The preparation of the USWTDB was funded, in part, by the Wind Energy Technologies Office of the U.S. Department of Energy under Contract No. DE-AC02-05CH11231.

Please Note:
• All participants will be muted during the webinar
• Please submit questions via the chat window

The preparation of the USWTDB was funded, in part, by the Wind Energy Technologies Office of the U.S. Department of Energy under Contract No. DE-AC02-05CH11231.
Meet The USWTDB Team

Lawrence Berkeley National Laboratory
Ben Hoen

United States Geological Survey
Jay Diffendorfer

American Wind Energy Association
Joe Rand

Louisa Kramer

American Wind Energy Association
Hannah Hunt

Chris Garrity
Meet The USWTDB Team & Today’s Speakers

Lawrence Berkeley National Laboratory
Ben Hoen

United States Geological Survey
Jay Diffendorfer

American Wind Energy Association
Joe Rand

Louisa Kramer

Chris Garrity

Hannah Hunt
Outline Of The Presentation

1. Project Background
2. Database Management
3. Visual Verification
4. Website and Viewer Demo
Wind Turbine Radar Interference Mitigation Working Group (WTRIM) Was Established

A Consortium Of Federal Agencies To Address Wind Turbine Interference With Radar

[Logos of various federal agencies]
Two Public Datasets Were Available From The FAA

#1 Digital Obstacle File (DOF)

#2 Obstruction Evaluation/Airport Airspace Analysis (i.e., “Study”) Files (OE/AAA)
Three Other Datasets Existed That Added Key Information To FAA Data...
...But They Were Either No Longer Being Updated Or Privately Held
WTRIM Used FAA & USGS Files With Other .Gov Data To Conduct Radar Operational Impact Assessments

Source: UT Austin
There Were Problems With The WTRIM Data Collection And Maintenance That Needed To Be Resolved

Problems:
1. Overlapping datasets had unresolved duplicates
2. Limited information on turbine characteristics
3. Limited geo-rectifying
4. No decommissioned turbine screening
5. No option for public release of the data
6. Not inclusive of repowered & retrofitted turbines
7. Limited long-term institutional support

OE/AAA & DOF
Other .gov Sources
U.S. DOE Proposed The Idea Of A Collaborative Dataset Between LBNL, USGS And AWEA

Wind Energy Technologies Office
Office Of Energy Efficiency & Renewable Energy
Negotiations Began On A Cooperative Research and Development Agreement (CRADA)

2016

U.S. Wind Turbine Database (USWTDB)
### Roles

<table>
<thead>
<tr>
<th>Overall Project &amp; Database Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual Verification &amp; Portal Design</td>
</tr>
<tr>
<td>Characteristics Sourcing &amp; Initial Locational Assessment</td>
</tr>
</tbody>
</table>

#### U.S. Wind Turbine Database (USWTDB)

- **Locational Verification**
- **Turbine Characteristics**
- **Project Information**
- **Turbine Locations**
Building The USWTDB Began

