

**Researcher in Residence**

Includes:

Final Report

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Completed for: The Arthur

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Course Code: FRSC 4890

Course Name: Forensic Community-Based Research Project

Completion Date: April, 2023

Project ID: 6005



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**Project 6005- Researcher in Residence**  
**Does Trent University Prepare its Students for Potential Careers in**  
**Environmental Forensic Science?**

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April 4, 2023

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FRSC 4890- Forensic Community-Based Research

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## **Abstract**

Two of Trent University's largest faculties are the Forensic Science Department and the School of the Environment. With the rise of the importance of protecting our natural resources, the demand for people to legally protect our natural resources has increased. This study explored whether students at Trent University feel prepared for potential careers in environmental forensic science. Three specific environmental forensic job postings were analyzed: conservation officer, water analyst, and enforcement (pollution) officer. After, four professionals who were familiar with recruitment for these types of careers were interviewed. A survey was created and distributed to environmental science and forensic science students. The students generally did not feel prepared for environmental forensic science careers, as seen through the lack of interdisciplinary crossover. Students in forensics did not feel confident in their environmental science knowledge and students from the school of the environment did not understand most forensic/legal practices. For this reason, recommendations have been made to students who are interested in this field, as well as Trent University to aid students in the preparation process.

## **Acknowledgements**

I would like to acknowledge everyone who has aided in the completion of this research project. Without all of you, this project would never have been possible.

Dr. Joel Cahn, thank you for supporting me and the entire FRSC 4890 course by running weekly seminars. Your continued support and teachings throughout the research process have been extremely helpful, allowing me to be even more successful than I had imagined. Without your help, challenges would not have been faced, deadlines would not have been met, and my research would not have been complete.

Bethan and Sebastian, thank you so much for allowing me to explore my interests with this research. You have allowed me to follow a topic that is near to my heart, network with professionals in the field, and communicate my findings to the Peterborough-Nogojwanong community. You have shown me how to communicate my findings through journalism, a completely new method for me. Also a huge thank you to Arthur's team, especially the copy editors for your countless hours of help.

Brittany Finigan, thank you for running the bi-weekly check-ins, ensuring that I stayed on track, and staying in contact with my hosts.

To my family, partner, and friends, thank you for your continued support throughout this project. You have all believed in me every day, pushed me to succeed, and read my newspaper articles countless times. Thank you, thank you, thank you.

## **Introduction**

Over the last 10 years, environmental awareness has increased significantly. People are more conscientious of their environmental footprint - from the amount of pollution that their cars emit into the atmosphere, to the material of the reusable straws that they carry. This increase in awareness of the impact that we have on the world has carried into other parts of our lives as well. People are more aware that water conservation and wildlife protection should be prioritized to protect these valuable resources. Industrial laws limiting the amount of pollution that can be discharged into the environment are becoming more strongly enforced [1]. Pollution enforcement, wildlife investigations, and water analysis are all completed by professionals within the discipline of environmental forensic science.

Environmental forensics can be loosely defined as the application of science to environmental law. Environmental crimes include the illegal emission, or discharge of substances into the environment, illegal trade in wildlife, illegal transport, shipment or dumping of waste, and more [2]. With the increasing number of people paying attention to the way we treat our surroundings, legislative changes, and stronger law enforcement about the environment have arisen [1]. This specific type of forensics has developed in response to the changes and development of environmental regulations, advances in chemical analysis tools, and increased quality control procedures for organizations across the world [3]. Environmental forensics is an encompassing term used for various categories of investigations that pertain to natural sources. These include, but are not limited to, wildlife forensics, pollution audits, and water contamination investigations.

Professionals in environmental forensic sciences need a wide variety of foundational scientific knowledge in fields including chemistry, biology, and environmental science. These individuals need an understanding of forensic science and investigative techniques as well [4]. Although some of these skills can be acquired while working as an environmental forensic professional, ideally, a candidate should exhibit this knowledge base when applying for the job. Currently, there are no educational institutions that offer specific degrees in environmental forensics to give aspiring professionals a foundational understanding of these concepts. The closest post-secondary option for these students is a degree in forensic science, environmental science, or a joint major in environmental science and forensic science at an institution such as

Trent University. Although these are great degree options for students, I wanted to know if either of these three academic pathways can properly prepare a student for a career in environmental forensic sciences. As a student who hopes to become an environmental forensic scientist myself, I wanted to do this research to help other students learn more about these career opportunities and analyze the current classes and resources available to those who are interested in pursuing a job in this field.

Through this research, I hope to provide students with information about job requirements in this field through job posting analysis and interviews with recruitment officials in various avenues of environmental forensics. I also analyzed curriculum, and course syllabi and surveyed students to gain a better understanding of how students feel that these job requirements are being met. Once my research was complete, I reported on the effectiveness of Trent University at preparing students for careers in environmental forensic sciences as well as provide any recommendations to the forensic and environmental departments with ideas on how to better support their students, should there be a need.

I hypothesize that Trent University does not effectively prepare its students for potential careers in environmental forensic sciences. There is a large disconnect between the environmental and forensic science departments as only 3 courses are cross-listed between them. These being FRSC-CAST-ERST-POST 3120H: Canadian Environmental Policy, FRSC-ERST 3250H: Introduction to Environmental Law, and FRSC-ERST 4250H: Environmental Law and Regulation. Canadian Environmental Policy requires 1.0 ERST, CAST, POST, and/or ADMN credit at the 2000 level or beyond. The Introduction to Environmental Law course requires Environmental forensic sciences requires 9.0 university credits credits including ERSC-CLIM 1050H or both ERSC 1010H and 1020H. The Environmental Law and Regulation course requires 10.0 university credits including ERST 3250H or permission of instructor. The disconnect between the departments can be seen through these requirements where forensic science majors generally do not meet these prerequisites that would allow them to take the course.

Environmental forensic science careers require foundational understandings of investigations, crime scene analysis, and interviews, but also environmental procedures, ecosystem knowledge, and natural resource training. Due to the disconnect observed between the

departments through the course listings and prerequisites, I do not believe that students have the opportunity to take courses in the discipline that they may not be majoring in. For example, a forensic science student would have a difficult time taking courses that are cross-listed with the school of the environment because they do not have the required ERST courses. This results in gaps where students may not be effectively prepared for environmental forensics careers without doing further education after their time at Trent.

## **Purpose**

The purpose of this project is to allow me to research an issue and articulate the information in a non-academic setting. This makes learning about research outcomes less daunting by minimizing the amount of difficult language that is usually present in an academic article. To prepare for this experience, weekly story meetings were mandatory to maintain strong communication with the editors-in-chief.

Arthur is a student newspaper that provides free articles and other forms of journalism for students at Trent and the Peterborough-Nogojwanong community. This year, Arthur will be publishing Volume 57 in print, as well as online articles. The vision of this organization is to be “an online and print publication is to be a valuable, constructive, informative and critical voice on developments in the Peterborough-Nogojwanong and Trent community.” Publications touch on subject material such as educational, social, economic, environmental, and political issues.

Last year, a similar project was completed by Alexia Kambanis. Arthur newspaper allowed them to research ‘The Portrayal of Crime in the Media’ and provide a platform to teach students about the bias that is present. This topic will not be researched by myself this year, but the agency and requirements are the same.

## **Significance**

The proposed research project is important because it will allow students to learn more about careers available to them that combine forensic and environmental sciences. This is possible through articles that will be published in the Trent and Peterborough - Nogojwanong communities. The Arthur newspaper provides an opportunity for this research to be shared with students in all fields of interest, as well as the general public who are interested to learn more

about these careers. I hope to educate these people about professions that they may not have known about before this research was done. I also hope to educate students about different classes and resources that are available to them that can help them prepare for environmental forensic science.

My research will also provide insight into how prepared students feel for a career near the end of their undergraduate degree. In combination with an assessment of the current degree options and class listing offered at Trent, and analysis of the skills required for this career, I will effectively determine in which classes students are receiving the preparation for this type of career path. Student feedback will allow me to draw conclusions and determine if there are gaps or areas that need improvement in order to help better prepare students for this type of job. These sources of data will help determine what changes need to be made (if any). Helpful resources and general recommendations will be shared with students, allowing students to be the most prepared for this type of career.

