Problem-Oriented Wildlife Protection

A.M. Lemieux & R.S.A. Pickles

2020

Center for Problem-Oriented Policing

nscr Netherlands Institute for the Study of Crime and Law Enforcement

PANTHERA

Problem-Oriented Wildlife Protection

About this guide

As an officer for a national wildlife authority, you may experience déjà vu. You arrest poacher after poacher but the poaching threat in your park is not decreasing. You get called out to deal with crop raiding animals, but despite culling and translocation, each year there are more callouts. You are probably not alone in thinking 'if we had more patrol teams…or faster response vehicles…or more money for operations, we could solve our problems'. Instead you have a restricted budget and the public expect you to deal with a broad range of wildlife problems, some of which use a lot of time and resources but do not seem to change.

What's more, you're probably aware many wildlife protection problems are getting worse. Poaching and trafficking of wildlife for pets, food, ornaments or medicine is increasing across the world. There's also more conflict between wildlife and people as they compete with one another for land and resources. Many of the problems you'll be asked to solve are complex and you might find your organization's traditional approaches need updating.

Problem-oriented policing is a proven way to reduce crime and disorder by removing opportunities and drivers that cause a specific problem.

It's time to try something new. Problem-oriented policing was developed to help police officers find ways of reducing crime without substantial additional resources. A problem-oriented approach (a) supports ground-up initiatives addressing the context of a specific problem, (b) encourages innovative solutions beyond the criminal justice system, and (c) promotes collaboration within and beyond your agency. We think this approach has a lot to offer wildlife authorities and can be integrated with ongoing conservation strategies.

There is a wealth of guides, case studies, and learning resources available at the Center for Problem-Oriented Policing on how to make problem-oriented policing work. Much of this will immediately feel familiar to you, but although police officers and wildlife officers share many similarities, there are important differences. Some things could use a bit of 'greening', or translating for the conservation context. This guide explains how the ideas and principles of POP can be adapted to wildlife protection problems and explains how your organization could start a problem-oriented project of its own.

Problem-Oriented Wildlife Protection

A.M. Lemieux and R.S.A. Pickles

Table of Contents

Part 1: What is a problem-oriented approach to crime reduction?

Protecting wildlife and wilderness from harm is complex and challenging. This is especially true when considering the needs of people and communities benefiting from wildlife as a commodity. Conservation has been described as a combination of 'wicked problems'[1] that are difficult to solve because there is not necessarily a single cause or solution and these issues are related to other wicked problems like climate change.

Within conservation, wildlife crime is a broad term encompassing many different types of behavior violating national and international species protections. Much of this concerns the illegal trade in wildlife but also includes behaviors such as persecuting protected species perceived as pests and illegal forest clearance. Given the diverse nature of wildlife crime, and its link to other issues such as poverty, food security and human-wildlife conflict, solving this problem is no easy task.
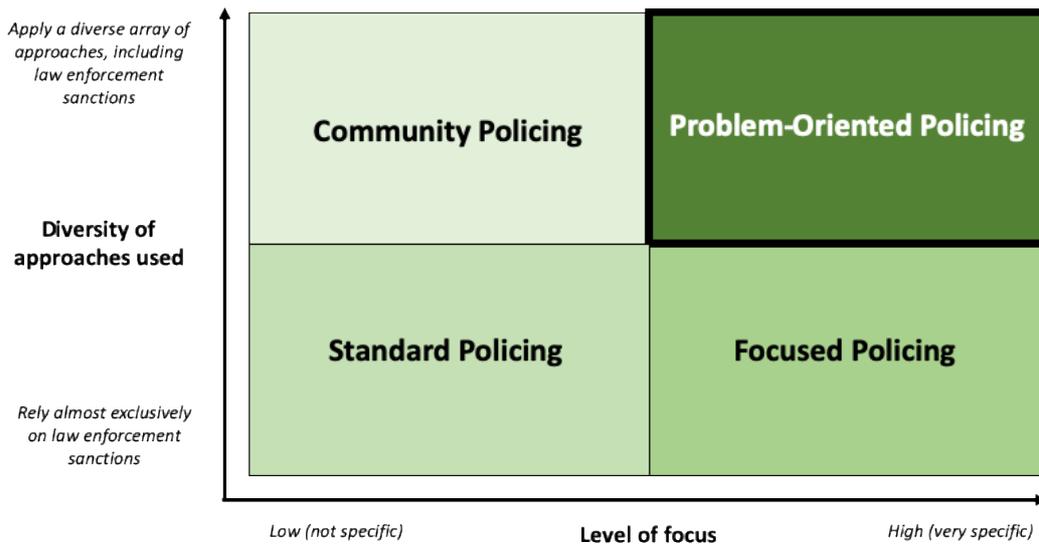
In Part 1 of this guide, we provide an overview of problem-oriented policing (POP). POP helps policing agencies structure their approach to tackling complicated issues by breaking them into smaller, more manageable pieces. Wildlife officers and police officers share many similarities in how they work, but also some fundamental differences. Here we show how the ideas of POP, with its track record of success, make it an interesting strategy for people like yourself working in wildlife protection.

We titled this guide Problem-Oriented Wildlife Protection because much of the global effort to prevent wildlife crime is led by people with a diverse set of backgrounds and mandates. Many of you are not necessarily 'police', but you do deal with rule breakers. Our objective is to provide a framework that helps you substantially reduce emerging or chronic harm to wildlife by people, criminal or not. This guide is mainly aimed at helping you deal with wildlife crime, but you will find the ideas and principles can be adapted to address other types of wildlife protection problems.

What is problem-oriented policing and how is it unique?

In the 1970s high crime rates and a police strategy focused on responding to incidents caused sensations of hopelessness and low morale in police officers. They found themselves responding to calls in the same place, often dealing with the same offenders they recently arrested. Problem-oriented policing arose in 1979 and ushered in a fundamentally different way for police officers to consider their work. Instead of focusing on increasing efficiency in responding to calls, the emphasis became how to prevent those call outs altogether by being more focused and less reliant on the criminal justice system.

POP is focused and uses a diversity of interventions to reduce crime and disorder. The figure below shows how POP compares to other policing strategies (adapted from[2]). The standard policing model of responding to calls and making arrests is not problem specific and relies heavily on the criminal justice system to make change. Community policing looks for different ways to address crime, but is not necessarily focused on a specific problem. Focused policing strategies, such as hot spots patrolling and focused deterrence, are very specific, but mainly rely on the threat of law enforcement sanctions to deter behavior.

A 2×2 matrix diagram. The vertical axis is labeled "Diversity of approaches used" ranging from "Rely almost exclusively on law enforcement sanctions" (bottom) to "Apply a diverse array of approaches, including law enforcement sanctions" (top). The horizontal axis is labeled "Level of focus" ranging from "Low (not specific)" to "High (very specific)". The four quadrants are: Community Policing (top-left), Problem-Oriented Policing (top-right), Standard Policing (bottom-left), Focused Policing (bottom-right).

POP is crime and place specific. Broad categories of crime are hard to address and some places provide better opportunities for crime than others. Recognizing this, POP emphasizes being crime and place specific when analyzing and responding to crime. 'Robbery' for instance, is too broad a category; it can be subdivided into robbery at ATMs, robbery of convenience stores, robbery of drug dealers, and many more.

POP encourages prevention. Much like fire prevention, crime prevention is the preferred option for first responders. This saves lives, time, and money. Identifying the root cause of problems, and the opportunity structures that facilitate them, is a key element of POP. This enables agencies to change the way they respond to incidents and find stakeholders from government and civil society to help remove drivers and facilitators.

POP involves action research: analysts working with practitioners to design interventions. Taking a step back to understand the problem before responding is a unique element of POP. More patrollers and faster vehicles might help you reduce a crime problem in the short term, but it is likely to be expensive and unsustainable. Analysts work with subject matter experts and practitioners to understand the problem, develop interventions and monitor their impact until success is achieved. The problem-solving cycle is covered in Part 2 of this guide.

POP works alongside other strategies. In policing, much like wildlife protection work, an agency is likely to use a combination of strategies. This is normal and the key to success is making sure strategies support one another. The POP Center has hundreds of case studies showing how POP was adopted to solve a problem without disrupting ongoing operations.

Read More:

Resource 1: Recommended background readings on Problem-Oriented Policing. Center for Problem-Oriented Policing. (link)

Resource 2: Scott, J. B. P. and M. S. (2009). *Effective Policing and Crime Prevention: A Problem-Oriented Guide for Mayors, City Managers, and County Executives*. Center for Problem-Oriented Policing. (link)

Is problem-oriented policing more effective?

Determining what works in policing is not easy. What works in one neighborhood may not work in another and strong strategies may fail because of poor implementation or unforeseen, external circumstances, such as a global pandemic. Despite these challenges, the evidence-based policing movement uses research and experiments to determine 'what works'.

POP is proven to reduce crime, standard policing does not. Evidence on the effectiveness of police strategies in reducing crime and disorder is clear: the standard model of policing does not work. Random preventative patrols, rapid response to calls for help, and general increases in arrests _do not reduce crime_[3]. A recent analysis across different studies found POP significantly reduced crime and disorder by an average of 34%[4]. Several studies used an experimental design to make direct comparisons, providing strong evidence POP outperforms standard policing.

