been used to create a complex, 3-D landscape, challenging young bodies to maneuver, reminiscent of a Sierra Nevada mountain stream (small, recirculating stream is off camera). *Museum Backyard,* Santa Barbara Museum, CA. (Case Study 9).

LEARNING THROUGH NATURE

Nature also offers educators a context for an interdisciplinary approach to multiple subject areas, including learning about nature. Educational programs conducted in nature tend to provide a greater range of options better matched to children's varied learning styles and personalities than do programs limited to indoor classroom activity.[39] The learning-through-nature approach to education or learning naturally supports the 6Cs of intrinsic motivation. The number and names of intrinsic motivation C's varies in the literature. Here we choose six that apply:[40] Curiosity, Choice, Content, Collaboration, Challenge, and Context.

Curiosity is the intrinsic force of a child's playful interaction with the physical world. *Choice* is freely donated by nature's diversity and change through time, which provides infinite, equal opportunity—an antidote to boredom. *Content* is the thing itself: worms under logs, giant leaves, sweet-smelling flowers, the way water ripples over rocks, the varied textures of soil, ad infinitum. *Collaboration* is the way nature brings children together to explore an idea, to execute a project, to make friends through constantly changing shared experience. *Challenge* exercises agency and self-efficacy, as the child alone and children together take risks, continuously test the limits of their understanding of how things are and thus learn how the world works. *Context* refers to the transfer of skill and understanding between situations and surroundings, from nature play and learning space to classroom, to home, to other friends in other places.

Nature play is intensely physical, obligating the body to move through space: up, down, in, and around, which positively affects hands-on, active learning. Intrinsic motivation, the essence of free play, drives engagement, whereby children acquire deeply grounded environmental values attached to experience and a core of knowledge. The environment-based education framework developed by Gerald Lieberman and colleagues, using the environment as the context for learning, provides a useful approach for linking nature play and learning to standards-based education across the curriculum.[41]

Frequent visits to a richly endowed nature play space for adventures with friends helps a child to know the place, to understand what goes on there, how it works, and how its many attributes behave through the day and through the seasons. As Robert Pyle so eloquently asserts, hands-on childhood experience helps us understand the natural world as an interactive system.[42]

SUPPORTING ENVIRONMENTAL LITERACY

According to the North American Association for Environmental Education (NAAEE), "Environmental education (EE) teaches children and adults how to learn about and investigate their environment, and to make intelligent, informed decisions about how they can take care of it." Further, "EE is taught in traditional classrooms, in communities, and in settings like nature centers, museums, parks, and zoos."[43]

Environmental literacy, a key outcome of effective EE, came into common usage following the publication of David Orr's book, *Ecological Literacy*.[44] In the proposed bi-partisan No Child Left Inside Act of 2013 (H. R. 2702), environmental literacy is defined as "a fundamental understanding of ecological principles, the systems of the natural world, and the relationships and interactions between natural and man-made environments." NAAEE defines an environmentally literate person as "someone who, both individually and together with others, makes informed decisions concerning the environment; is willing to act on these decisions to improve the well-being of other individuals, societies, and the global environment; and participates in civic life."[45] The primary elements of environmental literacy are described as cognitive (knowledge and skills), affective and behavioral, and interactive and developmental in nature; meaning, individuals develop along a continuum of literacy over time and are not either environmentally literate or illiterate. A majority of states have developed or are developing a *State Environmental Literacy Plan*, as described in H. R. 2702.

Nature play is a means for activating the experiential, affective domain in environmental literacy, which appears underplayed across the field of EE. Theories of experiential education contend that cognitive learning in early and middle childhood can be more effective if preceded by spontaneous play, free exploration, and direct, personal discoveries in nature.[46] If not, later stages of cognitive development, served only by "disembodied," abstract knowledge from indirect, secondary sources (print and visual media), will be less likely to motivate the kind of strong personal convictions that lead to environmental action. Psychologist Edward Reed presents compelling support for this point of view.[47] Ruth Wilson suggests that the sensorimotor experiences of nature play early in life are more likely to become deeply embedded in a child and establish a foundation for cognitive understanding as capabilities of symbolic thought mature.[48]

To be effective, the "continuum of literacy" referred to above must be paralleled by a spatial continuum of natural settings within the child's expanding

2.6 Sensory exploration of nature, beginning in early childhood, is an important, if not crucial, pre-curser to later deep understanding. Here, as part of the annual *Magic in the Garden* family festival, a preschooler, festooned with the vine crown ("green princess") of a previous activity, is deeply engaged in earth play conveniently framed in a raised planter. North Carolina Botanical Garden, NC.

2.7 Literally getting "into" nature early in life, feeling comfortable and unafraid (child and parents) is obviously a key first step toward becoming an environmentally literate citizen. Here, the picture speaks for itself through the joyful expression on the child's face. *Nature PlayScape*, Cincinnati Nature Center, OH. (Case Study 6)


2.7

2.8 For close-up, observation of small critters, a container suitably up-fitted helps. Here, the volunteer high school docent is using a observation box with a group of children after they have "hunted" for similar species along the Insect Walk. *Hamill Family Play Zoo*, Brookfield Zoo, IL. (Design: MIG)


2.8

2.9 Using tools to extend observational skills and awareness of specifics in nature can also start early in life. Here, a knowledgeable parent guides use of binoculars to look at birds close up, which is otherwise difficult to achieve for children.


2.9

2.10 Dramatizing animal life taps into children's imaginative powers and motivates them to start understanding animal-habitat interdependency—and have fun! Here, a child has made butterfly wings to "be" a butterfly flitting through the landscape, sampling the nectar offered by the flowers. *Hamill Family Play Zoo*, Brookfield Zoo, IL.


2.10

2.11 Hands-on experience with small critters is especially engaging for children and can be surprisingly simple to arrange. Here, the leaf insect has been attracted to a sunny spot on the ground for all to observe. *Hamill Family Play Zoo*, Brookfield Zoo, IL.


2.11

territorial range (see pp. 25-27), in and around the child's home and immediate residential neighborhood. Here, parents, neighbors, and peers act as informal educator/companions. Beyond home, nature play and learning spaces located in child development centers, schools, and non-formal education institutions can extend the continuum of ecosystem experiences. By working with children and families, environmental educators extend the meaning of nature play and learning experiences to help the next generation become environmentally literate, to acquire strong environmental values, and move human culture in a more sustainable direction.[49]

WELCOMING A CONSTELLATION OF USERS

Nature play and learning spaces reach out with open arms to the whole community of users: children of all ages, including in the first months of life; accompanying parents and elders; independent youth and youth groups; all cultures and ethnic backgrounds; people of all abilities and those with special needs; childcare, school, and summer camp groups; boy and girl scouts doing badge work; home-schoolers; out-of-towners; the list goes on. The one commonality is a passion for nature play.

Children grow and develop in genetically driven stages with variations according to individual personality, family relations, socioeconomic circumstances, cultural traditions, climate, and more. Typical stages described in the literature are early childhood (birth to 7), middle childhood (8 to 11), preadolescence (12 to 14), and adolescence (15 to 18). To cover the full spectrum of childhood and to attract repeat visits, nature play spaces must be designed and managed to support the continuity of developmental stages. Current research suggests the following expected outdoor behavior and environmental requirements for each developmental stage, including early childhood, middle childhood, pre-adolescence, and adolescence.

2.12 Welcome to the planet! Here, an infant just learning to walk is mesmerized by the grasshopper alighted on the stump. The child testing his balance resembles the grasshopper behavior. *Bright Horizons Child Development Center, NC.*

Early childhood which includes infancy, toddlerhood, preschool and early school years *(pre-K to 2nd grade or Montessori Children's House, 3-6 years old)*, covers the most crucial period of individual human development.

Infancy *(includes "year zero" and subsequent months of crawling and the first hesitant steps toward "toddling")*. Greenman (p. 241),[50] calls infants and toddlers "sensory motor scientists who systematically investigate their world using their scientific tools: mouth, eyes, skin, ears, and whole body muscles." If not handled wisely, a baby's first experiences with the natural world may be negative, which could affect future understanding. Spaces are needed for positive, "active exploration" close to adults. Also, recognizing that infants and toddlers put objects in their mouths, play coordinators must carefully inspect and assess spaces designated for this age group from this perspective as part of the risk management protocol (see Chapter 6).

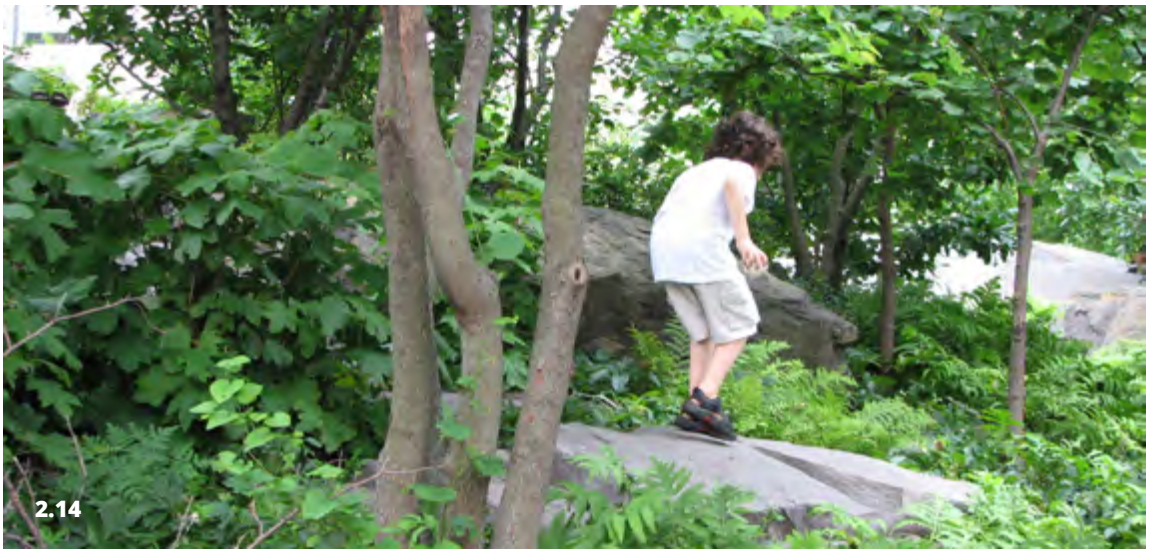
Recognition of the importance of outdoor experience of nature starting in the first year of life is quite recent in the field of child development and is still not mainstream in research or practice.[51] For the crawling-learning-to-walk child, ground-level quality is critical. Designated spaces can be small, intimate, enclosed with a gate, and have a simple layout. Clean, unitary ground surfaces are required without plant scraps or mulch that could stick to clothes or be mouthed. Possible settings include an undulating lawn to challenge balance, and pull-up rails to practice standing. Sensory stimulation could