## Methods

This research was completed exclusively remotely. Interviews were conducted through Zoom calls and surveys were delivered to students online. Four main sources of information were analyzed in this research project. First, job postings from the three categories of environmental forensic science were analyzed and compared. The three postings of interest were found on Indeed (a job listing website), and are for conservation officer, enforcement officer, and microbiology analyst positions. Next, recruitment officials were interviewed. They were found either through LinkedIn (an employment-focused social media platform), government websites, or other personal connections. I wanted to interview a professional familiar with conservation officer, environmental officer, and water analyst positions. This allowed me to compare the job postings to the interview findings.

These two sources of information helped me with highlighting the most important qualifications that employers are looking for from new graduates. From these skills and competencies outlined, a survey was created. The final source of information was gathered from the students in the environmental and forensic departments who were completing my survey. These students needed to be in their third or fourth year of study, allowing for a proper determination of preparedness to be taken. I chose these upper-year students because they are close to graduation, meaning that they are closer to a potential career in environmental forensic science. This allowed me to make more accurate determinations of preparedness for this type of career. The data collected from students informed how prepared students feel in specific skills, as well as overall preparedness for this type of career. This yielded an answer to the question “does Trent University prepare its students for potential careers in environmental forensic sciences?”

There is a combination of variables being examined in this research project. The first variable that was examined in this research was job postings from each of the three categories. The first job posting was from Climate Change Canada where they were seeking a pollution enforcement officer. The second posting was from the Government of Manitoba which they were seeking conservation officers who in turn help with wildlife investigations. The third job posting was for a microbiology lab analyst who would perform water and other analyses for EMSL Analysis Inc. These job postings provided the basis for the skills and knowledge that employers are looking for students to have when they apply for jobs. This data was compared to other

research findings from the professional interviews. Three postings were sufficient as the three highlighted focus on the main environmental forensic science careers, and these three encompass a range of different types of jobs.

The second source of information was the job requirements that employment officials are looking for in potential candidates. This information was collected from the job postings and recruitment official interviews. I interviewed one professional from pollution enforcement, and water analysis positions, as well as two professionals familiar with wildlife investigations on a Zoom call. This information suits the purpose of my research by definitively providing criteria for environmental forensic science employment opportunities. It was extremely challenging to determine if students are prepared without understanding the knowledge and skills that they need to succeed. Due to the amount of time present to complete the project, and difficulty contacting professionals from government organizations, just four professionals were interviewed for this project. Nevertheless, these four interviews provided a solid foundation of information to base the students' survey off.

The final factor being examined in my research was the preparedness of students. The requirements were displayed, and students had to rate how confident they were in their ability to display the skill. This helped determine how prepared students feel and therefore how well Trent prepares its students for this type of career. Students were recruited through a QR code in Arthur newspaper, and shared posters to the forensic science department and school of the environment. Questions included how confidently a student could display skills (communication, computer fluency, independent working, etc.) as well as if they have a general knowledge base in different subjects (ecosystems, natural resources, interviews, investigations, etc.). Ideally, I wanted to survey around 50 students, and I received 62 responses. This higher number of participants allowed me to make statistically sound inferences from the collected data. The larger number also allowed me to speak to a wider demographic of students and potentially rule out any biases or lack of representation within the student body.

## **Ethics and Safety**

To perform this research ethically and safely, necessary steps were taken to mitigate any risks. Confidentiality is one safety concern in this research project. This risk was mitigated by

storing data from interviews on a password-protected computer. These individuals could also agree to the sharing of their interview answers as some of them were included in Arthur publications as the research progressed. If individuals did not agree to this disclosure, their interview answers were used solely for quantitative analysis. Surveys were completed anonymously and the data collected from this part of the research project were stored on a password-protected computer.

The groups who were interviewed and surveyed as part of this research project were (and still are) recruitment professionals from each of the three categories of environmental forensic science presented. These are pollution enforcement, wildlife investigations, and water examinations. This group of people was not considered vulnerable; therefore, no mitigation of vulnerabilities needed to be addressed. Students were surveyed as the final part of this research. Students could be considered more vulnerable than recruitment staff, therefore the surveys were completed anonymously and used for quantitative analysis only. This project was a very low-risk and high-reward project, so there was no need to address researcher risk in this project.

## Results

### Job Posting Findings

Three specific careers under the environmental forensic sciences umbrella were researched in this project. Although these three pathways are different in many ways, they are foundationally the same in the sense that they are all the application of environmental science to law. Each of these careers has environmental crimes that require thorough investigations, complete reports, and presentation of evidence to convict those who are not following legislation. This knowledge allows professionals in the field to collect evidence properly, apply relevant legislation to a case, and provide strong testimony in court. They also require basic knowledge of ecosystems to understand what to look for during these investigations. This includes an understanding of water systems and soil composition. This knowledge is important because an individual needs to understand the basics of these ecosystems in order to compare samples and perform proper investigations.

One environmental forensic science career is pollution enforcement. This is an up-and-coming field with the publicity of the depletion of the ozone layer in recent years. Pollution enforcement involves the analyses of pollution and contamination emissions. This is done by performing quality control analyses of the environmental waste that an organization disposes into the environment [3]. Environmental waste can include airborne pollution, hazardous chemicals that are dumped into waterways, or physical waste that does not get recycled or properly disposed of [5]. The investigation of pollution emissions is now mandatory for most, if not all, organizations. These organizations include factories, large corporations, and even small businesses [3].

Pollution enforcement is usually done by environmental pollution officers. There was a job posting published by the Government of Canada for an *environmental enforcement officer with Environment and Climate Change Canada* [6]. These professionals often require specific training in the field of investigations and corporate pollution legislation. This is because they conduct investigations into alleged violations of environmental laws such as the Environmental Protection Act, Ontario Water Resources Act, Environmental Assessment Act, and more. They are also required to take statements from witnesses or accused persons, prepare, and execute search warrants, and prepare court briefs. Special equipment must also be carried by these

officers including a duty belt, body armor, handcuffs, baton, and prohibited weapons. Being physically fit is a requirement for this job. Other soft skills that these professionals should possess include effective communication and computer fluency [6].

Wildlife investigations are another important type of environmental forensics. The types of crimes examined by these officers include: wildlife poaching, animal trafficking, and illegal breeding or farming of wildlife [7]. This profession uses scientific procedures to examine, identify, and compare evidence from crime scenes, and link this evidence to a potential suspect. The investigations of these specific cases require a professional to conduct an unbiased examination, maintain a chain of custody, document/photograph scenes, and provide information necessary for law enforcement officials to make decisions about the case. These investigators are also responsible for submitting samples from a crime scene for further analysis at a lab [7].

In Ontario, specialized conservation officers commonly perform wildlife investigations. The *Government of Manitoba* had published a job posting for a *conservation officer* role in October of 2020 [8]. The duties of these officers are like those of a normal crime scene investigator; however, knowledge of environmental and wildlife legislation is a necessity. These officers must also be able to react properly in high-stress environments and have excellent interpersonal skills to aid them in dealing effectively with hostile people. This is because these officers often have to execute search warrants and investigate at locations such as a suspect's house. Some soft skills that this profession requires include problem-solving, independent working, initiative, communication, and leadership [8].

Water contamination forensics is becoming more common with the increase in contaminants that are present [9]. Testing of wastewater can determine the presence of bacteria, fungi, and even illicit drugs. This requires specific training and instrumentation experience because wastewater contaminants are often found at exceedingly small concentrations [10.]The presence of any uncommon material could be an indication of how many people in a population are sick or using illicit drugs. These tests can also help determine the efficiency of water treatment plants to ensure that drinking water is meeting proper sanitization requirements. Other analyses can also be completed for other crimes, such as the presence and source of an oil spill. Detection of this type of contamination also requires a special skill set. Knowledge of literature and legislation, as

well as experience with this type of case, would be necessary for an environmental forensic expert who is conducting the examination [11].

Water investigations are completed by a laboratory biologist or microbiologist. These professionals can collect samples and run specific tests to determine if contaminants are present. In October 2020, *EMSL Analytical Inc.* had also published a job posting for a *microbiology laboratory analyst* [12]. The role of an individual in this position includes the preparation and analysis of microbiological samples, including water, to test for bacteria and fungi. Other responsibilities include recording data according to the company's standard operating procedures and completing reports to send to clients. For students to be eligible for this job, they need to demonstrate multitasking, communication, attention to detail, independent working, ability to work independently and with a team, and computer skills. These skills are important as professionals in this career are constantly testing samples and drafting reports. If an individual hopes to work in water testing, they will also need microbiology lab experience and be able to work with complex instruments such as microscopes, analytical balances, and filtration devices [12].

