MB Drought Plan and Strategies
Data, Information and Assessment Needed

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Outline

➢ **Drought Management Plan Development**

➢ **Data, Information and Assessment Needs**

➢ **Research Needs**

➢ **Indicator Analysis – Preliminary Observations**

MB Drought Management Plan Development

Conceptual Framework

- **Definitions**

- **Indicator Selections**

- **Drought Action Plan and Strategies**

- **Water Supply and Demand Projection**

- **Climate Change Adaptation (with respect to drought)**

Data, Information and Assessment needed

Drought Indicators and Data Needs:

➢ **Meteorological:**

- **Indicators: Percent of average/median precipitation, percentiles/deciles, Standard Precipitation Index (SPI))**
- **Data: Precipitation**

➢ **Hydrological:**

- **Indicators: Percent of average/median flow, streamflow/ ground water(GW) percentiles/deciles, Surface Water Supply Index (SWSI), reservoir storage volume)**
- **Data: Streamflow/ snowpack, precipitation and reservoir storage, GW levels**

Data, Information and Assessment needed

Indicators and data needed:

- ➢ **Agricultural**
  - ➢ **Indicators: Palmer Drought Index (PDI), Crop Moisture Index (CMI), Normalized Vegetation index**
  - ➢ **Data: temperature, precipitation, percent of water holding capacity, remote sensing data/images**

Data, Information and Assessment needed

Water Supply and Demand

➢ **Prediction of water supply and demand (Short-, Medium- and Long-term) under expected economic growth and climate change:** precipitation, temperature, stream flow, soil moisture, ground water levels, water uses (domestic, commercial, agricultural and industrial), reservoir operational rules, storages and basin information.

Research Need

- **Development of Drought Indicators**
  - ➢ **Soil moisture modelling**
  - ➢ **Reservoir storage and operation indicators**

- **Projection of future water supply and demand (short-and long-term) for expected trend and climate change scenarios for each River Basin in Manitoba**
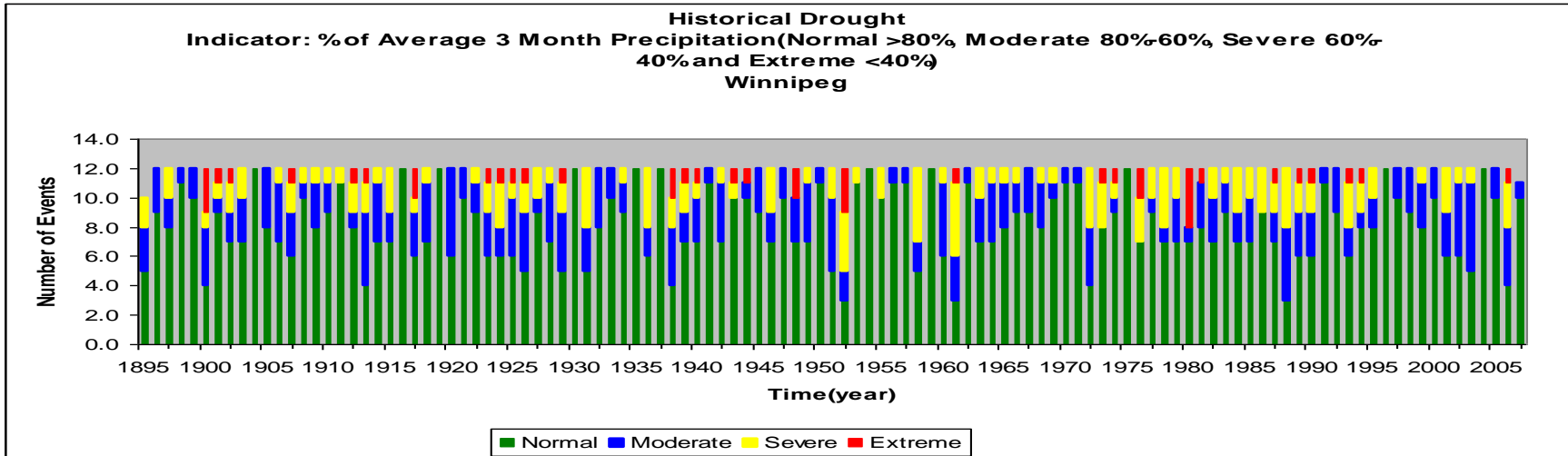
Preliminary results for Indicator

