

Introduction to Drought Indices



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What is an Index?



- Simplify complex relationships and provide a good communication tool for diverse audiences
- Examples?

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Body Mass Index

- ▶ Approximation of body fat based on height and weight
- ▶ Potential use: evaluation of health (insurance)
- ▶ $BMI = (\text{weight} \times 4.88) / \text{height}^2$
- ▶ Scale
 - Underweight (≤ 18.5)
 - Normal (18.5 – 24.9)
 - Overweight (24.9 – 29.9)
 - Obese (≥ 30.0)
- ▶ Limitations: BMI overestimates for people with more lean body mass (athletes)

Key Variables for Monitoring Drought

- ▶ **Climate data**
- ▶ **Soil moisture**
- ▶ **Stream flow**
- ▶ **Groundwater**
- ▶ **Reservoir and lake levels**
- ▶ **Snowpack**
- ▶ **Short, medium, and long range forecasts**
- ▶ **Vegetation health/stress and fire danger**
- ▶ **Impacts**



Drought Indices

- ▶ Simplifies complex relationships and provides a good communication tool for diverse audiences
- ▶ Quantitative assessment of anomalous climatic conditions
 - Intensity
 - Duration
 - Spatial extent
- ▶ Historical reference (probability of recurrence)
 - Planning and design applications



Drought Indices

- ▶ Percent of Normal
- ▶ Palmer Drought Severity Index
- ▶ Deciles
- ▶ Standardized Precipitation Index
- ▶ Keetch-Byram Drought Index
- ▶ Vegetation Drought Response Index (VegDRI)



Characteristics of the SPI

- Developed by McKee et al. in 1993
- Simple index—precipitation is the only parameter (probability of observed precipitation transformed into an index)
- Multiple time scales allow for flexible analyses of water resources

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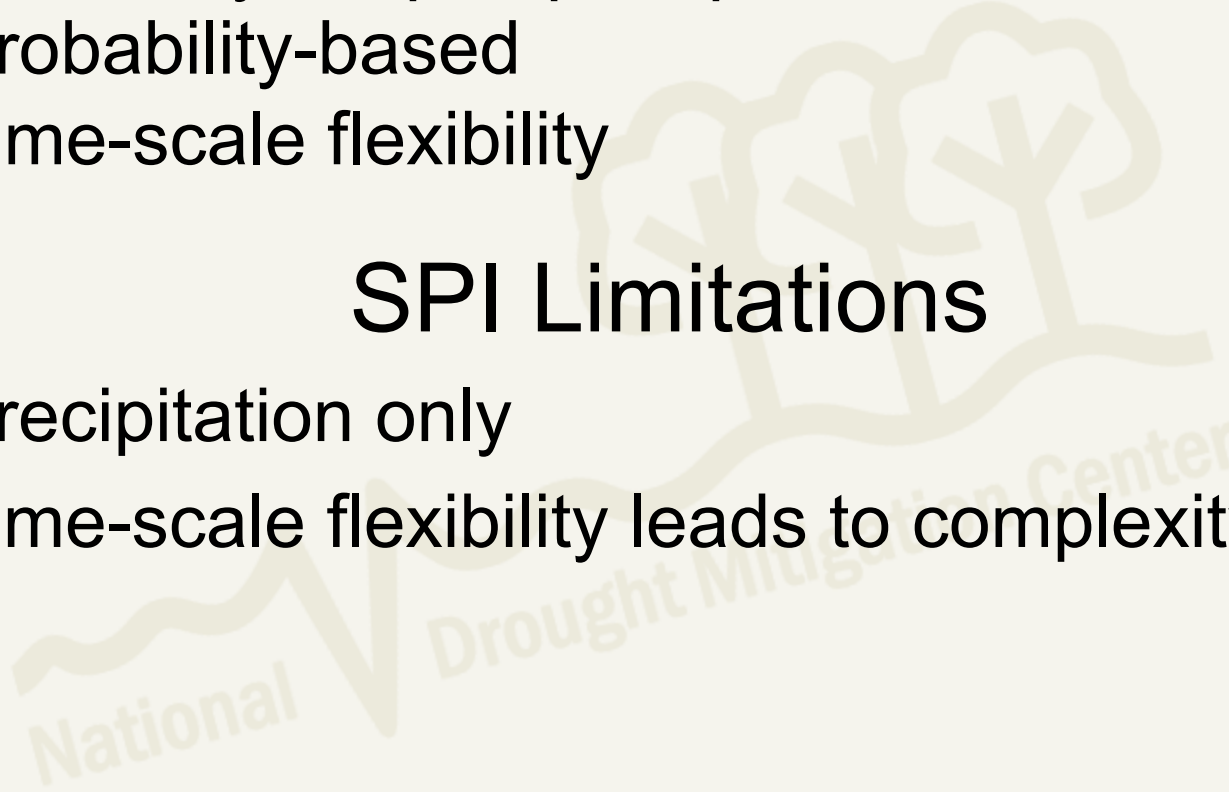


SPI Strengths

- Relatively simple, precipitation-based
- Probability-based
- Time-scale flexibility

SPI Limitations

- Precipitation only
- Time-scale flexibility leads to complexity



Drought Monitoring Questions



- Where are we now?
- How did we get here?
- What's the historical perspective for the current situation?
- What are the most likely outcomes from the current situation?

