River Basin
Water Resources Planning

Don Rayno
Division of Water Resources

North Carolina Department
of
Environment and Natural Resources

Water Resources Plans support





- Sustainable management
- Reliable, quantitative methods for planning
- Objective management and regulatory decision making







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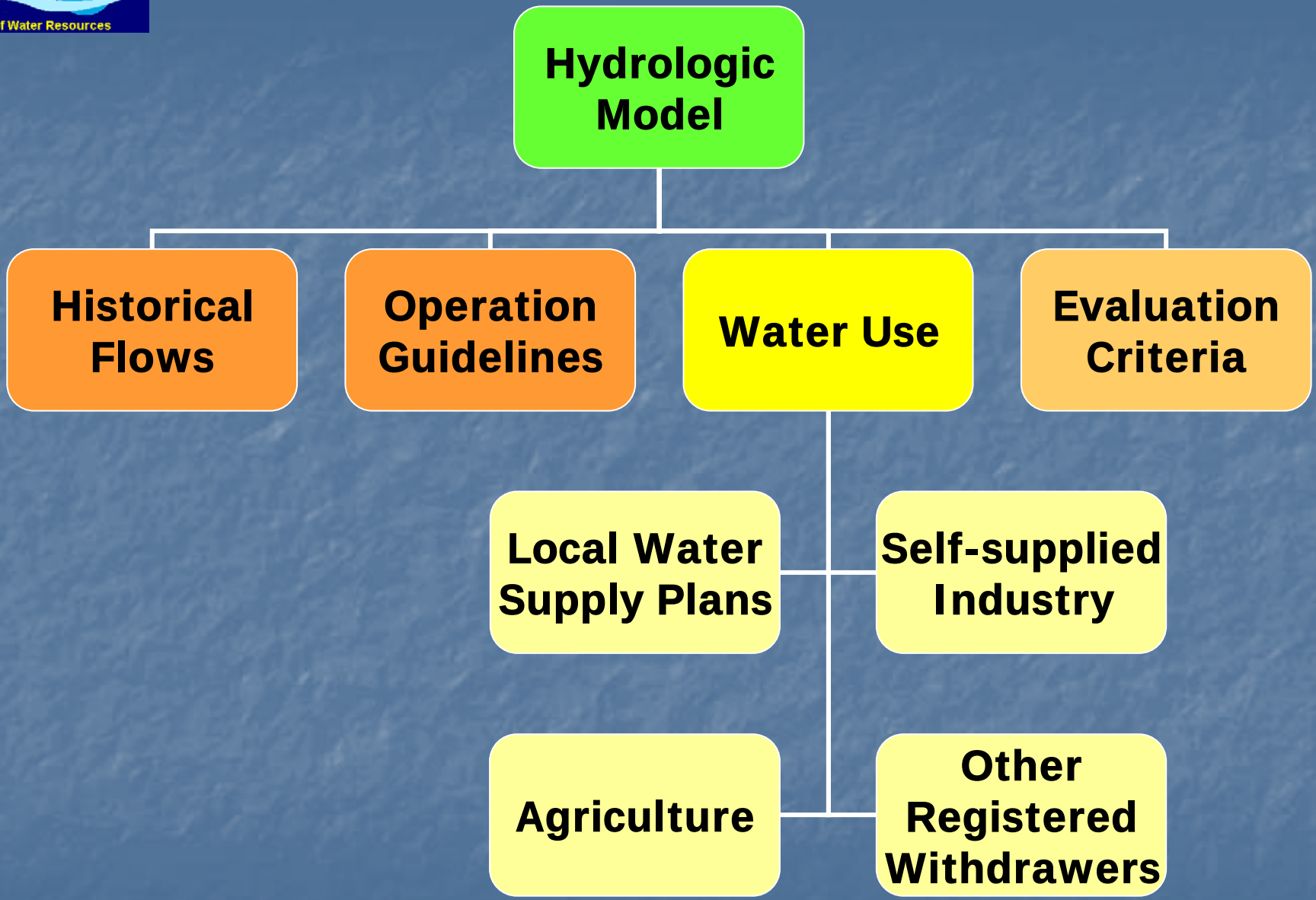
Critical Questions

How much water is available in the river system?

How much and when is water needed for the various services we expect the river to provide?

Water Use Data
+
Hydrologic Model


Hydrologic Model
Historical Flows
Operation Guidelines
Water Use
Evaluation Criteria
Local Water Supply Plans
Self-supplied Industry
Agriculture
Other Registered Withdrawers