From birth, children discover through moving themselves about and manipulating materials about them. The prime concerns of a baby are interaction with others and to be in a position to explore, hence the strong drive to reach, sit up, crawl, and walk. This discovery continues until the three- and four-year-old wants to understand such concepts as 'near and far', 'heavy and light', 'lines and curves.'[52]

2.13 Toddlers like to "interact with stuff," says Jim Greenman. Here, these children, just beyond "parallel play," are engaged in an endless cycle of exploring all the possible permutations of sand, "tools" for manipulating it, the log surfaces, gaps between, and the straw mixed in. *Shepherd's Way Day School*, Asheboro, NC.

include a patch of textured flagstones interspersed with "steppable" plants selected for their strong texture, color, and fragrance. Comfortable adult seating centrally placed to ensure close contact is essential as is dappled shade during the summer to provide comfort and sun protection for children and adults. A water feature can offer the sound of falling water and opportunities for hand splashing. A diaper changing station with sink and running water is always appreciated, as well as screened seating for nursing mothers.

Toddlerhood *(approximately 18 to 36 months or once the infant has learned to toddle)*. In



2.14 Children at the upper end of early childhood (6-7 years old), should be sufficiently skilled to range freely, to engage with nature in urban parks and open space, often in the company of older siblings or friends or caregivers in the same vicinity. Here, two 7-year-olds are playing hide-and-go-seek in the complex, three-dimensional landscape of *Teardrop Park,* NYC (Case Study 3).

toddlerhood, spatial exploration expands dramatically. Parallel play (children playing next to each other rather than with each other), dominates because children are still discovering themselves as individuals. Greenman describes how the toddler is "each day practicing and expanding physical skills: climbing, sliding, swinging, hanging, jumping off, and tumbling" (p.242).[53] Bilton underscores opportunities for such movement as "probably the most crucial mode of learning" (p.30).[54] Movement sequences can be created through the three-dimensional design of pathways, ground surfaces, and plant placement to stimulate basic spatial relations of up/down, in/out, over/under/on, around/through.

Toddlers like to interact with "stuff," to "carry/transport, fill/dump, splash, stack/pile/knock over, take apart/put together, sort/match, put in/take out, and paint/smear" (Greenman, p.242).[55] They look for, watch, and inspect. Natural objects and plant parts available in the setting, or toys and objects brought to the space by caregivers can help toddlers accomplish this. Nature play and learning spaces for toddlers can be provided as an extension of infant spaces, which will help parents supervise siblings and their friends. As toddlers continue to actively explore through their senses, they require an expanded territory, including more diverse spaces with increased richness of plantings and natural objects. Two year olds begin to transition from toddlerhood, become more competent and confident, but still engage in parallel play as they continue the process of "individuation" (learning the difference between "me" and the external world) and do not fully understand "sharing." To avoid conflict, ensure multiples of everything. Twos may still be in the process of toilet training, which once accomplished will allow freer movement. Some parents may feel comfortable letting their 2-year-olds "off leash" to explore larger-scale spaces shared with older age groups.

Preschool into elementary years *(approximately 3 to 7 years old)*. Preschoolers move beyond self-centered, parallel play into a more cooperative social world where creative, spontaneous action serves as the socializing process through which they learn the benefits of give-and-take. Preschool is the critical age for beginning to learn lifelong habits. Children this age should be able to confidently explore nature. Observational skills become developed. As rapid brain development is still underway, sensory stimulation through play can further contribute to neurological development before windows of opportunity close.[56] Since preschoolers

2.15 Middle childhood is the "hunter-gatherer" age according to David Sobel, a time for engaging with nature full-tilt, using skills of observation, naming, classifying, counting and describing. Exposed appropriately, kids can be turned on to science. Here, two girls are collaborating on an insect safari using a butterfly net next to a bed of diverse, flowering, native perennials (plant them and critters will come). *Minnesota Waldorf School,* Maplewood, MN.

construct their world through experience, it is essential to present them with situations we want them to believe in. Qualities such as peaceful, beautiful, ordered, and responsive can be embodied in nature play and learning spaces through careful design and management.

Preschoolers have more strength, skill, and confidence. They "build, construct, tear down, destroy, pound, knead, shape, sculpt, dig, sift, burrow, and experiment" and "exercise curiosity, wonder, ask questions, explore, discover, and pretend." (Greenman, p.242).[57] The changeability and unpredictability of nature are "key qualities that support self-organized, open-ended play—allowing adults to step aside" (Bilton p.31,[58] referencing Stephenson). For these experts, outdoors is where playing, learning, and education become a unified process allowing preschoolers' imagination and creativity to develop unimpeded, where collecting, sorting, classifying, questioning, and experiencing cause and effect support early science learning.

Five-year-olds enter kindergarten but are still considered to be in early childhood through second grade. At this age, children need to take charge of their own experience, to be challenged intellectually, socially, and physically. They "need opportunities for risk-taking and daring, for construction, experimentation, and problem solving" (Greenman, p.243).[59] Conducted in nature, these activities develop teamwork and a sense of responsibility, and can increase environmental awareness.

Middle childhood *(approximately 8 to 11 years old, overlaps with preadolescence)*

Children this age need similar opportunities for nature activities as their younger peers but larger in scale. This stage of childhood typically extends longer for boys than girls because of the earlier onset of puberty and adolescence in females. Children in this age group create strong friendships, especially of the same sex, and want to belong to a group to feel socially secure. They enjoy being outdoors in attractive, easily accessible, diverse spaces where

imaginations can be exercised in activities that they see as adventurous—that support growth of confidence through autonomous action (fort-building for example). This is especially true for under-privileged children who may lack opportunities for independence away from home. Nature play and learning can help equalize opportunities for underserved children, particularly in science and the arts. Children this age need a space large enough to pretend to be "lost"—an attribute defined by landscape qualities such as topography, tree cover, and distribution of understory vegetation.

David Sobel calls middle childhood the "hunter gatherer" age, when territory expands and the collection and classifying of natural objects is popular.[60] Beginning at this age, clubs linked to nature play and learning at museums, zoos, and botanical gardens provide opportunities to build relationships with educators who, as Rachel Carson suggests (and research supports), can help individuals become inspired by nature through working with a knowledgeable adult in a rich, natural environment.[61]

Preadolescence *(ages approximately 12 to 14, preadolescence, puberty, and the beginning of adolescence)*

For young people, this is a period of rapid physical, social, and psychological change. Preadolescent introspection, the search for personal identity, the quest for the meaning of life may find expression through interaction with nature in poetry and drama. Self-expression is also important, and may be inspired by nature through writing, poetry, drawing, painting, sculpture, and music. Through active involvement with the natural world, young people learn deep concentration and experience the joy of accomplishment,[62] which may create a sense of on-going attachment to a nature play and learning place, resulting in multiple visits to continue working on projects or venture into new ones. Visionary educator Maria Montessori developed learning processes grounded in nature for adolescents.[63]

Adolescence *(approximately 15 to 18 years old)*

For some adolescents, a nature play and learning place may serve as a "nature club," as a medium for healthy inter-gender understanding and relationships, a community service opportunity, a viable place to volunteer, an alternative to organized sports, and/or an inspiration to study the expressive arts or science. It may be a place for meaningful adventure and risk-taking as a rite of passage into teen culture. [64]

2.16 For pre-adolescents, nature play and learning places can serve social needs, stimulate interest in conservation and environmental issues, help youth feel useful, and at the same time provide opportunities for emerging leadership skills. Here, a youth group enjoys time together scavenging litter from an urban stream. *Walnut Creek Wetlands Center*, Raleigh, NC. (Design: Frank Harmon Architect with NLI)

2.17 For adolescents, nature play and learning places provide opportunities for contributing to programs and site management, including skill development. Here, young adults and youth are working together preparing the area for a children's nature play program. *Nature Play Corps*, *Alligator River National Wildlife Refuge*, *NC* (see insert, pp. 30-35).


2.16


2.17

04

Designing nature play and learning places

Think of designated nature play and learning places and children playing there as dynamic, people-environment ecosystems constantly evolving and adapting to new ideas, user groups of all abilities, and individual energies—always conditioned by the ebb and flow of time and money. The role of design is to create viable content in flexible settings that offer users a strong sense of place.

4.1 Surrounded by the highly active play areas of *Brooklyn Bridge Park*, NYC, an intimate, zigzagging, trail of Black Locust boards leads children around a small, boulder-lined, marsh garden where something natural is usually going on. In early Spring, ethereal creamy blossoms of *Catulpa bignoides* enhance the experience. Design: Michael Van Valkenburgh and Associates.

