

SQL-Mongo Project – Spatial Data of US Wildfires

BUAN 6320

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Data Model

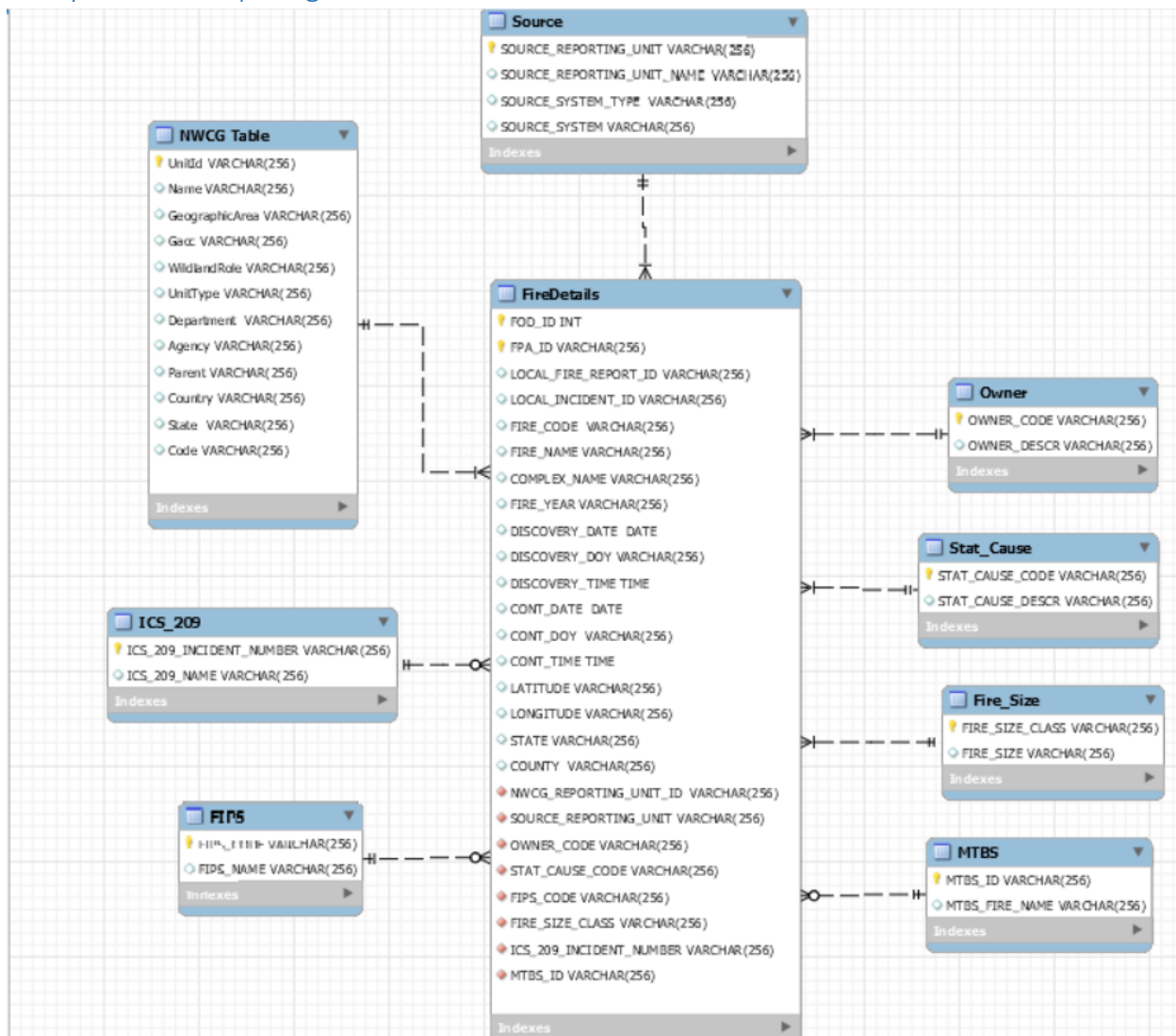
Assumptions/Notes About Data Entities and Relationships

1. A fire originating will have a single source and each fire will have a fire report and a single unit may report multiple fires.
2. Each fire may be reported by the NWGC agency and an agency unit may report one to many fires.
3. Each fire will have a statistical cause and each statistical cause denote the cause of one to many fires.
4. Each fire will have an origin and owner of the land or property from where the fire originated, and each property may have one to many instances of fire.
5. Each fire is classified based on size and each fire class may represent one to many fires.
6. Each fire may or may not have an mtbs id and each mtbs id may denote zero to many fires.
7. Each fire may or may not have an incident number from the secondary ICS209 report and each report may denote zero to many fires.
8. Each fire may have a FIPS state/county code and zero to many fires may occur in each state or county.
9. Each NWCG reporting unit or source reporting unit may be located near a forest and hence therefore represents a forest.
10. Each forest may have one to many fires.

Reasons for 3NF:

1. To eliminate any undesirable data anomalies that may be present in the data.
2. To reduce the need for restructuring over time.
3. To make the data model more informative.
4. To make the data model neutral to different kinds of query.
5. To ensure referential integrity.
6. To make sure there are no transitive functional dependencies between any column in table which satisfies the condition of 3NF.

Entity-Relationship Diagram



Physical Database

Assumptions/Notes About Data Set

1. All records on fire data are contained in Fire Details table
2. All records on NWCG reporting agency are kept on NWCG table
3. NWGC agency and its individual units generates the fire report for the fires originating.
4. Fire report is generated by the source reporting unit indicating the source of the fire.
5. Owner table contains the data about primary owner or entity responsible for managing the land at the point of origin of the fire at the time of the incident.
6. Stat cause table contains the data about statistical cause of fire.
7. Fire size table contains the data about the size of the fire.
8. MTBS table contains the data about the burn severity of caused by the fire.
9. ICS table contains the fire id and fire number of the secondary ICS_209 fire report.
10. FIPS table contains data about the federal information process standards.

Screen shot of Physical Database objects

Fires Table:

The screenshot displays a database management interface with the 'fires' table selected. The table structure is shown on the left, and the query results are displayed in the main pane.

Table: fires

Columns:

- FID_ID (bigint(20))
- FPA_ID (text)
- LOCAL_FIRE_REPORT_ID (text)
- LOCAL_INCIDENT_ID (text)
- FIRE_CODE (text)
- FIRE_NAME (text)
- COMPLEX_NAME (text)
- FIRE_YEAR (bigint(20))
- DISCOVERY_DATE (double)
- DISCOVERY_DOY (double)
- DISCOVERY_TIME (double)
- CONT_DATE (double)
- CONT_DOY (double)
- CONT_TIME (double)
- LATITUDE (double)
- LONGITUDE (double)
- STATE (text)
- COUNTY (text)
- NWCG_REPORTING_UNIT_ID (text)
- SOURCE_REPORTING_UNIT (text)
- OWNER_CODE (bigint(20))
- STAT_CAUSE_CODE (bigint(20))
- FIPS_CODE (text)

Query Results:

```
1 select *
2 from fires
```

FID_ID	FPA_ID	LOCAL_FIRE_REPORT_ID	LOCAL_INCIDENT_ID	FIRE_CODE	FIRE_NAME	COMPLEX_NAME	FIRE_YEAR	DISCOVERY_DATE	DISCOVERY_DOY	DISCOVERY_TIME
1	FS-1418826	1	PNF-47	BJRK	FOUNTAIN	WALL	2005	2453403.5	133	1300
2	FS-1418827	13		AACD	PIGEON	WALL	2004	2453137.5	133	845
3	FS-1418835	27	021	A3SW	SLACK	WALL	2004	2453156.5	132	1021
4	FS-1418845	143	5	WALL	DEER	WALL	2004	2453184.5	130	1600
5	FS-1418847	44	7	WALL	STEVENOV	WALL	2004	2453184.5	130	1600
6	FS-1418849	54	8	WALL	HIDDEN	WALL	2004	2453186.5	132	1800
7	FS-1418851	58	9	WALL	FORK	WALL	2004	2453187.5	133	1800
8	FS-1418854	3	02	BRGX	SLATE	WALL	2005	2453437.5	137	1300
9	FS-1418856	5	03	BLPQ	SHASTA	WALL	2005	2453444.5	134	1200

Action Output:

Time	Action	Response	Duration / Fetch Time
19:17:47	select * from Owner	16 row(s) returned	0.00036 sec / 0.000...
19:17:59	select * from Source	7130 row(s) returned	0.00077 sec / 0.0053...
19:18:13	select * from Stat_cause	13 row(s) returned	0.00038 sec / 0.000...
19:18:58	select * from fires	1880465 row(s) returned	0.0014 sec / 7.857 sec

FIPS Table

The screenshot shows a database management interface for a local instance 3306. The left sidebar displays a tree view of schemas, with 'FIPS' selected under 'Tables'. The main query editor shows a SQL query: `select * from FIPS`. The 'Object Info' panel on the left lists the columns: `FIPS_CODE` (bigint(20)) and `FIPS_NAME` (text). The 'Result Grid' displays a list of rows with columns `FIPS_CODE` and `FIPS_NAME`. The 'Action Output' panel at the bottom shows the execution history, including a successful query execution for 'select * from FIPS'.