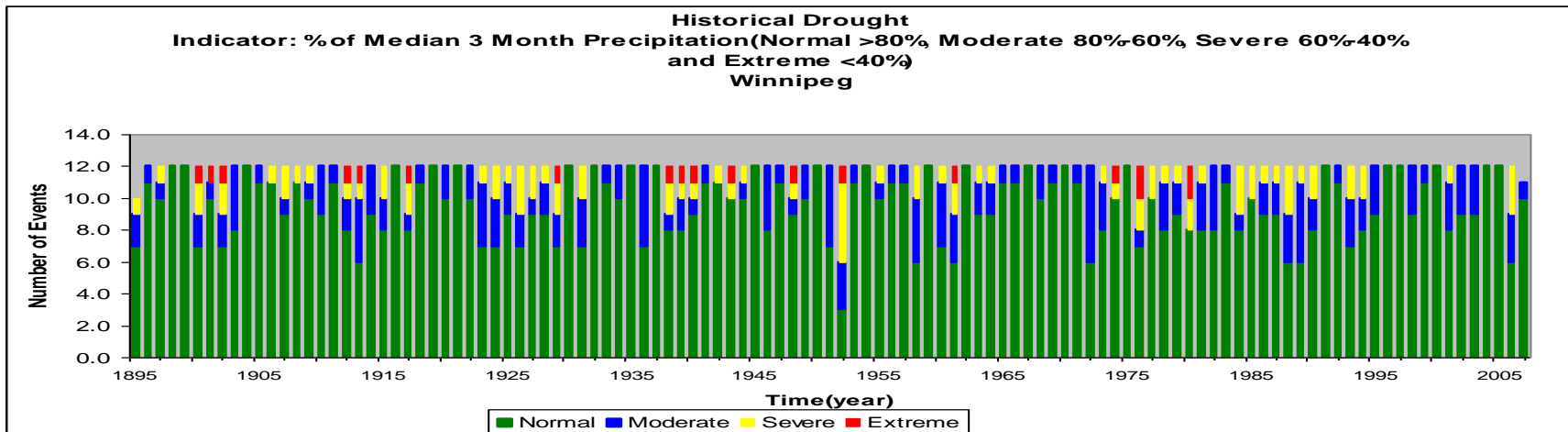**Map of selected precipitation stations (based on historical data availability)**
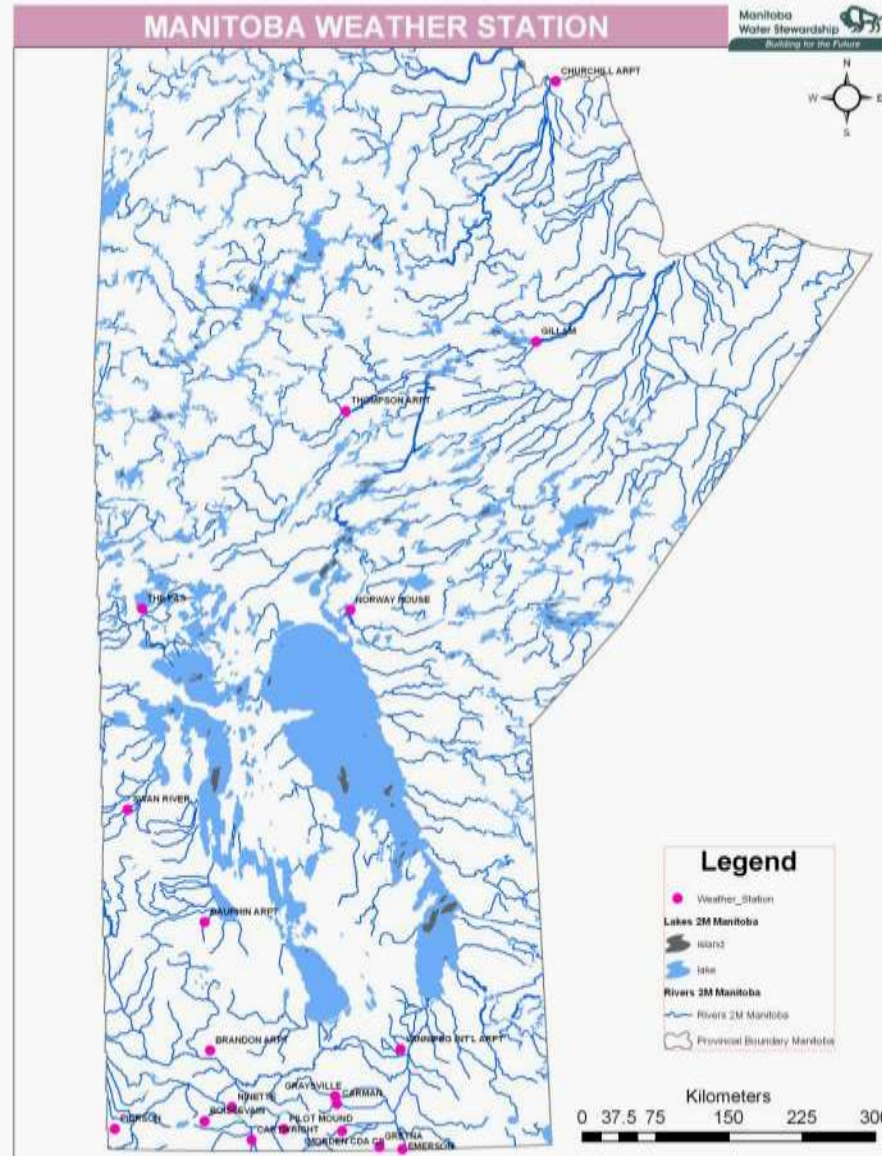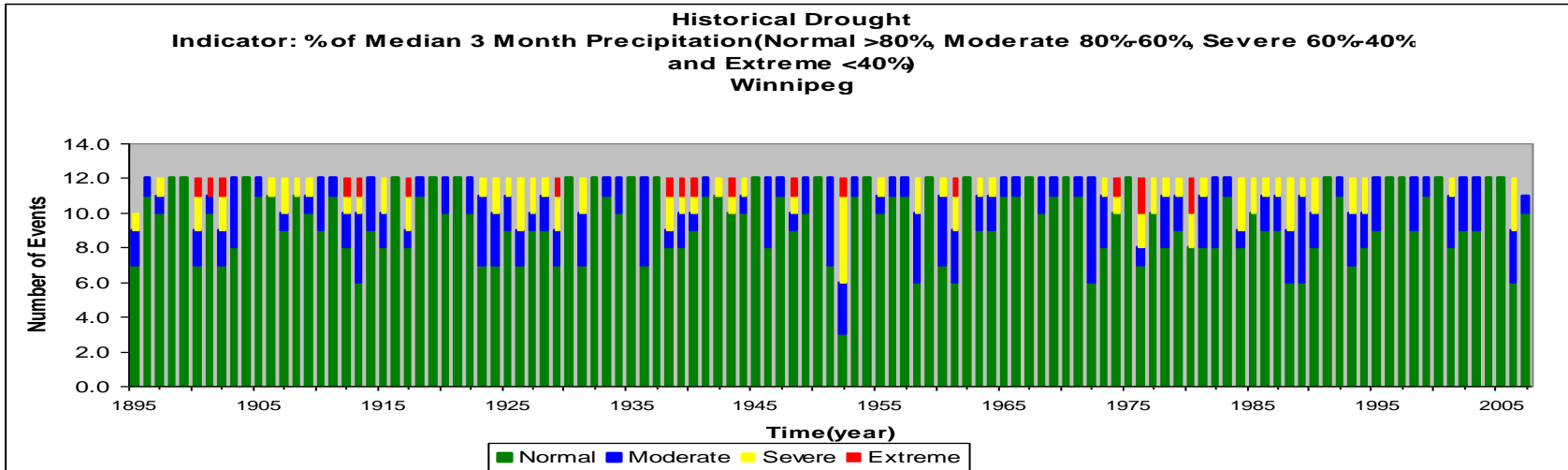
Preliminary results for Indicator
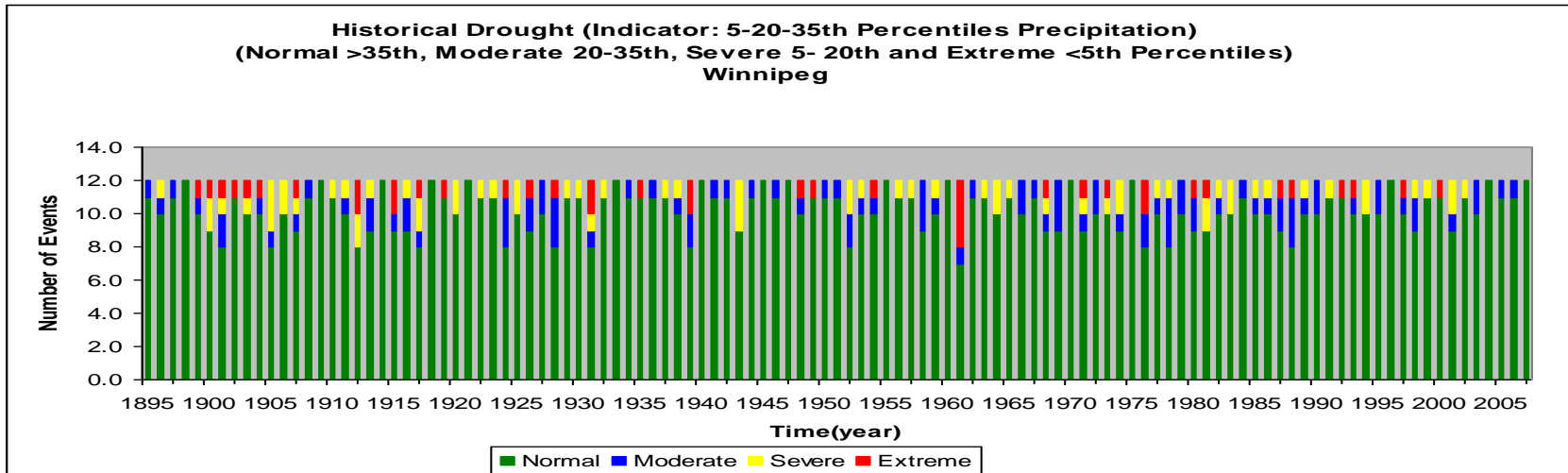