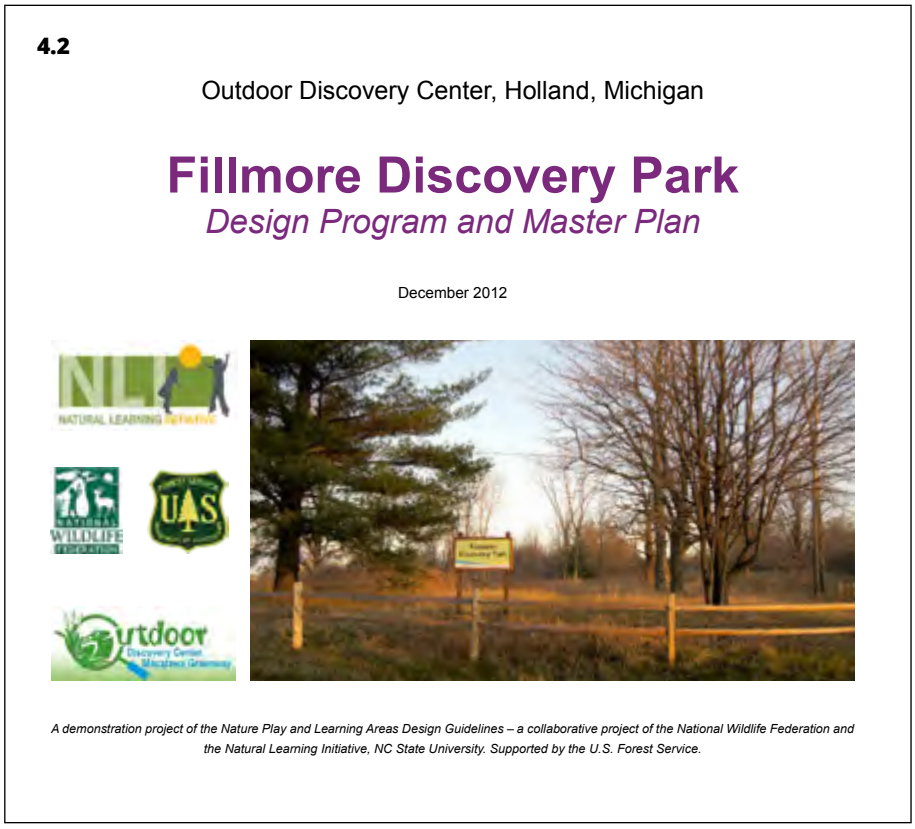
DESIGN AND MANAGEMENT PROGRAM

Developing a design and management program is the core of the design process. It is usually the first major step and normally created through a community engagement process as outlined in Chapter 7. The purpose is to provide a written and visual narrative of the nature play and learning place project, which can then serve as the driver of site design. A typical program includes a project mission statement, goals, and objectives; user groups to be served; age group needs; site assets and constraints; descriptions of each proposed activity setting; federal accessibility guidelines and other mandated requirements; agency needs; and other pertinent information. Explicit cultural objectives may support evolution of the space into a compelling venue for children and families.

Programs reflect the enormous variation in scope, site conditions, and degree of physical intervention of different nature play and learning spaces. At one extreme, where a proposed site is an existing natural area, just a small degree of design intervention will be required to make it usable while conserving as much of the existing natural value as possible.

In this case, management steps required to convert the site will be the program focus. At the other extreme, a barren site devoid of nature may require design of an entirely new ecosystem for nature play and learning as the program focus. Many sites fall somewhere in the middle, requiring a mix of light to heavy interventions described in the program.

4.2 The design program defines the project mission, goals, and objectives; describes the nature play and learning settings that support them; and presents a master plan or schematic design showing site layout and circulation. The *Fillmore Discovery Park* Design Program was created through a community engagement process with local stakeholders (Case Study 7).



4.2

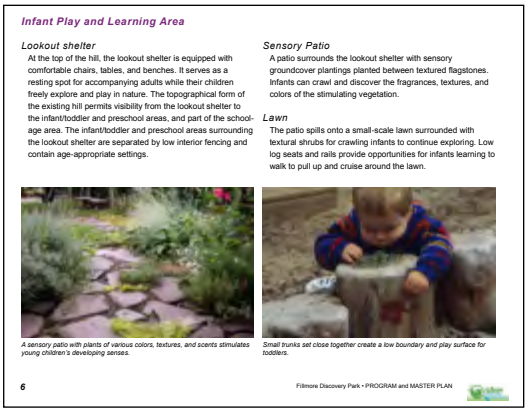
Outdoor Discovery Center, Holland, Michigan

Fillmore Discovery Park

Design Program and Master Plan

December 2012

A demonstration project of the Nature Play and Learning Areas Design Guidelines – a collaborative project of the National Wildlife Federation and the Natural Learning Initiative, NC State University. Supported by the U.S. Forest Service.



Infant Play and Learning Area

Lookout shelter
At the top of the hill, the lookout shelter is equipped with comfortable chairs, tables, and benches. It serves as a resting spot for accompanying adults while their children freely explore and play in nature. The topographical form of the existing hill permits visibility from the lookout shelter to the infant/toddler and preschool areas, and part of the school-age area. The infant/toddler and preschool areas surrounding the lookout shelter are separated by low interior fencing and contain age-appropriate settings.

Sensory Patio
A patio surrounds the lookout shelter with sensory groundcover plantings planted between textured flagstones. Infants can crawl and discover the fragrances, textures, and colors of the stimulating vegetation.

Lawn
The patio spills onto a small-scale lawn surrounded with textural shrubs for crawling infants to continue exploring. Low log seats and rails provide opportunities for infants learning to walk to pull up and cruise around the lawn.

A sensory patio with plants of various colors, textures, and scents stimulates young children's developing senses.

Small trunks set close together create a low boundary and play surface for toddlers.

6

Fillmore Discovery Park • PROGRAM and MASTER PLAN

Picnic area
Further along the pathway a picnic area provides an additional opportunity for family gathering, school group lunches, or birthday parties. The picnic area is adjacent to the head of the play stream, the log balancing area, and the grass maze.

Grass maze
The grass maze offers children playful immersion in a vegetated wonderland while parents relax at the picnic tables.

Earth play
Continuing around the looped, primary pathway is an earth play area where children work with soil amended with compost or sand to make digging easier.

Natural construction
Active play continues along the primary pathway with an area for natural construction, loose parts play, and boulders for climbing. A loose parts storage shelter in the natural construction area protects materials from the elements.

Stump walk
A stump walk follows a secondary pathway. Stumps can be utilized in myriad ways to encourage active play. Stumps placed within leg's reach with vertical sticks for balance create a fun stump walk. Stumps that are 18" high afford jumping and balancing when secured in the ground.

Grass mazes are immersive textural experiences for children.

Boulders containing the amended soil for an earth play setting double as seating for adults.

Fillmore Discovery Park • PROGRAM and MASTER PLAN

11

SITE DESIGN

Site design or layout is a further major step in the design process. Focused on circulation and the location of activity settings, this step often includes considerations of age-appropriateness, territorial development, and accessibility. Nature play and learning spaces can be created in any place accessible to the community as described in Chapter 3. Sites vary in physical characteristics such as size, topography, elevation, and climatic zone, and key factors such as demographic profile, projected visitation, budget, and institution type. All influence the design and management approach together with projected levels of financial support, open-access or controlled access, and so on.

Design processes may range from dumping a pile of dirt in a suitable spot in a park, or defining a natural construction zone and supplying it with fort-building material, to hiring a landscape architect and other consultants to design a nature play and learning space with full community participation, production of construction documents and implementation by a team of skilled, qualified contractors.

Small projects may be executed with volunteer professional assistance and may not require full construction documents. If technical issues and/or the degree of intervention are modest, site layout and installation may be handled "in-house" using existing skills and labor and/or external community assistance, including volunteers (see Fillmore Discovery Park, Case Study 7).

For substantial projects, in other words, involving investment of more than a few thousand dollars, the preferable process, in full or in part, is to engage a design professional who can act as a neutral third party to manage the community participation process (see Chapter 7), prepare the site design according to the client intent, ensure that local regulations are addressed, oversee quality control during installation, and match expectations for physical change with available budget.

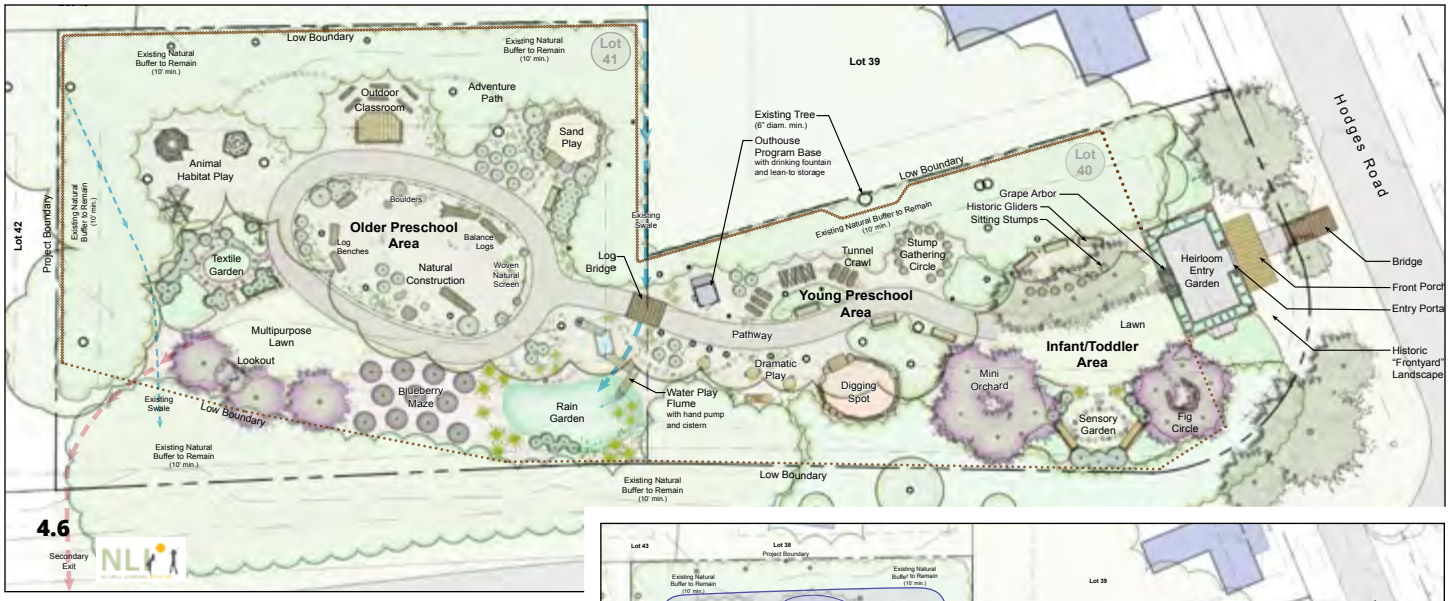
Site design can proceed, once the draft design and management program is available, usually in three phases: Conceptual design, schematic design, and construction documentation. This sequence of steps, which could vary, sometimes greatly, according to project parameters, is summarized below:

