

An Assessment of the Indiana Department of Correction GPS Pilot Program



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In February 2007 the Indiana Department of Correction (IDOC) implemented a Global Positioning Satellite (GPS) pilot program for paroled sex offenders residing in Vanderburgh (Southern district) and St. Joseph (Northern district) counties. As part of this process, researchers at the Center for Criminal Justice Research were selected to document, describe, and assess the planning, design, and implementation of the pilot program. Between October 2007 and June 2008 the research team worked with IDOC personnel, parole district supervisors and agents, community corrections staff, and the GPS vendor to collect the data for this assessment. In addition to the pilot sites, data were also collected for a comparison group of sex offenders in Madison County (Comparison District) (see Appendix 3 for research methods).

The pilot programs utilized the BI ExacuTrack AT system operated in the active mode without the base units. When operated in this way the system consisted of a transmitter attached to the client's ankle, a tracking unit carried by the client, and a central computer system. The transmitter, like other radio frequency (RF) systems, generated a periodic signal intended to identify the general proximity of the client to the tracking unit. The tracking unit was a cell phone with RF monitoring, GPS, and messaging capabilities (see Appendix 1 for complete description of GPS technology). The tracking unit would periodically contact the central computer to report a wide variety of information about the client's movements.

This summary report presents the basic findings and recommendations of the study.

Findings

The strength of the assessment design and ultimately the strength of the research findings were limited by the late entry of the assessment team in the GPS Pilot Program process. This limited the research team to data derived from the memories of individuals involved in the program, documents developed and retained by IDOC personnel, and existing records and databases.

The planning and design stage was rushed and characterized by a lack of involvement by local personnel or direction by state officials. Each of the initial three sites had to develop their own program and they had to do it in a very short time frame. This resulted in no program at one of the three initially selected pilot sites. No specific goals, guidelines, or objectives were provided at the state level.

The decision to have the GPS systems operated by local community corrections agencies resulted in a structure that potentially could work for a statewide GPS program. Indiana has a strong network of community corrections agencies with considerable experience with electronic monitoring systems. Local administration of the GPS monitoring system would take advantage of the personal knowledge of the geographic area possessed by the personnel at these agencies.

The lack of statewide guidelines about the Pilot Program structure produced not one, but three different outcomes with differing structure and somewhat differing behavioral restrictions. One site failed to develop a program. More explicit program definition and more clearly defined role expectations might have avoided this result. The remaining two sites developed viable programs in a very short period of time. While the two programs were similar in most respects, there were significant differences. Any anticipated statewide program would need to standardize program structure and features.

The available data indicate that the dedicated staff approach utilized in the Southern district produced more attentive operation of the GPS system. In general, at this site



system alerts were cleared more quickly than at the other site. The site with the dedicated staff experienced fewer parole failures due to technical violations. It is possible that the closer system operation resulted in fewer violations of the conditions of parole.

In the Northern district, for the 30 individuals with the possibility of at least six months on the GPS monitoring, there were no parole failures as a result of a new arrest. The parole agent in this district imposed a curfew on the program participants that may have contributed to this outcome.

It is possible that the GPS monitoring may have helped reduce parole failure in this population. When the two pilot sites were combined, the overall parole failure rate for those clients with at least a six-month exposure was 48.3 percent, while the overall failure rate for the comparison site was 61.7 percent. This represents a 21.7 percent lower rate of parole failure over a relatively short exposure period. As with the other findings, the assessment design does not allow for the elimination of other explanations (selection methods, sample size, length of time) for this outcome. On the other hand, the observations made during the site visits and the impressions of the community correction and parole personnel suggest the monitoring as a likely contributor to the lower failure rate.

The parole agents and their supervisors in the GPS Pilot Program sites thought the program improved their ability to do their job. In particular, they thought the GPS monitoring both reduced misbehavior (through an increased chance of detection) and reduced lying about activity patterns. This was viewed as a valuable addition to parole supervision.

Recommendations

Based on the findings of the assessment, several recommendations are offered:

- Essential program elements, objectives, guidelines, and expectations need to be developed in advance of program implementation.
- Subsequent programs should narrow the population of individuals targeted for GPS monitoring to those individuals rated as high risk of recidivism on a validated risk assessment instrument designed for sex offenders and/or those individuals at imminent risk of being returned to prison for technical violations. While a GPS system may help reduce the chances of a return to prison for high risk individuals, it can have very little effect on those groups at low risk of recidivism.
- When considering implementation of a new program, the researchers who will conduct the evaluation or assessment should be involved in the very earliest stages of program development.
- GPS electronic monitoring may be a viable tool for parole supervision of some client populations. As of the cutoff date for data collection, very few (8 of 133) of the individuals monitored with the GPS system had been arrested. Of those who were arrested, only one was charged with a new sex offense.
- Future GPS monitoring programs for parolees should include a curfew and should be delivered by a dedicated staff. One of the present programs included a curfew and experienced no new arrests. The other program utilized a dedicated staff and experienced fewer system alerts and fewer revocations for technical violations. These differences may be attributable to other sources, but it is plausible that they derive from these program characteristics.



INTRODUCTION

In February 2007 the Indiana Department of Correction (IDOC) implemented a Global Positioning Satellite (GPS) pilot program for paroled sex offenders residing in Vanderburgh and St. Joseph counties. As part of this process, researchers at the Center for Criminal Justice Research were selected to document, describe, and assess the planning, design, and implementation of the pilot program. Between October 2007 and June 2008 the research team worked with IDOC personnel, parole district supervisors and agents, community corrections staff, and the GPS vendor to collect the data for this assessment (see Appendix 3 for research methods).

The body of this report presents the basic findings of the research team. The program origin, planning, and design features are described; the basic operational characteristics of the GPS system are reviewed; agency operation of the GPS system in the two pilot sites is discussed; parolee performance in the pilot and comparison sites is discussed; and the parole agent reactions to the GPS system are described. The findings are followed by summary conclusions and recommendations. Appendices contain a description of the operation of GPS systems, a literature review, documentation of the methodology used in the assessment, and descriptive profiles of the clients in the pilot and comparison sites.





PROGRAM ORIGIN, INITIAL PLANNING, AND PROGRAM DESIGNS

The Indiana GPS Pilot Program was funded by the Bureau of Justice Assistance (BJA), under the *Protecting Inmates and Safeguarding Communities* grant program to states. The proposal for this grant was prepared in mid-2005 by IDOC and the award was made later that year. While most of the grant activities focused on sexual victimization in prisons, one component was to “provide GPS monitoring for the highest risk sexually aggressive inmates and juveniles upon release to the community” (IDOC, 2005, p.9). Operationally, this was interpreted as applying to the “top 100” – the 100 highest risk sex offenders released to parole. The proposal specified an intent to lease 100 GPS electronic monitoring units, to determine the additional staffing requirements for 24/7 monitoring of the system, and to hire and train the requisite staff. In addition, a number of performance indicators were proposed.

Following receipt of the grant award, the Indiana Department of Correction (IDOC) developed more detailed feasibility and cost estimates for this component of the grant. This exercise clearly indicated that the fiscal, personnel, and logistical requirements of the project, as envisioned, far exceeded those available through the grant. Within the constraints of the grant it simply was not feasible to have the state parole districts monitor the “top 100” high risk parolees. Organizationally, they possessed neither the personnel required for such an endeavor, nor did they have any experience, within parole, operating an electronic monitoring system. Other states learned the importance of these factors the hard way (Tennessee Board of Probation and Parole, 2007). In addition, the logistics of getting the GPS equipment for only 100 parolees to the right offices in a timely fashion were going to be difficult, at best. This began a search for alternative strategies.

Various respondents indicated that an alternative approach was quickly identified that would solve most of the technical problems noted above. The revised plan was to let regional community corrections agencies with existing electronic monitoring programs operate the GPS equipment and coordinate their activities with the regional parole district. This approach had the advantage of mitigating the potential organizational, expertise, and personnel issues to be faced if the parole authority had to deliver the entire program from scratch. It did, however, create a potential for interorganizational coordination and communication problems and limited the program focus to a small number of community corrections agencies. This decision also eliminated the possibility of focusing on the “top 100” highest risk parolees in the state.

Site Selection

Given the decision to focus the pilot program on a subset of counties within the state, specific sites had to be selected. The state has 92 counties, 68 counties with community corrections programs (at the time), and 8 parole districts. The questions were “how many sites?” and “which locations?” The assessment staff was unable to locate any documentation of the site selection process and the turnover in IDOC staff limited the ability to reconstruct the site selection process. Some respondents reported that the initial focus and discussions were with a single high volume county. This focus, however, subsequently shifted. One respondent reported the emphasis shifted from issues of risk and statewide coverage to practical concerns about how to implement the



pilot program quickly. In the search for other sites, several respondents suggested two principal criteria were considered: a volume of cases high enough to generate 100 clients within the allotted time frame and a community corrections agency that had an existing contract and experience with the vendor selected for the pilot. In addition, one respondent added “interested in participating” and another added “strong Director and existing good relationship with IDOC that would facilitate a quick startup” as reasons for selection.

Neither parole personnel nor the community corrections officials in the selected counties were aware of the site selection process. In one district the parole supervisor was asked to contact the local community corrections agency to determine their interest; when they responded positively a meeting was scheduled to discuss it in more detail. In another district, a meeting was scheduled with central office personnel and local officials. After this meeting, both parole district and the community corrections agency indicated they received a call indicating that they would be a pilot site and needed to get started as soon as possible. The third county never did get started, largely because of an inability to reach agreement on the contractual arrangements between IDOC and the county community corrections agency.

Program Design and Start-Up

The local officials charged with implementation were given very little guidance about program design. They were aware that the target population was parolees who were required to register as sex offenders and each district was given a target number of cases to enroll in the pilot program. They were not provided with common program elements, procedures, guidelines, or rules; nor were program goals or objectives developed for the overall effort. The lack of an overall program design was further complicated by a very short time frame for implementation. Upon notification, both sites reported they were told to begin the program and fill the client positions allocated to them as soon as possible. This short implementation time frame resulted in one district with no program and two somewhat different programs in the remaining areas.

Within each county/district, responsibilities and program organization were developed quickly. The personnel in both counties reported organizing a meeting where responsibilities were allocated. In both sites the importance of communication and coordination were recognized. The parole district personnel set the basic rules and eligibility criteria for the program. Each of them saw the GPS program as an additional tool for monitoring and enforcing the conditions of parole. The community corrections personnel were responsible for operating the system, maintaining the equipment inventory, and adding and removing clients as directed by the parole agent. Inclusion zones (places where the parolee was supposed to be at certain times, such as home or work) and exclusions zones (places where the parolee was not supposed to be, such as schools) to be monitored by the GPS system were determined by the parole officer in consultation with the community corrections staff. The parole agents relied on the community corrections staff to monitor and handle the alerts generated by the GPS system.



Program Designs

The planning and design process described above produced different results in each of the three targeted districts: two developed and implemented programs very quickly, but no program was implemented in the third. Each program design is discussed below.

Vanderburgh County

Upon notification that they had been selected as a pilot program site, the personnel at the parole district and community corrections agency scheduled a series of planning meetings. These meetings focused on organization, duties, and responsibilities of the program. It was reported that from the beginning the focus was on the importance of communication and coordination between the two agencies. Both agencies agreed that the clients clearly were parolees. This meant that the primary responsibility and decision making rested with the parole agent who would identify the clients, determine program rules, and determine the consequences for documented violations. The community corrections agency was to be responsible for connecting the GPS equipment, monitoring compliance with the stated conditions of parole, and communicating violations to the parole agent.

The community corrections agency approached the pilot program as an entity separate from their ongoing operations by using a dedicated staffing approach. Two individuals were assigned to the program as full-time case managers. After being assigned to the program and having the equipment connected and activated, each new client met with one of them. The case managers conducted the original data entry for the new clients: entering the individual information, identifying the exclusion zones, and defining inclusion zones. These two case managers covered the hours between 8:00am and 8:00pm Monday through Friday. While in the office they monitored the system for alerts generated by the individual units. The program design called for them to meet with each of their clients weekly. Every other month the case managers attended the Sex Offender Management and Monitoring (SOMM) programs to answer questions.

In addition to the two dedicated case managers, a supervisor and the agency director were involved in program delivery. The supervisor managed the project, supervised the case workers, connected the equipment to the clients, activated the units, provided an initial orientation for new clients, monitored system alerts, and generated periodic reports from the monitoring system. The agency director was responsible for the overall pilot program contract, met regularly with the program staff, and alternated being on call after hours with the supervisor.

On the weekends and between 8:00pm and 8:00am during the week the system was monitored by the building deputy assigned to the community corrections agency entrance. These people were trained in system operation and given guidelines concerning the appropriate responses for system alerts, including when to contact the “on call” supervisor.

The community corrections agency staff reported that all individuals involved in the pilot program were trained by the GPS vendor in system operation. This training required approximately one day and all employees had to pass the certification exam created by the vendor. The exam was composed of 77 multiple choice and matching



questions divided into two parts: software certification and equipment certification. A “pass” on the exams required a minimum 85 percent correct answers.

St. Joseph County

In early 2007 the parole district supervisor was asked by IDOC central office staff to inquire whether St. Joseph County Community Corrections (SJCC) would be interested in participating in the GPS pilot program. After determining that SJCC was interested, a meeting was scheduled with personnel from IDOC central office, the parole district, and SJCC to confirm the general parameters of the program. Once agreement to move forward was reached, the parole district and SJCC personnel scheduled a series of planning meetings. It was reported that these meetings focused on the operational aspects of how to “make it work.” The substantive focus was on the definition of exclusion zones, determination of inclusion zones, and which GPS system alerts should merit notification to the parole agent. A formal memorandum of understanding was signed on February 16, 2007. This agreement indicated that SJCC would monitor the selected parolees and communicate violations to the parole agent. It was specified that SJCC would attempt to resolve GPS system alerts prior to notification. The parole agent was identified as responsible for all decisions concerning discipline and removal from the program.

The community corrections agency incorporated the tasks related to the operation of the GPS system and the monitoring of the clients into their existing routines. Although they did not have an existing GPS monitoring program, they were using a radio frequency electronic monitoring system produced by the same vendor. Two individuals who worked with the existing electronically monitored home detention program were assigned to the new GPS Pilot Program. They connected and activated the equipment for new clients and monitored the system for alerts between the hours of 8:00 am and midnight. Between midnight and 8:00 am the system was monitored by the night officers at the SJCC work release center. These individuals also entered all of the system information for each client during these hours. In addition, a case manager was assigned to the program part-time. This individual was responsible for reviewing the alerts generated by the GPS system and the actions taken by the home detention officers.

It was reported that the two home detention officers received one day of training in the operation of the new system from the vendor. They, in turn, trained the other individuals assigned to the pilot program.

Allen County

Allen County Community Corrections (ACCC) was approached by IDOC in early 2007 about participating in the GPS Pilot Program. A meeting was arranged between officials from IDOC central office, the parole district, and ACCC to discuss the project. At that meeting the general parameters of the GPS Pilot and the reimbursement rates were outlined. ACCC looked into the potential programmatic arrangements and developed what they thought was an acceptable program. Negotiations with IDOC continued through the spring and, at one point, a draft contract was prepared. By mid-May an impasse had been reached and by the end of July, ACCC had officially withdrawn.