POP can save resources. With an emphasis on solutions that involve civil society, a problem-oriented approach can help share costs among partners. Problem analysis requires you to invest time up front but can provide greater savings later on as the time spent reacting to incidents decreases. Cost-effectiveness was not reported in many of the scientific evaluations of POP, but those that did showed significant savings in the financial impacts of crime or officer time[4].

Diffusion of benefits is more likely than crime displacement. Criticism that crime inevitably displaces to a neighboring area is not supported by the evidence. In reality, focused crime prevention efforts, such as POP, have a contagious effect. While displacement can occur, it is more likely crime control benefits, not problems, will spread into neighboring areas[5].

> **Read More:**
>
> Resource 1: _What Works in Policing?_. George Mason's Center for Evidence-Based Crime Policy. (link)
>
> Resource 2: Hinkle, J. C., Weisburd, D., Telep, C. W., & Petersen, K. (2020). Problem-oriented policing for reducing crime and disorder: An updated systematic review and meta-analysis. _Campbell Systematic Reviews_, _16_(2). (link)
>
> Resource 3: Goldstein, H., & Scott, M. (2014). Shifting and Sharing Responsibility for Public Safety Problems. _Center for Problem-Oriented Policing_. (link)

Has a problem-oriented approach been used to prevent wildlife crime before?

Reading this you may be thinking 'hey, I know a project that used a similar approach, surely this is not all new'. We completely agree. Problem-solving has long been part of conservation. There are some excellent examples where teams of wildlife officers, NGOs and community groups have solved wildlife protection problems. Unfortunately, documentation of these case studies is poor, meaning the lessons we could learn from both successes and failures are hard to find and repeat.

The table on the next page summarizes four case studies we consider to be problem-oriented wildlife protection. These highlight the value in picking a specific problem and analyzing it

with various sources of information before implementing a response. The responses chosen in each case directly target one or more of the drivers and facilitators discovered during the problem analysis. The case studies also highlight the ability of organizations to focus on specific problems alongside other conservation and enforcement activities. We believe case studies such as these, produced through structured problem-solving, will form a useful body of evidence to guide practitioners.

As you read through the table try to imagine how the problem would have changed if an unfocused and standard law enforcement approach had been used. Would the same outcome have been achieved? What if the enforcement agency had not worked with partners? Would the same responses have been possible?

Why should I consider starting a problem-oriented project?

You might consider starting a project because the wildlife crime problems you deal with, and have for years actually, are not going away. In fact, they are getting worse. It is clear that the status quo is not working. There is growing awareness of the need to implement holistic responses that are not totally reliant on law enforcement. A problem-oriented approach could help you address some of these issues.

We are not alone in our support of problem-oriented wildlife protection. Recent research shows that a problem specific approach is supported by wildlife law enforcement rangers[6] and will help facilitate better interdisciplinary research to inform policy[7]. By starting a problem-oriented project of your own, and documenting it properly, you will help build an evidence-base for what works in wildlife crime prevention.

Read More:

Resource 1: Moreto, W. D., & Charlton, R. (2019). Rangers can't be with every elephant: Assessing rangers' perceptions of a community, problem-solving policing model for protected areas. *Oryx*, 1–10. (link)

Resource 2: Boratto, R., & Gibbs, C. (2019). Advancing interdisciplinary research on illegal wildlife trade using a conservation criminology framework. *European Journal of Criminology*, 1–22. (link)

How can my organization start?

Although the concept of using a problem-oriented approach is simple, introducing any new approach may face resistance and skepticism. It is best to start with a small project, focused on a specific problem. You might choose a chronic issue that has been consuming resources without success. How you get your project up and running is explained in Part 3 of this guide. In Part 2, we explain how to pick and address problems using the SARA model.
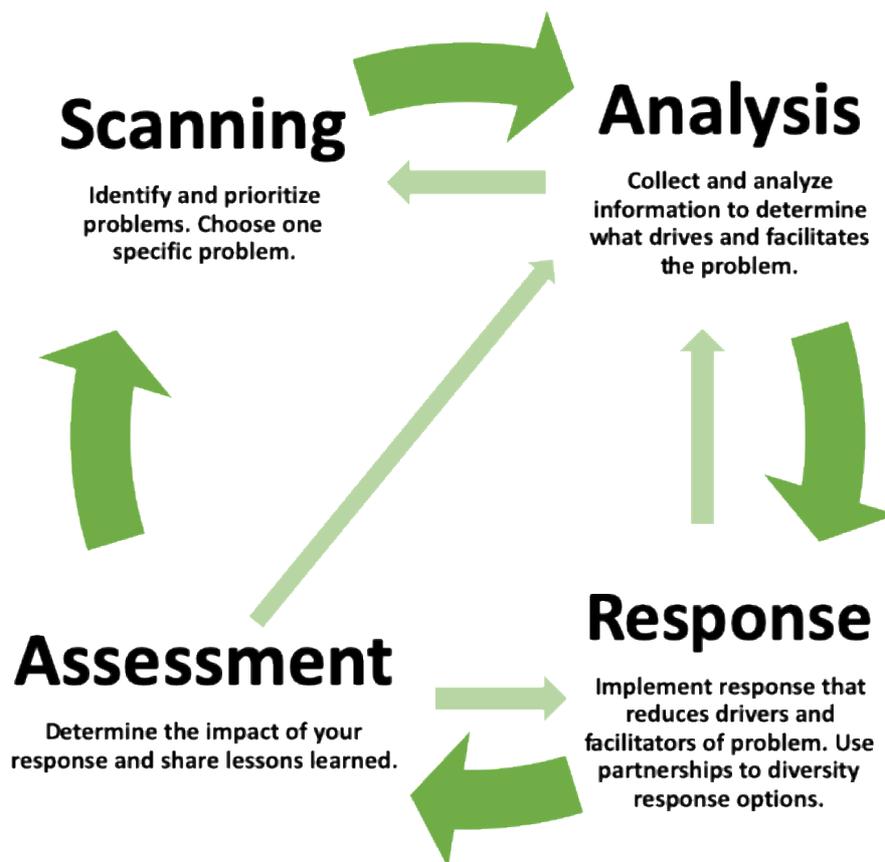
ORGANIZATIONS	SCAN	ANALYZE	RESPOND	ASSESS
Government agency: Dinas Perikanan Kabupaten Flores Timur (East Flores Fisheries Agency), East Nusa Tenggara; **NGOs:** Wildlife Conservation Society Indonesia Program; Misool Baseftin Read more: Booth et al (*in review*)[8]	*Hunting of manta rays in Eastern Indonesia, driven by demand for manta gills in traditional medicine markets elsewhere in Asia.*	Single village identified as the main site for hunting and trading. Hunting was conducted by a small group of repeat offenders motivated by prestige and high financial reward. Hunting peaked either side of the full and new moons and targeted manta aggregations.	Patrols targeted manta aggregation areas, peak times in the month and sea close to the hunters' village. Prosecutions of high-level traders, supported by training of judiciary. A range of livelihood-based interventions targeting hunters, meat processors, and wider community. Community-based monitoring of illegal fishing and bycatch.	Landings of manta rays reduced by ~86% in 2017 compared to the 2013 baseline. Some displacement of tactics to hunting with gill nets occurred.
Religious group: The Nazareth Baptist (Shembe) Church. **NGOs:** Panthera; Peace Parks NGO; Wildlife ACT NGO. **Businesses:** digital designers, textile manufacturers and a number of independent traders Read more: Naude et al (2020)[9]	*Poaching leopards for fur capes used in traditional ceremonies by the Nazareth Baptist (Shembe) congregation in South Africa.*	15,000 leopard skins estimated in circulation within the congregation. Leopard fur capes were costly and lasted seven years. Some members were using cheap artificial leopard skins. There was low awareness of the threatened status of leopard within the congregation.	Durable, highly realistic synthetic leopard skin capes manufactured and distributed free to congregation before transitioning to a self-sustaining business model. This was combined with an education campaign to reduce desire for wild leopard skin.	The ratio of real leopard capes to fake leopard capes in ceremonies dropped to nearly 50:50 by 2018.
Government agency: Nagaland Forest Department; Ministry for the Environment **NGOs:** Nagaland Wildlife and Biodiversity Conservation Trust; Conservation India; Birdlife in India; Wildlife Trust of India **Religious group:** Nagaland Christian Church leaders **Societies:** Bombay Natural History Society; Amur Falcon EcoClubs **Village councils:** Pangti, Ashaa, Sungro Read more: Ghosh (2018)[10] Rao (2013)[11]	*Mass trapping of amur falcons at Doyang Reservoir for cheap meat by local villages during annual migration.*	Migrating falcons were trapped exclusively over 10 days in October while congregating before migrating to Africa. Approximately 70 groups of hunters trapped falcons using old fishing nets. Trapping was a recent acute problem. Few cultural ties to the practice and the market highly localized to three villages. Hunters were strongly influenced by village council decisions and church leaders.	Nagaland FD officers seized nets and posted guards around Doyang reservoir. Church leaders promoted messages that falcon consumption was against Christian beliefs. Initiatives supported hunters transitioning into tourist guides and falcon protection teams. Eco clubs established and a culture of falcon protection encouraged.	Falcon trapping decreased from at least 120,000 in 2012, to zero in 2013 and all subsequent years.
Government agency: Australian Commonwealth Fisheries Management *note they specifically adapted POP and used SARA Read more: Gibson (2017)[12]	*Commercial fishing in unapproved areas or at unapproved times.*	Fishermen bypass regulations by failing to install a vessel monitoring system (VMS) on board and/or have it operating at all times.	A team was formed to focus on VMS data. Increased emphasis to cross check logbooks against VMS data within three days of landing to identify violations. Short-term zero tolerance programs introduced forcing vessels without VMS to return to port.	Average VMS compliance rates increase from 87.5 to 97.9 during the study period.