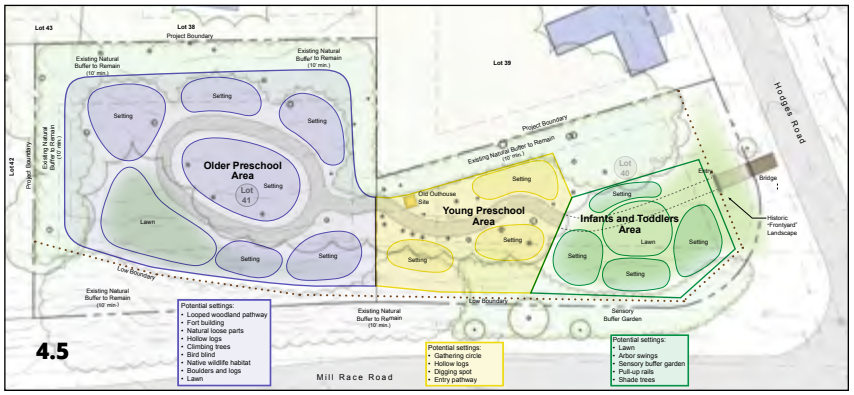
4.3 The stakeholder workshop is designed to gather interests of the agency and local community to create the design program—as well as to develop a sense of ownership and commitment to finding resources to implement the project. The stakeholder workshop lies at the heart of the design process described in Chapter 7. Here, the stakeholder workshop for *Fillmore Discovery Park*, facilitated by the design consultant, brought together civic, business, and agency leaders for a half-day meeting.

4.4 The *Fillmore Discovery Park* site, for which the stakeholders try to imagine how it could be developed and who it would serve (Case Study 7).


4.3


4.4





Conceptual design describes the overall layout for the site: location of entrances, primary pathways, main activity settings, placement of buildings and ancillary facilities such as restrooms and parking.

Schematic design can proceed once the parties involved have agreed to the conceptual design. This phase adds a layer of detail to activity settings so that they are better defined and tightly meshed together. Site design may also involve environmental factors such as drainage and erosion control with legal requirements that may call for an engineer to be involved. Factors such as vegetation assessment, tree preservation, and soil analysis may require additional experts, including a landscape architect.

Construction documentation is required to solicit accurate bids for construction costs. Completion normally requires systematic review of construction documents by relevant parties. After each review, design changes become progressively more costly to execute; however, it's better to make changes while construction documents are still in progress rather than during construction when "change order" costs are much higher.

Regardless of the level and type of intervention, a well-executed, accurate site design will specify activity setting locations linked together with looping pathways, which together define the synergy of site affordances and activity options, influenced by factors such as building and entrance locations, centers of activity, and setting "adjacency" (spatial relations). For example, are highly attractive settings such as water play located away from the entrance so that visitors are "pulled" into the site to discover other offerings? Are potentially incompatible settings separated, such as noisy and quiet, active and reflective, mobile and stationary? Are considerations of solar exposure and shade included? The site design should provide a "road map" and a useful management tool to guide site development, which may be executed in phases over months or even years as funding becomes available.

4.5 The *conceptual master plan* is developed from the stakeholder workshop. It designates overall age-related areas, setting locations (including main entrance and primary pathways). Here, the dual-purpose conceptual master plan proposes a nature playground for use by residents and as a training site for early childhood educators. *Outdoor Learning Environment, Alamance Partnership for Children.* (Design: NLI).

4.6 The *schematic design* contains a more detailed description of each setting, their relationships to each other, and the circulation system. Locations of trees, shrubs, perennials, and vegetable gardens are included.

ACTIVITY SETTINGS

Design of activity settings and their affordances (defined in Chapter 2) and as described in a typical project design and management program, make up the third major step in the design process. Design is now focused on details (including pathways), which provide experiences with natural elements.

Following are the most common two-dozen activity settings and their affordances, together with particular considerations and adjacency recommendations. Settings are introduced in the approximate hierarchy of design importance and sequence of consideration when thinking through site layout. How visitors enter the area and move around are key initial questions. Consideration of trees, because they are large and permanent, is a top priority, including trees already on the site. Thinking about specific activity settings to support nature play and learning comes next. And last but not least, practical matters such as programmatic bases, storage, signage, and design of setting boundaries. Confirmation of the overall legal site boundary and entries/exits must be an initial consideration.

section preview

COMMON ACTIVITY SETTINGS

- **Pathways**
- **Plants**
  - Trees
  - Shrubs
  - Perennials
  - Permanent edible plants
  - Vegetable gardens
  - Annuals
- **Natural surfacing**
- **Natural loose parts**
- **Natural construction**
- **Natural play structures**
- **Multipurpose lawns**
- **Meadows**
- **Woodland**
- **Landform**
- **Animals**
- **Aquatics**
- **Sand, Soil, Dirt**
- **Gathering**
- **Program Base & Storage**
- **Signage**
- **Boundaries**

ENTRANCES

Entrances are the portals to nature play and learning. Welcome! Play freely! Have fun! Playful, child friendly, naturalized entrance designs can convey positive messages to attract visitors and put them at ease.

Entrance affordances

- Celebrate a sense of arrival and departure.
- Express social and cultural meanings.
- Provide a sequential transition zone linking multi-modal arrival by public transit, car/pick-up/drop-off zone, street sidewalk, greenway/trail, and accessories such as bike racks.
- Serve as a gathering and socializing setting.
- Provide a point of information about the facility and its special features.
- Accommodate the needs of visitors of all abilities; connect to an accessible route linking all other settings.
- Help orient and guide visitors by adding sensory cues: visual (bollards, paving patterns, landmark towers, flagpoles, screen walls, particular plantings); tactile (paving surfaces, tactile maps, signs, plant textures); acoustic (wind chimes, the sound of children playing, songbirds); and olfactory (fragrant plants).

Considerations

Consider space for school visits, for assembly and briefing for about 25 children. Think about shady seating. Imagine an entry archway with the name of the space. Create a separate child-size entry, especially if the main entrance has to be large enough to accommodate service vehicles. Specify sturdy materials so that entry structures are built to last.

Adjacencies

Relaxed, intergenerational meeting/seating settings. Subspace with settings for families with infants and toddlers. Restrooms/diaper change-nursing mother facility/changing room. Storage.

4.7 Main entrance to universally designed family recreation area in a community park offers a shady place to gather before/after visiting. A diverse, living landscape of shade trees, flowering shrubs, and ornamental grasses awaits beyond, integrated with pathways and play areas. *Kids Together Playground*, Cary, NC. (Design: Robin Moore with Little and Little).

4.8 Fun, "talking benches," created as public art, engage children and adults as they wait for friends at *Kids Together Playground*. (Design: Robin Moore with Little and Little).

4.9 Main entrance to designated nature play area at a nature center. Notice the "kids' entrance" on the left. *Nature PlayScape*, Cincinnati Nature Center, Tealtown, OH (Case Study 6).

4.10

4.11

4.10 The pathways in this universally designed family recreation area are designed as experiential settings for movement and exploration. Primary pathways provide clear pedestrian wayfinding from parking to entrance adjacent to shelter/bathroom (green roof), to multiple settings beyond, continuously curving, wide enough for groups to converse. Highly curved, narrower secondary and tertiary paths are clearly visible. *Kids Together Playground*, Cary, NC. (Design: Robin Moore with Little and Little).

4.11 Connected to the primary pathway (foreground), a secondary, vegetated, rocky pathway steps up a created hill to play setting on the summit. Wheelchair access is off to the side (not visible). Notice the foreground, vine-covered arbor marking the entrance to an area for families with the youngest children. *Kids Together Playground*, Cary, NC. (Design: Robin Moore with Little and Little).

PATHWAYS

Pathways are the arteries of a space, directing the flow of human energy in a hierarchy of scale: primary, secondary, and tertiary. Children travel wherever they want unless a barrier obliges a change in direction. In a woodland area without protective railings, children will run every which way and wear down groundcovers and fragile understory plants to bare dirt. However, if pathway alignments are defined and edged in some way, environmental impact will be minimized. Primary pathways should also be considered as accessible routes designed to meet federal and state guidelines, and to provide access to all activity settings in the play and learning space. Inclusive design will also serve the needs of families with young children in strollers.

Primary pathway affordances

- Follow a looping form without dead ends, and provide a direct, comfortable route connecting the entrance to all other major play and learning activity settings.
- Provide an accessible route to centers of activity, important landmarks, and facilities such as toilets, drinking fountains, and meeting spaces.
- Offer an accessible surface and ease of navigation on level ground.
- Allow groups of users to interact socially on pathways wide enough (5 to 12 feet) for pedestrian circulation, including school children during the week and family groups on weekends.
- Curvy enough to retain a sense of exploration and discovery.

Considerations

Hard-surfaced pathways more easily support wheelchairs, wheeled toys or strollers. Acceptable hard surfaces include concrete, asphalt, decomposed granite, and fine crushed stone. Consider tinted concrete or painted asphalt to add color. In infant/toddler settings where children are still learning to walk, consider a thin coat (3/4") of poured-in-place safety surfacing to buffer falls. To protect adjacent plantings, consider low, single rail or rope-and-post edging; hoops of curved metal bar; or recycled tires laid horizontally, filled with soil, and planted. The idea is to stop young visitors from running through plantings (see p.87).

Adjacencies

Primary pathways connect entrances to all other settings and may serve as setting boundaries.

Secondary pathway affordances

- Offer less direct, narrow routes *(3 to 4 feet wide)*.
- Particularly attractive to children, who may follow contorted "up, down, and around" routes that stimulate hiding-and-chasing games.
- Can cross-connect primary pathways so that children can leave the primary pathway to follow more "secret" alternative hidden connections to other play settings.
- Take many forms to encourage children to explore and learn in secluded places by interacting freely with nature and make discoveries at their own pace.

