ComEd
An Exelon Company

# ComEd Flood Mitigation - Technology for Response

IAFSM Conference

March 2017

# ComEd Flood Mitigation Program

Presented by Eric Jensen


# FLOOD MITIGATION PROGRAM

- ✓ **Substation Flood Improvement Projects**
  - TDC 555 Glen Ellyn (constructed)
  - TDC 557 Butterfield (constructed)
  - TSS 69 North Chicago (constructed)
  - TSS 192 Ridgeland (constructed)
  - TSS 46 Des Plaines (engineering)
  - TSS 153 Taylor Street (pending)
- ✓ **V3FR System:**
  - TSS 46 Des Plaines (constructed)

# FLOOD MITIGATION PROGRAM

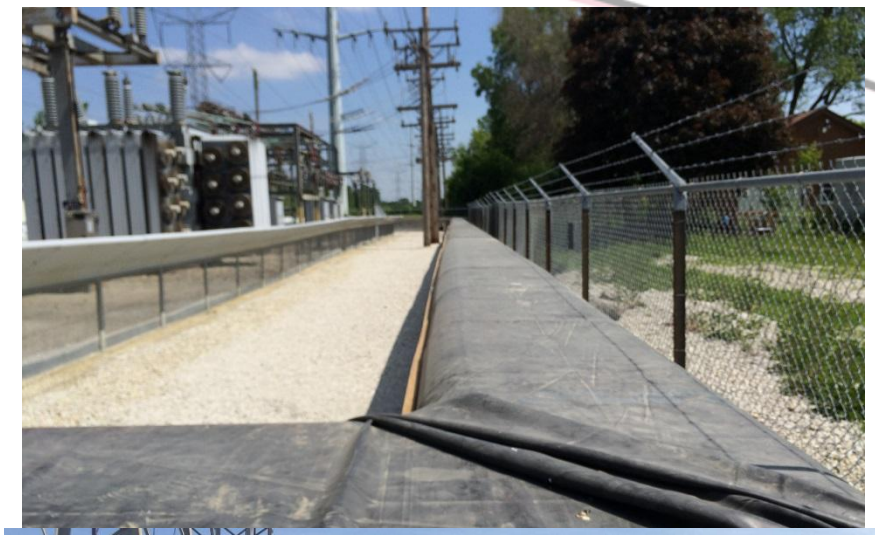
Typical Lift Station showing valving, pumps and discharge piping.