Historical Flows

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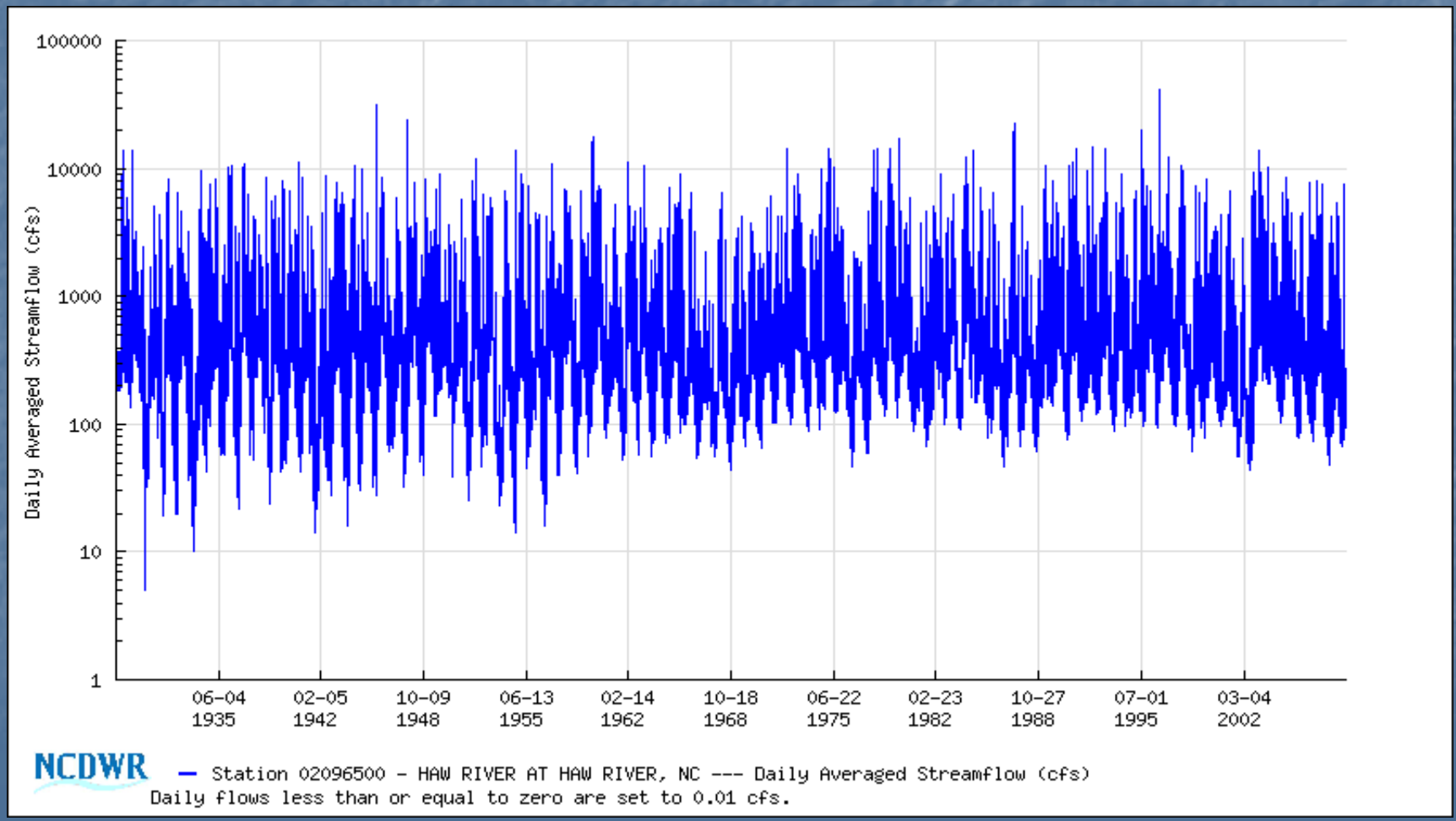

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Operations Guidelines

Examples

- Quantity and timing of specific flows
  - Aquatic habitats
  - Water quality protection
  - ✓ Intake coverage
  - Recreation
- Reservoir water level limits and timing
  - Structural limits
  - Aquatic habitat protection
  - ✓ Intake coverage
  - Boat ramp access
  - Authorized purposes and storage allocations

Operation Guidelines

Flow-Aug. Pool	Minimum Release	Release water to meet Lillington target flow of:
>100 %	40 cfs	600 cfs
80-100 %	40 cfs	600 cfs
60-80 %	40 cfs	450-600 cfs
40-60 %	40 cfs	300-450 cfs
20-40 %	200 cfs	
0-20 %	100 cfs	

Jordan Lake Drought Protocol

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Water Use

- **Water Withdrawal Registrations**
  - Agriculture > 1,000,000 gallons per day
  - Non-agriculture > 100,000 gallons per day
- **Local Water Supply Plans**
  - Local Government Water Systems
  - Other Large Community Water Systems
- **Annual Use Reporting due by April 1**