Considerations

Although woodchips or shredded hardwood mulch are typically used as a surface, also consider decking, thick planks of locust or other rot-resistant timber.

Adjacencies

Primary pathways (linked by secondary "cross cuts") connecting other settings provide an alternative means of moving through the space.

Tertiary pathway affordances:

- Serve as an "animal run" (2 to 3 feet wide) with sharp bends, up-and-down alignments, through green tunnels of bushy vegetation arching overhead, around rocks, stumps and trees to create an endless sense of exploration and discovery.
- Offer a short, "secret" loop off a main or secondary pathway (especially for small children) around a fixed feature such as a tree or group of shrubs.

Considerations

Flagstones or similar can be used as a surface.

Adjacencies

Tertiary pathways can connect to individual settings or special natural play objects such as rocks and sculptures.


4.12


4.13


4.14

4.12 Primary pathway in preschool area of childcare center enables children to interact with adjacent/overhead vegetation. *First Environments Early Learning Center*, RTP, NC. (Design: MIG).

4.13 Secondary pathway, articulated with native stones *John Denver Park/Sanctuary*, Aspen, CO.

4.14 Tertiary pathway. *Kids Together Playground*, Cary, NC. (Design: Robin Moore with Little and Little).

05

Managing nature play and learning places

"Do what you can, with what you have, where you are."
—Theodore Roosevelt

Children's hands-on interaction with nature calls for a dynamic, time-sensitive approach to ensure that environmental stewardship is pursued as an essential goal, while at the same time recognizing that nature play is manipulative and often messy. Managers understand that settings may get worn through use but also can be managed to recover, including supplemented with prepared natural materials to augment play value. Both management and maintenance are involved as distinctly different levels of professional responsibility.[102]

Effective management attempts to balance stewardship with continuing efforts to keep the nature play and learning space attractive to children so they keep coming back for more. Tasks include replenishing physical resources, training staff, encouraging volunteers, launching innovative programs, producing special events, installing new settings, and refreshing those already there. Plants get diseased and damaged and need to be replaced. Invasive plants need to be removed. Natural settings are seasonal, constantly growing and developing, and require nimble, flexible techniques that respond to the requirements of living systems. Management tasks may also include accommodating individuals with special needs who, prior to a visit, seek printed guidance or online information about all available opportunities to enhance their visit.

Effective maintenance, in contrast, is focused on upkeep, repairs, and keeping things in order. It means tidying up at the end of the day, making sure equipment and materials are properly stowed, ensuring risk management protocols are executed—leaving the space in "shipshape" condition for the next day.

MANAGEMENT FACTORS

Regardless of location (as described in Chapter 3), several factors frame management approaches, including type of project, type of access, programming, type and size of organization, and resource availability.

Type of project

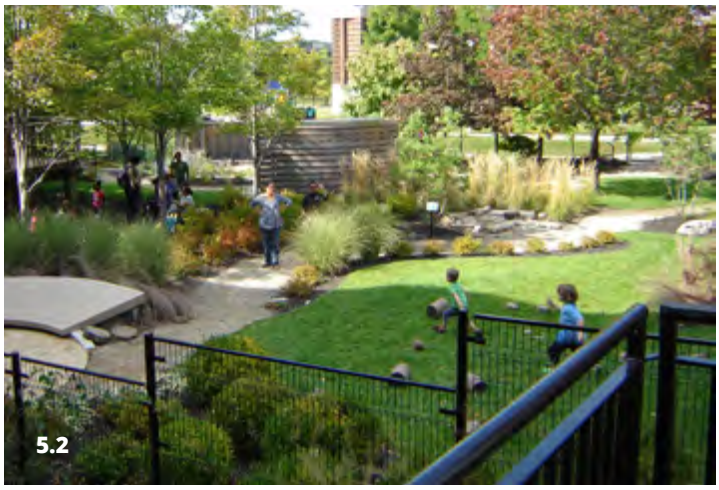
Type of project covers a range of beginning conditions on the ground, which define possibilities for implementing different types of nature play and learning place. A project may be primarily renovation or new construction or a mix of the two. Either may include ecological restoration. The distinctions are not always obvious, especially when project implementation is phased. By understanding the differences, those promoting nature play and learning are better able to identify local opportunities for nature play and learning, and ensure that policy is developed to embrace them.

Renovation applies to an existing site, such as a standard school playground, to be naturalized by adding diverse plantings in and around equipment to increase opportunities for engagement with nature. Extension of the playground area to embrace a separate but connected natural area (in itself new construction) could increase nature play and learning possibilities.

New construction refers to a project starting from scratch. The Nature PlayScape at the Cincinnati Nature Center is an example (see Case Study 6, p. 140). The center of the site, which previously was an open, bramble-infested field, was replaced by a professionally designed playscape containing many of the settings described in Chapter 4. However, the new construction centerpiece was surrounded on two sides by existing woodland, which to be viable required only pathways connected to modest "new construction" settings (built out of locally sourced timbers and rocks).

Ecological restoration (or eco-restoration) can apply to either renovation or new construction when a degraded ecosystem or one that once existed on a site is being restored or re-established. The term may also apply to a nature play and learning space being installed within a larger restoration project, such as an urban stream corridor.


5.1


5.2

5.1 A range of options, from renovation to new construction, is available to managers implementing nature play and learning projects. All include possibilities for eco-restoration. This school park renovation (from a virtual desert) included a longleaf pine restoration component, reflecting the regional ecology. *Blanchie Carter Discovery Park*, Southern Pines Primary School, So. Pines, NC (Case Study 10).

5.2 This university campus site contained a stand of semi-mature trees to be conserved but otherwise was new construction. *Arlitt Nature PlayScape*, University of Cincinnati, OH (Case Study 11). Photo: Eric Thomas.

5.3

5.4

5.3 Open access is communicated by the welcoming gates to a bounded nature play and learning area. *Nature PlayScape*, Cincinnati Nature Center, OH (Case Study 6).

5.4 Controlled access is ensured by this entry setting, which includes payment booth (notice child-height window), welcoming sign, and visitor information. Protected stroller parking is provided beyond the booth. *Hamill Family Play Zoo*, Brookfield Zoo, IL. (Design: MIG) Photo: Ko Senda.

Type of access

Whether access is open or closed is fundamental to management approaches because the degree of environmental protection and levels of potential diversity differ greatly.

Open access invites visitors to freely engage with nature as a positive experience without an entry fee. Because time in contemporary life is tightly structured, children and families seek close-to-home opportunities for engaging with nature in the green infrastructure of local neighborhood parks, school grounds, and stream corridors. However, neighborhood natural spaces are often small with limited carrying capacities that may be unable to support heavy use. Without deliberately intensive management, recovery may be slow, leading to gradual reduction of both natural diversity and play value.

Controlled access applies to sites such as zoos, botanical gardens, arboreta, nature centers and museums where entry is through some type of portal controlled by opening times and where an entry fee may be charged. Here, messages about appropriate use can be delivered, which may help protect natural resources from damage. The site can be managed by rotating subareas so they recover from heavy use. Access may also need to be controlled in urban areas where perception or actual occurrence of crime may be higher.

Play and learning programming

Activity programming (not covered in detail in this publication) should reflect the mission, goals and objective of the project as conveyed in the design and management program. It may include science learning, the expressive arts, and many other possibilities. At the Hamill Family Play Zoo (an innovative child-centered model launched in 2000 at the Brookfield Zoo near Chicago), programming is

5.5 Many national government and nongovernment organizations have joined the children and nature movement as symbolized here. Many similar state and local organizations promote getting children and youth outdoors—in nature.

focused on helping children develop an emotional attachment to nature through hands-on experience and dramatic play facilitated by playworkers.[103]

In both open and controlled-access spaces, play programming may help to instill a sense of stewardship among users, reinforced by secondary communication via signage, brochures, websites, etc. Programming requires trained staff, which on the one hand increases play value and educational benefits but on the other increases cost. Staff capacity may also need to include site management, which could be invested in the same individual or spread across a group responsible for developing and delivering programs.

Type and size of organization

The organization sponsoring the nature play and learning space will influence the level of management responsibility and degree of freedom. For community leaders and nature play advocates, an understanding of the pros and cons of different organizational contexts may help determine which to target to promote nature play and learning places.

Governmental organization usually implies navigation of a large bureaucracy, which can be time-consuming and at times frustrating. However, once nature play and learning policy has been adopted, fundraising is legitimized and action plans can move ahead assured of some level of stability.

Nongovernmental organization (often a nonprofit organization) is usually smaller, less bureaucratic, with creative initiative more likely to be celebrated. Collaboration between government and nongovernmental entities can result in a win-win strategy for nature play and educational programming, especially in local parks.[104]

Resource availability is usually a key controlling factor on progress. An important role of the management team is to devise ways to creatively stretch budgets by organizing and training volunteers in both site management and play and learning programming, seeking material donations, reaching out to high schools and colleges to establish service learning opportunities, etc.

ENVIRONMENTAL MANAGEMENT

Best practice environmental management applied to nature play and learning spaces recognizes the necessity of flexible trade-offs between the human development goals of nature play and learning, and environmental protection. Historically, "best practice" was introduced in the U.S. Clean Water Act (1977) as "best management practice" (BMP), which has become a broadly applied concept but limited to water quality resource management.

Applied to nature play and learning spaces, best practice management provides a flexible framework that recognizes the reality of innovation as an open-ended work in progress. In 2014, the Natural Learning Initiative published best practice guidelines for the design and management of child development center outdoor learning environments.[105] The Sustainable Sites Initiative[106] offers a relevant, broader site design best practice framework, which could encompass the specialized field of nature play and learning. Also of note is the excellent Play England publication, *Nature Play: Maintenance Guide*,[107] which discusses nature play management and maintenance linked to research-informed staff training guides used by the UK Forestry Commission.[108] Even though the U.S. context is different, many of the principles are adaptable to U.S. conditions.

Ecosystem thinking

Ecosystem thinking is especially relevant for a new site. How can it be designed and managed to reflect local ecosystems so that users will experience firsthand the place where they live—their "ecological address"? Each has climatic and physiogeographic characteristics that influence soils, water, topography, and animal and plant life.