It appears that the failure to develop Allen County as a GPS Pilot site derived from four interrelated concerns. First, Allen County had a reentry court with an existing program delivered by ACCC. This program had been carefully developed and ACCC was committed to the overall model and programmatic elements. Rather than simply serve as a “monitoring contractor,” ACCC sought to deliver the GPS Pilot Program within the existing reentry court model. This included a mental health evaluation at intake, field officers to check on the clients and respond to alerts, case management by ACCC (in addition to the parole agent), and general transfer of the client to the county reentry court. This model was considerably different than that pursued in the other counties.

Second, given that they would be delivering field services for the program, ACCC was very concerned about their lack of authority to arrest clients when a serious technical violation was detected. The field officers would have the authority to make an arrest in the case of criminal behavior, but since the GPS Pilot Program clients would be on parole, only the parole agent would have the authority to arrest for technical violations. ACCC saw this as critical to the credibility of the program. Several alternatives were investigated, but in the end no satisfactory arrangement could be developed.

The third issue concerned state residency restrictions for sex offenders. During the program planning stage ACCC officials obtained the names of all potential GPS Pilot clients and checked their addressees for compliance with state law prohibiting them from living within 1,000 feet of a variety of locations such as schools, parks, and day care centers. This review suggested that 28 of the 41 individuals checked lived within 1,000 feet of a prohibited location. ACCC officials recognized that they and parole measured distance in different ways, but they were insistent that all clients must be in compliance with state residency restrictions. While this could have been corrected in the long run, in the short run it created another impediment to program implementation.

The fourth issue concerned the schedule differences between ACCC and parole. ACCC operated its monitoring center around-the-clock seven days per week and had field staff on duty approximately 20 hours per day. The parole agents worked and the district parole office was open primarily 8:00am to 4:30pm Monday through Friday. This left a significant amount of time when ACCC personnel might detect or encounter a violation, but the parole office was not open. The agents could be called or paged, but the concern was with the elapsed time between the incident and response.





GPS EQUIPMENT OPERATION AND PERFORMANCE

The pilot programs utilized the BI ExacuTrack AT system operated in the active mode without the base units. When operated in this way the system consisted of a transmitter attached to the client's ankle and a tracking unit carried by the client. The transmitter, like other RF systems, generated a periodic signal intended to identify the general proximity of the client to the tracking unit. The tracking unit was a cell phone with both RF monitoring, GPS, and messaging capabilities. This unit was tuned to the signal of the transmitter to verify the proximity of the client to the unit. Like all RF systems, failure to receive the signal from the transmitter was recorded by the system as a potential violation. The tracking unit also included GPS technology designed to identify the location of the unit (see Appendix 1 for complete description of GPS technology). The cell phone was utilized by the system to report the RF and GPS information to the central computer system. The text messaging capability of the cell phone could be used by the agency to send messages to the client. The clients could acknowledge receipt of the text message by pressing an "acknowledge" button on the tracking unit, but they could not send text messages.

The personnel at the pilot sites were generally satisfied with the reliability of the equipment and the responsiveness of the equipment vendor. Few problems were reported with the actual transmitters or tracking units. Some clients experienced minor equipment problems that were easily resolved. Others had multiple problems that proved more difficult to resolve. Personnel at the pilot sites attributed these multiple problem situations to the clients (tampering, location, activity patterns, etc.) rather than equipment reliability. Personnel at one site reported problems with the power cords and the connections into the tracking unit. Also, the tracking unit serial numbers were printed on tags attached to the units. In some cases it was reported the serial number was obliterated rendering the unit unusable. The personnel reported that it is better to etch the serial number into the case. Program personnel did not experience the inventory and inventory replacement problems reported in the early GPS monitoring literature (Brown, et al., 2007). Faulty units were shipped by express mail and the replacement was usually received within a day or two.

Loss of the cellular telephone signal is a potential problem for all active GPS systems. Since the units in the Pilot Program relied exclusively on a cellular signal for communication with the central computer, a reliable signal was absolutely necessary. In one of the parole districts the contracting community corrections agency agreed to monitor three individuals who lived in the same parole district but resided in another, more rural, county. For each of these individuals the inability to consistently acquire a cellular signal at their residences interfered with the successful operation of the system. All three individuals were removed from the system within a few days. It is not known how extensive this problem might be across all areas of the state. For the remaining clients residing in the more populous areas, cell signal acquisition was not a major issue.

For these two sites GPS signal acquisition was a more frequently encountered problem (see *system reported events* below). In general, site personnel noted few problems with the tracking units' ability to report a location for the individuals. A few clients worked in industrial locations with heavy steel frame buildings that would interfere with both the cellular and GPS signals. Program staff reported that they would lose the signal in the morning when the individual entered the building and would not pick it up again until the person exited later in the day. This was not viewed as a critical problem by the staff. Personnel at both sites also reported occasional instances of serious drift, where an individual would appear to move over very large distances in a very short period of time. Since, they would then "return" to the original location within a few minutes, these incidents were treated as system artifacts.



Personnel at the pilot sites did report considerable frustration with initial client setup. Because the clients were sex offenders released from prison on parole, they were prohibited from being within 1,000 feet of “public parks with playgrounds, pools, rides, and/or nature trails; schools, day care centers, public swimming pools, public beaches, theaters, or any other place where children can reasonably be expected to congregate,” the list of “exclusion zones” was extensive (see Appendix 4 for parole stipulations for sex offenders in Indiana). The number of exclusion zones in one county was cited as “over 60” while the staff in the other county indicated over 100 distinct exclusion zones within the county. Because they are privately owned and operated, both sites indicated difficulty in identifying and including daycare centers as exclusion zones. The problem was that the vendor’s software did not allow creation of a template that could be applied to all clients. This required separate entries for each client and each zone and could require one to two hours of staff time for each new client. The vendor had promised this capability in a software update.

What Was Monitored?

It will be reported later that the parole agents were very positive about the GPS monitoring, but as one pointed out it is very important to note that the equipment helps identify where the clients are but not what they are doing. In general, the equipment could monitor proximity to inclusion and exclusion zones and client location at any given time. Both sites entered inclusion and exclusion zones for their clients. The inclusion zones generally were limited to the workplace and their place of residence. The parole agent in one district was more insistent about enforcing the housing inclusion zone than was the other parole agent. Because of the difficulty in entering the exclusion zones individually, both agencies limited the number of entries: one site entered all schools and some parks while the other reported entering schools, parks, and the daycare centers listed in the telephone book. Both sites reported that they entered the victim’s address as an exclusion zone, if it was current.

It is very difficult to navigate an urban area without coming within 1,000 feet of a school, park, or daycare center. Indeed, if absolutely prohibited from this proximity to such sites, the clients would be unable to accomplish the routines of daily life such as shopping and work. The parole agents and agency personnel understood this and allowed brief “passing” contact with the exclusion zones. The software allowed violation alerts to be “paired” such that an exclusion zone entry could be paired with an exclusion zone exit. If the latter occurred within a specified time period, usually five minutes, the alerts could be cleared automatically. One site reported periodic problems with the automatic clearance of paired alerts. This sort of travel violation was common, especially in the morning and afternoon. If a client remained in an exclusion zone longer than the grace period, both sites indicated they would send a “move from area” text message. As will be seen later in this report, the system generated a lot of exclusion zone and inclusion zone events, but almost all of them were viewed as informational rather than as actionable violations.

The ability to monitor client location at any given time proved to be valuable to the agencies in two ways. First, most potential clients were not very excited about the possibility of having their whereabouts monitored around-the-clock. Indeed, one individual chose to stay in prison rather than submit to the GPS monitoring. For the reluctant clients the agency personnel tended to emphasize the ability of the equipment to protect them from unwarranted accusations of misbehavior. It was reported that most of the potential clients found this to be an acceptable rationale.

The second value was the ability to pinpoint a client’s location at a specific time.

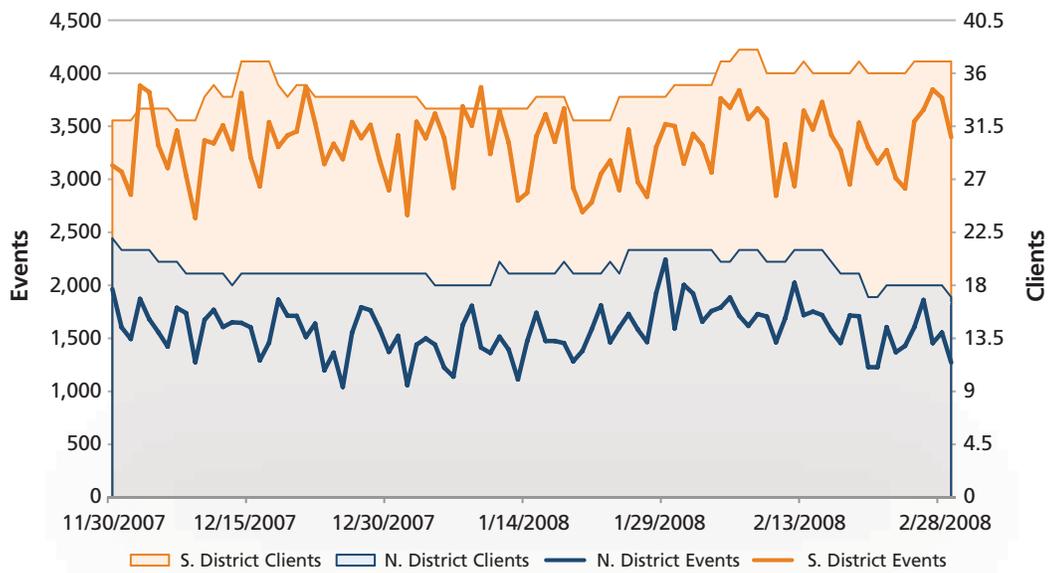


This could serve to exclude the individual as a suspect or could place them at the location of a crime at the time it occurred. The former situation occurred when a police officer from another county contacted program personnel about one of their clients stalking an individual in the other county. A quick check of the client's activities on the days in question eliminated him as a suspect. It turned out the other agency was looking for a person with the same name. The latter situation did occur once or twice during the pilot program. In one instance a convenience store was burglarized and the offender was caught on video. An alert detective tentatively identified the suspect as a parolee in the GPS program. This detective contacted the agency and asked if they could pull the client's activities from the night in question. The GPS record indicated the suspect left his residence, went to the convenience store at a time matching the burglary, and then returned to his place of residence. Based on the video and the GPS data, a warrant was obtained. When they went to the suspect's residence at a local motel, the money from the burglary was lying on the bed. In another instance the parole agent suspected a client of misbehavior and used the GPS system to locate him at his brother's house in violation of the "no contact with children" rule.

System-Reported "Events"

Figure 1 graphically presents the volume of system reported events and the number of clients in the two pilot sites. The graph indicates day-to-day variation in the number of recorded "events" with the number of events related to the number of clients (client days). For both programs the volume of events was substantial with the smaller Northern program generating around 1,500 events daily and the larger Southern program generating over 3,000 events per day. While events generally do not require action on the part of the operator, these figures serve to emphasize the large volume of information generated by the system.

Figure 1: Number of events and clients by day, St. Joseph and Vanderburgh County GPS pilot programs, November 30, 2007 - February 29, 2008



Notes: Events are messages transmitted from a client's tracking unit to a host computer as a result of equipment/system changes and/or client behavior and can be categorized as: host, transmitter, tracker, base station, client notification and acknowledgement, and other events.

Source: Behavioral Incorporated (BI), BI ExacuTrack Monitoring System



Table 1 presents the number of system-generated events and the number of events per client day for the period between November 2007 and the end of February 2008. On average the system reported 77.67 events per client day in the Northern district and 96.38 events per client day in the Southern district. The most common events were related to the GPS signal. This table indicates, on average, the system lost the GPS signal (*no GPS*) between 11 (10.97) and 16 (15.81) times per client day. While it is not clear why, the system recorded GPS signal loss almost 50 percent more per client day in the Southern district.

The next most common events were related to periods of inactivity, *no motion* and *tracker moving*. The tracking unit contained a motion detector which would notify the system when it did not detect movement for a period of time and then report again when it did. For the recorded time period this occurred approximately seven times (6.72; 6.98) per client per day.

Informational reports concerning the tracker battery charger also were common. The two sites received between two and three (2.48; 2.83) reports per client day that the tracker battery was charging or it had been disconnected (2.46; 2.79).

Following these were events related to the clients' *inclusion zone* and *exclusion zone* movements. An inclusion zone is a location where the client is supposed to be, such as their place of residence, while an exclusion zone is a location where they are not supposed to be, such as a school. On average the pilot program sites logged between two and three (2.68; 2.65) inclusion zone events per client day. Exclusion zone events were about as common as inclusion zone events in one site (2.25 per client day) but twice as high in the other site (4.99 per client day). This difference in exclusion zone event information may have been a function of the number of exclusion zones, the location of exclusion zones, or client activity patterns. In any event they did not translate into higher levels of system alerts. As noted elsewhere in this report the pilot sites acknowledged the difficulty of moving about the city without violating exclusion zones by allowing a grace period. If the client remained within an exclusion zone beyond the grace period, the system would generate an exclusion zone alert. The table reports the mean number of exclusion zone enter alerts (0.32; 0.21 per client day) and exclusion zone leave alerts (0.32; 0.21 per client day) were very similar for the two sites.

The cellular telephone part of the GPS system accounted for relatively few recorded events. The system reported losing the cell signal less than twice per day (1.84; 1.41 events per client day). It appears that the cell phone signals were considerably more accessible and stable than the GPS part of the technology (see above).

There are two other items of note in Table 1. First, it appears that one site utilized the text messaging capability more often than the other. The Southern district submitted approximately one text message every four client days (0.25 per client day) while the other site submitted text messages approximately once every ten client days (0.09 per client day). Based on the observations made during the sites visits, this appears to be related to the staffing patterns and operational styles in the two sites.

Second, it should be noted that it appears the Southern district used a few features not used in the Northern district. These include *areas of interest*, *master zone* movement, and *officer mode* activities. These are largely optional settings not used by the Northern district personnel.