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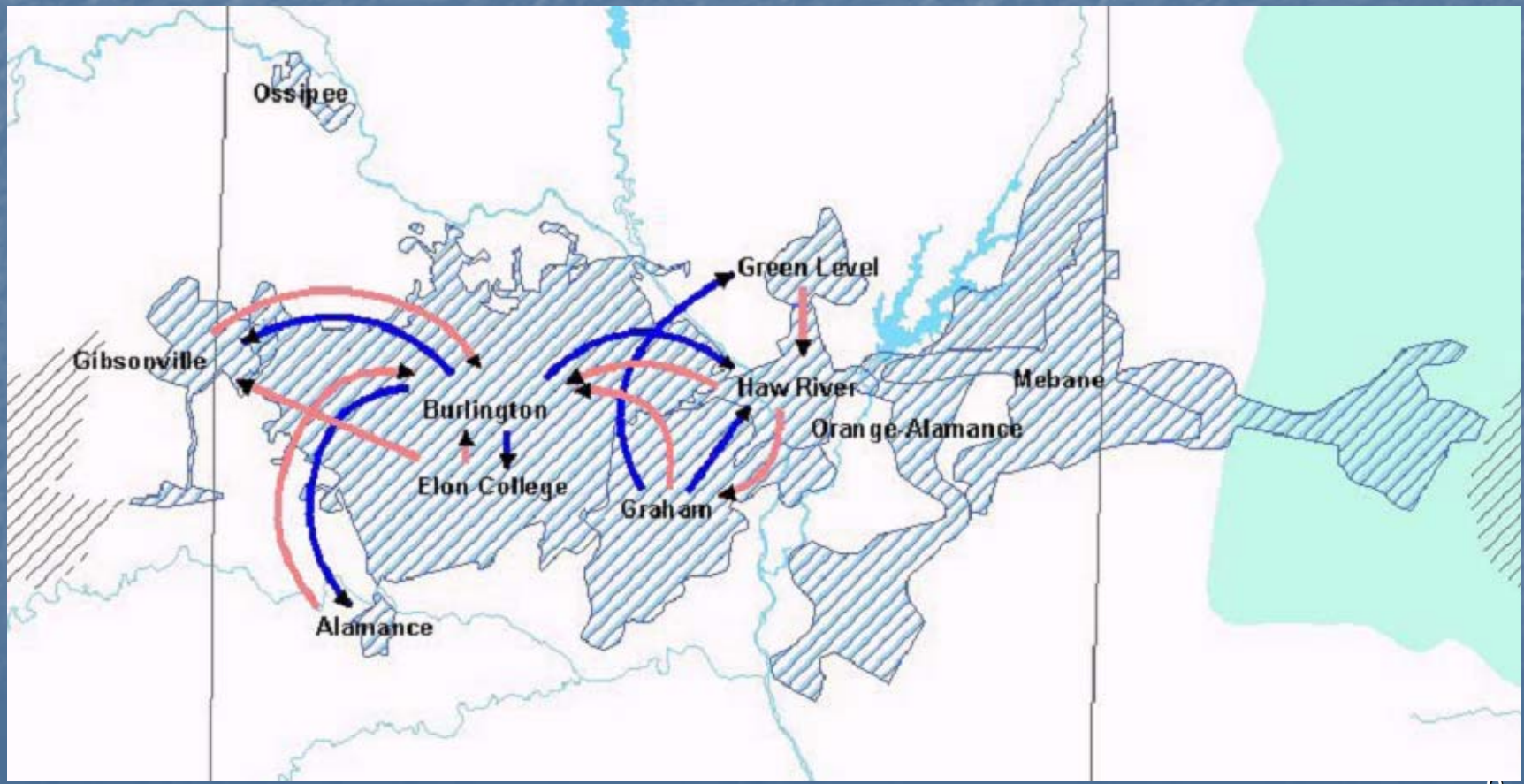
Water Use

Water and Treatment Sharing



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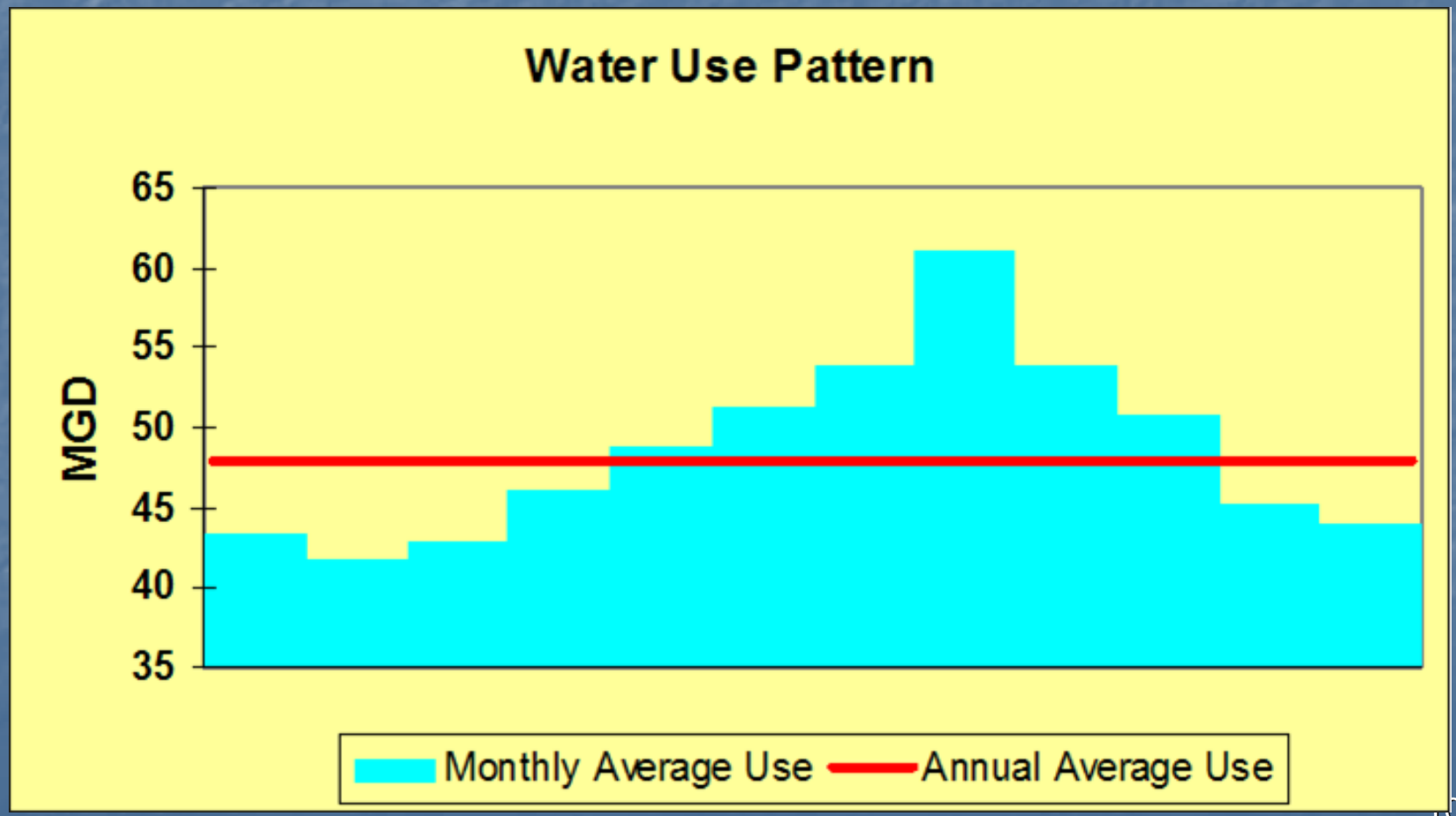
Water Use