Ecosystems vary enormously in quality and vulnerability, which may greatly influence the approach to design and management. Is the site of high, average, or low ecological value? Are ecosystems being restored as part of the renovation? Can users be involved in the restoration process? Can the site be easily adapted to nature play and learning? Is the intended nature play and learning site near or adjacent to a manufactured equipment playground, which may create some positive synergy between the two models?

Healthy ecosystems support dynamic landscapes that grow and change over time. Regardless of whether a nature play and learning space is initiated as a renovation, restoration or new construction site, managers will need to plan for long-term landscape evolution. Landscapes installed at a single moment in time risk trees aging out simultaneously, which can be avoided by choosing species with different growth rates and climax conditions planted in phases at different times. By recording initial conditions and following management protocols, present and future managers can implement informed decisions. What if the site is a tree-less Midwest tall grass prairie, where the aim is to conserve its strong ecological identity? The management protocol would possibly include controlled burning. A restoration site such as the Blanchie Carter Discovery Park (Case Study 10) had the same need for recordkeeping, which could also support curriculum objectives.

Basic ecological health is reflected in water and soil conservation and the diversity of plants (native or otherwise). As these factors vary by region, management plans will benefit from advice from local experts in Cooperative Extension, the State Soil Survey Office, and/or state and local water quality regulators and arborists found in departments of environment and natural resources.

5.6

5.7

5.8

Water

Water is not only recognized as a finite, planetary resource essential to life, it is also the most popular play setting for children. Protection of water quality is enshrined in multiple regulations and best management practices (BMPs) across all levels of government. This suggests triple responsibilities of managers to, a) make sure "playable" water is available, b) ensure that environmental quality is not permanently compromised, and c) that users of all ages are helped to understand the need for water quality protection and how to do it. For example, best practice means harvesting rainwater and retaining as much as possible onsite for irrigation and/or for feeding aquatic features such as streams, ponds, and wetlands to extend play and learning possibilities.

Soil

Human life depends on soil. Our food is grown in soil or animals used as food eat plants growing in soil. Caring for soil and helping visitors understand its importance are tasks for site managers and educators. Protecting soils from erosion is critical. Onsite soil quality enhancement can be implemented using permaculture practices such as composting, mulching, and vermiculture. Hands-on opportunities for children to participate will help them understand the difference between good and poor quality soil and how to improve the latter.

Plants

Plants are the most important components of nature play and learning spaces and the activity settings they contain. To maximize benefits as hands-on resources, an informed management approach is required, which offers guidance on types of plants, their selection, and placement, as described below.

5.6 Soil quality is a key to ecosystem thinking. Here, students examine a soil profile. Photo: George R. Hess, NC State University.

5.7 Ecosystem thinking includes the basic parameters of water, soil, and vegetation (and therefore healthy animal habitats). All work together in dynamic synergy. Here, a "constructed wetland" demonstrates keeping storm water on site as an aesthetic/educational feature. *Emerson Waldorf School*, Durham, NC.

5.8 Vermiculture fascinates children. Here, a plastic container with food waste and shredded paper is the medium. The resulting compost is used to boost quality of the vegetable garden. *Preventing Obesity by Design*, NLI, NC State University.

06

Contributed by Allen Cooper

Risk management

"The desire for safety stands against every great and noble enterprise."
—Cornelius Tacitus, Roman historian (55–120 AD)

Risk management in children's play settings has historically focused on injury avoidance, and standards for manufactured play equipment (ASTM) and playground guidelines (CPSC) were developed to achieve that goal. Unfortunately, an exclusive focus on injury avoidance has tended to produce uninspired, "cookie-cutter" playgrounds with diminished play value.[109]

Nature play and learning places are of interest in part because they offer a more varied, challenging, and stimulating play environment with greater potential play value than that available from strictly manufactured equipment. Providers of natural play and learning opportunities must pursue two goals simultaneously: "to offer children and young people challenging, exciting, engaging play opportunities while ensuring that they are not exposed to unacceptable risk of harm."[110]

This is not a simple task. One rule does not fit every setting or organization. Each provider must decide what level of challenge is appropriate for their particular situation—depending on age, level of supervision, and degree of modification of the natural setting. For example, a supervised natural outdoor space may allow children to take greater risks relative to the children's maturity level than a public park where no supervision is provided. In each context, the management goal should be to create an ongoing balance between developmental benefits and risk of harm.

In nature, many children will seek play and learning opportunities to engage and challenge themselves, foster their curiosity, and provide risk-taking that is appropriate to their individual developmental level. Children normally recognize risks, make judgments, and respond within or at the limits of their skill development. Under these developmentally appropriate circumstances, injury is unlikely. Consider this example:

A circuit of horizontal and angled logs has been installed for children to climb on, to step or jump from one to another, practicing balancing skills, and jumping off having completed the circuit. The size of the logs, the height above the ground, the inclination angles, the gaps between them, and the overall scale

appear to have been carefully considered to attract children 5 years old and older who jump from one to another to complete the circuit. However, the more skilled 4-year-olds are not to be left out and try climbing on individual logs. Some succeed and delight in jumping off—and endlessly repeat the climbing-jumping sequence. Others see the climb as too challenging and zigzag around the logs at ground level. At other times, this multipurpose setting serves as a meeting circle. Older children who read the setting as insufficiently challenging self-select out and find something else to do.

Children attracted by the level of challenge of the logs experience the risk by balancing above ground, judge the distance between logs to traverse, exercise gross motor skills as they leap from log to log, and enjoy the sense of accomplishment at the end. From previous experience, the children have learned that if they judge the distance incorrectly they might lose their balance and fall but likely will stay upright and, if not, may experience a knock or scrape. In this example, an unacceptable risk of harm would be present if the logs appeared to be anchored but in fact were not and could topple when children stood on them.

6.1 A child carefully "tests the affordances" of logs spanning a small stream as he faces the challenge and calculates the risk of crossing to the other bank. At the same time he is honing psychomotor balancing skills that may be put to use later in life as gymnast, fireman, or just navigating a piece of furniture down a staircase. *Nature PlayScape*, Cincinnati Nature Center, OH. (Case Study 6)

HAZARD, RISK, AND INJURIES

Words like "hazard" and "risk" are often used interchangeably and without precision, but it is important to have a shared agreement about what the terms mean to achieve the desired outcome of a play and learning settings that are challenging, but do not present an unacceptable risk of harm.

Hazard refers to any potential source of harm and is often used to describe a situation that is unacceptable and requires mitigation. But a moment's reflection makes it clear that hazards are present in every situation, in the sense that any action or object has the potential in certain circumstances to cause harm.[111] Even safety materials in certain circumstances can be hazards; pea gravel and poured-in-place rubber surfacing are commonly used for impact attenuation, but they are also choking and burn hazards under certain conditions. The challenge for the risk manager is not to eliminate all hazards, but to assess the risk presented by the hazard, and to remove hazards that in present and foreseeable circumstances present an unacceptable risk of harm. "Dangerous" and "safe" are also used to describe children's play settings, but they are imprecise, contribute to unclear expectations, and therefore are not useful.

Risk is defined as the combination of the probability of occurrence of harm and the severity of that harm. A *Risk Assessment* involves consideration of the developmental benefit of the hazard, the probability that the hazard will cause harm, and the likely severity of the harm.[112] Risk is present in virtually every situation both in nature and in life, and part of growing up is learning how to navigate risk. A setting devoid of risk is boring and, from a developmental perspective, lacks opportunity to develop skills and judgment. For this reason Frost concludes that, "a reasonable risk level is necessary in play but, as in other life activities, there must be limitations on the degree of physical risk."[113]

6.2 Which situation poses a hazard, if any? What are the relative risks and benefits of each? What is the adult role in each situation, if any?


6.2a


6.2b

Severity of injury can be described in terms of the Abbreviated Injury Scale, with range of severity from 1 (minor) to 6 (unsurvivable injury).[114]

An important goal of a nature play and learning space is to present and maintain a reasonable risk level, so that challenging, interesting conditions are present but an unacceptable risk of harm is not. In conditions of reasonable risk, minor injuries, such as scrapes resulting from a boulder scramble, should not be regarded as adverse outcomes at all—unless they indicate the presence of an avoidable or bad risk such as a hidden sharp object, or a design or other fault that is likely to cause more serious injury. Risk of severe and life-threatening injury should be vanishingly small—but it is important to observe that, short of removing all trees and draining all bodies of water, some risk will remain, and the occurrence of serious injury is not in itself evidence of a poorly managed space.[115]

A reasonable risk relates to the play "affordances" discussed earlier. As children move around their environment, they "read" the risk affordances, evaluate them, and choose whether to activate them. In this way, risks are learned and mastered. With the newly acquired skill, the child seeks out and tests new levels of risk. As described in *Managing Risks*, "Good risks and hazards in play provision are those that engage and challenge children, and support their growth, learning and development. Bad risks and hazards are those that are difficult or impossible for children to assess for themselves, and that have no obvious benefits."[116] A manager will strive to cultivate good risks, and eliminate bad risks.

An example of reasonable risk comes from the Santa Barbara Natural History Museum's fort building station, which consists of lengths of bamboo poles up to 8 feet long and four inches in diameter (6.4). Children lean the lengths against a slanting tree to create a temporary structure, and regularly remove, adjust, and replace the poles. One day a child remained under the structure while other children were dismantling it and a pole fell and struck her head. The child cried for a few minutes before resuming play and the adult supervisor asked her, "What did you learn from that experience?" "Not to stay under the fort when we are taking it down," she replied.[117] Despite the risk of being struck by a pole, the risk was reasonable, because the poles were light enough not to cause even minor injury and because there is developmental value in the fort building activity. To the manager's knowledge this was the only time that a child had been struck by a falling pole, which suggested that most kids were able to "read" the risk and avoid falling poles. Even the child who did not catch on at first will probably not be surprised again!

6.3 Tree climbing, once an unquestioned, quintessential, rite of childhood, now appears contentious. Nonetheless, any tree-climbing kid can discriminate between "good" trees (like the one pictured here) and the to-be-avoided variety (lowest branches too far from the ground, not enough limbs and/or angles too vertical, insufficient crotches to hang out in, etc.). Why is tree climbing so attractive? Is it dangerous? What are the facts?

