

The Poaching Diaries

*Crime Scripting for
Wilderness Problems*

Edited by A.M. Lemieux

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The Poaching Diaries is an edited collection of contributions on wildlife crime prevention and wilderness problems. It is an outlet for practitioners, policy makers, and academics to tell stories that facilitate problem-solving.

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Reactionary script after rhino poaching event

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Problem description

After a rhino poaching incident in an African game reserve, the crime scripting tool was used to reactively trace back the steps in the poaching process, and identify windows of opportunity based on patrol movements. A reactionary script like this, including the actions of multiple actors such as poachers and law enforcement, can help guide investigations – possibly even leading to prosecutions – and it can aid in the development of interventions and policies to prevent repeat victimization. In this case repeat victimization can be a repeat poaching event on the game reserve, using all or some of the same methods and opportunities.

The full decision-making processes of the poachers involved need to be considered to understand how the event unfolds. Crime scripts are useful to obtain a structured understanding of all stages within the crime commission process – where the actual killing of a rhino is only one stage in the script. Crime scripts explicitly articulate the decision-making process involved in a particular crime, specifying the actors, circumstances and components required during each stage, i.e. before, during, and after crime. Here, seven stages were identified: “preparation”, “illegal entry”, “searching”, “killing”, “returning”, “illegal exit”, “selling” (Figure 1). Figure 1 displays known and estimated information from the rhino poaching incident that is being scripted.

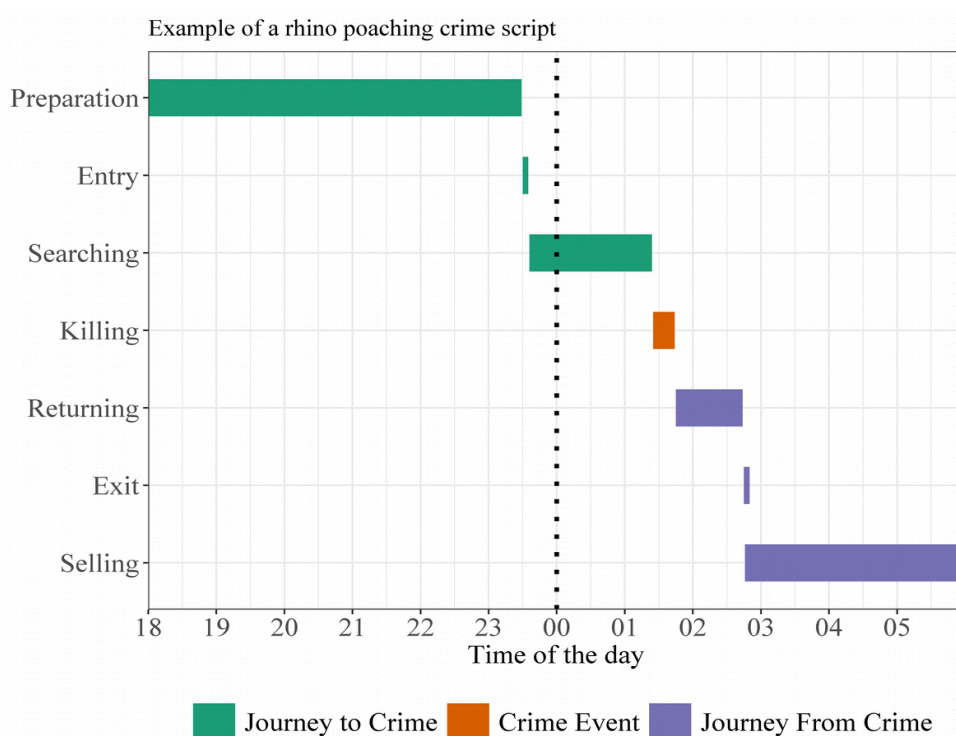


Figure 1. Overview of the seven different stages of a rhino poaching crime script. The example is based on known and estimated information from the poaching incident under investigation

Information sources

The reactionary scripting shown here is based on operational information from law enforcement teams in the game reserve, as well as spatial and temporal analyses thereof. For this example, the specific context was removed, presenting the thought process and application of reactionary scripting without sensitive information.