# FLOOD MITIGATION PROGRAM

✓ Innovative Design


# FLOOD MITIGATION PROGRAM

- ✓ Personnel access and completed liner

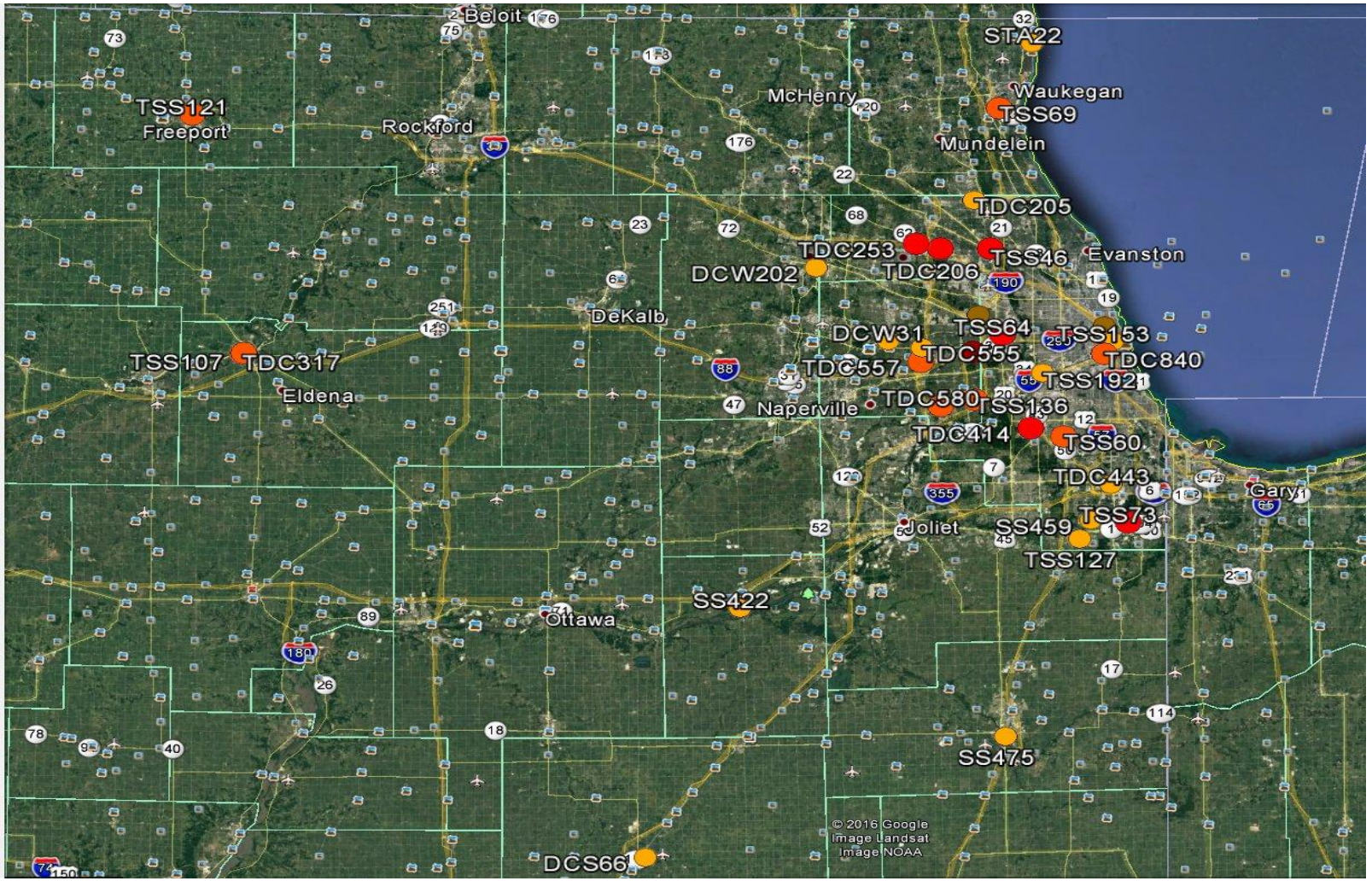


# FLOOD MITIGATION PROGRAM

- ✓ Stanley Cup Storm
  June 2015

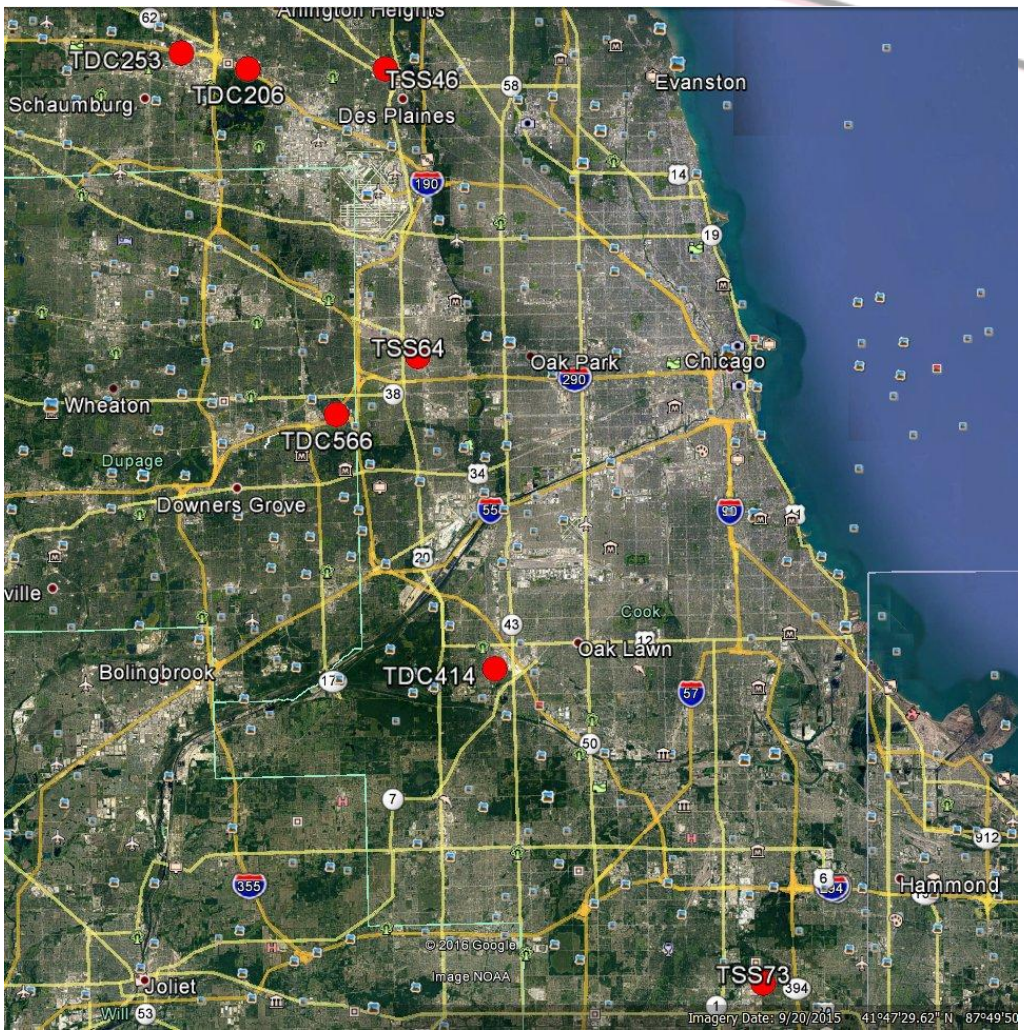
# FLOOD MITIGATION PROGRAM

30 Priority Stations (out of 810 total)

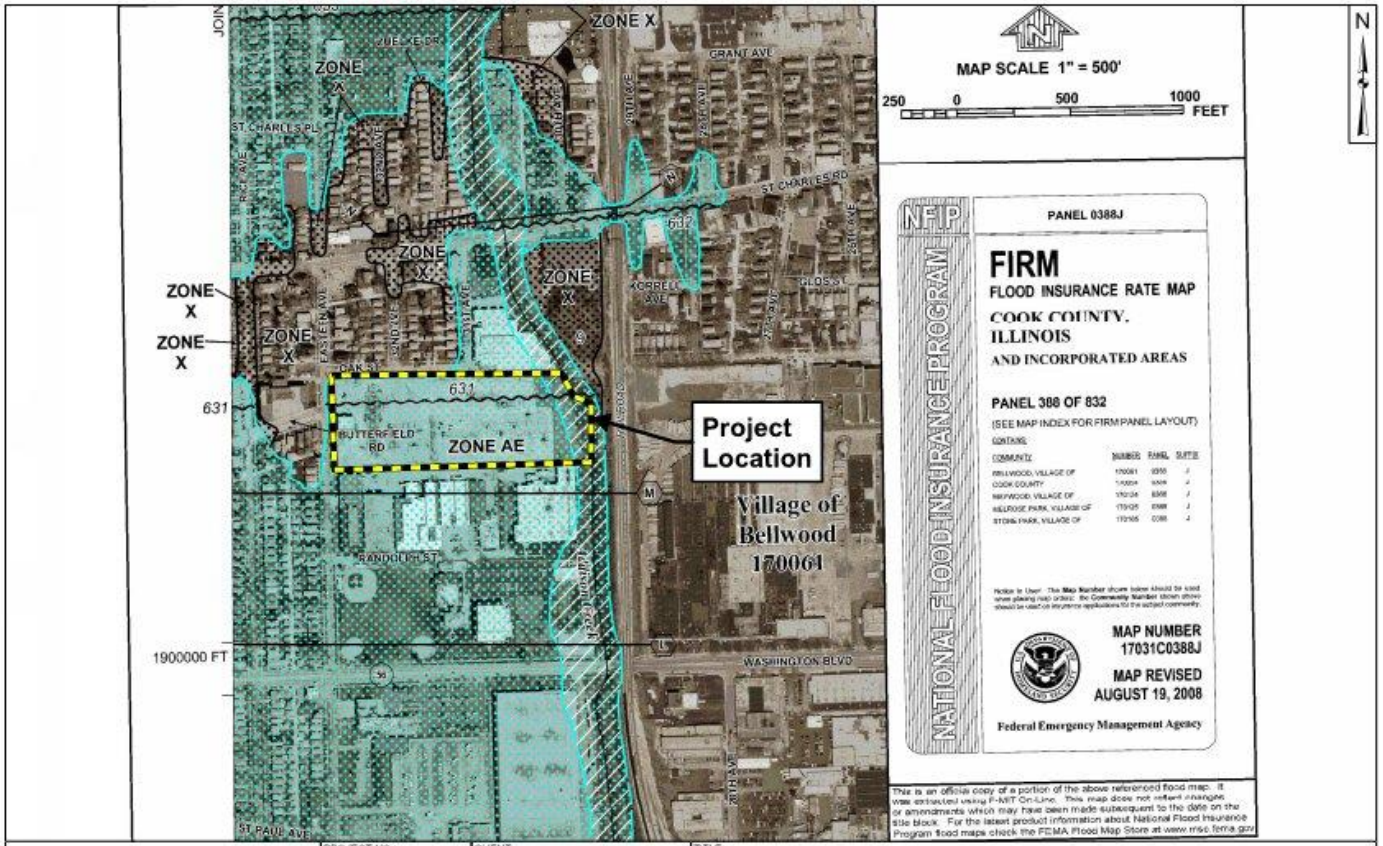


# FLOOD MITIGATION PROGRAM

- ✓ Severe Risk Stations
- TDC 414 Roberts Road (done)
- TSS 46 Des Plaines (ongoing)
- TSS 64 Bellwood
- TSS 73 Chicago Heights
- TDC 206 Rolling Meadows
- TDC 253 Schaumburg
- TDC 566 Oak Brook



# FLOOD MITIGATION PROGRAM




| | | | |
|---|---|---|---|
| V3 Companies<br>7325 Janes Avenue<br>Woodridge, Illinois 60517<br>630.724.9200 phone<br>630.724.9202 fax<br>www.v3co.com<br>Visio, Vertere, Virtute...<br>*"The Vision To Transform With Excellence"* | PROJECT NO.: | CLIENT:<br>ComEd<br>1N423 Swift Road<br>Lombard, Illinois 60148 | TITLE:<br>**FEMA FLOOD INSURANCE RATE MAP (FIRM)** |
| | CREATED BY:<br>JWW | | |
| | DATE:<br>06/14/16 | BASE LAYER:<br>FEMA FIRM Panel<br>17031C0388J | SITE:<br>TSS 64<br>Bellwood, Illinois |
| | SCALE:<br>Not To Scale | | FIGURE:<br>5 |

E:\2013\13180\Drawings\ArcGIS\NRITSS 64\FIG5lrm_13180.mxd

# FLOOD MITIGATION PROGRAM

## ESTIMATED STATION FLOOD PROOFING COSTS
## SEVERE FLOOD RISK STATIONS

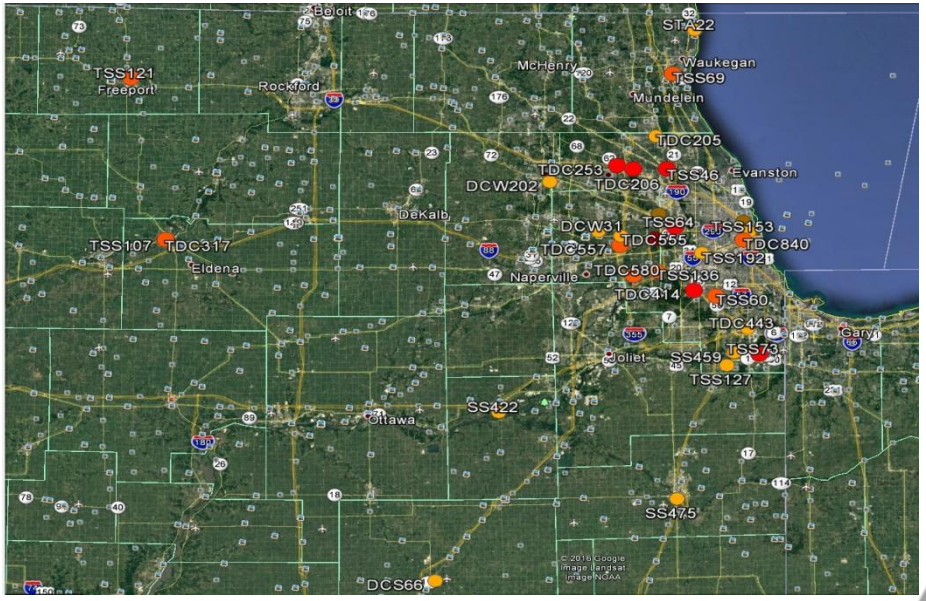
| Site | Approximate Wall Height | Approximate Wall Length (ft) | Approximate Station Area (Ac) | Total Estimated Flood Proofing Costs |
|---|---|---|---|---|
| TSS 64 – Bellwood | 8-9 feet | 2700 | 8.5 | $4M - $6M |
| TSS 73 – Chicago Heights | 3-4 feet | 1600 | 3.9 | $1M - $2M |
| TDC 206 – Rolling Meadows | 6-7 feet | 1400 | 1.1 | $2M - $3M |
| TDC 253 – Schaumburg | 5-6 feet | 1000 | 1.7 | $2M - $3M |
| TDC 566 – Oak Brook | 6-7 feet | 1000 | 1.1 | $2M - $3M |