## **Interview Findings**

As discovered through my four interviews (Appendix A 1-4), there are a variety of entry-level positions for students who are new graduates from Trent University. With the Ministry of the Environment, a new graduate is eligible to apply for a junior environmental officer, investigations officer, inspector, or a variety of administrative staff positions. Other entry-level positions include wildlife technician and forestry technician with the Ministry of Natural Resources. Within different municipalities, environmental forensic science careers such as water compliance technicians are also available. These positions generally require a college diploma. With that in mind,  $\frac{3}{4}$  interviewed professionals said that candidates with undergraduate degrees or higher are hired over those with a college education.

Communication was mentioned by all four environmental forensic professionals that were interviewed. This soft skill includes communication in writing reports, talking to the public, sharing information with shareholders, writing professional emails, and more. Other important soft skills that were mentioned by  $\frac{2}{4}$  of professionals include organization, networking, thinking outside the box, and teamwork. All of these skills are important as they directly relate to working

as a team to collect samples, analyze data, write reports, and draw conclusions from them. Other soft skills that were mentioned by ¼ professionals include asking questions, flexibility, respect, independent work, and time management. ¾ professionals also stated that they felt students were generally failing to include or properly display their soft skills.

This type of career requires a wide range of hard skills. The most common hard skills shared by ¾ employers were having a valid driver's license and experience writing reports. These are both crucial because this type of career often involves driving to different locations and compiling reports to support findings. Other common hard skill requirements include an understanding of collecting samples, analyzing data, environmental legislation, expert testimony, the ability to operate a boat, and evidence-gathering skills. These were mentioned by 2/4 of employers, meaning that the skills are still highly relevant to environmental forensic science careers. Some additional hard skills mentioned by ¼ professionals include knowledge of witness statements, AutoCAD, root-cause analysis, and computer skills.

Specialized knowledge in this specific career field includes wildlife identification, tree identification, understanding of firearms (PAL license), understanding of small motors, GPS data/navigation skills, understanding of complex writing (environmental protection act, water resources act, safe drinking water act, endangered species act), knowledge of fishing equipment, and the ability to analyze specific environmental samples.

### **Student Survey Results**

The students who participated in this survey were from a variety of different majors including forensic science, forensic chemistry, forensic biology, joint major with forensics, environmental and resource science, ecological restoration, conservation biology, sustainable agriculture, environmental chemistry, geography, water sciences, and joint-major with environmental science. The percentage breakdowns can be found in figure 1. Over 60 students participated in this survey.

Overall, 87% of students are confident in displaying their soft skills in a workplace setting, as seen in Figure 2. Students are most confident in their attention to detail, initiative, and teamwork, with no students answering 'never' in these soft skill categories. Working under pressure, communication, independent work, organization, and leadership were all ranked the same, with one student selecting 'never' in each category. 76% of students felt that they had been allowed to improve their soft skills at Trent.

As seen in figure 3, 74% of students are confident in their hard skills. The specific skill that students were least confident in was photography, with 10 students stating they would 'never' be confidently displaying this skill in a work environment. 3 students ranked statistical analysis as 'never' and 2 students ranked 'never' in the computer, data interpretation, and lab practice skill categories. Students were most prepared in their research methods and essay/report writing hard skills, with none of them selecting 'never.' 84% of students stated that they had been able to improve their hard skills at Trent University in courses or extra-curricular activities.

Specialized knowledge preparedness data can be seen in figure 4. 60% of students were not confident in this category overall. Over half of the students who completed the survey were not confident in their knowledge of environmental legislation, environmental surveying, species identifications, and search warrant executions. Students were slightly more confident in their ability to display sample comparisons, legal proceedings, investigative report writing, evidence collection, and investigative knowledge in a job setting. When asked if they were allowed to improve their specialized knowledge, 53% of students felt that they had.

Finally, overall preparedness can be found in figure 5. Students felt a wide variety of overall preparedness, anywhere from 1-80/100. There appears to be a bi-modal distribution of about 10/100 and 60/100. The mean of this data is 42/100, or 42%. 70% of students stated that courses they had taken at Trent contributed to their overall level of preparedness. These included FRSC 2030H- Wildlife DNA, ERST 3120H- Canadian Environmental Policy, ERSC 2240H- Ecological Assessment for Natural Resource Management, FRSC 4312H- Presentation of Forensic Evidence. 12% of students felt that extra-curricular activities such as the Forensic Science Society and the Society for Ecological Restoration had contributed to their overall level of preparedness.

The results of this study can also be broken down into two categories, students majoring in degrees offered by the School of the Environment (ENV students), and students in a core- or joint-major with Forensic Science (FRSC students). Both of these categories had results consistent with those of the overall soft and hard skill preparedness.

Majors such as environmental and resource science, ecological restoration, conservation biology, sustainable agriculture, environmental chemistry, geography, water sciences, and joint-major with environmental science made up 30% of the survey results. 82% of ENV students felt confident in their soft skills and 91% of students were confident in their hard skills.

64% of students felt confident in their species identifications, and 45% of ENV students were confident in their environmental surveying and environmental legislation. Other specialized knowledge includes knowledge of investigations where 18% of students were confident, evidence collection where 9% of ENV students felt confident, and report writing where 27% of students felt confident.

70% of students that completed the survey were majoring in Forensic Science, Forensic Chemistry, Forensic Biology, or a joint-major with Forensic Science. From the survey, FRSC students were 80% confident in their soft skills and 83% confident in the hard skills listed in the survey. In the specialized knowledge category, 84% of FRSC students were confident in their investigation and evidence collection. 66% of these students were also confident in their report writing skills, 50% of students were confident in species identifications, 28% confident in environmental surveying, and 37% confident in environmental legislation.

## **Discussion**

As seen in figure 5, students feel an overall average of 42% prepared for careers in environmental forensic science. In the context of the student survey, preparation meant to feel confident in the majority of the skills listed. These were laid out in the soft skill, hard skill, and specialized knowledge. Overall, 87%, 74% and 60% of students were confident in their soft skills, hard skills, and specialized knowledge, respectively. When broken down into students from the School of the Environment and Forensic Science Department, these results were fairly consistent. 82%, 91%, and 58% of ENV students were confident in their soft skills, hard skills, and specialized knowledge, respectively. 80%, 83%, and 61% of students were confident in soft skills, hard skills, and specialized knowledge, respectively.

More specifically, ENV students lacked specialized knowledge such as investigations, evidence collection, and legal proceedings. These students were however much more confident in their ability to complete species identifications, environmental sampling, and understand environmental legislation than the FRSC students. The FRSC students were much more confident in their ability to conduct investigations, collect evidence, and complete investigative reports than the ENV students. On the other hand, FRSC students did not feel readily able to demonstrate species identifications, environmental sampling techniques, or an understanding of environmental legislation. This shows a disconnect between these two disciplines and supports the hypothesis that Trent University does not fully prepare its students for potential careers in environmental forensic sciences.

## **Current Recommendations**

In this research, every student felt that there were gaps in their education that made them feel unprepared for this type of career. The first recommendation that can be made to students is to pick a major at Trent University that best suits their interests or career goals. Specifically for environmental forensic science careers, students could pick forensic science, forensic biology, conservation biology, ecological restoration, or many other degree options offered at the university. I recommend that students consider an Honors Bachelor of Science joint-major degree with Environmental & Resource Studies and Forensic Science. This may allow students to receive the proper courses and skills from both disciplines required for this type of profession.

Another way that students could prepare better for this type of career is by planning their degree in the first year of study. If a student is interested in this field of work when they start their undergraduate degree, they can ensure that courses are taken in their upper years that would give them the required knowledge. The reason that this need to begin at the start of the university degree is because prerequisites must be taken for the majority of third- and fourth-year courses. If a student can ensure that they are taking these required courses, they are more likely to have the opportunity to take specific courses in their upper years of study.

To gain or improve soft skills, I encourage students to join extracurricular activities. Some examples include clubs/groups at Trent- Trent Environmental and Geographical Society, Forensic Science Society Society for Ecological Restoration, and Biology Undergraduate Society (BUGS). Students can also gain soft skills by joining professional organizations outside of the university. Some ideas of organizations directly related to environmental forensics are The International Society of Environmental Forensics, ECO Canada, and the American Academy of Forensic Science. These organizations all have student discounts and positions available.