Crime process and script

Preparation

The process starts with a group of motivated poachers preparing to obtain a rhino horn. It is unknown how much time is typically spent on the preparation of a poaching event but presumably, several days, or even weeks will be necessary. Preparation at least includes obtaining a weapon to kill or immobilize the rhino and equipment to cut off its horn. Further actions likely also include collecting information on the patrol regime, offering bribes, obtaining food and water, and arranging a car and driver before poachers can head towards the border of the reserve to initiate the incursion.

Collecting information on the preparation stage is challenging because it includes information on legal activities, like purchasing or obtaining equipment. In addition, all these actions are done outside the borders of the reserve and cannot be detected by patrolling rangers. Still, it is possible to collect additional information. For example, in the current case under investigation, .458 and .404 projectiles were recovered from the poached rhino crime scene. In this region, these types of bullets are typically found in two industries: the big game hunting industry, and the lodge industry. The bullets are not commercially available unless a person has a license for a specific weapon. Therefore, poachers likely obtained the bullets by bribing someone who works at a local lodge or hunting company. Other types of evidence may include leftover food scraps, trash, cigarette and alcohol packets and tire tread marks. Such traces can help determine where poachers originated, their group size, and transportation methods.

As we will see later, the poachers entered the reserve from a small river / drainage line. This river runs near a local village Y. With plenty of roads around the area, poachers may have been dropped-off near the river, from where they continue on foot. They could have continued on foot, likely following the river towards the border of the reserve.

Illegal entry

The illegal entry into the reserve is the first offense in the rhino poaching crime script that rangers can detect and report. Poachers need to decide on where and when to cross the border before they can start hunting. The exact timing of the illegal entry in this case was unknown, as it will commonly be, but can be estimated from other sources of information through a scripting approach. Importantly, the entry location was identified.

On the day in question, a patrol team passed the entry location at 18:19 (red dotted line in figure 2). The earliest that the poachers could have entered the reserve was at 18:20. Here, we assume that patrol teams would have detected the illegal entry if poachers entered before 18:19. The gunshot was reported at 01:25, and the carcass was located 3.3 km away from the entry location. If we assume that poachers walked with an average speed of 3 km/h (Tobler's hiking function), it would take them approximately 66 minutes if they walked in a straight line from the entry location to the kill-site. Keeping this in mind, it is unlikely that poachers would have entered before 18:19, because that would mean they spent over 7 hours inside the reserve before the shots were fired (or reported). Furthermore, using the carcass location and time of gunshot, poachers likely did not enter later than 00:19. The maximum window of opportunity for entry was about 6 hours (light gray area in figure 2).

Refining Window of Opportunity for the Entry

Walking in a straight line from entry location to the kill site is an unlikely scenario. The entry and kill site are near a perennial river, so a more likely scenario is that the poachers followed the river until they reached a dam near the eventual kill-site. The distance along the river from entry to kill site is approximately 5.8 km, and would take them about 116 minutes, just under two hours. From this, it follows that poachers likely did not enter later than 23:29. In this scenario, the maximum window of

opportunity for entry was just over 5 hours (figure 2). Looking at the patrol data, another patrol team crossed the river at 23:13, but did not detect or report any poacher- related signs. Poachers might have entered after that team passed by, or it may have failed to detect the potential signs.

Another scenario would be that poachers have information about patrol regimes. To illustrate this scenario, we used patrol data from the months following the poaching incident and assumed that the observed patterns are similar to the patrol regime before the incident. The data show that 36% of all patrol visits to the entry site were between 18:00 and 21:00 (Figure 2). Patrol activity peaked at around 18:40. If poachers somehow know this pattern, it is likely that they would choose to enter after 21:00. The probability of encountering a patrol at the illegal entry site between 21:00 and midnight is 11%, compared to the 36% between 18:00 and 21:00.

Combining the two scenarios, poachers probably entered the reserve sometime between 21:00 and 23:30 (blue area in figure 2). Poachers may have followed the river after entering, but possibly also used patrol information to decide when to enter. Looking at the patrol data, the first patrol team ended their patrol at 23:03. Another patrol team crossed the river at around 23:13 and continued eastwards. A worrisome scenario would be that someone on the inside informed the poachers or signaled to them that it was safe to enter. In this scenario, the poachers likely entered sometime between 21:13 and 23:30 (red area in figure 2). Figure 2 shows the probability of a patrol being present at the entry location, over a 24-hour time period.

