“IT’S ALIVE!”: AN EXPLORATION OF YOUNG CHILDREN’S PERCEPTIONS OF THE NATURAL WORLD

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We accept this thesis as conforming
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Abstract

A pilot program for young children aged three to five years old, River Buddies, developed for the St Lawrence River Institute of Environmental Sciences, was used as a setting for this research project. The program was conducted in order to gain insight into young children’s interest in and experience of the natural world in order to provide direction for appropriate program development for young children. Indoor and outdoor daycare workshops and family programs were offered, with hands-on activities, free play and live animals. Clark’s Mosaic Approach (2001) was the methodology used to gather data including photography, audio-recorded interviews, surveys and observations notes. Findings highlighted the children’s interest in learning through sensory experiences, through play with open-ended materials and the power of connecting with live animals. Adults play an important role in children’s engagement with the natural world. Listening to children and following their interests strengthened the experience for children.
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Introduction

As both researcher and educator in this qualitative study of young children’s understanding of the natural world, my knowledge, experience and motivation have influenced this project. I will therefore start by providing a short personal history. I have always been drawn to the natural world as a source of inspiration and wonder. As a child I was free – and encouraged – to explore my home and cottage environments and marvelled at the intricacies of plants and insects and the immenseness of the night sky. I studied environment and health studies and environmental conservation at university, and worked as a nature interpreter and educator in several parks and wetlands. I was lucky to be given opportunities to design educational materials and programs, and learn natural history from a few key naturalists. These experiences led me to pursue an MA in environmental education and communication.

I have been specifically interested in teaching young children since my late teenage years. I obtained employment in a daycare centre and loved my experience working with children from 6 months to 5 years (although I found the noisy indoor environment to be quite difficult to work in). To this day I have memories of special moments I shared with these children. For example, I remember helping a young boy through a difficult transition. This boy’s family had just arrived from the Middle East and his communication in English and French was limited. Often, I would glance across the hallway into another classroom and see his lost expression. Even when he was not in the group that I was responsible for I would invite him, through a hand gesture, to come to my room and would give him a bit of focused attention and time. He thanked me with a hug when he had to return to the other classroom. Seeing him months later playing actively and leading a group of boys in game of ball in the yard, I remember being impressed at the change I saw and feeling happy that I might have had an impact on this boy’s transitional experience.
I have worked with adults and children of all ages, but my favourite groups were always the younger preschool children as I have always been drawn to their wonder and curiosity. I discovered, as well, my own facility to connect them to nature and started researching nature-related activities for young children early on.

This project was conducted through a non-profit organization for research in environmental sciences, the St Lawrence River Institute of Environmental Sciences (River Institute). The River Institute is a well-established centre for environmental research on freshwater ecosystems in Cornwall, Ontario, as well as a local leader in environmental education, community events and action projects. Curriculum-linked education programs have been successfully offered for many years to elementary and high school groups. However, there were no formal early years programs being offered. As an employee of the River Institute at the time of starting my thesis project, I took the opportunity to pilot new programs and activities with the sponsorship of the organization. The River Institute’s education strategy included expanding education programs to new audiences, such as young children. This provided me with the support of colleagues and supervisors. It is within this context that I explored young children’s understanding of the natural world and how best to help them in their discovery.

There is a wealth of literature on child development, child psychology and early years teaching practices, as well as on environmental education and communication. There is also growing interest in including environmental education in early years practices, however actual research in this field is limited. There is a real need for research projects targeted at the early childhood sector in order to help build a foundation for this new field. This project investigates the activities that are meaningful for young children’s learning in the natural world, as well as their understanding of the environment (Davis, 2009).
The above motives led to the following guiding research questions:

- What format, topics and activities work best with young children for early years environmental education programs?
- What can educators learn from listening to children regarding their understanding of the environment?
- How can the findings from the River Buddies pilot program inform development of future early years programs?

I hope that the insights provided through this action research project will provide some answers to these questions and have broader applications to the field of early childhood environmental education.

**Structure of Manuscript**

The first part of this manuscript addresses the rationale for including environmental education in the early years, and current teaching practices that guided my research project. The second part outlines the development of the River Buddies program, the research participants and the framework which was used to collect data. The findings section addresses the children’s relationships with the natural world and the activities and the teaching practices that engaged them. Evaluation of the River Buddies program and reflections are found in the conclusion.

**Rationale for Early Years Environmental Education**

Young children are often overlooked in environmental education (Davis, 2009), that is, education which focuses on the natural environment and aims to foster cognitive understanding, awareness and respect for the natural world (Wilson, 1994). They can be overlooked for various reasons. For one, they are not yet able to grasp complex environmental problems the way adults can, and they have limited ways to take action or make decisions regarding their lifestyle.
However, young children are in their critical learning years, as it is in the early years that one’s values are initially formed (Leeming & Dwyer, 1995). Providing children with direct experiences with nature may awaken a sense of wonder and concern for the earth (Carson, 1998; Cornell, 1989; Cornell, 1998). Early experiences can be linked to later interest in natural history and/or involvement in environmental action (Vadala, Bixler, & James, 2007). Developing respect for all living things will also contribute to the “development of active and informed citizens capable of positive interaction and problem solving” (Basile & White, 2000).

Environmental education in the early years therefore has possible benefits for the development of children, future generations, and the protection of the environment (Robertson, 2008; Tilbury, 1994; Wilson, 1994; Wilson, 2008a).

In urban areas, where many children may grow up isolated from the natural world, programs and workshops offered by organizations and institutions such as botanical gardens, museums, community groups and parks may provide important opportunities for families to discover the natural world and begin to experience how it sustains us. Organizations such as the River Institute, which have the knowledge and specialized equipment to catch live animals and transport them for educational programs or provide programs that direct children’s attention to natural phenomenon, can help provide unique experiences with nature which young children might not otherwise enjoy.

**Standards and Practices**

Standards and practices relating to early years environmental education have been proposed by researchers and experienced educators. I started the planning stages of *River Buddies* by examining the literature and resources that relate to the provision of quality learning experiences in and about nature for young children.
First, young children are quite different in their learning styles from older children (Wilson, 1994) therefore it would not be appropriate to take environmental activities used in the River Institute’s elementary and secondary education programs and merely simplify them. The pilot programs would need careful planning for activities that are responsive to particular ages and children.

Piaget spoke of children’s cognitive development in terms of stages and provided insight into the type of learning that children experience. Children approach learning about the world and their relationship to it in unique ways. This group is pre-literate and understands the world from their own perspective (Piaget, 2001). They see things in light of their own experience and understandings of the world, which makes it important to follow the particular interests of the children, help them connect to other experiences they have had, and provide for quality play and discovery.

Quality play time should involve all aspects of the child: gross motor, fine motor, senses, emotion, intellect, individual growth and social interaction (White & Stoecklin, 2011). In my planning for River Buddies I tried to address all these spheres of learning.

Several guides and practical books are available for early years educators and parents which focus on nature and the outdoors. In Sharing Nature with Children, a widely sold book for parents and teachers, Cornell (1998) outlines five basic tenets of outdoor teaching with children:

1- Teach less, share more.
2- Be receptive.
3- Focus the child’s attention without delay.
4- Look and experience first, talk later.
A sense of joy should permeate the experience.

White (2008) proposes a series of similar core values for high quality outdoor experiences for young children which help guide practitioners when leading outdoor activities, such as: “Play is the most important activity for young children outside” (p.7), “Young children need all the adults around them to understand why outdoor play provision is essential for them, and adults who are committed and able to make its potential available to them” (p.8) and “Young children must have a rich outdoor environment full of irresistible stimuli, contexts for play exploration and talk, plenty of real experiences and contact with the natural world and with the community” (p.9). These values helped shape the development of River Buddies.

Thornton and Brunton’s book, *Making the most of reclaimed and natural materials* (2009) provides guidelines and specific ideas for using these types of materials with young children, as well as links to child development standards. Several of the stories inspired me to lead certain activities or incorporate certain materials. For example having a basket filled with open-ended natural materials, providing beautiful fresh flowers and drawing materials and including kitchen utensils and select found objects during soil, sand and water play.

Wilson’s (2008a) description of play units – a designated area containing objects for play that helps structure the learning experiences of the children – is important in the planning of early years activities. Play units can be simple with an obvious use, or be more open-ended leading to multiple play possibilities. A sand box is made more complex as a play unit with cups, a funnel and sieves and adding water it becomes even more interesting to learn about textures, movement, etc. I prepared for River Buddies various bins and baskets with a variety of materials to be interesting play units.
This is not meant to be an extensive list of practices as there are many, most of which are not documented in research and literature, but common practice with early years educators. The main standards I observed were: including all aspects of the child’s development in teaching, providing real-world experiences and allowing the children to lead their own learning, based on their interests and abilities. These were all included in the planning stages of River Buddies.
Research Setting, Participants and Data Collection

Pilot River Buddies Programs

The River Buddies program is a set of pilot educational programs I created for young children aged three to five in the Cornwall and surrounding area. The goals of the River Buddies pilot program were to offer nature-related experiences and activities to young children and their caregivers that would foster a sense of wonder and respect for the natural world, teach families about local natural history, and provide an opportunity for children to interact with environmental scientists and naturalists from the River Institute. River Buddies was piloted in various formats to fit the available teaching environments. The programs were an integral part of the research to engage children and to gage the participation and interest of the community for early years nature programs.

River Buddies programs piloted for the purpose of this research include:

- A four-week series of nature workshops for children and their caregiver, offered at a local drop-in early years centre.
- Three nature outings aimed at young children and their families in two local parks.
- A one-hour daycare workshop offered onsite at a daycare.

Programs at early years centre.

I met with the activities coordinators at a local drop-in early years centre to plan a workshop series. Programs on literacy, physical activity, nutrition and other topics are typically offered on a weekly basis, and through their recommendation, we planned for a four-week recurrence of River Buddies with a one-hour workshop each week on a different theme – plants, soil, animals and water. Workshops were originally scheduled in the morning at one centre and
in the afternoon in a different centre, but due to large demand at one centre (following an article appearing in the local paper – see appendix A) and no registrations at the other, we decided to offer a morning and an afternoon session of the same workshop at the same location, on Tuesdays for four weeks.

Morning registration was full, with ten children registered, and six were registered in the afternoon session, although most didn’t attend all four sessions.