# FLOOD MITIGATION PROGRAM

## ✓ Very High & High Risk Stations

ComEd is implementing a Flood Risk Mitigation Program to recommend next steps toward achieving flood resiliency for all 30 of the stations identified as Severe, Very High and High Risk to flooding. Tasks such as feasibility, station recommendations, prioritization, and design and construction will be performed as part of this Flood Mitigation Program.

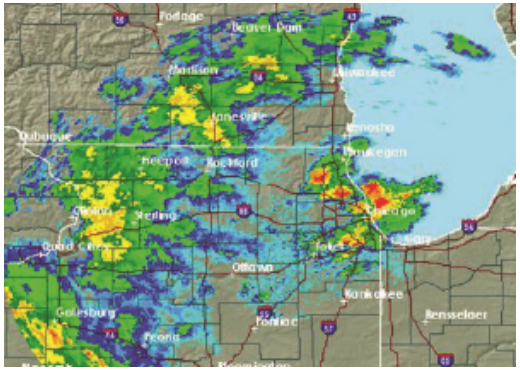
- Mitigate Flood Damages
- Cost Effective Solutions
- Technology for Forecasting
- Efficient Emergency Response
- Planned Expenditures

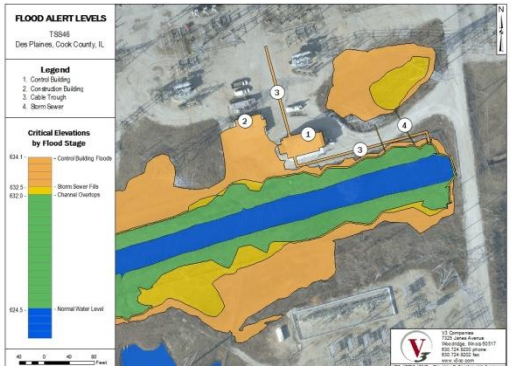


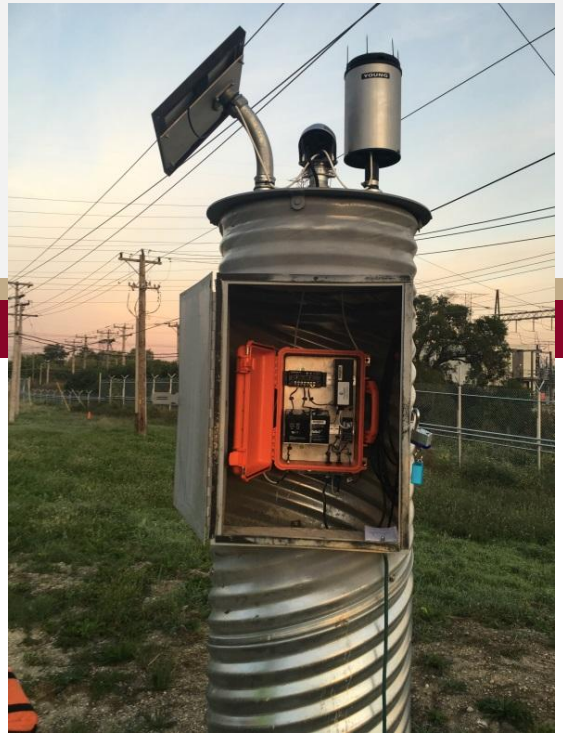
# V3 Flood Forecasting For Resiliency (V3FR)

Presented by:

Greg Wolterstorff, P.E.



# V3FR INTRODUCTION

## ❖What is Flood Resiliency?

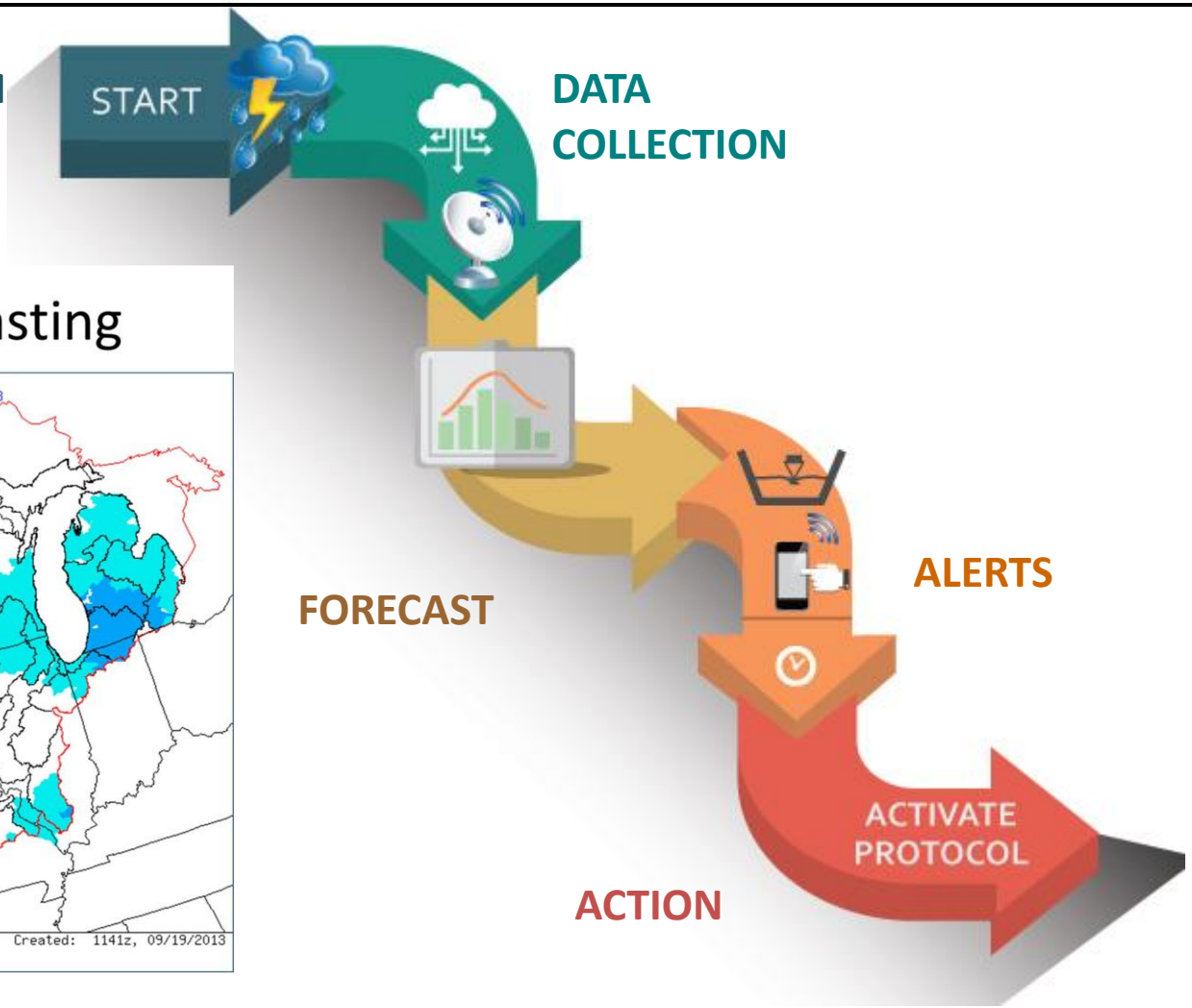
The ability to respond proactively and with prioritization to protect vulnerable properties and assets during a flood event, and the capacity to recover quickly from disruptive flood waters.