As previously mentioned, recruitment officials feel that students are not accurately displaying soft skills on their resumes. My final recommendation to students is to cater their resumes to specific job postings. This can be achieved by copying the exact skills that an employer is looking for and inserting them into a resume. From here, students should write a sentence showing how they may have displayed or improved the specific skill previously.

## **Limitations**

The small sample size of interviewed professionals is one limitation of this research. Four professionals are not the ideal number of individuals to speak to all facets of environmental forensics or provide a full picture of the requirements that a student needs. If given more time, interviewing more professionals would have been ideal. This would have allowed for more responses and different input from different types of environmental investigations.

Over 60 students participated in the survey, which is a significant sample size. It should however be noted that 70% of students who completed the survey were from the forensic science department, as seen in figure 1. They were either in forensic science, forensic chemistry, forensic biology, or a forensics joint major. The limitations of this part of the research arise from the lack of representation of students studying in the school environment. Ideally, 50% of students would

have been from each discipline, allowing for an equal sample number to be collected from both departments.

Bias could have potentially arisen from students when they were completing the survey. I believe that students are less likely to admit that they do not have a certain skill or knowledge base or under-estimate their abilities. To mitigate this, the surveys were completed anonymously to encourage students to be as open and honest as possible and answers such as 'I don't know' were available if students did not want to select yes/no.

### **Next Steps**

Trent University could help students feel more prepared for this type of career through the introduction of new courses. If more courses were available that were cross-listed between the Forensic Science Department and the School of the Environment, there would be more opportunities for students to explore interdisciplinary studies. Some examples of courses that I have thought of include Environmental Investigations, Environmental Forensics, and Wildlife Poaching Forensics. These courses would allow students in both disciplines to learn transferable skills from the other and bridge the current gaps between departments.

On top of introducing new courses, Trent University could reduce boundaries to interdisciplinary studies. By removing or changing prerequisites for some courses in which transferable skills exist, it would be easier for students to explore courses offered by the department that they are not majoring. For example, if a student in environmental science wanted to take Criminal Code, they currently cannot due to the prerequisites of FRSC 1011-Introduction to Canadian Justice for Criminal Code. This student may still have an understanding of law through environmental legislation courses, so they likely have transferable skills that would allow them to succeed in the criminal code course. Another example of this could arise if a forensic science student wanted to take FRSC-CAST-ERST-POST 3120H: Canadian Environmental Policy, they would need to complete 1.0 ERST, CAST, POST, and/or ADMN credit at the 2000 level or beyond. This forensic student likely has an understanding of criminal law through their forensic courses, allowing them to be successful in this environmental policy course. If these boundaries could be reduced, even on a case-by-case basis, interdisciplinary studies would be much easier for students who are interested in environmental forensic science careers.

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Laboratory%20Analyst%20-%20Microbiology.pdf

## **Appendix A: Interview Transcripts**

### **Interviewee 1- Municipal Stormwater Operations**

February 2, 2023, 10am

#### **1. What are the specific positions that undergraduate students would be eligible to apply for at your organization?**

- There's a position titled regular compliance technician, and that's sort of our entry level position. It requires a 2 year diploma in environmental science to get into the position with.
- So hoping that students had some experience in the environmental field. And it's really designed for someone coming out of school into the position.
- Collecting water samples, taking GPS data point locations doing inspections on stormwater infrastructure as the core duties of the job

#### **2. What are the necessary skills that an individual has to possess in order to be considered for these positions?**

##### **a. Soft Skills**

- Being able to answer telephone call and appropriately seek out the information that you're requiring (communication)
- Networking
- Organization
- Written communication
- Thinking outside the box with innovative ideas and solutions
- Asking questions
- Flexibility

##### **b. Hard Skills**

- Using the GPS data
- Collecting samples
- Experience with a drone flying
- Experience with autocad
- Analysis decisions

**c. Knowledgebase**

- Understanding of the environmental analysis component

**3. What is the most common/a few of the most common undergraduate degrees that students apply for careers in your field with?**

- That's the edges given where I see the combination of having a 3 or 4 year year University degree coupled with a college department, and and so at being able to to prove that you you're certified in in the sampling techniques through a college as well as further understanding of the the background.
- I'm seeing environmental technician or environmental technology as the college programs.
- But the main one is the environmental technology and technician program
- I've seen a 4 year honors degree environmental resource studies, environmental science, straight environmental studies

**4. Is there one piece of advice you would give to someone hoping to enter this field of work?**

- I would say, take us, take a step back, take a take a look at where you want to be in 15 to 20 years and make sure it's the right path. Because quite often times, once you start down a path in the environmental field, the environmental field stick, step back the environmental field. But once you start down one path, that's it, and quite typically you're gonna follow that path until you get to a point where you're comfortable or you're looking for more. But there's going to be a turning point in your career and if if you're looking for continual advancement, and so you have to be comfortable and thinking about that from the get go on.

## **Interviewees 2 and 3- Provincial Environmental Forensic Services and Intelligence Section**

February 23, 2023, 2:00pm

### **1. What are the specific positions that undergraduate students would be eligible to apply for at your organization?**

- Compliance enforcement
  - Junior Environmental Officer
  - Investigations Officer
  - Inspector
- Support staff
  - Project manager
  - Administrative staff

### **2. What are the necessary skills that an individual has to possess in order to be considered for these positions?**

#### **a. Soft Skills**

- Communication
  - Verbal and written (reports, email, etc.)
- Ability to explain scientific concepts in layperson language
- Problem solving
- Critical thinking
- Research and analytical skills
- Organization
- Time management
- Teamwork

#### **b. Hard Skills**

- Water chemistry
- Root cause analysis
- Industrial processes
- Environmental knowledge (impacts, etc.)
- Credible (education and training to support your expertise)
- Understanding policies and procedures

- Knowledge of judicial process (search warrants, case law, etc.)
- Taking witness statements
- Gathering evidence
  - Environmental sampling
- Compiling crown brief reports
- Expert evidence testimony

**c. Knowledgebase**

- Ability to understand legislation and complex writing
- Knowledge of environmental acts and regulations
  - Environmental protection act
  - Water resources act
  - Safe drinking water act
  - Endangered species act
- Computer skills (produce reports, graphs, visuals, etc.)
- Valid G drivers license

**3. What is the most common/a few of the most common undergraduate degrees that students apply for careers in your field with?**

Bachelor of science (physical science or environmental science)

Some master's of science and a few PhD of science

**OR**

On a case-to-case basis potentially a combination of education and work experience

**4. Do you find that students who have recently graduated from their undergraduate degrees possess these required skills?**

- Generally new hires are provided with proper training (shadowing, etc) to address potential gaps in skill sets or allow for personal growth in areas that an individual is showing interest

**5. Are there any education or skills that you feel applicants are generally lacking?**

- Written communication (formal, clear and concise emails)

- Speaking up in meetings (verbal communication)
- Ask questions of peers
- Time management (work needs to be done on time)
- Building confidence in a new workplace and career
- Take initiative

**6. Is there one piece of advice you would give to someone hoping to enter this field of work?**

- Don't be afraid of entry-level positions, you will move around quickly and go to the next step.
- Build your network and get to know what positions are available through talking with professionals in the field
- Attend environmental conferences/webinars offered by schools, conservations authorities, professional associations, government municipalities
- Gain experience with the government organizations through student summer positions or research

## Interviewee 4- Provincial Conservation Authority

February 24, 2023, 4:30pm

**1. What are the specific positions that undergraduate students would be eligible to apply for at your organization?**

- Technician positions (wildlife and forestry)

**2. What are the necessary skills that an individual has to possess in order to be considered for these positions?**

**a. Soft Skills**

- Reputation and ability to communicate with the public
  - Answer questions and interview people who might not want to talk with you
- Deal with nasty people maturely

**b. Hard Skills**

- Able to trek through the bush
- How to conduct yourself (navigation)

**c. Knowledgebase**

- Driver's license
- Comfortable flying and operating watercraft
- Wildlife knowledge

**3. What is the most common/a few of the most common undergraduate degrees that students apply for careers in your field with?**

College diploma (natural resources, wildlife/forestry technician)

University degrees (biology, conservation, etc.)