**Daycare programs.**

A flyer was created to advertise free early years programs at Cooper Marsh (see appendix B), and distributed to various daycares in person, by email and by fax. The River Institute regularly leads elementary programs at this marsh (according to an agreement with the conservation area which runs it) and it is a rich natural environment with which I am very familiar as an educator. When I noticed that there were no inquiries about the programs at Cooper Marsh I included in fax messages that the *River Buddies* program could be delivered on site at the daycare (free of charge), which resulted in the one booking, at a daycare that is referred to in this text as Daycare K.

**Nature hikes.**

Three nature hikes were scheduled in Cornwall, at Gray’s Creek Conservation Area and Guindon park, for young children and their families, as an opportunity for families to explore nature together, ask questions and spend time outdoors. A second flyer was created to advertise the dates of the nature hikes (see appendix C). The poster was put up on the River Institute website and sent to the Cornwall Outdoor Club. The dates of the walks were advertised through various local website calendars, sent through the River Institute email list as a reminder.
For the April 3rd walk, no one showed up (although I did receive an email after the fact from a family who went, but were late and couldn’t find me). For May 8th, two families came (three children, five adults) and for May 18th, two families as well (five children, three adults). Each time, one of the families had participated in the River Buddies workshop series at the early years centre and had come following an announcement I made during the workshop.

**Participants and Recruitment**

Participants included in this study are all the children who participated in the pilot programs outlined above, and their parents and educators. In total, through the River Buddies programs delivered, 32 children (mainly in the three to five years age range) were included in the study. Adults were asked prior or at the very start of the program to sign consent forms (found in appendix D) for their child/children to be part of the research, and at the same time if they would agree to fill out a survey at the end of the program or workshop (found in appendix E) in order to help me observe the children during the program, provide me with information on their child, and feedback on the activities.

**Methods of Data Collection**

Research with young children poses challenges and opportunities. A growing number of studies include listening to the children themselves and including their input through various developmentally appropriate participatory research tools. In this way, children can be valued as active participants, meaning-makers, explorers and experts in their own lives (Clark, 2010). Alison Clark has created a research method called the Mosaic Approach (Clark & Moss, 2001), which brings together various data sets to create a composite picture of the research topic. In this study, various tools were used to collect data on the insight of the children, as well as the adults’
take on environmental programming for young children and the group’s experiences in nature and with natural objects.

**Clark’s Mosaic Approach.**

The Mosaic Approach is a “multi-method ‘strength-based’ framework for gathering young children’s views and experiences of their everyday lives (Clark & Moss, 2001; Clark, 2005). It relies on the theoretical basis that the young child is an expert in his or her own life (Clark, 2005). The Mosaic Approach can include use of various research tools such as map-making, child conferencing, photography and child-led tours, however it is designed to be flexible and adaptable. This approach has mainly been used to assess children’s views on their preschool experiences. Given that this research is conducted in various physical environments and with different audiences, the mosaic created with data collected not only brings together the children’s perspectives using the spectrum of research tools, but also brings together the perspectives of other voices such as the researcher’s, and the children’s regular caregivers.

**Audio recordings.**

Typically, in social science research, audio recording is used to record verbal interviews. Children aged five and under have less ability to communicate verbally, which usually makes interviewing inappropriate for young children (Clark, 2005). However, children are quite expressive and recording the children’s comments while playing and being active contributes a lot of valuable information, without having to interrupt their enjoyment of activities and while encouraging them to be natural and creative.

All four workshops at the early years centre, as well as the daycare workshop, were recorded using a digital voice recorder I operated during the programs. The voice recorder was shown and discussed with participants at the beginning of the program and consent was asked of
the children and parents. I chose to include as little as possible of the adult comments during the program (excluding the researcher’s) as the focus was on the children. In total, approximately 10 hours 26 minutes of audio was recorded during these programs.

**Surveys.**

A survey was composed prior to program delivery for the adults to complete. Surveys and questionnaires are not normally an effective research tool used with young children, but in this context the survey gave an opportunity for adults and caregivers, who know the children well, to provide observations and important details. Questions in the survey focused on the children’s behavior and interaction during the program, the adults’ views on use of natural materials and success of program activities and finally, a set of questions aiming to describe the regular habits of their child at home in relation to playing in nature. The survey can be found in appendix E. In total, 11 parents and 4 educators filled out the survey.

**Participatory methods: photography and drawings.**

Photography can help provide deeper knowledge of a person’s views. There are various ways to incorporate photography into research methods, some where participants are shown pictures to obtain richer descriptions or elicit emotions, others which place the camera in the hands of the subjects (DeMairie, 2010). Autophotography, where the research participants are the photographers, is not widely used in research with young children (DeMairie, 2010, Approaches to studying children's perspectives section, para. 8), but studies incorporating this data collection method are successful in gaining a better understanding of children’s views, notably of their pre-school settings (Clark, 2005). I therefore opted to use autophotography during the nature hikes.
Child participants between three and five years old attending the hikes were given a disposable camera and asked to take pictures of what they found interesting, in order to provide further insight into their perspective. There were only two suitable candidates: Andrew, three years old, and Walter, also three. Due to the intimate nature of the hikes (two families attending each one) and the larger number of adults, I deemed it appropriate to include natural history information to engage the adults. Andrew was quite shy and quiet and therefore no audio comments were recorded with the digital voice recorder during the first hike. Leading the hike, observing the group and monitoring the child with the camera was a challenge in itself, so I decided that the voice recorder would not be used for the second hike either. The rolls of film taken by both boys were developed and converted to digital files.

Similar to autophotography, children’s drawings can provide valuable insight into their perspective, especially when including their comments while the drawing is being produced (Einarsdottir, Dockett, & Perry, 2009). During the River Buddies program, there was limited opportunity for drawings, and I preferred to focus on outdoor activities and play with loose materials. However, there were two instances where a drawing activity was led and a few of the drawings were kept (with permission of the children and parents) for use as data.

**Researcher observations.**

Observation of children is a research tool traditionally used in early years settings, and is “increasingly important, the younger the age of children involved” (Clark, 2005). During and after many of the programs, I jotted down a few pages of observation notes on the children’s behaviours. I also recorded a few audio comments with the digital voice recorder. Furthermore, I listened carefully to each audio recording of the River Buddies programs and wrote notes that contained time markers (minutes, hours), the events occurring and some of the dialogue of
interest. In total, approximately 22 pages of typed notes were written corresponding with specific segments of audio recording.

**Ethical Considerations**

There are several ethical considerations that were addressed throughout the various stages of this research project. I was bound by my personal ethics to provide positive learning experiences to children through my thesis project, which is why I chose action research. Providing the best possible experience for the children meant that I was to be the best educator I could be. Therefore I chose not to change my own teaching style in order to modify the impact of my enthusiasm and behaviour. It was important to me that children understood my own love of nature and my enthusiasm for the natural world.

I also thought it important to listen to the children. Listening, and observing the children’s behaviours and reactions helped inform the direction my explorations with them would take. For example, after seeing their enthusiasm for live creatures I opted to continue to include these experiences in future programs and workshops. Furthermore, according to the United Nations Convention of the Rights of the Child, children have a right to receive information, express themselves and participate in what is important to them (United Nations, 2011). I was, therefore, ethically bound to these principles, which correspond with the ideology of the Mosaic Approach.

In order to protect the identity of participants, all names in this manuscript have been changed.
Findings

Ten Minutes of Learning and Play During River Buddies

The following ten-minute segment gives a glimpse into one of the River Buddies workshops. It took place outside, and contains many examples of the topics which are discussed in this section: children making connections to their lives, discovering on their own, learning through their senses and with loose materials and with live animals.

Walter – “I found something!”
Elizabeth – “what did you find?” I walk over to see what he has found in the bin. It is a shell.
Walter – “I wonder where how’d [sic] that get there?”
Elizabeth – “Well it came in with the bins, I put some shells in there to play with. But ... this shell was somebody’s home in the water, for the animals that live in the water, did you know that?”
Walter - ‘yeah.’

Meanwhile, a few feet away, Maria is using a container and playing in the bin with sand. Maria – “We’re workers!” [she is trying to make sand castles] I remark that the very fine sand with no water to stick it together is not great for making sand castles.

The children are busy playing where they wish for a few minutes. Maria has moved to a different area where there is soil and another child is playing. She chats with me about insects (although it takes me a minute to understand what she is referring to):
Maria – “There’s all kind of sexes eh? There’s all kind of sexes!”
Elizabeth – “Sixes?”
M – “Yeah! Did you ever been here?” [sic]
E – “I’ve been here, yeah, I was here last week”
M – “Oh!”
E – “What do you mean there’s sixes?”
M - “Because they can bug you” ... (not clear, ..) “They can sting you”
E - “Oh you mean insects!”
M – “Yeah!”
E- “Oh, insects, okay, some insects sting but most of them don’t”
Olivier – “I don’t like bugs.”
M – “Some are happy, some are mad and some are crying!”
E – “Mm-hmm”
O – “Do you like bumble bees?”
E – “I do!”
M – “I like bumble bees”
E – “I do because they like to eat the flowers and then it makes fruit come out, without the bees we wouldn’t have any fruit”
M – “Yeah!”

The children continue to play in the soil and sand. I announce that I am going to get something else ready for them. I walk towards the truck where I have hidden a bin containing marsh water and live snails which I collected the previous day for them. The children are eager to find out what I am bringing and follow me to the truck. I get them involved by asking them to carry a few small empty containers back to the picnic table for me. They eagerly want to know what is in the bin. I explain that there are real live animals, and I place them in small clear containers for the children to see. I ask them if they know what kind of animals they are. Walter thinks for a moment and says “a worm”. I tell the group that they are snails, and give a bit of information. I explain that their body is inside their shell and that they move around in the water and suction onto things, sort of like slugs. Maria wonders “where’s the face?”
E – “Well that’s a good question, it doesn’t really have as much of a face... it sees with its hands”
M – “Once I saw one of those!”
E – “What do you think that the shell is for?”
Olivier – “pro..tect.. to protect it”

I point to one snail and show how it is opening and closing, moving. One mother takes a close look. One of the children asks me when are we going to go in nature. I answer that we are in nature, and point out some nearby chickadees I hear. We get up and walk slowly towards the tree and look for the birds.

The above narrative illustrates how children are learning through play and experiences that intrigue and interest them. They are curious, they connect to their previous knowledge, and they are eager to understand the world around them. The mix of free playtime and led observation of live animals kept the children interested and engaged. My role as the educator was to help the children discover what they were touching and looking at, and encouraging them to continue this exploration. The outdoor setting provided for freedom of movement and an
enjoyable environment. The children really did form River Buddies as they played together and formed relationships.