2017

Q1

+ BERKELEY LAB

+ USGS science for a changing world

+ FEDERAL AVIATION ADMINISTRATION

OE/AAA & DOF
Building The USWTDB Continues

Q1

Q1 USWTDB

+ Updated OE/AAA & DOF

Q2

+ Updated AWEA Manual Duplicate Removal

+ OE/AAA & DOF
Building The USWTDB Continues

Q1

Q1 USWTDB

Updated OE/AAA & DOF

Q2

Q2 USWTDB

Updated OE/AAA & DOF

Q3

Updated AWEA Manual Duplicate Removal
<table>
<thead>
<tr>
<th>Quarter</th>
<th>USWTDB Actions</th>
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</thead>
<tbody>
<tr>
<td>Q1</td>
<td><strong>Q1 USWTDB</strong></td>
</tr>
<tr>
<td></td>
<td>+ Updated OE/AAA &amp; DOF</td>
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<tr>
<td>Q2</td>
<td><strong>Q2 USWTDB</strong></td>
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<td></td>
<td>+ Updated OE/AAA &amp; DOF</td>
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<tr>
<td>Q3</td>
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<td></td>
<td>+ Updated AWEA</td>
</tr>
<tr>
<td>Q4</td>
<td><strong>Q3 USWTDB</strong></td>
</tr>
<tr>
<td></td>
<td>+ Updated OE/AAA &amp; DOF</td>
</tr>
<tr>
<td></td>
<td>+ Manual Duplicate Removal</td>
</tr>
</tbody>
</table>
Building The USWTDB Continues

Q1
- Q1 USWTDB
  - Updated OE/AAA & DOF

Q2
- Q2 USWTDB
  - Updated OE/AAA & DOF

Q3
- Q3 USWTDB
  - Updated OE/AAA & DOF
  - Updated AWEA
  - Manual Duplicate Removal

WTRIM Served As An Advisor During This Process
Outline Of The Presentation

1. Project Background
2. Database Management
3. Visual Verification
4. Website and Viewer Demo
Database Management: Five Main Sources of Data

1. USGS Dataset (March 2014)

2. LBNL Dataset (March 2017)

3. FAA Digital Obstacle File (DOF) (Jan 2, 2018)

4. FAA Obstacle Evaluation / Airport Airspace Analysis (OE/AAA) (Jan 6, 2018)

5. AWEA Q4-2017 Database (Jan 26, 2018)
Data Sources Were Merged (i.e., Matched) Using Two Methods:

1. Merging tables using unique IDs shared between two datasets (inner join)

### Table 1

<table>
<thead>
<tr>
<th>fua_code</th>
<th>dwe_lat</th>
<th>dwe_long</th>
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<td>44.33036</td>
<td>-96.32217</td>
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<td>27-022942</td>
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<td>27-026426</td>
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<td>-96.26601</td>
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</table>

### Table 2

<table>
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<th>fua_code</th>
<th>site_name</th>
</tr>
</thead>
<tbody>
<tr>
<td>27-022940</td>
<td>Marshall Wind</td>
</tr>
<tr>
<td>27-022962</td>
<td>Marshall Wind</td>
</tr>
<tr>
<td>27-021606</td>
<td>Marshall Wind</td>
</tr>
<tr>
<td>01-021390</td>
<td>Shepards Flat South</td>
</tr>
<tr>
<td>01-023645</td>
<td>Shepards Flat South</td>
</tr>
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<td>01-021623</td>
<td>Shepards Flat South</td>
</tr>
<tr>
<td>01-021391</td>
<td>Shepards Flat South</td>
</tr>
<tr>
<td>01-021824</td>
<td>Shepards Flat South</td>
</tr>
<tr>
<td>01-021619</td>
<td>Shepards Flat South</td>
</tr>
<tr>
<td>01-021435</td>
<td>Shepards Flat South</td>
</tr>
<tr>
<td>01-021383</td>
<td>Shepards Flat South</td>
</tr>
<tr>
<td>01-021389</td>
<td>Shepards Flat South</td>
</tr>
<tr>
<td>01-021632</td>
<td>Shepards Flat South</td>
</tr>
<tr>
<td>01-021425</td>
<td>Shepards Flat South</td>
</tr>
<tr>
<td>01-021490</td>
<td>Shepards Flat South</td>
</tr>
<tr>
<td>01-021425</td>
<td>Shepards Flat South</td>
</tr>
</tbody>
</table>
Data Sources Were Merged (i.e., Matched) Using Two Methods:

1. Merging tables using unique IDs shared between two datasets (inner join)

<table>
<thead>
<tr>
<th>USGS/LBNL data point</th>
<th>AWEA data point</th>
<th>FAA DOF data point</th>
</tr>
</thead>
</table>