Event Transmission Time

It is generally believed that the GPS systems monitor and report the client's movements in real time or near real time. The transmission rate can be variable but

Table 1: Number of GPS events, events per client day, and transmission time by district, November 2007 - February 2008

Event Type	Northern district				Southern district			
	Count	Events per client day	Average transmission time	Median transmission time	Count	Events per client day	Average transmission time	Median transmission time
Total Events	163,647	77.67	0:13:29	0:01:09	310,521	96.38	0:14:13	0:01:10
GPS Acquired	30,596	14.52	0:08:06	0:00:43	59,869	18.58	0:02:16	0:00:41
GPS Seek	29,262	13.89	0:07:53	0:01:12	59,420	18.44	0:09:04	0:01:14
No GPS	23,105	10.97	0:14:44	0:05:45	50,955	15.81	0:17:29	0:05:43
No Motion	14,167	6.72	0:29:59	0:15:43	22,490	6.98	0:39:33	0:15:44
Tracker Moving	14,127	6.70	0:14:11	0:00:43	22,426	6.96	0:20:37	0:00:44
Inclusion Zone Enter	5,638	2.68	0:10:16	0:00:59	8,539	2.65	0:03:22	0:00:56
Inclusion Zone Leave	5,584	2.65	0:09:45	0:01:02	8,539	2.65	0:01:24	0:01:00
Tracker Battery Charging	5,220	2.48	0:17:49	0:00:45	9,111	2.83	0:16:19	0:00:44
Charger Disconnected	5,188	2.46	0:15:12	0:00:46	8,990	2.79	0:06:29	0:00:45
Exclusion Zone Enter	4,731	2.25	0:03:42	0:00:58	16,078	4.99	0:01:04	0:00:54
Exclusion Zone Leave	4,503	2.14	0:02:26	0:00:55	15,446	4.79	0:01:03	0:00:53
Cell Signal Acquired	3,998	1.90	0:19:41	0:05:52	4,730	1.47	0:58:32	0:06:38
Cell Signal Lost	3,882	1.84	0:41:58	0:25:09	4,530	1.41	1:48:51	0:34:37
Callback	3,199	1.52	0:05:49	0:02:13	4,534	1.41	0:22:24	0:02:13
Tracker Battery Charged	3,137	1.49	0:08:28	0:00:43	5,683	1.76	0:20:58	0:00:44
Tracker Low Battery	752	0.36	0:06:11	0:00:46	1,020	0.32	0:47:05	0:00:46
Transmitter In Range	742	0.35	0:29:04	0:00:26	469	0.15	0:33:52	0:00:27
Inclusion Zone Leave Alert	694	0.33	0:04:53	0:01:01	3	0.00	0:00:36	0:00:43
Exclusion Zone Enter Alert	680	0.32	0:13:07	0:00:58	684	0.21	0:00:55	0:00:52
Exclusion Zone Leave Alert	678	0.32	0:13:05	0:00:56	684	0.21	0:00:54	0:00:51
Inclusion Zone Enter Alert	640	0.30	0:05:19	0:00:59	0	0.00	0:00:00	N/A
Transmitter Out of Range	596	0.28	0:38:53	0:04:25	215	0.07	0:40:20	0:04:19
Transmitter Battery Restore	274	0.13	0:03:40	0:00:42	208	0.06	0:00:45	0:00:41
Transmitter Low Battery	273	0.13	0:04:25	0:00:45	204	0.06	0:00:49	0:00:45
Locate Request Submitted	220	0.10	N/A	N/A	610	0.19	0:00:01	0:00:01
Text Message Submitted	190	0.09	N/A	N/A	808	0.25	0:00:01	0:00:01
Locate Request Failed	182	0.09	2:55:23	0:00:15	489	0.15	0:15:25	0:00:14
Text Message Delivered	179	0.08	N/A	N/A	776	0.24	N/A	N/A
Acknowledged	178	0.08	0:55:20	0:00:16	769	0.24	0:04:26	0:00:13
Restart Complete	172	0.08	0:58:20	0:00:41	367	0.11	1:17:16	0:01:53
Restart Initiated	142	0.07	1:26:00	0:01:53	224	0.07	3:28:11	0:59:40
Tracker Missed Callback	122	0.06	0:30:00	0:30:00	335	0.10	0:30:00	0:30:00
Locate Request Delivered	119	0.06	N/A	N/A	359	0.11	N/A	N/A
Failed to Enter Inclusion Zone	105	0.05	0:43:26	0:05:34	188	0.06	0:14:39	0:01:42
Did Not Acknowledge	59	0.03	0:02:50	0:00:14	160	0.05	0:06:20	0:00:12
Tracker Still Missed Call	38	0.02	N/A	N/A	32	0.01	N/A	N/A
Locate Request Complete	31	0.01	5:51:03	0:00:19	132	0.04	0:01:51	0:00:13
Proximity Tamper	30	0.01	0:03:03	0:00:48	51	0.02	0:03:57	0:00:59
Strap Tamper	30	0.01	0:02:58	0:00:36	51	0.02	0:03:49	0:00:35
Tamper Reset	26	0.01	4:50:45	0:08:27	47	0.01	2:50:23	0:08:30
Tracker Battery Restore	25	0.01	0:00:53	0:00:40	34	0.01	1:08:54	0:01:22
Tracking Unit Docked to Base	16	0.01	0:00:46	0:00:31	0	0.00	0:00:00	N/A
Tracking Unit Undocked from Base	16	0.01	0:00:36	0:00:34	0	0.00	0:00:00	N/A
Tracking Unit Docked	15	0.01	0:00:20	0:00:20	2	0.00	0:00:17	0:00:16
Tracking Unit Undocked	15	0.01	0:00:21	0:00:19	2	0.00	0:01:03	0:01:02
Text Message Failed	11	0.01	N/A	N/A	32	0.01	N/A	N/A
Tracker Transmitter Not Found	10	0.00	0:12:08	0:00:26	2	0.00	0:32:48	0:32:48
Unauthorized Leave	9	0.00	0:07:39	0:06:40	0	0.00	0:00:00	N/A
Data Link Lost Error	8	0.00	0:02:26	0:02:27	0	0.00	0:00:00	N/A
Unauthorized Enter	8	0.00	0:00:51	0:00:32	0	0.00	0:00:00	N/A
Power Restore	5	0.00	0:00:34	0:00:32	0	0.00	0:00:00	N/A
Power Loss	3	0.00	0:00:39	0:00:41	0	0.00	0:00:00	N/A
Transmitter Not Found	3	0.00	0:01:52	0:01:11	0	0.00	0:00:00	N/A
Has Not Docked	2	0.00	N/A	N/A	0	0.00	0:00:00	N/A
Leave Did Not Undock	2	0.00	N/A	N/A	0	0.00	0:00:00	N/A
Locate Request Deleted	2	0.00	N/A	N/A	1	0.00	N/A	N/A
Phone Restore	2	0.00	0:00:31	0:00:31	0	0.00	0:00:00	N/A
Receiver Restart	2	0.00	0:00:54	0:00:54	0	0.00	0:00:00	N/A
Fail to Dock	1	0.00	0:00:39	0:00:39	0	0.00	0:00:00	N/A
Receiver Missed Callback	1	0.00	0:45:00	0:45:00	0	0.00	0:00:00	N/A
Receiver Still Missed Call	1	0.00	N/A	N/A	0	0.00	0:00:00	N/A
Transmitter First Found	1	0.00	0:00:39	0:00:39	0	0.00	0:00:00	N/A
Area of Interest Enter	0	0.00	0:00:00	N/A	22	0.01	0:02:03	0:00:53
Area of Interest Leave	0	0.00	0:00:00	N/A	22	0.01	0:00:56	0:00:54
Master Zone Enter Alert	0	0.00	0:00:00	N/A	91	0.03	0:01:10	0:01:03
Master Zone Leave Alert	0	0.00	0:00:00	N/A	67	0.02	0:01:19	0:01:03
Officer Key Connected	0	0.00	0:00:00	N/A	10	0.00	0:00:49	0:00:45
Officer Key Disconnected	0	0.00	0:00:00	N/A	9	0.00	0:00:47	0:00:47
Officer Mode Entered	0	0.00	0:00:00	N/A	1	0.00	0:01:11	0:01:11
Officer Mode Exited	0	0.00	0:00:00	N/A	1	0.00	0:01:02	0:01:02

Notes: Events are messages transmitted from a client's tracking unit to a host computer as a result of equipment/system changes and/or client behavior, and can be categorized as: host, transmitter, tracker, base station, client notification and acknowledgement, and other events.
 Data are for 87 clients on GPS during November 13, 2007 to February 29, 2008 though the actual time individual clients were on GPS during this period varies. Events per client day equals the number of events divided by the sum of client days on GPS (i.e., 163,647 events, St. Joseph / 2,107 (total number of days all clients were on GPS based on the range of each client's event days).
 Average transmission time is the amount of time it took the host computer to receive the event from the client's tracking unit.
 If a county did not have any of a given type of event, 0:00:00 is shown as the average transmission time.
 For some events, the time the event was received by the host computer was earlier (or the same) than when the event occurred (n = 4,821). These events were excluded from the average transmission time calculation and are shown as N/A (not available).
 Median transmission time is the value that divides the range of values for a given type of event so that half of the values are below it and half are above it. Records with invalid transmission times are excluded from the median calculation (n = 4,821) and shown as N/A (not available).

Source: Behavioral Incorporated (BI), BI ExacuTrack Monitoring System



often is set at one minute intervals. This belief in the real time nature of the data leads to expectations and standards about quick response time. For example, it is not unusual for an agency to advertise that the continuous monitoring will allow them to observe an exclusion zone violation and respond before a problem can occur. All of this, of course, depends on the instantaneous transmission of data from the GPS system to the agency and immediate response time from the agency. We present below event transmission times for the GPS Pilot Program. Elsewhere in the report we look at the number of alerts and the time to clearance of these events. We do not cover them in this section because the official administrative response of clearing an alert can be quite independent of system transmission of that alert.

Table 1 also presents the number and average transmission times for all system events received for the pilot program clients between November 2007 and the end of February 2008. This table indicates that the average (mean) transmission time across all events was approximately 14 minutes in both sites (13:29; 14:13), but the median transmission times were both around one minute (1:09; 1:10). Since the mean scores are affected by the numeric values, this indicates that there were a number of very long transmission times. The median is a physical middle, in this case indicating that one-half of the transmission times were over one minute while the other one-half were under one minute. Some of the delays in message transmission are built into the system. For example, it might be expected that the *cell signal lost* times would be dependent upon acquisition of a new cell signal. The median delay of around six minutes (5:52; 6:38) in reporting *cell signal acquired*, suggests some delay after the signal has been acquired. The median delays of around 15 minutes (15:43; 15:44) in transmission of the *no motion* events are also related to a *timed out* delay for that message, the *tracker moving* events were transmitted in under one minute (0:43; 0:44).

In the course of acquiring the data reported in Table 1 the research team encountered some anomalies in the recorded transmission times. In approximately one percent of the recorded events (4,821) the GPS system recorded an equal or negative transmission time. That is, the time received was earlier or the same as the time recorded. The research team attempted to reconcile these anomalous times with the equipment vendor. After several inquiries, the company representative claimed that the reason for the negative and equal transmission times was proprietary information and could not be divulged. From an assessment perspective, however, this answer throws all of the transmission times into question.

For a GPS monitoring system some events are more time sensitive than others. Since the system is designed to provide near real time information on the clients' whereabouts, the transmission times related to loss of the GPS signal, separation of the transmitter from the tracker, and exclusion zone violations are all potentially important. Table 1 indicates that the median system transmission time for loss of GPS signal was nearly six minutes (5:45; 5:43). While some delay is built into the system in order for it to locate a temporarily lost signal and the client may not be aware of the signal loss, the question is whether a six-minute delay is acceptable. This is a programmatic question to be addressed by the related agencies.

In order for the tracker to report accurately the client's locations it must be kept in close proximity to the transmitter attached to the client's ankle. Both the distance between the two units (10 to 80 feet) and the allowable duration of the separation can be set by the operator. The tracking unit can report the time of the separation and the time the transmitter returned, but cannot report the client's location during that time. In the current program the *transmitter out of range* events were not very common and were transmitted to the system in a median time of a little over four minutes (4:25;



4:19). The median delays for *transmitter in range* events were under one minute in both sites (0:26; 0:27).

Since the system is designed to provide near real time information on the client's location and specifically their proximity to exclusion zones, the transmission times for exclusion zone violations are important considerations. The system recorded two types of exclusion zone violations: events and alerts. As noted earlier, both sites recognized the necessity of briefly passing exclusion zones while in transit around the city. Thus, an exclusion zone event was a brief entry into a predefined exclusion zone while an exclusion zone alert involved exceeding the allotted amount of time within an exclusion zone (usually five minutes). Table 1 shows that the median transmission time for the brief exclusion zone enter events was under one minute (0:58; 0:54); similar transmission times were recorded for the *exclusion zone leave* events. The exclusion zone entry *alerts* demonstrated similar transmission times. In both sites the transmission times were under one minute for both the enter and leave alerts.



Learning Curve

Several studies have noted a steep learning curve when a GPS system is introduced into an organization without experience with electronic monitoring equipment (Brown et al., 2007; Tennessee Board of Probation and Parole, 2007). The agency personnel must develop the technical expertise to operate the system and the organizational capacity to monitor and respond to the system-generated information around-the-clock. Indiana sidestepped these issues by contracting with county community corrections agencies. At the time of start-up neither site operated a GPS monitoring system, but both were in the process of investigating these systems and both had existing RF electronic monitoring programs using equipment from the selected GPS vendor. The agencies, therefore, had the organizational capacity and experience to operate the system; this carried with it some technical expertise in system operation. All that was needed was adequate training from the vendor in the operational aspects of the GPS system and adequate staff to operate the system. As a result very few program start-up problems were reported. The parole agents were satisfied with the arrangement and thought it utilized a good division of labor. All things considered, this may be a model for other states to consider.

Information Load

GPS electronic monitoring systems potentially generate an overwhelming amount of information. For a simple RF electronic monitoring system, the basic information is related to the clients' presence or absence in a few locations (usually one, but some can include a second site, such as the victim's residence) and the system screens these for potential violations. These RF systems must be monitored, but the volume of information per client is limited to activity patterns related to certain locations. GPS monitoring systems, on the other hand, generate a steady drizzle of information about the client and his or her activities. This information ranges from exclusion zone entry notices to *battery charging* and *no motion* alerts. While the system can be directed to prioritize the events, an operator still must acknowledge, decide on a course of action, and clear every one of them.

As a rough indicator of the volume of information generated by the system, the research team captured the number of alerts in the two pilot sites twice daily (morning and evening) for a period of one week. Alerts are events defined as having a high priority. This information is summarized in Table 2.

This table indicates the number of alerts per client varied considerably between the two sites. The Southern district recorded a mean of 5.53 alerts per client in the 24-hours preceding the report while the Northern district recorded a mean of 28.70 alerts per client in the preceding 24-hour period. The variation within site also was considerable: the Southern district varied from 4.36 to 6.82 alerts per client in the preceding 24-hours, while the Northern district ranged from a low of 20.63 to a high of 56.41 alerts per client in the preceding 24-hours.

The above differences in the volume of alerts translated into other differences. Table 2 also presents the percentage of clients with an open alert and the number of open alerts per client. An alert generated by the GPS system remained open and active until



Table 2. GPS system alerts during 14 different caseload snapshots by district

	Northern district	Southern district
Percent of Clients with open alerts		
Low	29.40%	0.00%
High	94.70%	39.40%
Median	6 of 17-19	1 of 33
Open alerts per Client		
Low	0.47	0
High	20.17	0.88
Mean	6.06	0.16
Alerts per client in past 24 hours		
Low	20.63	4.36
High	56.41	6.82
Mean	28.70	5.53

Notes: Drawn from sampling from GPS system of two queries per day over a seven-day period. (N=14)

Source: Behavioral Incorporated (BI), BI ExacuTrack Monitoring System

removed by an operator. During the week in question, the Southern district never had more than 39.4 percent of the clients with an open alert while the *low* for the Northern district was 29.4 percent with an open alert. Similarly, for the Southern district the mean number of open alerts per client was 0.16 while the mean number of open alerts per client was 6.06 in the Northern district. Thus, the Northern district experienced considerably more alerts per client and this translated into more open alerts and more clients with open alerts.

The reasons for these observed differences in system alerts probably derive from two sources. First, it will be seen later in this report that the Southern district adjusted the GPS system such that it returned fewer alerts. So, for example, they reduced the *no motion* message from an alert to an event. This interpretation does not mean that there were necessarily fewer messages concerning the clients, but rather that the system was instructed to report fewer events as alerts.