**Engaging Children’s Senses and Bodies**

Young children are little explorers – and to fully explore their environment, children need real, multi-sensory experiences (White, 2008). Through the pilot programs, I included various activities meant to engage the children’s bodies and senses. The following are some key examples of how these experiences enhanced the children’s understanding of nature.

**Building understanding of animals through tactile experiences.**

During one program, several specimens of stuffed and mounted birds were brought in for the children, and getting the chance to feel these special creatures engaged them for nearly ten minutes in a daycare classroom setting. I observed that, “the group is very quiet while I set up the animals! The mood is calm and quiet and the children seem very gentle while touching the birds”. The children were very absorbed in the activity, and their little hands stroked the feathers gently and in the right direction, after seeing how I demonstrated this. I structured the observation by having the group look at one bird at a time, and having open ended questions for the children to answer, such as: “why do you think this bird [the owl] has such big eyes?” As the children looked at the bird and offered answers, I wrote them down on the clipboard, validating their input and encouraging them to take the activity seriously and think about what they were looking at. The children’s gentle gestures and responsible behaviour with the specimens were a bit surprising to me (I had been a bit nervous about bringing these valuable specimens to such a young group), which made me question – Why do we often not give children enough credit for their competence? In this case, the children responded well to these real objects and knew them to be different from their usual plastic toys. Given a chance to engage with the birds and being
shown how to engage with them respectfully, the children proved that they appreciated the opportunity to discover the birds and that they were fully competent handling fragile specimens.

In the same program, I had brought a bag full of various animal furs (all local animals) such as beaver, lynx, squirrel, etc. and gave the children time to feel them and notice the differences. They were eager to know what animal the piece of fur belonged to, and I found it helpful to have some laminated animal pictures that we could use to physically place the piece of fur on the picture of the animal and help the children understand the connection. I asked the children why they thought fur was important and one girl answered that “without fur they would be bald!” Having pieces of fur for the children to learn with was a good way to introduce the topic of mammals, and there would have been many ways of extending this activity, such as acting out being cold or warm and talking about the role of fur, or practicing hiding and learning about the colour of fur and importance of camouflage.

**Seedlings: a story followed by sensory observation.**

During the workshop at daycare K, I planned on starting with a story about seeds, while the group was sitting in the classroom, on their rug. I had brought two stories and had decided beforehand to gauge the group’s attention span and pick the shorter or longer story depending on how the children acted in the first few minutes. As they were quite active, I picked the shorter story so that I would have their attention for the full reading, then take them outside and allow them to move around and explore more actively.

Prior to reading, I introduced the concepts of seeds by asking the children what they knew about seeds: “Can anybody tell me anything about seeds? What’s a seed?”
One boy put up his hand for an answer: “… plants flowers… it plants flowers”. Another child added: “and vegetables” and yet another added: “and dandelions!” I validated all their answers. One boy proposed: “seeds goes [sic] with umm… eggs” which is an interesting parallel.

I started the story, and at each page, made it interactive by asking the children questions and focussing their attention on various parts of the pictures. The story is about ten sunflower seeds and what happens to each one until there is but a single one left which will bloom and produce more seeds. The story addresses concepts such as the food chain, human impact on the environment, pollination and plant life cycles. As the number of seeds starts at 10 and reduces by one on each page, it also introduces early math skills. I asked the children to count the number of seeds out loud as I turned some of the pages. The children seemed to get the flow of the story quickly:

Elizabeth – “Five seedlings, one cat” (The picture shows a cat eating a seedling out of the ground)

Child: “Is he gonna eat the seedling?”

Elizabeth - “It’s going to eat the seedling, that’s right! He’s digging it up!”

Another child: “And, and it’s not gonna grow”

It is apparent that the children are enhancing their vocabulary by using the words in the book to ask questions, and that they can predict that the seed will not grow if it is dug up or eaten by an animal. The imagery in this book kept the children’s attention and including storybooks in early years workshops can be a good fit as they provide a “natural and fun learning context” (Bellon & Ogletree, 2000, para. 4).

Following the story, I explained to the children that we had three seedlings, just like in the book to show the group. I framed it as a very special and exciting opportunity and the
children soon became very eager to see the plants! As the tallest seedling was passed around, about a foot high, the children exclaimed “Whoa!! Giant!!” and were curious “Why is it so high?” Since they were tomato plants, I suggested the children smell the plants as they got a close look. I asked the children if they liked the smell of the tomato plant and they answered that it did smell good.

Making the story interactive and linking it to real plant observation and sensory experience seemed to engage the children very well in the learning experience, and prepared them for going outdoors to explore the yard.

**Learning about soil by engaging the body.**

During the workshop at Daycare K, I allotted time for free play with various bins of soil and sand. There were four bins – the same as those I had prepared for the soil-themed workshop at the early years centre. They contained: fine white sand and shells, muddy river sand with rocks and sticks, grassy soil and finally earthy soil with plastic insects. The children chose a bin, then rotated every few minutes. As I played with the children, I noticed a couple of boys using sticks to try to break apart the clump of grass. I suggested they look for insects and that they could use their hands to break it apart even more. We moved the clump of grass out of the bin, onto the pavement and one boy in particular got to work energetically. Later, when I asked the children what their favourite activity was, he said “I like chopping up the dirt!” Moving, doing and involving their whole body is how children find things out and express themselves (White, 2008) and it was important to encourage this type of discovery. Physical play in this case is linked to new cognitive learning, as we were discussing the grass roots and the insects we might find in the clump. It is also linked to social development, as the children needed to read social cues and communicate to share the task (Bjorklund & Brown, 1998).
**Move like the animals game.**

One active game I successfully led three times during River Buddies programs was a game in which the group practices moving around like different types of animals to a certain area and back. This game was adapted from a River Institute program with the same name. As I noted in my observations notes:

The children really like this activity! I used the assorted laminated pictures of animals from earlier and asked how the animal moves around, then we acted it out by going from one end of the sandbox to the other. When I asked children for ideas or to help pick pictures they were very enthusiastic. Andrew (who was shy in the classroom) seemed to get really into this, he was smiling much more. His little sister was also smiling and having fun with this game. Their mum was the only parent also acting out the animals.

Through the active and dramatic nature of the game, and the outdoor environment, Andrew and the other children got a chance to learn about animals through engaging their bodies. The fact that one mother participated clearly had a positive impact on the experience of her children – the children laughed and played and they followed their mother’s lead.

**Exploring nature through child-led photography.**

During the nature hikes, photography seemed to provide a playful activity for the boys, as well as engage their senses and allow for physical movement. They were free to roam and take pictures of what they found interesting, as long as they were reasonably near the group as we were walking through the woods.

Andrew, age three, was very engaged with the camera. When I first gave it to him, his smile conveyed to me that he was very proud to be given this responsibility. He took his whole roll of film in the first half of the walk (30 minutes). Taking photos helped frame and focus his
attention on what I was pointing out to the group along the way. The vast majority of pictures do indeed portray plants and things of interest I pointed out, for example this picture of a shoot piercing a dead leaf. I particularly enjoy this type of nature occurrence, as I am always impressed at how plants will poke through a dead leaf and grow with it, lifting it off the ground.

Andrew wanted to take a picture:

![Image of a shoot growing through a dead leaf.]

*Figure 1.* A shoot growing through a dead leaf. Photo by Andrew, 3.

Two of his pictures show an interesting exploration of his own movement along the path:
Figure 2. Andrew walks along the path.

Walter also enjoyed taking pictures on the following nature hike a few weeks later. He did not take his whole roll of film, but he was used to digital cameras at home (he pointed out that the camera didn’t seem to be working since he couldn’t see the picture straight away), and this probably had an impact on his interest in taking pictures. In one instance however, he ran over to me during the nature hike, out of breath and excited: he had managed to take a picture of an insect flying above the wetland! He said he watched it flying by, looked through the camera and saw it, and took a picture! It was a very proud moment for him and he was very enthusiastic. His picture:
Although I was expecting the children to photograph nature objects such as plants, trees, or animals, I was surprised to see that Walter took eight pictures (out of 20) of the nature hike participants, including himself, his mother, me or the group. Two examples are shown below:

*Figure 3. An insect flying over the wetland. Photo by Walter, 3.*

*Figure 4. A boy looks out over the wetland. Photo by Walter, 3.*
Providing the children with cameras helped them focus on specific natural objects, and provided me with further insight into their interests during the hike. As a methodology for research, I would advocate using digital cameras in order to provide children more opportunity to see their pictures and discuss them.

**Adults observe the children’s desire to learn through sensory experience.**

Although I did not directly ask adults about this topic in the survey, adults interestingly listed items related to sensory experience and body movement when asked what topics the children were most interested in, for example: “touching and feeling rocks/trees/organisms”, “watching animal behaviour”, “playing in the different bins”, “using and finding things with the magnifying glass”, “playing in mud”, “seeing the water bugs”. The adults’ answers support the notion that the children are most interested in *experiencing, doing, playing, and moving around*. Parents and caregivers know children well, and know that sensory experience and body movement is key to learning.
Direct Experiences with Live Animals

Live animals were central to all River Buddies programs – both animals found as the children explored the outdoors and live animals brought in especially for them to observe.

Including live animals in program planning.

Nowadays children are not familiar with even the most common of animals. Providing experiences with live animals is central to most of the other River Institute programs and has been successful for many years in getting children excited about nature, and biology in particular. Elementary and secondary school programs include activities such as frog catching, aquatic invertebrate sampling in the marsh, and for older children, catching large fish with gill nets in the St Lawrence River. Getting wet and/or dirty makes the learning fun and a memorable experience. Extending these live animal experiences to young children was therefore a goal of the River Buddies pilot programs.

Experiences with live animals are also an important step in understanding nature. Research by Fawcett (2003) shows that direct experiences with live animals are important for positive human-animal relationships and that even a short sensory experience in an indoor setting where the animal is not in its habitat, such as a classroom, can contribute to the children’s intent to behave in a positive way towards that animal (Fawcett, 2003). Kellert, as cited in Lindenmann-Matthies (2005) also notes that it is important to educate people about the value of the diversity of organisms including what are often seen as the less attractive ones, such as plants and invertebrates.

