

VISUALIZING US NATURAL DISASTER DECLARATION – TRENDS AND PATTERNS

Week 1 Documentation/ Screenshots

Data Cleaning in Power BI

Data Cleaning in Power BI

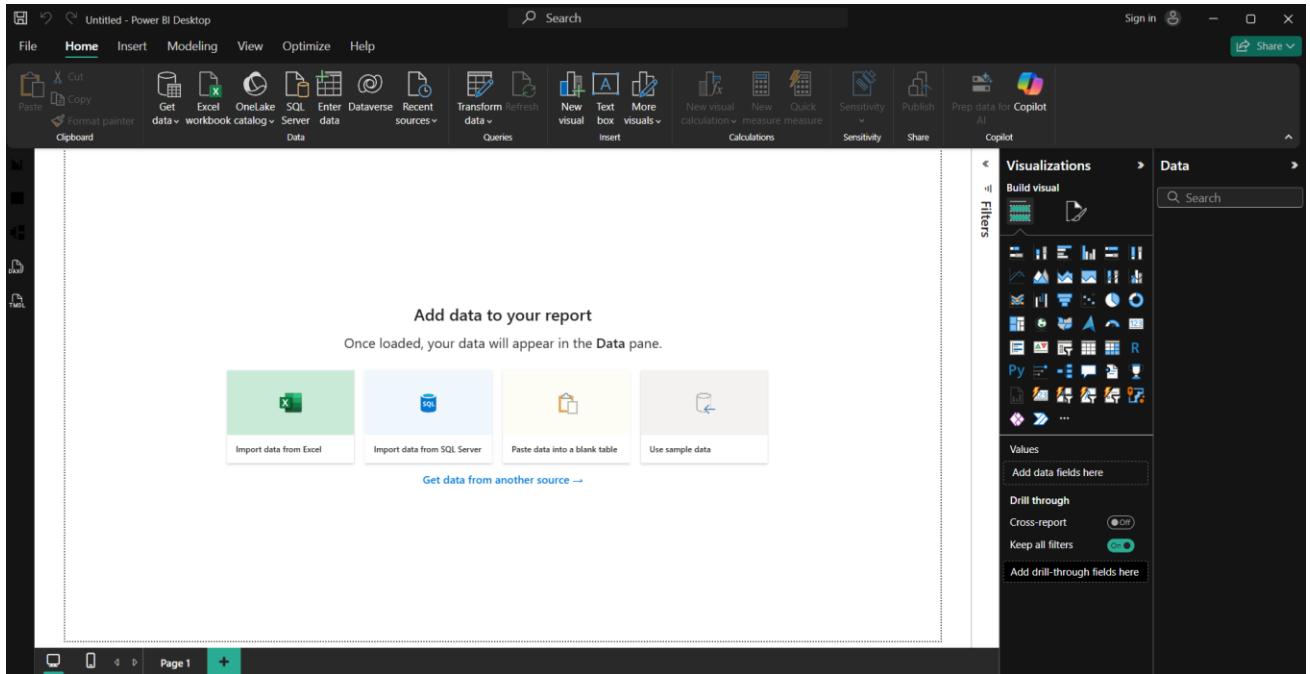


Fig 1.1 PowerBI Canvas

Load Data:

