Levee Vulnerabilities
Web-Application on FERIX
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Division of Flood Management
California Department of Water Resources
Presentation Outline

- FERIX Overview
- Levee Vulnerabilities Application
- Potential Uses
What Is FERIX?

- **Flood Emergency Response Information Exchange.**
  - **Purpose** - Improve flood emergency preparedness, response, and recovery. Began in 2009.
- Web GIS GUI to retrieve and visualize data.
- Integrates geo-databases, real-time data, and Decision Support Data (DSS).
Flood Emergency Response Information Exchange

- Shares and exchanges data between different agencies.
- Customized tools to support multiple applications such as climate, hydrologic and hydraulic analysis, flood operation, and flood project inspection.
How We Use FERIX

- Support decision making with real time/historical data.
- Instantaneous access to our levees’ worst areas.
- Increased situational awareness and response time.
- Targeted levee patrols/monitoring and advance deployment of ICT’s/resources.
- Quick and accurate communication tool between field crews and the Flood Center.
FERIX Functionality

Main functions
- Locate and select data on a map.
- View attributes of selected data
- Flexible
- Interactive
- Expandable
- Graphical User Interface platform

Layer organization and base map selection.
FERIX Functionality

- **Advanced tools**
  - Measure
  - Buffer
  - Graphics
  - Map notes
  - Surface Profile
  - Export, Print, Save, and Share Maps

- **Program specific functions**
  - Levee mile calculator
  - Levee vulnerability viewer
  - Flood Inundation Animation
How FERIX Displays Maps and Data
## FERIX Applications Development Status

<table>
<thead>
<tr>
<th>No.</th>
<th>Application Name</th>
<th>Status as of September 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Station Locator</td>
<td>Deployed to California Data Exchange Center (CDEC)</td>
</tr>
<tr>
<td>2</td>
<td>Snow Survey</td>
<td>Deployed to CDEC</td>
</tr>
<tr>
<td>3</td>
<td>Flood Control System</td>
<td>Deployed to CDEC</td>
</tr>
<tr>
<td>4</td>
<td>Flood System Documentation</td>
<td>Deployed to CDEC</td>
</tr>
<tr>
<td>5</td>
<td>Climate/Rainfall/B-195</td>
<td>Deployed to CDEC, needs update</td>
</tr>
<tr>
<td>6</td>
<td>Levee Mile</td>
<td>Ready for deployment</td>
</tr>
<tr>
<td>7</td>
<td>CVFED</td>
<td>Ready for deployment</td>
</tr>
<tr>
<td>8</td>
<td>CVHS</td>
<td>Ready for deployment</td>
</tr>
<tr>
<td>9</td>
<td>CSH</td>
<td>Ready for deployment</td>
</tr>
<tr>
<td>10</td>
<td>Channel Capacity</td>
<td>Ready for deployment</td>
</tr>
<tr>
<td>11</td>
<td>AFFED</td>
<td>Under development</td>
</tr>
<tr>
<td>12</td>
<td>Reservoir</td>
<td>Under development</td>
</tr>
<tr>
<td>13</td>
<td>Flood Inundation Map</td>
<td>Deployed to CDEC</td>
</tr>
<tr>
<td>14</td>
<td>Levee Vulnerabilities</td>
<td>Deployed to CDEC</td>
</tr>
<tr>
<td>15</td>
<td>LiDAR and Topography</td>
<td>Under development</td>
</tr>
<tr>
<td>16</td>
<td>LFPZ</td>
<td>Deployed to DTS</td>
</tr>
<tr>
<td>17</td>
<td>BAM</td>
<td>Deployed to DTS</td>
</tr>
</tbody>
</table>
Levee Vulnerability Data

➢ The Levee Vulnerabilities are within the Non-Urban State Plan of Flood Control, and are locations of known deficiencies identified from multiple data sources.
Data Sources

- Non Urban Levee Evaluations (NULE) – One-time evaluation
- Flood Project Integrity and Inspection Branch (FPIIB) – annual inspection report
- USACE – periodic inspections
- Local Maintaining Agencies (LMAs) – reports from the locals
- Calls into the Flood Operations Center (FOC)
- Flood Maintenance Office (FMO) – annual inspection
2015 Levee Vulnerability Data Stats

Critical
- 35% (134)

Serious
- 65% (248)

Erosion
- 48%

Seepage
- 43%

Stability
- 8%

Other
- 1%

Critical
- Erosion 19%
- Seepage 69%
- Stability 10%
- Other 2%
Categories

The Levee Vulnerabilities have been narrowed down to the highest severity and categorized as **Critical** or **Serious**.
- Critical – The site is likely to fail in the next high water event.

- Serious – The site may fail in the next one or two high water events and if not repaired, may turn critical.

- The definitions of “critical and “serious” are used in the context of the DWR Flood System Repair Project only and may be defined differently for other programs.
Example Erosion Site

### Levee Vulnerabilities

<table>
<thead>
<tr>
<th>Location Start</th>
<th>Location End</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.92</td>
<td>1.94</td>
</tr>
</tbody>
</table>

**Failure Type:** Erosion  
**Category:** Critical - The site is likely to fail in the next high-water event.

**Description:**

- **Location**
  - **Start Latitude:** 40.05222  
  - **End Latitude:** 40.05224  
  - **Waterway:** Elder Creek  
  - **Maintaining Agency:** Tehama County Flood Control and Water Conservation District

- **2015**
  - **Field Date:** 2015-07-09 00:00:00  
  - **Field Team:** JRM, JWG  
  - **Field Comments:** Erosion has progressed into the levee prism since last field visit. Site category changed to critical. Ryan Teubert at Tehama County will be declaring this site an emergency repair. New photos added.

![Image of erosion site](image-url)
Future Goals of FERIX

- Identify and display all statewide levee vulnerabilities/flood concerns – not just the Critical and Serious ones.
- Make FERIX completely dynamic – including real time updates. Not just one time a year updates.
- Continue to add other applications and data from the department for a one-stop-shop resource tool.
Questions?

- FERIX - http://ferix.water.ca.gov
- Flood Control System
- Levee Vulnerabilities

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