Part 2: Problem solving with SARA

After reading Part 1 of this guide you may think problem-oriented policing is an interesting way to deal with wildlife crime, but it is unclear exactly how you unpack problems to find durable solutions. In problem-oriented policing, SARA guides this process; Scanning—Analysis—Response—Assessment. SARA is a basic problem-solving cycle that helps you identify and understand problems, implement tailored responses, and determine if what you are doing is working. In Part 2 we explain how it can be used for wildlife protection and how readers like yourself might integrate it into your daily work. We use a hypothetical example to show how you might unpack a problem using the SARA process.

SARA: A brief overview

Without a structured approach to problem solving, you will find it difficult to develop tailored solutions. The urge to 'do something' about the problem quickly and the idea that 'we already know what will solve the problem' are natural reactions that when left unchecked can disrupt problem solving. Patience is a virtue for problem-oriented work; unpacking complex issues takes time.

Scanning
Identify and prioritize problems. Choose one specific problem.

Analysis
Collect and analyze information to determine what drives and facilitates the problem.

Response
Implement response that reduces drivers and facilitators of problem. Use partnerships to diversity response options.

Assessment
Determine the impact of your response and share lessons learned.

The SARA Process

A problem-oriented approach integrates with, and strengthens conservation planning

Your organization may already be using a conservation planning framework. Open Standards by the Conservation Measures Partnership is among the most widely used. Like SARA, it emphasizes the need for a thorough understanding of specific threats as you design and implement interventions. The cycles emphasize slightly different phases but are otherwise the same adaptive management cycle.

Because SARA was developed to guide problem-oriented policing there is a rich vein of research and expertise on its use to reduce crime and disorder. This is useful to draw from when addressing wildlife protection problems that involve individuals breaking rules or violating social norms. As you read Part 2 of this guide, ask yourself if the ideas and principles of problem-oriented policing could be integrated into your current planning cycle.

Hypothetical

Decline of endangered deer species due to bushmeat hunting

The population of an endangered species of deer is declining due to a rise in illegal hunting; deer appear to be targeted for their meat. Under pressure from the public to do something, the protected area manager asks you to lead a team and identify interventions to reduce the problem. You decide to use a problem-oriented approach led by SARA.

Scanning: Identify, prioritize, and select problems

Pick one problem. Working in wildlife protection you'll know that there are *many* problems inside your protected area. Some are illegal activities, others, such as invasive species or human-wildlife conflict, may not be. During the scanning phase, problems are listed and prioritized and one problem is selected for your problem-solving team to work on. A problem could be selected because it is causing a large amount of harm to a population, there is public demand for action, or because it is a chronic issue consuming a lot of resources. In problem-oriented policing, a problem is defined as *'a recurring set of related harmful events in a community that members of the public expect the police to address'*.

Be specific when defining your problem and set practical boundaries. Tightly defined problems help you focus work and are easier to solve and measure. 'Poaching' is too broad; '*snaring for bushmeat to generate income to plant tobacco crop* is better. '*Human-wildlife conflict*' is too broad; '*retaliatory killing of lions with poison following livestock attacks*' is better. Try to be place specific as well; '*snaring for bushmeat to generate income to plant tobacco crop along the borders of plantations X, Y & Z*'. If your problem is too vast then your response may end up being too diluted over a large area or delayed by inertia if it involves too many different jurisdictions. Think of your problem as an experiment. A small well-designed project that can show measurable success and be scaled up or replicated elsewhere.

Hypothetical: Scanning	Your scanning shows bushmeat poaching is a broad phenomenon. There are different actors, using different methods, supplying different markets. After an initial review, you are aware of three different well-defined problems: 1. Snaring deer for bushmeat for sale to restaurants in local town 2. Shooting deer from hides for personal consumption by illegal gold miners 3. Poaching deer with dogs and firearms for personal consumption and recreation by city dwellers The data available indicate the first problem is causing greatest harm to the deer population. However, your park is enormous and there are large financial and practical challenges to implementing interventions among all communities. Moving into the analysis phase, you and your team refine focus to the park's Southern Sector. Problem selected for analysis ***Snaring deer for bushmeat in the Southern Sector for sale to restaurants in local town***

Use the CHEERS test to help you focus. When scanning for problems the CHEERS test is a useful way to determine if your problem has the required elements: Community, Harm, Expectation, Events, Recurrence, Similarity. As you define and prioritize problems apply the CHEERS test to each one. Those that do not meet the requirements should not be taken forward into the analysis phase.

	CHEERS Element		Explanation	Deer Snaring Problem	Met?
Hypothetical: Scanning	**C**	Community	Members of the public, civil society organizations, businesses, government agencies, and/or wildlife are harmed by the problem.	The wild deer population, a national 'asset', is harmed; so are predators dependent on this prey species as it declines.	X
	H	Harmful	The harm directly affects people, wildlife or institutions, causing damage, injury, undue stress, or death.	Deer populations are declining, leaving less prey for predators. Snares have also injured and killed a number of non-target species.	X
	E	Expectation	There is an expectation from some members of the community that the wildlife authority should help solve the problem.	The community expects the wildlife authority to intervene as they hold the national mandate to protect parks and combat the illegal wildlife trade.	X
	E	Events	The problem is made up of specific events that can be described and documented.	Snaring events have been observed and documented by patrol teams. Bushmeat is regularly advertised for sale in local restaurants.	X
	R	Recurring	The events happen more than once. They can be chronic, i.e. recurring for years, or acute, i.e. a new, emerging problem.	Snaring is a chronic problem that has been happening for many years.	X
	S	Similarity	The events are linked by when and where they happen, who gets victimized, the offenders and groups involved, or the modus operandi.	The type of snare used, hunting area, and restaurants offering bush meat connect the snaring events to one another.	X

Read More:

Resource 1: Scott, M. S. (2015). *Identifying and Defining Policing Problems*. Center for Problem-Oriented Policing. (link)

Resource 2: Sparrow, M. K. (2008). *The Character of Harms. Operational Challenges in Control*. Cambridge University Press. (link)

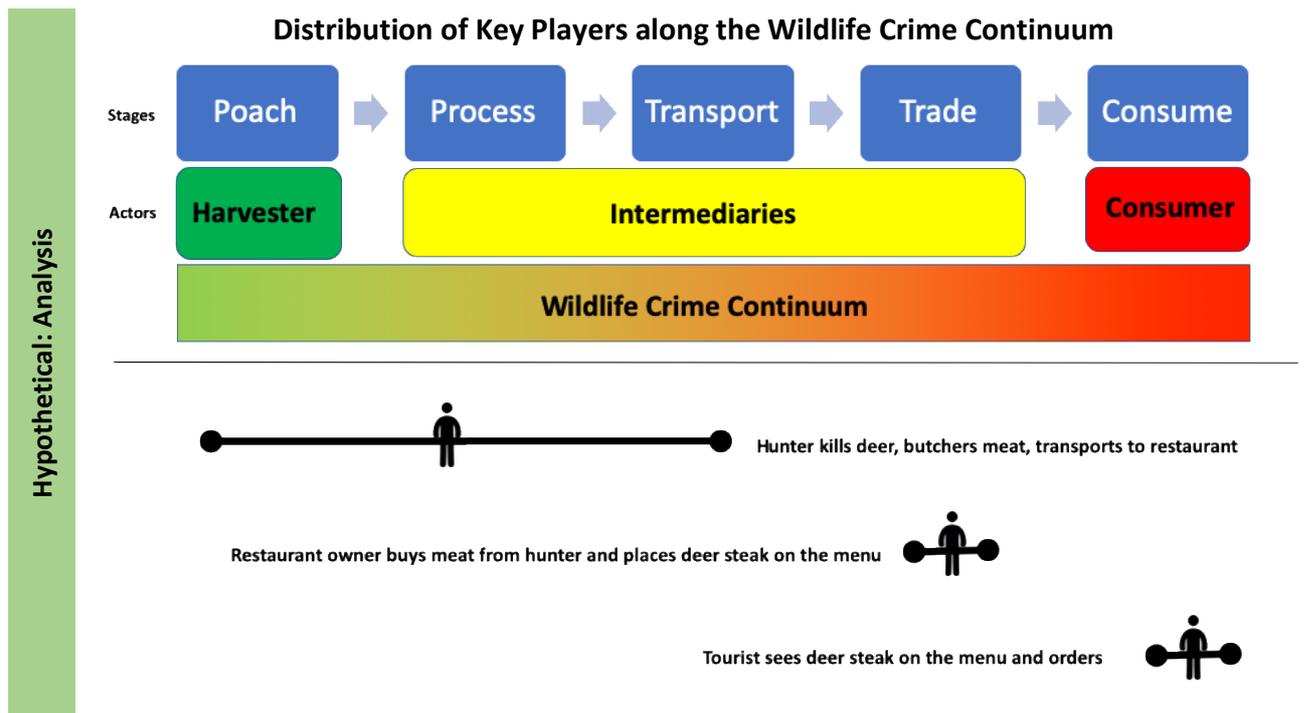## Analysis: Analyze information, develop hypotheses, set indicators

Answer the 5 Ws and 1 H. Who? What? When? Where? Why? How? Doing this you will begin to see what you know about the problem, what information needs to be collected, and who should be contacted to provide it. This will also help you start to determine the scale of the problem and its impact on wildlife, local economies, and communities.