Get Data -> Text/CSV -> Choose File -> Transform Data

FemaWebDisasterDeclarations.csv

| File Origin | Delimiter | Data Type Detection | | | | |
|----------------------------------|---------------------|--------------------------------------|---------------------|---------------------|-----------------|-------|
| 1252: Western European (Windows) | Comma | Based on first 200 rows | | | | |
| disasterNumber | declarationDate | disasterName | incidentBeginDate | incidentEndDate | declarationType | state |
| 5243 | 22-06-2018 05:30:00 | GRAHAM FIRE | 21-06-2018 05:30:00 | 25-06-2018 05:30:00 | Fire Management | OR |
| 5554 | 07-03-2025 05:30:00 | COVINGTON DRIVE FIRE | 01-03-2025 05:30:00 | null | Fire Management | SC |
| 4859 | 15-01-2025 05:30:00 | SEVERE STORM AND FLOODING | 20-10-2024 05:30:00 | 23-10-2024 05:30:00 | Major Disaster | AK |
| 4856 | 08-01-2025 05:30:00 | WILDFIRES AND STRAIGHT-LINE WINDS | 07-01-2025 05:30:00 | 31-01-2025 05:30:00 | Major Disaster | CA |
| 5551 | 08-01-2025 05:30:00 | HURST FIRE | 07-01-2025 05:30:00 | null | Fire Management | CA |
| 5550 | 08-01-2025 05:30:00 | EATON FIRE | 07-01-2025 05:30:00 | null | Fire Management | CA |
| 5549 | 07-01-2025 05:30:00 | PALISADES FIRE | 07-01-2025 05:30:00 | null | Fire Management | CA |
| 4854 | 01-01-2025 05:30:00 | WILDFIRES | 10-07-2024 05:30:00 | 23-08-2024 05:30:00 | Major Disaster | OR |
| 53 | 05-04-1956 05:30:00 | TORNADO | 05-04-1956 05:30:00 | 05-04-1956 05:30:00 | Major Disaster | MI |
| 52 | 29-03-1956 05:30:00 | FLOOD | 29-03-1956 05:30:00 | 29-03-1956 05:30:00 | Major Disaster | NY |
| 4852 | 24-12-2024 05:30:00 | WILDFIRES AND STRAIGHT-LINE WINDS | 05-10-2024 05:30:00 | 06-10-2024 05:30:00 | Major Disaster | ND |
| 5548 | 10-12-2024 05:30:00 | FRANKLIN FIRE | 10-12-2024 05:30:00 | 18-12-2024 05:30:00 | Fire Management | CA |
| 4851 | 09-12-2024 05:30:00 | POST-TROPICAL STORM HELENE | 25-09-2024 05:30:00 | 28-09-2024 05:30:00 | Major Disaster | WI |
| 4849 | 26-11-2024 05:30:00 | WILDFIRES | 17-07-2024 05:30:00 | 21-08-2024 05:30:00 | Major Disaster | WI |
| 4847 | 14-11-2024 05:30:00 | SEVERE STORM AND STRAIGHT-LINE WINDS | 06-08-2024 05:30:00 | 06-08-2024 05:30:00 | Major Disaster | MT |
| 4846 | 13-11-2024 05:30:00 | LANDSLIDES | 25-08-2024 05:30:00 | 25-08-2024 05:30:00 | Major Disaster | AK |
| 4845 | 13-11-2024 05:30:00 | WILDFIRES | 21-08-2024 05:30:00 | 31-08-2024 05:30:00 | Major Disaster | WI |
| 5546 | 11-11-2024 05:30:00 | CALLAHAN FIRE | 11-11-2024 05:30:00 | 13-11-2024 05:30:00 | Fire Management | NV |
| 5545 | 06-11-2024 05:30:00 | MOUNTAIN FIRE | 06-11-2024 05:30:00 | 15-11-2024 05:30:00 | Fire Management | CA |
| 4844 | 05-11-2024 05:30:00 | HURRICANE MILTON | 05-10-2024 05:30:00 | 02-11-2024 05:30:00 | Major Disaster | FL |

Fig 1.2 Transform Data

Remove Duplicate Rows:

Ctrl+A -> Remove Rows -> Remove Duplicates

Remove Unnecessary Columns:

Click StateCode column, Ctrl+alt+(other columns to remove) -> Remove Columns (in toolbar ribbon) -> Remove Columns

The screenshot shows the Power Query Editor interface with the following details:

