



Case Study ~ Cyber Attack in Fremont County

Introduction:



You are a group of consultants advising Fremont County officials. The event below has already ended. The county has completed recovery and is back to "normal". They want your recommendations for strengthening their resiliency to withstand similar events and operational impacts, should they occur. Fremont County officials chose your group because of your "World Renowned" Resiliency Model.

Directions:



Read this case study and review the seven resiliency principles. Based on what you know about the scenario, the INPO resiliency principles, and your own experiences, which two principles would you recommend that they strengthen? You must pick one of the three steady state principles (Plan, Prepare, Situational Awareness) AND one of the three event sequence principles (Anticipate, Absorb & Respond, Recover).

The Situation.

Government entities continue to be targeted by cyberattacks, which directly affect the availability of public services provided to area residents. When a government entity gets hit with a cyber-attack, it affects us all.

At 2:00 am, August 16, 2022, the entire Fremont County, Colorado internal communication network failed because of a ransomware cyberattack.

Communication connectivity to — and between — county departments was down. County business came to a halt. The state's radio system remained uncompromised, and most emergency response agencies were still in operation. But across the county, other departments — including the transportation department, emergency management agency, and sheriff's office — were locked out and unable to serve the county's 50,000 residents. The cyber security attack also shut down the Department of Human Services, the Department of Public Health, and the Fremont County Administration Building, which houses many services such as the county assessor, treasurer, coroner, veterans' services, and planning and zoning. As the manager of Fremont County put it, it was as if "everything was just unplugging."

Government offices and public services in Fremont County were disrupted for over three weeks while they recovered from the event that affected the county computer systems. During this time, all county buildings, including administration and public health, were closed. The motor vehicle department personnel operated from a tent to provide basic services, but could not process title paperwork, nor could neighboring counties process title work for Fremont County residents. The Recording Division had to manually recreate lost data. Citizens who recorded documents on August 16 were asked to call the division so the transactions could be recreated. Fremont County officials also notified employees and a small number of individuals in the community that their personal information may have been compromised due to the ransomware attack.

Fremont County officials discovered the county's systems had been hacked. The hackers used social engineering, specifically phishing emails, and deceptive messages, to trick users into granting access to their system. The malware introduced in the attack was a variant called Black Cat. The county had recently been given training on cyber security threats and had developed an email testing program to check for employee compliance. After an initial success rate, they determined their employees were diligent and would not fall for an email phishing scheme.

After the event, the Governor's Office of Information Technology (OIT) determined through a follow-up investigation that the cybersecurity attack resulted from Black Cat ransomware. The OIT Chief Information Security Officer issued the following statement — "The Black Cat ransomware variant has recently impacted multiple jurisdictions in Colorado, so it's imperative that every business and government agency be on high alert and take the necessary steps to protect their systems from being compromised."





Case Study ~ *Fire in Paradise*

Introduction:



You are a group of consultants advising Jody Jones, the Mayor of Paradise, California. The event below has already ended. The area has completed recovery and is back to "normal." They want your recommendations for strengthening their resiliency to withstand similar events and operational impacts, should they occur. Jody chose your group because of your "World Renowned" Resiliency Model.

Directions:



Read this case study and review the seven resiliency principles. Based on what you know about the scenario, the INPO resiliency principles, and your own experiences, which two principles would you recommend that they strengthen? You must pick one of the three steady state principles (Plan, Prepare, Situational Awareness) AND one of the three event sequence principles (Anticipate, Absorb & Respond, Recover).

The Situation.

A wildfire named the "Camp Fire" was reported near Paradise in the early morning. One hour later, the Butte County Sheriff's Office ordered an evacuation. Other locations were also issued evacuation orders or warnings, and emergency shelters were established. However, many residents never received an evacuation warning, while others chose not to leave because the warnings did not convey the urgency of the situation.

The Camp Fire was caused by a faulty transmission line that ignited dry vegetation after six years of drought. High winds of up to 50 miles per hour drove the fire quickly and most of the town was destroyed in less than 6 hours. Eighty-five people died, tens of thousands were displaced, and 18,804 buildings were destroyed. On the morning of ignition, high winds limited fixed-wing air support. By that afternoon, calming winds allowed nine fixed-wing aircraft to work on the fire.