Seasonal Use Pattern



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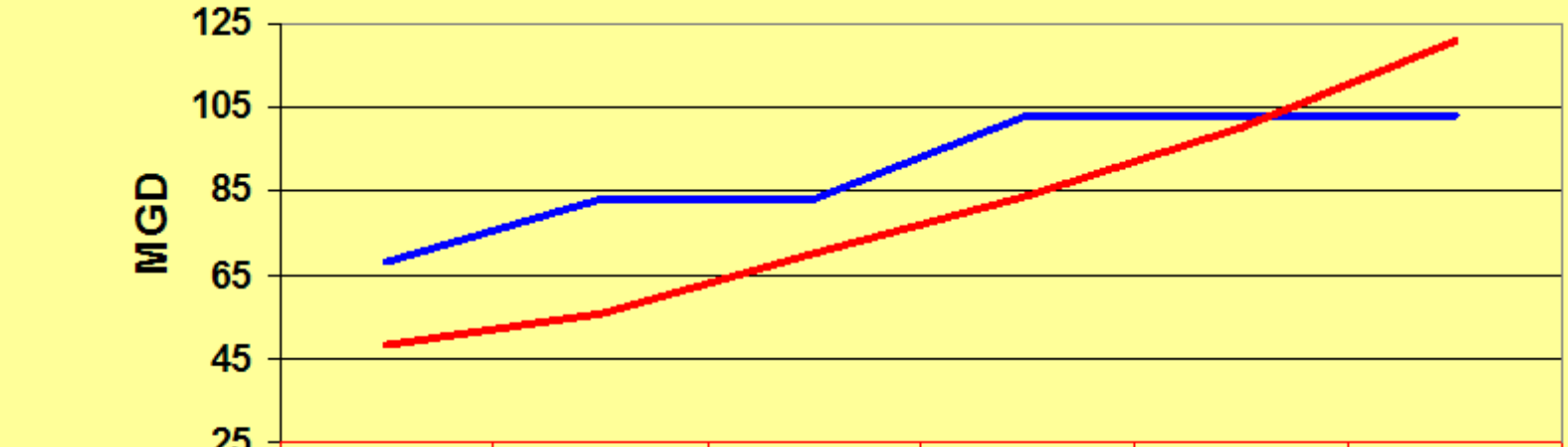
Water Use

Projected Demands



	2006	2010	2020	2030	2040	2050
Supply	68	83	83	103	103	103
Demands	48	56	70	84	101	121

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Major Assumptions

- Future withdrawals will come from current intake locations
- Future wastewater discharges will be the same percent of withdrawals at the same locations
- Sellers will continue to meet buyers' needs
- Future flows will be within the range of flows in the historical record
- Local utilities are the best judges of future system growth