- Home Tab:** Selected.
- Toolbar:** Includes Close & Apply, New Source, Recent Sources, Enter Data, Data source settings, Manage Parameters, Refresh Preview, Advanced Editor, Properties, Choose Columns, Remove Columns, Keep Rows, Remove Rows, Sort, Split Column, Group By, Replace Values, Data Type: Date/Time, Use First Row as Headers, Merge Queries, Append Queries, Combine Files, and Combine.
- Queries [1]:** FemaWebDisasterDeclar...
- Table View:** Shows a table with 19 columns and 26 rows. The columns are labeled: laProgramDeclared, paProgramDeclared, hmProgramDeclared, designatedIncidentTypes, declarationRequestDate, and lastRefresh. The data includes various values like 0, 1, R, W, and specific dates/times.
- Properties Panel:** Shows the query name "FemaWebDisasterDeclarations".
- Applied Steps Panel:** Shows the steps taken: Source, Promoted Headers, Changed Type, Removed Duplicates, and Removed Columns.
- Bottom Status:** 19 COLUMNS, 999+ ROWS, Column profiling based on top 1000 rows, PREVIEW DOWNLOADED AT 14:11.

Fig 1.3 Removed unnecessary columns

Check Datatype:

To convert disaster programs declared to Boolean: Click the number icon -> true/false

Untitled - Power Query Editor

Home Transform Add Column View Tools Help

Queries [1]

FemaWebDisasterDeclar...

| Note | region | ihProgramDeclared | iaProgramDeclared | paProgramDeclared | hmProgramDeclared | designatedIncidentTypes | declaration |
|------|--------|-------------------|-------------------|-------------------|-------------------|-------------------------|-------------|
| 1 | 10 | FALSE | FALSE | TRUE | TRUE | | TRUE |
| 2 | 4 | FALSE | FALSE | TRUE | TRUE | R | TRUE R |
| 3 | 10 | FALSE | FALSE | TRUE | TRUE | S, W | TRUE S, W |
| 4 | 9 | TRUE | FALSE | TRUE | TRUE | 2, R | TRUE 2, R |
| 5 | 9 | FALSE | FALSE | TRUE | TRUE | R | TRUE R |
| 6 | 9 | FALSE | FALSE | TRUE | TRUE | R | TRUE R |
| 7 | 9 | FALSE | FALSE | TRUE | TRUE | R | TRUE R |
| 8 | 10 | FALSE | FALSE | TRUE | TRUE | R, W | TRUE R, W |
| 9 | 5 | FALSE | TRUE | TRUE | TRUE | R | TRUE R |
| 10 | 2 | FALSE | TRUE | TRUE | TRUE | R | TRUE R |
| 11 | 8 | FALSE | FALSE | TRUE | TRUE | 2, R | TRUE 2, R |
| 12 | 9 | FALSE | FALSE | TRUE | TRUE | R | TRUE R |
| 13 | 3 | TRUE | FALSE | FALSE | FALSE | A | TRUE A |
| 14 | 10 | FALSE | FALSE | TRUE | TRUE | R | TRUE R |
| 15 | 8 | TRUE | FALSE | FALSE | TRUE | 2, W | TRUE 2, W |
| 16 | 10 | FALSE | FALSE | TRUE | TRUE | M | TRUE M |
| 17 | 8 | FALSE | FALSE | TRUE | TRUE | R | TRUE R |
| 18 | 9 | FALSE | FALSE | TRUE | TRUE | R | TRUE R |
| 19 | 9 | FALSE | FALSE | TRUE | TRUE | R | TRUE R |
| 20 | 4 | TRUE | FALSE | TRUE | TRUE | H | TRUE H |
| 21 | 6 | TRUE | FALSE | TRUE | TRUE | F | TRUE F |
| 22 | 6 | FALSE | FALSE | TRUE | TRUE | R | TRUE R |
| 23 | 6 | FALSE | FALSE | TRUE | TRUE | R | TRUE R |
| 24 | 3 | FALSE | TRUE | TRUE | TRUE | R | TRUE R |
| 25 | 2 | FALSE | FALSE | TRUE | TRUE | A, W | TRUE A, W |
| 26 | 0 | TRUE | FALSE | TRUE | TRUE | E | TRUE E |