# V3FR INTRODUCTION

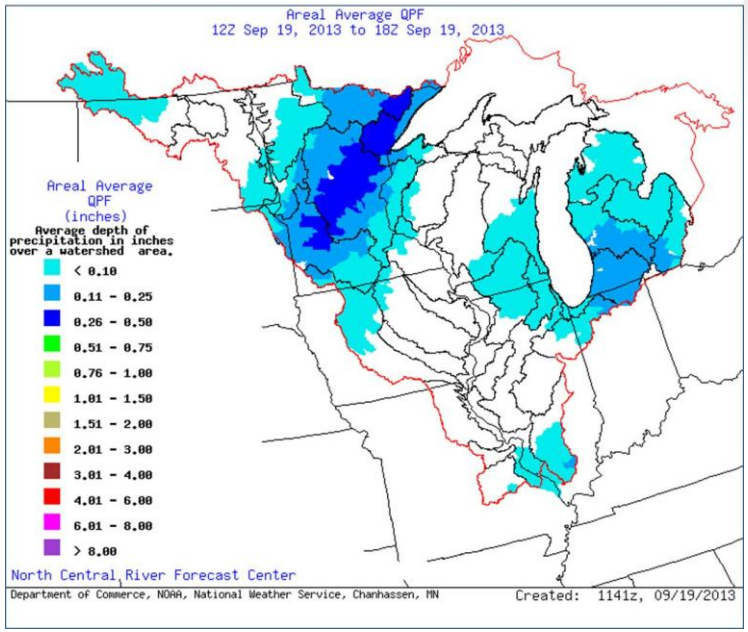
## ❖V3FR System:

- ***Continuously calculates*** the likely peak flood elevation
- ***Determines Risk Levels*** at each location
- ***Forecasts timing*** of peak flood
- Assists with ***prioritization of resource deployment***
- ***Communicates advance warning*** of future flood risk event

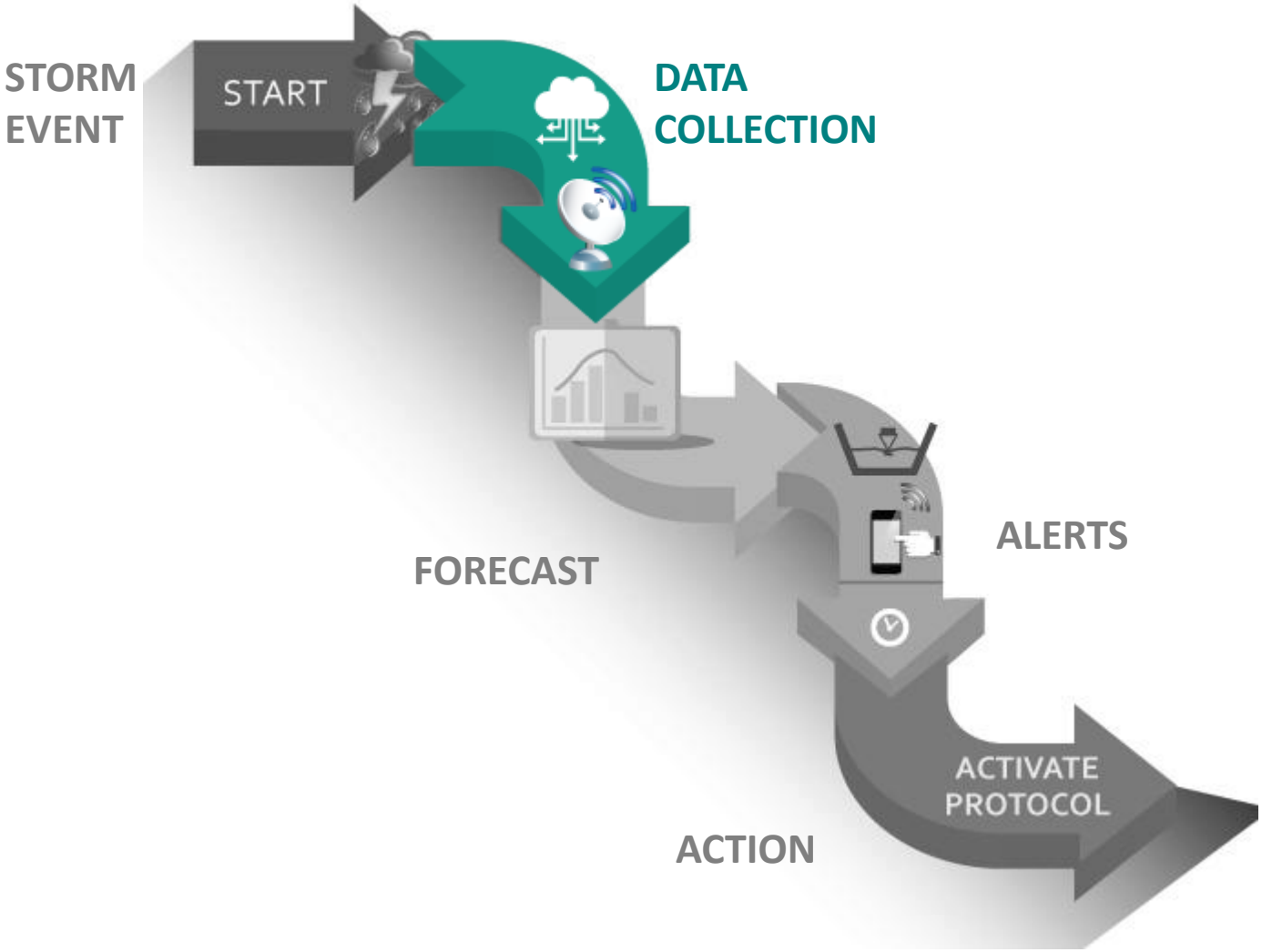
# STORM EVENT




## Incident Forecasting



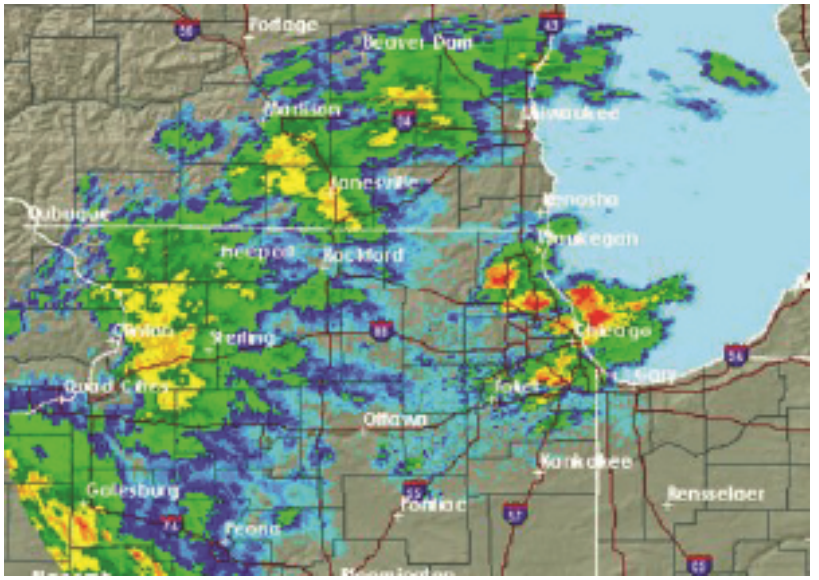
# DATA COLLECTION



# DATA COLLECTION

## ❖ NOAA Weather Data

- Publicly available data
- Rainfall data is provided up to ***48 hours in advance of storm***, and updated every 15 minutes.



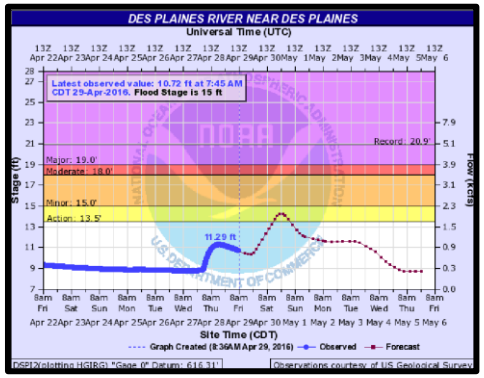

## ❖ Real Time Weather Data

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NOAA
U.S. DEPARTMENT OF COMMERCE

# DATA COLLECTION

## ❖USGS Stream Gauge Data

- Data is provided at specific monitoring stations.
- V3 utilizes this watershed gauge data for calibration, correlation and calculation of potential flood due to actual storm events.