Develop and challenge hypotheses. As you deepen your understanding of a problem, use observations to form hypotheses about drivers and facilitators. Then use new information to test these. Does the new information support your hypothesis, or force you to revise it? This process prevents you being led astray by assumptions and perceived general knowledge.
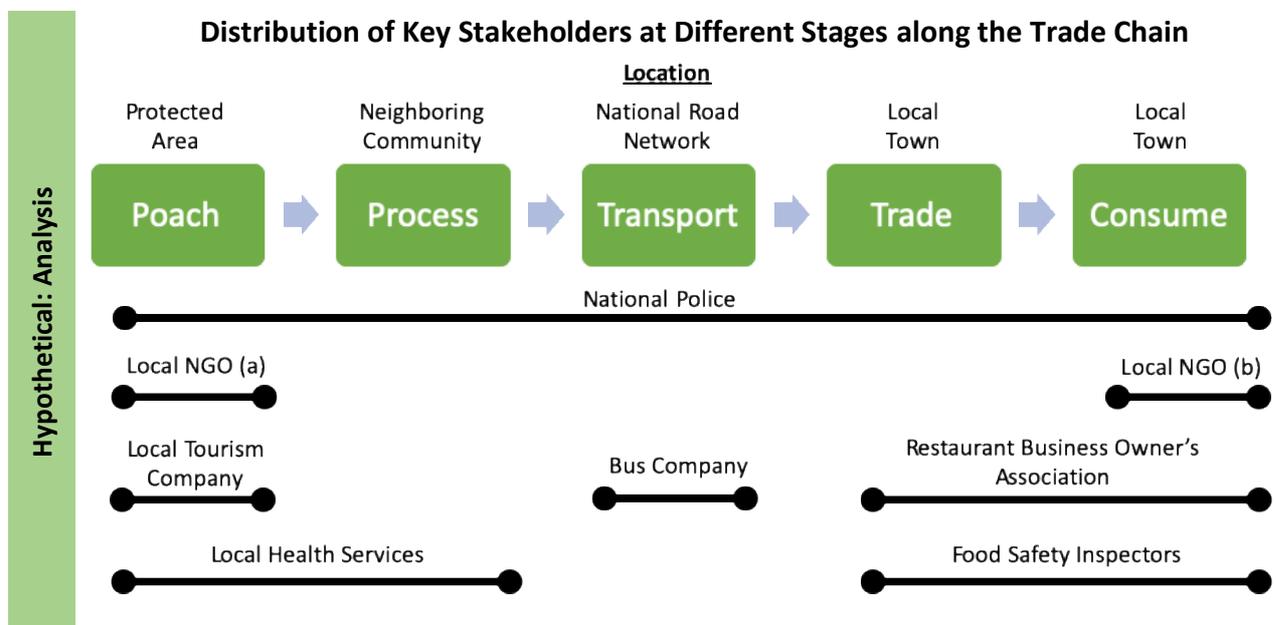
Hypothetical: Analysis	**Who?**	**You learn about the consumers**	Through online research of restaurant advertisements, combined with community interviews, you learn that patrons are primarily wealthy tourists from the capital, consuming deer meat as a luxury.
	Why?	**You learn what motivates hunters**	You identify the Local Health Services as a potentially important partner. During initial discussions you learn about a chronic problem of drug addiction among young men in the forest-edge communities. Post-arrest interviews reveal that for 65% of offenders, the primary motivation to poach is to repay drug debts. Prosecution data reveals a high rate of re-offending.
	How?	**You learn about the weapon of choice- the snare**	Interviews with patrollers and arrested poachers indicate abandoned wire reels are used to make high-grade snares which are extremely effective at catching and holding deer. You confirm this out on the ground, identifying 20 piles of abandoned wire of the same type as used in snares.
	When?	**You find there's seasonality**	Patrol data shows bushmeat poaching peaks during August and September. This corresponds with the dry season and a local festival that attracts many tourists.

Identify where your problem lies along the wildlife crime continuum. The behaviors pushing and pulling wildlife products along supply chains can be categorized into stages. The stages describe events where wildlife is turned into products for consumption (adapted from[13,14]). At each stage actors are involved in conducting the behavior[15]. The wildlife crime continuum recognizes that individuals involved often blur the lines between stage and actor categories, meaning some will not fit neatly into a single box.

Identify vulnerabilities. An important objective of the analysis phase is to identify weak points along the wildlife crime continuum where you can cause critical stages to fail. To do this well, you will want to determine the motivations driving the behaviors of actors (see [15]), the types of networks being used to move product (see [15,16]), and think about the feedback mechanisms between stages. This is a large task, so having a well-defined problem will help you reduce some of the complexity.

Distribution of Key Players along the Wildlife Crime Continuum

Stages	Poach	Process	Transport	Trade	Consume

Actors	Harvester	Intermediaries			Consumer

Wildlife Crime Continuum

Hunter kills deer, butchers meat, transports to restaurant

Restaurant owner buys meat from hunter and places deer steak on the menu

Tourist sees deer steak on the menu and orders

Map out stakeholders. Who deals with the problem? Who might help you solve it? At each stage along the wildlife crime continuum, different government and civil society partners are well-placed to provide you with information about a problem and play a role in developing a tailored intervention[17].

Distribution of Key Stakeholders at Different Stages along the Trade Chain

Location

Protected Area	Neighboring Community	National Road Network	Local Town	Local Town
Poach	Process	Transport	Trade	Consume

National Police

Local NGO (a)   Local NGO (b)

Local Tourism Company   Bus Company   Restaurant Business Owner's Association

Local Health Services   Food Safety Inspectors

Revise problem definition. After careful analysis you may need to redefine your problem, or it may be clear that a different but related problem should be the priority. That is fine. The SARA model is not linear and supports shifting back to the scanning stage should this happen.

Prepare a 'before and after' test to check if the problem declined. Doctors take your vital statistics before and after giving you treatment to understand if it is working or if they need to make adjustments. Similarly, you need a good measurement of how bad your wildlife protection problem is before you implement your response. That is known as a baseline and is crucial for assessing if the problem declined.

Consider controls to check if your response caused the decline. When testing new medicines, researchers divide people into a group receiving the treatment and a control group that does not, but is monitored in the same way. That gives more confidence an improvement in the treatment group is due to the medicine and not other factors. Controls are difficult with wildlife protection problems, but not impossible. When you define the treatment area of your project, think about other areas experiencing the same problem. Are they similar enough to use as a control?

Having refined your problem to focus on the park's Southern Sector, you decide to use the Northern Sector as a control. You identify three indicators and establish baselines.

Indicator	Description	CONTROL Baseline North Sector	TREATMENT Baseline South Sector
Snare Sweep Encounter Rate	The park runs monthly snare sweeps in both sectors, targeting areas where snaring is most likely.	12 snares per sweep	26 snares per sweep
Bushmeat Restaurant Index	Community contacts identify restaurants selling bushmeat in communities to the north and south.	25	30
Deer population	Annual camera trap monitoring takes place in both sectors.	70-80	50-60

Hypothetical: Analysis

Read More:

Resource 1: Clarke, R. V, & Eck, J. E. (2005). *Crime Analysis for Problem Solvers in 60 Small Stepas*. Center for Problem-Oriented Policing. (link)

Resource 2: *Situational Crime Prevention*. Center for Problem-Oriented Policing. (link)

Response: Reduce opportunities, increase risk, increase compliance, be focused

Be realistic. The response phase is when you agree on an appropriate response, develop a work plan and implement selected interventions. As you weigh up possibilities, choose those that are not overly complicated. Discuss proposed interventions with field teams to gauge practicalities. Try to find responses that are considered to be a positive change to ongoing operations.

Consider Situational Crime Prevention. The 25 techniques of situational crime prevention[18] provide a useful framework for your team to think about opportunity reduction. These are broadly categorized as finding ways to increase the efforts and risks associated with crime, reduce rewards and provocations, and remove excuses. The table below shows how this applies to the hypothetical; also see[19].

	The 25 techniques of Situational Crime Prevention (SCP)				
	Increase effort	**Increase risk**	**Reduce rewards**	**Reduce provocations**	**Remove excuses**
Hypothetical: Response	**Target harden** Not applicable	**Extend guardianship** Appoint honorary wardens in communities	**Conceal targets** Not applicable	**Reduce frustrations/stress** Entrepreneur grants and alternative livelihood programs in key communities	**Set rules** Collaborative agreements for wildlife harvesting and use
	Control access to facilities Increased vigilance for trespassing violations, including warnings and fines	**Assist natural surveillance** Hotline to report bushmeat sales	**Remove targets** Not applicable	**Avoid disputes** Regular meetings between community and park leaders; hotline for emergencies	**Post instructions** Post signs with park rules along borders and known access points.
	Screen exits Vehicle/motorcycle checks along park roads at night	**Reduce anonymity** Inform local leaders about known individuals and businesses involved with the bushmeat trade	**Identify property** Rapid test kits for bushmeat identification	**Reduce temptation/arousal** Social and sport activities for youths at risk of being used as bushmeat poachers	**Alert conscience** Signage at restaurant entrances indicating bushmeat is illegal
	Deflect offenders Detection dogs attached to road check units	**Use place managers** Work with restaurant owners to discourage the sale of bushmeat	**Disrupt markets** Close or fine restaurants serving bushmeat	**Neutralize peer pressure** Programs for hunters to use their skills for positive conservation outcomes	**Assist compliance** Develop legal and sustainable supply chain for alternatives to deer meat
	Control tools/weapons Remove abandoned wire reels that provide good snaring materials	**Strengthen formal surveillance** Increase spot checks on restaurants by health inspectors	**Deny benefits** Use demand reduction campaigns to decrease tourist interest	**Discourage imitation** Publicity for enforcement activities (i.e. arrests) as well as alternatives (i.e. forest guard program)	**Control drugs/alcohol** Substance abuse programs for hunters with addiction problems.