**4. Is there one piece of advice you would give to someone hoping to enter this field of work?**

“If you want it bad enough, you can get it”

- You have got to want the career bad enough come ‘hell or high water’ in order to achieve your goals

## **Interviewee 5- Provincial Conservation Authority**

February 27, 2023, 7:00pm

### **1. What are the necessary skills that an individual has to possess in order to be considered for these positions?**

#### **a. Soft Skills**

- Respectful to other workers
- Independent work
- Teamwork
- Organizations

#### **b. Hard Skills**

- Write a politically acute email

#### **c. Knowledgebase**

- Operate electric fishing equipment
- Boat certifications
- PAL, so your acquisition license to use a firearm
- Managing small motors
- Hook up a trailer to a hitch

### **2. Is there one piece of advice you would give to someone hoping to enter this field of work?**

First, don't do it for the money. There was a lot of other industries where much more lucrative. Don't stop trying. Keep your doors open. The more we own you are to move around where feasible do that, and just don't be discouraged. If you're not gaining the jobs right away, it does take time and it will come, and it's rewarding.

## **Appendix B: Student Survey Template**

Thank you for your interest in being surveyed as part of this TCRC Research Project! This project focuses on researching the preparedness of undergraduate students for careers in environmental forensic sciences.

In this project, environmental forensic science can be defined as the 'application of science to environmental law.' Throughout this survey, questions will be asked about the type of skills, training, and knowledge you have gained while attending Trent. You will also be asked to answer questions regarding your personal preparedness displaying these types of skills. The purpose of this research is to determine students' preparedness by displaying hiring trends alongside generalized student confidence in particular skills. Your name and other identifying information will not be collected in order to ensure confidentiality for participants.

This project has been approved by the Trent University Departmental Ethics Review Board, File #28295. This survey involves a series of multiple choice questions that will take approximately 5 minutes. We do not anticipate any risks associated with your participation. No incentive or compensation is available to volunteers who participate in this survey. There will be no commercialization of the research findings.

Ethical procedures for academic research undertaken from Trent University require that survey volunteers explicitly agree to being surveyed and how the information contained in their survey will be used. In order to ensure that you understand the purpose of your involvement and that you agree to the conditions of your participation, please read the following conditions:

- Identifying information will not be provided, however information about your program and year of study will be
- The results from this survey will be analyzed by the research investigator
- Access to the survey results will be limited to McKenna Campbell, the Trent University Forensic Science Department, and The Trent Community Research Center in order to ensure confidentiality
- The data collected will be destroyed on May 1, 2023
- Any variation of the conditions above will only occur with your explicit approval.

The information you provide in your survey may be used to determine trends within surveyed participants. None of the specific answers you give in this survey will be used. The interpretations of group data may be used in:

- Academic papers and research reports
- Presentations by the research investigator
- Publications in the Arthur Newspaper

By selecting yes, you agree to the terms and conditions listed above.

- a) Yes
- b) Other

Thank you for agreeing to participate in this survey. Your consent may be withdrawn at any time by closing the browser window or you may skip questions. If the survey has been completed, you may contact the primary researcher, McKenna Campbell, at [mckennacampbell@trentu.ca](mailto:mckennacampbell@trentu.ca), if you wish to withdraw your answers.

Other questions may be directed to the Trent Community Research Centre Coordinator, Brittany Finnigan, at [brittanyfinigan@trentu.ca](mailto:brittanyfinigan@trentu.ca), the department advisor, Dr. Joel Cahn, at [joelcahn@trentu.ca](mailto:joelcahn@trentu.ca), or the Research Conduct and Reporting Coordinator, Jamie Muckle, at 705-748-1011 ext. 7896 or [jmuckle@trentu.ca](mailto:jmuckle@trentu.ca).

Thank you again.

What is your current year of study?

- a) Third Year (10+ Credits Complete)
- b) Fourth Year (15+ Credits Complete)
- c) Other: \_\_\_\_\_

Are you graduating this year (Spring 2023)?

What is your program at Trent University?

- a) Forensic Science
- b) Forensic Biology
- c) Forensic Chemistry
- d) Joint-Major Forensic Science

- e) Environmental & Resource Science/Studies
- f) Joint-Major Environmental & Resource Science/Studies
- g) Ecological Restoration
- h) Conservation Biology
- i) Other: \_\_\_\_\_

**Skills ranking**

I rank the skills I have developed while attending Trent University in order (1 being the most developed and 4 being the least developed). This can be done by clicking and dragging the options into the desired order.

1. Soft Skills (leadership, organization, communication)
2. Hard Skills (laboratory procedures, research methods, etc)
3. Environmental Knowledge (species identifications, pollution types, water sampling)
4. Forensic Knowledge (evidence collection, legislative understanding, report writing)

**Soft Skills**

I am confident in my ability to demonstrate my knowledge about the following:

Skill	Always	Sometimes	Never
Leadership	●	●	●
Organization	●	●	●
Independent Work	●	●	●
Teamwork	●	●	●
Initiative	●	●	●
Attention to Detail	●	●	●
Communication	●	●	●
Working Under Pressure	●	●	●

I feel that I have been given opportunities to develop or improve my soft skills (listed above) through courses and extracurricular activities at Trent University.

- a) Yes
- b) No
- c) Undecided

Please feel free to elaborate about your answer(s) here: \_\_\_\_\_

**Hard Skills**

I am confident in my ability to demonstrate my knowledge about the following:

Skill	Always	Sometimes	Never
Lab Practices	●	●	●
Data Interpretation	●	●	●
Statistical Analysis	●	●	●
Essay and Report Writing	●	●	●
Research Methods	●	●	●
Computer Skills	●	●	●
Photography	●	●	●

I feel that I have been given opportunities to develop or improve my hard skills (listed above) through courses and extracurricular activities at Trent University.

- a) Yes
- b) No
- c) Undecided

Please feel free to elaborate about your answer(s) here: \_\_\_\_\_

**Specialized Knowledge**

I am confident in my ability to demonstrate my knowledge about the following:

Skill	Always	Sometimes	Never
Investigations	•	•	•
Evidence Collection	•	•	•
Investigative Report Writing	•	•	•
Legal Proceedings	•	•	•
Search Warrant Executions	•	•	•
Species Identifications	•	•	•
Environmental Surveying	•	•	•
Sample Comparisons	•	•	•
Environmental Legislation	•	•	•

I feel that I have been given opportunities to develop or improve my specialized knowledge (listed above) through courses and extracurricular activities at Trent University.

- a) Yes
- b) No
- c) Undecided

Please feel free to elaborate about your answer(s) here: \_\_\_\_\_

Would you say that you feel prepared for a career in the environmental forensic science field? (0 being very unprepared, 100 being very prepared): \_\_\_\_\_

Have you taken any courses at Trent that you believe have helped prepare you for a potential career in environmental forensic science? This can include courses in which you have learned about one or more of the following: environmental sampling, native species identification, data collection, investigations, legislation, evidence collection, and more.

- a) Yes

- b) No
- c) Undecided

Have you participated in any extra-curricular activities at Trent that you believe have prepared you for a potential career in environmental forensic science? This can include clubs, groups, events, and more.

- a) Yes
- b) No
- c) Undecided

If you answered yes to either question above, which course(s) or extra-curricular(s): \_\_\_\_\_