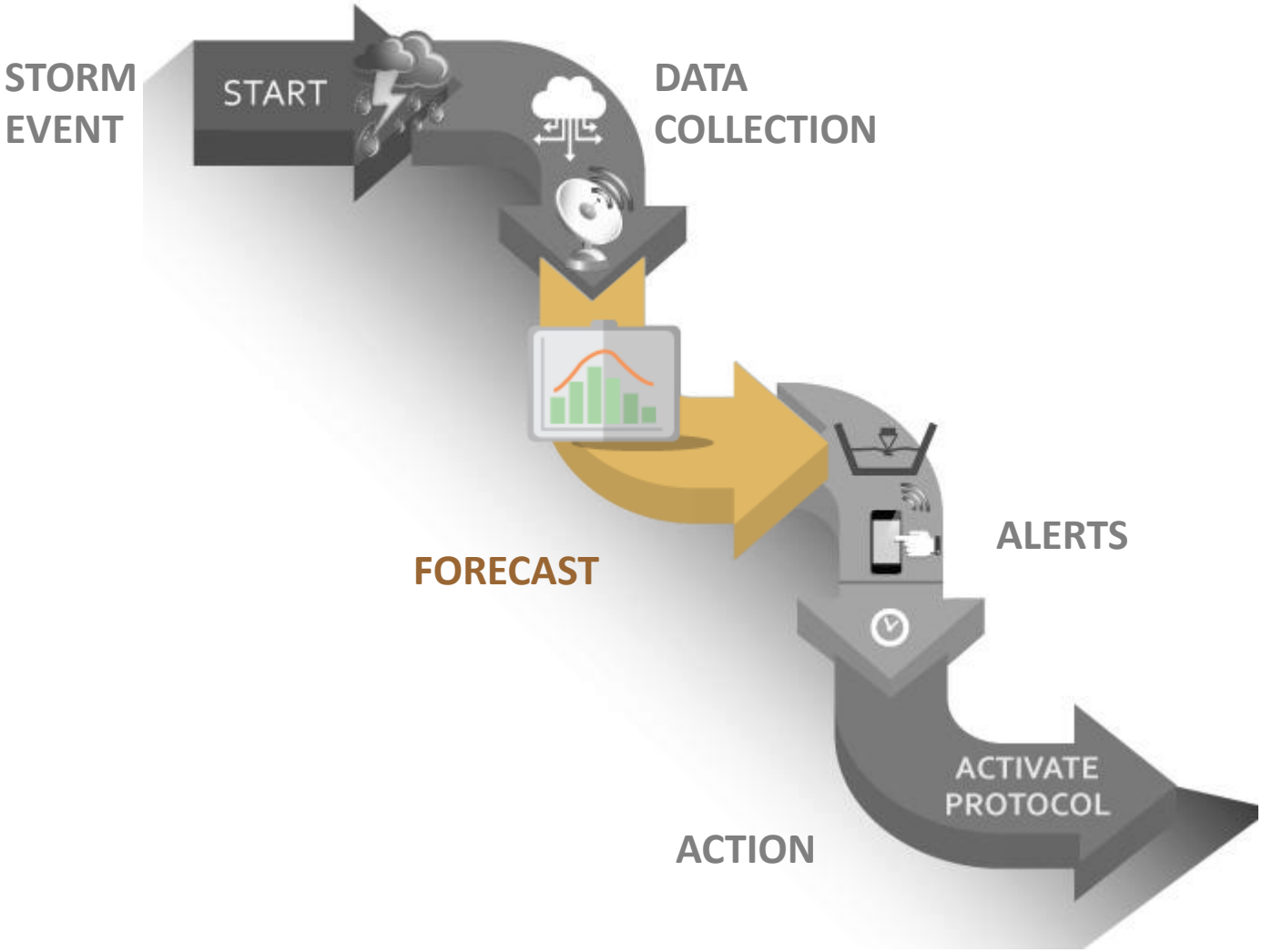



## ❖ V3FR Real Time Data

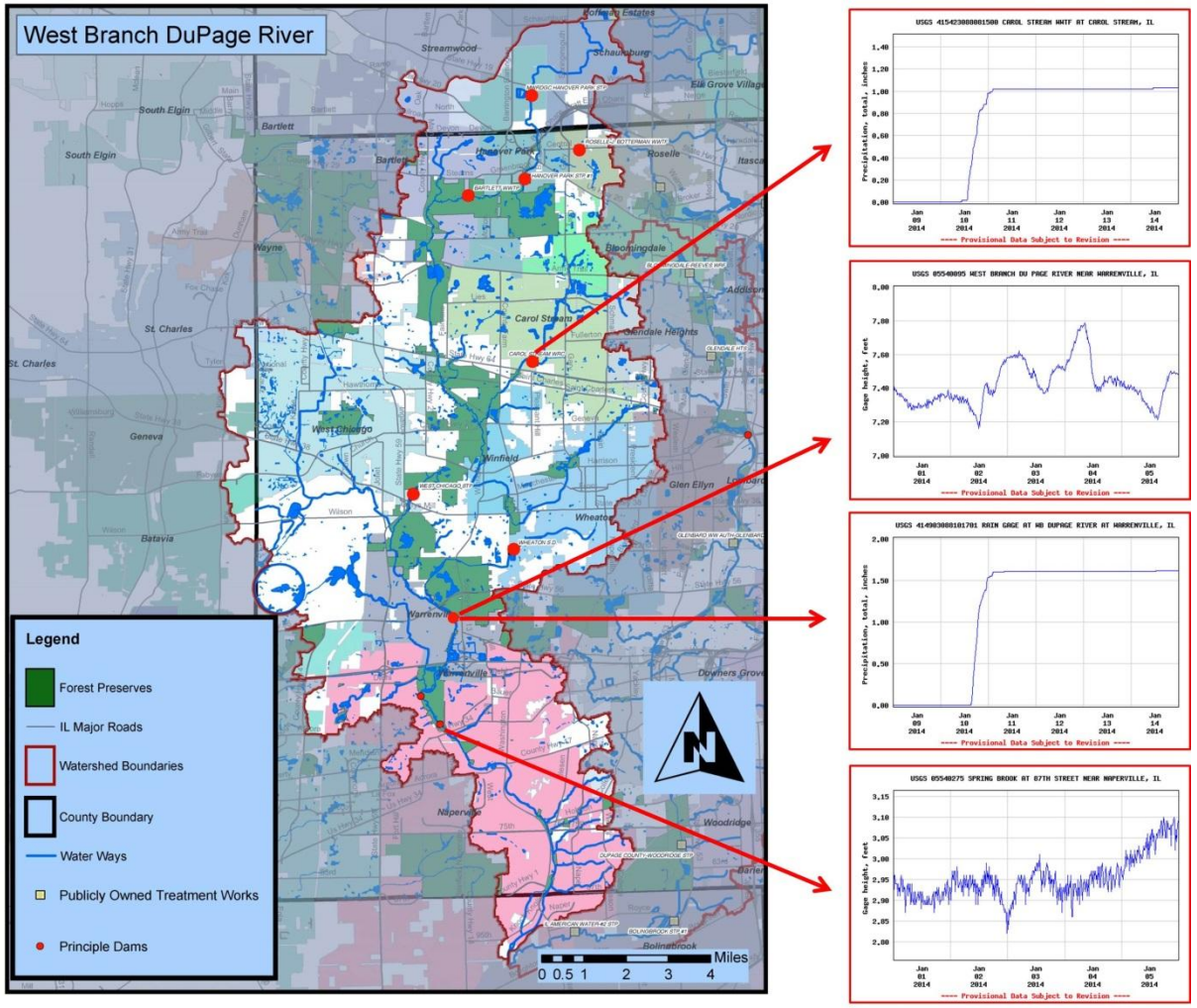
- V3FR Monitor senses ***rainfall amounts and water level changes*** at the site.