The second possible contributor to the volume of alerts could be program organization and delivery. It will be remembered that the Southern district utilized a dedicated staff while the Northern district incorporated the program into their existing staff and routines. Since a staff member had to clear manually every alert, these organizational differences could easily account for the differences in the number of open alerts per client. The field observations suggested that the organizational differences meant that the system was monitored more closely with the full-time staff and the staff was more likely to send a text message to the client concerning an alert. Over the long term this could communicate to the clients that their movement was being watched and might result in fewer actions which generate an alert.

It was noted earlier that the absence of a single program design resulted, not in a single program delivered in two sites, but rather two programs organized and delivered in different ways. There were two primary differences in the pilot sites. First, there were structural differences: one utilized a dedicated staff while the other incorporated the new program into their existing staff and programs. Second, the parole officers in the two districts interpreted the conditions of parole release differently: one parole agent sought to enforce a curfew while the other did not. These differences in structure and program conditions generated some distinct approaches to system operation and agency responses.

Table 3 presents the number of GPS system *alerts* and the average (mean and median) time elapsed until they were cleared by agency personnel. It will be remembered that alerts are a subset of system events. The system records all events but records *and* reports all alerts.

Table 3 indicates that overall, much of the alert information is system noise. Seven categories accounted for 84.6 percent of all alerts in the two sites during the focus week. These all included administrative alerts about equipment functioning: *tracker battery charging, no motion, tracker battery charged, cell signal acquired, charger disconnected, cell signal lost, and tracker battery low*. Four of the seven categories concerned equipment battery status. During this time period only 5.6 percent (207) of the alerts involved an inclusion zone or exclusion zone. Since many of these inclusion and exclusion zone alerts are paired (e.g., exclusion zone enter paired with exclusion zone leave), the actual proportion of such violations involving a potential incident is much lower.

Table 3 also indicates significant variation in the way the two sites handled system alerts. Personnel in the Southern district reduced the flow of information by reducing some of the alert categories to event status. The Southern district recorded no alerts during the focus week for three of the top seven alert types and recorded only seven alerts for a fourth type. These included *no motion, cell signal acquired, cell signal lost, and charger disconnected*. By contrast, these four types of alert accounted for 69.4 percent (1,441) of the alerts in the Northern district. In addition, because of the curfew requirement in the Northern district some inclusion zone alerts were generated during this period while the Southern district recorded none. These differences significantly reduced the number of alerts in the Southern district: while they typically had almost twice the number of clients they received and processed significantly fewer system alerts.

The differences in the number of alerts in these categories were the result of administrative decisions about the types of activities that should merit a system alert. For example, personnel in the Southern district decided that the lack of motion or a disconnected charger on the part of a client did not merit an alert. At first glance the decision to remove cell signal lost and acquired may seem unusual, but while it may be useful to know that the cell signal has been lost, nothing can be done until a signal is received and the system will update all activity occurring during the outage. Any violations meriting an alert will then be noted by the system.

Table 3: Number of alerts and elapsed time to closure by district

Alert Type	Northern district				Southern district				Total			
	Count	Alerts per client day	Average elapsed time	Median elapsed time	Count	Alerts per client day	Average elapsed time	Median elapsed time	Count	Alerts per client day	Average elapsed time	Median elapsed time
Total alerts	2,077	21.19	4:43:55	0:31:00	1,698	6.82	1:16:40	0:17:30	3,775	10.88	3:10:42	0:25:00
Acknowledged	9	0.09	6:45:33	1:32:00	73	0.29	0:35:23	0:10:00	82	0.24	1:16:01	0:12:00
Cell Signal Acquired	252	2.57	0:46:32	0:05:00	0	0.00	0:00:00	0:00:00	252	0.73	0:46:32	0:05:00
Cell Signal Lost	247	2.52	0:52:35	0:18:00	0	0.00	0:00:00	0:00:00	247	0.71	0:52:35	0:18:00
Charger Disconnected	243	2.48	7:56:39	2:13:00	7	0.03	0:15:26	0:15:00	250	0.72	7:43:44	0:48:00
Did Not Acknowledge	1	0.01	0:06:00	0:06:00	17	0.07	1:24:14	0:40:00	18	0.05	1:19:53	0:51:30
Exclusion Zone Enter Alert	19	0.19	24:07:16	13:37:00	58	0.23	0:36:09	0:13:30	77	0.22	6:24:21	0:22:00
Exclusion Zone Leave Alert	19	0.19	23:46:03	13:35:00	58	0.23	0:30:49	0:10:00	77	0.22	6:15:05	0:19:00
Failed to Enter Inclusion Zone	2	0.02	61:19:00	61:19:00	0	0.00	0:00:00	0:00:00	2	0.01	61:19:00	42:53:30
Failed to Enter Inclusion Zone Residence	2	0.02	38:28:00	38:28:00	0	0.00	0:00:00	0:00:00	2	0.01	38:28:00	8:12:00
Inclusion Zone Enter Alert home	1	0.01	9:17:00	9:17:00	0	0.00	0:00:00	0:00:00	1	0.00	9:17:00	18:35:00
Inclusion Zone Enter Alert Primary Residence	11	0.11	17:42:49	12:29:00	0	0.00	0:00:00	0:00:00	11	0.03	17:42:49	16:38:00
Inclusion Zone Enter Alert Residence	13	0.13	25:15:37	12:05:00	0	0.00	0:00:00	0:00:00	13	0.04	25:15:37	3:13:00
Inclusion Zone Leave Alert home	5	0.05	16:10:12	20:18:00	0	0.00	0:00:00	0:00:00	5	0.01	16:10:12	39:11:00
Inclusion Zone Leave Alert Primary Residence	11	0.11	17:43:55	12:30:00	0	0.00	0:00:00	0:00:00	11	0.03	17:43:55	1:52:00
Inclusion Zone Leave Alert Residence	14	0.14	25:17:34	10:32:00	0	0.00	0:00:00	0:00:00	14	0.04	25:17:34	3:50:30
No Motion	699	7.13	4:56:51	0:41:00	0	0.00	0:00:00	0:00:00	699	2.01	4:56:51	0:51:00
Proximity Tamper	0	0.00	0:00:00	0:00:00	2	0.01	0:38:30	0:38:30	2	0.01	0:38:30	0:12:30
Strap Tamper	0	0.00	0:00:00	0:00:00	2	0.01	0:38:30	0:38:30	2	0.01	0:38:30	0:14:00
Tamper Reset	0	0.00	0:00:00	0:00:00	2	0.01	0:14:30	0:14:30	2	0.01	0:14:30	0:15:00
Text Message Delivered	9	0.09	6:48:20	1:33:00	73	0.29	0:36:57	0:10:00	82	0.24	1:17:42	0:16:00
Text Message Failed	0	0.00	0:00:00	0:00:00	2	0.01	0:24:00	0:24:00	2	0.01	0:24:00	1:13:30
Tracker Battery Charged	152	1.55	2:39:08	0:01:00	456	1.83	1:32:42	0:21:00	608	1.75	1:49:18	0:15:00
Tracker Battery Charging	244	2.49	1:54:32	0:45:00	730	2.93	1:15:34	0:18:00	974	2.81	1:25:19	0:26:30
Tracker Battery Restore	1	0.01	15:34:00	15:34:00	0	0.00	0:00:00	0:00:00	1	0.00	15:34:00	0:00:00
Tracker Low Battery	41	0.42	5:07:34	0:09:00	121	0.49	1:21:14	0:13:00	162	0.47	2:18:31	0:20:00
Tracker Missed Callback	5	0.05	17:53:00	11:34:00	23	0.09	1:37:47	1:04:00	28	0.08	4:31:56	0:06:30
Tracker Still Missed Call	0	0.00	0:00:00	0:00:00	1	0.00	7:47:00	7:47:00	1	0.00	7:47:00	0:10:00
Transmitter In Range	43	0.44	6:33:15	2:50:00	50	0.20	2:31:24	0:43:30	93	0.27	4:23:14	0:27:00
Transmitter Out of Range	34	0.35	4:55:51	2:27:00	23	0.09	1:14:21	0:43:00	57	0.16	3:26:28	0:32:00

Notes: Alerts are more serious events as defined by the program for which a response is more urgent. A sample of alert data was collected for a one week period (February 23, 2008 - February 29, 2008). 51 clients generated alert data during this time. Alerts per client day equals the number of alerts divided by the sum of client days on GPS (i.e., 2,077 alerts / 98 (total number of days all clients were on GPS based on the range of each client's event days). Average elapsed time is the amount of time that passed from when the alert was generated to when it was closed. Average and median elapsed time includes alerts where the transmission time was 0:00:00.

Source: Behavioral Incorporated (BI), BI ExacuTrack Monitoring System



The two pilot sites also differed in the way they cleared alerts from the system. Table 4 presents the method of closure for all alerts recorded during the focus week. This table shows that the Southern district manually closed all alerts. The Northern district, on the other hand, relied heavily on the “event pairing” capability of the GPS system to close two-thirds (66.8 percent) of the alerts with the remainder closed manually by officers.

Event pairing allowed the operator to pair one alert type (e.g., exclusion zone enter) with another alert type (exclusion zone leave). When the pair occurred within a specified time frame the GPS system could be directed to clear them automatically. While these differences were policy choices made by the two agencies, they derive from the differing organizational arrangements. It will be remembered that the Southern district utilized dedicated staff while the Northern district integrated the GPS program into their existing programs and staff. This allowed the personnel in the Southern district to focus exclusively on the task of monitoring the system and clearing alerts. In the Northern district allowing the system to clear the paired alerts saved time for agency personnel with other duties.

The two pilot sites also differed in the time elapsed before an alert was cleared. Table 5 presents the mean and median elapsed time to clearance for all alert categories with a nonzero count in both sites. This allows for a direct comparison between the two sites. These times do not include the system transmission times discussed earlier in the report. It should be noted that this table presents only the administrative action of clearing the alert from the screen; it does not represent any action taken by the agency in response to the alert, nor does it represent the time frame in which such action might have been initiated.

The overall median time to clearance for these alerts was 47 minutes in the Northern district and 17 minutes in the Southern district. While this difference did not hold across the board, the time to clearance was higher for the Northern district in nine of the twelve common alert types. Some of the differences were striking. For example, the median length of time taken to clear exclusion zone alerts (not events) from the system in the Northern district was over 13 *hours* while this was accomplished in the Southern district in just over 13 *minutes*. Similarly, *transmitter out of range* and *transmitter in range* alerts were cleared in a median of 2.5 to 3 hours in one district and in approximately 43 minutes in the other. These differences were a function of the differing operational strategies in the two sites. The Southern district adopted a hands-on strategy where personnel monitored the system, responded to alerts, and cleared alerts from the system around-the-clock. In the Northern district personnel monitored the system and responded to alerts around-the-clock, but relied on event pairing to clear most alerts and only periodically were the others manually cleared from the system.

Table 4: Alerts by method of closure by district

Closed by	Northern district			Southern district			Total		
	Count	Percent of district total	Average elapsed time	Count	Percent of district total	Average elapsed time	Count	Percent of total	Average elapsed time
Total alerts	2,077	100.0%	4:43:55	1,698	100.0%	1:16:40	3,775	100.0%	3:10:42
Southern district officer	N/A	N/A	0:00:00	1,698	100.0%	1:16:40	1,698	45.0%	1:16:40
Event pairing (Northern district)	1,388	66.8%	0:26:33	N/A	N/A	0:00:00	1,388	36.8%	0:26:33
Northern district officer 1	381	18.3%	7:41:26	N/A	N/A	0:00:00	381	10.1%	7:41:26
Northern district officer 2	216	10.4%	21:39:51	N/A	N/A	0:00:00	216	5.7%	21:39:51
Northern district officer 3	92	4.4%	17:26:29	N/A	N/A	0:00:00	92	2.4%	17:26:29

Notes: Alerts are more serious events as defined by the program for which a response is more urgent. A sample of alert data was collected for a one week period (February 23, 2008 - February 29, 2008). 51 clients generated alert data during this time. Average elapsed time is the amount of time that passed from when the alert was generated to when it was closed. Alerts can be closed by officers or "event pairing". Event pairing is a method set up by the program whereby one event is closed by a subsequent event provided the second event occurs in a specified time frame after the initial event. N/A equals not applicable. Average elapsed time includes alerts where the transmission time was 0:00:00.

Source: Behavioral Incorporated (BI), BI ExacuTrack Monitoring System

Table 5: GPS system alerts for categories common to both districts

Alert Type	Northern district			Southern district			Total		
	Count	Alerts per client day	Average elapsed time	Count	Alerts per client day	Average elapsed time	Count	Alerts per client day	Average elapsed time
Total alerts	819	8.36	5:35:34	1,689	6.78	1:16:40	2,508	7.23	2:41:13
Tracker Battery Charging	244	2.49	1:54:32	730	2.93	1:15:34	974	2.81	1:25:19
Charger Disconnected	243	2.48	7:56:39	7	0.03	0:15:26	250	0.72	7:43:44
Tracker Battery Charged	152	1.55	2:39:08	456	1.83	1:32:42	608	1.75	1:49:18
Transmitter In Range	43	0.44	6:33:15	50	0.20	2:31:24	93	0.27	4:23:14
Tracker Low Battery	41	0.42	5:07:34	121	0.49	1:21:14	162	0.47	2:18:31
Transmitter Out of Range	34	0.35	4:55:51	23	0.09	1:14:21	57	0.16	3:26:28
Exclusion Zone Enter Alert	19	0.19	24:07:16	58	0.23	0:36:09	77	0.22	6:24:21
Exclusion Zone Leave Alert	19	0.19	23:46:03	58	0.23	0:30:49	77	0.22	6:15:05
Acknowledged	9	0.09	6:45:33	73	0.29	0:35:23	82	0.24	1:16:01
Text Message Delivered	9	0.09	6:48:20	73	0.29	0:36:57	82	0.24	1:17:42
Tracker Missed Callback	5	0.05	17:53:00	23	0.09	1:37:47	28	0.08	4:31:56
Did Not Acknowledge	1	0.01	0:06:00	17	0.07	1:24:14	18	0.05	1:19:53

Notes: Alerts are more serious events as defined by the program for which a response is more urgent. A sample of alert data was collected for a one week period (February 23, 2008 - February 29, 2008). 51 clients generated alert data during this time. Alerts per client day equals the number of alerts divided by the sum of client days on GPS (i.e., 163,647 events / 51 Joseph / 2,107 (total number of days all clients were on GPS based on the range of each client's alert days). Average elapsed time is the amount of time that passed from when the alert was generated to when it was closed. Median transmission time is the value that divides the range of values for a given type of alert so that half of the values are below it and half are above it. Average and median elapsed time includes alerts where the transmission time was 0:00:00.

Source: Behavioral Incorporated (BI), BI ExacuTrack Monitoring System

An important question for the pilot program concerned performance of the individuals placed on the GPS monitoring. For the present study this was an implementation question and not a question of program impact: the number of cases was very small and the clients were not selected in a way that would facilitate meaningful answers about outcome. What the present study could do, however, was describe client performance within a reasonable time frame. Specifically, the research team identified the proportion of GPS Pilot Program clients with the potential for at least six months experience after prison who were returned to prison for either a new arrest or a violation of the conditions of parole. A comparison group of paroled sex offenders was selected from another parole district in a way that was similar to the way the GPS clients were selected (see Appendix 3 for research methods). Below are presented the number and nature of new arrests, technical violations, and the total number of clients not successful for the three groups (Table 6).