### Student Survey Results

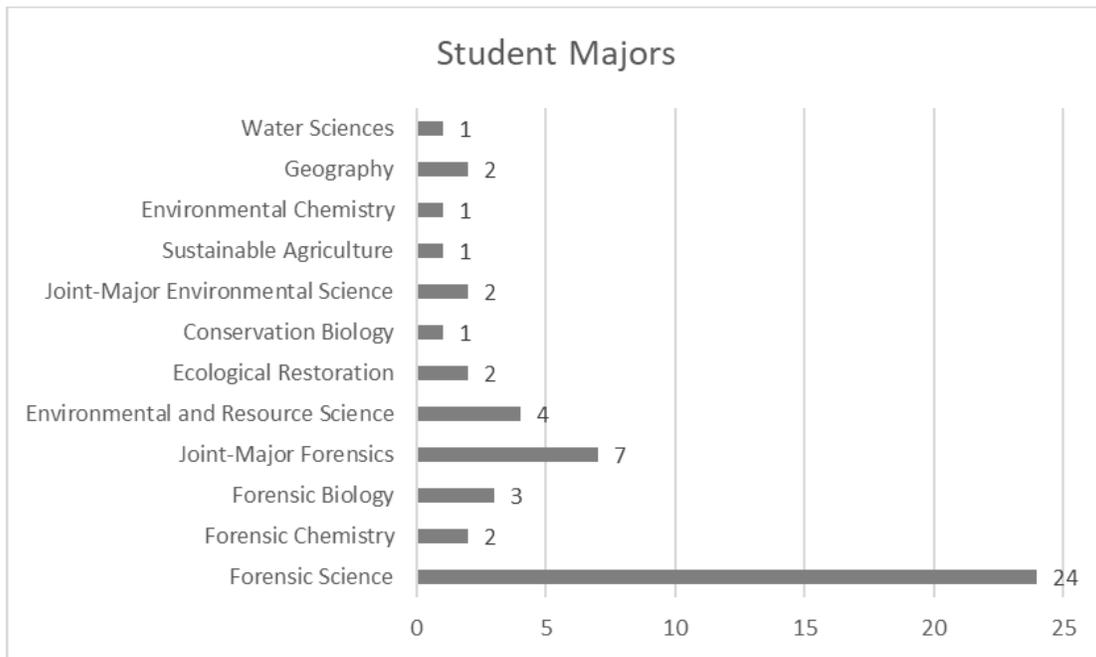


Figure 1: Degree majors of students who completed the anonymous survey, taken from Qualtrics on March 21, 2023. 70% of students who completed the survey were in forensics.

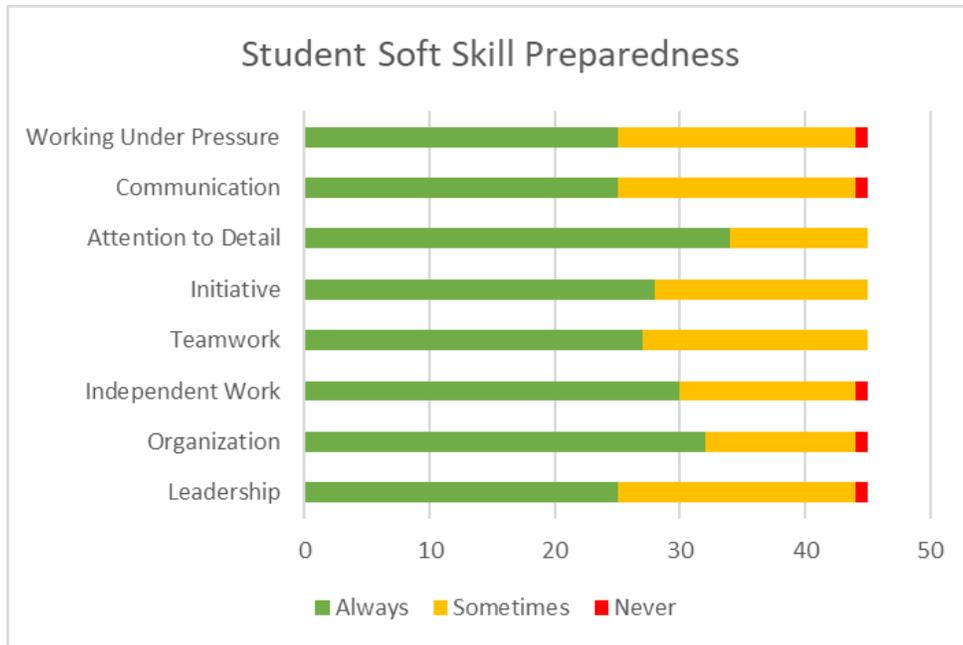


Figure 2: Soft skill student preparedness, taken from Qualtrics on March 21, 2023. 83% of students are confident in their soft skills.

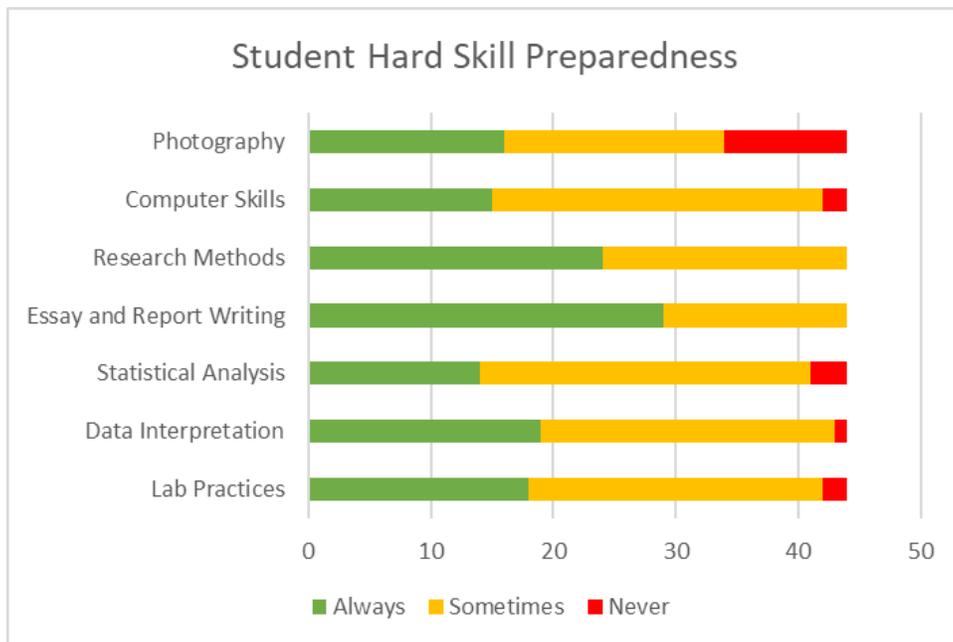


Figure 3: Hard skill student preparedness, taken from Qualtrics on March 21, 2023. 77% of students are confident in their hard skills.

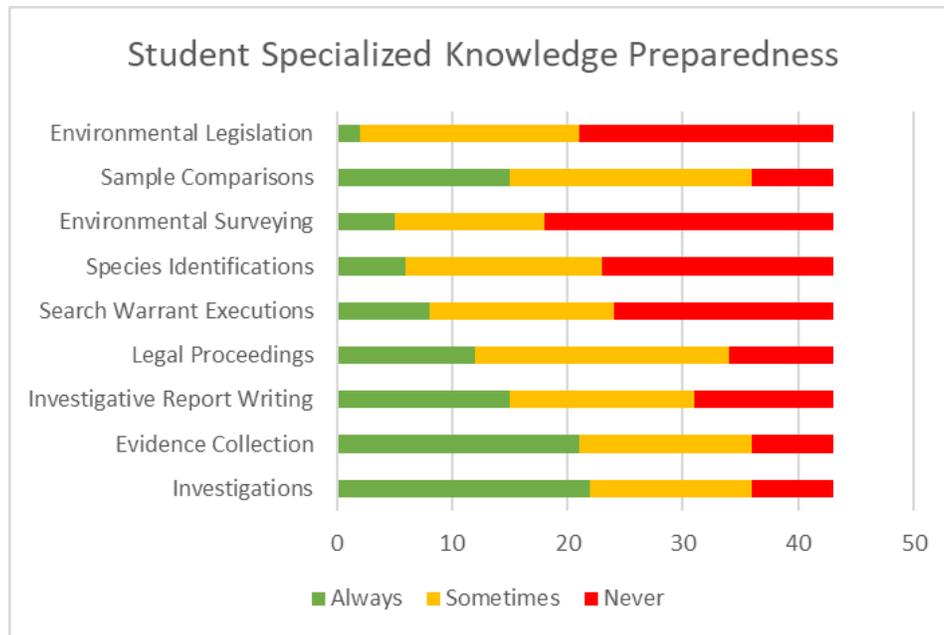


Figure 4: Specialized knowledge student preparedness, taken from Qualtrics on March 21, 2023. 60% of students are confident in their specialized knowledge.

Table 1: Student answers to the question “I feel that I have been given opportunities to develop or improve my \_\_\_\_\_ (soft skills, hard skills, or specialized knowledge) through courses and extracurricular activities at Trent University.” Recorded from Qualtrics on March 21, 2023.