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

FIPS_CODE	FIPS_NAME
17	El Dorado
3	Alpine
5	Amador
27	Lincoln
17	Deschutes
21	Buncombe
113	Macon
27	Caldwell
11	Avery
9	Converse
69	Wheeler
37	Lake
53	Shenandoah
27	Grays Harbor
53	Lincoln
89	Sanders
49	Utah

Time	Action	Response	Duration / Fetch Time
18:49:01	DROP TABLE 'fpa_fod', 'Stat_cause'	0 row(s) affected	0.017 sec
18:50:08	DROP TABLE 'fpa_fod', 'fires'	0 row(s) affected	0.024 sec
19:01:56	select * from fires	1880465 row(s) returned	0.0015 sec / 7.918 sec
19:16:40	select * from FIPS	2695 row(s) returned	0.0012 sec / 0.00078...

Fire Size Table

The screenshot shows a database management interface for a local instance 3306. The left sidebar displays a tree view of schemas, with 'Fire_size' selected under 'Tables'. The main query editor shows a SQL query: `select * from Fire_size`. The 'Object Info' panel on the left lists the columns: `FIRE_SIZE` (double) and `FIRE_SIZE_CLASS` (text). The 'Result Grid' displays a list of rows with columns `FIRE_SIZE` and `FIRE_SIZE_CLASS`. The 'Action Output' panel at the bottom shows the execution history, including a successful query execution for 'select * from Fire_size'.

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

FIRE_SIZE	FIRE_SIZE_CLASS
0.8	B
1	B
8	B
0.2	A
16823	G
7700	G
2.5	B
10	C
8.2	B
0.6	B
50.3	C
125	D
25	C
3	B
9	B
0.5	B
0.3	B

Time	Action	Response	Duration / Fetch Time
18:50:08	DROP TABLE 'fpa_fod', 'fires'	0 row(s) affected	0.024 sec
19:01:56	select * from fires	1880465 row(s) returned	0.0015 sec / 7.918 sec
19:16:40	select * from FIPS	2695 row(s) returned	0.0012 sec / 0.00078...
19:16:56	select * from Fire_size	13637 row(s) returned	0.0017 sec / 0.0095 s...

ICS Table

The screenshot displays the SQL Server Enterprise Manager interface for a local instance 3306. The left pane shows the 'SCHEMAS' tree with 'Tables' expanded, listing various tables including 'FIPS', 'fires', 'Fire_size', 'ICS', 'MTBS', 'nwcg', and 'Owner'. The 'Table: Fire_size' is selected, showing its columns: 'FIRE_SIZE' (double) and 'FIRE_SIZE_CLASS' (text). The main pane shows a query window with the following SQL:

```
1 select *
2 from ICS
```

The 'Result Grid' displays the following data:

ICS_209_INCIDENT_NUMBER	ICS_209_NAME
NC-NCS-050201401	Austin Creek
CA-LFP-1353	CHIMNEAS
AZ-TNF-105	THREE FIRE COMPLEX
CA-SQF-1857	NINE
AZ-TNF-136	Oak
AZ-TNF-139	Greenback
AZ-TNF-140	SALOME
AZ-TNF-7	Two Bar
NM-SNF-027	Mesa Camino
LA-KIF-050004	Box
MT-CNF-010	SAWMILL GULCH
MT-KNF-075	CAMP 32
LA-KIF-050004	Left Taylor
LA-KIF-050012	Mothers Day
MT-CNF-1-045	PAGET
LA-KIF-	Coochie Brake
CA-SQF-2233	WISHON

The 'Action Output' pane shows the following results:

Time	Action	Response	Duration / Fetch Time
19:01:56	select * from fires	1880465 row(s) returned	0.0015 sec / 7.918 sec
19:16:40	select * from FIPS	2695 row(s) returned	0.0012 sec / 0.00078...
19:16:56	select * from Fire_size	13637 row(s) returned	0.0017 sec / 0.0095 s...
19:17:06	select * from ICS	23314 row(s) returned	0.00084 sec / 0.013...

Query Completed

MTBS Table

The screenshot displays the SQL Server Enterprise Manager interface for a local instance 3306. The left pane shows the 'SCHEMAS' tree with 'Tables' expanded, listing various tables including 'FIPS', 'fires', 'Fire_size', 'ICS', 'MTBS', 'nwcg', and 'Owner'. The 'Table: MTBS' is selected, showing its columns: 'MTBS_ID' (text) and 'MTBS_FIRE_NAME' (text). The main pane shows a query window with the following SQL:

```
1 select *
2 from MTBS
```

The 'Result Grid' displays the following data:

MTBS_ID	MTBS_FIRE_NAME
FS-0417-018-20050715	SUMMIT
AZ3372311127120050621	THREE FIRE COMPLEX (THREE)
FS-0417-023-20050721	SUNKARD 2
CA3568311842220050709	NINE
AZ3393311135020050716	OAK
AZ3355111105020050719	TWO BAR
MT4531510636420050404	SAWMILL GULCH
MT4885411516320050807	CAMP 32
CO370281026420050723	CARRIZO COMPLEX
NM3394710851120050529	FORK WU
MT4544510596120050822	ERICKSON SPRING
CO3816010503620050706	MASON
MO3764409188620050330	FREEMAN
OH158911863320050813	BURNY CABIN
SD4421510341420050706	RICCO
WY4434710418220050723	CEMENT
MO3662609111220050311	WOLF MTN

The 'Action Output' pane shows the following results:

Time	Action	Response	Duration / Fetch Time
19:16:40	select * from FIPS	2695 row(s) returned	0.0012 sec / 0.00078...
19:16:56	select * from Fire_size	13637 row(s) returned	0.0017 sec / 0.0095 s...
19:17:06	select * from ICS	23314 row(s) returned	0.00084 sec / 0.013...
19:17:19	select * from MTBS	10481 row(s) returned	0.00077 sec / 0.0064...

Query Completed

NWCG Table

Administration Schemas Query 1

Don't Limit

```
1 select *
2 from nwcg
```

100% 10:2

Result Grid Filter Rows: Search Export: Fetch rows:

OBJECTID	UnitId	GeographicArea	Gacc	WildlandRole	UnitType	Department	Agency	Parent	Country	State	Code	Name
3	USAKCFFX	AK	USAKACC	Incident Host Geographic	US County/Local	AK	C&L	HALL	US	AK	CFFX	City Fairbanks Fire Department
4	USAKCFMX	AK	USAKACC	Incident Host Geographic	US County/Local	AK	C&L	HALL	US	AK	CFMX	Central Mat-Su Fire Department
5	USAKCFGQ	AK	USAKACC	Incident Host Geographic	US Federal	DOO	USAF	HALL	US	AK	CFO	Clear Air Force Station
6	USAKCGF	AK	USAKACC	Incident Host Geographic	US Federal	USDA	FS	HALL	US	AK	CGF	Chugach National Forest
7	USAKCGFC	AK	USAKACC	Dispatch/Coordination Center	US Federal	USDA	FS	HALL	US	AK	CGFC	Chugach National Forest Dispat
8	USAKCGFX	AK	USAKACC	Incident Host Geographic	US County/Local	AK	C&L	HALL	US	AK	CGFX	Chena Goldstream Fire & Rescu
9	USAKCGKX	AK	USAKACC	Incident Host Geographic	US County/Local	AK	C&L	HALL	US	AK	CGKX	US Coast Guard - Kodiak
10	USAKCGMX	AK	USAKACC	Incident Host Geographic	US County/Local	AK	C&L	HALL	US	AK	CGMX	Chigik
11	USAKCRCX	AK	USAKACC	Incident Host Geographic	US County/Local	AK	C&L	HALL	US	AK	CRCX	Chistochina
12	USAKCHN	AK	USAKACC	Resource Provider Only	Non-Government	NG	ANC	HALL	US	AK	CHN	Chugach Regional Native Corp
13	USAKCIN	AK	USAKACC	Resource Provider Only	Non-Government	NG	ANC	HALL	US	AK	CIN	Cook Inlet Regional Native Corp
14	USAKCLKX	AK	USAKACC	Incident Host Geographic	US County/Local	AK	C&L	HALL	US	AK	CLKX	Cooper Landing Volunteer Fire
15	USAKCLMX	AK	USAKACC	Incident Host Geographic	US County/Local	AK	C&L	HALL	US	AK	CLMX	Caswell Lake Fire Department
16	USAKCNKX	AK	USAKACC	Incident Host Geographic	US County/Local	AK	C&L	HALL	US	AK	CNKX	Chitina Volunteer Fire Departme
17	USAKCNFX	AK	USAKACC	Incident Host Geographic	US County/Local	AK	C&L	HALL	US	AK	CNFX	Chitina Volunteer Fire Depart
18	USAKCOCX	AK	USAKACC	Incident Host Geographic	US County/Local	AK	C&L	HALL	US	AK	COCX	Cordova Volunteer Fire Departm
19	USAKCRCX	AK	USAKACC	Incident Host Geographic	US County/Local	AK	C&L	HALL	US	AK	CRCX	Crystal Creek Volunteer Fire De

nwgc 6

Action Output

Time	Action	Response	Duration / Fetch Time
16:44:35	select * from Fire_size	1880465 row(s) returned	0.0020 sec / 1.364 sec
16:44:52	select * from ICS	1880465 row(s) returned	0.0013 sec / 1.029 sec
16:45:10	select * from MTBS	10481 row(s) returned	0.0025 sec / 0.0085...
16:45:22	select * from nwgc	5867 row(s) returned	0.00073 sec / 0.0089...

Owner Table

Local Instance 3306

Administration Schemas Query 1

Don't Limit

```
1 select *
2 from Owner
```

100% 11:2

Result Grid Filter Rows: Search Export: Fetch rows:

OWNER_CODE	OWNER_DESCR
5	USFS
13	STATE OR PRIVATE
14	MISSING/NOT SPECIFIED
6	OTHER FEDERAL
2	BIA
4	FWS
9	TRIBAL
8	PRIVATE
7	STATE
1	BLM
3	NPS
10	BOR
0	FOREIGN
12	MUNICIPAL/LOCAL
11	COUNTY
15	UNDEFINED FEDERAL

Owner 19

Action Output

Time	Action	Response	Duration / Fetch Time
19:17:06	select * from ICS	23314 row(s) returned	0.00084 sec / 0.013...
19:17:19	select * from MTBS	10481 row(s) returned	0.00077 sec / 0.0084...
19:17:35	select * from nwgc	5867 row(s) returned	0.00073 sec / 0.0088...
19:17:47	select * from Owner	16 row(s) returned	0.00036 sec / 0.000...

Query Completed

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

Source Table

Local instance 3306

Administration Schemas Query 1

SCHEMAS

Filter objects

- nwgc
- Owner
- Source
- Stat_cause
- Views
- Stored Procedures
- Functions
- RecipesExample

Object Info Session

Table: Source

Columns:

- SOURCE_REPORTING_UNIT
- SOURCE_REPORTING_UNIT_NAME
- SOURCE_SYSTEM_TYPE
- SOURCE_SYSTEM

Result Grid

SOURCE_REPORTING_UNIT	SOURCE_REPORTING_UNIT_NAME	SOURCE_SYSTEM_TYPE	SOURCE_SYSTEM
0514	Shasta-Trinity National Forest	FED	FS-FIRESTAT
0306	Lincoln National Forest	FED	FS-FIRESTAT
0501	Deschutes National Forest	FED	FS-FIRESTAT
0811	National Forests in North Carolina	FED	FS-FIRESTAT
0206	Medicine Bow-Rout National Forest	FED	FS-FIRESTAT
0614	Umatilla National Forest	FED	FS-FIRESTAT
0212	Pike San Isabel National Forest	FED	FS-FIRESTAT
0507	Ochoco National Forest	FED	FS-FIRESTAT
0602	Fremont-Winema National Forest	FED	FS-FIRESTAT
0202	Bighorn National Forest	FED	FS-FIRESTAT
0114	Kootenai National Forest	FED	FS-FIRESTAT
0418	Uinta National Forest	FED	FS-FIRESTAT
0307	Kaliab National Forest	FED	FS-FIRESTAT
0510	Six Rivers National Forest	FED	FS-FIRESTAT
0305	Coronado National Forest	FED	FS-FIRESTAT
0501	Angeles National Forest	FED	FS-FIRESTAT
0203	Black Hills National Forest	FED	FS-FIRESTAT

Source 20

Action Output

Time	Action	Response	Duration / Fetch Time
19:17:19	select * from MTBS	10481 row(s) returned	0.00077 sec / 0.0064...
19:17:35	select * from nwgc	5867 row(s) returned	0.00073 sec / 0.0088...
19:17:47	select * from Owner	16 row(s) returned	0.00036 sec / 0.000...
19:17:59	select * from Source	7130 row(s) returned	0.00077 sec / 0.0053...

Query Completed

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

Stat_Cause Table

Local instance 3306

Administration Schemas Query 1

SCHEMAS

Filter objects

- nwgc
- Owner
- Source
- Stat_cause
- Views
- Stored Procedures
- Functions
- RecipesExample

Object Info Session

Table: Source

Columns:

- SOURCE_REPORTING_UNIT
- SOURCE_REPORTING_UNIT_NAME
- SOURCE_SYSTEM_TYPE
- SOURCE_SYSTEM

Result Grid

STAT_CAUSE_CODE	STAT_CAUSE_DESCR
9	Miscellaneous
1	Lightning
5	Debris Burning
4	Campfire
2	Equipment Use
7	Anson
8	Children
6	Railroad
3	Smoking
11	Powerline
12	Structure
10	Fireworks
13	Missing/Undefined

Stat_cause 21

Action Output

Time	Action	Response	Duration / Fetch Time
19:17:19	select * from MTBS	10481 row(s) returned	0.00077 sec / 0.0064...
19:17:35	select * from nwgc	5867 row(s) returned	0.00073 sec / 0.0088...
19:17:47	select * from Owner	16 row(s) returned	0.00036 sec / 0.000...
19:17:59	select * from Source	7130 row(s) returned	0.00077 sec / 0.0053...
19:18:13	select * from Stat_cause	13 row(s) returned	0.00038 sec / 0.000...

Query Completed

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

Data in the Database

Table Name	Primary Key	Foreign Key	# of Rows in Table
FireDetails	<ul style="list-style-type: none"> FOD_INT FPA_ID 	<ul style="list-style-type: none"> NWCG_REPORTING_UNIT_ID SOURCE_REPORTING_UNIT OWNER_CODE STAT_CAUSE_CODE FIPS_CODE FIRE_SIZE_CLASS ICS_209_INCIDENT_NUMBER MTBS_ID 	1880465
NWCG Table	UnitId		5867
Source	SOURCE_REPORTING_UNIT		7130
Owner	OWNER_CODE		16
Stat_Cause	STAT_CAUSE_CODE		13
Fire_Size	FIRE_SIZE_CLASS		13637
MTBS	MTBS_ID		10481
FIPS	FIPS_CODE		2695
ICS_209	ICS_209_INCIDENT_NUMBER		23314

SQL Queries

Query 1

Question 1:

A leading beverage company has announced a billion-dollar fund for removing debris from forests, rivers and mountains in the US. All states are interested. Which state has the least chance to win a share of the fund?

Assumptions

The state with fires caused by debris burning is the least, will have the least chance of winning the fund.