Precipitation Average

Precipitation Median

Preliminary results for Indicator

Historical Drought
Indicator: % of Median 3 Month Precipitation (Normal >80%, Moderate 80%-60%, Severe 60%-40% and Extreme <40%)
Winnipeg

Precipitation Median

Historical Drought (Indicator: 5-20-35th Percentiles Precipitation)
(Normal >35th, Moderate 20-35th, Severe 5- 20th and Extreme <5th Percentiles)
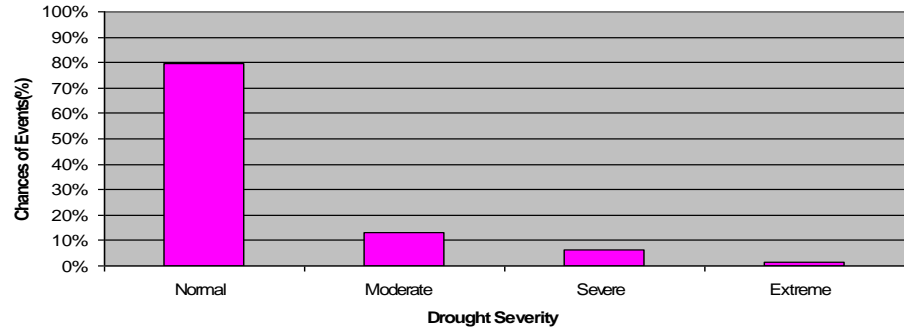Winnipeg