It should be noted that these numbers exclude those individuals who were placed on parole less than six months prior to data collection. Many of the clients included in this table were still on parole at the time of data collection. If all clients could have been followed to the end of their parole term, the “failure rate” would be higher by an unknown amount. This table shows that the Northern district reported that none of the 30 GPS clients were removed from parole because of a new arrest. Further investigation indicated that at least one of these clients was arrested, but a technical violation occurred before the arrest, so the agent counted it as a technical violation. In the other GPS site 10.5 percent (6) of the eligible clients were removed from parole because of a new arrest. This was very similar to the 8.5 percent (4) removed for a new arrest in the comparison county.

This table also presents the number of clients removed from parole because of a violation of the conditions of parole. Regular parolees have 10 standard conditions of parole, while sex offenders face an additional 25 restrictions on their behavior (see Appendix 4 for parole stipulations for sex offenders in Indiana). In the Northern district over one-half (56.7 percent) of the GPS clients with the possibility of being in the program for at least six months were returned to prison for violating the parole conditions. This was similar to the proportion of technical violations in the comparison site (48.9 percent). In the Southern district only one-third (33.3 percent) of the GPS clients were returned to prison for violations of the conditions of parole. In all three sites technical violations were the most common reason for return to prison.

Overall, 56.7 percent (17) of the clients in the Northern district with a potential exposure period of at least six months were returned to prison for a new arrest or a technical violation of parole. This rate was considerably lower in the Southern district (43.9 percent) and a little higher in the comparison county (61.7 percent). For comparison purposes the results from the two pilot sites are combined in the bottom row of the table. These combined results suggest that the GPS pilot sites experienced lower new arrest (6.9 percent; 8.5 percent), technical violation (41.4 percent; 48.9 percent), and overall failure rates (48.3; percent 61.7 percent) than did the comparison site. The data suggest that the clients in the GPS pilot program may have had a reduced chance of returning to prison. Again, the reader is cautioned about drawing strong



Table 6. Type of Parole Failure by District *

	(N)	New arrests % (N)	Technical violations % (N)	Total not successful % (N)
Northern district	30	0.0 % (0)	56.7 % (17)	56.7 % (17)
Southern district	57	10.5 % (6)	33.3 % (19)	43.9 % (25)
Comparison district	47	8.5 % (4)	48.9 % (23)	61.7 % (27)
Combined GPS Sites	87	6.9 % (6)	41.4 % (36)	48.3 % (42)

* All clients entering parole supervision prior to August 29, 2007.

Source: Madison, St. Joseph, and Vanderburgh County Parole Districts

conclusions from these findings: the samples were small, the clients were not randomly assigned, the follow-up period was short, and the programs delivered in the two pilot sites were not the same. Nevertheless, there is some room for optimism about potentially improved chances of successful completion of parole for the GPS clients.

The specific charges for those individuals with a new arrest were varied. Overall, as of the cutoff date for the assessment, eight of the 133 GPS clients had been removed from the pilot program for a new arrest. Of these eight individuals, only one was arrested for a new sex offense. This individual collected a new rape charge. A second individual was charged with contributing to the delinquency of a minor after fleeing to Louisiana with his 16-year-old girlfriend (not a sex offense). Of the remaining six individuals, two were arrested for controlled substance offenses, two were arrested for battery, one was arrested for burglary of a commercial establishment, and one was arrested for being a habitual traffic offender. Five of the 70 individuals from the comparison county were arrested while on parole. One of these was arrested for rape, one for aiding a criminal, and three were arrested for failure to register as a sex offender.

The parole agents were very enthusiastic about the GPS Pilot Program. Overall, they thought it helped them do the job of parole supervision. In particular, the system could notify them of exclusion zone violations as well as inclusion zone violations. For example, it was noticed that one client was passing, unnecessarily, a particular school on the way to and from work and was told to take a different route to work. While no violation occurred, in their view it helped manage the offender's behavior. Alternately, the system could alert them if a client failed to report to work at the appropriate time. One parole agent reported that the GPS system really helped reduce lying about activity patterns. While the client might be tempted to lie about their whereabouts at a particular time, the GPS system could verify the accuracy of the claim. One client reported that he could not make a meeting with the case manager because he had car trouble in a particular location. When the case manager checked, the GPS system indicated he was in another part of the city at a shopping mall. He was caught in the lie and directed to be at the agency immediately.

The parole agents also reported that the GPS system significantly increased the level of parole supervision. Without the GPS equipment, the conditions of parole largely rely on happenstance for enforcement: the agents rarely know where their clients are and have limited capacity to check on them. With traditional RF electronic monitoring, they know whether the client is at home at the appointed time, but little else. With the GPS system, however, they could verify the clients' whereabouts 24/7. Inclusion zone and exclusion zone violations could be observed, the clients could be sent a text message about the violation, and when necessary, the clients' movements could be reviewed long afterwards.

There was some belief by the officers that the higher level of monitoring and communication both increased compliance with the conditions of parole and the ability to detect technical violations related to client location, or at least the number of allegations in a revocation for technical violations. This was a reasonable assumption: the clients' activities were watched much more closely and the periodic text message reminded them of this. It is only reasonable to expect that in order to avoid the possibility of returning to prison some proportion of them would adjust their activities accordingly. For related reasons the increased information about the clients' movements increased the possibility of detecting violations. Unfortunately, it would be very difficult to test such a hypothesis and we have no firm evidence to support or reject it. The pilot sites experienced very few incidents where the GPS system identified an actionable violation. This might be taken as evidence that the parolees were following the rules, but the extent to which they would follow the activity rules anyway is not known, *and* the limited nature of the monitoring must be considered (see "what was monitored" elsewhere in this report).

The parole agents expressed a belief that a GPS program could be very useful for parolee monitoring and control of higher risk cases, but it should not be applied across the board to all sex offenders. While all of the sex offenders were prohibited from proximity to schools, parks, and other locations where children congregate, some of the clients' actions were not related to children while others were viewed as very low risk offenders. The stated preference was to utilize the GPS equipment as an aid in supervision of higher risk offenders with child victims.



Addition of the GPS monitoring probably increased the parole agents' workload. While they were glad to have the additional capability and the bulk of the GPS work was handled by the community corrections agency staff, the program did require additional time. The additional workload was reported as primarily dealing with after-hours telephone calls about clients. This was not viewed as a burden, but rather as a cost of a program they found to be helpful. Counterbalancing this, the community corrections personnel were regularly in contact with the clients both through text messages and through in-person meetings. The parole agents suggested they were very satisfied with the organizational arrangements of the program. The agents in both pilot sites commented that there was "no way" their office could have operated the GPS system.



CONCLUSION AND RECOMMENDATIONS

The purpose of this study was to assess the planning, design, and implementation of the Indiana Department of Correction GPS Pilot Program for paroled sex offenders. This was in anticipation of future adoption of this technology for individuals paroled from the Indiana Department of Correction. The Indiana General Assembly has mandated this technology for some offenders. GPS systems are an increasingly popular form of electronic monitoring for a wide array of accused and convicted offenders. In some cases the GPS system replaces an older Radio Frequency electronic monitoring system, while in other jurisdictions it is adopted specifically for specific subpopulations of offenders.

The strength of the assessment design and ultimately the strength of the research findings were limited by the late entry of the assessment team in the GPS Pilot Program process. The solicitation for the assessment was released in August 2007 and the study began in November of that year. This was eight months after the program began at the first pilot site and almost two years after the federal grant funds for the program were received. This timing meant that the assessment was, of necessity, a retrospective *post facto* review of the program design and implementation. This limited the research team to data derived from the memories of individuals involved in the program, documents developed and retained by IDOC personnel, and existing records and databases.

The planning and design stage of the GPS program was rushed and characterized by a lack of involvement by local personnel or direction by state officials. Neither the parole nor the community corrections personnel at the local level was aware of why or how they were selected as pilot sites. Personnel at the community corrections agencies were asked if they were interested in participating. Given a positive response from the community corrections agency the parole officials were informed that they would be a pilot site for the program. The only program guidelines provided involved the target population (sex offenders) and the program size (the number of GPS units to be funded). Each of the initial three sites had to develop their own program and had to do it in a very short time frame. This resulted in no program at one of the three initially selected pilot sites. No overall specific goals, guidelines, or objectives were provided at the state level.

The decision to have the GPS systems operated by local community corrections agencies resulted in a structure that potentially could work for a statewide GPS program. Other states have attempted to have their parole agents operate the GPS system with disappointing results (Tennessee Board, 2007). Indiana has a strong network of community corrections agencies with considerable experience with electronic monitoring systems. The development of a statewide system delivered through these agencies would require a very clearly developed set of guidelines, duties, and expectations. It would also depend on the level of collegiality, cooperation, and trust between the parole district and community corrections personnel. It would, however, have a number of advantages. These would include a division of labor that utilizes existing expertise and organizational experience. In addition, local administration of the GPS monitoring system would take advantage of the personal knowledge of the geographic area possessed by the operators.



The lack of statewide guidelines about the Pilot Program structure produced not one, but three different outcomes with differing structure and somewhat differing behavioral restrictions. One site failed to develop a program. This derived largely from differing visions of the program rules and the role of the community corrections agency. More explicit program definition and more clearly defined role expectations might have avoided this result. The remaining two sites developed viable programs in a very short period of time. While the two programs were similar in most respects there were two significant differences. First, one site utilized staff dedicated exclusively to the GPS program while the other assigned the GPS duties to staff with other existing duties. The second difference concerned a program rule: one site imposed a nightly curfew on the clients while the other did not. The personnel in both sites were satisfied with their version of the program, but it appears there were some significant differences. Any anticipated statewide program would need to standardize program structure and features.

The available data indicate that the dedicated staff approach utilized in the Southern district produced more attentive operation of the GPS system. In general, at this site system alerts were cleared more quickly than at the other site. It is important to note that this does not mean that any actions initiated by an alert were handled any more quickly. Field observation of the sites and the GPS system data suggest the personnel in this site handled each alert as it came in and often utilized the text messaging capability of the system to notify the clients of actions required of them to clear an alert. The site with the dedicated staff did, however, experience fewer parole failures due to technical violations. It is possible that the closer system operation resulted in fewer violations of the conditions of parole.

In the Northern district, for the 30 individuals with the possibility of at least six months on the GPS monitoring, there were no parole failures as a result of a new arrest. The parole agent in this district imposed a curfew on the program participants. It is possible that the curfew, combined with the parole conditions and the GPS monitoring, contributed to this result. While this finding was promising, the *post facto* nature of the design allows two other possible explanations. The first concerns the nature of the clients assigned to the program in this district: overall, the participants in the Northern district were identified as lower risk offenders. It is possible that the lack of new arrests was due to their existing lower risk. The second possible explanation is related to sample size. In general, sex offenders have a low risk of a new arrest (Sample & Bray, 2003) over a five-year period. When this relatively low risk is combined with the small number of offenders (30) and the short time period (six months to a year) the observed outcome could be simply an expected outcome for this population.

It is possible that the GPS monitoring may have helped reduce parole failure in this population. When the two pilot sites were combined the overall parole failure rate for those clients with at least a six-month exposure was 48.3 percent, while the overall failure rate for the comparison site was 61.7 percent. This represents a 21.7 percent lower rate of parole failure over a relatively short exposure period. As with the other findings, the assessment design does not allow for the elimination of other explanations (selection methods, sample size, length of time) for this outcome. On the other hand, the



observations made during the site visits and the impressions of the community correction and parole personnel, suggest the monitoring as a likely contributor to the lower failure rate.

The parole agents and their supervisors in the GPS Pilot Program sites thought the program improved their ability to do their job. In particular, they thought the GPS monitoring both reduced misbehavior (through an increased chance of detection) and reduced lying about their activity patterns. The ability to locate a particular person at a particular time helped parole agents on several occasions both to exclude individuals suspected of wrongdoing and to include them as being at a suspected site at the time of an offense. In one of the sites the community corrections case managers also met with the parolees on a regular basis. This was viewed as a valuable addition to parole supervision.

Recommendations

Based on the findings of the assessment, we offer several recommendations:

- Essential program elements, objectives, guidelines, and expectations need to be developed in advance of program implementation. In the case of a pilot program where the purpose is to establish “what works” the absence of direction may allow the implementing agencies to develop important adaptations. If a statewide program is considered, however, the program design needs to be spelled out very clearly for the implementing agencies.
- Subsequent programs should narrow the population of individuals targeted for GPS monitoring. The target population should be limited to those individuals rated as high risk of recidivism on a validated risk assessment instrument designed for sex offenders and/or those individuals at imminent risk of being returned to prison for technical violations. While a GPS system may help reduce the chances of a return to prison for high risk individuals, it can have very little effect on those groups at low risk of recidivism. A GPS monitoring system is an expensive addition to parole supervision, but it is still less expensive than prison. A judiciously applied program potentially can both facilitate a successful return to society and reduce the costs associated with a return to prison.
- When considering implementation of a new program or the continuation of an existing program, the researchers who will conduct the evaluation or assessment should be involved in the very earliest stages of program development. The ability to design and deliver effective programs, as well as the ability to improve underperforming programs and to phase out programs that do not meet performance expectations, depends on high quality information about those programs. The decisions that affect the quality of the evaluation are almost always made at the design and development stage.
- GPS electronic monitoring may be a viable tool for parole supervision of certain types of offenders. As of the cutoff date for data collection, very few (8 of 133) of the individuals monitored with the GPS system had been arrested. Of those who were arrested, only one was charged with a new sex offense. One other was charged with



commercial burglary, while the remaining six were arrested for a variety of lesser charges. The assessment design does not allow identification of the reasons for this low arrest rate, but the possibility that the GPS monitoring contributed should be investigated.

- Future GPS monitoring programs for parolees should include a curfew and should be delivered by a dedicated staff. One of the present programs included a curfew and experienced no new arrests. The other program utilized a dedicated staff and experienced fewer system alerts and fewer revocations for technical violations. These differences may be attributable to other sources, but it is plausible that they derive from these program characteristics. This should be investigated in the future.



APPENDIX 1: OPERATION OF GPS SYSTEMS

What Is GPS

The Global Positioning Satellite System, more commonly referred to as GPS, is a satellite-based navigation system developed, maintained, and owned by the U.S. Department of Defense. It consists of three distinct segments: the space segment, the control segment, and the user segment (U.S. Department of Homeland Security, 2008). The space segment consists of between 27 and 30 geostationary satellites, 24 of which are active with the remaining functioning as backups (Kingsley-Hughes, 2005). The control segment includes a master control station located at Schriever Air Force Base in Colorado; five monitoring stations located in Hawaii, Kwajalein, Ascension Island, Diego Garcia, and Colorado Springs, Colorado; and three ground antennas located in Kwajalein, Ascension Island, and Diego Garcia. Finally, the user segment consists of GPS receivers operated by persons attempting to navigate land, sea, or air. These receivers are available in vehicles, cellular phones, laptops, personal devices, and watches (Brown, McCabe, & Wellford, 2007).