6.4 (Inset) "What did you learn from that experience?" "Not to stay under the fort when we are taking it down," she replied.

07

Implementing nature play and learning places

"The ultimate test of man's conscience may be his willingness to sacrifice something today for future generations whose words of thanks will not be heard."

— Gaylord Nelson, former Governor of Wisconsin, founder of Earth Day

Successful project implementation entails key factors such as leadership, community engagement, a viable site, finances, and trained staff. Project completion may be constrained by budget and occur in increments over time, though managed as a viable nature play and learning place from the beginning. The primary principle is to initiate change—even on a pilot basis—so that something tangible appears on the ground that staff can work with, thereby learning by doing. The kidZone play zoo at the North Carolina Zoo started this way, allowing staff several years to test a variety of low-cost, temporary settings to discover how well they worked (*kidZone*, Case Study 8).

Possibly the most important point is to recognize the diversity of potential projects, which may range from a few thousand dollars (or even just hundreds by using volunteers) required to open up a wooded lot to neighborhood kids for nature play, to large projects serving a regional population and costing hundreds of thousands of dollars. Likewise, the need for professional landscape assistance may be minimal at the modest end (although always a good idea that may save money in the end) but essential at the upper end—with many variations between the two extremes.

INITIAL PLANNING

7.1 Planning nature play and learning places always starts with people—getting organized and focused. Timing is crucial so that energies coalesce around the project to map out its scope and make decisions before energies begin to dissipate.

History tells us that great projects, like great social movements, are often initiated by a single champion who has a bold idea, is able to articulate it, starts to proselytize, perhaps has good political connections, and gathers together like-minded believers as a coordinating committee to start the ball rolling. Then what?

Institutional partners need to be recruited. A community engagement process must be defined. A stakeholder group needs to be formed, alternative sites and organizations identified and evaluated, kick-off funding needs to be raised and, depending on circumstances, a project coordinator or manager appointed. These and several other steps may be considered initially and feature in the planning and implementation process (7.2).

7.2

Potential steps

PLANNING, ENGAGEMENT, DESIGN AND IMPLEMENTATION PROCESS

Creating a sustainable nature play and learning place is a process with many possible steps, which may not all be required for every project. The five key stages are outlined below:

I. Initiating the planning process

01. Create a coordinating committee and stakeholder group, and possibly a nonprofit organization.
02. Collaborate with an existing organization.
03. Engage with prospective government and nongovernment partners and collaborators.
04. Find a suitable site.

II. Defining the community engagement process

05. Define the scope of the project.
06. Organize a participatory design process.
07. Search for kick-off funding support.
08. Appoint a designer and/or site manager.
09. Conduct a community survey.
10. Organize a stakeholder design workshop.
11. Organize a children and youth design workshop.
12. Produce a progress report.

III. Creating a design program/design

13. Develop a design and management program.
14. Create a site design with continued support of the coordinating committee.

IV. Raising money

15. Launch a capital campaign.
16. Use the completed master plan as a fund-raising tool for construction funding.
17. Execute value engineering if necessary.

V. Implementing the project

18. Move ahead with construction documents and selection of contractor(s), once funding is secured.
19. Appoint a manager and program staff.
20. Invite the community to a ground-breaking ceremony.
21. Proceed with construction/installation.
22. Organize a grand opening/ribbon-cutting ceremony.
23. Manage the site for success.

7.2 Implementing a nature play and learning place usually involves five key stages covering many steps. Of the 23 listed here, some may not apply as conditions vary greatly between one project and another.

INSTITUTIONAL ENGAGEMENT

Nature play and learning places can be created in a variety of locations (Chapter 3), each within the jurisdiction of an organization (Chapter 5). A first step for local advocates searching for sites and implementation strategies could be to scan and assess the range of organizations and alternative potential pathways to success. Institutional alternatives and their characteristics include:

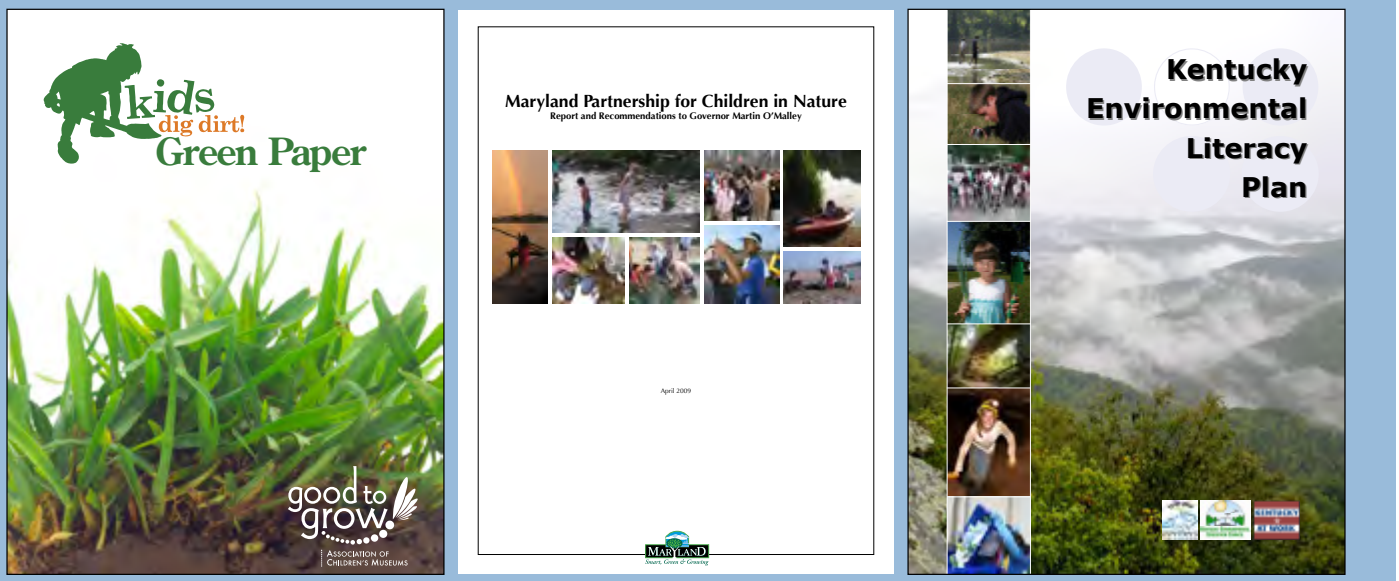
City and county parks work with appointed volunteer citizen boards that set policy, which is implemented by professional staff. Some systems contract out specialized programming responsibilities to nonprofit organizations, which could be the case with nature play and learning. Initial contact could be made by staff or by an advocate group in the community. In either case, the proposal should be brought before the parks board for endorsement. If board opinion is divided, suggest launching a pilot project with high visibility for a summer or year in a location where the chance of success is high.

A pilot project may be the first feasible step to help staff get their feet wet and confirm community support. If the pilot is successful, the department will work out how to proceed and whether an external organization could be involved. The scope of management will depend on whether a programmed space is proposed or not. A management committee could be formed and hosted by the parks board, with representation of local community groups and stakeholders such as schools, childcare centers, churches, banks, and civic organizations—and, of course, children. This group would be responsible for developing and implementing the design, related management plan, and fund-raising strategy.

Public schools are governed at county or city level and in some cases as entities independent of such jurisdictions. Typically, school policy is set by elected bodies and implemented by professional staff. Although some city school systems have implemented explicit school grounds renovation programs, few, if any see school grounds as primarily nature play and learning spaces. For decades, scattered individual schools have taken this approach but, without a formal mandate, such efforts are vulnerable. Management of school grounds typically falls under the physical plant department (rather than curriculum and instruction). However, the growth of site-based school management, with teachers and parents asserting more influence, may increase possibilities for improving and managing school grounds, which could lead to "joint use" for nature play and learning as discussed in Chapter 3.

Independent schools are more likely to value nature play and learning as part of their educational philosophy and may be open to creative design and management of their grounds. Typically, independent schools run their own affairs with a board of trustees that may include leading citizens and/or alumnae, or supporters of an educational philosophy that values engagement with nature. Montessori is an obvious example of a well-established educational approach that embraces the natural world not only as a vehicle for learning but also within the Montessori grand vision of the child and the universe.

Childcare centers, although an obvious candidate, may require engagement with regulatory agencies to develop policies and incentives to consider outdoor spaces as nature play and learning



7.3

7.3 Governmental and non-governmental organizations continue to develop policies and initiatives, increasing the pathways to action on nature play and learning. Community collaboration is the vehicle.

environments. Once policy has been established and field personnel are on board, work at the individual site level is easier to justify and support. To empower individual centers to move ahead with naturalization, a professionally developed master plan is typically needed to guide installation, which may take place over several years of incremental development as resources become available.