19 COLUMNS, 999+ ROWS Column profiling based on top 1000 rows

Query Settings

PROPERTIES

Name: FemaWebDisasterDeclarations

APPLIED STEPS

- Source
- Promoted Headers
- Changed Type
- Removed Duplicates
- Removed Columns
- Changed Type1

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Fig 1.4 Changed Datatype

Replace blank with Unknown: (in designatedIncidentType)

Select column -> replace values -> , Unknown

Untitled - Power Query Editor

Home Transform Add Column View Tools Help

Queries [1]

FemaWebDisasterDeclar...

| Note | region | ihProgramDeclared | iaProgramDeclared | paProgramDeclared | hmProgramDeclared | designatedIncidentTypes | declarationRequestDate | lastRefresh |
|------|------------------------|-------------------|-------------------|-------------------|-------------------|-------------------------|------------------------|---------------------|
| 1 | 2025-05-30 00:00:00 | 10 | FALSE | FALSE | TRUE | TRUE Unknown | 21-06-2018 05:30:00 | 13-03-2025 00:51:44 |
| 2 | null | 4 | FALSE | FALSE | TRUE | TRUE R | 07-03-2025 05:30:00 | 13-03-2025 00:51:45 |
| 3 | null | 10 | FALSE | FALSE | TRUE | TRUE S, W | 16-12-2024 05:30:00 | 13-03-2025 00:51:45 |
| 4 | null | 9 | TRUE | FALSE | TRUE | TRUE 2, R | 08-01-2025 05:30:00 | 13-03-2025 00:51:45 |
| 5 | null | 9 | FALSE | FALSE | TRUE | TRUE R | 08-01-2025 05:30:00 | 13-03-2025 00:51:45 |
| 6 | null | 9 | FALSE | FALSE | TRUE | TRUE R | 07-01-2025 05:30:00 | 13-03-2025 00:51:45 |
| 7 | null | 9 | FALSE | FALSE | TRUE | TRUE R | 07-01-2025 05:30:00 | 13-03-2025 00:51:45 |
| 8 | null | 10 | FALSE | FALSE | TRUE | TRUE R, W | 21-10-2024 05:30:00 | 13-03-2025 00:51:45 |
| 9 | 24-1956-05-30 00:00:00 | 5 | FALSE | TRUE | TRUE | TRUE Unknown | 05-04-1956 05:30:00 | 13-03-2025 00:51:45 |
| 10 | 24-1957-05-30 00:00:00 | 2 | FALSE | TRUE | TRUE | TRUE Unknown | 29-03-1956 05:30:00 | 13-03-2025 00:51:45 |
| 11 | null | 8 | FALSE | FALSE | TRUE | TRUE 2, R | 21-11-2024 05:30:00 | 13-03-2025 00:51:45 |
| 12 | null | 9 | FALSE | FALSE | TRUE | TRUE R | 10-12-2024 05:30:00 | 13-03-2025 00:51:45 |
| 13 | null | 3 | TRUE | FALSE | FALSE | TRUE 4 | 25-10-2024 05:30:00 | 13-03-2025 00:51:45 |
| 14 | null | 10 | FALSE | FALSE | TRUE | TRUE R | 15-10-2024 05:30:00 | 13-03-2025 00:51:45 |
| 15 | null | 8 | TRUE | FALSE | FALSE | TRUE 2, W | 05-10-2024 05:30:00 | 13-03-2025 00:51:45 |
| 16 | null | 10 | FALSE | FALSE | TRUE | TRUE M | 24-10-2024 05:30:00 | 13-03-2025 00:51:45 |