WaterTechnologies International

# FORECAST


STORM EVENT
START
DATA COLLECTION
FORECAST
ALERTS
ACTIVATE PROTOCOL
ACTION

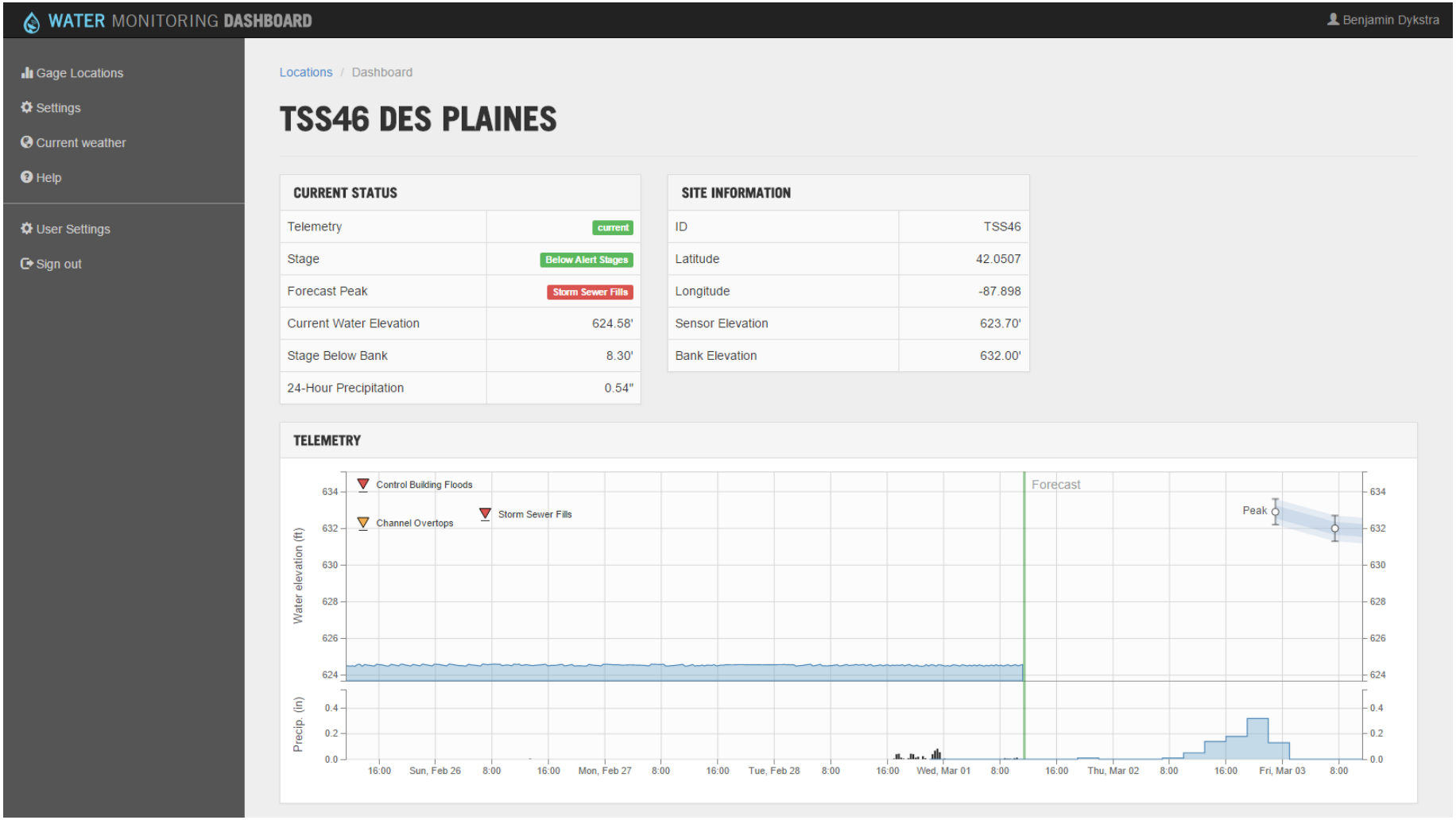
# FORECAST



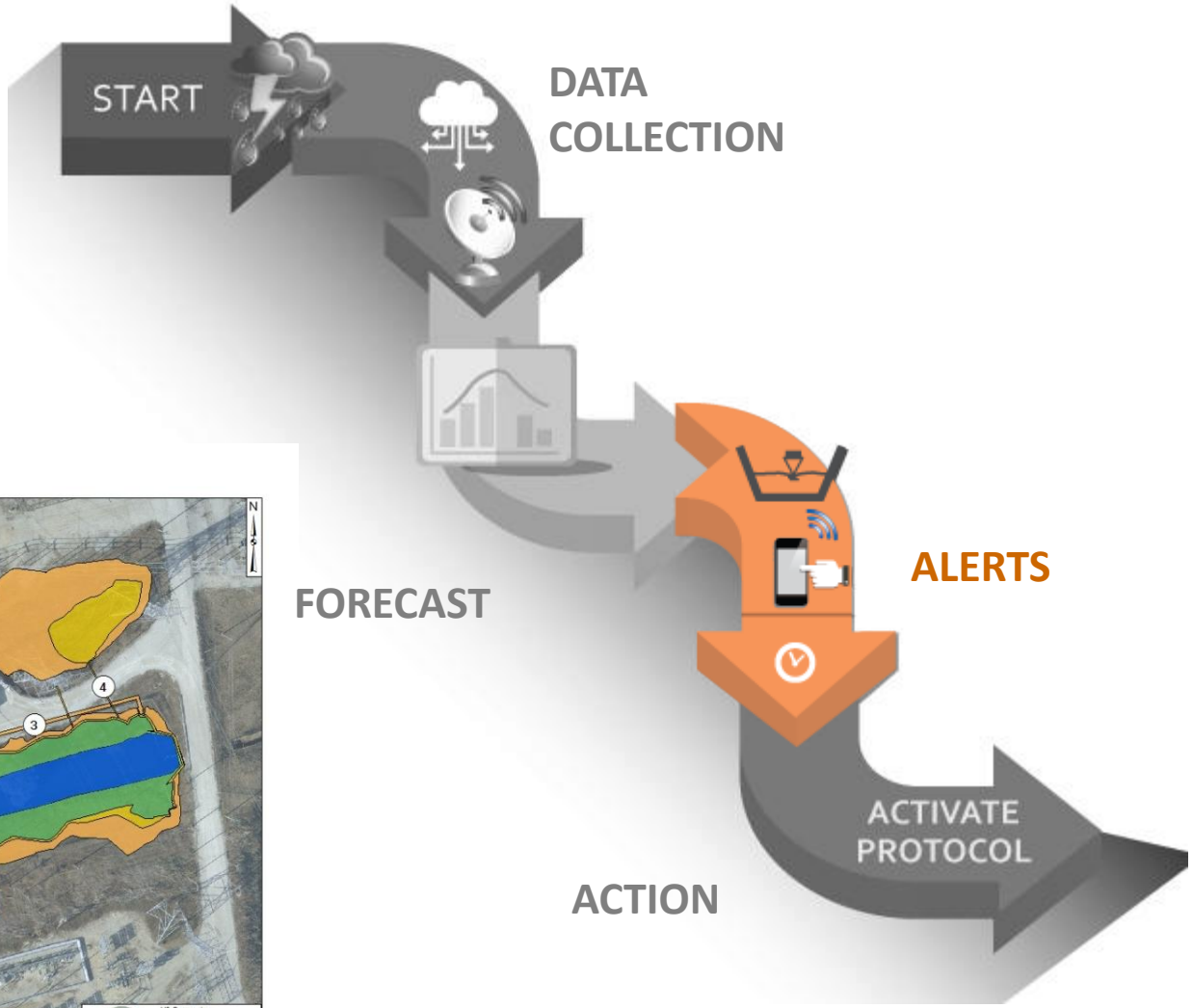



- Predictive information and real-time data is fed through V3's proprietary model.
- Watershed characteristics, historic information and hydraulic system all determine forecasted outcome.
- A range of potential flood elevations is developed.