The animal group which was the easiest to collect and transport was indeed one of the less attractive ones – aquatic invertebrates (crayfish, dragonfly/damselfly nymphs, leeches, aquatic worms etc.). This made for an interesting experiment, as aquatic invertebrates are not the
typical cuddly bunnies, cats and dogs or large exotic animals which children tend to prefer – and
indeed did name when I asked them what their favourite animal was. Children are not likely
exposed to aquatic invertebrates on a regular basis, compared to larger animals, such as
mammals, birds or amphibians. It has in fact been shown that children often particularly like
“large animals, especially those with considerable intelligence and the capacity for social
bonding [and] tend to avoid invertebrates like insects and spiders because they are small and
morphologically and behaviourally unlike humans” (Lindemann-Matthies, 2005).

However, it is important to focus environmental education on native species and
introduce children to the nearby natural world (Sobel, 2008). These animals are all around us
and play an important role as water filterers and food source, yet children living along the St
Lawrence River may never have seen them. Understanding the environment in which we live
and the food web, energy flow and natural cycles around use, connects us to the world. By
focussing on native species in early childhood environmental education, we may encourage
children to explore their local environment and contribute to their development of a sense of
place.

Since the River Institute had the equipment and containers necessary for collecting these
animals, and as the educator I know how to interpret these animals to children from previous
experience, aquatic invertebrates were a logical choice. Mudpuppies (river dwelling
salamanders) were brought to one program, as well as invertebrates since they had also been
recently collected from the river and were available to borrow from the River Institute for a few
hours.
The children’s experience and reactions to the animals.

Throughout the programs, the children’s behaviours and comments indicated that they were indeed fascinated with the live creatures. They did not necessarily want to touch or hold them, and were a bit frightened of them at times – but given a chance to observe them, and sufficient time, they were very eager. I noticed a significant difference from the children’s first introduction to the animals at the beginning of a program, to their reactions by the end of the program. Most of the children felt much more at ease with the creatures after a little time in close proximity to them—some of them wanted to touch or hold them after a few minutes, and their curiosity seemed to increase as they learned how interesting these animals were and how little they knew about them.

During the water-themed workshops at the early years centre, where I brought live river invertebrates and two live mudpuppies (see fig. 6 below), the children, as well as the adults were very curious about these animals asking me many questions. In the afternoon session, our observation session lasted over ten minutes in the classroom, and although the children thought the dragonfly nymph was “yucky”, when I proposed to move on to a different activity, they wanted more time to watch the animals moving around in the aquarium and the basin. We continued observing for a few minutes longer. I could possibly have extended this observation session by having the children create something related to their observations, for example drawing the animals.
I connected my discussion of the mudpuppies to animals with which the children were familiar describing the mudpuppies’ bodies as slimy like a fish. I also offered a sensory experience by giving them a chance to touch it as I held it out of the water for a short while. One boy found it to be very slimy. Walter, three, showed his interest by staring intently at the animals for a few minutes while I talked about them and answered participants’ questions. Cornell (1998) suggests that children have an amazing capacity for absorbing themselves in what they are looking at.

When I pointed out that these animals live in the water and need to be in the water to survive, one young girl, aged four, asked if they would get sick if they don’t stay in the water, expressing her concern for the animal. This experience helped develop understanding of the animals and perhaps empathy for living creatures.

I observed the following about a boy, five, who needed some time before he felt comfortable holding one of the invertebrates in the bin (see fig. 7):
Joey was nervous about holding the insect nymphs at the beginning of the workshop. Following the snack break, however, he was the first back to the programming room with his mother, and went straight to the look at the live animals again. His mother helped him remember the names of some of the creatures and interesting facts I had mentioned earlier. When I offered it again, he decided he’d like to hold the dragonfly nymph in his palm.

*Figure 7.* Live river invertebrates for the children to observe.

During an exploration of the yard at the early years centre, I noticed the children digging in the soil. I approached and asked them “What is under there?” One child answered: “There is a worm!!” At first I wasn’t sure there really was a worm, but the children had found one. A boy asked me to “take it out!!” I did and held it up for the children. Everyone laughed and enjoyed the children’s discovery. One boy cried out “it’s alive” five times in a row!

As I modelled curiosity and respect for living things during the programs, I noticed the children mirroring this behaviour. During the daycare workshop, most children loved looking for insects in their yard – a new activity for them – however it takes time for children to learn
how to engage with animals and the natural world. As this was a first experience for the group, it is not surprising that some children were rough with the insects and living things. One educator noted in the survey that it was surprising that one boy “kicked the mushroom we found, it was interesting to see the reaction he had from it. (…) a few [children] were a little rough when holding them [the insects] and hurting/killing them…”. It may have been surprising to her that the children did not instinctively have compassion for other living things, but having not seen this behaviour modelled in the yard before, it is normal that the children played freely as they were used to and saw living things as toy objects. The educators, following the workshop, also saw my behaviour with the children modelled and saw the potential for exploring the yard and teaching about living things. If they provide the children with regular opportunities they may see a change in the children’s behaviour outside in the future, such as a greater sense of care and respect for animals, plants and mushrooms.

**An opportunity for parents and caregivers to learn about the children.**

Although it maybe be obvious for many environmental educators that most children love dirt and bugs, this may come as a surprise to parents who have not explored this type of activity with their child, as noted in the survey by a parent participating in the soil-themed workshop at the early years centre: “I was surprised by [sic] child wanted to hold a worm”. Another parent pointed out that her daughter held a bug for the first time, during the same workshop. Considering that these families are evidently keen on nature-related activities, as they actively chose to sign up for the River Buddies workshops, it was a bit surprising to me that the children were not familiar with digging in the soil at home or exploring bugs on their own. It was clear that looking for live animals and holding them was a new and exciting activity.
It was interesting to compare the children enrolled in the four-week workshop series with the children at daycare K where I delivered a one-hour workshop. The former were fairly environmentally inclined already, as noted by all the positive answers to the following question in the parent survey: “Does your child seem particularly inclined towards nature/animals/plants?”. The daycare group was a mix of children from different backgrounds, family values and interests. The staff at daycare K noted in the survey that all the children loved looking around for bugs during the workshop but that they were surprised by which children wanted to have contact with the invertebrates (for example picking up a centipede to place it in a clear bucket to show the other children) and which ones didn’t. Not being a regular caregiver for these children, I did not know their personalities, and gave them all the same opportunities. The staff may have learned a bit more about the children through the activities and watching them take risks or step back during the program. They may also have learned to be a bit more themselves and how to be comfortable with insects and soil.

**Discovery through Loose Materials**

“Play is a form of learning that unites body, mind and spirit” (Bredekamp and Copple, as cited in Wilson 2008 p. 3) and it has important implications in child development (Wilson, 2008b). Providing children with loose materials can offer children rich opportunities for play, and throughout *River Buddies* it was clear that access to loose materials for children to play with was important, and that different types of objects and materials have different play and learning potentials.

**Providing children with loose materials.**

Nicholson, as cited in Stacey (2009), states that “in any environment, both the degree of inventiveness and creativity and the possibilities of discovery are directly proportional to the
number and kind of variables within it” (p.36). Children are engaged in quality play when they can choose where to play, can use their hands to move things around, feel different textures and shapes. Since my programs were focussed on nature, I planned to incorporate loose natural materials found outside as much as possible, along with supporting tools and containers which the children could use to learn about the natural world.

The early years centre yard was a fairly barren, mainly composed of mowed lawn, a few trees and an old sandbox. Since the yard lacked little interesting loose material as twigs, leaves, rocks, and the other early years programs might be indoors depending on the weather I decided to bring with me a wicker picnic basket filled with interesting natural found objects to use in various activities, and to invoke the children’s exploration and investigation (Thornton & Brunton, 2009). The wicket basket (which I called my “nature basket”) contained objects that I found interesting and wanted to share with the children, such as rocks, branches and pinecones, a wooden tray, a woven purse, seeds, etc. I also prepared a second basket filled with gear and tools used by naturalists with the idea that children could engage in pretend play. This basket contained binoculars, measuring tape, notepads, small envelopes, plastic vials and other containers from the River Institute’s labs. These were both used in the classroom and outdoors.

During playtime with the nature basket, one child noticed a small clear box containing sunflower seeds, which I had placed in the basket:

The box was amidst other natural materials for the children to play with. I had just finished acting out seed growth and plant development with the children when one boy pointed out the box containing seeds. At first I said we wouldn’t open it but the young boy seemed curious: “we need grow ourselves”, “make ourselves grow” and I understood that he would like to make the seed grow himself, having just learned or confirmed that
seeds do grow and turn into plants when their needs are met. I gave one sunflower seed each to a few children to take home, and suggested they put it in their pocket. The boy added again “we need to make ourselves grow first”.

Having the possibility of having objects to hold, and even keep and take home meant a great deal for the children.

**Natural versus man-made materials for environmental education.**

During the planning stages of River Buddies, I had originally planned to use natural materials as much as possible and man-made objects as little as possible, thinking that was important in the context of learning about nature to use only objects from nature.

Since natural materials are open-ended and have no predetermined human use, the children can use them to develop and express ideas. Having a variety of interesting materials encourages children to use their imagination and creativity (Thornton & Brunton, 2009) and can absorb their attention for extended periods of time (Banning & Sullivan, 2011). My experience taught me that simply providing a basket of the same objects (pinecones, for example) will not engage children for a long period of time. Children need a *variety* of objects and the potential to explore them in different ways.

Although nature is said to provide a huge variety of natural open-ended materials such as sticks, leaves, rocks and insects crawling around, my main workshops were in an urban setting and the outdoor spaces I had access to for the programs had limited loose materials available on the ground. I therefore needed to add to what was there by bringing in more man-made objects than I had planned on, such as containers, tools, and play animals to increase the play potential.

For example, at the beginning of the programs various plastic insects were available, among other games, to the children as we waited for all participants to arrive. The children
could pick what they played with. One boy picked up a plastic dragonfly out of a container of toy insects and flew it around with his hand while saying: “whooossshhh I am a dragonflyyyy!”. De Waal (2009) proposes that humans are naturally empathetic and this may be an example of a child developing a sense of empathy through playing freely with the objects. Although it was not a real dragonfly, the child still connected the toy with the living thing, and his connection to the natural world developed while he played outdoors with objects representing nature.

Wilson (2008b) argues that young children need appropriate outdoor spaces in the natural world, where they can learn about plants and animals, experience a variety of scents, sounds and colours, and have access to loose materials which they can move around and play with freely. Perhaps it is more important for materials to be appropriate in the learning context and that the potential for discovering nature be enhanced through select non-natural objects. The surveys seem to echo this notion – respondents had mixed views regarding the use of natural materials. Around 70% answered that it makes a difference if the objects offered to the children are natural as opposed to traditional plastic toys. Two of these parents noted that their child prefers natural objects as opposed to plastic toys. On the other hand, four participants didn’t think it mattered or preferred a mix of both, and two staff members at daycare K answered that it depended on the child.