Geospatial matching is conducted using Stata’s “geonear” function (Picard), which uses distance between two x/y coordinates using the Haversine equation on a reference ellipsoid (Vincenty, 1975)

2. Merging datasets by matching XY locations and turbine attributes (geospatial matching)
Started With USGS Dataset

Data Sources:
1. USGS Dataset

USGS 03/2014

48,956 turbines
Joining LBNL and USGS Datasets

Data Sources:
1. USGS Dataset
2. LBNL Dataset

USGS 03/2014
48,956 turbines

LBNL 03/2017
43,827 turbines

Match datasets using FAA unique obstacle repository system (ORS) number
USGS & LBNL Joined

Data Sources:
1. USGS Dataset
2. LBNL Dataset

These turbines matched between LBNL and USGS datasets
Adding FAA-DOF Data

Data Sources:
1. USGS Dataset
2. LBNL Dataset
3. FAA DOF

Match datasets using FAA unique obstacle repository system (ORS) number

OR...
Geospatial match

FAA-DOF 01/2018
49,191 turbines
When Not Possible To Join Datasets on ID (e.g., ORS), Geospatial Matching Was Used

• Designed to capture only highest confidence matches
  – If left unmatched, two duplicate points might appear in database
  – But, USGS visual verification would subsequently capture any duplicates that were not matched

• Two types of geospatial matching criteria were used:
  – Type 1:
    • Points were within 10 feet of each other, AND
    • Install years were +/- 1 year
  – Type 2:
    • Turbines were within 50 feet, AND
    • Install years were equal
USGS, LBNL, & DOF Joined

Data Sources:
1. USGS Dataset
2. LBNL Dataset
3. FAA DOF

These turbines matched between 2 or 3 of the datasets
# Adding FAA-OE/AAA Data

## Data Sources:
1. USGS Dataset
2. LBNL Dataset
3. FAA DOF
4. FAA OE/AAA

<table>
<thead>
<tr>
<th>Data Source</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>USGS Only</td>
<td></td>
</tr>
<tr>
<td>LBNL Only</td>
<td></td>
</tr>
<tr>
<td>DOF Only</td>
<td></td>
</tr>
<tr>
<td>FAA-OE/AAA</td>
<td>39,969</td>
</tr>
</tbody>
</table>

Match datasets using FAA aeronautical study number (ASN)

OR...

Geospatial match
USGS, LBNL, DOF, & OE/AAA Joined

Data Sources:
1. USGS Dataset
2. LBNL Dataset
3. FAA DOF
4. FAA OE/AAA

These turbines matched between 2, 3, or all 4 of the datasets.
Adding AWEA Data

Data Sources:
1. USGS Dataset
2. LBNL Dataset
3. FAA DOF
4. FAA OE/AAA
5. AWEA Q4-2017 Dataset

Matched

AWEA 01/2018
55,579 turbines

USGS Only

Geospatial match

OF-AAA Only
DOF Only
LBNL Only

USGS Only
AWEA Data Have No ID To Match To Other Datasets; Geospatial Matching Was Used

• Designed to capture only **highest confidence** matches
  – If left unmatched, two duplicate points might appear in database
  – But, USGS visual verification would subsequently capture any duplicates that were not matched

• Two types of matching criteria were used:
  – Type 1:
    • Turbines were within **100 feet** of each other, AND
    • Hub height, rotor diameter, and install year were equal
  – Type 2:
    • Turbines were within **10 feet** of each other, AND
    • Install years were within one year
Interim Fully-Merged Database to USGS for Visual Verification; Returned to LBNL to Remove Duplicates & Decommissioned
Interim Fully-Merged Database to USGS for Visual Verification; Returned to LBNL to Remove Duplicates & Decommissioned*

USGS Visual Verification:
- Identify duplicate points
- Identify decommissioned turbines
- Update XY coordinates (if needed)