# FORECAST


WATER MONITORING DASHBOARD
Benjamin Dykstra
Gage Locations
Settings
Current weather
Help
User Settings
Sign out
Locations / Dashboard
TSS46 DES PLAINES
CURRENT STATUS
Telemetry current
Stage Below Alert Stages
Forecast Peak Storm Sewer Fills
Current Water Elevation 624.58'
Stage Below Bank 8.30'
24-Hour Precipitation 0.54"
SITE INFORMATION
ID TSS46
Latitude 42.0507
Longitude -87.898
Sensor Elevation 623.70'
Bank Elevation 632.00'
TELEMETRY
Control Building Floods
Channel Overtops
Storm Sewer Fills
Forecast
Peak
Water elevation (ft)
Precip. (in)
634
632
630
628
626
624
0.4
0.2
0.0
16:00
Sun, Feb 26
8:00
16:00
Mon, Feb 27
8:00
16:00
Tue, Feb 28
8:00
16:00
Wed, Mar 01
8:00
16:00
Thu, Mar 02
8:00
16:00
Fri, Mar 03
8:00

# ALERTS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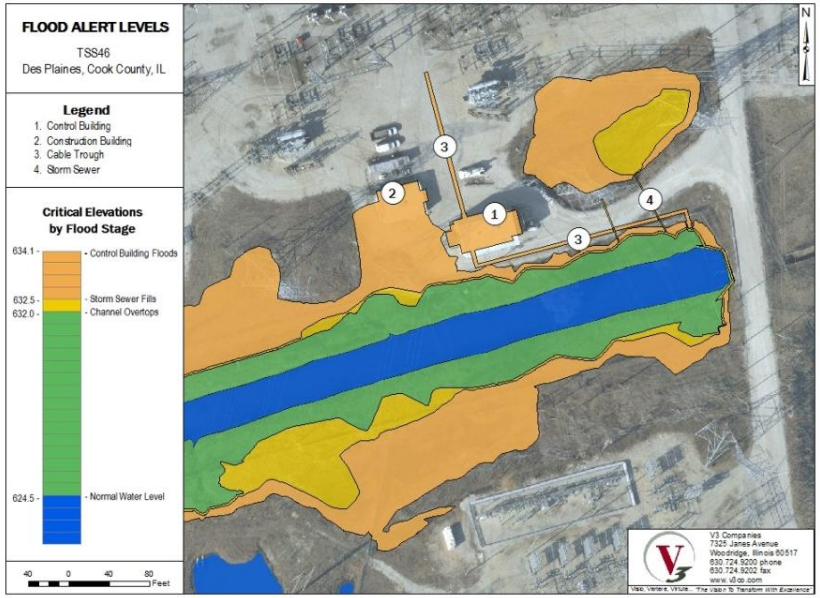

FLOOD ALERT LEVELS
TSS46
Des Plaines, Cook County, IL
Legend
1. Control Building
2. Construction Building
3. Cable Trough
4. Storm Sewer
Critical Elevations by Flood Stage
634.1 - Control Building Floods
632.5 - Storm Sewer Fills
632.0 - Channel Overtops
624.5 - Normal Water Level
40 0 40 80 Feet
N
V3 Companies
7325 James Avenue
Woodridge, Illinois 60517
630.724.9200 phone
630.724.9202 fax
www.v3co.com

# ALERTS

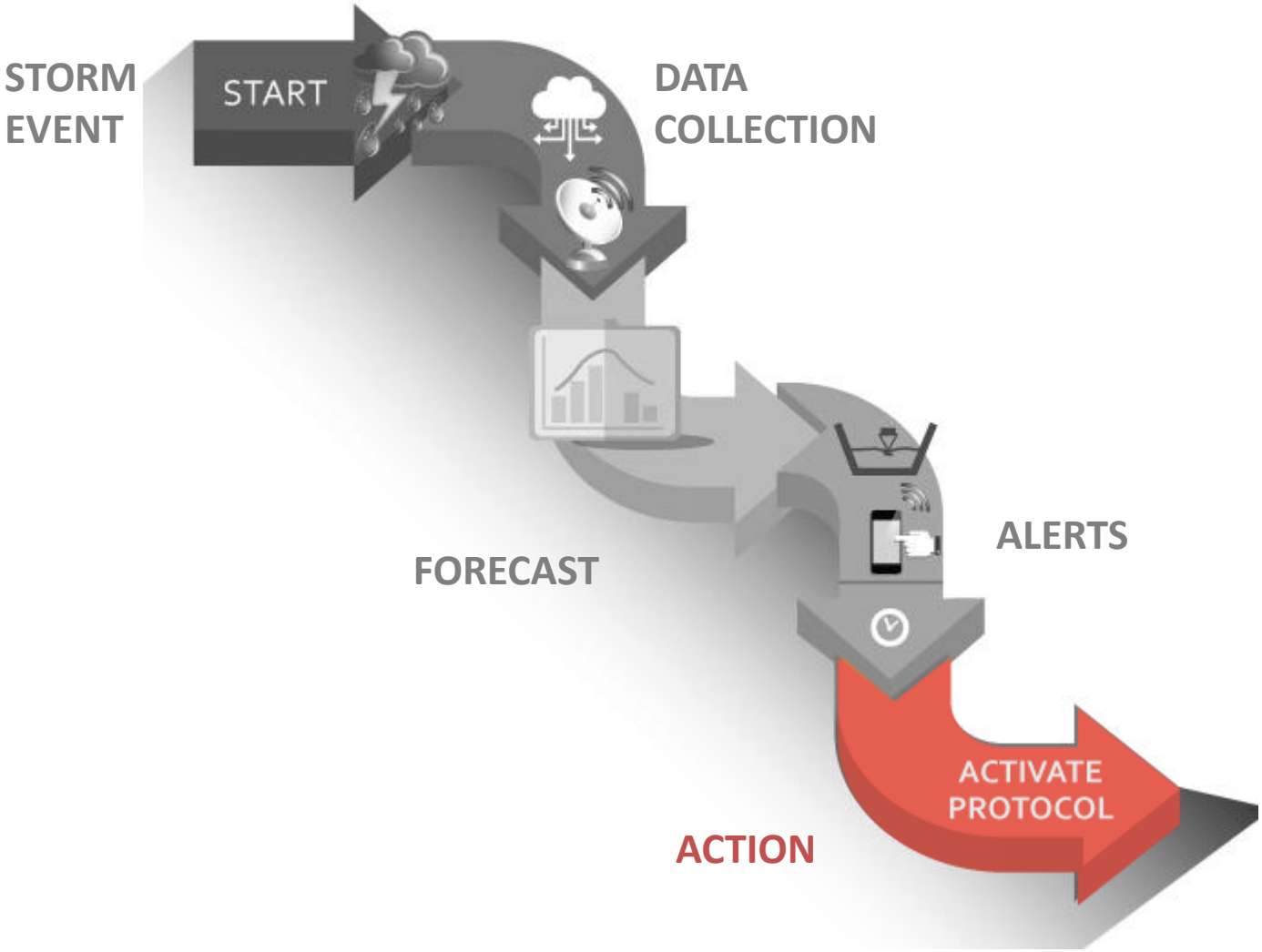
## ❖Flood Alerts

- Predictive and real-time alerts are created.
- Criteria is customized for each V3FR location.
- Alerts are evaluated regularly.

# FLOOD ALERTS

- Alerts are sent by SMS, email and phone.
- Key operational staff are notified up to 48 hours in advance of the storm event.
- Updates provide ***storm tracking and shifts in intensity*** and duration.
- Dashboard access allows ***full digest of V3FR locations***

# ACTION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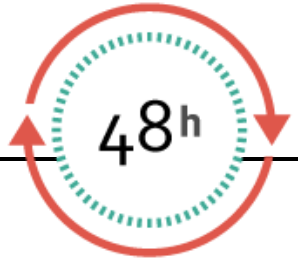
# ACTION




## ❖Activate Client Specific Protocol

- ***Timing and approximate water elevation*** of flood is forecasted.
- ***Prioritize response*** based on severity at each location.
- For flood protected sites: ***Install flood gates, inflate bladders, etc.***
- For non-flood protected sites: Deliver sand and bags, ***construct temporary mitigation measures.***
- 48 hour **advance notice!**