Playing with the soil and sand bins I prepared turned out to be one of the more popular and successful activities of the River Buddies program. The bins are mainly composed of natural materials, along with various tools and objects to add new levels of enjoyment and creative play for the children.
Playing with sand and soil.

The bins of soil I provided were great as they allowed the children to choose what they wanted to explore through play, while staying within the theme. Figure 8 below shows one of the bins, which contained: soil, smooth driftwood I collected from the river shoreline, a few large shells suitable for digging or scooping, a few green plastic kitchen utensils and a kitchen masher. Another bin, shown in figure 9, contained: sand, a large funnel, walnuts, attractive cups, a stick and a shiny piece of pyrite. Two other bins were prepared, one with mud from the shoreline, and one with a section of grass and soil taken near the river shoreline. These also had carefully selected objects within them to create a more complex learning unit.

Figure 8. A River Buddies bin containing sand from the shoreline, sticks and tools.
I had planned on only using the four bins for the soil-themed early years centre workshop. However, at the request of one of the boys, I brought them back the following week for the animal workshop, and also brought them to the workshop at daycare K.

During one workshop, the bin with very fine, white sand (fig. 9) was a big hit with the group. The children loved seeing the sand flow through their hands like water. One young boy commented that he liked sand “even in a sand box”, he asked me about the objects which were in the sand (a walnut, a piece of shining pyrite). I encouraged the children to use the various objects in the bin, and I noticed that as I participated, the other children joined in. A pinecone was in the sand bin and Maude, aged 2 ½, wondered if it would make a good scooper. She tried to use it to transfer sand from the bin to the lid, which was set down next to the bin, but of course she found it is not an effective scooper. Maude then decided to use the pinecone to draw pictures and lines in the sand. The other children asked me for more objects and tools to add to the bin.
and I encourage them to pick a few things from the nature basket and bring them back. The atmosphere during play was very relaxed, showing that the children were focused, and this lasted for over ten minutes.

After seeing how engaged the children were with the sand during this play session, I added a sieve to this bin for the following week to increase the learning potential. I noted in my observation notes that:

“I have added a sieve in the bucket with the sand and the children enjoy seeing the fine sand go through so quickly and leave the small pebbles inside.”

**Playing with water.**

During the early years water-themed workshop, I was surprised at how long the children were engaged in playing with water, even in an indoor setting. I would have preferred the water play to be outside but given the rainy weather I attempted to set it up in the indoor classroom, and linked the water theme to rain when I took the group outside for a short period of time. The children mainly loved seeing the water flow out of cups, transferring the water to other containers. The variety of objects allowed for creativity and development of fine motor skills (for example, using spray bottles and eyedroppers to play) as well as creativity. One young girl, Emily, noticed many natural objects and was inspired to produce a beach scene. I asked permission to photograph it:
Figure 10. Beach scene made by Emily, 4.

Water play engaged the children for approximately 16-17 minutes during both the morning and afternoon sessions. Only one child in the afternoon session was less engaged and wanted to play with something else, so I suggested he move to the other table and I offered some modelling clay, another open-ended natural material. He ended up being very proud to show me the fish he made with his mother’s help.

Later in the afternoon workshop, I took the group outside as the rain had stopped. I brought out a variety of shells to encourage them to create a beach scene outside. While arranging various shells around a puddle of water outside in a paved area (see figure below), Emily commented: “it’s fun getting wet! … you can change all over again and get more wet! And change all over again and get more wet!” All these experiences encouraged children to connect to natural elements, and experiences outside.
Figure 11. Beach scene made by 3 children outside in the parking lot.

**Building confidence and motor skills through exploring naturalists’ tools.**

Exploring natural objects such as soil and water, and having access to appropriate supporting objects was important for the children’s enjoyment of the activities, and supported the notion of loose parts for quality play. The basket I prepared containing a variety of naturalists’ tools such as binoculars, notepads and sampling containers, also allowed children to experience playing with loose objects – this time in a way that promoted the motor skills and built confidence as these were real objects used by adults.

For example, during the soil-themed workshop at the early years centre, the afternoon group really enjoyed learning how to use a measuring tape. We spent almost ten minutes measuring the girth of the trees in the small yard. I wrote the following notes while listening to my audio recording of this event:

*For 7 minutes towards the end of the program, we measure trees in the yard. I had not planned this activity, but the children seem to love it so I went with it. One boy shows interest in the measuring tape he finds in my basket:*

*Elizabeth – “Do you think we should go measure one of the trees to see how [the measuring tape] works?”*

*Oliver – “Yeah”*
I ask the other children if they want to come and help. They follow me. I take them to the biggest tree in the yard. I show them how to pull the tape all the way around, and I read out the measurement out loud: “8 feet, wow!”

O. – “Wow that’s a lot, that’s a lot daddy!”

I show them how to wind the measuring tape back in. We go to a smaller tree. One girl starts pulling out the tape, but finds it fun to walk backwards and see the tape coming out so she keeps going until all the tape is out! I ask her to wind it back in, and I use the end of the tape to measure the tree with another child. I give someone else a chance to wind some of the tape. One boy wants to try to climb the tree, but I suggest it is a difficult one to climb since there are no good places to put your foot. I ask him if he wants to come help measure the next tree. He is very eager to help, asking: “What can I do?” “Can I help you” “Can I do this”. I give each child a task - holding the measuring tape, walking the tape around the tree, etc. - so they can all help. When we have our measurement, I note the long piece of tape we need to wind:

E – “That’s a long piece of measuring tape”

O. – “Yeah. I can wind it all up” he says confidently while cranking it back in. I tell him is doing a great job.

We play for 5 minutes with other objects, and at the very end of the program, I suggest that there is one last tree we haven’t measured yet. The children are very keen on doing one last measurement and all seem to understand how to use the measuring tape now and how to wind it back in.

This activity was entirely child led and grew out of the fact that the children could access various tools I brought with me and had the freedom to explore them. Having an adult show them how to use the measuring tape was important, and after a few times and some encouragement, they learned how to use this tool and took the lead in this activity. This is something the other groups did not do, as none of the other children picked out the measuring tape from the basket and asked about it, in the time we had together.

Throughout the various programs I delivered, I observed the children to be most engaged, and engaged for the longest amount of time, in situations where they had access to stimulating play materials such as water, soil, sand, objects from the baskets I provided, or natural objects in wild natural areas. I asked adults in the survey if they deemed it important for the children’s
enjoyment of the program to have a variety of loose materials and objects for the children to play with and explore and 14 out of 15 adults agreed that it seemed important, as I observed. One educator commented that “the children definitely benefited/were more engaged when they were at a ‘station’ with loose materials and objects to play with”.

Discussion

According to Basile and White (2000), there are three main components of environmental education at any age: context, connections and communications. Although the children in River Buddies were very engaged when their learning activities included their senses, body movement and playing with loose materials, the process was affected by the context in which the learning took place, the connections the children made, as well as communication and relationship building.

The indoor or outdoor context.

Research in environmental education points to the importance of outdoor play. Simply being outdoors had been shown to increase people’s vitality (Ryan et al., 2010) and experiencing nature outdoors with the whole catalogue of sounds and sights that our eyes and ears are open to, and that we do not witness in the city, actually helps our human senses grow (Louv, 2008). Children have a desire to be outside and have voiced concern over not being able to spend as much time as they’d like to play outside (Clark, 2005), therefore I planned to include a portion of outdoor time.

All four days at the early years centre took place partly indoors in a small programming room, and partly outdoors in the yard adjacent to the building, depending on the activity and the weather. The yard was not a very wild environment – it consists of mowed grass, an old unkempt sandbox, a picnic table, a few trees and a paved area. Yet, the outdoors offered more than enough to explore, when I took the time to lead the group and point out such natural living and non-living objects as different types of grass, maple seeds on the ground, ants, lichen on tree bark, etc. Exploring nature is mainly a matter of being receptive to what lies around you (Carson, 1998) and can be done in a simple yard. Furthermore as the educator, I found the
outdoor setting to be much easier to manage, mainly because the indoor classroom was filled with toys that distracted the children from the natural materials and the outdoor activities. Play outside was more active, free and exploratory. One parent observer noticed that her son “really enjoyed it [the workshop] – especially the time spent outdoors”.

A few key indoor activities were actually very successful: for example, sensory activities, circle time talking about the different topics at the beginning of the workshops, and creative activities such as drawing and creating large depictions of a scenery with pieces of felt depicting water and clouds. The success of these indoor activities suggest that the indoors can be more appropriate at times and that it is important to make connections between what is being learned and experienced indoors and outside.

The daycare workshop mainly took place outdoors, except the introduction and story which were indoors. It was difficult to keep the children’s attention during a portion of the indoor time, as distracting cries from other young children in the nursery could clearly be heard from other rooms. The children were all very excited when I announced we were going to go outside in the yard. Mid-way through the workshop, it started to rain a bit while the group was outside. I asked the children if they wanted to stay outside for the rest of the activities, or go back inside, and the answer was unanimous to stay outside. My colleague commented in the survey that it was surprising that “the children wanted to stay outside in the rain!” Another survey comment from a daycare educator alludes to the children’s enjoyment of the outdoors: “some children were so excited to play with nature while others yearned for colourful plastic toys. ALL children however were excited about being outside”.

In the case of either program setting (the early years centre or daycare K), it is difficult to determine the factors for the children’s general preference for the outdoors. Had I conducted the
indoor activities outside and vice versa, I might have obtained different behavioural reactions from the children. The children probably associate the outside with playtime and fun, and the inside of a classroom or daycare room with rules, “indoor voices” and structured learning. As an educator delivering a program to a group with which they are not familiar, it is perhaps an advantage to use the outdoor environment, where the children are used to playing and are more at ease.

The nature hikes were set entirely in a rich natural environment. The groups were engaged in the outdoor setting, where there was a multitude of sensory experiences including the smell of the forest, sound of wind moving through leaves, birds and squirrels communicating and looking for food, and beautiful wildflowers in bloom along the forest floor. These engaging and inspiring natural settings are, for young children, “full of puzzles, mysteries and things to observe, wonder about, and figure out (Banning & Sullivan, 2011)”. It was therefore easy to get the children engaged with the forest simply by walking along, enthusiastically pointing things out and allowing them to roam and explore.