	<b>Yes</b>	<b>No</b>	<b>Undecided</b>
<b>Soft Skills</b>	76%	7%	17%
<b>Hard Skills</b>	84%	8%	8%
<b>Specialized Knowledge</b>	53%	19%	28%

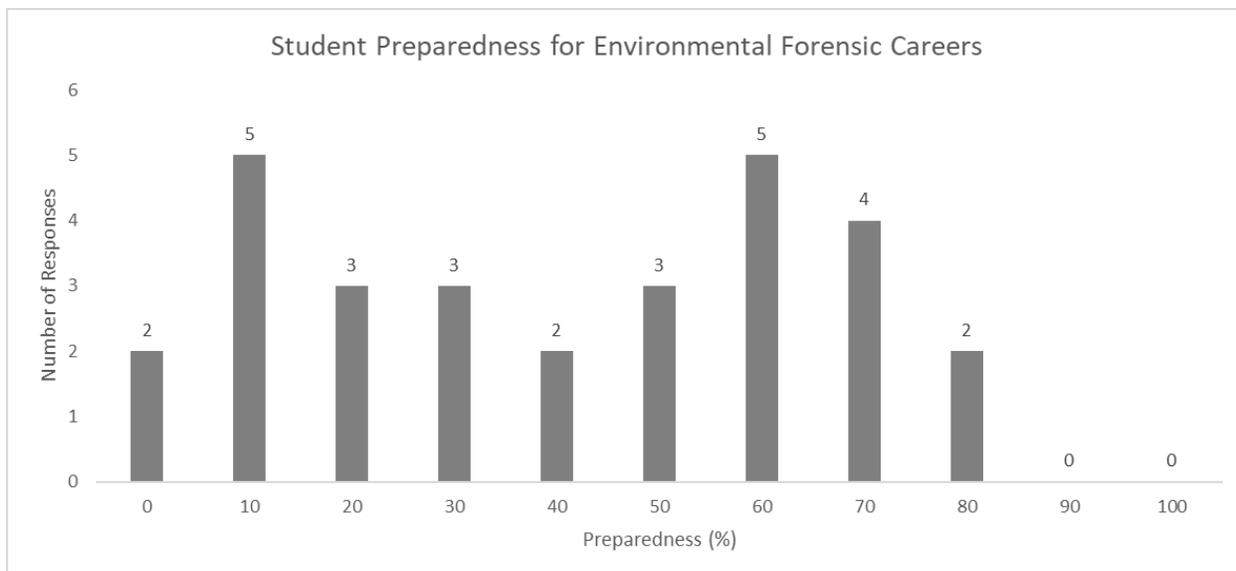


Figure 5: Student preparedness for careers in environmental forensic science, taken from Qualtrics on March 21, 2023. The average student preparedness is 42/100.

Table 2: Student answers to the question “Have you participated in any \_\_\_\_\_ (courses or extra-curricular activities) at Trent that you believe have prepared you for a potential career in environmental forensic science?” Recorded from Qualtrics on March 21, 2023.

	<b>Yes</b>	<b>No</b>	<b>Undecided</b>
<b>Courses</b>	70%	15%	15%
<b>Extra-Curricular</b>	12%	80%	8%

## Appendix C: Arthur Newspaper Articles

### Arthur x TCRC: Student Preparedness for Environmental Forensic Science Careers

Are students actually prepared for their dream careers after graduation? This is a question that I am sure all students ask themselves. As someone who hopes to enter the field of environmental forensic sciences, I often wonder how well my degree at Trent University will prepare me for my future.

Over the last ten years, environmental awareness has increased significantly. Our society is more conscious of our environmental footprint - from the amount of pollution that our cars emit into the atmosphere to the material of the reusable straws that we carry. In addition, stronger laws limiting the amount of pollution that can be dumped into the environment are being created. We are also more aware that water conservation and wildlife protection should be prioritized to protect these valuable resources. As with any law, no matter how they are enforced, there will always be those who do not follow them. This is where environmental forensic science comes into play.

Environmental forensic science is known as the application of science to environmental law. These laws are put in place to protect the atmosphere, wildlife, water, and other natural resources. The enforcement of these laws requires trained professionals, especially with the prioritization of environmental protection.

Two of Trent University's largest faculties are Environmental Science and Forensic Science. These departments are quite divided, with little to no overlap or cross-listed courses that students can take. Knowledge of both forensic and environmental science is necessary for students who plan to start a career under the environmental forensic science umbrella. This separation in science departments at Trent leads me to wonder if students, like me, are being adequately prepared for this type of career at the undergraduate level.

For my ongoing research project with *Arthur* and the Trent Community Research Centre, I will be researching if Trent University effectively prepares its students for careers in environmental forensic science. I plan to teach students more about environmental forensic careers that are available to them. I will then assess the current degree options and courses

offered at Trent to determine which classes are best-preparing students for this type of career. Finally, I will provide insight to how prepared students feel for a career near the end of their undergraduate degree through a student survey.

In my research, two main questions will be researched and answered:

1. What are the skill and knowledge requirements of a student who hopes to be successful in their careers? I will address this question by reading job postings and interviewing individuals who work in environmental forensic careers.
2. Does Trent University prepare its students for potential careers in environmental forensic science? This question will be answered by interviewing professors and surveying environmental and forensic science students.

To start this research, I analyzed job postings for a pollution enforcement agent, conservation officer, and water (laboratory) analyst. For each listing, I noted key skills such as communication, leadership, understanding of criminal law, and knowledge about environmental policies. Ideally, these are skills that students should have when they apply for jobs under the environmental forensic science umbrella. All three of these postings require a bachelor's degree.

Environmental pollution officers measure the amount of pollution that is dumped by an organization in order to determine if they are within the legal limits. The Government of Canada had posted a job advertisement for an environmental enforcement officer with their Environment and Climate Change Canada department. This job requires “Knowledge of inspection and investigation techniques and procedures, understanding of collecting and/or interpreting evidence, and analyzing environmental evidence.” Other required skills include effective communication and computer skills.

In Ontario, specialized officers also perform wildlife investigations. Conservation officers are the people who examine cases involving poaching, animal trade, and wildlife trapping crimes. In a job posting for a conservation officer a successful candidate will need to have “knowledge of legislation, experience in law enforcement and legislative compliance applicable to natural resources, management skills in high-stress situations and have effective communication skills.” Some other job requirements include problem-solving, independent working, and leadership.

The third career of interest for my research is water investigations. These are done by lab biologists who need to be able to collect water samples and run tests in order to determine if pollution or other contaminants are present in the water. EMSL Analytical Incorporated, a company that specializes in environmental testing, including water microbiology analysis had posted a job for a microbiologist. Applicants need to exhibit “a variety of laboratory equipment proficiencies, the ability to record data and complete reports to send to clients, and environmental biology knowledge.” These candidates also need to demonstrate multitasking, communication, attention to detail, as well as computer skills.

It can be concluded that there is significant overlap between these three environmental forensic science careers. This includes forensic knowledge of investigations and interviews, as well as environmental law, and environmental data collection methods. On top of this, strong candidates must exhibit communication, leadership, and computer skills. Based on my research thus far, I do not believe that Trent University prepares its students for these careers. From what I have experienced, this lack of preparedness occurs because of a disconnect and lack of freedom within the Environmental Science and Forensic Science Programs themselves. The Trent University Environmental Science/Studies webpage states that the program prepares students for environmental protection officer and environmental policy advisor careers. The Forensic Science webpage states that it can prepare students for careers with the Ministry of Natural Resources. As a student who is finishing a forensics degree myself, there is very little room for environmental electives in order to receive any type of environmental education.

This is a year-long project in which I will continue to follow my research questions and determine if Trent prepares students for potential careers in environmental forensic sciences. As this is my first article in my three-part series, further publications will focus on interviews with professionals from pollution enforcement, wildlife conservation, and water testing professions, as well as professor interviews and student survey results.

## **So You Think You Want an Environmental Forensic Science Career**

Environmental forensic science, what the heck is that? Let's rewind...

In November I published an article titled “Arthur x TCRC: Student Preparedness for Environmental Forensic Science Careers.” In that article, I defined Environmental forensic science as the application of science to environmental law. Environmental law encompasses the policies related to the atmosphere, wildlife, water, and other natural resources. The enforcement of these laws requires trained professionals, especially with the prioritization of environmental protection. In my previous publication, I analyzed job postings for a pollution enforcement agent, conservation officer, and water (laboratory) analyst. This was done to help answer my first research question; what are the skill and knowledge requirements of a student who hopes to be successful in their careers?