5-20-35th Percentile

Preliminary results for Indicator

Chances of Drought Events
Winnipeg
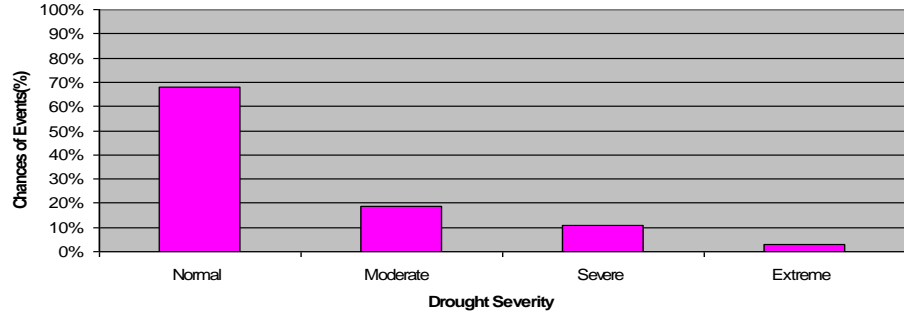
Indicator: % of Average 3 Month Precipitation(Normal >80%, Moderate 80%-60%, Severe 60%-40% and Extreme <40%)
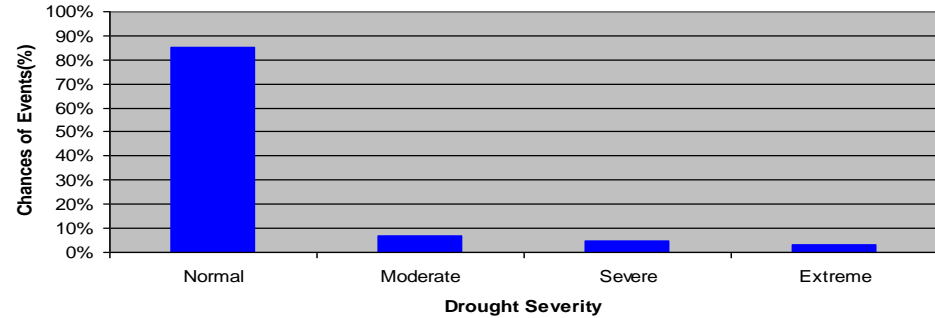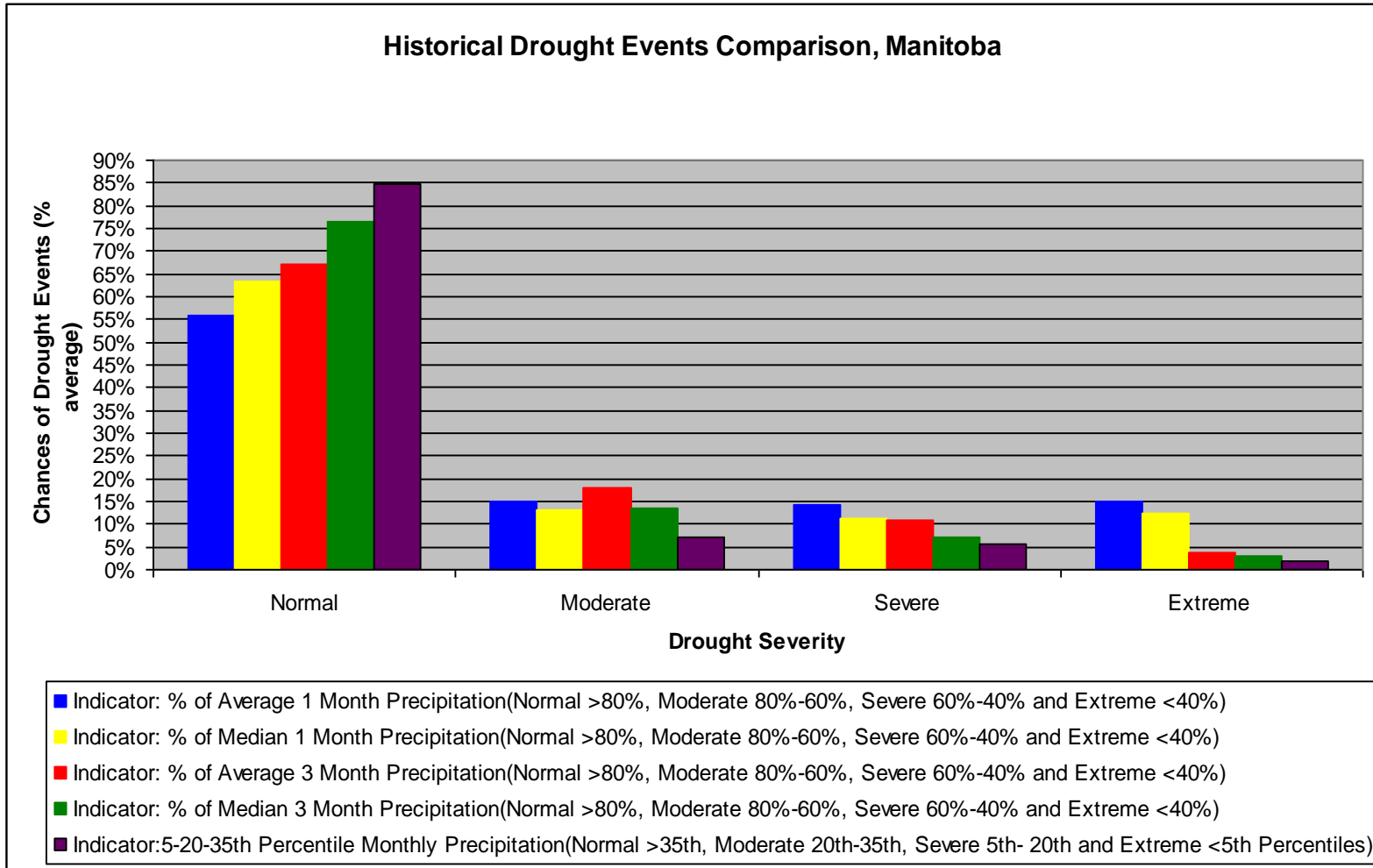
Precipitation Average

Chances of Drought Events
Winnipeg

Indicator: Lowest 5-20-35th Percentile of Monthly Precipitation (Normal >35th, Moderate 20th-35th, Severe 5th- 20th and Extreme <5th Percentile)

Chances of Drought Events
Winnipeg

Indicator: % of Median 3 Month Precipitation(Normal >80%, Moderate 80%-60%, Severe 60%-40% and Extreme <40%)

5-20-35th Percentile

Precipitation Median

Preliminary results for Indicator

Historical Drought Events Comparison, Manitoba

Legend:
- Indicator: % of Average 1 Month Precipitation(Normal >80%, Moderate 80%-60%, Severe 60%-40% and Extreme <40%)
- Indicator: % of Median 1 Month Precipitation(Normal >80%, Moderate 80%-60%, Severe 60%-40% and Extreme <40%)
- Indicator: % of Average 3 Month Precipitation(Normal >80%, Moderate 80%-60%, Severe 60%-40% and Extreme <40%)
- Indicator: % of Median 3 Month Precipitation(Normal >80%, Moderate 80%-60%, Severe 60%-40% and Extreme <40%)
- Indicator:5-20-35th Percentile Monthly Precipitation(Normal >35th, Moderate 20th-35th, Severe 5th- 20th and Extreme <5th Percentiles)