How Does GPS Work

To calculate a desired position, a GPS receiver must be able to locate at least three satellites (in most areas of the world, six satellites are visible to receivers at any time) and calculate the distance between those satellites and the receiver (Kingsley-Hughes, 2005). Distance is calculated by multiplying the time it takes the satellite to transmit the signal to the receiver times the rate the signal travels—which is equal to roughly the speed of light or 186,000 miles per second. Once this information is known, a three-dimensional location can be determined through trilateration—a process whereby the location of an object is found based on its relative position to reference points (in this case a GPS receiver’s location relative to satellites). Various sources of error are inherent to this process.

Sources of GPS Signal Errors

The margin of error for GPS is approximately 10.4 meters or 33 feet (Table A1.1)—though more accurate positioning can be obtained with more sophisticated GPS receivers such as those used by the military and for land surveying (Wikipedia, 2008a). A variety of sources contribute to this error margin. Atmospheric conditions, particularly in the ionosphere and troposphere, can slow down satellite signal transmissions and result in position calculation errors. Timing errors between satellite and receiver clocks and errors in satellite location identification (ephemeris) may also cause position calculation errors. Another source of error is multipath error where the satellite signal bounces off objects such as buildings or land on its way to the receiver resulting in longer signal transmission times. Additionally, water can interfere with signal transmissions by absorbing the signals. Water on receiver antennas, in the air (humidity), and even water contained in leaves and pine needles (effect most evident in dense forests) can degrade and weaken signals and result in position calculation errors. Finally, interference from natural sources—such as solar flares, geomagnetic storms, and Van Allen Belt radiation—and interference from artificial sources—such as unintentional and/or intentional jamming or spoofing of GPS signals—may threaten signal quality and position calculation accuracy (Wikipedia, 2008b).



Table A1.1: Sources of GPS signal errors

Error	Amount of Error (feet/meters)
Ionosphere	13.1 / 4.0
Clock	6.9 / 2.1
Ephemeris	6.9 / 2.1
Troposphere	1.3 / 0.7
Receiver	1.6 / 0.5
Multipath	3.3 / 1.0
Total	33.1 / 10.4

Source: Adapted from Kingsley-Hughes (2005)

Techniques to Improve Accuracy

Various methods are used to enhance GPS accuracy, all of which “rely on external information being integrated into the calculation process” (Wikipedia, 2008b). The *Wide Area Augmentation System (WASS)* is a system used by the Federal Aviation Administration (FAA) to enhance air navigation using GPS in the United

States. The system consists of a network of reference stations, a master station, and geostationary satellites that ultimately transmit corrected GPS signals to WASS-enabled GPS receivers (Wikipedia, 2008c). *Assisted GPS* is common GPS with an *assistance server* incorporated. The addition of the server helps to overcome some of the problems with conventional GPS such as multipath errors and errors in locating satellites ephemeris delay (Wikipedia, 2008d). Similar to WASS, *Differential GPS (DGPS)* is a method for correcting GPS determined positions by comparing “roving” receiver locations with reference stations on the ground. The ground reference stations correct GPS signal errors and then transmit the correct information to the receivers allowing for improved position accuracy. Many commercial GPS units support DGPS and can achieve accuracy of one to five meters (GPS Information Net, 2008).

Applications, Advantages, and Shortcomings

Spatial referencing, that is the need to know where things are, makes GPS a particularly attractive and useful technology with a multitude of applications both civilian and military. Military applications include troop movement, fleet management, target tracking, missile and projectile guidance, search and rescue of downed pilots, reconnaissance, and map creation (Wikipedia, 2008b). Civilian applications include navigation (of all types of transport vehicles and crafts), surveying and mapping, tracking of items, emergency services, location-based games. And novel applications are being found regularly.

One of the major advantages of GPS technology is its many applications. Whether the task involves guiding missiles or simply navigating to the nearest restaurant, GPS technology can be a useful and effective tool. Furthermore, the user segment now has the ability to incorporate GPS into common items such as vehicles, cellular phones, laptops, personal devices, and watches rather than purchasing a separate receiver as was necessary previously. A final advantage is that GPS technology is relatively easy to learn and requires little knowledge of the overall system (Garmin Inc., 2000). Users can purchase their receiver and begin tracking and locating within hours.

Aside from general system and equipment errors inherent to GPS, ethical considerations and the absence of standards for using GPS, particularly in the context of tracking and monitoring persons, may be less obvious areas of concern about the technology. Michael, McNamee, and Michael (2006) outline a number of questions



regarding the ethics of “human-centric GPS tracking and monitoring” that remain unanswered. These include issues of privacy, accuracy, property, and accessibility. The authors discuss the implications of these questions and the need “to ethically integrate these [GPS] technologies into society” (Michael et al., 2006, p. 40).

Standards for the use of GPS systems in human tracking and monitoring applications are also largely undeveloped. In the context of community supervision of offenders, Brown, McCabe, and Wellford (2007) highlight the current lack of standards among community supervision programs stating that no national standards have been created for using GPS in these types of programs. The authors underscore the importance of standards to community supervision programs and how these standards relate to the overall program:

However, there is another set of questions that precede program evaluation. These involve the issue of whether the use of GPS in community supervision meets the standards and expectations established by the agency or other organizations; these questions go to the integrity of the program. Is the program operating in a way that is consistent with the way GPS should work or at least is expected to work by the agency responsible for its operation? This requires that from the beginning of the use of GPS in community supervision there be clear statements about how the program should work and ways to monitor whether these standards or expectations are being met (Brown et al., 2007, p. 5-1).

Though GPS technology is a useful and effective tool for navigating, has a variety of applications, and is convenient and affordable, it remains imperfect. Beyond inherent errors of the system, many recent applications of GPS have raised important ethical questions and questions regarding standards for GPS use. For instance, early GPS was used primarily as a tool for the navigation and tracking of *objects* in military settings. More recently, however, GPS has been used to track *persons*—including paroled offenders participating in community supervision programs. Though GPS may be a useful tool in tracking and monitoring persons, the expectations for how this application should work have been outpaced by the rush to implement GPS in these settings, and, as a result, many of the ethical and standards-related questions remain unanswered.



Electronic monitoring systems (EM) are designed to provide an additional level of supervision to ensure offenders are adhering to the restrictions prescribed by the courts and criminal justice agencies. There are a number of electronic monitoring technologies to aid in the surveillance of offenders released to communities. The most commonly used methods include radio frequency (RF) systems, Passive Global Positioning Satellite (GPS) systems, and Active GPS systems. RF technology monitors whether the offender is at a specified location at required times by transmitting a signal through the offender's landline telephone. This technology was developed in the 1980s and is widely used in the United States. Passive GPS provides data regarding an offender's whereabouts, but only once the offender arrives at their place of residence and places the receiver on the base to be transmitted to the monitoring center. An offender can incur violations that go undetected until the data are transmitted to the monitoring center. Active GPS monitoring provides "near real time" tracking of an offender's location. Offender tracking data can be displayed on a computer with a map of exclusion zones, such as schools or parks. If any of the boundary restrictions are violated or equipment is tampered with, the monitoring center receives an alert.

The following discussion of GPS systems will include considerations regarding program and policy design, technology use, and funding issues. An extensive review of scholarly articles, case studies, and reports has been used to assess offender monitoring with GPS technology. Determining the appropriate use of EM in each community will require policy makers to have a clear understanding of the potential benefits and the drawbacks of the technology, as well as the limitations of the environment in which it is being employed.

Program and Policy Design

Program and policy design of GPS monitoring of offenders varies among criminal justice agencies and organizations. Most authors agree that GPS monitoring is best suited for high risk offenders. Despite this agreement about appropriate target populations, electronic monitoring (EM) tends to be used on lower risk offenders with less serious offenses such as drug and property offenses. A recent study completed for the Florida legislature concluded that the reluctance to place high risk offenders on electronic monitoring stems from the historical use of EM on community control (low risk) offenders (OPPAGA, 2005). The Florida Department of Corrections maintains the authority to place offenders on EM but they are disinclined to do so unless it was specified as part of their sentence. The Florida report recommends that electronic monitoring be a standard condition of punishment for any offender eligible for monitoring. EM is a standard condition for community control offenders, which gives the judge and the department specific authority. They report providing more specific authority may ease the department's uncertainty in placing offenders on EM without a court order. Iowa legislation requires adult offenders with offenses against minors 17 and under to be electronically monitored for a period of at least five years and all other offenders on any type of conditional release may be electronically monitored (Iowa Department of Corrections, 2005).

The Florida study (OPPAGA, 2005) also recommended the use of a risk assessment tool to identify high risk offenders as candidates for EM. A risk assessment tool will be



critical in effectively prioritizing offenders for placement on a limited number of electronic monitoring units. Offender selection for GPS monitoring should require an assessment of criminal history, current crime, and status in the criminal justice system (e.g., probation, pretrial release, parole), among other factors (Maryland Task Force, 2005). The Maryland Task Force developed a ranking system to identify offenders most likely to re-offend and determine the best candidates for GPS monitoring. The Iowa Department of Corrections also established criteria for placement on GPS monitoring, which includes a high risk score, high profile offender, access to the victim, history of absconding or escaping, and director approval (Iowa DOC, 2005). Offenders assigned to electronic monitoring are routinely assessed and can be moved up and down the EM continuum (e.g., radio frequency, passive GPS, active GPS). According to the Maryland Task Force, "...GPS, like other supervision tools, should not be applied en mass to all offenders or categories of offenders" (Maryland Task Force, 2005).

California's Sexual Predator Punishment and Control Act requires lifetime GPS monitoring of registered felon sex offenders released on parole (Peckenpaugh, 2006). The California Department of Corrections and Rehabilitation (CDCR) places high risk sex offenders on GPS monitoring and in treatment programs with CDCR-contracted therapists. California has also implemented a screening tool to determine which sex offenders are best suited for the program. The tool was created by a former employee and consists of a three-question assessment that is similar to accredited assessment tools like Static-99 or Stable-2000. Using an assessment tool that is not validated presents challenges for contracted therapists. The current assessment tool does not provide therapists with "a firm sense of the risk posed by the offenders they treat" (Peckenpaugh, 2006). At the time (2006), CDCR was considering adopting a validated screening tool to provide a better risk assessment of offenders.

Some GPS programs include periodic risk assessment and regular face to face meetings with a case manager. As mentioned previously, a number of jurisdictions utilize risk assessment tools to prioritize offender placement on GPS monitoring programs and some reassess their placement as often as every 45 days. In addition to assessing the appropriateness of the monitoring level, many jurisdictions require weekly visits with a case manager or officer (Ibarra & Erez, 2005). Weekly visits provide case managers with the opportunity to evaluate the offender in person, update information, and address any concerns or violations. Interacting with the offender on a weekly basis allows the case manager to assess the general physical and mental well-being of the client. These regular meetings may also help case managers anticipate "trouble" or the potential to re-offend. They may be able to diffuse potentially volatile situations and keep the offender from violating the terms of his/her sentence. Ibarra and Erez report that those on monitoring/supervising programs were "appreciative of the officer's long-term orientation to their well being" and "talk about how the officer seems to be trying to "help" them get their lives back on track" (Ibarra & Erez, 2005).

In some programs GPS monitoring is viewed as an additional "tool" to facilitate a transition from prison. According to some professionals in the justice fields, GPS monitoring balances accountability and freedom. The United Kingdom uses GPS monitoring as a "form of transition from prison back into the community" (Black & Smith,



2003, p. 3). Similarly in South Australia, at the final six months of a prison sentence, “the prisoner is released into the community with an electronic monitoring condition and will then either progress to a traditional parole order or finish the sentence” (Black & Smith, 2003). The California Department of Corrections and Rehabilitation (CDCR) is considering an advanced risk assessment tool to shift offenders progressing in treatment programs to different levels of surveillance and risk designations. In an Arizona program, GPS monitoring was used for offenders on work release (Johnson, 2002). The offenders would go to work or school during the day and report back to a designated facility in the evening.

A key component of GPS monitoring program design is the communication and collaboration of all stakeholders such as law enforcement, parole, department of corrections, and treatment providers. According to the Maryland Task Force, collaborative and cooperative efforts with law enforcement personnel can assist in solving crimes and streamlining work load.

GPS Tool Evaluation and Use

GPS monitoring often is viewed as a technology that could potentially reduce costs within the criminal justice system, increase public safety, and improve reintegration of offenders back into society. Active GPS monitoring allows criminal justice officials to track offenders in near real time, which provides alert notification and increases response capabilities. The tracking unit can alert offenders if they are near a prohibited area and give them the opportunity to change course. If the offender violates the zone restriction, supervising officials can be notified quickly of the violation. With some systems, victims can also be notified when the offender is nearby, which may provide a better sense of security for the victim (See Ibarra & Erez, 2005).

Monitoring offenders on active GPS requires wireless data service coverage, which can be subject to interruption. According to a Michigan case study, GPS programs experienced occasional delays in reporting and dead spots in cellular service (Johnson, 2002). GPS signals can be interrupted by dense vegetation, weather conditions, and buildings. Washington State determined that weather conditions did not present as many issues as did solar flare-ups (Maryland Task Force, 2005). The solar flare-ups caused the GPS devices to record misplaced locations. The most common occurrence of lost signals originated from offenders entering buildings for work or other reasons. Some additional commonly cited drawbacks of GPS equipment include daily access to electricity to charge the device and the size and weight of tracking devices.

GPS monitoring programs can be labor intensive and require additional staff considerations. Depending on the type of system, the technology can provide quick notifications of violations, some of which may require immediate agency response. The Maryland Task Force found that many jurisdictions complained of information overload. Tennessee experienced similar workload problems (Tennessee Board, 2007). There was too much to analyze and consequently some information had to be ignored. The Maryland Task Force determined this created more agency liability and risks of legal action from lack of response to GPS information. Near real time information of offender violations might have never been detected with traditional supervision. Increased information on offender activity could potentially lead to increased re-



incarceration from technical violations. On the other hand, it has been argued that stringent GPS monitoring reduces the number of revocations. According to a 2001 Florida Report, GPS monitored offenders had lower rates of absconding and revocation (Johnson, 2002). Padgett et al. argue that “EM does have a crime reductive effect in the period during which offenders are subject to it” and “technical violations while on EM are minimal” (as cited in Nellis, 2006). A Michigan case study included in Johnson’s (2002) analysis of GPS monitoring concluded that the equipment did have some effect on offender behavior and made them feel as though they were constantly being watched. Black and Smith (2003) discussed the possibility of electronic monitoring in general, improving the transition of offenders back into society.

Funding and Cost Factors

A new GPS program, like other electronic monitoring systems, is usually an added expense for a jurisdiction. GPS monitoring is viewed by some as a means to reduce the cost of administering the justice system by decreasing prison populations, the number of prisons being built, and the cost of overseeing custodial sentences (Black & Smith, 2003). The majority of the studies reviewed by Johnson (2002), however, expressed funding concerns as a primary reason for not implementing GPS monitoring of offenders. A Florida study determined GPS monitoring to be as expensive or less than regular electronic monitoring and a less expensive alternative to incarceration (Johnson, 2002). The Maryland Task Force discovered that several jurisdictions charge offenders to offset the costs of GPS monitoring. Some jurisdictions make offenders demonstrate their ability to pay as a condition of release and non-payment would result in a violation. In Maryland, offenders are charged after they have obtained employment, with some exemptions of payment granted to individuals with disabilities, student status, or other extenuating circumstances. In addition to equipment costs, GPS tracking may require additional staff to monitor and respond to alerts 24/7.

