

Sustainable Water Resource Series Forum

- Jan 7 – Introduction – why and what for
- Jan 21 – State Water Plan
- Feb 4 – Other Water Supply Options
- Feb 18 – Lake Thunderbird
- Mar 4 – Regional Water Supply Solution
- Mar 18 – Trusts
- Apr 1 – Financial Conditions of Utilities
- Apr 15 – Comparison of Financial Options of Long Term Water Solutions

Acknowledgements

- Water Customers
- NUA (Norman Utility Authority)
- City of Norman
- COMCD (Central Oklahoma Master Conservancy District)
- ODEQ (Oklahoma Department of Environmental Quality)
- OWRB (Oklahoma Water Resource Board)
- Central Oklahoma Regional Water Trust
- Norman City Council

Water

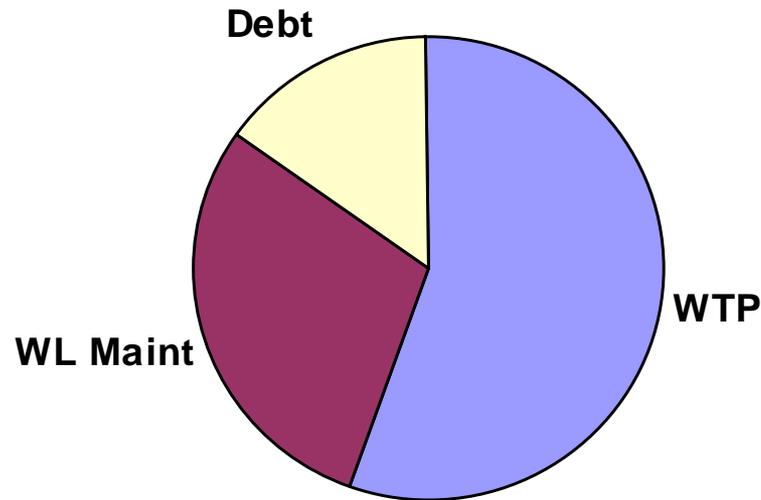
Over 4.5 billion gallons produced/yr
24/7 365 days a year