Translation

Select the state where the cause of fire due to Debris Burning is the least

Cleanup

Select STATE, COUNT (*) from fires table inner join Stat_cause where STAT_CAUSE_DESCR = 'Debris Burning' GROUP BY STATE ORDER BY FIRE_BY_DEBRIS

Screen Shot of SQL Query and Results

The screenshot shows the SQL Developer interface. The query editor contains the following SQL query:

```
1 SELECT f.STATE
2 FROM fires f inner join Stat_cause sc
3 WHERE sc.STAT_CAUSE_DESCR = 'Debris Burning'
4 GROUP BY f.STATE
5 ORDER BY count(*)
6 LIMIT 1;
```

The left sidebar shows the 'SCHEMAS' tree with the 'Stat_cause' table selected. The 'Columns' pane for 'Stat_cause' shows 'STAT_CAUSE_CODE' (bigint(20)) and 'STAT_CAUSE_DESCR' (text). The 'Result Grid' shows the following result:

STATE
DC

The 'Action Output' pane shows the following information:

Time	Action	Response	Duration / Fetch Time
18:37:43	SELECT f.STATE FROM fires f inner join Stat_cause sc WHERE sc.STAT_CAUSE_DESCR = 'Debris...	1 row(s) returned	1.966 sec / 0.000008...

The status bar at the bottom indicates 'Query Completed'.

Result

DC state has the least chance of fire caused by Debris Burning, and hence has the least chance of winning the fund. (Rows returned:1)

Query 2

Question 2:

One of the reporting agencies has suggested that children be banned from its forests unless there is one adult for every 3 children in a group visiting a forest. Name 3 forests where this would be the least appropriate.

Assumptions

In forests where children are the likely cause of fire, the forest with least number of fires is safer for children to be accompanied by an adult, and hence considered least appropriate. We have considered the Source_reporting_unit_name as the forest name (agencies, wildlife refuge etc) in our dataset.

Translation

Select the forest (SOURCE_REPORTING_UNIT_NAME) where the ban for children to be accompanied with the adults is least appropriate

Cleanup

Select three SOURCE_REPORTING_UNIT_NAME (forest names) where STAT_CAUSE_DESCR = 'Children' and count of fires are least.

Screen Shot of SQL Query and Results

The screenshot displays the SQL Developer interface. The query editor at the top contains the following SQL code:

```
1 select s.SOURCE_REPORTING_UNIT_NAME as forest_name, count(*) as count_of_fires
2 from fires as f
3 left join Stat_cause as sc on f.STAT_CAUSE_CODE = sc.STAT_CAUSE_CODE
4 left join Source as s on f.SOURCE_REPORTING_UNIT = s.SOURCE_REPORTING_UNIT
5 where sc.STAT_CAUSE_DESCR = 'Children'
6 group by s.SOURCE_REPORTING_UNIT_NAME
7 order by count_of_fires asc
8 limit 3;
9
```

Below the query editor, the 'Result Grid' shows the results of the query:

forest_name	count_of_fires
Salmon-Challis National Forest	1
Hoodier National Forest	1
Lewistown District	1

The 'Action Output' pane at the bottom shows the execution details of the query, including the time taken and the number of rows returned.

Time	Action	Response	Duration / Fetch Time
20:49:52	select s.SOURCE_REPORTING_UNIT_NAME as forest_name, count(*) as count_of_fires from fr...	2109 row(s) returned	80.779 sec / 0.0046...
20:53:03	select * from Stat_cause	13 row(s) returned	0.00036 sec / 0.000...
20:53:57	select * from Stat_cau select * from Source	Error Code: 1064. You have an error in your SQL synta...	0.00028 sec
20:54:08	select * from Source	7130 row(s) returned	0.0011 sec / 0.0086 s...
20:54:25	select count(*) from Source	1 row(s) returned	0.0048 sec / 0.00001...
20:54:53	select count(SOURCE_REPORTING_UNIT_NAME) from Source	1 row(s) returned	0.0031 sec / 0.00001...
20:55:08	select count(SOURCE_REPORTING_UNIT) from Source	1 row(s) returned	0.0031 sec / 0.00001...
20:55:39	select s.SOURCE_REPORTING_UNIT_NAME as forest_name, count(*) as count_of_fires from fr...	3 row(s) returned	62.504 sec / 0.0000...

Result

Rows returned are 3. These are the three forests in which the ban is least appropriate.

Query 3

Question 3:

One advocacy group says human actions and not Nature is to blame for most wildfires. Write a query that supports this statement

Assumptions

Natural causes of fire ('Lightning', 'Structure') and Human Causes ('Debris Burning', 'Campfire', 'Equipment Use', 'Arson', 'Children', 'Railroad', 'Smoking', 'Powerline', 'Fireworks')

Translation

Select different causes with respective fire counts

Cleanup

Select count (*), STAT_CAUSE_DESCR from fires table inner join Stat_cause where STAT_CAUSE_DESCR = ('Lightning', 'Structure')

Union

Select count (*), STAT_CAUSE_DESCR from fires table inner join Stat_cause where STAT_CAUSE_DESCR = ('Debris Burning', 'Campfire', 'Equipment Use', 'Arson', 'Children', 'Railroad', 'Smoking', 'Powerline', 'Fireworks')

Screen Shot of SQL Query and Results

The screenshot displays the SQL Developer interface. The query editor contains a SQL query that uses a UNION to combine results from two different cause categories. The first part of the query selects 'Nature' causes (Lightning and Structure) and the second part selects 'Man-made' causes (Debris Burning, Campfire, Equipment Use, Arson, Children, Railroad, Smoking, Powerline, and Fireworks). The results are shown in a grid with two columns: Cause and count_of_Fires.

```
1 select 'Nature' as Cause, SUM(total_fire) AS count_of_Fires
2 from (select count(*) as total_fire, sc.STAT_CAUSE_DESCR
3 from fires f inner join Stat_cause sc
4 on f.STAT_CAUSE_CODE = sc.STAT_CAUSE_CODE
5 where sc.STAT_CAUSE_DESCR in ('Lightning', 'Structure')
6 group by sc.STAT_CAUSE_DESCR
7 order by total_fire Desc) SRC
8
9 UNION
10
11 select 'Man-made', SUM(total_fire)
12 FROM
13 (SELECT COUNT(*) AS total_fire, sc.STAT_CAUSE_DESCR
14 from fires f inner join Stat_cause sc
15 on f.STAT_CAUSE_CODE = sc.STAT_CAUSE_CODE
16 where sc.STAT_CAUSE_DESCR in ('Debris Burning', 'Campfire', 'Equipment Use', 'Arson', 'Children', 'Railroad', 'Smoking', 'Powerline', 'Fireworks')
17 group by sc.STAT_CAUSE_DESCR
18 order by total_fire Desc) SRC;
```

Cause	count_of_Fires
Nature	282284
Man-made	1107673

The Action Output pane at the bottom shows the execution details: the query was executed at 20:18:43, returned 2 rows, and took 4.011 seconds to execute.

Result

Rows returned are 2. Results show that, the human actions are to be blamed for most wildfires (11,87,673)

Query 4

Question 6:

What were the forests that had no fires that lasted more than two days?

Assumptions

We have considered the Source_reporting_unit_name (agencies, wildlife refuge etc) as the forest name in our dataset.

Translation

Select the forests where the fire was discovered and controlled in no more than 2 days

Cleanup

Select SOURCE_REPORTING_UNIT_NAME from source table inner join fire where (CONT_DOY - DISCOVERY_DOY) <=2

Screen Shot of SQL Query and Results

The screenshot shows a SQL IDE interface with a query editor, a schema browser, and a results grid. The query editor contains the following SQL code:

```
1 select distinct sc.SOURCE_REPORTING_UNIT_NAME
2 from Source sc inner join fires f
3 on sc.SOURCE_REPORTING_UNIT = f.SOURCE_REPORTING_UNIT
4 where (f.CONT_DOY - f.DISCOVERY_DOY) <=2
5 order by sc.SOURCE_REPORTING_UNIT_NAME
```

The results grid displays a list of forest names under the column header SOURCE_REPORTING_UNIT_NAME. The list includes:

- Acadia National Park
- Ace Basin National Wildlife Refuge
- AFC Bay Minette
- AFC Birmingham
- AFC Brewton
- AFC Dadeville
- AFC East Central Region
- AFC Florence
- AFC Huntsville
- AFC Montgomery
- AFC Northeastern Region
- AFC Northern Region
- AFC Northwestern Region
- AFC Ozark
- AFC Selma
- AFC Southeastern Region
- AFC Southwestern Region
- AFC Tuscaloosa

The action output section shows the following results:

Time	Action	Response	Duration / Fetch Time
21:32:32	select distinct sc.SOURCE_REPORTING_UNIT_NAME from Source sc inner join fires f on sc.S...	Error Code: 1054, Unknown column 'f.SOURCE_REPO...	0.0012 sec
21:32:45	select distinct sc.SOURCE_REPORTING_UNIT_NAME from Source sc inner join fires f on sc.S...	1694 row(s) returned	656.111 sec / 0.0007...