Since then, I have had the opportunity to speak with professionals in environmental forensic careers, I can tell you that I have the ‘tea.’ I was provided with such great answers to my interview questions. For the majority of careers in this field, a college diploma is required, but the hiring trends seem to be suggesting that individuals with an undergraduate degree are the ones getting hired. Some specific skills that employers are looking for that might not be listed on a job posting include drone flying abilities, geographic information system (GIS) experience, an understanding of data analysis, investigative report writing skills, and legislative proceedings. Many of these skills are attainable in courses offered at Trent including Environmental Law and Regulation (ERST-FRSC 4250H) and Species-at-Risk Biology and Policy (BIOL-FRSC 4510H). Other ways to further-develop hard skills such as those listed above include completing a thesis, community-based research project, or field courses.

Not only are employers looking for these hard skills in successful candidates, they are also looking for specific soft skills. Some of the recurring skills include written communication, understanding the role and organization you’re applying for, thinking outside of the box, problem solving, and oral communication, specifically over the phone. These may seem obvious to some however, it is not as easy as taking a course and learning the content through labs. If they can't be taught in a classroom, how can these soft skills be developed? One way to meet students with similar interests and improve or develop these necessary skills is to join a club or group. At Trent University, clubs often welcome general members, which means students can attend a few events and add their involvement to your co-curricular record. Some great examples of groups on campus include;

- Trent Environmental and Geographical Society

- Forensic Science Society
- Society for Ecological Restoration
- Biology Undergraduate Society (BUGS)

Another great way to get involved and begin to expand your network is by becoming a member of a professional organization. These memberships generally allow you to attend conferences or seminars, network with professionals in the field, and are a great addition to your resume. Most professional affiliations will also publish journals or articles, allowing you to explore new research in the field. Some examples of organizations that students who are interested in environmental forensics include The International Society of Environmental Forensics, ECO Canada, and the American Academy of Forensic Science.

The International Society of Environmental Forensics is a group that aims to regularly provide workshops, and training on subject matter encompassing all aspects of contamination within the environmental media of air, water, soil, and biota. They publish the peer-reviewed journal known as *Environmental Forensics* with yearly releases. For \$50.00 US, students can register for a one year membership, giving them access to the electronic journal and discounts on their workshops and training events.

Another membership that students are able to obtain is the Eco Canada Environmental Professionals in-training (EPt) Designation. This organization strives to provide career development in the environmental workforce, from educational development and accreditation, to professional designation and soft skill training. \$130 CAD allows students to register and become a member for one year. This membership includes enrollment in the mentorship program, access to over 60 online workshops, and the EP designation upon graduation.

For someone who is interested in wildlife forensics or the investigative side of environmental forensics, the American Academy of Forensic Science could be a great organization for you to join! Registration is just \$25 CAD and includes subscription to the Journal of Forensic Science, mentorship program, continuing education credits and courses, ability to apply for grants, scholarships, and awards. The American Academy of Forensic Science aims to promote professionalism, integrity, competency, education, foster research, improve practice, and encourage collaboration in the forensic sciences.

In the final part of my research, I am seeking third and fourth year environmental or forensic students to complete a survey. As these are the two programs most closely-related to

environmental forensic science, I hope to determine how prepared students from various disciplines feel for potential careers in this field. The results of the survey will ultimately help me determine the main research question for my project; does Trent University prepare its students for potential careers in environmental forensic science? The anonymous survey can be accessed by scanning the QR code. I can't wait to hear your input and share the results with you next month, and at the Celebration of Community-Based Research on March 22nd from 9 am -12 pm!

### **You're Interested in Environmental Forensics, What's Next?**

If you've been keeping up with this series, surely you know what I mean when I talk about environmental forensic science. If not, feel free to check out my previous publications ["Arthur x TCRC: Student Preparedness for Environmental Forensic Science Careers"](#) and ["So You Think You Want an Environmental Forensic Science Career."](#) For those just joining, this is

my final publication for my community-based research project where I aimed to determine if Trent prepares its students for environmental forensic science careers. Environmental forensic science can be defined as the application of science to environmental law. Careers under this umbrella include conservation officer, environmental (pollution) officer, microbiology (water) analyst, and so many more.

Throughout my research project, I have been fortunate enough to speak with professionals in the field and compare their interview results to job postings for similar jobs. This gave me a good understanding of the skills, knowledge, and qualifications that employers are looking for. Recruitment officials look for candidates who demonstrate strong communication, teamwork, problem-solving, and computer skills. On top of this, they also search for candidates who understand environmental policies, environmental sampling, investigation techniques, and evidence collection methods. With such a variety of expectations from employers, are students actually prepared for this type of career when they graduate?

To be blunt, I believe that Trent does not fully prepare students for careers in environmental forensic science. The forensic department and school of the environment do provide courses in which students can learn some of the required skills or knowledge for this type of career. However, there is a large disconnect between the two departments with few cross-listed courses, making it difficult for students to be fully prepared upon graduation.

Last month, an anonymous survey was made available for upper-year students in environmental and forensic courses. I was fortunate to receive over sixty responses! The results of this survey are consistent with my hypothesis that there are gaps in preparedness that need to be addressed. When reviewing the results of the hard and soft skill preparedness, I was pleasantly surprised. 83% of students felt confident in their soft skills and 77% of students' hard skills were well-prepared. Some of the skills listed under soft skills included communication, independent work, teamwork, organization, and attention to detail. Hard skills included general laboratory practices, computer skills, statistical analyses, and data interpretation.

Although I was pleased to know that students felt their hard and soft skills had been refined while at Trent, specialized knowledge was also a component of this survey. This included investigative processes, evidence collection techniques, investigative report writing, legal proceedings, species identifications, environmental surveying, sample comparisons, and environmental legislation. Over 40% of students were not confident or felt unsure that they

would be able to demonstrate specialized knowledge in a job setting. When given the opportunity to elaborate, many students stated that they were confident in some of the specialized knowledge, but not all. This gap is likely due to the disconnect between forensic and environmental disciplines at Trent.

One of the final questions in the survey was ‘Would you say that you feel prepared for a career in the environmental forensic science field? (0 being very unprepared, 100 being very prepared).’ The students' results ranged anywhere from 0-80. Although a wide range, the average preparedness that students felt was 42%, meaning that the majority of students felt less than half prepared for this type of career. This makes it obvious that current and future students who choose to study at Trent University may struggle with a career or future being an environmental forensics scientist without proper preparation and planning.

Students can better prepare themselves by doing a number of things at Trent University. Preparedness begins with selecting a degree that is right for you. This could be ecological restoration, conservation biology, forensic science, or even a joint major with environment and resource science and forensics. This choice is not only important when high-school students apply to universities, but also while attending university as many students switch majors throughout their undergraduate degree. After a student has picked the degree that is right for them, they should initially seek help from Academic Advising. These advisors will ask about a student's goals and courses that may interest them in the future. From these ideas, students are able to work backward and plan to take required courses, allowing them to choose electives in their final years. Some courses that students found prepared them for this type of career that are currently offered at Trent include: FRSC 3111: Wildlife DNA Forensics, ERST-FRSC 3250H: Introduction to Environmental Law, BIOL-FRSC 4570: Biocrime and Bioterrorism, ERST-GEOG 4140H: Climate and Energy Policy, ERST-FRSC 4250H: Environmental Law and Regulation, BIOL-FRSC 4510: Species at Risk Biology and Policy, and FRSC 4312H: Presentation of Forensic Evidence.

If courses such as those listed above exist, why do students generally feel less than half prepared for this type of career? The answer is simple, there is a significant disconnect between the school of the environment and forensic science. This is shown by the barriers to interdisciplinary studies where transferable skills from one department to the next exist. An

example of this can be seen when looking at the prerequisites for biocrime and bioterrorism where students are required to have forensic science prerequisites. As someone who has taken the class myself, I believe that there are many transferable skills that a student studying in the school of environment would possess that would allow them to be successful in this course. By reducing pre-requisite courses or providing students with opportunities to utilize transferable skills, I believe that students would generally feel more prepared for environmental forensic careers. Trent could also introduce new cross-listed courses between these two disciplines. Some ideas of classes not currently available that I think would benefit students include environmental forensics, environmental investigations, and wildlife poaching forensics. These potential cross-listings between the forensic department and school of the environment would give students more opportunities to explore interdisciplinary studies at Trent University.