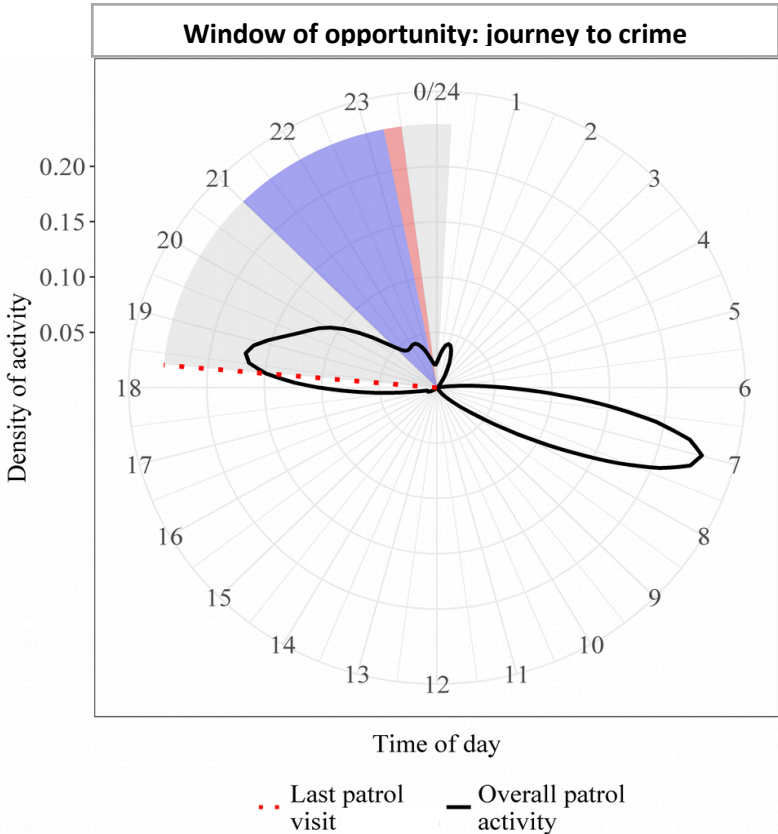


Figure 2. Patrol activity probability around the entry location (solid black line). The colored areas represent the windows of opportunity for entry. The red dotted line is the likely first possible entry time. The light gray area of 6 hours is the maximum window of opportunity to enter, the blue area of 2.5 hours is the window based on required walking time and general patrol avoidance, and the red area of 2 hours and 17 minutes (21:13-23:30) represents possible inside information to avoid a specific active patrol.

Searching

After the entry, poachers start searching for rhinos while avoiding detection. A possible poacher tactic could be to time their incursion with high rhino activity. This way poachers could optimize their chances of encountering a rhino or picking up fresh signs. The green line in Figure 3 represents the average activity pattern of rhinos based on analyses and publications on this subject. Rhinos seem to be most active in the early morning between 5 am and 10 am. The previously determined 'window of opportunity' estimations are also presented in the figure. Rhino activity was estimated to be quite low in the time range that poachers likely operated. From this, it seems that poachers did not time their incursion with activity peaks of rhinos.

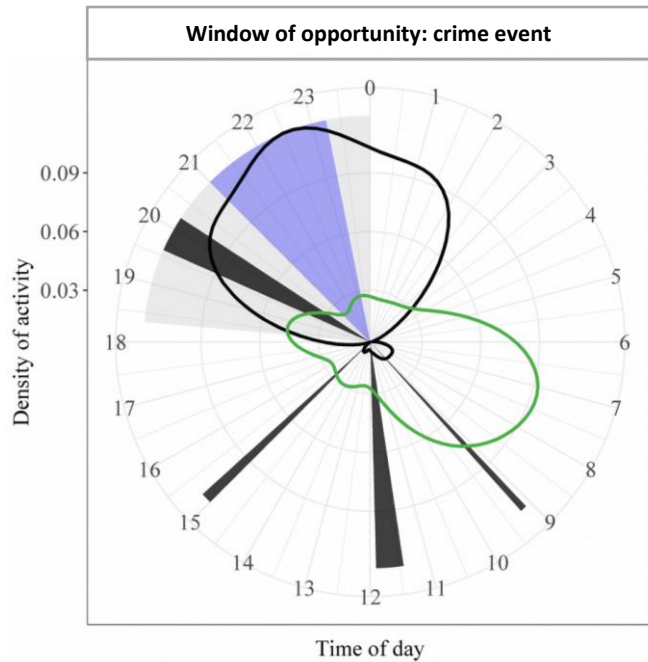


Figure 3. Activity probability estimation for patrols at dam (black line) and rhinos (green line). The black areas show when and for how long a patrol was present at the dam on the day before the incident that took place at night.