*Note: 5,897 turbines were marked as decommissioned
Interim Fully-Merged Database to USGS for Visual Verification; Returned to LBNL to Remove Duplicates & Decommissioned*

USGS Visual Verification:
- Identify duplicate points
- Identify decommissioned turbines
- Update XY coordinates (if needed)

*Note: 5,897 turbines were marked as decommissioned
Final Database After Merging 5 Sources and Removing Duplicates & Decommissioned Turbines:

<table>
<thead>
<tr>
<th>Source Matches</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-Source Matches</td>
<td>32,139</td>
</tr>
<tr>
<td>4-Source Matches</td>
<td>10,670</td>
</tr>
<tr>
<td>3-Source Matches</td>
<td>4,982</td>
</tr>
<tr>
<td>2-Source Matches</td>
<td>4,960</td>
</tr>
<tr>
<td>OE/AAA Only</td>
<td>-</td>
</tr>
<tr>
<td>DOF Only</td>
<td>30</td>
</tr>
<tr>
<td>LBNL Only</td>
<td>-</td>
</tr>
<tr>
<td>USGS Only</td>
<td>4,855</td>
</tr>
<tr>
<td>AWEA Only</td>
<td>-</td>
</tr>
<tr>
<td>Total Turbines</td>
<td>57,636</td>
</tr>
</tbody>
</table>

![Diagram showing database matches]

- **Matched**: 52,751
- **DOF Only**: 30
- **USGS Only**: 4,855
# Key Turbine Attributes (and their sources)

<table>
<thead>
<tr>
<th>Attribute</th>
<th>LBNL / AWEA / USGS</th>
<th>FAA DOF / OE/AAA</th>
</tr>
</thead>
<tbody>
<tr>
<td>X/Y coordinates</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Online/install year</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Total height (m)</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Hub height (m)</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>Rotor diameter (m)</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>Rated capacity (kW)</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>Manufacturer</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>Model</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>Project name</td>
<td>●</td>
<td></td>
</tr>
</tbody>
</table>
Key Turbine Attributes Are Well Populated In USWTDB

<table>
<thead>
<tr>
<th>Attribute</th>
<th># of Turbines Populated</th>
<th>% of Database Populated</th>
<th>Minimum</th>
<th>Median</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>X/Y coordinates</td>
<td>57,636</td>
<td>100%</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Online/install year</td>
<td>57,523</td>
<td>99%</td>
<td>1981</td>
<td>2009</td>
<td>2018</td>
</tr>
<tr>
<td>Total height (m)</td>
<td>52,334</td>
<td>91%</td>
<td>9.1</td>
<td>123.1</td>
<td>181.1</td>
</tr>
<tr>
<td>Hub height (m)</td>
<td>51,431</td>
<td>89%</td>
<td>18.2</td>
<td>80</td>
<td>116.5</td>
</tr>
<tr>
<td>Rotor diameter (m)</td>
<td>52,499</td>
<td>91%</td>
<td>11</td>
<td>87</td>
<td>150</td>
</tr>
<tr>
<td>Rated capacity (kW)</td>
<td>54,595</td>
<td>95%</td>
<td>40</td>
<td>1650</td>
<td>6000</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>54,413</td>
<td>94%</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Model</td>
<td>53,541</td>
<td>93%</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Over 87% of turbines in the USWTDB have data populated for ALL of these key attributes.
Latest Database Release

Version: USWTDB_V1_0_20180419 - Changelog | Detailed memo & codebook

The latest release includes data on 57,636 turbines covering 43 states plus Guam and Puerto Rico. The most recent turbines added to the USWTDB became operational as recently as the fourth quarter of 2017, with a few from early 2018. The oldest turbines in the data set were installed prior to 1990. USWTDB releases generally lag installations by one quarter to allow for merging of the various datasets, visual verification, and quality control. See more details on the release.

Join the USWTDB mailing list to receive news about future updates and changes.

