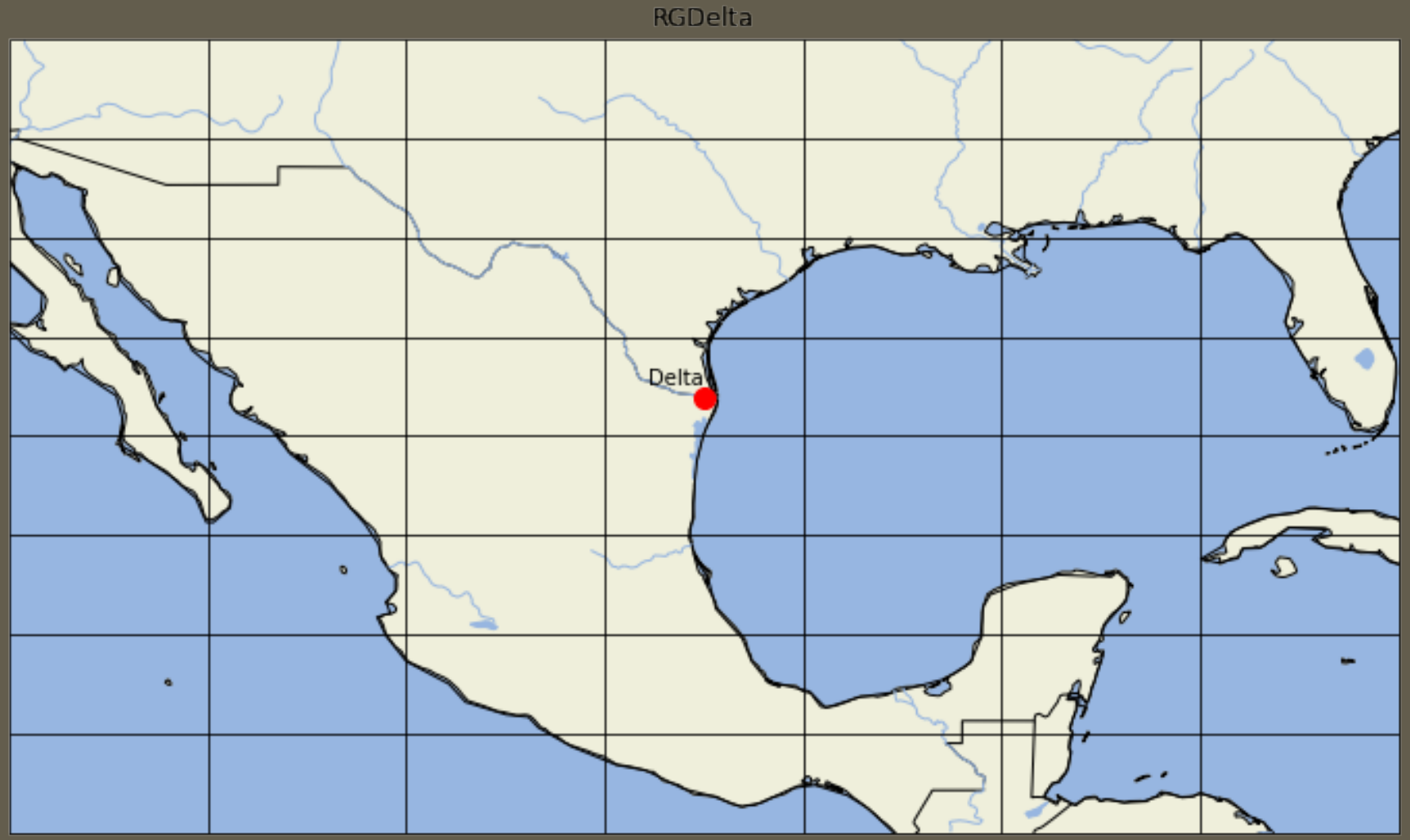
# REDUCTION OF DISCHARGE AND SEDIMENT SUPPLY IN THE RIO GRANDE DELTA

Edoardo Davila

MARS 5170

# RIO GRANDE DELTA




- River length: 90 km
- Delta area: 7,770 Km
  - Starts at the boundary line between Cameron county and Hidalgo county (90 km from the mouth)
  - Shoreline: 300 km
- Population: 600,000