Average % of all selected stations
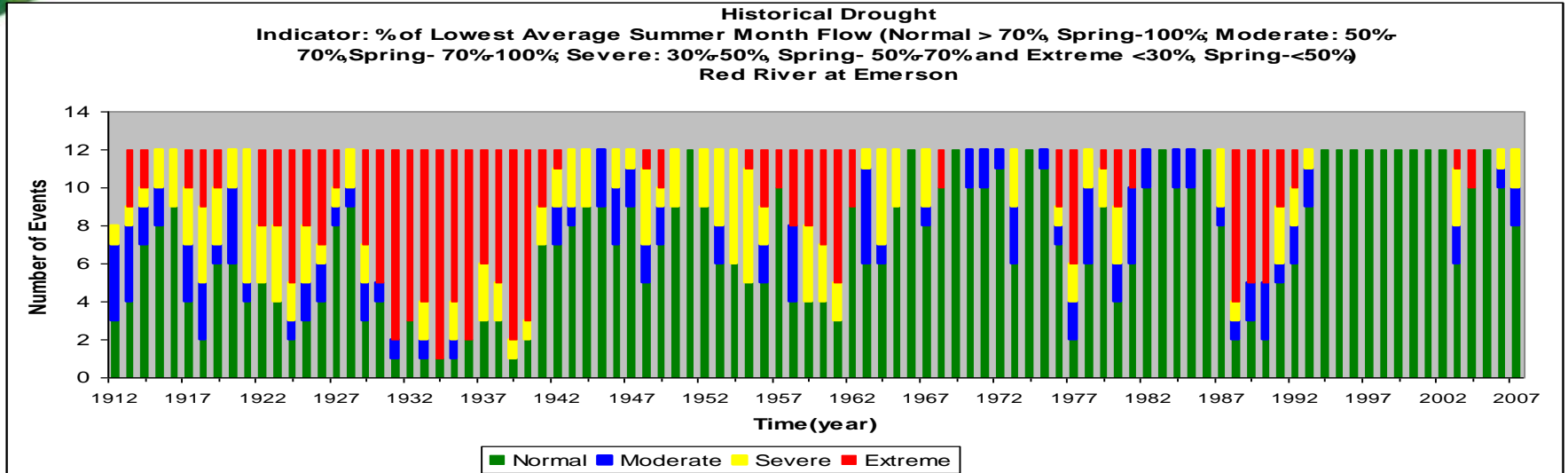
Preliminary observation for Precipitation Indicators

➢ **% of Median of Monthly Precipitation Indicator give better results than % of Average of monthly Precipitation Indicator**

➢ **5-20-35th Percentile of monthly Precipitation Indicator gives better results than percent of average and median But the lowest percentile(5th) precipitation found as zero when a time series contain lots of Zero values which are very common on Precipitation Time Series. There is a chances of getting wrong signal about drought severity level.**

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Preliminary results for Flow Indicator