Suggested Citation:

Latest Database Release

Version: USWTDB_V1.0.20180419 - Changelog - Detailed memo & codebook

The latest release includes data on 57,636 turbines covering 43 states plus Guam and Puerto Rico. The most recent turbines added to the USWTDB became operational as recently as the fourth quarter of 2017, with a few from early 2018. The oldest turbines in the data set were installed prior to 1990. USWTDB releases generally lag installations by one quarter to allow for merging of the various datasets, visual verification, and quality control. See more details on the release.

Join the USWTDB mailing list to receive news about future updates and changes.

Suggested Citation:
For More Details, See Release Memo & Codebook

### Codebook

<table>
<thead>
<tr>
<th>field</th>
<th>category</th>
<th>description</th>
<th>type</th>
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<th>Min</th>
<th>Median</th>
<th>Max</th>
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<td>unique uswtdb id</td>
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<tr>
<td>state</td>
<td>location</td>
<td>state where turbine is located</td>
<td>str</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>county</td>
<td>location</td>
<td>county where turbine is located</td>
<td>str</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>fips</td>
<td>location</td>
<td>state and county fips where turbine is located</td>
<td>str</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>p_name</td>
<td>project characteristic</td>
<td>project name</td>
<td>int</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>p_year</td>
<td>project characteristic</td>
<td>year project became operational</td>
<td>int</td>
<td></td>
<td></td>
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<td>project characteristic</td>
<td>number of turbines in project</td>
<td>int</td>
<td></td>
<td></td>
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<td>project characteristic</td>
<td>project capacity (MW)</td>
<td>double</td>
<td></td>
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<td>t_manu</td>
<td>turbine characteristics</td>
<td>turbine original equipment manufacturer</td>
<td>str</td>
<td></td>
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<td></td>
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<td>turbine characteristics</td>
<td>turbine model</td>
<td>str</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>t_capacity</td>
<td>turbine characteristics</td>
<td>turbine capacity (MW)</td>
<td>int</td>
<td></td>
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<td>t_hubhgt</td>
<td>turbine characteristics</td>
<td>turbine hub height (meters)</td>
<td>double</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>t_rotd</td>
<td>turbine characteristics</td>
<td>turbine rotor diameter (meters)</td>
<td>double</td>
<td></td>
<td></td>
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<tr>
<td>t_swa</td>
<td>turbine characteristics</td>
<td>turbine rotor swept area (meters²)</td>
<td>double</td>
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<td>t_tors</td>
<td>turbine characteristics</td>
<td>turbine torsal height - calculated (meters)</td>
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</tr>
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<td>turbine characteristics</td>
<td>turbine characteristic confidence (0-2)</td>
<td>byte</td>
<td></td>
<td></td>
<td></td>
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<td>t_con1loc</td>
<td>visual inspection info</td>
<td>location confidence (0-1)</td>
<td>byte</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>t_imgdate</td>
<td>visual inspection info</td>
<td>date of image used to visually verify turbine location</td>
<td>str</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>t_imgsrc</td>
<td>visual inspection info</td>
<td>source of image used to visually verify turbine location</td>
<td>str</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x_long</td>
<td>location</td>
<td>longitude (decimal degrees - NAD 83 datum)</td>
<td>double</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ylat</td>
<td>location</td>
<td>latitude (decimal degrees - NAD 83 datum)</td>
<td>double</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Outline Of The Presentation

1. Project Background
2. Database Management
3. Visual Verification
4. Website and Viewer Demo
Visual Verification

- Visual Verification Types
  - Already Completed
  - Moved
  - Added
  - Removed
    - Duplicates or Extra Data Points
    - Not a turbine
    - Small (less than 65 kW and blade size less than 30 meters)
    - Dismantled

- Imagery Types and Access

- Confidence of Location
Already Completed – Visually Checked In Previous USGS Data
Moved
Distance Moved Summary Statistics