Consider focused deterrence. This approach is useful for problems caused by a small group of known, repeat offenders[20,21]. Research shows focused deterrence reduces crime[22] by increasing the perceived certainty, swiftness, and severity of punishment. It also provides offenders with social services to help them move away from a criminal career.

Reward compliant behavior. Findings ways to encourage compliance, while simultaneously discouraging unwanted behaviors is key. Remember that rule breakers will only make up a very small proportion of the total population. Think carefully how a 'carrot and stick' model could be used to address the problem.

Consider unintended consequences. Carefully consider the costs, benefits and risks before recommending a response. That includes broader implications of an intervention beyond reducing the problem such as impacts on ecosystems, communities, and other stakeholders[23]. For instance, increased wealth from a livelihood program may enable hunters to purchase firearms or free up their time to hunt more often[24].

Describe how your intervention will reduce the problem. Put yourself in the shoes of the offender. If you implement an intervention, how exactly will this change behavior and reduce the problem? Thinking through this in detail helps you decide whether to reject or revise an intervention before committing resources to it.

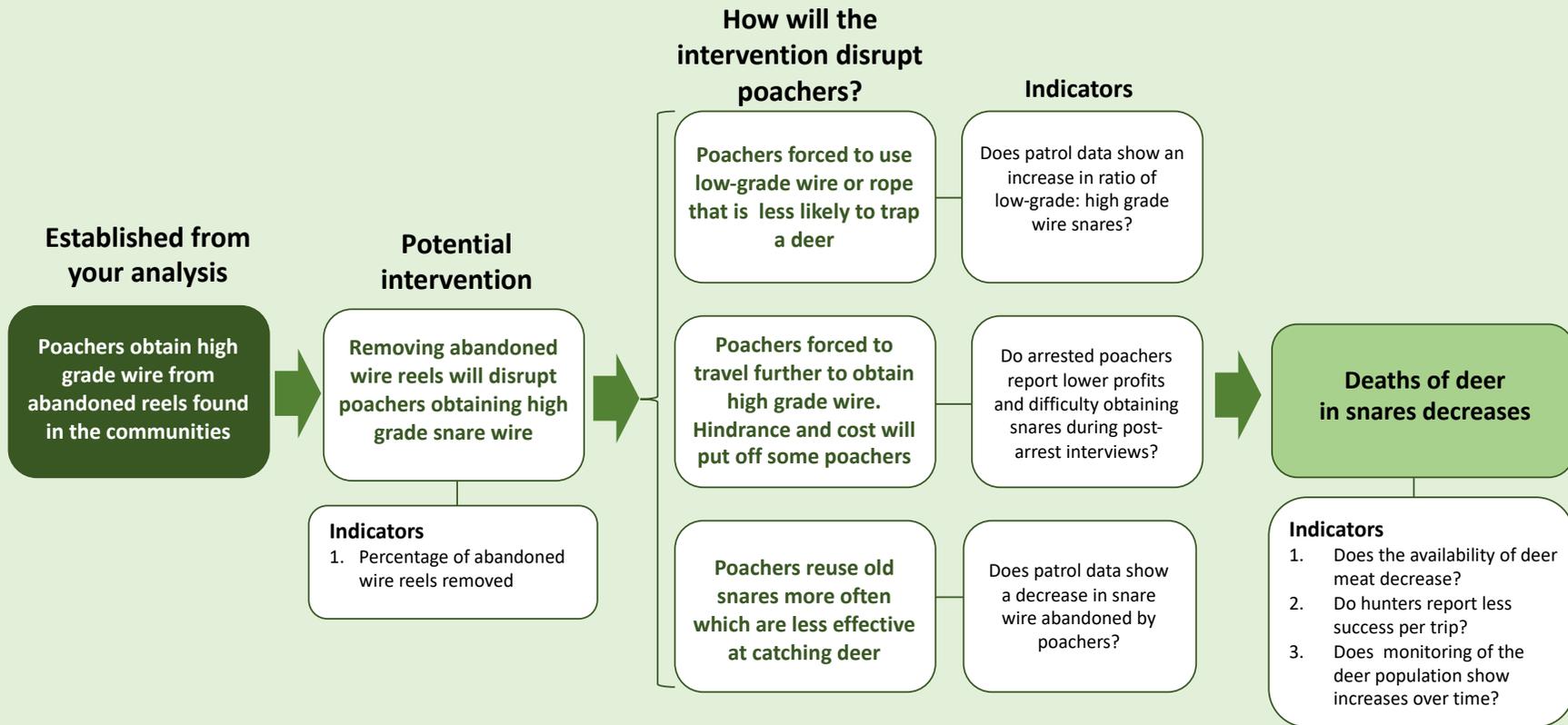|	
Hypothetical: Response	After careful consideration you decide to use a multi-pronged approach with four interventions targeting different parts of the wildlife crime continuum. 1. **Strengthen formal surveillance**. Led by the town health inspectors, you increase spot checks on local restaurants and shut down establishments repeatedly serving illegal bushmeat. 2. **Control drugs**. In partnership with the local health agency and a local NGO, you start a scheme to put offenders and community members suffering from addiction problems into rehabilitation schemes. In partnership with the local police and community leaders, you set up a hotline to report on drug dealers trying to sell drugs in the communities. 3. **Reduce temptation**. Led by a local NGO and community leaders, you develop a scheme for sport and social activity to engage bored youths and steer alternative livelihoods to hunters that need it. 4. **Control tools and weapons**. With a local waste company, you collect abandoned reels of wire being used to make snares.

Read More:

Resource 1: Scott, M. S. (2017). *Focused Deterrence of High-Risk Individuals*. Center for Problem-Oriented Policing. (link)

Resource 2: Brown, R., & Scott, M. S. (2007). *Implementing Responses to Problems*. Center for Problem Oriented Policing. (link)

One of your interventions focuses on controlling access to snare wire. You sketch out a diagram of how this intervention might disrupt poachers and identify indicators that will test this. Your logic suggests controlling snare wire is a relatively cheap way to cause some disruption but will not be enough on its own. You anticipate poachers adapting.

Hypothetical: Response

How will the intervention disrupt poachers?

Indicators

Established from your analysis

Poachers obtain high grade wire from abandoned reels found in the communities

Potential intervention

Removing abandoned wire reels will disrupt poachers obtaining high grade snare wire

Indicators
1. Percentage of abandoned wire reels removed

Poachers forced to use low-grade wire or rope that is less likely to trap a deer

Does patrol data show an increase in ratio of low-grade: high grade wire snares?

Poachers forced to travel further to obtain high grade wire. Hindrance and cost will put off some poachers

Do arrested poachers report lower profits and difficulty obtaining snares during post-arrest interviews?

Poachers reuse old snares more often which are less effective at catching deer

Does patrol data show a decrease in snare wire abandoned by poachers?

Deaths of deer in snares decreases

Indicators
1. Does the availability of deer meat decrease?
2. Do hunters report less success per trip?
3. Does monitoring of the deer population show increases over time?