Map of selected flow stations (based on historical data availability)
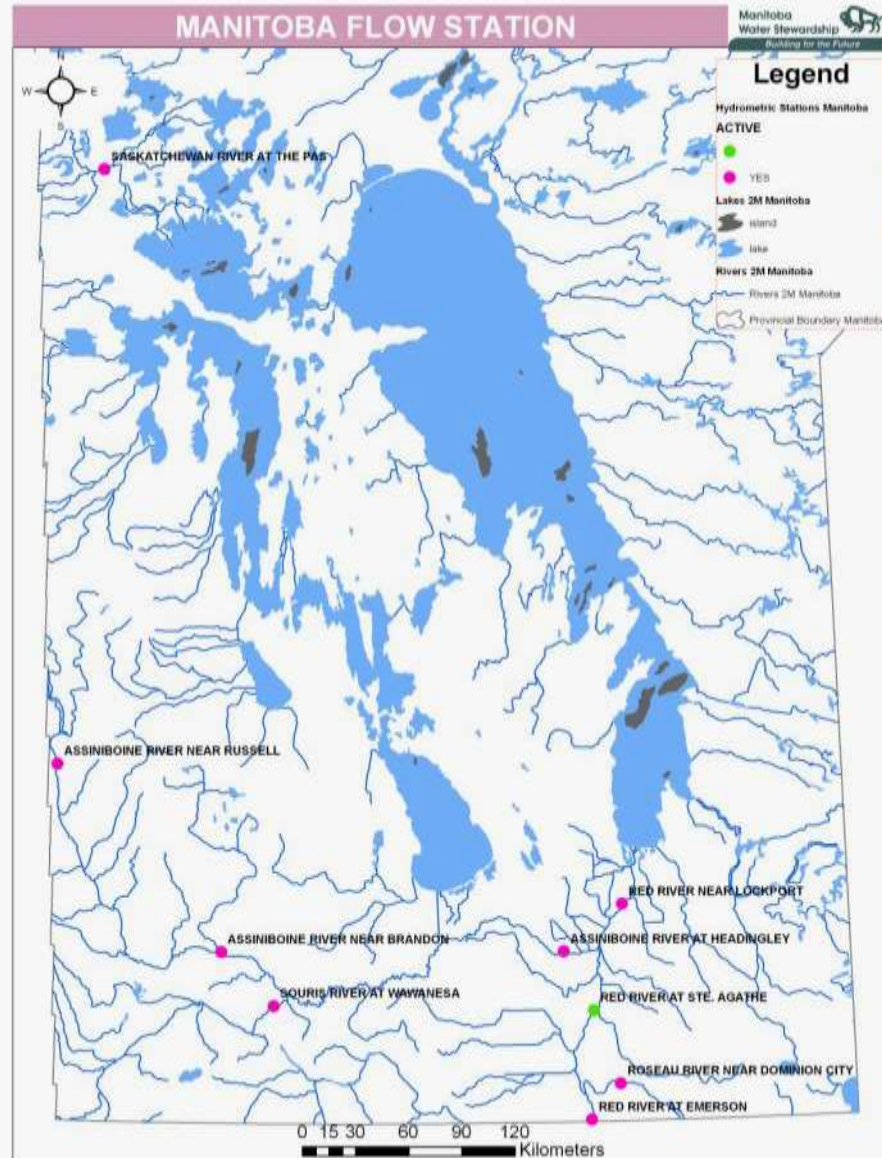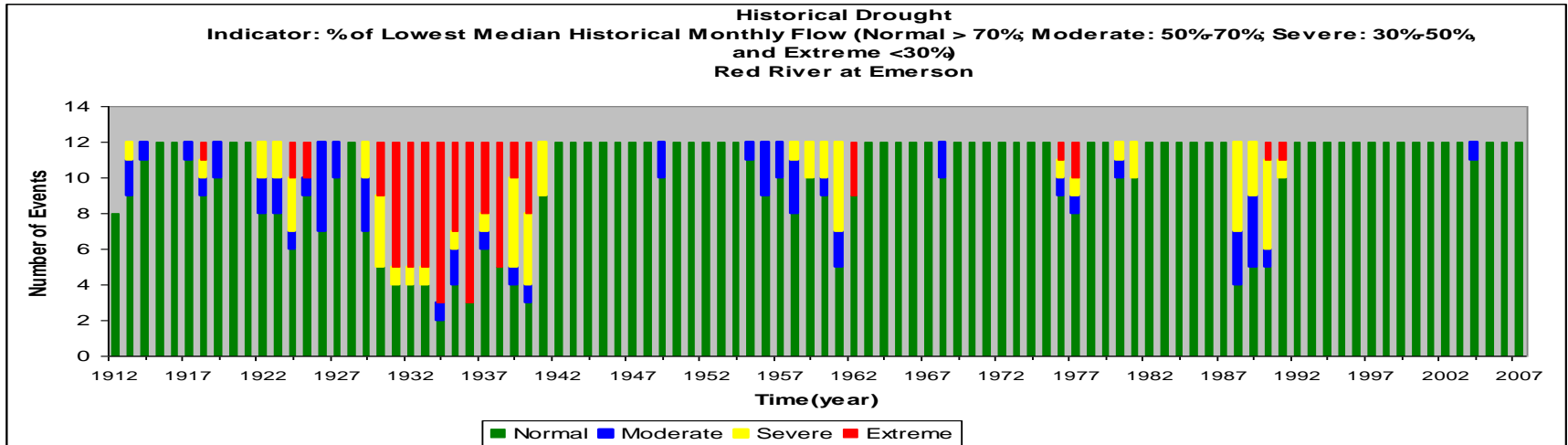
Preliminary results for Flow Indicator
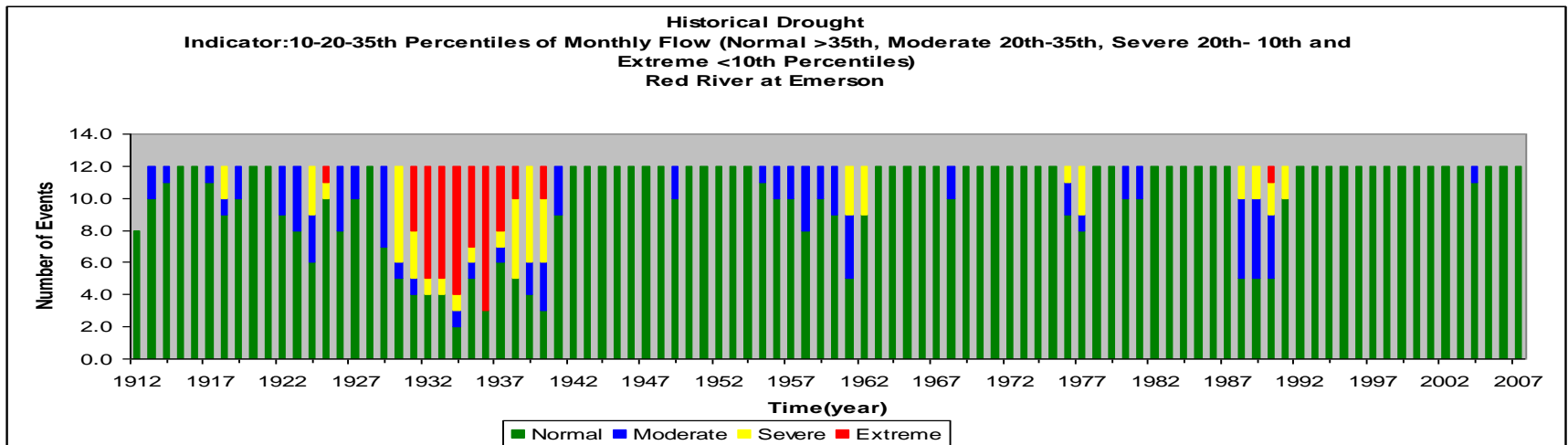

Lowest Average Summer Month Flow
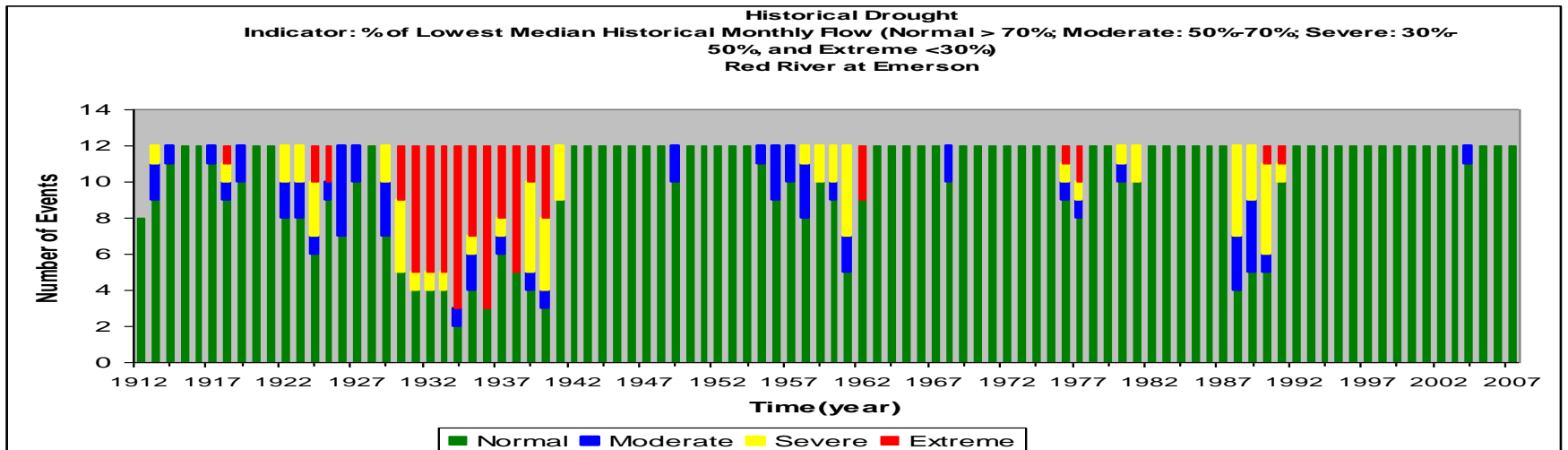
Lowest Median Summer Month Flow