Hydrologic Model

Cape Fear River Model Schematic

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Hydrologic Model

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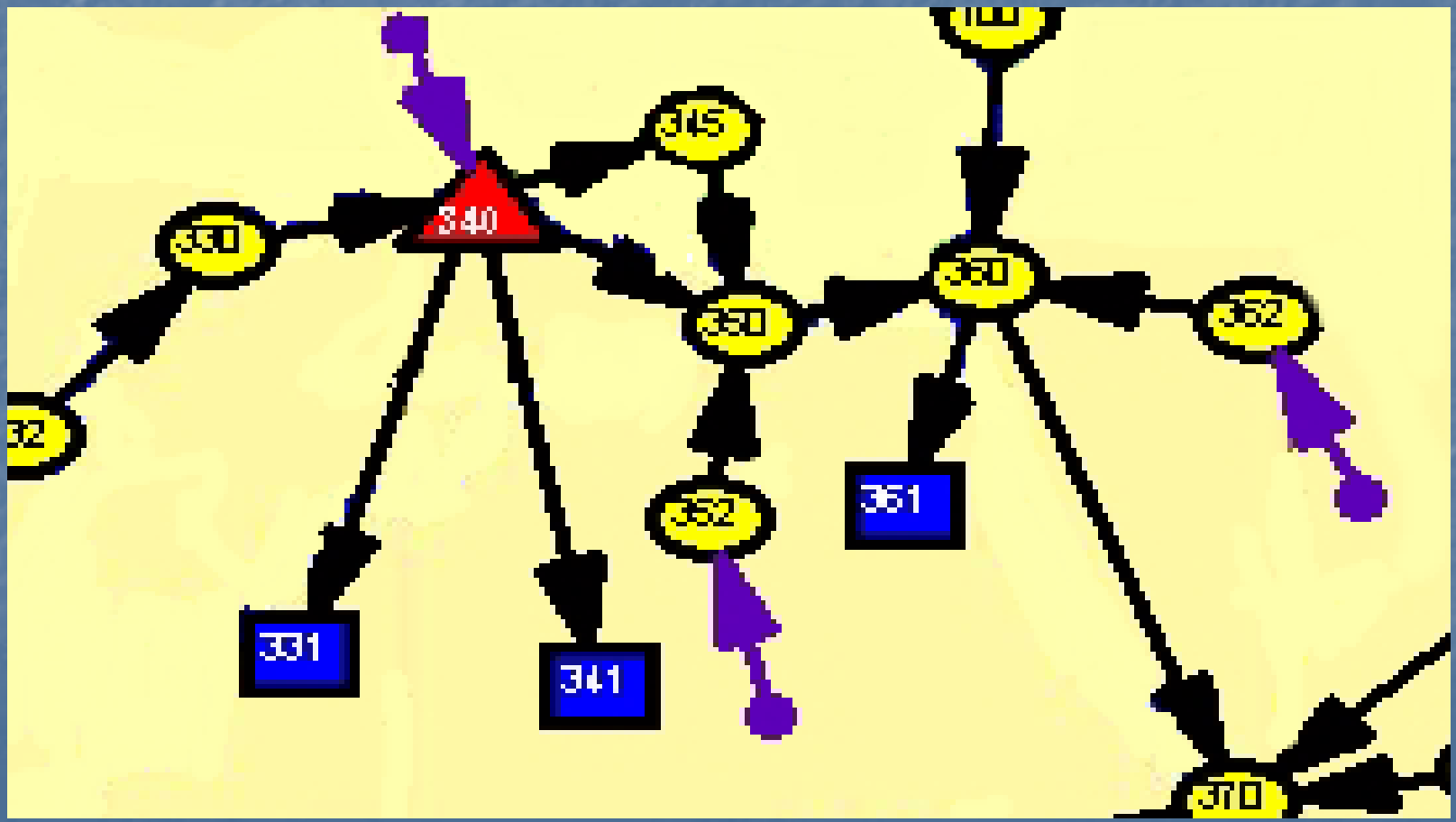
Data into Hydrologic Model



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How often?
What's the chance?

Evaluation Criteria

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Evaluate Modeling Results

- What is the answer to each of the evaluation questions?
- Are there areas where there may be problems meeting expected demands?
- When can we expect to have shortages and how can we adapt when there is a shortage?