Outdoors or indoors, children need to experience for themselves the knowledge we’re communicating in order for lessons to be truly meaningful (Cornell, 1989). The learning environment is important by connecting children to the concepts and realities. During my programs, I discovered the children were intensely interested in topics such as how animals move and live, how various materials feel and the excitement of finding treasures like living things hidden in soil – basic concepts which connect them to their world.

**Connecting new concepts to familiar realities.**

Children’s constructions of the world are very different from ours as adults (Banning & Sullivan, 2011). To a three or four year old, every day is an exploration and learning of the
world. Each conversation they witness, structure they build, or sound they hear can adds to their growing constructions of the world around them. A short workshop or series of workshops, on any topic, delivered to this age group should take this into consideration by ensuring that the learning which occurs connects to the children’s previous knowledge, engages them in building on their interests and helps them re-imagine their experience over and over (Banning & Sullivan, 2011)

For many young children, their world consists of mainly home life and the family unit. It is therefore not surprising that when I showed a laminated picture of two ants to a group, Emily, four, pointed to the picture and exclaimed: “that’s the mommy and that’s the baby!”

In one instance, during the very first early years workshop I led on plants, I did an activity where the children explored the topic of fruits and vegetables and how some of these grow from seeds. I had a variety of fruits and vegetables in a cloth bag and asked each child to put his or her hand in and pick one at random – broccoli, carrot, mushroom, apple, etc. As the children each had a place at the small table in the classroom, we went through each one and I carefully cut it open with a knife and showed the children inside. I encouraged them to make predictions and guess whether there would be seeds. Some of the children got some right, and some wrong. As we did this I referred back to the story I had read at the beginning of the program, Ten Seeds (Brown, 2001), which connected the story to a real experience. Although we were indoors in the classroom and the children had to sit at their place and be patient, they remained engaged for around twelve minutes, which was quite a long time compared to other activities.

Children can relate to the topic of fruits and vegetables by exploring them in a new way; looking at the inside aroused their curiosity and engaged their interest. They also had a
participatory role by being responsible for a particular fruit or vegetable and guessing where the seeds were. My enthusiasm and build up for showing the inside of each fruit was key to the success of the activity, and demonstrates the important role of the educator’s style of communication. As children take a holistic approach to learning, connections are made in all learning situations to many other areas of learning as well (Thornton & Brunton, 2009).

**Communicating with young children.**

Young children have different methods of communication than adults, and even older children, and it is important for educators to understand how young children communicate in order to be tuned in to their interests and concerns. I found most children to be quite verbal in their communication, but this was complemented by behaviours and body language, especially in the case of shy or younger children. Adults confirmed this through their answers in the survey. One respondent noted that the children “were able to communicate by holding up materials”. Indeed I saw this happen many times, as shier children would find an object interesting and hold it up to show their parent and in this way ask for information or for help in figuring it out. One educator had interesting insight following the daycare workshop:

> The children mainly asked questions to confirm their intuitions about the form of nature in question ‘is this a bug?’ for example. They would point [and] feel and then ask questions. Occasionally, after receiving an answer they would remain there, staring at the object!

Children use many modes of communication. As Basile and White (2000) put it, “teachers need to communicate ‘with’ children not ‘to’ children” (p.58) which I interpret to mean engaging in a dialogue and steering away from teacher talk. Furthermore, by offering the children interesting learning experiences, they were often eager to talk about what they are
feeling, seeing and discovering (Banning & Sullivan, 2011) and this in turn helped fuel language
development and social interaction.

While planning for _River Buddies_ I struggled with how much emphasis to put on
“naming” objects. On one side, one can enjoy nature regardless of knowing the name of trees,
birds and plants around, yet on the other it is important to know names to be able to
communicate effectively about our surroundings. One study shows that the more wild plants and
animals children know by name, the more they appreciate these organisms (Lindemann-
Matthies, 2005) therefore I felt it was important to teach children specific names or organisms
and information. Depending on the context and method of communication, teaching young
children natural history can easily be included in learning experiences. For example, providing
children with interesting materials or live animals will usually prompt the children to ask what
they are. As children learn, they need the guidance of adults who can answer their many
questions.

**Role of significant adults in connecting children to nature.**

Children need the companionship of at least one adult with which to share the excitement
and mystery of the world (Carson, 1998). Adults play a key role in young children’s cognitive
and moral development, especially at a very young age. They provide safety, organization,
interpretation, enthusiasm and engagement as they build and share interests (E. Elliot, personal
communication, July 30, 2011).

Adults, whether they be a parent, grandparent or early years educator, have an important
responsibility when it comes to teaching environmental literacy. Robertson (2008) suggests that
adults, such as caring parents, need to guide children through modeling appropriate attitudes and
behaviour. They also need to provide “appropriate materials for the child to interact with, helping
them construct an image of their universe within the limits of their schema” (Robertson, 2008). While interacting with natural materials, it is important for adults to teach the value of natural things; having a significant adult reaffirm the value of natural areas is shown to be an important factor in children becoming adults with a leaning towards caring and taking positive action for the environment (Chawla, 1999).

Many adults are intimidated feeling that they cannot “teach” their children because they lack the natural history knowledge and few early childhood educators know how to encourage children’s connections with the natural elements (Davis, 2009). Ruth Wilson (2008a) confirms that the primary role of the adult should be to have fun with the children not to teach them or try to pass on a “save the world” message.

During River Buddies I, as the educator, led the activities and acted as a resource person for questions from the children and adults, but having the children attend with an adult they knew and trusted made them feel safer and more relaxed (Clark & Moss, 2001), and thus they became engaged more quickly. For example, many times the children would be keener on an activity or topic if their parent was enthusiastic, or would stay physically close to them if they were shy.

During the May 8th nature hike, Andrew showed how his own behaviour mirrors that of his parents’. I noted in my observations notes following the hike that for around 15 minutes, he had a walking stick, just like his father, and walking behind or next to him. He asked at one point where he was going as we turned onto a different trail, and asked if this was the trail we were on before (it was). He seems to perceive his father as a trusted authority figure and a role model. By accompanying him on the hike, Andrew built his experience of the world through physical activity and exploration of the woods within the comfort of his relationship with his
father. The interest and engagement of the father was obvious in a picture taken by a news
photographer, where the father is crouched down and actively helping his son to take a picture.

The role of the adult in children’s experiences with nature may be more important the
younger the child and the more dependent they are on their caregivers. It was therefore
interesting to get the parents’ and educators’ understanding of the role of adults when in a natural
environment with a young child. One respondent writes: “fun and exposure outside”. Five
respondents allude to teaching or describing and discussing nature, and one writes: “bring the
child to locations and perhaps point out natural objects that match book images”. None of the
children in the study would have participated in River Buddies programs if it had it not been for
an adult, either a parent or the daycare director who got in touch with me about delivering a
workshop, or parents driving their family out to a nature hike. This highlights a challenge in
environmental education in the early years – how do we engage families who are not drawn to
the activities and programs? Through answering this question, many children will have further
learning opportunities as they are taken to programs, workshops and nature hikes available
locally.

**Relationship with the educator.**

As an educator, my values and beliefs blended with my experience, translate into my
personal way of teaching and this “directly affects children’s love of learning, their problem
solving, and their engagement with materials, investigations and people” (Stacey, 2009). I feel
that my passion was important in the children’s experience. For example, as I led the children on
an exploration of the early years centre yard, looking for animals, I stopped the children at a
large tree trunk. I noted in my observation notes that: “we take a look at a tree to see if there are
any animals hiding. I am whispering and the children copy and do the same”. The children
seemed to pick up on my interest for the tree trunk and wonder at the possibility of tiny insects hiding within the creases of the bark.

I also developed relationships with my participants, which was important. One family (mother and son) attended my workshops at the early years centre, one of my nature hikes, and a follow-up workshop at the same early years centre I delivered following the programs used for data collection. She noted on the survey following the nature walk at Guindon Park, “my son enjoys it – especially Elizabeth”.

During the nature hikes, my interests directed my attention, and led me to talk about what we were seeing or experiencing. As I was interested and excited in natural phenomena, I shared them with the group. I was particularly focused on plants and natural history, for example, I pointed out some turtle egg remains on the ground, which participants would not have noticed or been able to identify. They were very excited to learn what these things were, especially the family who spent a lot of time in this park and had extensive natural history knowledge already. Walter, 3, took a picture with his disposable camera:

![Figure 12. Turtle egg shell. Photo by Walter, 3.](image)

I also actively promoted relationship building and communication by participating in the activities I proposed to the children and conversing with them throughout. For example, during
the early years centre workshop on plants I brought in a bouquet of flowers and offered the children paper and crayons to promote observing the flowers by drawing them. I sat at the table with the children and drew my own picture to model the activity. I asked a child if I could borrow his yellow crayon for my drawing, and just a second later another child asks me: “Can I borrow your yellow?” As we shared crayons, we developed our learning community and the children built their relationship with me as the educator and with the other participants.

**Going with the children’s flow.**

Young children are naturally curious about the natural world (Kellert & Wilson, 1993), therefore it is not usually difficult to get children interested in exploring and discovering nature. However, it can be a challenge to prepare and plan programs and workshops while “remaining open to the possibilities of what might occur day by day as children explore, discover, negotiate, and create worlds of their own through their play” (Stacey, 2009). For example, I planned four main topics for my four-week series of workshops: plants, soil, animals and water, and researched appropriate activities and play materials to offer the children, but left the timing of the one-hour session flexible in order to be able to observe the children’s interests and energy level, and adapt the plan as I led the workshop.

Emergent curriculum design is a type of teaching which is child-centered and dynamic. It is guided by what the children want to learn, as opposed to what the teacher wants to teach. The teacher must be prepared to provide the information and resources relevant to the children’s interests. Emergent curriculum places extremely high value on play as a generator for curriculum. Play provides an opportunity for children’s exploration, problem solving, development of big ideas, and, therefore, learning. It also provides the teacher, as researcher, a prime opportunity to watch and listen carefully in order to generate further understanding of the
individual child (Stacey, 2009). I found this idea to be very useful, especially the idea of using playtime as an opportunity to watch and listen carefully. However, not being with the same children on a regular basis, and having committed to workshop topics already, I was limited in my ability to apply the notion of emergent curriculum. I was able to follow the children’s interests in small ways, such as measuring the trees. For educators who are in daily or weekly contact with the same children, curriculum could more easily be generated by the emergent interests of the group.