Receiving offender tracking data 24/7 can greatly alter the workload of a caseworker. The Maryland Task Force found that many jurisdictions complained of information overload. Careful evaluation and assignment of caseloads and employee shifts will be critical in the success of a GPS monitoring program. According to one study active GPS creates less additional work than passive GPS, but more than radio frequency (RF) monitoring (OPPAGA, 2005). Although active GPS is more expensive than passive GPS, the latter is less cost effective when additional workloads are taken into consideration. Radio frequency systems create the least expense to agencies but provide considerably less information. The standard caseload for the three types of electronic monitoring consists of 17 offenders per officer for active GPS, 8 offenders per officer for passive GPS, and 22 offenders per officer for radio frequency monitoring (OPPAGA, 2005). Passive GPS creates the greatest workload due to a higher number of alerts that require follow-up. Officers must sift through all of the data from the previous day. OPPAGA considers active GPS the most cost effective mechanism for high risk offenders and radio frequency best suited for low risk offenders.

Overall, jurisdictions considering adoption of a GPS monitoring system will need to thoroughly evaluate the costs and benefits of implementing a GPS monitoring program.



It will be necessary for agencies to evaluate funding, staffing, and technical aspects of GPS monitoring to determine the suitability of the technology for the proposed application.





APPENDIX 3: METHODOLOGY AND CLIENT PROFILES

Methodology

This was an *ex post facto* assessment designed and conducted after the initial program planning, design, and implementation occurred. The original state proposal was submitted to the federal agency in mid-2005 and funding was received later that year. Planning for the GPS Pilot Program began in 2006, the first program began in February 2007, the solicitation for the assessment was issued in August 2007, and work began on the assessment in late October of that year.

The late entry of the assessment team into the process affected some aspects of the effort more than others. In general, the data utilized for the assessment were limited to existing records and the memories of respondents. Documentation of program planning and design was hindered by the relative absence of documents for this phase of the program and depended in large part on the recollections of the individuals who were involved with the original activities and were still employed by the relevant agencies and IDOC. Program organization was documented with interviews and site visits to the pilot counties. Some GPS performance data were recovered by accessing archived data. Since the programs had been operating six to eight months prior to the initial assessment activities, traditional methods for creation of a comparison group such as random assignment were not possible. Thus, the comparison groups were constructed from parolees active in another parole district during the Pilot Program.

Data Sources

Observations and interviews conducted during site visits were utilized to reconstruct the program planning and design, as well as to identify the program structures. Researchers made site visits to all three counties initially identified as participants in the GPS Pilot Program. Members of the research team observed the facilities and program operation at each of the community corrections agencies during these visits. These observations generated essential details about program operation and served as a check against information provided by program personnel.

Whenever possible, the team collected documents related to the planning, design, and delivery of the GPS Pilot Program. This included the original program proposal to the funding agency, memoranda of understanding between IDOC and the county community corrections agencies, program guidelines developed by the agencies, parole stipulations for sex offenders, and documentation related to the GPS electronic monitoring system.

Researchers conducted interviews with individuals at the cooperating community corrections agencies, the parole districts, and IDOC central office. During the site visits team members made an attempt to interview, either individually or in a group setting, all individuals working with the GPS Pilot Program. These open ended interviews focused on program design, organization, and operation. At the two operational sites two members of the research team conducted the interviews, recorded detailed notes, and then prepared a detailed narrative about the site. At the third site only the principal investigator conducted the interviews. At the two operational sites, the team also conducted interviews with the parole district supervisor and the parole agent with the



caseload assigned to the pilot program. Interviewers followed the same procedures (notes and narrative) with these respondents. Team members also conducted interviews with several individuals at IDOC central office who were involved in the original planning and design of the program. A number of individuals were no longer employed by IDOC.

The GPS monitoring systems collect enormous amounts of information about client movement and activities. Of primary importance to an assessment are the nature and volume of alerts generated by the system and the agency resolution of these alerts. For the assessment the research team attempted to obtain a download of information for each client from the vendor, BI Incorporated. Unfortunately, the vendor claimed that it was not possible to generate this information. After several months of discussion it was determined that the research team would access existing reports from the system and create a database from these reports. This was labor intensive, delayed the project considerably, and seriously limited the available data and subsequent analysis.

The parole agents at the two pilot sites completed data sheets for each of the parolees assigned to the GPS program. The information included committing offense, risk assessment scores (Static 99 and Stable 2000), length of sentence, time served, length of time on parole/GPS, basic demographic information, and if appropriate, the nature of program termination (successful, technical violation, or new arrest). This information was used to describe the program participants and their performance while in the program.

Selection of a comparison group was difficult. The original plan was to select individuals from the same target population, in the same parole districts, released in the year prior to program implementation. The nature of program implementation in the two counties negated this strategy. As an alternative, the parole agents and supervisors in the pilot districts were asked to identify other districts with similar populations and parole agents with the same caseloads and operational styles as those in the pilot districts. The personnel from both of the pilot districts identified the same three districts. Two of these were selected and the individuals at these parole offices agreed to collect the same data for their clients. They were asked to duplicate the process experienced in the pilot counties as closely as possible: include all sex offenders residing in the counties similar to those in the pilot, those parolees on the caseload in February 2007, and all individuals added through February 2008. One site responded quickly with full data and information, while the other site provided only partial data after a two month delay. As a result the comparison data in this report are derived from only one parole district.

Client Profiles

Below are descriptive statistics for the clients in the two GPS sites and the one comparison site.

Qualifying Offenses

Table A3.1 presents a summary of the qualifying offenses for the parolees in the three parole districts. These are the offenses that qualified the individual for the Sex Offender Monitoring and Management (SOMM) caseload. In a few cases it was not the current offense, but rather a prior offense that qualified the individual.



Table A3.1: Offense qualifying parolee as a sex offender by district

Offense	Northern district % (N)	Southern district % (N)	Comparison district % (N)
Total	100.0 (51)	100.1 (82)	100.1 (70)
Child Molesting	49.0 (25)	36.6 (30)	52.9 (37)
Sexual Misconduct	9.8 (5)	18.3 (15)	27.1 (19)
Rape	15.7 (8)	17.1 (14)	4.3 (3)
Failure to Register	9.8 (5)	13.4 (11)	4.3 (3)
Sexual Battery	2.0 (1)	4.9 (4)	4.3 (3)
Child Exploitation	2.0 (1)	3.7 (3)	1.4 (1)
Child Solicitation	3.9 (2)	0.0 (0)	2.9 (2)
Other	7.8 (4)	6.1 (5)	2.9 (2)

Source: Madison, St. Joseph, and Vanderburgh County Parole Districts

At all three sites the three most common offenses were child molesting, sexual misconduct with a minor, and rape, but the proportions of these offenses varied considerably. Around one-half of the parolees in the Northern district (49.0 percent) and the Comparison district (52.9 percent) had been convicted of child molesting while a little over one-third (36.6 percent) of the parolees in the Southern district were convicted on this offense. Sexual misconduct convictions were considerably more common in the Comparison district (27.1 percent) than in either the Southern district (18.3 percent) or the Northern district (9.8 percent). On the other hand, rape as a qualifying charge was considerably less common in the Comparison site (4.3 percent) than in either the Northern district (15.7 percent) or the Southern district (17.1 percent). When combined these three charges accounted for between 72 and 84.3 percent of all parolees included in the three sites.

Risk Scores

The Indiana Department of Correction utilizes the Static-99 instrument to assess the risk of recidivism for sex offenders paroled in Indiana. This instrument originally was developed in Canada, but has been validated and is in wide use in the United States (Austin, Peyton, & Johnson, 2003). While a numeric score is assigned, these scores are often translated into risk categories. Table A3.2 presents the categorical risk scores by district, as reported by the parole agents.

This table indicates that the Static-99 risk scores for the Northern district were lower than in the other two districts. The percentage of parolees with high risk scores in both

Table A3.2: Static-99/RRASOR risk of parolees by district

Risk level	Northern district	Percent of district total	Southern district	Percent of district total	Comparison district	Percent of district total	Total
Total	48	100.0	75	100.0	51	100.0	174
Low	20	41.7	9	12.0	8	15.7	37
Medium	12	25.0	23	30.7	17	33.3	52
High	16	33.3	43	57.3	26	51.0	85
Missing values	3	N/A	7	N/A	19	N/A	29

Notes: Parole districts were asked to report each parolee's Static 99 score. The majority reported a categorical score of low, medium or high though some reported numeric values. For consistency, tabulations were completed using categorical scores only.

RRASOR stands for Rapid Risk Assessment for Sexual Offense Recidivism.

Missing values are not included in total or percent calculations.

N/A equals not applicable.

Source: Madison, St. Joseph, and Vanderburgh County Parole Districts



the Southern (57.3 percent) and Comparison (51.0 percent) districts was considerably higher than in the Northern district (33.3 percent). Similarly, in the Northern district 41.7 percent of the parolees were scored as low risk while this number was much lower in the Southern (12.0 percent) and Comparison (15.7 percent) districts.

Sentence Length

Sentence length, as reported by the parole agents, is presented in Table A3.3. The reader will note that this is the original sentence and not the amount of time served. Sentence length ranged from one to 35 years. In the Northern district the median sentence length was 10 years. This compares to the median sentence length of 6 years in the Southern district and 5.4 years in the Comparison district.

Table A3.3: Sentence length by parole district

Sentence length (years)	Northern district	Percent of district total	Southern district	Percent of district total	Comparison district	Percent of district total	Total
Total offenders	51	100.0	82	100.0	70	100.0	203
1	0	0.0	6	7.3	1	1.4	7
1.5	4	7.8	0	0.0	3	4.3	7
1.7	0	0.0	1	1.2	0	0.0	1
2	6	11.8	6	7.3	11	15.7	23
2.5	1	2.0	1	1.2	1	1.4	3
3	5	9.8	4	4.9	8	11.4	17
4	4	7.8	13	15.9	9	12.9	26
5	2	3.9	2	2.4	2	2.9	6
5.8	1	2.0	1	1.2	2	2.9	4
6	1	2.0	9	11.0	8	11.4	18
7	0	0.0	2	2.4	2	2.9	4
8	1	2.0	9	11.0	10	14.3	20
9	0	0.0	2	2.4	1	1.4	3
10	8	15.7	8	9.8	2	2.9	18
12	4	7.8	1	1.2	0	0.0	5
15	1	2.0	8	9.8	2	2.9	11
18	0	0.0	1	1.2	0	0.0	1
20	7	13.7	6	7.3	8	11.4	21
25	0	0.0	2	2.4	0	0.0	2
27	1	2.0	0	0.0	0	0.0	1
28	1	2.0	0	0.0	0	0.0	1
29.5	1	2.0	0	0.0	0	0.0	1
32	1	2.0	0	0.0	0	0.0	1
35	2	3.9	0	0.0	0	0.0	2
Mean length	10.8		8		6.8		8.3
Median length	10		6		5.4		6

Source: Madison, St. Joseph, and Vanderburgh County Parole Districts

Current Age

Table A3.4 presents the current age of the parolees in the three districts. The overall median age for all parolees in the three samples was 38.5 years. The median age for parolees in the Northern district was about five years older than the overall age (43 years old) and eight years older than the Southern clients. The median age for the parolees in the Southern district was 35 years old and the median age in the Comparison site was 37 years old.



Table A3.4: Age of parolee by district

Age group	Northern district	Percent of district total	Southern district	Percent of district total	Comparison district	Percent of district total	Total
Total offenders	50	100.0	81	100.0	69	100.0	203
18-24	3	6.0	4	4.9	8	11.6	15
25-34	7	14.0	35	43.2	25	36.2	67
35-44	17	34.0	19	23.5	12	17.4	48
45-54	17	34.0	17	21.0	13	18.8	47
55-64	6	12.0	4	4.9	8	11.6	18
65-74	0	0.0	2	2.5	1	1.4	3
75 +	0	0.0	0	0.0	2	2.9	2
Missing values	1	N/A	1	N/A	1	N/A	3
Mean age	42.5		37.3		39.3		39.3
Median age	43		35		37		38.5

Notes: No offenders were under the age of 18.

Missing values are not included in total or percent calculations.

N/A equals not applicable.

Source: Madison, St. Joseph, and Vanderburgh County Parole Districts

Gender

The parolees at the three sites were primarily male. Table A3.5 indicates that of the 196 individuals included in the sample only three were women. The Northern district had no women during the study period, the Southern district had two, and the Comparison site had one female client. This predominance of males is not unusual for sex offender caseloads.

Table A3.5: Gender of parolees by district

County	Male	Percent of district total	Female	Percent of district total	Missing values	Total
Total offenders	193	98.5	3	1.5	7	196
Northern district	46	100.0	0	0.0	5	46
Southern district	80	97.6	2	2.4	0	82
Comparison district	67	98.5	1	1.5	2	68

Notes: Missing values are not included in total or percent calculations.

Source: Madison, St. Joseph, and Vanderburgh County Parole Districts

Race

A majority of the parolees in all three sites were identified as white. Table A3.6 shows that the racial distribution did, however, vary considerably between the three sites. In both the Southern district and the Comparison district approximately 80 percent (79.3 and 81.4 percent, respectively) of the clients were white. This compares to general population counts (not shown) of 88.7 percent white in the primary Southern district

Table A3.6: Race of parolees by district

County	African American	Percent of district total	White	Percent of district total	Missing values	Total
Total offenders	49	25.1	146	74.9	8	195
Northern district	19	44.2	24	55.8	8	43
Southern district	17	20.7	65	79.3	0	82
Comparison district	13	18.6	57	81.4	0	70

Notes: Missing values are not included in total or percent calculations.

Source: Madison, St. Joseph, and Vanderburgh County Parole Districts



county and 90.2 percent white in the Comparison site (not shown in A2.6). In the Northern district the sex offender caseload was 55.8 percent white while the general population in that county was 84.0 percent white.

Marital Status

Table A3.7 presents the current marital status of the parolees in the three sites. Slightly over one-half were single in all three locations: Northern 57.4 percent, Southern 55.6 percent, and Comparison 57.6 percent. One-third (34.0 percent) of the clients in the Northern district were divorced, while 29.6 percent in the Southern district and 25.8 percent in the Comparison site were divorced. In the Southern district 14.8 percent of the clients were married. This compares to 8.5 percent in the Northern district and 15.2 percent in the Comparison site.

Table A3.7: Marital status of parolees by district

Marital status	Northern district		Southern district		Comparison district		Total	
	Count	Percent of district total	Count	Percent of district total	Count	Percent of district total	Count	Percent of district total
Total offenders	47	100.0	81	100.0	66	100.0	194	100.0
Married	4	8.5	12	14.8	10	15.2	26	13.4
Single	27	57.4	45	55.6	38	57.6	110	56.7
Divorced	16	34.0	24	29.6	17	25.8	57	29.4
Widowed	0	0.0	0	0.0	1	1.5	1	0.5
Missing values	4	N/A	1	N/A	4	N/A	9	N/A

Notes: Missing values are not included in total or percent calculations.
N/A equals not applicable.