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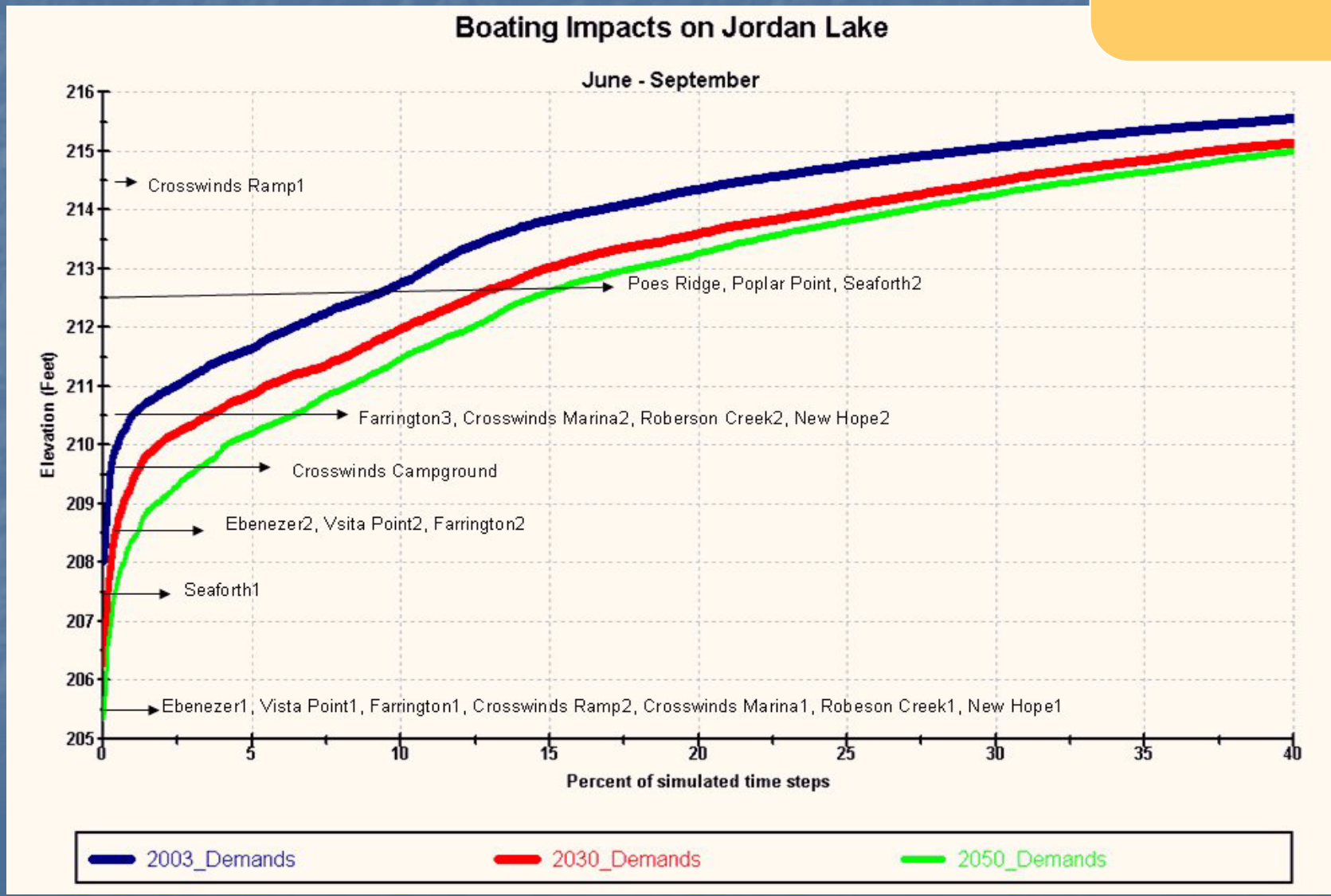
Evaluation Criteria



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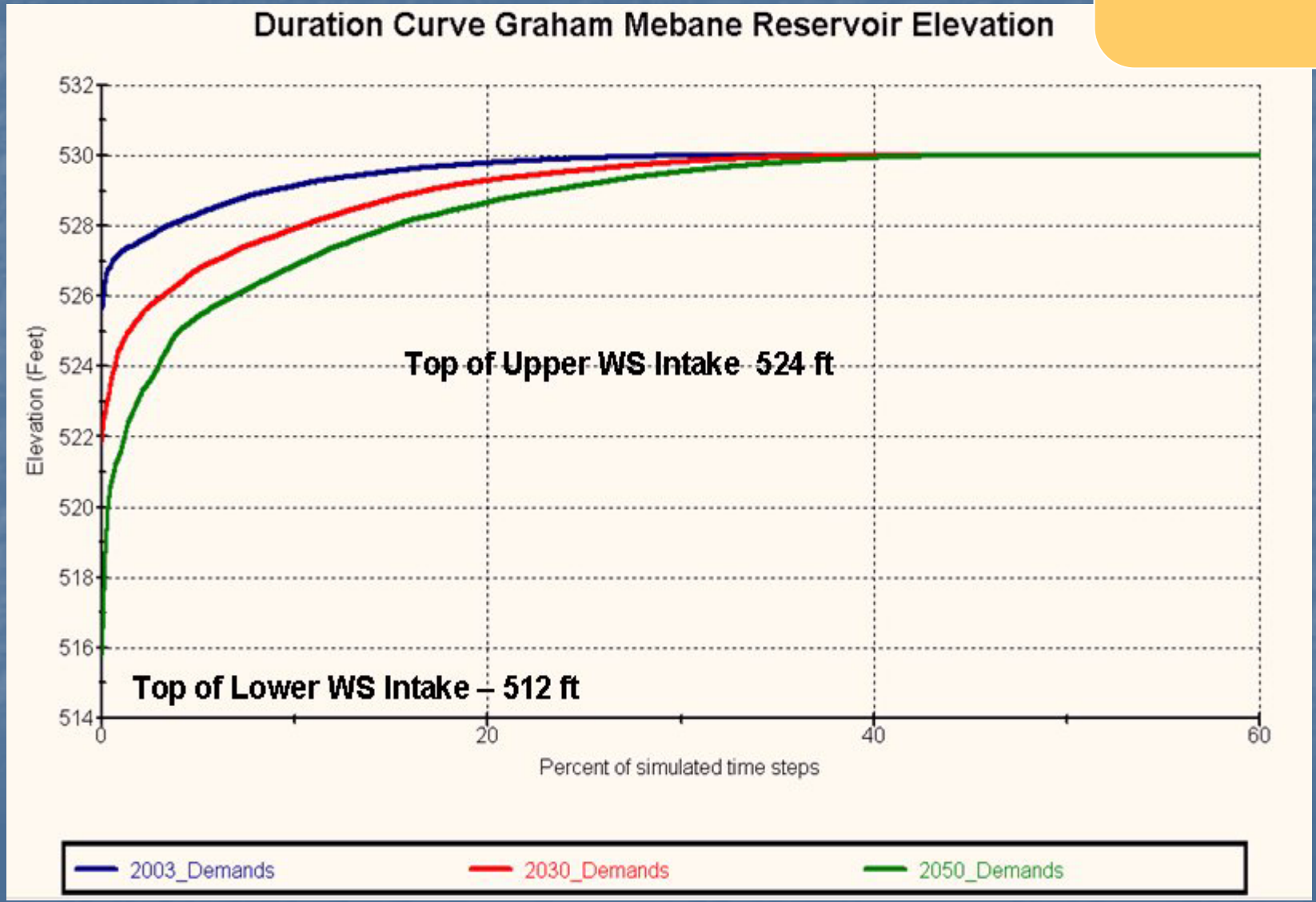
Evaluation Criteria