Result

Rows returned are 1694. The returned rows have the forest names in which the fire was discovered and contained within two days.

Query 5

Question 4:

What are the bottom two unit types that reported wildfires in each county in the US?

Assumptions

We have considered the Source_reporting_unit_name as the forest name in our dataset.

Translation

Select the bottom 2 underperforming unit types which reported the least number of fires in each county in US

Cleanup

Select UnitType, Count, County from fires join nwcg where county = US and order by count.

Screen Shot of SQL Query and Results

The screenshot displays the SQL Server Enterprise Manager interface. The left pane shows the 'SCHEMAS' tree with 'fpa_fod' selected. The central pane shows the following SQL query:

```
1 select n.UnitType, count(*) as count_of_fires, f.COUNTY
2 from fires as f join nwcg as n on f.NWCG_REPORTING_UNIT_ID = n.UnitId
3 where n.Country = 'US' group by f.COUNTY, n.UnitType
4 order by count_of_fires asc limit 2;
```

The right pane shows the 'Result Grid' with the following data:

UnitType	count_of_fires	COUNTY
US State	1	Douglas C
US County/Local	1	Benton

Below the result grid, the 'Action Output' pane shows the query execution details:

Time	Action	Response	Duration / Fetch Time
12:23:16	select n.UnitType, count(*) as count_of_fires, f.COUNTY from fires as f join nwcg as n on f.NWCG_REPORTING_UNIT_ID = n.UnitId where n.Country = 'US' group by f.COUNTY, n.UnitType order by count_of_fires asc limit 2;	2 row(s) returned	1497.996 sec / 0.000...

The status bar at the bottom indicates 'Query Completed'.

Result

Rows returned are 2. These are the most underperforming unit types.

Query 6

Question 8:

Which forest had the least number of fires?

Assumptions

We have considered the Source_reporting_unit_name (agencies, wildlife refuge etc) as the forest name in our dataset.

Translation

Select the forest which has least number of fires.

Cleanup

```
SELECT COUNT(FOD-ID), SOURCE_REPORTING_UNIT_NAME from fires tables group by SOURCE_REPORTING_UNIT_NAME
```

Screen Shot of SQL Query and Results

The screenshot shows a SQL IDE interface with a query editor and a results grid. The query is as follows:

```
1 SELECT COUNT(*) AS TOTAL_FIRES, sc.SOURCE_REPORTING_UNIT_NAME
2 FROM fires f inner join Source sc
3 on f.SOURCE_REPORTING_UNIT = sc.SOURCE_REPORTING_UNIT
4 where sc.SOURCE_REPORTING_UNIT_NAME LIKE '%Forest%'
5 group by sc.SOURCE_REPORTING_UNIT_NAME
6 order by TOTAL_FIRES
7 LIMIT 4
```

The results grid displays the following data:

TOTAL_FIRES	SOURCE_REPORTING_UNIT_NAME
1	Black Forest Fire Rescue Protection District
1	OAHU FOREST NWR
1	Wyoming State Forestry (CPC Area)
1	Oregon Department of Forestry State Headquar...

The bottom of the screenshot shows the 'Action Output' tab with the following information:

Time	Action	Response	Duration / Fetch Time
19:08:22	SELECT COUNT(*) AS TOTAL_FIRES, sc.SOURCE_REPORTING_UNIT_NAME FROM fires f inner...	4 row(s) returned	108.614 sec / 0.0000...

Result

Rows returned are 4. These are the forests with least number of fires.

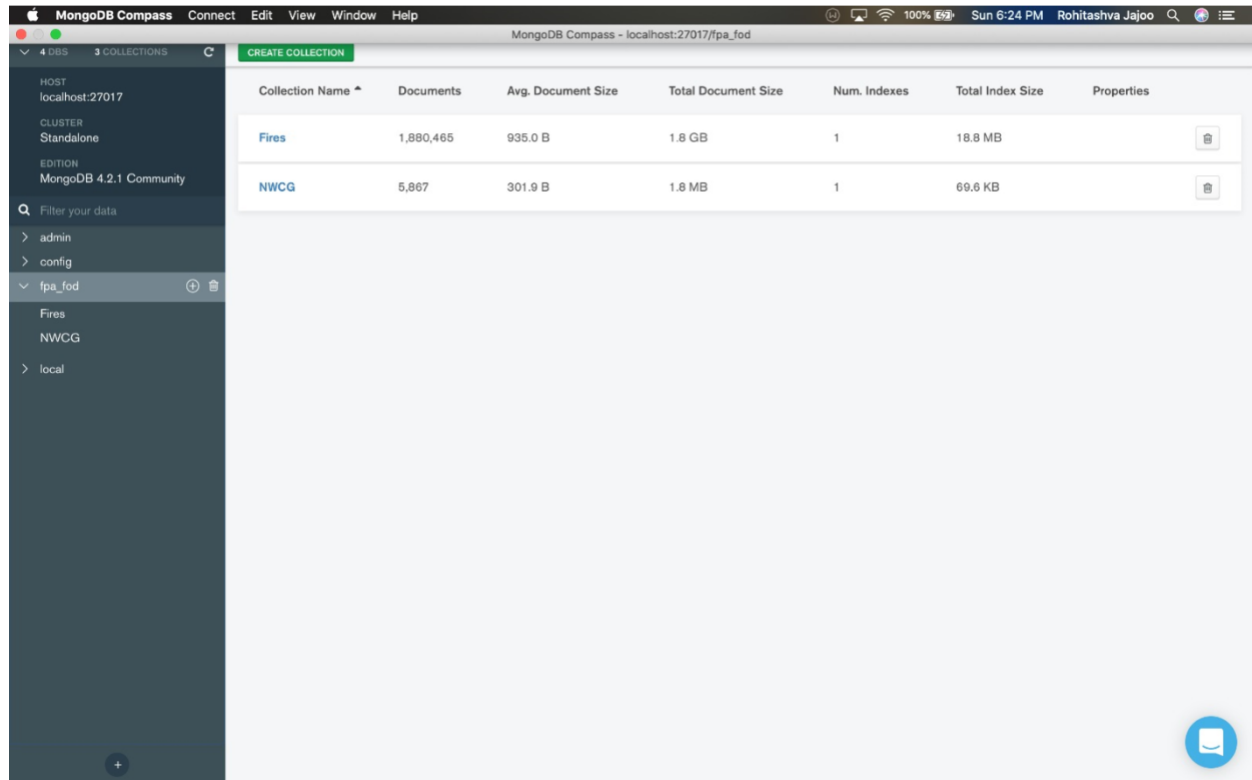
Data Review for MongoDB

Physical Mongo Database



Assumptions/Notes About Data Set

1. All records on fire details are contained in fires document.
2. All records on NWCG reporting agency are kept on NWCG document

Screen shot of Physical Database objects (Database, Collections and Attributes)



The screenshot shows the MongoDB Compass interface. On the left sidebar, the database 'fpa_fod' is selected, showing collections 'Fires' and 'NWCG'. The main panel displays a table of database objects with the following data:

Collection Name ^	Documents	Avg. Document Size	Total Document Size	Num. Indexes	Total Index Size	Properties
Fires	1,880,465	935.0 B	1.8 GB	1	18.8 MB	
NWCG	5,867	301.9 B	1.8 MB	1	69.6 KB	