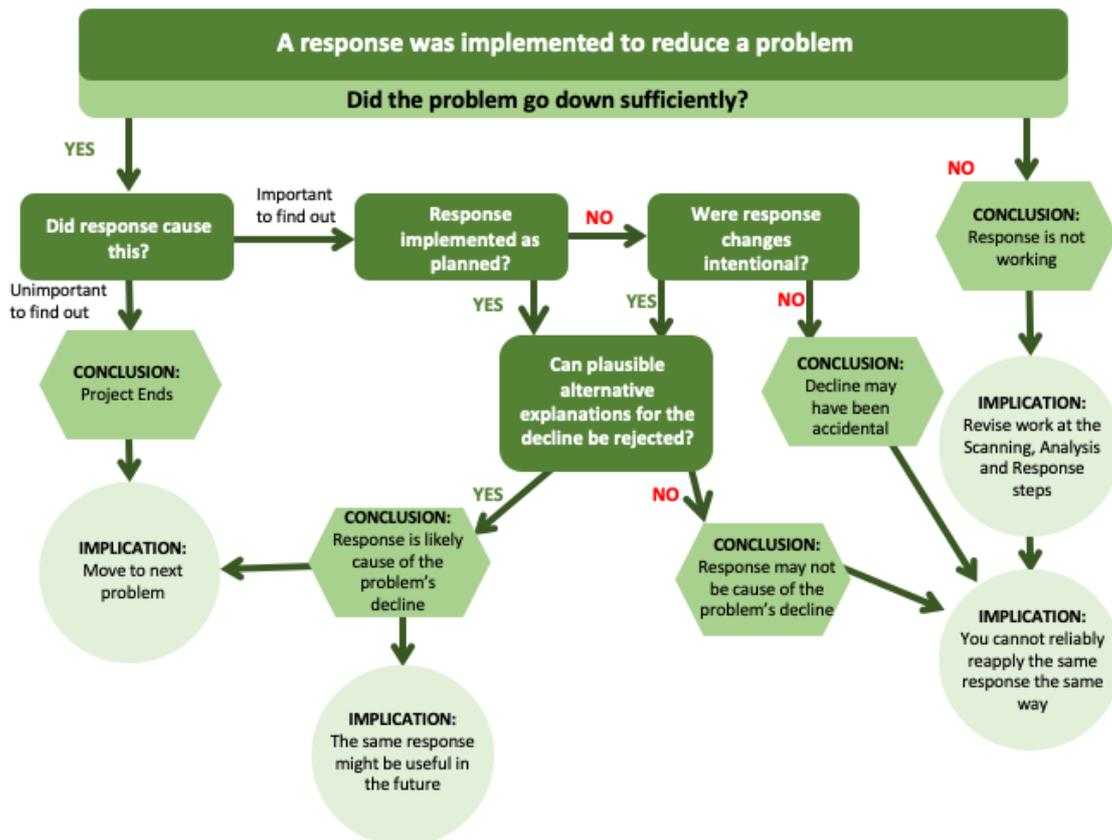| **Possible displacement effects**	**Possible diffusion of benefit**
Expect to see novel methods of killing deer as poachers experiment with alternatives to snares. Be alert to rises in shooting and spearing.	Snares cause high bycatch mortality of non-target species. Reducing wire snares in the park would benefit other important populations of large-bodied mammals. Snaring in Northern sector may also decrease as wire supplies decrease.

Assessment: Monitor implementation, measure impact, adjust as required

Claiming success in problem-oriented projects requires you to ask two fundamental questions: Did the problem decline? If so, to what extent did your response cause the decline?[2]. The indicators you identified earlier on and began following will allow you to answer these questions. The flowchart below illustrates how to think through the assessment of your response and implications for future work; recreated from[25].

Assess how you implemented and adapted your project. Interventions often fail because of poor implementation, not because the idea itself was flawed. Review how you implemented the intervention and revised it over time as you adapted to hurdles.

Triangulate information about the impact. Measuring impact in wildlife protection is hard due to the 'silent victim problem'[3]. Unlike human victims, wildlife cannot report crime or let you know if things are getting better. Indicators used to measure the problem all suffer from certain biases and limitations. A single indicator will rarely tell you if your response is being successful. Comparing multiple indicators from different sources, collected by different methods overcomes some of the single indicator bias. This triangulation increases the validity and credibility of your findings.
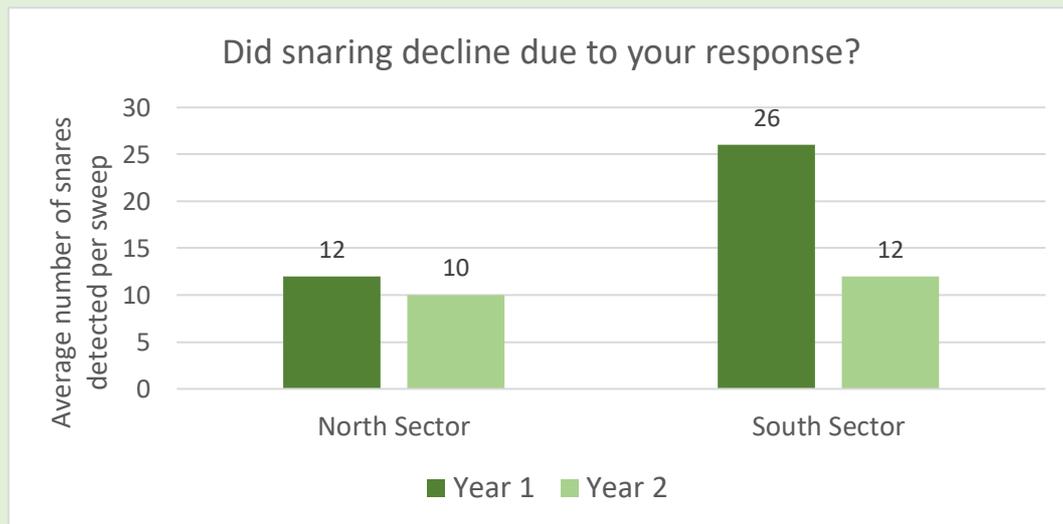
Document and disseminate. Documented properly, your case study could be used internally to guide responses to similar problems, as a training module for new problem solvers, and even shared broadly so other organizations might adapt a similar approach.

Your assessment finds not all your implementations ran smoothly. Restaurant spot-checks showed limited success initially, with lack of interest from health inspectors. But working with the inspectors, you develop a method to conduct a seemingly random spot check once a tip-off has been received that wild meat is being consumed and they start to get behind the project.

Over the course of the year, the Health Ministry conducts ten such spot checks, and suspends licenses from seven restaurant owners. This is accompanied with releases to local media and a messaging campaign to restaurant owners explaining the penalties for selling bushmeat.

Twelve offenders and another twenty youths from the communities enroll in the rehabilitation program; police arrest three drug dealers following alerts on the hotline. Through your involvement in this, you build stronger working relationships with community leaders.

Indicators show the problem declined in the Northern and Southern sectors, suggesting either other factors may be contributing to the decline, or there may be diffusion of benefits if poachers in the northern communities also use the same wire reels for snaring. However, the decline in your treatment block (South Sector) is much stronger than in your control. This strongly suggests your response caused a decline in the problem.

Did snaring decline due to your response?

| | North Sector (Control) | | South Sector (Treatment) | |
	Baseline	% Change	Baseline	% Change
Snare Sweep Encounter Rate	12 snares per sweep	17% decrease	26 snares per sweep	42% decrease
Bushmeat Restaurant Index	25	20% decrease	30	57% decrease
Deer population	70-80	No change	50-60	No change

Read More:

Resource 1: Eck, J. E. (2017). *Assessing Responses to Problems: Did It Work? An Introduction for Police Problem-Solvers*. Center for Problem-Oriented Policing. (link)

Resource 2: *Crime Reduction Tool Kit and EMMIE*. College of Policing. (link)

Part 3: Starting a problem-oriented project of your own

Parts 1 and 2 of this guide have introduced you to the problem-oriented approach and how this process unfolds using SARA. Now you might be thinking 'this all sounds good, but I need more detail on the mechanics of what is involved and where to begin'. In Part 3, we describe six key components you'll need to get started and some guidelines on how to put these components in place alongside your organization's day to day operations. Our advice is to start small, select an achievable pilot project with a clear time limit, and document your work.

It helps to understand how others have made problem-oriented projects a success. Resources explaining how to implement and sustain POP projects in policing agencies are useful companions to Part 3 of this guide[26,27].

> **Read More:**
>
> Resource 1: *Implementing POP: Leading, Structuring, and Managing a Problem-Oriented Police Agency.* Center for Problem-Oriented Policing. (link)
>
> Resource 2: Sidebottom, A., Kirby, S., Tilley, N., Armitage, R., Ashby, M., Bullock, K. and Laycock, G. (2020). *Implementing and sustaining problem-oriented policing: A guide.* Jill Dando Institute of Security and Crime Science, University College London. (link)

Component 1. A problem-solving team

Re-task your staff and select your team. A problem-oriented approach emphasizes using your existing staff more productively over recruiting new staff. Not everyone is productively occupied eight hours a day, five days a week, and if your staff are all focused on reacting to threat, they may be unnecessarily busy. Check how your staff time is currently being used and work out a proportion of time in the week that certain staff can be allocated to work on the focal problem. A mix of skills, capabilities and experience will make the team well-rounded, which could include front-line rangers, managers and decision makers. They don't need to be experts in the problem already, but able to weigh up information, create and challenge hypotheses, and innovate solutions.
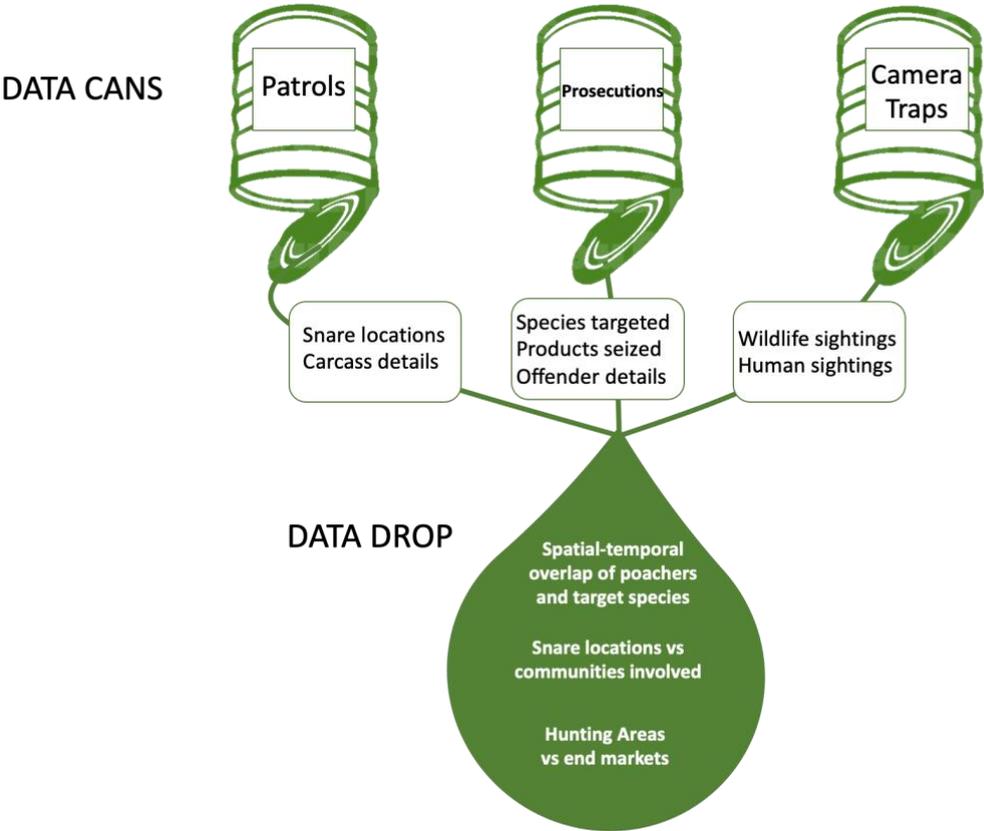
Delegate decision-making authority. Your team will need authority to engage other agencies and partners, gather information, and then develop plans with those partners for interventions. Make sure this authority is established early and clearly communicated to staff.