Preliminary results for Flow Indicator
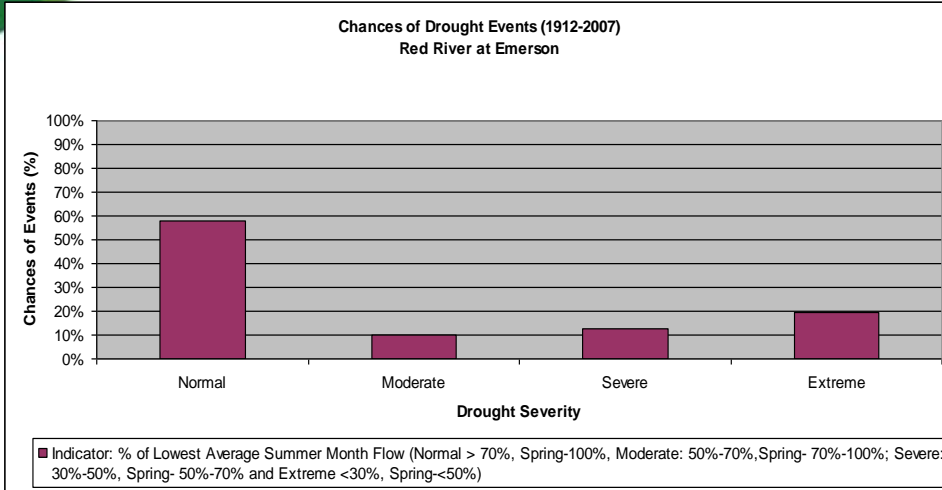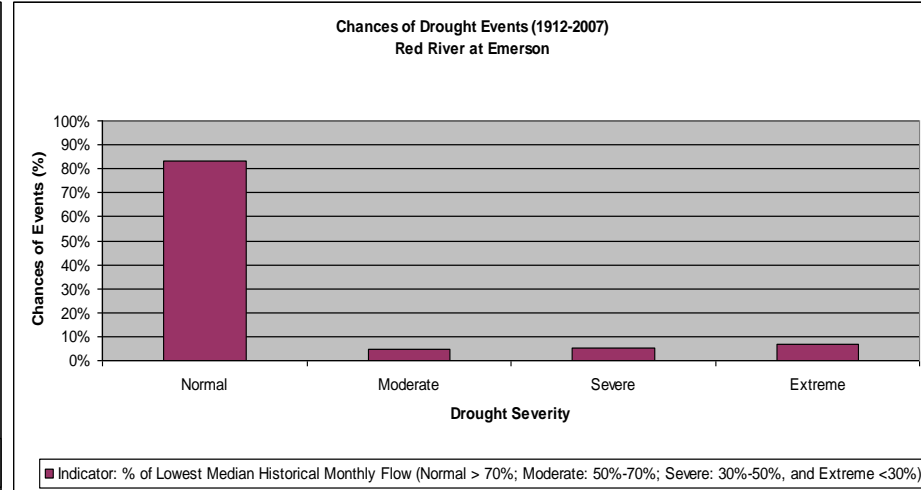

Lowest Median of Monthly Flow

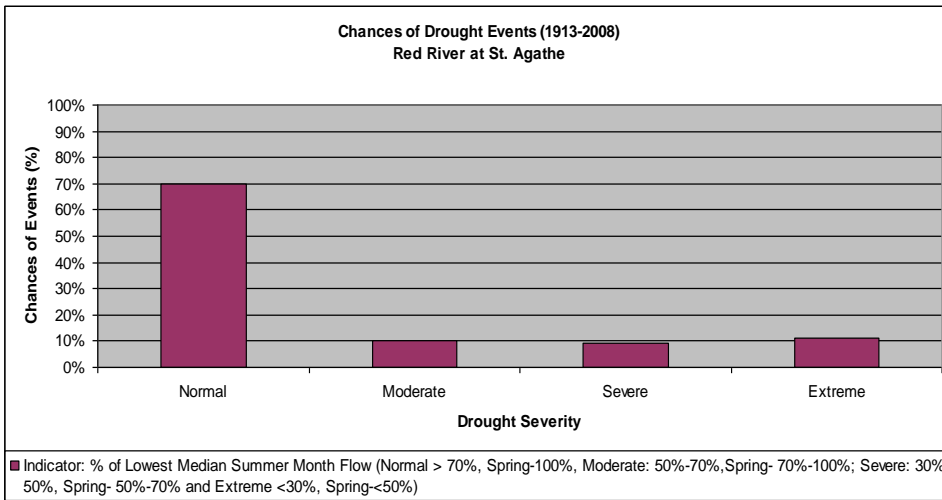**10-20-35ᵗʰ Percentiles of Monthly Flow**