| 17 | null | 8 | FALSE | FALSE | TRUE | TRUE R | 16-10-2024 05:30:00 | 13-03-2025 00:51:45 |
| 18 | null | 9 | FALSE | FALSE | TRUE | TRUE R | 11-11-2024 05:30:00 | 13-03-2025 00:51:45 |
| 19 | null | 9 | FALSE | FALSE | TRUE | TRUE R | 06-11-2024 05:30:00 | 13-03-2025 00:51:45 |
| 20 | null | 4 | TRUE | FALSE | TRUE | TRUE H | 25-10-2024 05:30:00 | 13-03-2025 00:51:45 |
| 21 | null | 6 | TRUE | FALSE | TRUE | TRUE F | 28-10-2024 05:30:00 | 13-03-2025 00:51:45 |
| 22 | null | 6 | FALSE | FALSE | TRUE | TRUE R | 29-10-2024 05:30:00 | 13-03-2025 00:51:45 |
| 23 | null | 6 | FALSE | FALSE | TRUE | TRUE R | 29-10-2024 05:30:00 | 13-03-2025 00:51:45 |
| 24 | 26-1959-05-30 00:00:00 | 3 | FALSE | TRUE | TRUE | TRUE Unknown | 15-03-1956 05:30:00 | 13-03-2025 00:51:45 |
| 25 | null | 2 | FALSE | FALSE | TRUE | TRUE A, W | 13-09-2024 05:30:00 | 13-03-2025 00:51:45 |
| 26 | null | 9 | TRUE | FALSE | TRUE | TRUE F | 20-09-2024 05:30:00 | 13-03-2025 00:51:45 |
| 27 | null | 1 | FALSE | FALSE | TRUE | TRUE R | 24-10-2024 05:30:00 | 13-03-2025 00:51:45 |
| 28 | null | 10 | TRUE | FALSE | TRUE | TRUE F | 19-09-2024 05:30:00 | 13-03-2025 00:51:45 |
| 29 | null | 4 | TRUE | FALSE | TRUE | TRUE F, H | 11-10-2024 05:30:00 | 13-03-2025 00:51:45 |
| 30 | null | 8 | FALSE | FALSE | TRUE | TRUE R | 06-10-2024 05:30:00 | 13-03-2025 00:51:45 |
| 31 | null | 9 | TRUE | FALSE | TRUE | TRUE R | 16-09-2024 05:30:00 | 13-03-2025 00:51:45 |
| 32 | null | 4 | TRUE | FALSE | TRUE | TRUE A, W | 30-09-2024 05:30:00 | 13-03-2025 00:51:45 |
| 33 | null | 3 | TRUE | FALSE | TRUE | TRUE 4 | 30-09-2024 05:30:00 | 13-03-2025 00:51:45 |
| 34 | null | 4 | TRUE | FALSE | TRUE | TRUE A, H | 30-09-2024 05:30:00 | 13-03-2025 00:51:45 |
| 35 | null | 8 | FALSE | FALSE | TRUE | TRUE R | 30-09-2024 05:30:00 | 13-03-2025 00:51:45 |
| 36 | null | 3 | FALSE | FALSE | TRUE | FALSE 4 | 28-09-2024 05:30:00 | 13-03-2025 00:51:45 |

19 COLUMNS, 999+ ROWS Column profiling based on top 1000 rows

Query Settings

PROPERTIES

Name: FemaWebDisasterDeclarations

APPLIED STEPS

- Source
- Promoted Headers
- Changed Type
- Removed Duplicates
- Removed Columns
- Changed Type1
- Replaced Value

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Fig 1.5 Replaced blank values

Adding Useful Columns:

1. Status

Creating Conditional Columns:

Select column -> Add Column -> Conditional Column

Using closeOutDate:

Create a column named “Status” which is used to depict whether the disaster is officially declared as closed or not.