Fires Document

My Cluster

4 DBS 3 COLLECTIONS

HOST localhost:27017

CLUSTER Standalone

EDITION MongoDB 4.2.1 Community

Filter your data

- admin
- config
- fpa_fod
 - Fires
 - NWCG
 - local

fpa_fod.Fires

DOCUMENTS 1.9m TOTAL SIZE 1.6GB AVG. SIZE 935B INDEXES 2 TOTAL SIZE 26.4MB AVG. SIZE 13.2MB

Documents Aggregations Schema Explain Plan Indexes Validation

0 FILTER

INSERT DOCUMENT VIEW LIST TABLE

Displaying documents 1 - 20 of 1880465

```
{ "_id": ObjectId("5ded84e79ad9cd5fd5ab4d3d"), "OBJECTID": 3, "FID": 3, "FPA_ID": "FS-1418835", "SOURCE_SYSTEM_TYPE": "FED", "SOURCE_SYSTEM": "FS-FIRESTAT", "NWCG_REPORTING_AGENCY": "FS", "NWCG_REPORTING_UNIT_ID": "USCAENF", "NWCG_REPORTING_UNIT_NAME": "Eldorado National Forest", "SOURCE_REPORTING_UNIT": 583, "SOURCE_REPORTING_UNIT_NAME": "Eldorado National Forest", "LOCAL_FIRE_REPORT_ID": 27, "LOCAL_INCIDENT_ID": 21, "FIRE_CODE": "A32W", "FIRE_NAME": "SLACK", "ICS_209_INCIDENT_NUMBER": "", "ICS_209_NAME": "", "MTBS_ID": "", "MTBS_FIRE_NAME": "", "COMPLEX_NAME": "", "FIRE_YEAR": 2004, "DISCOVERY_DATE": 2453156.5, "DISCOVERY_DAY": 152, "DISCOVERY_TIME": 1921, "STAT_CAUSE_CODE": 5 }
```

SHOW 15 MORE FIELDS

```
{ "_id": ObjectId("5ded84e79ad9cd5fd5ab4d3e"), "OBJECTID": 2, "FID": 2, "FPA_ID": "FS-1418827", "SOURCE_SYSTEM_TYPE": "FED", "SOURCE_SYSTEM": "FS-FIRESTAT", "NWCG_REPORTING_AGENCY": "FS", "NWCG_REPORTING_UNIT_ID": "USCAENF", "NWCG_REPORTING_UNIT_NAME": "Eldorado National Forest", "SOURCE_REPORTING_UNIT": 583, "SOURCE_REPORTING_UNIT_NAME": "Eldorado National Forest", "LOCAL_FIRE_REPORT_ID": 13, "LOCAL_INCIDENT_ID": 13, "FIRE_CODE": "AACB", "FIRE_NAME": "HATFIELD" }
```

NWCG Document

My Cluster

4 DBS 3 COLLECTIONS

HOST localhost:27017

CLUSTER Standalone

EDITION MongoDB 4.2.1 Community

Filter your data

- admin
- config
- fpa_fod
 - Fires
 - NWCG
 - local

fpa_fod.NWCG

DOCUMENTS 5.9k TOTAL SIZE 1.7MB AVG. SIZE 302B INDEXES 1 TOTAL SIZE 68.0KB AVG. SIZE 68.0KB

Documents Aggregations Schema Explain Plan Indexes Validation

0 FILTER

INSERT DOCUMENT VIEW LIST TABLE

Displaying documents 1 - 20 of 5867

```
{ "_id": ObjectId("5ded855811f231276dc7f7ef"), "OBJECTID": 2, "UnitId": "USAKCEXX", "GeographicArea": "AK", "Gacc": "USAKACC", "WildlandRole": "Incident Host Geographic", "UnitType": "US County/Local", "Department": "AK", "Agency": "CSL", "Parent": "", "Country": "US", "State": "AK", "Code": "CEXX", "Name": "Central Emergency Services" }
```

```
{ "_id": ObjectId("5ded855811f231276dc7f7f0"), "OBJECTID": 1, "UnitId": "USAKCAN", "GeographicArea": "AK", "Gacc": "USAKACC", "WildlandRole": "Resource Provider Only", "UnitType": "Non-Government", "Department": "NG", "Agency": "AKC", "Parent": "", "Country": "US", "State": "AK", "Code": "CAN", "Name": "Calista Regional Native Corporation" }
```

```
{ "_id": ObjectId("5ded855811f231276dc7f7f1"), "OBJECTID": 3, "UnitId": "USAKCFX", "GeographicArea": "AK", "Gacc": "USAKACC", "WildlandRole": "Incident Host Geographic", "UnitType": "US County/Local", "Department": "AK", "Agency": "CSL", "Parent": "", "Country": "US" }
```

Data in the Database

Collection Name	Relationships With Other Collections (if any)	# of Documents in Collection
Fires		1880465
NWCG		5867

MongoDB Queries/Code

Query 1

Question 1:

A leading beverage company has announced a billion-dollar fund for removing debris from forests, rivers and mountains in the US. All states are interested. Which state has the least chance to win a share of the fund?

Assumptions

The state with fires caused by debris burning is the least, will have the least chance of winning the fund.

Translation

Select the state where the cause of fire due to Debris Burning is the least

Cleanup

Match stat_cause_descr with 'debris burning' and group by state, sort by ascending order, limit to 1.

Screen Shot of MongoDB Query/Code and Results

```
Last login: Sun Dec 8 18:33:02 on ttys000

The default interactive shell is now zsh.
To update your account to use zsh, please run 'chsh -s /bin/zsh'.
For more details, please visit https://support.apple.com/kb/HT208050.
(base) Rohitashvas-MacBook-Pro:~ sumit$ mongo
MongoDB shell version v4.2.1
connecting to: mongodb://127.0.0.1:27017/?compressors=disabled&gssapiServiceName=mongodb
Implicit session: session { "id" : UUID("bbc83acb-4aec-459c-a484-94662189ae78") }
MongoDB server version: 4.2.1
Server has startup warnings:
2019-12-08T17:08:45.346-0600 I CONTROL [initandlisten]
2019-12-08T17:08:45.346-0600 I CONTROL [initandlisten] ** WARNING: Access control is not enabled for the database.
2019-12-08T17:08:45.346-0600 I CONTROL [initandlisten] **           Read and write access to data and configuration is unrestricted.
2019-12-08T17:08:45.346-0600 I CONTROL [initandlisten]
---
Enable MongoDB's free cloud-based monitoring service, which will then receive and display
metrics about your deployment (disk utilization, CPU, operation statistics, etc).

The monitoring data will be available on a MongoDB website with a unique URL accessible to you
and anyone you share the URL with. MongoDB may use this information to make product
improvements and to suggest MongoDB products and deployment options to you.

To enable free monitoring, run the following command: db.enableFreeMonitoring()
To permanently disable this reminder, run the following command: db.disableFreeMonitoring()
---

> use fpa_fod
switched to db fpa_fod
> db.fires.aggregate({ $match : { STAT_CAUSE_DESCR: "Debris Burning" } },{$group: { _id:"$STATE", count:{$sum:1}}},{ $sort: {count:1}},{ $limit:1},{ $project: { _id:1}};
{ "_id" : "DC" }
>
```

Result

DC state has the least chance of fire caused by Debris Burning, and hence has the least chance of winning the fund.

Query 2

Question 2:

One of the reporting agencies has suggested that children be banned from its forests unless there is one adult for every 3 children in a group visiting a forest. Name 3 forests where this would be the least appropriate.

Assumptions

In forests where children are the likely cause of fire, the forest with least number of fires is safer for children to be accompanied by an adult, and hence considered least appropriate. We have considered the Source_reporting_unit_name as the forest name in our dataset.

Translation

In forests where children are the likely cause of fire, the forest with least number of fires is safer for children to be accompanied by an adult, and hence considered least appropriate. We have considered the Source_reporting_unit_name as the forest name in our dataset.

Cleanup

Match STAT_CAUSE_DESCR = 'Children', group by Source_reporting_unit_name and display first 3 forest names.