The black line in Figure 3 represents the likelihood of a patrol being present around the dam. For this estimation, we used patrol data from the months surrounding the poaching incident, excluding the data from the month in which it took place because it will likely bias the overall patrol activity estimation. In general, a patrol team is likely to be present between 7 pm and 2 am. Within the analyzed period, a patrol team visited the dam at least 66 out of 105 days, or 62% of the time. However, on the day/evening before the incident at night, no patrol team was present at the dam after 8 pm (black rectangles in Figure 3). Two sightings of rhinos were reported on the day before the poaching event, and patrol data show patrol presence to be focused at the areas where these sightings were recorded. This resulted in the entry site and dam being unprotected.

Killing

The three gunshots were reported by shareholders in the dam at 01:25. The shareholders live 600 – 650 m away from where the carcass was found. Around the time of gunshot, a patrol team was active near another water dam, approximately 2.1 km away from the carcass location, but did not report anything. Depending on whether the poachers were experienced hunters or not, horn removal can take somewhere between 5 to 30 minutes. This would mean that poachers left the crime scene between 01:30 and 01:55.

Returning to the border of the reserve

After cutting off the rhino's horn, poachers will need to make their way out of the reserve. This is perhaps the riskiest stage for the rhino poacher because they can get caught with the horn in their possession. A realistic assumption is that poachers will attempt to escape as soon as possible and do not try to hide inside the reserve. Therefore, we assume that the poachers' travelling speed is higher than when they were searching for rhinos. The nearest "exit" would be approximately 2.6 km away from the carcass location. Assuming a travelling speed of 5 km/h, poachers would have reached the point of exit between 02:00 and 02:30. In this scenario, however, the poachers probably would have ran into one of the patrol teams, which was driving in Northern direction along the boundary between 02:15 and 02:40. Another plausible scenario is that poachers used the same route as after they entered the reserve, by following the river again. The river likely provided some cover for the

poachers or perhaps an easier surface to walk or run on. Under this assumption, it took the poachers approximately 1 hour and 10 minutes to return to the reserve's border. Depending on how much time was spent on removing the rhino horn, poachers likely made their way towards the exit location somewhere between 01:30 and 03:05.

After the gunshot report, other patrol teams were informed about the incident. One of the patrol teams made their way back towards the incident location along the reserve's border. They crossed the river that the poachers likely used around 02:23. The team did not report any poacher signs at that moment and continued driving towards the gunshot location. Either the poachers had already passed that location, or they may have heard or seen the vehicle coming. In that scenario, they would likely hide until the patrol passed by.

Exit

The escape out of the reserve is often the last offense in the rhino poaching crime script that rangers can detect and report. Similar to the illegal entry, the timing of the exit is unknown but can also be estimated.

For this incident, the exit location was the same as the entry location. A possible reason why poachers acted in this way might be because someone was waiting for them to return, on the other side of the border. Figure 4 shows the probability of a patrol team being present near the entry-exit location (this is the same density line as in Figure 2). The earliest that the poachers could have exited was probably around 02:40. In this scenario poachers would have removed the horn very quickly and maintained a travel speed of approximately 5 km/h.

The entry-exit location was reported by patrol teams at 13:43, after the incident. The entry-exit location was not covered during a morning patrol. This means that technically the poachers had a maximum window of 13 hours to exit. However, the teams estimated the age of the sign to be around 6 to 12 hours old. According to their estimation, poachers left sometime between 01:43 and 07:43. The estimation of 01:43 would mean that poachers escaped within 20 minutes after the gunshot was reported at 01:25. Assuming that the shareholders reported the gunshots immediately, it is unlikely that poachers removed the horn and returned to the border within 20 minutes. The earliest that poachers likely could have reached the border would be around 02:40. Therefore, a more realistic estimation is that poachers escaped the reserve between 02:40 and 07:43 (blue area in figure 4). While not impossible, in most cases poachers do not hide inside the reserve after firing gunshots because there is a likelihood that they will be caught by patrolling rangers. Therefore, the most likely scenario here is that poachers moved towards the exit location, as soon as they obtained the rhino horn. This would suggest that they exited the reserve some time between 02:40 and 03:05, depending on how much time was spent on removing the horn (red area in Figure 4).