IF (closeOutDate EQUALS null) THEN Status = “Open”

ELSE Status = “Closed”

The screenshot shows the Power Query Editor interface with the following details:

- Home**, **Transform**, **Add Column**, **View**, **Tools**, **Help** menu items.
- General** tab selected in the ribbon.
- Applied Steps** pane on the right shows the following steps:
 - Properties: Name = FemWebDisasterDeclarations
 - Applied Steps:
 - Source
 - Promoted Headers
 - Changed Type
 - Removed Duplicates
 - Removed Columns
 - Changed Type 1
 - Filtered Rows
 - Replaced Value
- Queries [1]** pane shows a single query named **FemWebDisasterDeclarations**.
- Table View** pane displays a large table with approximately 100 rows of disaster declaration data. Key columns include:
 - declarationType**: Contains values like Fire Management, Major Disaster, etc.
 - stateName**: States like Oregon, South Carolina, Alaska, California, etc.
 - incidentType**: Types like Fire, Severe Storm, Tornado, Flood, etc.
 - entryDate**, **updateDate**, **closeoutDate**: Dates indicating the status of the declaration.
 - region**: Regions like West Virginia, Washington, Montana, etc.
 - isProgramDeclared**, **isProgramOpen**: Boolean values indicating if the declaration is officially declared.
- Formula Bar** at the top shows the formula: = Table.ReplaceValue(#"Filtered Rows", "", "Unknown", Replacer.ReplaceValue, {"designatedIncidentTypes"}).
- Bottom Status Bar** indicates 19 COLUMNS, 999+ ROWS, and a preview download count of 15/13.

Fig 1.6 Before creating “Status” column

Screenshot of the Power Query Editor showing the "Add Conditional Column" dialog. The main pane displays a table of disaster data from FEMA Web Disaster Declarations. The dialog is open at the bottom, titled "Add Conditional Column". It asks to add a conditional column based on other columns or values. A "New column name" field contains "Custom". Below it, a "Column Name" dropdown is set to "closeoutDate", an "Operator" dropdown is set to "equals", and a "Value" dropdown is set to "null". To the right, there are "Then" and "Else" fields, both currently empty. Buttons for "OK" and "Cancel" are at the bottom right.

Fig 1.7 “Add Conditional Column” pop-up

Screenshot of the Power Query Editor showing the "Add Conditional Column" dialog. The main pane displays a table of disaster data from FEMA Web Disaster Declarations. The dialog is open at the bottom, titled "Add Conditional Column". It asks to add a conditional column based on other columns or values. A "New column name" field contains "Status". Below it, a "Column Name" dropdown is set to "closeoutDate", an "Operator" dropdown is set to "equals", and a "Value" dropdown is set to "null". To the right, there are "Then" and "Else" fields, both currently empty. Buttons for "OK" and "Cancel" are at the bottom right.

Fig 1.8 “Add Conditional Column” pop-up

The screenshot shows the Power Query Editor interface with a table named "FemaWebDisasterDeclar". A new column, "Status", has been added using a conditional formula:

```
= Table.ReorderColumns(#"Added Conditional Column",{"disasterNumber", "declarationDate", "disasterName", "incidentBeginDate", "incidentEndDate", "declarationType", "stateName", "incidentType", "entryDate", "updatedDate", "closeoutDate", "region", "isProgramDeclared", "paProgramDeclared", "hr"}), [{"Status": if [incidentBeginDate] < [incidentEndDate] then "Open" else "Closed"}]
```

The "Status" column contains values "Open" or "Closed" corresponding to the dates. The "Properties" pane on the right shows the "Name" is "FemaWebDisasterDeclarations".

Fig 1.9 Created a conditional column “Status”

2. Incident Duration

= Duration.Days([incidentEndDate] - [incidentBeginDate])

In header, Add Column -> Custom Column

The screenshot shows the Power Query Editor with a custom column formula being defined:

```
Custom Column
Add a column that is computed from the other columns.
New column name: Duration
Custom column formula: = Duration.Days([incidentEndDate] - [incidentBeginDate])
```

A "Available columns" pop-up window is open, listing various disaster-related columns like "disasterNumber", "declarationDate", "disasterName", etc.