Preliminary results for Flow Indicator
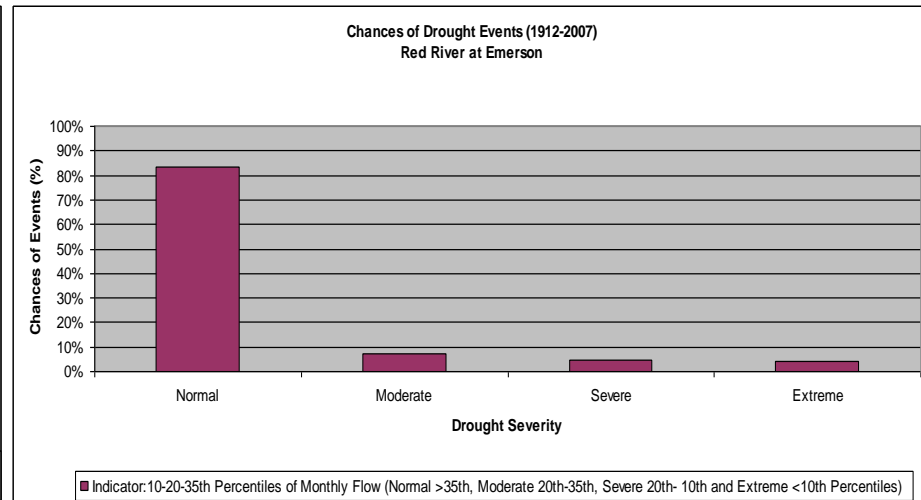

Lowest Average Summer Month Flow
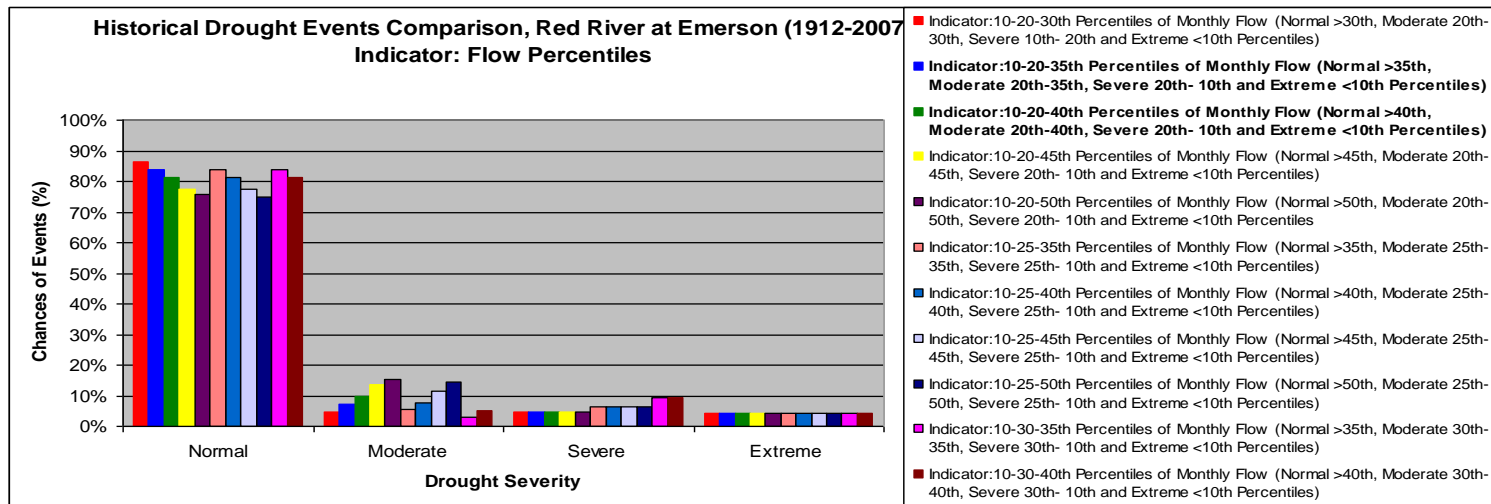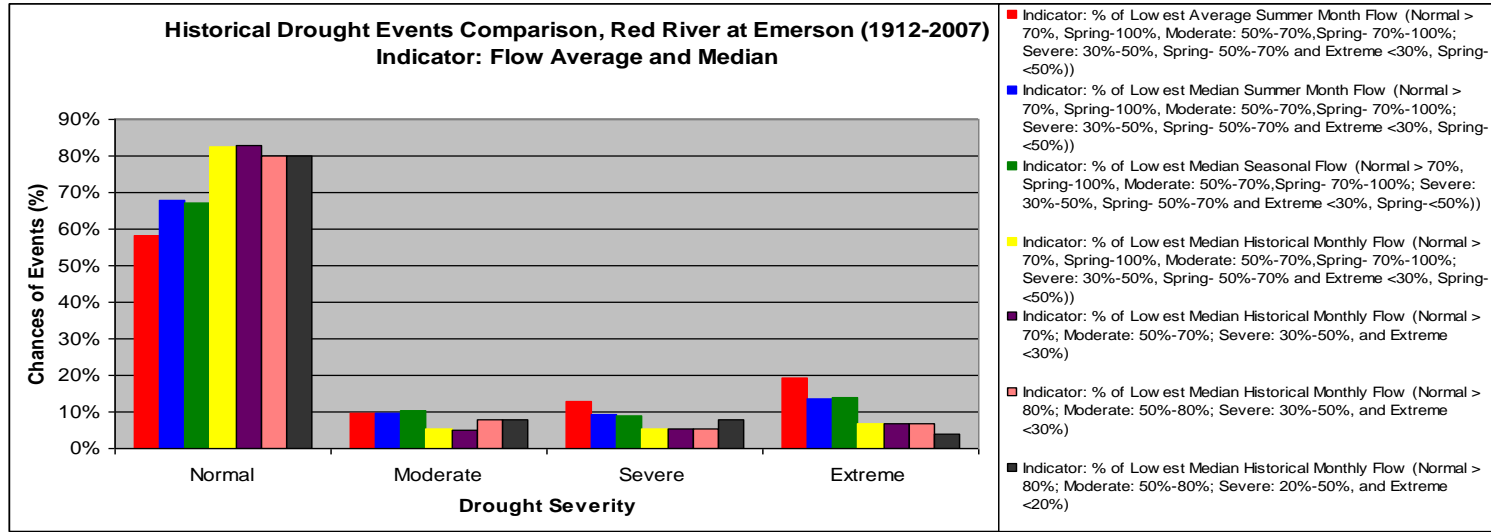

Lowest Median of Month Flow

Lowest Median Summer Month Flow

10-20-35th Percentiles of Monthly Flow

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Preliminary results for Flow Indicator

Comparison results of different indicator options for Red at Emerson

Preliminary observation for Flow Indicators

➢ **% of Median of Monthly Flow Indicator gives better results than % of Average of monthly Precipitation Indicator**

➢ **10-20-35th Percentile of monthly Flow Indicator gives better results than percent of average and median.**

Thanks