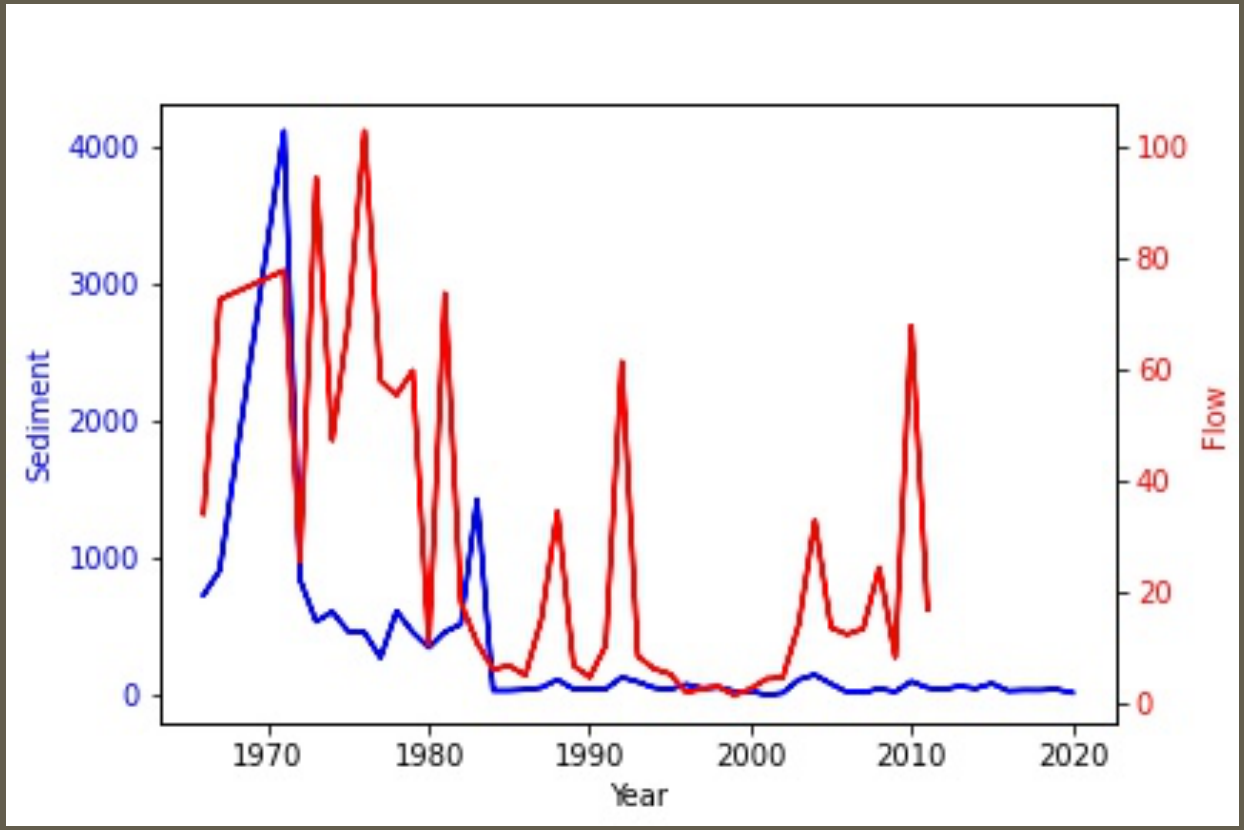
# HUMAN ACTIVITY IN RIO GRANDE DELTA

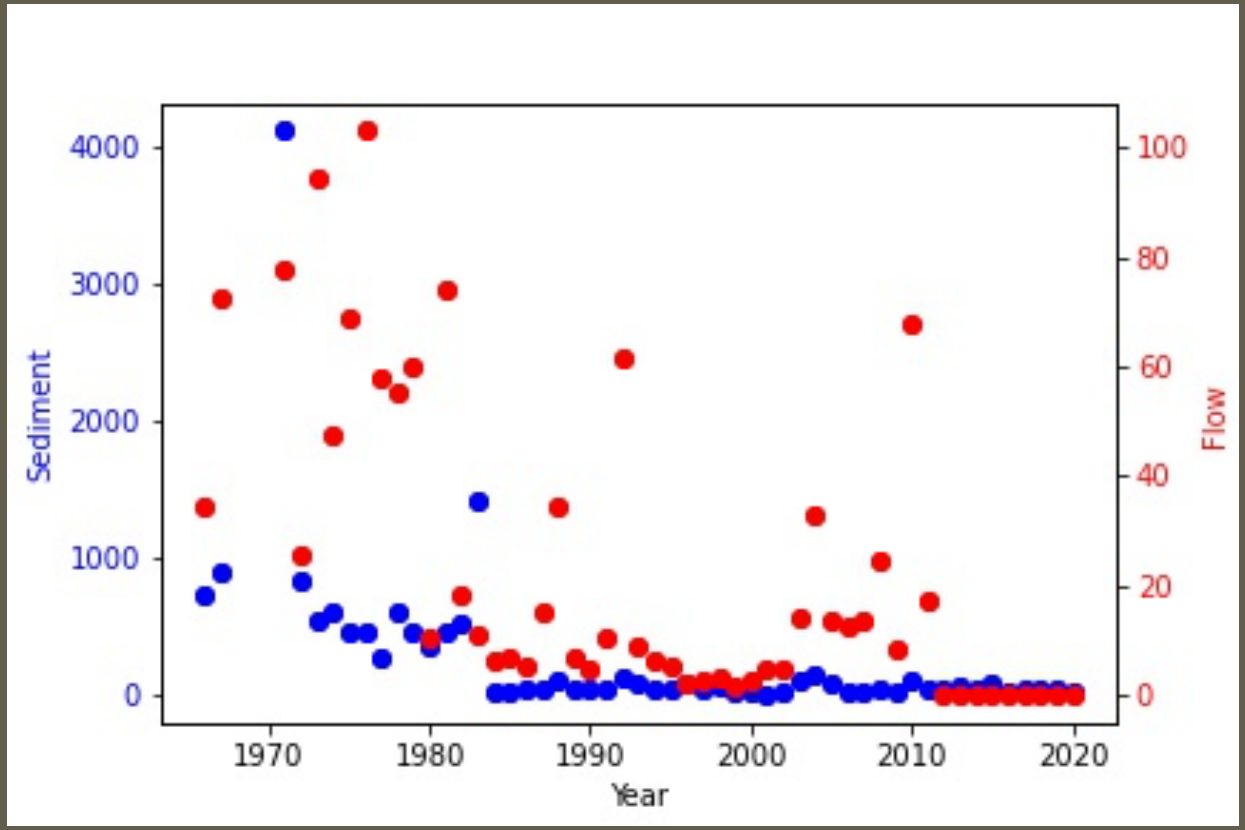

- Increasing necessity of water management encouraged U.S Congress to approve the construction of the first dam on the Rio Grande
  - In 1916, Elephant Butt Dam was completed
- In 1944, Mexico and the United States signed a new treaty allowing both countries to build and operate dams on the Rio Grande
  - In total, 13 major dams and diversions have been built; many more exist in the tributaries.
- Falcon Dam and Amistad Dam are located two of the biggest dams in the Rio Grande and are located new near the delta, which is an unusual place for dams.