530 miles of pipelines
170,000 water quality tests
per year

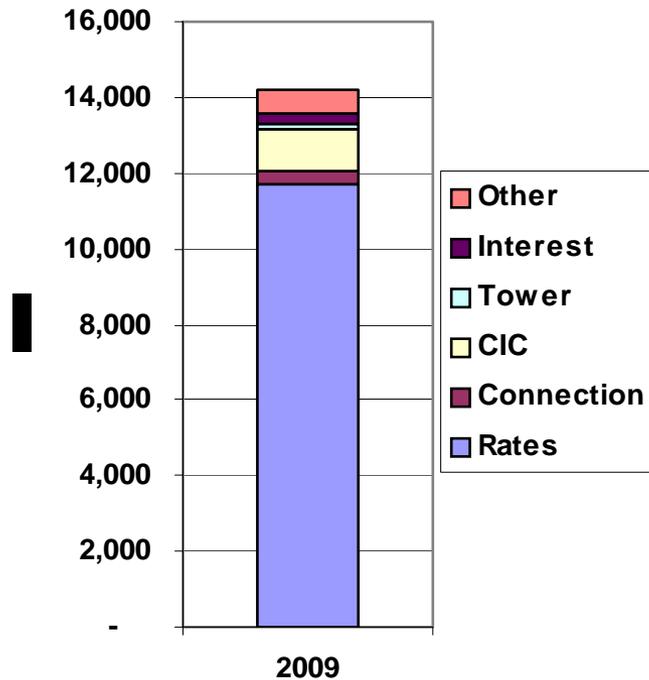
Water Utility Expense

Water Utility Expenses

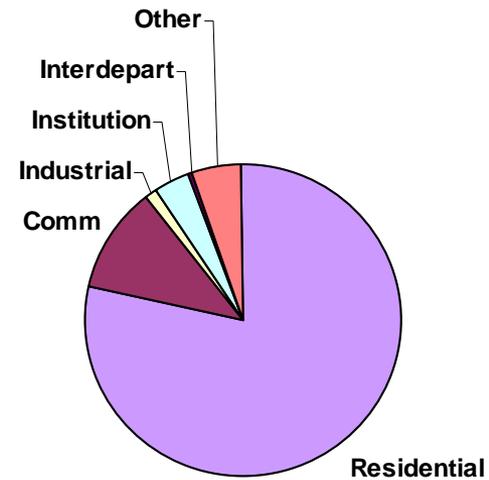


Water Utility Revenues

Water Revenue 2009



Water Utility Revenues by Customer Class 2009



Water Utility Rates

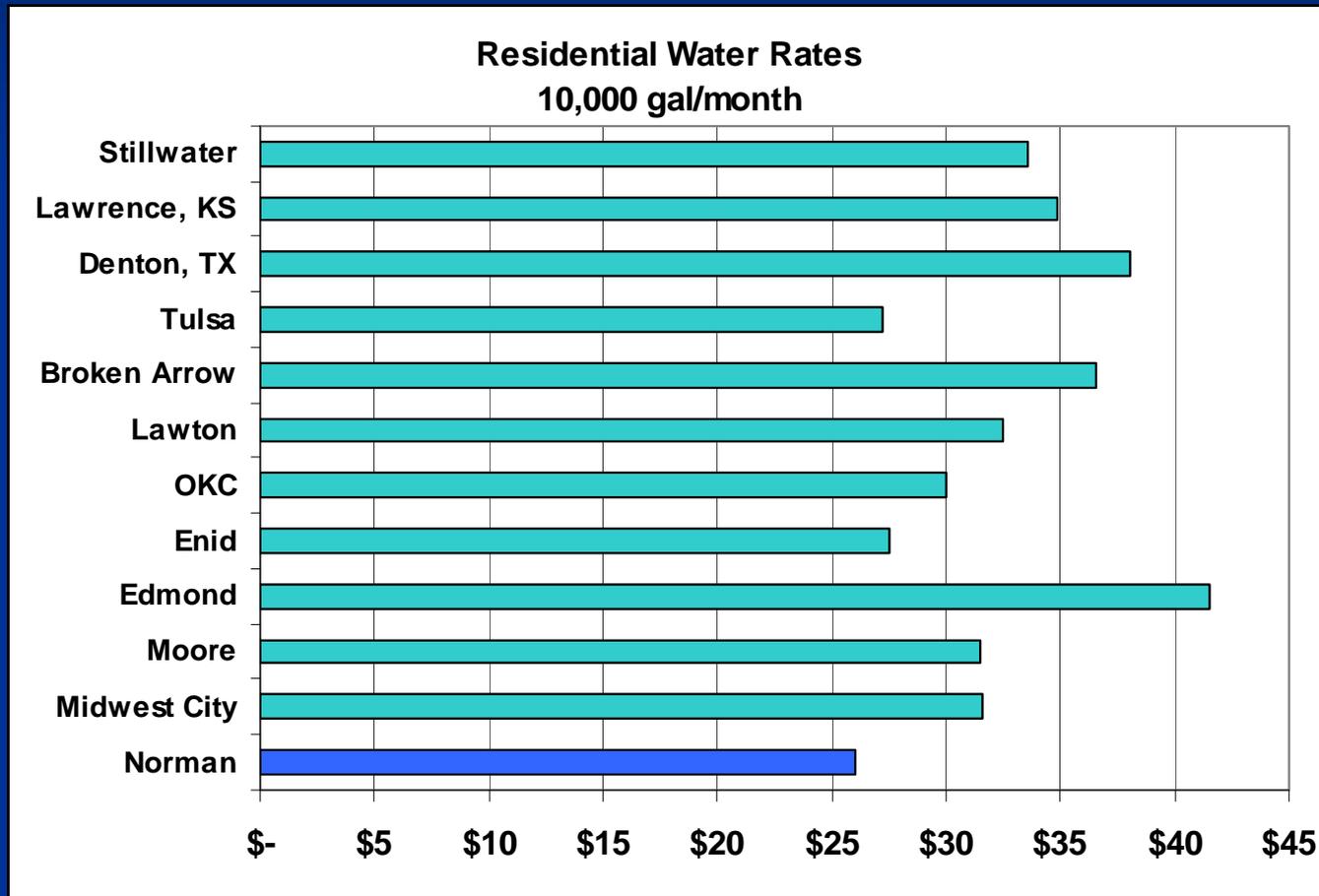
<u>Gallons</u>	<u>\$ Rate/ 1k gal</u>
Residential	
Base fee	4.00
0 – 5,000	2.00
5,001 – 15,000	2.10
15,001 – 20,000	2.75
Over 20,000	4.95
Commercial	
Base fee	4.00
All consumption	2.10