Train your team and line managers in the problem-oriented approach. Training your staff early on in problem-solving skills and crime prevention is important. Check for training opportunities with academic institutions or police departments that have institutionalized the approach.

Component 2. Information

Access information from within your wildlife authority. Each division of your organization will likely have its own database, and some of the data from each of those will be important for your analysis. In the figure below, different databases are visualized as separate 'data cans'. Below the data cans, 'data drops' illustrating analytic products that could not have been

produced from an individual data can. Combining all three cans, you begin to see how products seized during arrests link to methods of hunting used in the park, and how this is related to target species available. Combining data cans can be difficult as it generally means additional work for database managers to run a query and export data to the team, but it is important for projects to succeed. Your problem-solving team will need senior management support in requests for data access.

Access information from other agencies and organizations. NGOs, civil society groups, and other government agencies in your area will probably have their own databases as well. Some of this information will be useful to you, but data sharing is not easy; it is often hampered by concerns over operational sensitivity and data security. Sometimes this is justifiable, but can also become an excuse not to share. Data drops allow you to take small steps. Starting with a specific problem related to specific data sets, and combining the necessary information for that project, can help you get around institutional unwillingness to share data. Selective data drops negotiated by your problem-solving team and line manager can start a process of collaboration, moving towards broader data sharing agreements in time.

Find ways to sanitize information. Sanitization helps share information across agencies or with staff holding a lower security clearance. Historical data that is not operationally sensitive can help describe how the problem has changed over time.

Collect data proactively. There is no substitute for problem-solving team members getting on the ground to experience different locations and settings from the offender's or wildlife officer's perspective. This adds context to the data points and reports. Some ways your team could start to gather the information they need include:

- *Open-source research.* Much information collection can be done before leaving the office. A thorough search of the internet may reveal studies conducted on the problem you are trying to address, and contact details of the authors who could provide you with useful data or insights. Do not forget the wealth of open-source information for Geographic Information Systems which can help add context to the places where the problem occurs.
- *Groundwork of incident sites.* Examining where poaching kills were made and facilities used, or where you have recurrent human wildlife conflict, will help shape your thinking about the problem and what the recurring similarities are in places and tactics. Ask other officers to contact you if there has been a new incident relating to your problem so you can view the situation while it is still fresh.
- *Shadowing patrols*. Spending time as an observer on patrols helps you to understand from their perspective how decisions are made and how effective they are in addressing the problem.
- *Offender interviews.* Imprisoned, recently arrested, or ex-offenders can provide a wealth of information to understand the how and why of your problem. These individuals can also comment on why current operations may not be effective.
- *Expand your network.* Push yourself to look outside your immediate network of contacts. The complex nature of your problem may require you to speak with individuals who have totally different jobs and backgrounds. Do not be afraid to leave your comfort zone of 'law enforcement', 'conservation' or 'criminology'.

Component 3. Analytic capacity

Invest in a trained analyst. Problem solving requires analysis, so you'll need a dedicated analyst on your team. A common question will be 'what skills does my analyst need?' The analyst need not be an expert in everything, but should be able to work with different information sources and analytic techniques. They would benefit from a foundation in theories of crime generation and prevention. Above all, the analyst is a critical thinker with a curious mind. Line managers play a key role in protecting the analyst's time from being taken up with requests from other staff, ensuring they are able to focus on the problem.

Outsource discrete analysis tasks. If your in-house analyst is stretched, consider outsourcing select questions. Academic institutions and NGOs have substantial analytic capacity and are often willing to work on tasks to support conservation initiatives of mutual interest. Discussing your priority research questions and crafting a sanitized data drop with your research partner can be an effective way to move your project forward.

Component 4. Partners

Encourage and support interagency collaborations. As your team develops a stronger understanding of the problem, you will be able to identify individuals, businesses and organizations best placed to intervene in reducing the problem instead of your wildlife authority alone. Forming working relationships with other agencies and civil society groups becomes easier when problem-solving staff are given the authority to engage and craft mutually beneficial problem reduction strategies.

Encourage novel, long-lasting crime prevention solutions. Partnerships allow you to access expertise you may not have within your wildlife authority, enabling more innovative and long-lasting interventions. Partnerships also help you overcome the limitations of your mandate.

Component 5. Management

Set accountability early on. Guard against creeping back to old work routines by making responsibilities and project deliverables clear early on. An open-ended problem-oriented project is at risk of drifting. This is particularly important if your team comprises individuals from different branches within your wildlife authority reporting to different line managers. Make sure you have a leader that sets realistic timelines for the project and ensures the team has the expertise and support it needs in order to succeed.

Look for and get quick wins. Quick wins are accomplishments that help you and your team build momentum on a new project. Knowing that problem-solving requires time and patience, it is good to find tasks that show the value of your approach early on. Can you produce a 1-page fact sheet about the problem? Do it. Can you speak with officers and communities about the problem informally? Do it. A quick win does not have to be an intervention; it could be sharing some preliminary analysis back to project partners that have contributed to a data drop. For instance, analysis of NGO alternative livelihood data against you own arrest records might reveal the NGO partner is not investing in the villages where most poachers come from. Giving back results of the analysis early on will avoid the sensation that partners are feeding information into a black hole and not seeing any return. Building these communication channels early in the project is key; a quick win in itself.

Support your problem-solving team. The project will need oversight and frequent checks to make sure the team is on track and progressing, and any challenges are identified early and removed. Problem-oriented projects can fail when initial enthusiasm from senior management fizzles out and administrative hurdles are not removed. Line managers should hold regular progress meetings with problem-solvers to:

- *Scrutinize findings and interpretations*
- *Check the team has the capacity and expertise it needs to succeed*
- *Coordinate and deconflict the team's work with other projects*
- *Ensure that the responses being proposed are in line with the wildlife authority's code of ethics and overall mission*
- *Ensure that lines of communication are clear and being used effectively within the authority and outside it*

Update colleagues throughout the project. Informal staff meetings or more formal problem-solving presentations are forums for engaging other members of your wildlife authority. Encouraging your problem-solving team to share findings and discuss approaches throughout the project engages other staff who may later be asked to support or share data. Regular sharing keeps project momentum and staff enthusiasm, and makes it easier to build a second problem-oriented project. Personnel outside your problem-solving team may bring fresh ideas and check assumptions your team is making, as well as helping you spot and avoid pitfalls.

Appraise staff performance in problem-solving. Staff performance indicators often focus on processes such as snares pulled, kilometers patrolled or reports written. Assessing and promoting staff based on aptitude in problem-solving would help you to start to embed the approach within your wildlife authority. Indicators for an appraisal of a staff member in a problem-solving team could include:

- *The problem-solver identified interventions which tackled the root cause of the problem and were not a continuation of a reactive response.*
- *The problem-solver identified interventions which did not rely solely on wildlife authority capacity, and found areas of mutual overlap with partners.*
- *The problem-solver was able to clearly communicate the logic for how the selected intervention would cause a reduction in the problem.*
- *The problem-solver evaluated the strengths and weaknesses of different interventions thoroughly.*
- *The problem-solver considered crime displacement and unintended negative consequences and identified how these could be mitigated.*

Component 6. Review

Document your case study. Assessment is a critical element of the SARA process. All problem-oriented projects should deepen your understanding of how this approach works within your wildlife authority. The Herman Goldstein Award submission [template](#) is a useful series of questions that guide you through the documentation process. Publishing your case study internally will provide an important reference for the next cohort of problem-solvers.

Learn from failures by embracing them, not hiding them. Not all problem-oriented projects are guaranteed to succeed in reducing your wildlife crime problem. That is fine, provided the reasons for failure are then assessed, documented and the findings shared to avoid repeating the same mistakes.

Share lessons learned within your wildlife authority and outside it. The problem-solving team can give presentations on their work to colleagues or mentor the next cohort of problem solvers. Doing the same with current and future partners is also important. Sending your problem-solvers to present at international conferences such as the World Conservation Congress or World Ranger Congress, and submitting your case study to the Center for Problem-Oriented Policing's Herman Goldstein Award would all be significant steps to take.