Screen Shot of MongoDB Query/Code and Results

```
Last login: Sun Dec 8 21:06:40 on tty000

The default interactive shell is now zsh.
To update your account to use zsh, please run 'chsh -s /bin/zsh'.
For more details, please visit https://support.apple.com/kb/MT208050.
(base) Rohitashvas-MacBook-Pro:~ sumitjajoo$ mongo
MongoDB shell version v4.2.1
connecting to: mongodb://127.0.0.1:27017/?compressors=disabled&gssapiServiceName=mongodb
Implicit session: session { "id" : UUID("c8b825b6-4a91-48b5-a9c5-fc3f7e0a6664") }
MongoDB server version: 4.2.1
Server has startup warnings:
2019-12-08T17:08:45.346-0600 I CONTROL [initandlisten]
2019-12-08T17:08:45.346-0600 I CONTROL [initandlisten] ** WARNING: Access control is not enabled for the database.
2019-12-08T17:08:45.346-0600 I CONTROL [initandlisten] ** Read and write access to data and configuration is unrestricted.
2019-12-08T17:08:45.346-0600 I CONTROL [initandlisten]
---
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To enable free monitoring, run the following command: db.enableFreeMonitoring()
To permanently disable this reminder, run the following command: db.disableFreeMonitoring()
---
> use fpa_fod
switched to db fpa_fod
> db.fires.aggregate({ $match : { STAT_CAUSE_DESCR: "Children" } },{$group: { '_id':'$SOURCE_REPORTING_UNIT_NAME', count:{$sum:1}}},{ $sort:{$SOURCE_REPORTING_UNIT_NAME:1, count:1}},{$limit:3});
{ "_id" : "Quitman", "count" : 1 }
{ "_id" : "Pueblo County", "count" : 1 }
{ "_id" : "OPERATIONS SALEM", "count" : 1 }
>
```

Result

These are the three forests in which the ban is least appropriate.

Query 3

Question 3:

One advocacy group says human actions and not Nature is to blame for most wildfires. Write a query that supports this statement.

Assumptions

Natural causes of fire ('Lightning', 'Structure') and Human Causes ('Debris Burning', 'Campfire', 'Equipment Use', 'Arson', 'Children', 'Railroad', 'Smoking', 'Powerline', 'Fireworks')

Translation

Select different causes with respective fire counts

Cleanup

Match stat_cause_descr with lighting or structure as natural cause of fire, default cause of fire as human and count no of fires.

Screen Shot of MongoDB Query/Code and Results

```
Last login: Sun Dec 8 19:48:09 on ttys000

The default interactive shell is now zsh.
To update your account to use zsh, please run 'chsh -s /bin/zsh'.
For more details, please visit https://support.apple.com/kb/HT208050.
(base) Rohitashvas-MacBook-Pro:~ sumit$ mongo
MongoDB shell version v4.2.1
Implicit session: session { "id" : UUID("9474852a-65e8-4b9a-9a0a-115bc32a1663") }
MongoDB server version: 4.2.1
Server has startup warnings:
2019-12-08T17:08:45.346-0800 I CONTROL [initandlisten]
2019-12-08T17:08:45.346-0800 I CONTROL [initandlisten] ** WARNING: Access control is not enabled for the database.
2019-12-08T17:08:45.346-0800 I CONTROL [initandlisten] **           Read and write access to data and configuration is unrestricted.
2019-12-08T17:08:45.346-0800 I CONTROL [initandlisten]
---
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The monitoring data will be available on a MongoDB website with a unique URL accessible to you
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improvements and to suggest MongoDB products and deployment options to you.

To enable free monitoring, run the following command: db.enableFreeMonitoring()
To permanently disable this reminder, run the following command: db.disableFreeMonitoring()
---

> use fpa_fod
switched to db fpa_fod
> db.fires.aggregate([
...   {$match:{$STAT_CAUSE_DESCR:{$in:["Miscellaneous","Missing/Undefined"]}}},
...   {$project:
...     {$STAT_CAUSE_DESCR : 1,
...     "summary" :
...       {$switch:
...         {branches: [
...           {case: { $eq : [ '$STAT_CAUSE_DESCR', 'Lightning' ]}, then: "Nature" },
...           {case: { $eq : [ '$STAT_CAUSE_DESCR', 'Structure' ]}, then: "Nature" }
...         ]},
...         default: "Human"
...       }
...     }
...   }
...   {$group:{_id:"$summary",count:{$sum:1}}}
... ])
{ "_id" : "Human", "count" : 1107673 }
{ "_id" : "Nature", "count" : 282264 }
> |
```

Result

Results show that, the human actions are to be blamed for most wildfires (11,87,673)

Query 4

Question 4:

What are the bottom two unit types that reported wildfires in each county in the US?

Assumptions

We have considered the Source_reporting_unit_name(agency, wildlife refuge etc) as the forest name in our dataset.

Translation

Select the bottom 2 underperforming unit types which reported the least number of fires in each county in US

Cleanup

Project the Source_system_type, count the fires, sort by ascending, display the 1st two

Screen Shot of MongoDB Query/Code and Results

```
Last login: Sun Dec 8 17:37:10 on tty000
mo
The default interactive shell is now zsh.
To update your account to use zsh, please run 'chsh -s /bin/zsh'.
For more details, please visit https://support.apple.com/kb/MT288090.
(base) Rohitashvas-MacBook-Pro:~ sumitjao$ mongo
MongoDB shell version v4.2.1
connecting to: mongodb://127.0.0.1:27017/?compressors=disabled&gssapiServiceName=mongodb
Implicit session: session { "id" : "3cd0c3e7-d7ca-4d2a-8c6f-4c6cfc894e6f" }
MongoDB server version: 4.2.1
Server has startup warnings:
2019-12-08T17:08:45.346-0600 I CONTROL [initandlisten]
2019-12-08T17:08:45.346-0600 I CONTROL [initandlisten] ** WARNING: Access control is not enabled for the database.
2019-12-08T17:08:45.346-0600 I CONTROL [initandlisten] **           Read and write access to data and configuration is unrestricted.
2019-12-08T17:08:45.346-0600 I CONTROL [initandlisten]
---
Enable MongoDB's free cloud-based monitoring service, which will then receive and display
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The monitoring data will be available on a MongoDB website with a unique URL accessible to you
and anyone you share the URL with. MongoDB may use this information to make product
improvements and to suggest MongoDB products and deployment options to you.

To enable free monitoring, run the following command: db.enableFreeMonitoring()
To permanently disable this reminder, run the following command: db.disableFreeMonitoring()
---
> use fpa_fod
switched to db fpa_fod
> db.fires.aggregate($group: {_id: "$SOURCE_SYSTEM_TYPE", count: {$sum: 1}}), {$sort: {count: 1}}, {$limit: 2}, {$project: {_id: 1}};
{ "_id" : "INTERAGENCY" }
{ "_id" : "FED" }
> |
```

Result

These are the most underperforming unit types.

Query 5

Question 5:

How many wildfires were not reported by more than one unit/agency?

Assumptions

We have considered the Source_reporting_unit_name (agencies, wildlife refuge etc) as the forest name in our dataset.

Translation

Select the fires names that were not reported by any source_reporting_unit/agency

Cleanup

Project fire name, where the fire was not reported by any of the source_reporting_unit/agency