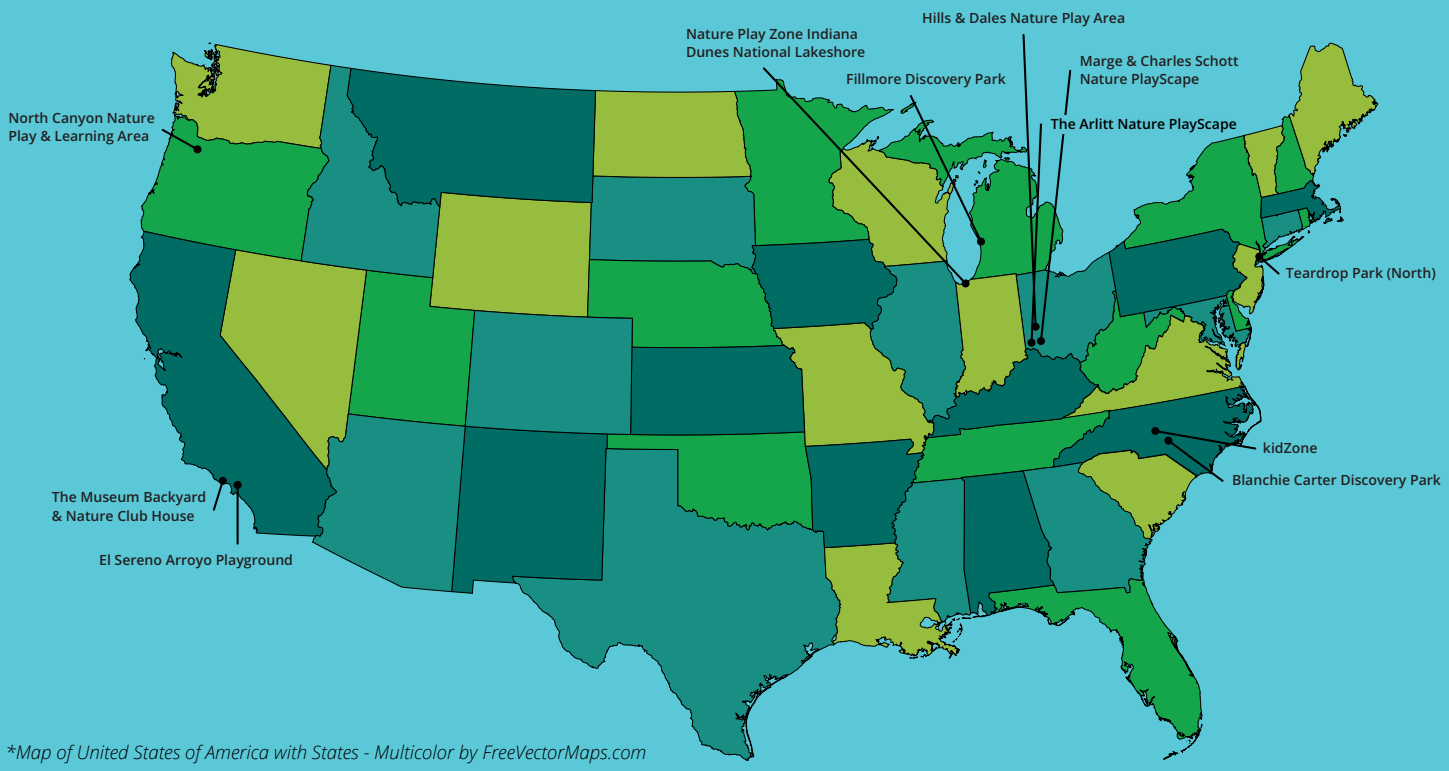
Nonformal education institutions, such as nature centers, botanical gardens, arboreta, zoos, museums, and children's museums, are controlled-access sites with established educational programs and therefore offer tremendous potential as nature play and learning places. Typically, a citizens board runs such a nonprofit organization with a passion for things natural, as well as an ability to apply political clout and access community resources. Implementation of nature play and learning may require nothing more than dedicating and managing a space for the purpose.

Camping organizations with an explicit focus on direct experience of nature and environmental stewardship, such as the American Camping Association, Boy Scouts of America, Girl Scouts of the USA, Camp Fire, 4-H, and YMCA, collectively represent great potential for promoting and implementing nature play and learning places—at camping locations but also, and more permanently, in the local communities they serve.

State and federal agencies administer vast land holdings with missions focused on nature conversation and getting youth outdoors. As budgets tighten, public agencies may more commonly work with nonprofit groups to install visitor facilities, including nature play and learning areas, particularly around visitor centers, day-use areas and family campgrounds. Strong links with the local visitor communities may increase visibility, strengthen promotion, and make fund-raising easier.

The 11 case studies described in the following pages are about play and learning places as defined on page 5. Several criteria influenced selection: some projects were a component of the cost sharing agreement with the U.S. Forest Service and implemented during the project timeline (e.g. Fillmore Discovery Park); others (the majority) had full NLI design process documentation; some were recommended by the Steering Committee; or they were registered with the Nature Play and Learning Guidelines Registry. Overall, an attempt was made to select a set of cases representative of the scope of *Nature Play and Learning Places*, as well as the range of current practice and diversity of contexts.

A required attribute of case studies is that gathered information is standardized so that systematic comparisons can be made across cases. The NLI–NWF project team developed the information categories, which were also used for the Nature Play and Learning Places Registry (which remains open). Additional requirements included the project staff being willing to collaborate in creating the standardized text and availability of usable photographs to illustrate the case. Many more nature play and learning initiatives and projects are underway across the nation. As additional cases are developed beyond the release of this version (1.2) of *Nature Play and Learning Places*, they will be posted on the Nature Play and Learning Places website.



**Map of United States of America with States - Multicolor by FreeVectorMaps.com*

CASE STUDY 1

Hills & Dales Nature Play Area

Located south of downtown Dayton, in historic 65-acre Hills & Dales MetroPark* adjacent to a renovated, naturalized equipment-based playground, near park entrance and restrooms. Demonstrates how a section of mixed hardwood, remnant forest can "give permission" for nature play to local children through installion of welcoming entrance, woodchip pathways, prepared natural loose parts (sections of tree limbs and stumps), and provision of digging implements and magnifying lenses.

Location
Hills & Dales MetroPark, White Oak Camp, 2606 Hilton Drive, Kettering, OH.

Context
Urban residential neighborhood.

Site type
Urban woodland.

Opened
2008.

Size
3 acres.

Age range
All ages.

Access
Walk (Safe Routes to School walking route), bike, car, Regional Transit Authority bus line.

Who initiated
Park Manager Todd Catchpole; MetroParks Nature Play Committee; Director of Education Robert Butts Jr.; Green Hearts Institute for Nature in Childhood, consultant.

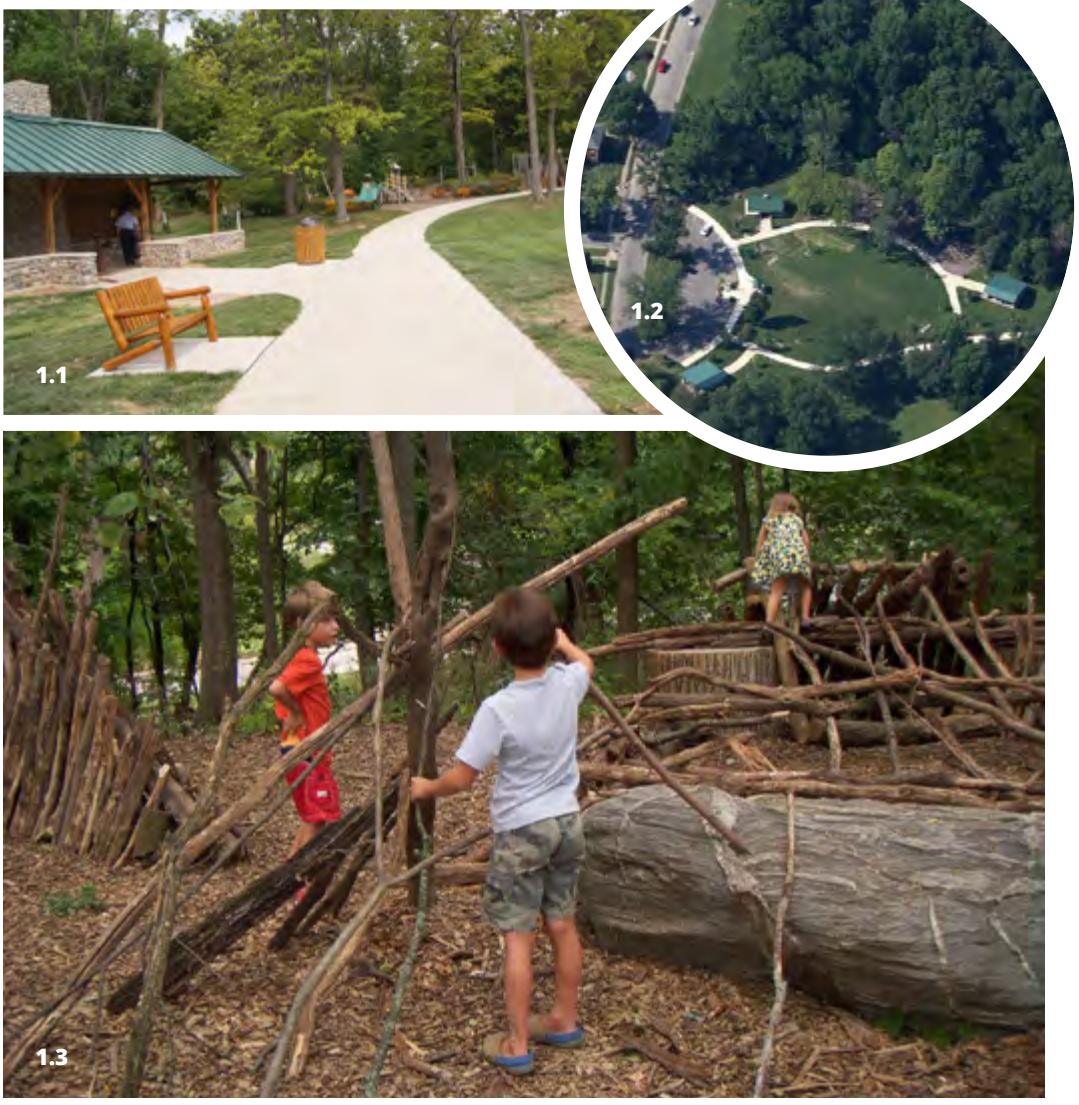
Principal stakeholders
Five Rivers MetroParks, surrounding neighbors, elementary schools near the park, childcare centers in the vicinity of the park, Safe Routes to School and play in the vicinity of the park, Dayton Regional Transit Authority bus route to the park.

Estimated construction cost
$800.00.

Actual construction cost
$500.00.

Funding sources
MetroParks general fund (homeowner taxpayer levy), earmarked for Nature Play Area construction.

Contractor
In-house MetroParks staff and volunteers.



1.1 Main entrance to the park. Restrooms on the left. Community playground straight ahead with Nature Play area beyond. Family-friendly synergy.

1.2 Aerial view showing restrooms (building on left) and Nature Play Area above. Image courtesy Google.

1.3 Large scale loose parts play.