The "Properties" pane on the right shows the "Name" is "FemaWebDisasterDeclarations".

Fig 1.10 Custom Column pop-up

The screenshot shows the Power Query Editor interface with the following details:

- Home**, **Transform**, **Add Column**, **View**, **Tools**, **Help** tabs.
- General** ribbon tab selected.
- Queries**: [1] FemaWebDisasterDeclar
- Table.TransformColumnTypes** step applied to "Reordered Columns1".
- Columns** list: IncidentBeginDate, IncidentEndDate, incidentDuration (Type: Whole Number), declarationType, stateName, incidentType, entryDate, updateDate.
- Properties** pane shows the step "Changed Type" under the "Applied Steps" section.
- Query Settings** pane shows the "Source" as "FemaWebDisasterDeclarations".

Fig 1.11 Added “incidentDuration” column

Change datatype of “incidentDuration” – whole number

3. Fiscal Year

In header, Add Column -> Custom Column

```
= if (Date.Month ([declarationDate])) >= 10
    then (Date.Year([declarationDate]) + 1)
    else (Date.Year([declarationDate]) )
```

Screenshot of Power Query Editor showing the "Custom Column" dialog for the "fyDeclared" column.

Custom Column

Add a column that is computed from the other columns.

New column name: fyDeclared

Custom column formula:

```
= IF([Date.Month([declarationDate]) >= 10]
    THEN [Date.Year([declarationDate]) + 1]
    ELSE [Date.Year([declarationDate])])
```

Available columns:

- disasterNumber
- disasterName
- declarationDate
- declarationRequestDate
- incidentBeginDate
- incidentEndDate
- declarationType
- stateName
- updateDate
- ...

Learn about Power Query formulas

OK Cancel

Query Settings

APPLIED STEPS

- Source
- Promoted Headers
- Changed Type
- Removed Columns
- Reordered Columns
- Filtered Rows
- Removed Duplicates
- Filtered Rows 1
- Changed Type 1
- Added Custom
- Reordered Column 1
- Added Conditional Column
- Reordered Column 3
- > Added Custom

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Fig 1.12 Custom Column pop-up for “fyDeclared” column

Screenshot of Power Query Editor showing the "Applied Steps" pane with the "Inserted Prefix" step highlighted.

APPLIED STEPS

- Source
- Promoted Headers
- Changed Type
- Removed Columns
- Reordered Columns
- Filtered Rows
- Removed Duplicates
- Filtered Rows 1
- Changed Type 1
- Added Custom
- Reordered Column 1
- Added Conditional Column
- Reordered Column 3
- > Inserted Prefix

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Fig 1.13 Added fyDeclared column

Select column -> Format -> Add Prefix -> FY

Delete previous column

Rename column

Screenshot of Microsoft Power BI Data Editor showing the transformation of the "FemaWebDisasterDeclar" query. The interface includes various tools like Column From Examples, Add Column, View, Tools, and Help, along with a toolbar for Conditional Column, Merge Columns, Trigonometry, Date, Time, Duration, and From Date & Time.

The main area displays a table with 21 columns and 999+ rows. The columns are:

- Name
- declarationDate
- fyDeclared
- declarationRequestDate
- incidentBeginDate
- incidentEndDate
- declarationType
- stateName
- updatedDate
- disasterNumber
- disasterName
- declarationDate
- fyDeclared
- declarationRequestDate
- incidentBeginDate
- incidentEndDate
- declarationType
- stateName
- updatedDate

The data shows various disaster types and their declarations over time, with specific fields like "fyDeclared" and "declarationType" being manipulated. The right side of the screen shows the "APPLIED STEPS" pane, which lists the history of changes made to the query, including "Reordered Columns2".

Fig 1.14 Final fyDeclared column