Combining the components: A word of encouragement

For readers who are ready to take on a problem-oriented project after reading this guide we wish you all the best. Take comfort in the old adage, 'problem solvers are made not born'. You and your colleagues are likely to run into frustrations along your road to success. Learn from the ups and downs of your project, and share these experiences with others, so we can all learn together. The value of a collection of problem-oriented case studies on wildlife prevention should not be underestimated. These small projects will help move us towards a better understanding of what works and what does not work in wildlife protection.

The Essential Components of Problem-Oriented Projects		
Component	**How to make it work**	**Check you are on track**
1 A Problem-Solving Team	**Re-task** staff to be designated problem solvers. **Delegate** decision making authority. **Train** managers and problem solvers in problem solving techniques.	• Do your problem-solvers have clear line management? • Do your problem-solvers have sufficient time allocated to begin? • Have your problem-solvers and line managers undergone formal training in problem identification and analysis? • Do your problem-solvers have sufficient expertise to begin?
2 Information	**Access Information** from within your own wildlife authority **Access Information** from other agencies and organizations. Support **proactive** Information collection.	• Are your problem-solvers using a diverse range of information sources? • Does the team have the skills and time to merge and triangulate data drops? • Has the team identified knowledge gaps and developed a strategy to fill the gaps?
3 Analytic capacity	**Invest in** a trained analyst. **Outsource** discrete analysis projects.	• Does your team have ready access to analytic support or personnel? • Does your analyst have the expertise needed? • Does the analyst have sufficient time to work on the project?
4 Partners	Encourage and support **interagency collaborations**. Encourage novel, long-lasting **crime prevention solutions**.	• Have you identified partners that also deal with the problem? Are they willing to help? • What are the possible hurdles to the collaboration and have you mitigated them? • Is the time required for interagency collaborations accounted for in workflows and expected outputs? • Are the levels of motivation and resources required for your response sustainable?
5 Management	Set **accountability** early on. Look for and get **quick wins**. **Support** your problem-solving team. **Update** colleagues. **Appraise staff performance** in problem-solving.	• Do problem-solvers and line managers have well defined project deliverables? • Does the project line manager hold meetings on a regular basis with the team? • Has the team identified quick wins that will build project momentum early in the process? • Do you have a staff performance appraisal system that rewards problem-solving aptitude?
6 Review	Document your **case study**. **Share** learnings within your wildlife authority and outside it **Learn from failures** by embracing them, not hiding them.	• Is the case study published and made available to all staff in your wildlife authority? • Have you shared the results of your project with any external agencies? • Is it encouraged to report failures and adaptations so others can learn?

References

1. Game, E. T., Meijaard, E., Sheil, D. & Mcdonald-Madden, E. Conservation in a wicked complex world; challenges and solutions. *Conserv. Lett.* **7**, 271–277 (2014).

2. Clarke, R. V & Eck, J. E. *Crime Analysis for Problem Solvers in 60 Small Steps*. (Center for Problem-Oriented Policing, 2005).

3. Skogan, W. & Frydl, K. *Fairness & effectiveness in policing: The evidence*. (National Research Council, 2004).

4. Hinkle, J. C., Weisburd, D., Telep, C. W. & Petersen, K. Problem-oriented policing for reducing crime and disorder: An updated systematic review and meta-analysis. *Campbell Syst. Rev.* **16**, (2020).

5. Bowers, K., Johnson, S., Guerette, R. T., Summers, L. & Poynton, S. Spatial Displacement and Diffusion of Benefits Among Geographically Focused Policing Initiatives. *Campbell Syst. Rev.* **7**, 1–144 (2011).

6. Moreto, W. D. & Charlton, R. Rangers can't be with every elephant: Assessing rangers' perceptions of a community, problem-solving policing model for protected areas. *Oryx* 1–10 (2019) doi:10.1017/S0030605318001461.

7. Boratto, R. & Gibbs, C. Advancing interdisciplinary research on illegal wildlife trade using a conservation criminology framework. *Eur. J. Criminol.* 1–22 (2019) doi:10.1177/1477370819887512.

8. Booth, H. *et al.* An integrated approach to tackling wildlife crime: impact and lessons learned from the world's largest targeted manta ray fishery. *Under Rev.* (2020).

9. Naude, V. N. *et al.* Longitudinal assessment of illegal leopard skin use in ceremonial regalia and acceptance of faux alternatives amongst followers of the Shembe Church, South Africa. *Ecol. Soc.* **in review**, 1–16 (2020).

10. Ghosh, S. A Naga village's journey from hunting ground to safe haven for the Amur falcon. *Mongabay* (2018).

11. Rao, K. How three Indian villages saved the Amur falcon: A new grassroots conservation model takes root. *The Guardian* (2013).

12. Gibson, M. C. G. Problem-Oriented Policing for Natural Resource Conservation. *Conserv. Criminol.* 115–131 (2017) doi:10.1002/9781119376866.ch7.

13. 't Sas-Rolfes, M., Challender, D. W. S., Hinsley, A., Veríssimo, D. & Milner-Gulland, E. J. Illegal Wildlife Trade: Scale, Processes, and Governance. *Annu. Rev. Environ. Resour.* **44**, 201–228 (2019).

14. Moreto, W. D. & Lemieux, A. M. From CRAVED to CAPTURED: Introducing a Product-Based Framework to Examine Illegal Wildlife Markets. *Eur. J. Crim. Policy Res.* **21**, (2015).

15. Phelps, J., Biggs, D. & Webb, E. L. Tools and terms for understanding illegal wildlife trade. *Front. Ecol. Environ.* **14**, 479–489 (2016).

16. Bichler, G., Malm, A. & Cooper, T. Drug supply networks: A systematic review of the organizational structure of illicit drug trade. *Crime Sci.* **6**, (2017).

17. Bennett, E. L. Another inconvenient truth: The failure of enforcement systems to save

charismatic species. *Oryx* **45**, 476–479 (2011).

18.   Cornish, D. B. & Clarke, R. V. Opportunities, Precipitators and Criminal Decisions: A reply to Wortley's critique of situational crime prevention. *Crime Prev. Stud.* **16**, 41–96 (2003).

19.   Kurland, J., Pires, S. F., McFann, S. C. & Moreto, W. D. Wildlife crime: A conceptual integration, literature review, and methodological critique. *Crime Sci.* **6**, (2017).

20.   Kennedy, D. M. Pulling levers: Chronic offenders, high-crime settings, and a theory of prevention. *Valparaiso Univ. Law Rev.* **31**, 449–484 (1997).

21.   Braga, A. A. Pulling levers focused deterrence strategies and the prevention of gun homicide. *J. Crim. Justice* **36**, 332–343 (2008).

22.   Braga, A. A., Weisburd, D. & Turchan, B. Focused deterrence strategies effects on crime: A systematic review. *Campbell Syst. Rev.* **15**, (2019).

23.   Borrion, H. *et al.* The Problem with Crime Problem-Solving: Towards a Second Generation Pop? *Br. J. Criminol.* **60**, 219–240 (2020).

24.   Damania, R., Milner-Gulland, E. J. & Crookes, D. J. A bioeconomic analysis of bushmeat hunting. *Proc. R. Soc. B Biol. Sci.* **272**, 259–266 (2005).

25.   Eck, J. E. *Assessing Responses to Problems: Did It Work? An Introduction for Police Problem-Solvers*. (Center for Problem-Oriented Policing, 2017).

26.   Scott, M. S. & Kirby, S. *Implementing POP. Leading, Structuring, and Managing a Problem-Oriented Police Agency*. (U.S. Department of Justice Ofce of Community Oriented Policing Services, 2012). doi:10.4324/9781351170765-4.

27.   Sidebottom, A., Kirby, S., Tilley, N., Armitage, R., Ashby, M., Bullock, K. and Laycock, G. Implementing and sustaining problem-oriented policing A guide. *Jill Dando Inst. Secur. Crime Sci. Univ. Coll. London* 26 (2020).

Author Information

Andrew M. Lemieux
Andrew M. Lemieux is a researcher at the Netherlands Institute for the Study of Crime and Law Enforcement (NSCR). He coordinates the NSCR's Wildlife Crime theme and is a member of the Spatial and Temporal Crime Patterns theme. Over the last decade, Andrew has worked with numerous wildlife-protection agencies in Africa and Asia including governmental, non-governmental, and private entities. His work revolves around the collection and use of data for decision-making, with an emphasis on problem solving and situational crime prevention. He has spent considerable time in the field with rangers on the front line of protection efforts and with managers looking for innovative ways to protect their ecosystem. These experiences are what led Andrew to promote the use of problem-oriented wildlife protection as a way to find holistic solutions that are mutually beneficial to wildlife and people.

Email: alemieux@nscr.nl

R.S.A Pickles
Rob closely supports and coordinates teams in protected areas in Asia to conduct problem-oriented wildlife protection. Having worked closely with counter-poaching teams for the last seven years, Rob is particularly focused on overcoming the challenge of preventing poaching in remote, deep forest environments with small resource-strapped ranger teams. Rob earned a Ph.D. in ecology from the University of Kent and Zoological Society of London in 2010 and joined Panthera in 2012. He is an honorary research fellow at the Netherlands Institute for the Study of Crime and Law Enforcement.

Email: rpickles@panthera.org

Acknowledgments