# METHODS

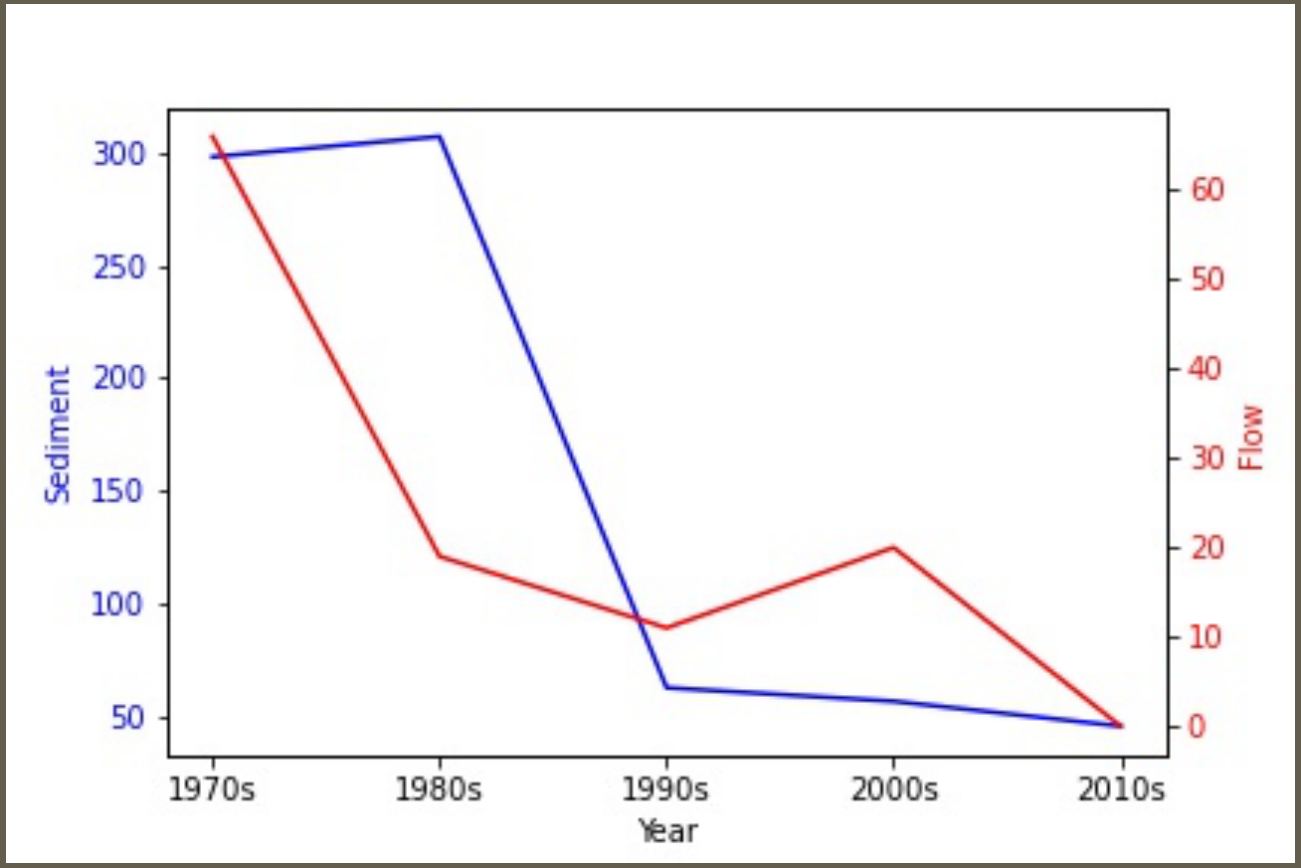
- Discharge data was obtained from the International Boundary and Water Commission
- Suspended sediment data was obtained from the USGS National Water Information System
- Python was used to analyzed data from the Rio Grande Delta
  - Look for overall average of sediment and discharge data
  - Also, analyzed data by decades to help identify any unusual patterns
  - Obtain mean,  standard deviation, and variation

# RIVER DATA


Sediment
Flow
Year
0
1000
2000
3000
4000
0
20
40
60
80
100
1970
1980
1990
2000
2010
2020


Sediment
Flow
Year
0
1000
2000
3000
4000
0
20
40
60
80
100
1970
1980
1990
2000
2010
2020

# RESULTS




| | DecadesSSC | DecadesFlow |
|---|---|---|
| **1970s** | 298 | 66.0 |
| **1980s** | 307 | 19.0 |
| **1990s** | 63 | 11.0 |
| **2000s** | 57 | 20.0 |
| **2010s** | 46 | 0.0 |

- Overall average: 283 SSC and 28 Flow

# RESULTS

- Sediment
  - Standard deviation: 609
  - Variance: 370934
- Flow
  - Standard deviation: 28
  - Variance: 810

# CONCLUSION

- Suspended Sediment and Discharge have been declining since the 1970s
- Isolated pike events between the late 1970s and early 1980s could disrupt data and create a false outcome
- Humans have changed the river conditions

# FURTHER RESEARCH

- It is necessary to look for data before major dams were built
- Look at precipitation patterns

Thank you!

Questions?