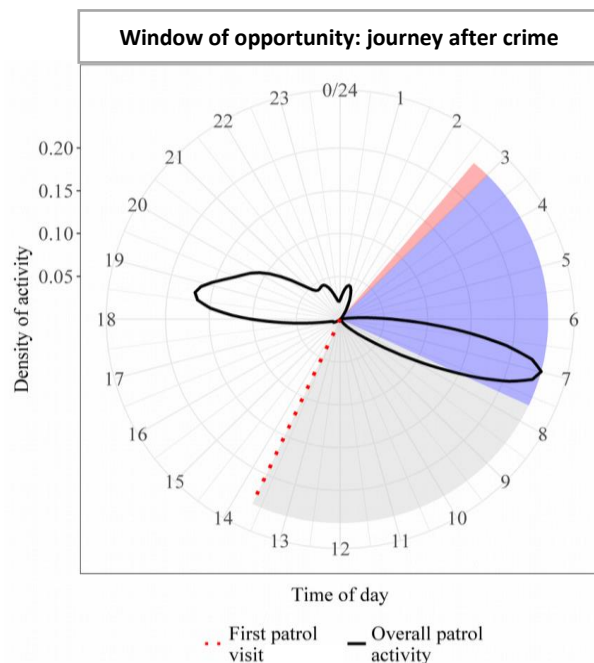


Figure 4. Patrol activity probability around the entry/exit location (solid black line). The area in gray, blue, and red represent different estimations of the poacher's window of opportunity to exit, with the red dotted line being the latest possible time.

Selling

After escaping the reserve, the poachers will have to return home or to a hiding place. It is unknown how much time there is between escaping the reserve and selling the horn to a middleman. As long as the poacher has the horn in his possession, he runs the risk of receiving higher charges if he gets arrested. Therefore, a poacher probably aims to sell the horn as soon as possible. Similar as to the preparation stage, it is difficult to obtain information on where, when, and how this happens and a lot is unknown at this stage. The best way to collect such information would be through poacher arrests. Arrested poachers may provide us with more information about how he was planning to go about selling the horn, or how he operated in the past.

Crime script summary

Poachers prepared for the hunt by collection at least two hunting rifles. In addition, they may have bribed rangers to obtain information on patrol regimes but no solid evidence exists to prove this. In the evening preceding poaching event, poachers most likely left from the nearby village Y or were dropped off near the river. Poachers then followed the river bed up North towards the border fence, arriving at approximately 23.00. They may have seen a patrol vehicle passing by around 23:13. After crossing underneath the fence line, they followed the river bed into the reserve. Poachers searched for approximately 1.5 hours, and covered around 5.8 km before arriving at the dam. They found rhinos at that location and fired three gunshots at 01:25. The poachers cut off the horns of the rhinos and made their way back to the border. They probably used a similar route as when they entered the reserve. The poachers returned to the border between approximately 02:40 and 03:05 at the same location as their entry. It is possible that a vehicle outside the reserve was waiting for them to provide cover and to hide the horn. The poachers likely spent less than 4 hours inside the reserve.

Discussion

The reactionary scripting of law enforcement actions, allows us to estimate windows of opportunity and likely decision-making processes of poachers. As such, using this approach a plausible *modus operandi* can be determined for a specific poaching event. Windows of opportunity, as well as their reliance on patrol coverage, can be identified, so changes can be made to reduce such opportunity. This may lead to preventing repeat victimization of the reserve. Additionally, the information above can guide investigations into the perpetrators, because it provides clues that can be followed up to arrive at suspects and possible charges.

Because the script deals with a specific case, it is unclear how it can be applied to other, similar crime events. Only with additional information from other events or from poacher arrests can one determine how common specific steps are. Additional information can also help determine how many resources should be diverted to preventing these specific opportunities, without displacing the crime to a different location, a different time, a different method or a different crime type all together.

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