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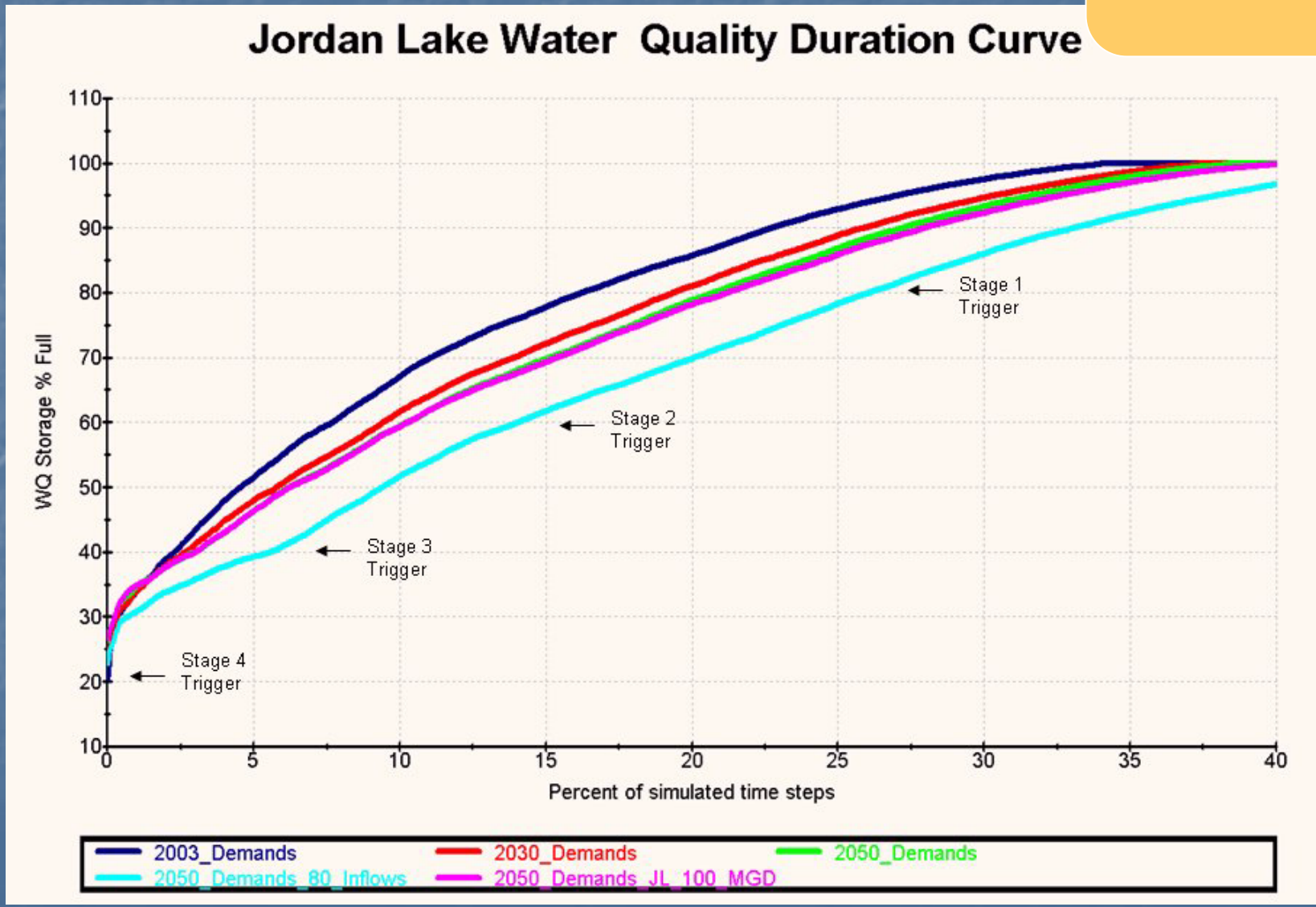