I found that the children needed to be allowed a certain freedom in following their interests and enough time to try new ways of playing with and utilizing available materials. As the children engaged with the materials and explored their interests they developed their own unique understandings and meanings of the natural world. Adults often get caught up in timing and doing all the activities that were planned within a certain amount of time, but research conducted by Clark (2005) confirmed that children dislike being rushed and hurried and need time to finish what they are doing before tidying or moving on to something else. Children need time for slow learning, allowing for assimilation, looking, daydreaming (White, 2008) and then the learning becomes part of their view of the world.

The flexibility I allowed in the planning partly stemmed out of my curiosity to see which activities most engaged the children. Through examining the written and recorded observations, the activities that engaged the children for the longest amount of time were free play with bins of water and objects, free play with bins of soil and sand with tools and objects, and exploring natural areas with magnifying glasses and/or boxes.

During the nature hikes, the children largely directed the timing and flow. One adult participant noted in the survey that, “half way through, the children began to more actively
participate, looking on their own rather than passively listening” which is interesting. Had the nature walk been only 30 minutes, the children might not have arrived at this point. It takes time to get familiar with a new environment, a new group of people, and perhaps the children first need to feel safe and understand that it is safe, even expected, for them to explore on their own.

The educators at daycare K had interesting comments relating to the timing of the program: one wrote that “the hour fly bye [sic] I think the children would have loved more time overall!” and another wrote that “the children are young, so the time provided was great and perfect [sic] timing before”.

**Inviting children to participate in activities while remaining flexible.**

I proposed we build a bird’s nest out of materials in the yard. I hoped this experience would provide the children with understanding of how difficult it is to build a soft and cozy nest. During this activity Daniel, chose to play in the soil bin for the few minutes. Having the soil bins or other activities available during a teacher guided experience allowed children to continue to explore alternative activities if they wished. Children paid closer attention when they chose to participate. The flexibility allowed children to play and participate as they were comfortable,

During the early years water-themed workshop, I asked the children to draw a picture of an animal, not an easy task for anyone. Some commented on their lack of skills, or resorted to drawing objects they already knew (for example, a butterfly princess), but one boy sat at the table where the container of aquatic invertebrate animals was set and decided to draw a picture of the crayfish. He had been quite curious about that particular animal during the program (calling it a scorpion many times), and the opportunity to draw it may have given him a chance to appreciate it in a new way.
This behaviour in fact told me that for young children, drawing what is physically available and in front of them may be easier and more interesting, and when children are comfortable, they will direct their own learning depending on the context and available materials.

**Exploring the daycare yard.**

During the soil themed workshop, I took the children on a “safari” around the early years centre yard. I gave each child a small clear box with a magnifying lid (see figure 14 below), and made an adventure and game out of the activity, looking for interesting materials to put in their box and look at closely. Many children delight in the small and inconspicuous (Carson, 1998), the boxes allowed for focussed collection and observation of small objects.

In one moment, I stopped the children to look at a clump of leaf litter and offered a piece to a child for their box. The other children soon also wanted a piece for their box after seeing
how intrigued I was with the decomposing leaf matter and its interesting colour and texture.

Example of the contents of the children’s box following the program:

![Contents of one child’s magnifying box after the yard safari.](image)

*Figure 14.* Contents of one child’s magnifying box after the yard safari.

During the workshop at daycare K, the yard exploration was guided by the children. In fact I told them that they were the ones who knew the yard well – I had never been there! I asked them to take me to a favourite place, and some of the boys started to run to the large-scale play structure. I suggested that we were going to focus on the rest of the yard since we were exploring nature. The yard consisted of mainly mowed lawn, surrounded by shrubs and trees along the surrounding fence, a few patches of flowers and one area with remains of a large tree stump and pile of bark. They took me to the edge of the yard and we observed the plants with magnifying glasses. I modelled curiosity by crouching down and pointing out small details such as interesting leaf shapes or flying insects. After a few minutes, I asked the children to take me to a new area. We went to the stump where there was a huge variety of insects to dig around for,
and neat squiggles drawn into the old bark by boring beetles. The children had not explored this small area before, although it was less than a hundred meters away from the play structure.

Helping the group direct the learning and being flexible in programming were key. In fact, I had only gone as far as planning that the children would explore plants and insects in the yards with magnifying glasses for around twenty or so minutes depending on the yard and their interest. The children were able to find interesting spots in the yard. Since there were a number of adults with the group it allowed for a few of the children to wander a bit further or look at other things they were interested in. This provided me with an opportunity to engage and interact with the children who were focused in on a particular place or object.

Having the staff participate had an interesting side effect. Along with the children, they learned a new way of exploring the yard and engaging with the plants, animals and soil which are always available to them. It was important that I model the teaching style and behaviour appropriate for exploring nature, and as shown in the survey answers, the workshop had an impact on the way the daycare staff will interact with the children in the yard in the future.

**Importance of feedback for multiple-week sessions.**

Flexibility during delivery of programs ensured that the activities were based on the children’s interests, however feedback through a survey at the end of the programs was very helpful in preparing for the following week, in the context of a multiple week workshop series. I asked the adults to comment on the success of the activities and timing in the *River Buddies* program, and this helped develop the curriculum for the following week. For example, after the first week, one parent noted that there should be more free play. I incorporated more free play the next week, and a different parent answered after this workshop that “it was a great start. Lots
of free time to enjoy the activities”. I valued the feedback of participants, and I feel that their answers helped improve the workshop every week, and validated my choice of activities.

The context in which the learning occurs, whether indoors or outdoors, the connections children can make and the types of communication between adults and children play an important role in environmental education for early years groups. As the educator, I felt these three components to be important – I changed my approach given the context, worked at connecting the children on several levels and encouraged communication. As I delivered the various programs, I also noticed that flexible timing was crucial to keeping the children engaged.
Conclusion

My personal interest in the field of early childhood environmental education and my desire to provide learning experiences for children led me to this exploratory action research project. Most of my findings support the existing literature, although a few key themes emerged that were surprising to me and merit further exploration.

As I developed and led the River Buddies program, I tried out activities, teaching practices and research methods. My recommendation for environmental educators wishing to offer programs to early years groups is to develop new, age appropriate activities which involve loose materials, live creatures and a variety of different activities. The educator should keep in mind that young children do not learn effectively by listening to information—they need to take the time to explore with all their senses, play freely in natural spaces and have real experiences that help them understand the world. Having various bins with natural, open-ended materials and exploratory tools to make the learning more complex, and having enough materials so that the children remain engaged, should be a focus of the program. Giving the children opportunities to interact with live animals, living plants and open-ended materials, such as water, sand and soil will provide exciting possibilities for children’s explorations. When the educator models his or her own passion and commitment, he or she will introduce children to the opportunities found in the natural world.

For early years educators wishing to incorporate nature activities, I recommend spending time outdoors to explore with the children. As illustrated by my own work, the simplest of yards with grass, a tree, and insects is enough to fascinate children. The educator should see the outdoor setting as a prime learning environment. Providing children with magnifying glasses or small magnifying boxes, small shovels, pails and their own enthusiasm will encourage
exploration and observation, and build confidence. Engaging with the children, validating their discoveries and encouraging them to look closely will inspire them to continue.

**Limitations and Delimitations**

This study was limited to approximately 13 hours of programming through the *River Buddies* pilot program (including the nature walks, the 4-week workshop series and the daycare workshop). The Mosaic Approach used to collect data was chosen as a way to include young participants’ points of views, and provide a broad range of data. Including young children in the research project was successful, however applying the Mosaic Approach to a study in environmental education for young children is novel and these findings should be considered as a starting point for future research. Other participatory research methods could be explored further, depending on the framework used by the researcher and the availability of participants. Including pictures of the children playing and learning could have been useful, but ethically I preferred not to ask the participants for permission to identify them.

The study was delimited by a small geographic span and by fairly similar socio-economic background of participant families. The children were all living in Cornwall, Ontario, and were not very diverse ethnically, or in terms of abilities. It would be beneficial to this field of research for future studies to include a diversity of participants and research methods.

**Evaluation of the River Buddies Pilot Program**

Following the pilot programs, I wrote a report for the River Institute to keep on file, outlining the factors for success of the various types of programs and recommendations for future early years programming.

For the very successful 4-week workshop series, I noted factors that led to the success of the workshops, such as the small size of the group, nice weather, the type and length of activities,
and familiarity with the educator. I wrote that activities had a duration, on average, of about seven minutes, therefore it was important to come prepared with a diversity of activities and materials to keep the children moving, and engaged.

For the daycare workshop, which was delivered after the early years centre workshops, I noted that it was a good opportunity to deliver all the best activities from the 4-week series at a different location with different children. Additional help from the daycare staff helped, and in fact gave them new ideas on how to use the yard as a teaching environment. Good outdoor weather and again, a variety of activities and objects to play with led to a successful workshop.

The nature hikes were successful in terms of delivery and satisfaction of participants, but there were so few people, it was not successful in attendance. There is interest in the community, but the narrow age range (3-5 years accompanied by adults) probably limited the number of people who could come. In the future, I would suggest continuing the walks and framing them as “family-oriented”, especially given the success of other family workshops offered by the River Institute.

Future early years programming offered by the River Institute should include more programs at the early years centre if possible, and daycare workshops offered similarly to the elementary Cooper Marsh programs. Because it is difficult to get kids off-site, promoting on-site programs for daycare is probably better and encourages educators to continue to explore learning with children about nature. I suggest 1-hour length or 1h15 min, since their attention span is shorter and there may be less to explore in a daycare yard than at Cooper Marsh. It would also be excellent to continue to offer the nature hikes, as I’m sure participation would build up, and they would be very popular if they were open to any age group. The hikes should be offered at different times and days of the week to see which works best for families.
Workshop impact on parents and caregivers.

Although the workshop at daycare K was only a one-time occurrence, and the impact may not have been huge on the children, one staff member noted in the survey that they had been “talking about bugs three days prior to [my] visit” which shows that the experience was extended beyond the one-hour program as children and educators anticipated the visit. Because the children experienced a new way to play and explore the daycare yard, no doubt they will want to continue the exploration in the future and the impact will be felt after the visit. The adults noted that the workshop might change their behaviour in the future: one noted that she will “definitely be more self-involved to help them explore better” and another noted that she will “get down and investigate bugs, plants”. This is very interesting, given that one staff member wrote in the survey that “it is not allowed normally to pick stuff up off the ground or explore when [the group is] supposed to be in a specific area all together” which is quite different from the workshop I led.

When asked how the River Buddies program affected the way they will interact with their child in nature in the future, parents have a variety of responses. To some, it was a reminder to explore nature, to pay attention to the children’s interests, and provide hand’s on activities, and play time. One nature hike participant noted “we will continue to take walks and visit the conservation centre again”.