Source: Madison, St. Joseph, and Vanderburgh County Parole Districts

Living Arrangements

Living arrangements for the parolees in the comparison site differed from those in the pilot sites (see Table A3.8). In both of the pilot sites a plurality of the parolees lived alone – 43.1 percent in the Northern district and 44.4 percent in the Southern district. In both pilot sites over one-half of the parolees lived with a family member or a non-relative roommate. In the Comparison district, however, the most common living arrangement was *roommate* (41.2 percent) followed by *group home or shelter* (26.5 percent) and *alone* (23.5 percent). Only 4.4 percent of the parolees in the comparison site lived with a family member. None of the parolees in the pilot sites were identified as living in a group home or shelter. The number of individuals living with a spouse was under 5 percent in all three locations.

Table A3.8: Living arrangements by district

	Northern district % (N)	Southern district % (N)	Comparison district % (N)
Total	100 (51)	100 (81)	100 (68)
Alone	43.1 (22)	44.4 (36)	23.5 (16)
Roommate, non-relative	27.5 (14)	22.2 (18)	41.2 (28)
Spouse-alone or with another	2 (1)	3.7 (3)	4.4 (3)
Group Home, Shelter	0 (0)	0 (0)	26.5 (18)
Family	27.5 (14)	29.6 (24)	4.4 (3)
Missing values	(0)	(1)	(2)

Notes: Missing values are not included in total or percent calculations.

Source: Madison, St. Joseph, and Vanderburgh County Parole Districts



Table A3.9: Employment status of parolees by district

Employment Status	Northern district	Percent of district total	Southern district	Percent of district total	Comparison district	Percent of district total	Total
Total offenders	51	100.0	81	100.0	69	100.0	203
Employed full-time	19	37.3	18	22.2	16	23.2	53
Employed part-time	3	5.9	18	22.2	16	23.2	37
Unemployed	25	49.0	36	44.4	27	39.1	88
Legally disabled	4	7.8	6	7.4	6	8.7	16
Other	0	0.0	3	3.7	4	5.8	7
Missing values	0	N/A	1	N/A	1	N/A	2

Notes: Missing values are not included in total or percent calculations.
N/A equals not applicable.

Source: Madison, St. Joseph, and Vanderburgh County Parole Districts

Employment Status

While employment is problematic for most people released from prison, because of the special conditions attached to sex offenders it is especially difficult for this group. The prohibition against being within 1,000 feet of a school, park, or playground as well as the ban on contact with children seriously restricts already limited employment opportunities. The parole agents reported that 49.0 percent of the parolees in the Northern district and 44.4 percent in the Southern district were unemployed (Table A3.9). These numbers compare to 39.1 percent of the Comparison group unemployed. Full-time employment was not common in any of the locations. In the Northern district the parole agent reported 37.3 percent as employed full-time, but that number was only 22.2 percent in the Southern district and 23.2 percent in the comparison site. Between seven (7.4) and nine (8.7) percent of the parolees were identified as legally disabled.





**APPENDIX 4: INDIANA
CONDITIONAL PAROLE
RELEASE AGREEMENT AND
PAROLE STIPULATIONS FOR
SEX OFFENDERS**



CONDITIONAL PAROLE RELEASE AGREEMENT
State Form 23R

CONDITIONAL PAROLE REGULATIONS

I do hereby agree to abide by the following terms and conditions of parole as established by the Department of Correction and promulgated by the Indiana Parole Board pursuant to IC 11-9-1-2; IC 11-13-3-4; IC 35-50-6-1.

1. **INITIAL REPORTING** - Upon my release from the Institution I agree to proceed directly to the program approved by the division of parole and report to my assigned supervising officer in accordance with the written instructions provided for me at the time of my release.
2. **EMPLOYMENT AND RESIDENCE** - I will make every effort to remain gainfully employed and I understand that I must obtain written permission from my supervising officer prior to changing my employment or residence.
3. **TRAVEL** a) I understand that out-of-state travel will require written permission from the Division of Parole and be in accordance with the provisions of the Interstate Compact Agreement. Permission for such travel may be obtained after consultation with and receiving written permission from my supervising officer.
b) I agree to consult with my supervising officer if personal needs or employment require frequent or prolonged periods beyond the parole district or area to which I am released.
4. **OWNING, LEASING, AND OPERATING MOTOR VEHICLES**
a) I will obtain from my supervising officer written permission from the Division before applying for or renewing a license to operate a motor vehicle.
b) I agree to consult with my supervising officer and receive his written permission prior to purchasing or leasing a motor vehicle. Permission to own, lease, or operate a motor vehicle is granted with the understanding that I shall comply with all state laws, local ordinances, and regulations of the Bureau of Motor Vehicles pertaining to ownership, financial responsibility, and the operation of motor vehicles.
5. **ABUSE OF ALCOHOL OR CONTROLLED SUBSTANCE** - I understand that the following is a violation of my parole:
a) Being intoxicated, or
b) Using, possessing, or trafficking illegally in a controlled substance. Abuse of alcohol or drugs is not a defense for violation of the parole release agreement.
6. **VISITING JAILS OR CORRECTIONAL INSTITUTIONS** - Visiting jails, city lock-ups, or state or federal correctional facilities is permitted only after first obtaining written permission of the parolee's supervising officer and of the chief administrative officer of the jail, city lock-up, or state or federal correctional facility to be visited. Such visits shall be limited to visiting those who are blood relatives or spouses, unless the supervising officer determines otherwise on a showing by me of a compelling reason.
7. **CRIMINAL CONDUCT** - I will not engage in conduct prohibited by federal or state law or local ordinance.
8. **FIREARMS AND DANGEROUS WEAPONS** - I understand that carrying, dealing in, or possessing firearms, explosive devices or deadly weapons is a violation of my parole release agreement.
9. **HOME VISITATION AND SEARCH** -
a) I will allow my supervising officer or other authorized officials of the Department of Correction to visit my residence and place of employment at any reasonable time.
b) I understand that I am legally in the custody of the Department of Correction and that my person and residence or property under my control may be subject to reasonable search by my supervising officer or authorized official of the Department of Correction if the officer or official has reasonable cause to believe that the parolee is violating or is in imminent danger of violating a condition to remaining on parole.
10. **COMMUNICATION AND SPECIAL INSTRUCTIONS** - I agree to report to my supervising officer as instructed and to respond to any and all communications from any authorized employee of the Department of Correction. I will abide by any special conditions imposed by the Indiana Parole Board which have been reduced to writing and included as a condition of my parole.

SPECIAL CONDITIONS

I understand that any acts of omissions in violation of the terms and conditions of my parole will subject me to being taken into immediate custody by the Indiana Parole Board and initiation of proceedings for revocation of my parole.

I hereby certify that the above statement of parole rules, regulations and conditions of parole has been read and explained to me by the following institutional Agent or Parole Officer, _____, and I agree and consent to these rules and regulations as evidenced by my signature this _____ day of _____, 19_____.

CONDITIONAL PAROLE AUTHORIZATION		
Name	Number	Institution
Witnessed: Institutional Agent or Parole Officer	Signature of Offender	
Released by Parole Board pursuant to IC 11-13-3-3; IC 35-50-6-1 per		
Chairman's Signature	Date Signed	Release Date
Released Per IC 35-50-6-1		
Institutional Agent	Date Signed	Maximum Expiration of Sentence Date

DISTRIBUTION: White - Institution, Canary - Central Office, Pink - Parole Officer, Goldenrod - Parolee



PAROLE STIPULATIONS FOR SEX OFFENDERS

State Form 49108 (R / 7-07)
INDIANA PAROLE BOARD

Name of offender	Department of Correction number	
DEFINITIONS: <ul style="list-style-type: none">• Child or children is / are any person or persons under the age of eighteen (18) years.• Contact means face-to-face, telephonic, correspondence, computer, or indirect contact via third parties.		
STIPULATIONS		OFFENDER INITIALS
1. You shall enroll in, actively participate in and successfully complete an approved sex offender treatment program. You must maintain steady progress toward all treatment goals and may not change treatment providers without prior approval of your parole agent. Prompt payment of any fees is your responsibility.		
2. You shall sign any waiver of confidentiality, release of information, or any other documents required to permit your parole agent and/or behavioral management or treatment providers to examine any and all records, to collaboratively share and discuss your behavioral management conditions, treatment progress, and parole stipulation needs as a team. This permission may extend to: (1) sharing your relapse prevention plan and treatment progress with your significant others and/or your victim and victim's therapist as directed by your parole agent or treatment provider(s), and (2) sharing of your modus operandi behaviors with law enforcement personnel.		
3. You shall be required to inform all persons living at the same residence of current and previous sex related convictions prior to establishing residency, as verified by your parole agent. You shall notify your parole agent of any change in home situations or marital status within twenty-four (24) hours. You shall have only one residence and one mailing address at a time.		
4. You shall not touch, photograph (<i>still or moving</i>), correspond with (<i>via letter or e-mail</i>), and/or engage in "small talk" or unnecessary conversation with any child, including your own, either directly or via third party, or attempt to do any of the preceding without written approval in advance by your parole agent in consultation with your treatment provider. You must never be in any vehicle or any residence with any child, including your own, even if other adult(s) is/are present, without written approval in advance by your parole agent in consultation with your treatment provider. You must report any inadvertent contact with children to your parole agent within twenty-four (24) hours of contact.		
5. You must not reside, visit or be within one thousand (1,000) feet of public parks with playgrounds, pools, rides, and/or nature trails; schools, day care centers, public swimming pools, public beaches, theaters, or any other place where children can reasonably be expected to congregate.		
6. You shall have no contact with your victim or victim's family, unless prior approval is granted by your parole agent and treatment provider, and only under special supervised conditions.		
7. You shall comply with any medical or mental health treatment or assessment, and any other behavioral management stipulations as required by your parole agent. You will only participate in behavioral management programs approved by your parole agent. You will not miss any appointments for psychotherapy, counseling, or community service obligations without the prior approval of your parole agent or treatment providers. You will not discontinue taking any prescribed medication without the approval of your prescribing physician and you must notify your parole agent and treatment provider within three (3) working days of discontinuing the medication.		
8. You shall not possess or view any material that is obscene, which for the purposes of this stipulation, is what the average person, applying contemporary community standards, finds that the dominant theme of the material, taken as a whole, appeals to a morbid, degrading, and unhealthy interest in sex; depicts or describes, in a patently offensive way, sexual conduct; and taken and a whole, lacks serious literary, artistic, political, or scientific value. You shall not visit strip joints, adult bookstores, peep shows, bars where topless or exotic dancers perform, or businesses which sell sexual devices or aids. You shall not possess personal contact materials (<i>for example, magazines, or papers</i>) that contain information about persons who are desiring to have personal relationships of any kind with others, nor will you place any ads that are sexual in content or respond by computer, telephone, or internet web sites, to any sexually solicitous ads.		

STIPULATIONS <i>(continued)</i>	OFFENDER INITIALS
9. You shall not use any computer with access to any "online computer service" at any location <i>(including place of employment)</i> without the prior approval of your parole agent. This includes any internet service provider, bulletin board system, e-mail system or any other public or private computer network.	
10. You shall allow your parole agent and/or computer service representative to conduct periodic, unannounced examination of your computer(s) equipment which may include retrieval and copying of all files from your computer(s) and any internal or external peripherals to ensure compliance with your stipulations. This may require removal of such equipment for the purpose of conducting a more thorough inspection. Your parole agent may have installed on your computer(s), at your expense, any hardware or software systems to monitor your computer usage.	
11. You shall not possess or use alcohol or any illegal controlled substance at any time.	
12. You shall not frequent or be present at any establishment whose main business purpose is the selling, distribution, serving or drinking of alcoholic beverages or illegal controlled substances.	
13. You shall submit to a substance abuse evaluation and follow all recommendations.	
14. You shall submit to breath <i>(e.g. alco-sensor)</i> , urine, blood, saliva and/or DNA testing as ordered by your parole agent.	
15. You shall refrain from "cruising" activity, frequenting areas where potential victims can be encountered.	
16. You shall not hitchhike or pick up hitchhikers. You shall not travel alone <i>(including but not limited to: driving, walking, bicycling, etc.)</i> after dark.	
17. You shall not stay overnight with any adult and/or establish an intimate and/or sexual relationship with any adult without prior approval by your parole agent and treatment clinician. You must also report whether the person you are having a relationship with has children under the age of eighteen (18) and/or if children under the age of eighteen (18) reside in the person's home.	
18. You shall not use your employment as a means to acquire new victims. Your parole agency may contact your employer at any time. You will not work in certain occupations that involve being in the private residences of others, such as, but not limited to: door-to-door sales, soliciting, or delivery. Your parole agent must first approve any employment that you do engage in.	
19. You shall not possess any items on your person, in your vehicle, in your place of residence, or as a part of your personal effects which attract children or that may be used to coerce children to engage in inappropriate or illegal sexual activities. You will not attempt to persuade, whether by words or actions or both, a child to enter a vehicle, structure, or enclosed area, or to otherwise relocate.	
20. You shall not join or be associated with any group which promotes activities involving children under eighteen (18) years of age, such as, but not limited to: church or religious youth groups, Boy Scouts, Girl Scouts, Cub Scouts, Brownies, YMCA, YWCA, youth sports teams, public parks, etc.	
21. You shall actively participate in offense specific mental health treatment program(s) approved and ordered by your parole agent at your own expense. You will contact the approved/designated provider within seven (7) days of release to parole to schedule an appointment unless an appointment was already scheduled prior to release on parole. Treatment is considered a behavioral management requirement of your parole and may include plethysmograph or polygraph testing or similar assessment/management tools. Termination from treatment or non-compliance with other required behavioral management requirements will be considered a violation of your parole release agreement. Subsequent treatment referrals, if any, will be at the direction of your parole agent. Should you request and be permitted to change treatment providers, stricter stipulations may be applied.	
22. You shall participate in and complete periodic polygraph testing at the direction of your parole agent or any other behavioral management professionals who are providing treatment of assisting your parole agent in monitoring your compliance with your parole rules and special stipulations.	

STIPULATIONS <i>(continued)</i>		OFFENDER INITIALS
23. You shall be under intensive supervision for ninety (90) days and shall report to your parole agent on a weekly basis <i>(or as frequently as instructed by your parole agent)</i> . Thereafter, you shall report as frequently as instructed.		
24. You shall register with local law enforcement authorities as a sex offender within seventy-two (72) hours of being released to parole supervision, or as instructed by your parole agent.		
25. You shall agree to permit the installation, maintenance and operation of any electronic monitoring equipment in both your home and on your body.		
The following additional and specific stipulations are also in effect and apply to your parole:		
26.		

27.		

28.		

I HEREBY IMPOSE THE FOLLOWING STIPULATIONS LISTED ABOVE:		
Signature of member of the Indiana Parole Board		Date <i>(month, day, year)</i>
I HAVE READ OR HAVE HAD READ TO ME THE ABOVE PAROLE STIPULATIONS AND AGREE TO ABIDE BY THEM CONSISTENTLY AND WITHOUT EXCEPTION. I UNDERSTAND THAT IF I REFUSE TO SIGN AT THE SPACE PROVIDED BELOW, THE STIPULATIONS ABOVE WOULD STILL APPLY TO MY PAROLE.		
Signature of offender		Date <i>(month, day, year)</i>
Signature of witness		Date <i>(month, day, year)</i>
WAIVER OF EXTRADITION: I hereby waive extradition to the state of Indiana from any jurisdiction in or outside the United States where I may be found and I also agree that I will not contest any effort to return me to the state of Indiana.		
Signature of offender		Date <i>(month, day, year)</i>
Signature of witness		Date <i>(month, day, year)</i>





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