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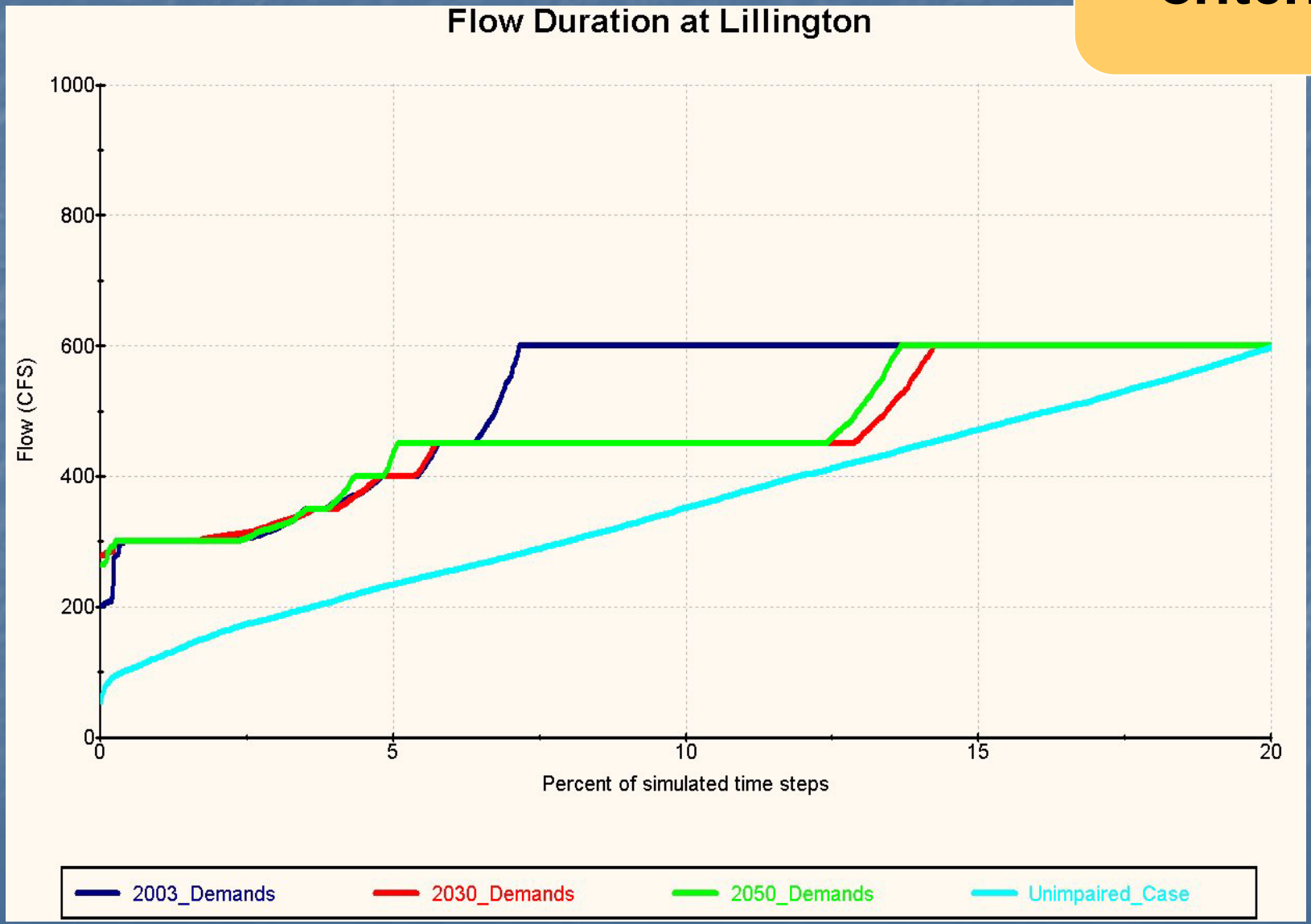

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What ifs:

- Would a reasonable reduction in demands avoid the identified problems?
- Could an alternative source meet expected demands?
- What happens if future droughts are longer or more severe?
- What happens if we can not discharge the same percent of wastewater?

Needed Information for Plan Update

- Annual Water Use Data LWSP & WWR
- Update LWSP
  - ✓ Projections to 2060
  - ✓ Projections of wastewater discharges
  - ✓ Anticipated source changes (GW --> SW?)
  - ✓ Anticipated additional water sources
- USE "NOTE" FIELDS to submit additional information

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Projections

* denotes required fields

Population Projections	2006	2010	2020	2030	2040	2050
*Year-Round	288	0	0	0	0	0
Seasonal		0	0	0	0	0

Water Use Projections (MGD)	2006	2010	2020	2030	2040	2050
*Residential	0.016	0	0	0	0	0
*Commercial	0.002	0	0	0	0	0
*Industrial	0.000	0	0	0	0	0
*Institutional	0.003	0	0	0	0	0
*System Process	0.003	0	0	0	0	0
Unaccounted-for Estimate	Calculate	0.000	0.000	0.000	0.000	0.000
*Unaccounted-for Fill	0.003	0	0	0	0	0

Note:

Add 2060 data here

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Let's manage our limited supply wisely?

www.ncwater.org

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NC Estimated 2008 Net Water Withdrawals

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