Given the impact the River Buddies programs had, not only on the children, but on the adults, I recommend including caregivers in similar early years programming and offering meaningful learning experiences for educators and parents to learn how to introduce young children to the natural world.
Reflections on the Combined Role of Researcher and Educator

It was a challenge in many ways to play the role of educator delivering the River Buddies programs, and to focus simultaneously on the research. Using the audio recorder was key: it allowed me to truly focus on the children, without worrying about jotting down comments and observations during the program. The experience opened my eyes to the wealth of information children are communicating during every minute of play, and how important it is to take the time to listen to what they are saying and incorporate that in curriculum planning. Listening to the children’s communication, and enlisting caregivers as fellow researchers and observers, truly helped me to take on the role of a facilitator of the children’s explorations of the natural world.

Listening to the children provides them with an opportunity to voice their ideas and influence their experiences in learning. Enlisting the caregivers as fellow researchers provides them with an opportunity to observe and learn. Encouraging children’s voices and encouraging caregivers to listen provides a powerful context for learning.

The Future of the River Buddies Program

There is potential for future early years programming in Cornwall, as shown by the interest and attendance of participants to the pilot programs. When asked in the survey if they would like their child to have more outdoor learning opportunities locally, all seven respondents answered positively. Parents expressed a strong interest for opportunities and listed the following as examples: play groups, nature walks on trails and boardwalks and more programs similar to the River Buddies workshops. There is also opportunity for developing the skills of daycare educators, and workshops for educators or programs which model outdoor teaching with young children would likely be well received by the community.
References


River Institute offers new early years programs

Do you have a curious three to five year-old? Are you looking for innovative ways to introduce your child to the wonders of nature? If so, consider 'River Buddies,' a new River Institute program for young children to learn about the river and the local environment.

Elizabeth Boileau is an educator at the River Institute, and the coordinator of the 'River Buddies' program. This program forms the basis of her Master's thesis in Environmental Education and Communication. "I am very much looking forward to providing fun educational activities about nature for youngsters in the Cornwall area," says Boileau. "It will be a perfect setting to better understand children's experiences in nature and how the River Institute can provide the best possible programs for young children in the future." Ms. Boileau will collect information during the 'River Buddies' programs for her Master's thesis.

The 'River Buddies' programs are free of charge, and offered in different formats throughout April and May.

Workshops will be delivered at the Early Years Centres in Cornwall and Alexandria on Tuesdays in April. These workshops will have a different theme each week, and include a combination of play-based learning activities. Registration is free, but limited to 10 children at each location. To register, contact Joanne at 613-436-3022 for the Cornwall location (550 Ninth Street E.) and Melanie at 613-678-7184 for the Alexandria location (260 Industrial Blvd).

Morning nature walks will be held at Grey's Creek Conservation Area on April 3 and May 8, and an evening walk will take place at Guindon Park on May 18. These walks will engage younger children with an awareness of nature, plant life, birds, and animals. Please call the River Institute at 613-936-3022 to sign-up.

Special programs for daycare or preschool groups are also available upon request. These programs take place at the Cooper Marsh Conservation Area and include outdoor play time, stories, and nature walks. These programs are also free of charge - ask your daycare provider to arrange a program with the River Institute!

For more information about the 'River Buddies' programs, contact Elizabeth Boileau at 613-936-3022, ext. 2.

Appendix B: River Buddies Flyer 1

River Buddies

Free programs at Cooper Marsh for early years groups!

The River Institute is offering a limited number of FREE programs in May 2011 for daycare groups. The River Buddies program is an outdoor early years program offered at Cooper Marsh Conservation Area (South Lancaster) which introduces children to the wonders of the marsh habitat through various hands-on activities.

These programs are offered as part of River Institute Educator Elizabeth Boileau's Masters thesis in environmental education, therefore some information on the children's experiences and interests will be gathered during the program.

Program includes:
❖ Nature hike
❖ Play time outside
❖ Story time
❖ Educational activities

For questions or registration information, contact:
Elizabeth Boileau, Educator/biologist
St Lawrence River Institute of Environmental Sciences
Email: bboileau@riverinstitute.ca
Tel: www.riverinstitute.ca
Appendix C: River Buddies Flyer 2

Do you have a 3-5 year-old? If so, join River Institute educators on a series of nature hikes at Gray’s Creek Conservation Area and Guindon Park. These walks are intended for children aged 3-5. Families are welcome—young children must be accompanied by an adult. The River Buddies program forms the basis for Elizabeth Boileau’s Masters thesis in environmental education. Children will be loaned a disposable camera to take pictures during the hike, and adults will be asked to complete a short survey for use in the research component (both optional).

**Dates and locations**:  

- April 3rd 10-11 am - Gray’s Creek Conservation Area  
- May 8th 10-11 am - Gray’s Creek Conservation Area  
- May 18th 6:30-7:30pm - Guindon Park  

*Please note that hikes may be cancelled due to weather conditions, if in doubt call Elizabeth at...*

For questions or registration
Information, contact:  
Elizabeth Boileau, Educator/biologist  
St Lawrence River Institute of Environmental Sciences  
Email:  
Tel: www.riverinstitute.ca
Appendix D: Consent Form for Children Participants

Dear Parent:

I am currently a Master of Arts candidate at Royal Roads University in the Environmental Education and Communication program and I am conducting a research project called *Exploring Children’s Understanding of Nature through the River Buddies Program*. I would like to ask your consent to include your child in an informal interview process during the River Buddies program your child will be participating in.

My project is exploring children’s understanding of nature and as such I would be interested to find out how your child views nature and what their experience of the *River Buddies* program was like. I may be asking your child a few questions verbally on this topic (audio recorded, if the child consents) asking him or her to take pictures with cameras of what is important to them and/or drawing a picture representing nature. I would also be writing down my observations, but at no time will specific comments be attributed to a particular individual unless a specific agreement has been obtained beforehand. All documentation will be kept strictly confidential.

All information will be kept at the River Institute (in a locked office) or on a password protected laptop until the final thesis is complete, and will only be viewed by myself, my academic supervisor and selected staff members at the sponsoring organization, the St. Lawrence River Institute of Environmental Sciences. Hard copies will be destroyed within a year, following the completion of my final thesis however digital notes may be kept on a password protected computer for up to 5 years after which they will all be deleted. In addition to submitting my final thesis to Royal Roads University, I will be sharing my research findings with my sponsoring organization, the St Lawrence River Institute of Environmental Sciences, and may potentially be used when submitting articles for publication.

A copy of the final report will be published and archived in the RRU Library.

You are not compelled to provide consent for your child. Should you prefer they not participate, I will ensure not to record any data from him or her, which will not at all affect the quality of the program your child will receive. I will also be asking consent of the child and tell them clearly that they do not have to participate (even if you have consented!) and that they may stop participating in the interview activities at any point.

Should you have any questions or concerns regarding the nature of this study, please contact myself at [email protected], or Dr. Milton McClaren, Program Head, at mcclaren@sfu.ca.

Sincerely,

*Elizabeth Boileau*

By signing the following, you give free and informed consent for your child or children to participate in this project and agree to the data collection provisions outlined in the letter above.

Child/children’s name(s): __________________________________________
Parent/guardian name and relationship to child: __________________________
Signature and date: _________________________________________________

Researcher signature and date: _____________________________________
Appendix E: Adults Survey

Dear Parent, Teacher, Educator,

Thank you very much for participating in a *River Buddies* program with your child or group. As you may know, I am currently conducting research for a Master’s degree in Environmental Education and Communication at Royal Roads University. My project is called *Exploring Children’s Understanding of Nature through the River Buddies Program*. The following survey will serve to provide valuable data on the children’s experiences and your personal views on children’s learning and understanding of nature. The survey should take around 5 minutes to complete. No sensitive information will be asked, and surveys are completely anonymous.

All completed surveys will be kept on file at the River Institute (in a locked office) until the final thesis is complete, and will only be viewed by myself, my academic supervisor and selected staff members at the sponsoring organization, the St. Lawrence River Institute of Environmental Sciences. Hard copies of your completed surveys will be destroyed within a year, following the completion of my final thesis however digital versions (scanned or typed) may be kept on a password protected computer for up to 5 years after which they will all be deleted. Your answers will be incorporated in the final MA thesis which will be a public document, and potentially academic articles and presentations as well.

Please note that you have the right not to answer any of the questions or stop completing the survey at any point. This will have no impact on River Institute programming or services you may receive in the future. Should you have any questions or concerns regarding the nature of this study, please contact myself at Elizabeth.boileau@royalroads.ca, or Dr. Milton McClaren, Program Head, at mcclaren@sfu.ca.

Thank you in advance for your time.

Elizabeth Boileau
Master of Arts Candidate, Royal Roads University

By signing the following, you give free and informed consent to participate in this research project by completing the following survey:

Name (Please print): _______________________________________________

Signature: _______________________________                   Date: _______________________


1. During the program, would you say that children were mainly building on previous knowledge of nature, or mainly being exposed to completely new concepts and words? List examples if appropriate.

2. Please list the 3 topics that the children were most curious about during the program (no ordering necessary):
   - ________________________________
   - ________________________________
   - ________________________________

3. Did it seem important for the children’s enjoyment of the program to have a variety of loose materials and objects for the children to play with and explore?

4. In your opinion, does it make a difference in the child’s enjoyment, attention span or learning whether the materials offered to children are natural (sticks, pine cones) as opposed to traditional toys (plastic)?

5. How did the children communicate their questions, wonderings and stories about nature?

6. Please comment on the overall success of the activities in the program and the amount of time allotted for free play (including possible improvements to the River Buddies program).

7. Please note any interesting or surprising behaviour you saw, or comment you heard from the children, during the program.

Please answer the following questions in relation to your child or children, if you have accompanied your child during a River Buddies program.

8. How much time in a week would you say your child spends playing outdoors in a natural environment where he/she is free to explore, play and make use of natural objects (trees, rocks, soil, etc.)?

9. If your child watches television, what show or character would you say your child prefers or admires the most?

10. Does your child seem to be particularly inclined towards nature/animals/plants?

11. Does your child tend to collect natural objects (rocks, shells, sticks)?
12. Would you like your child to have more outdoor learning opportunities locally? If so, please describe.

13. How has the River Buddies program affected the way you will interact with your child in nature in the future?

14. In your opinion, what is the role of an adult when in a natural environment with a young child (under 5 years old)?