Summary Of USWTDB Turbine Location Adjustments By Online Year

Note: Figure includes adjustments made to turbines in legacy USGS database, and which were incorporated into the USWTDB. Comparison is made between final location and that of the FAA DOF file, and excluding any adjustments of <1 meter or > 300 meters.
Added

Digital Globe

Adds
## Extra Points Removed

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Number of Extras Removed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q2-2017</td>
<td>730</td>
</tr>
<tr>
<td>Q3-2017</td>
<td>3,100</td>
</tr>
<tr>
<td>Q4-2017</td>
<td>2,861</td>
</tr>
<tr>
<td>Q1-2018</td>
<td>4,716</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>11,407</strong></td>
</tr>
</tbody>
</table>

Digital Globe
Data that were not a wind turbine such as water pump with a small windmill.

Turbines that are smaller than 65 kW and blade size less than 30 meters.
Dismantled and Removed

118°14'18.925"W  35°12'29.857"N, California
Imagery Types

1. Bing Maps Aerial - ESRI ArcMap Base maps, available from ESRI ArcMap
2. Google Earth - Available from Google
3. NAIP - National Agriculture Imagery Program County Mosaics from https://datagateway.nrcs.usda.gov/
4. USGS EDC SDDS - SGS Seamless Data Distribution System (SDDS) orthoimagery from internal USGS EROS Data Center Servers
5. Digital Globe - Digital Globe EV WebHosting Imagery from evwhs.digitalglobe.com
# Location Confidence

<table>
<thead>
<tr>
<th>Location Confidence $t_{\text{conf_loc}}$</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Not been visually verified (yet).</td>
</tr>
<tr>
<td>1</td>
<td>Turbine was not seen on image.</td>
</tr>
<tr>
<td>2</td>
<td>Turbine was in partial construction, image shows developed pad with base and/or turbine parts on ground.</td>
</tr>
<tr>
<td>3</td>
<td>Turbine clearly seen.</td>
</tr>
</tbody>
</table>
Confidence = 2 And Confidence = 3

101°1'4.506"W  32°54'20.779"N in Texas

Confidence = 3
Full Confidence

Confidence = 2
Blades Assembled
On Ground
Confidence = 2

84°58'13.888"W  40°17'54.855"N Indiana

Confidence = 2
Parts on ground
Confidence = 1 (Digital Globe)

(83°24'13.358"W  43°39'49.307"N) in Michigan. 9/3/2016 DG Image Date. 2/15/18 Access Date

Confidence = 1
Nothing Visible
Confidence = 1 (Google Earth)

(83°24'13.358"W  43°39'49.307"N) in Michigan.  6/23/2016 GE Image Date.   4/17/18 Access Date

Confidence = 1
Nothing Visible
Confidence = 3

(83°24'13.358"W  43°39'49.307"N) in Michigan.  3/24/2018 DG Image Date.   4/17/18 Access Date

In General, Cloud Cover (depending on coverage) is not available to the general population.
# Location Confidence - April 2018 Status

<table>
<thead>
<tr>
<th>Location Confidence t_conf_loc</th>
<th>Definition</th>
<th>Status April 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Not been visually verified (yet).</td>
<td>NONE 0%</td>
</tr>
<tr>
<td>1</td>
<td>Turbine was not seen on image.</td>
<td>920 1%</td>
</tr>
<tr>
<td>2</td>
<td>Turbine was in partial construction, image shows developed pad with base and/or turbine parts on ground.</td>
<td>1159 2%</td>
</tr>
<tr>
<td>3</td>
<td>Turbine clearly seen.</td>
<td>55,557 96%</td>
</tr>
</tbody>
</table>
USWTDB has 57,636 turbines (April 2018 release)

All of them looked at by a human!
Outline Of The Presentation

1. Project Background
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Questions?

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Email the USWTDB Team at: uswtdb@lbl.gov

Link to USWTDB: https://eerscmap.usgs.gov/uswtdb