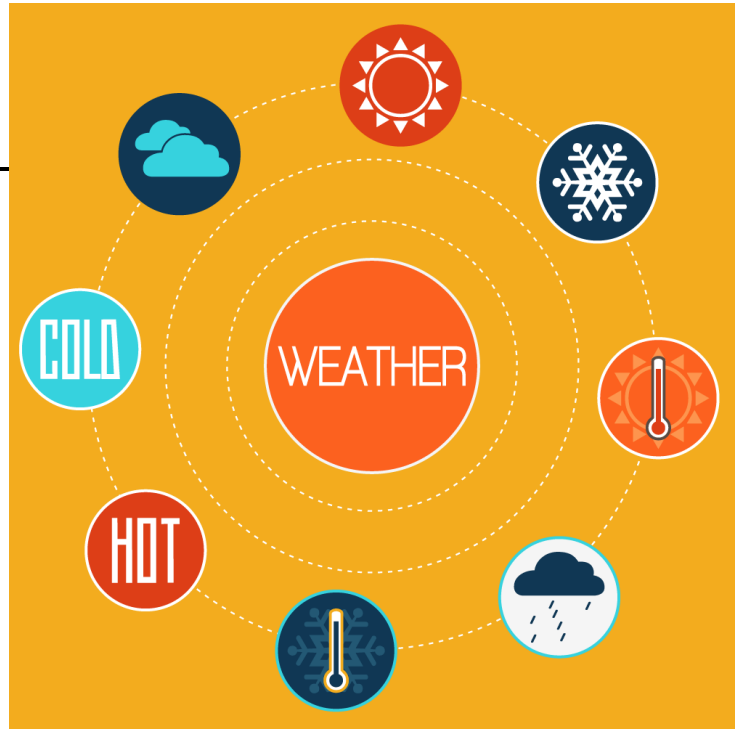
# WHO BENEFITS FROM V3FR?

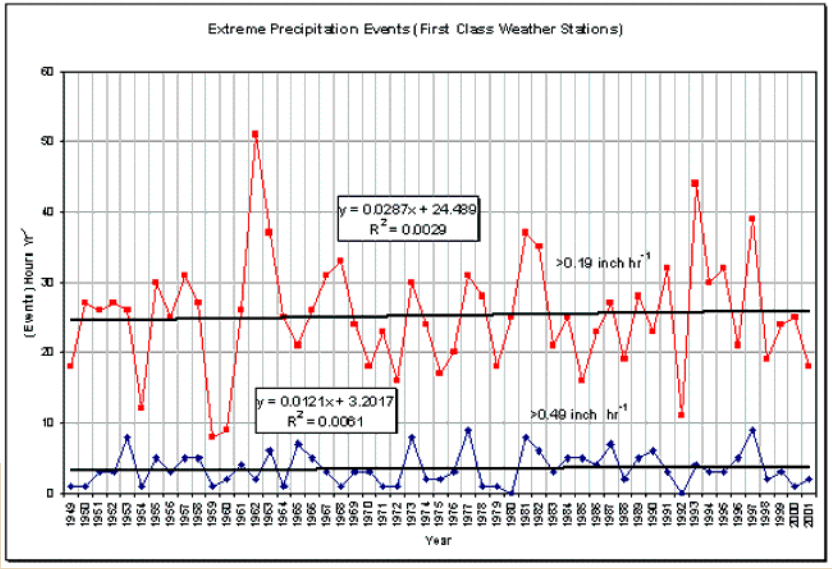
## ❖ Vulnerable Assets or First Responders

- Vulnerable assets at risk to flood loss, such as stations, buildings, quarries, etc.
- Municipality, agency, utility or business that has flood response deployment responsibility.
- Mitigate or prevent damages.
- Minimize emergency costs.
- Improve resiliency.

# CHANGE?

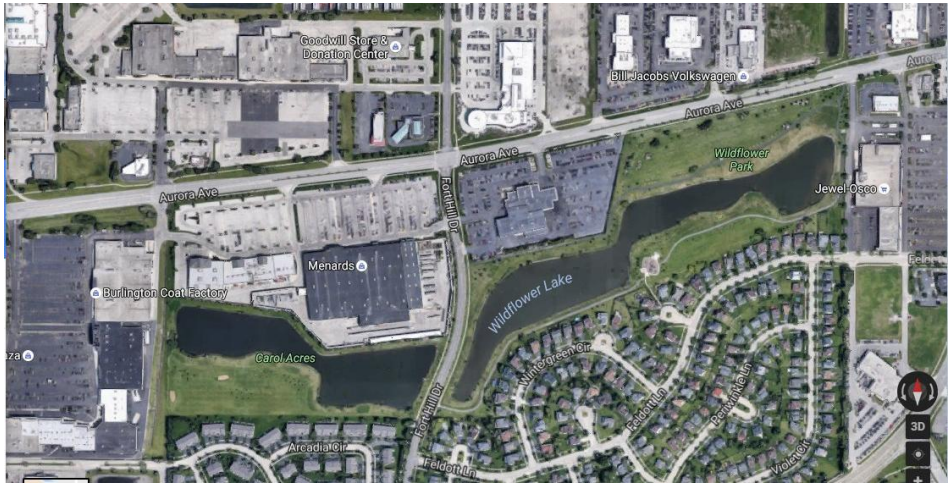
- **Climate & Watershed Change**
  - V3FR is continuously learning.
  - V3FR forecasting ***evolves with the change in climate*** and ***adjusts to the intensity of recent storm events*** and the outcome of those ***discharges from the watershed.***
  - Climate model costs not necessary.
  - Watershed changes incorporated.



# ADDITIONAL USES OF V3FR:

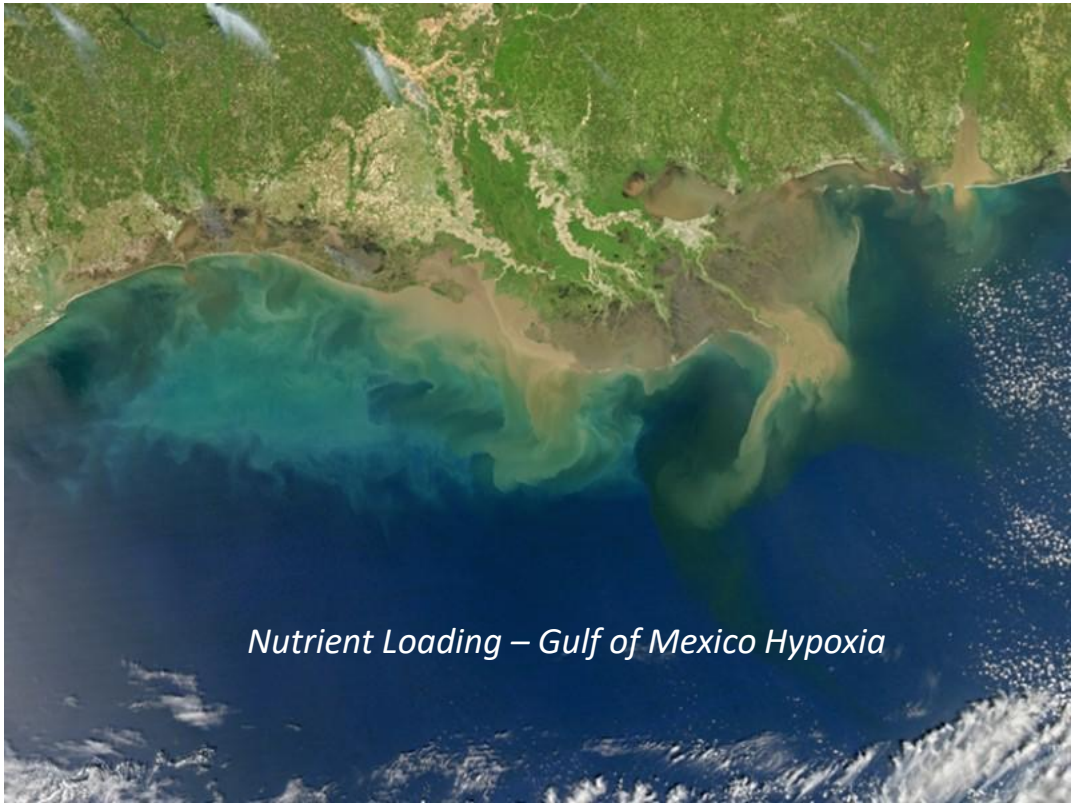
## Integrated Stormwater Management




- ***Proactively*** integrate existing stormwater assets
- ***Active control*** of pumps or valves during storm event
- Decreased damages to problem areas at a ***fraction of the cost***

# ADDITIONAL USES OF V3FR:

## Enhanced Water Quality




- Reduce sediment and nutrients during first flush
- Achieve up to100% of retention volumes
- Pollutants drop out
- Healthy receiving waters
- Pollutant reduction can be tracked with monitoring

# Questions

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