Screen Shot of MongoDB Query/Code and Results

```
Last login: Sun Dec 8 21:58:52 on tty000

The default interactive shell is now zsh.
To update your account to use zsh, please run 'chsh -s /bin/zsh'.
For more details, please visit https://support.apple.com/kb/HT208050.
(base) Rohitash@MacBook-Pro:~$ sumit@ajodh mongo
MongoDB shell version v4.2.1
connecting to: mongodb://127.0.0.1:27017/?compressors=disabled&gssapiServiceName=mongodb
Implicit session: session { "id" : "3a1fc645-c31f-473b-a533-2235b8a67f92" }
MongoDB server version: 4.2.1
Server has startup warnings:
2019-12-08T17:08:45.346-0600 I CONTROL [initandlisten]
2019-12-08T17:08:45.346-0600 I CONTROL [initandlisten] ** WARNING: Access control is not enabled for the database.
2019-12-08T17:08:45.346-0600 I CONTROL [initandlisten] ** Read and write access to data and configuration is unrestricted.
2019-12-08T17:08:45.346-0600 I CONTROL [initandlisten]
---
Enable MongoDB's free cloud-based monitoring service, which will then receive and display
metrics about your deployment (disk utilization, CPU, operation statistics, etc).

The monitoring data will be available on a MongoDB website with a unique URL accessible to you
and anyone you share the URL with. MongoDB may use this information to make product
improvements and to suggest MongoDB products and deployment options to you.

To enable free monitoring, run the following command: db.enableFreeMonitoring()
To permanently disable this reminder, run the following command: db.disableFreeMonitoring()
---

> use fpa_fod
switched to db fpa_fod
> db.fires.aggregate([
... ($project:{FIRE_NAME :{$toUpper : "$FIRE_NAME"},SOURCE_REPORTING_UNIT:"$SOURCE_REPORTING_UNIT"}),
... ($group:{_id : "$FIRE_NAME",
... No_of_units:{$sum:1}}),
... ($match:{No_of_units:{$lte:1}})
... ])
{ "_id" : "FY2000-DECATUR-100", "No_of_units" : 1 }
{ "_id" : "FOUR EAST", "No_of_units" : 1 }
{ "_id" : "I-10 HWY 285", "No_of_units" : 1 }
{ "_id" : "MUNSEL CREEK", "No_of_units" : 1 }
{ "_id" : "GRAVES RD SMOKE", "No_of_units" : 1 }
{ "_id" : "61412", "No_of_units" : 1 }
{ "_id" : "IK BLOCK ANNIE MOSES", "No_of_units" : 1 }
{ "_id" : "MILLOCK219", "No_of_units" : 1 }
{ "_id" : "CEDAR VALLEY CHURCH", "No_of_units" : 1 }
{ "_id" : "LAKE OLEAN", "No_of_units" : 1 }
{ "_id" : "OS CHIMNEY", "No_of_units" : 1 }
{ "_id" : "NORTH OLD STAGE RD.", "No_of_units" : 1 }
{ "_id" : "KOHLER Tn", "No_of_units" : 1 }
{ "_id" : "36/BLUE FISH", "No_of_units" : 1 }
{ "_id" : "KNOTSLANDI", "No_of_units" : 1 }
{ "_id" : "MANNING MILL", "No_of_units" : 1 }
{ "_id" : "BEAR", "No_of_units" : 1 }
{ "_id" : "MUTUAL AID DONLEY CO. 3A RANCH", "No_of_units" : 1 }
{ "_id" : "RICK HOLLOW", "No_of_units" : 1 }
{ "_id" : "FRENCHMANS BAR", "No_of_units" : 1 }
Type "it" for more
>
```

```

Last login: Sun Dec  8 22:03:35 on ttys000

The default interactive shell is now zsh.
To update your account to use zsh, please run 'chsh -s /bin/zsh'.
For more details, please visit https://support.apple.com/kb/HT208050.
(base) Rohitashvas-MacBook-Pro:~ sumit$ mongo
MongoDB shell version v4.2.1
connecting to: mongodb://127.0.0.1:27017/?compressors=disabled&gssapiServiceName=mongodb
Implicit session: session { "id" : UUID("02da4ec8-d953-4030-b3c6-7bf630adfd5c") }
MongoDB server version: 4.2.1
Server has startup warnings:
2019-12-08T17:08:45.346-0600 I CONTROL [initandlisten]
2019-12-08T17:08:45.346-0600 I CONTROL [initandlisten] ** WARNING: Access control is not enabled for the database.
2019-12-08T17:08:45.346-0600 I CONTROL [initandlisten] **           Read and write access to data and configuration is unrestricted.
2019-12-08T17:08:45.346-0600 I CONTROL [initandlisten]
---
Enable MongoDB's free cloud-based monitoring service, which will then receive and display
metrics about your deployment (disk utilization, CPU, operation statistics, etc).

The monitoring data will be available on a MongoDB website with a unique URL accessible to you
and anyone you share the URL with. MongoDB may use this information to make product
improvements and to suggest MongoDB products and deployment options to you.

To enable free monitoring, run the following command: db.enableFreeMonitoring()
To permanently disable this reminder, run the following command: db.disableFreeMonitoring()
---

> use fpa_fod
switched to db fpa_fod
> db.fires.aggregate([
... .. {$project:{FIRE_NAME :{$toUpper : "$FIRE_NAME"},SOURCE_REPORTING_UNIT:"$SOURCE_REPORTING_UNIT"}},
... .. {$group:{_id : "$FIRE_NAME",
... .. No.of.units:{$sum:1}}},
... .. {$match:{No.of_units:{$lte:1}}}
... .. }).toArray().length;
405118
>

```

Result

4,05,118 wildfires were not reported by more than one agency/unit.

Query 6

Question 8:

Which forest had the least number of fires?

Assumptions

We have considered the Source_reporting_unit_name (agencies, wildlife refuge etc) as the forest name in our dataset

Translation

Select the forest which has least number of fires.

Cleanup

Groupby Source_reporting_unit_name, where fire count =1, in ascending order

Screen Shot of MongoDB Query/Code and Results

```
Last login: Sun Dec 8 21:08:35 on tty000

The default interactive shell is now zsh.
To update your account to use zsh, please run 'chsh -s /bin/zsh'.
For more details, please visit https://support.apple.com/kb/HT208050.
(base) Rohitashw@MacBook-Pro:~$ mongo
MongoDB shell version v4.2.1
connecting to: mongodb://127.0.0.1:27017/?compressors=disabled&gssapiServiceName=mongodb
Implicit session: session { "id" : UUID("bbf22910-2420-4af1-acaf-43ee8863829d") }
MongoDB server version: 4.2.1
Server has startup warnings:
2019-12-08T17:08:45.346-0600 I CONTROL [initandlisten]
2019-12-08T17:08:45.346-0600 I CONTROL [initandlisten] ** WARNING: Access control is not enabled for the database.
2019-12-08T17:08:45.346-0600 I CONTROL [initandlisten] ** Read and write access to data and configuration is unrestricted.
2019-12-08T17:08:45.346-0600 I CONTROL [initandlisten]
---
Enable MongoDB's free cloud-based monitoring service, which will then receive and display
metrics about your deployment (disk utilization, CPU, operation statistics, etc).

The monitoring data will be available on a MongoDB website with a unique URL accessible to you
and anyone you share the URL with. MongoDB may use this information to make product
improvements and to suggest MongoDB products and deployment options to you.

To enable free monitoring, run the following command: db.enableFreeMonitoring()
To permanently disable this reminder, run the following command: db.disableFreeMonitoring()
---

> use fpa_fod
switched to db fpa_fod
> db.Fires.aggregate($group: {_id:"$SOURCE_REPORTING_UNIT_NAME", count:{$sum:1}},{$sort:{count:1}},{$limit:1},{$project:{_id:1}});
{ "_id" : "Sanborn County", "count" : 1 }
> db.Fires.aggregate($group: {_id:"$SOURCE_REPORTING_UNIT_NAME", count:{$sum:1}},{$sort:{count:1}});
{ "_id" : "Corson County", "count" : 1 }
{ "_id" : "BENTON LAKE WMD", "count" : 1 }
{ "_id" : "COUNCIL GROVE FIRE DEPT", "count" : 1 }
{ "_id" : "OVERFLOW NWR", "count" : 1 }
{ "_id" : "San Marcos Fire Protection Department", "count" : 1 }
{ "_id" : "Essex Junction Fire Department", "count" : 1 }
{ "_id" : "Port Mansfield Volunteer Fire Department", "count" : 1 }
{ "_id" : "James C. Campbell National Wildlife Refuge", "count" : 1 }
{ "_id" : "ST. CATHERINE CREEK NATIONAL WILDLIFE REFUGE", "count" : 1 }
{ "_id" : "PICTURED ROCKS NATIONAL LAKESHORE", "count" : 1 }
{ "_id" : "CENTERVILLE VFD", "count" : 1 }
{ "_id" : "MTN LONGLEAF NWR", "count" : 1 }
{ "_id" : "Sheffield VFD & EMS", "count" : 1 }
{ "_id" : "Sagamore Hill National Historic Site", "count" : 1 }
{ "_id" : "Marathon VFD", "count" : 1 }
{ "_id" : "KEYTESVILLE FPD", "count" : 1 }
{ "_id" : "Southwest Highway 115 Fire Protection District", "count" : 1 }
{ "_id" : "Moran Rural VFD", "count" : 1 }
{ "_id" : "COLE CAMP CITY & RFD", "count" : 1 }
{ "_id" : "Compens National Battlefield", "count" : 1 }
Type 'it' for more
> it
{ "_id" : "Garfield Township Fire Department", "count" : 1 }
{ "_id" : "Colonial National Historical Park", "count" : 1 }
{ "_id" : "Pleasant Township Fire Department", "count" : 1 }
{ "_id" : "Roosevelt/Vanderbilt National Historic Site", "count" : 1 }
{ "_id" : "Arizona - Tucson District", "count" : 1 }
{ "_id" : "Brookton Fire Department", "count" : 1 }
{ "_id" : "Sharon Fire Department", "count" : 1 }
{ "_id" : "Melissa VFD", "count" : 1 }
{ "_id" : "Logan County Fire Department #1", "count" : 1 }
```

Result

Above are the forests with least number of fires.