First responders were limited by an insufficient number of cell phone repeaters, which resulted in communication difficulties and reduced Internet speed. The wildfire alert system was similarly hampered by damaged cell towers — 17 towers burned the first day. Many residents didn't sign up for the warnings, and some neighborhoods did not receive any warnings. The failure rate of the warnings that did get sent ranged from 25 to 94 percent. Additionally, only two dispatchers were on duty to field thousands of calls to 911.

The town of Paradise is a rural mountain community in Butte County, California with a population of around 26,600 residents, many of whom were lower income retirees or commuters that had been attracted to the area by affordable housing. Camp Fire survivors faced many challenges after they tried to safely return home. After the Camp Fire, the population declined by more than 90 percent. Survivors were widely dispersed and had to drive long distances to visit the burned area, made worse by road closures caused by hazardous conditions in the mountains. According to Paradise officials, some survivors were emotionally and physically overwhelmed, lacked stable access to technology, or had lost the required documentation to apply for assistance. This left them unable to successfully navigate the federal disaster assistance requirements. This was especially true for elderly, disabled, and low-income populations.

After the fire, only 5 percent of buildings in town remained. Immediate recovery was slowed because thousands of burned trees were at risk of falling. These burned trees needed to be removed from property before rebuilding efforts could begin. Soil became contaminated by burn damage, which required testing and remediation before sites could be accessed by inspectors and insurance agents. The lack of access to water and wastewater services, coupled with a shortage of contractors, slowed rebuilding efforts. Rebuilding costs were prohibitively high, due to excessive demand on contractors and upgraded fire and seismic building codes.

Cleaning up took over a year. During recovery, the town and residents agreed on a Long-Term Community Recovery Plan. The plan included a greenbelt defensible buffer zone. The greenbelt would allow firefighters to control burns and create a barrier of land without fuel around the town (a firebreak) so future wildfires would have no path inwards. This borderland would also serve as a source of recreation and greenspace for the community.





Case Study *in* Road Washout on County Road 114

Introduction:



You are a group of consultants advising the Tribal Council of the Fond du Lac Reservation in northern Minnesota. The event below has already ended. The area has completed recovery and is back to “normal.” They want your recommendations for strengthening their resiliency to withstand similar events and operational impacts, should they occur. The Council chose your group because of your “World Renowned” Resiliency Model.

Directions:



Read this case study and review the seven resiliency principles. Based on what you know about the scenario, the INPO resiliency principles, and your own experiences, which two principles would you recommend that they strengthen? You must pick one of the three steady state principles (Plan, Prepare, Situational Awareness) AND one of the three event sequence principles (Anticipate, Absorb & Respond, Recover).

The Situation.

During June 2012, record amounts of rainfall in the Duluth area of northeastern Minnesota brought about a 500-year flood event. Preliminary damage assessments were done in 13 counties and at the Fond du Lac (FDL) Reservation in the days after the flood. Assessment teams included federal officials from FEMA and state and local officials. One month later, President Obama declared a major disaster in northeastern and central Minnesota for the storm and flood events.

Swollen rivers and flash floods washed away or damaged several bridges and rendered large sections of roadway impassable, including a primary road on the Fond du Lac Reservation that was essential for access to homes and emergency services. The storm damaged Carlton County Road 114 (locally known as Reservation Road) at a 60-inch pipe culvert crossing with Fond du Lac Creek underneath. The event caused water to back up at the culvert and collect along the roadway embankment, resulting in failure of the slope and the roadway. A 110-foot stretch of the road was completely washed out, leaving it impassable and closed. The FDL Tribal Council operates social services, tribal housing, a tribal police force, a natural resource building, a gas station, three community centers, and a private health clinic and pharmacy. The tribe also owns two casinos.



The 4,184 residents of the Fond du Lac Reservation and casino guests were isolated until the road was fully restored to service 16 months later. A call center was opened at the National Guard Armory to act as a clearinghouse for volunteers and donations. Meanwhile, many other bridges, roads and buildings in the surrounding area were also irreparably damaged, hampering rescue and relief efforts throughout the region. The steep terrain, along with many creeks and rivers, played a significant role in the devastating damage and flooding in reservation communities. Many neighborhoods outside the reservation were evacuated.

Although reservation residents needed this route restored as soon as possible, the Federal Highway Administration (FHA) opted for the longer option, building a bridge. A bridge was selected based on life cycle cost and minimization of environmental impacts. The existing culvert was undersized and would likely fail again. In fact, the embankment had failed at this same location 20 years ago. Six months later, the cost of the flood debris removal from the reservation had reached more than \$500K. Approximately 12,500 cubic yards of demolition and solid waste were removed and disposed of (not including appliances, electronics, or household waste). Many parents remained in limbo during bridge construction without easy access to specialty health care, quality schools and child-care.

Strong relationships between the Tribal Council, the contractor, and the FHA sped up construction. Contractor input on issues such as constructability, material availability, and local construction techniques helped maintain the construction schedule while providing a quality product. Construction began in July 2013, and final inspection was completed in October 2013 with a total construction cost of \$1.5 million. Tribal council members fear that this same working relationship is non-existent unless a federal disaster is declared. The tribal council wants to leverage the benefits of these relationships when preparing for future disruptions.



Case Study ~ Supply Chain Disruption at Toyota

Introduction:



You are a group of consultants advising the Executive Team at Toyota Motor Manufacturing, Kentucky (TMMK). The event below has already ended. The organization has completed recovery and is back to "normal." They want your recommendations for strengthening their resiliency to withstand similar events and operational impacts, should they occur. The CEO chose your group because of your "World Renowned" Resiliency Model.

Directions:



Read this case study and review the seven resiliency principles. Based on what you know about the scenario, the INPO resiliency principles, and your own experiences, which two principles would you recommend that they strengthen? You must pick one of the three steady state principles (Plan, Prepare, Situational Awareness) AND one of the three event sequence principles (Anticipate, Absorb & Respond, Recover).

The Situation.

When production came to a screeching halt at 14 Toyota assembly plants in September 2023, the automobile industry took notice. A fault in the parts order management system meant production could no longer be procured. It was a surprising setback given that Toyota is renowned for its "just-in-time" (JIT) principle, stemming from the Toyota Production System, initiated by Kiichiro Toyoda.

Located in Georgetown, Kentucky, TMMK is an \$8 billion testament to the ingenuity, pride, and skill of Kentucky workers. TMMK employs more than 8,000 people on 1,300 acres and is the largest Toyota manufacturing facility in the world. For perspective, TMMK can produce 500,000 vehicles annually at full capacity. Meanwhile, other North American plants were operating at 30 percent capacity because of the parts supply situation. Global production began to "ramp back up" at TMMK starting in October. All models were back to normal production by November or December. TMMK executives are proud that no employees were laid off during the production slowdown. Toyota team members reported to work for training on nonproduction days and used paid vacation time or took unpaid time off on production days.



The success of the JIT approach hinges on the timely delivery of all goods, components, or materials, which hasn't been the case since the pandemic outbreak. The pandemic caused the global supply chain to fall out of sync and significant disruptions are still occurring. In this instance, the parts management system fault delayed the delivery of chips from Taiwan. This created bottlenecks, leading to production stoppages. The fault was traced back to the unavailability of multiple servers responsible for processing parts orders. The sequence of events leading to the malfunction began with regular maintenance work conducted the day prior to the system failure. During this maintenance procedure, accumulated data was deleted, inadvertently leading to an error due to insufficient disk space.

More than 10 years ago, after the Tōhoku earthquake and tsunami, the Japanese carmaker conducted an "in-depth analysis" on production and the supply chain disruption. They determined that production processes in North America were at a lower risk to disruption because 75 percent of the parts used to produce the Camry, Camry Hybrid, Avalon, and Venza come from the U.S. Many companies are now going back to building up a larger safety stock and reintroducing "just-in-case" production. To mitigate supply issues, particularly when essential materials originate from a single source like Taiwan, the concept involves maintaining a larger safety stock. This approach reduces risks but escalates storage costs, tying up more capital. To enhance supply chain resilience, transparency is crucial. This involves sharing information with partners regarding supply and demand fluctuations, capacity constraints, and sustainability data like emissions, waste, and employee well-being. TMMK executives are concerned that global tensions between the U.S. and China may impact transparent communication with Taiwan.

Strong relationships between TMMK and chip suppliers enabled a quick response to the supply chain disruption and a return to full capacity production as quickly as possible. However, TMMK executives fear that a simple return to the JIT model (with inventory levels as low as before the pandemic) is unlikely to happen anytime soon. TMMK wants to leverage the benefits of JIT and operate with a resilient supply chain, so they are better prepared for future disruptions.