City Charter

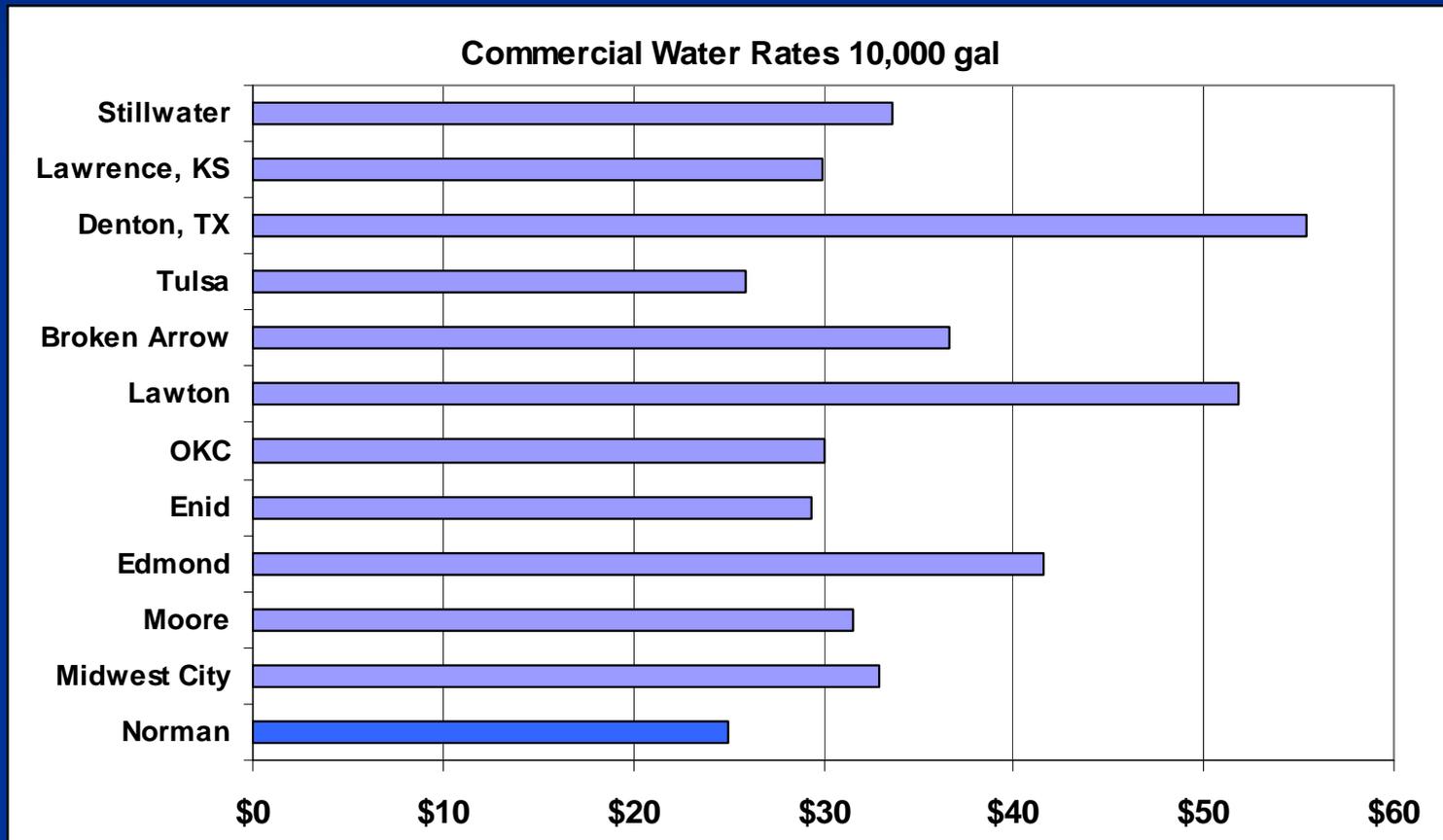
Article XVI. Municipally Owned Utilities

Section 2. ...an increase in utility rates must be submitted to the legal voters of the City for their approval or rejection...

Residential Water Rates



Commercial Water Rates



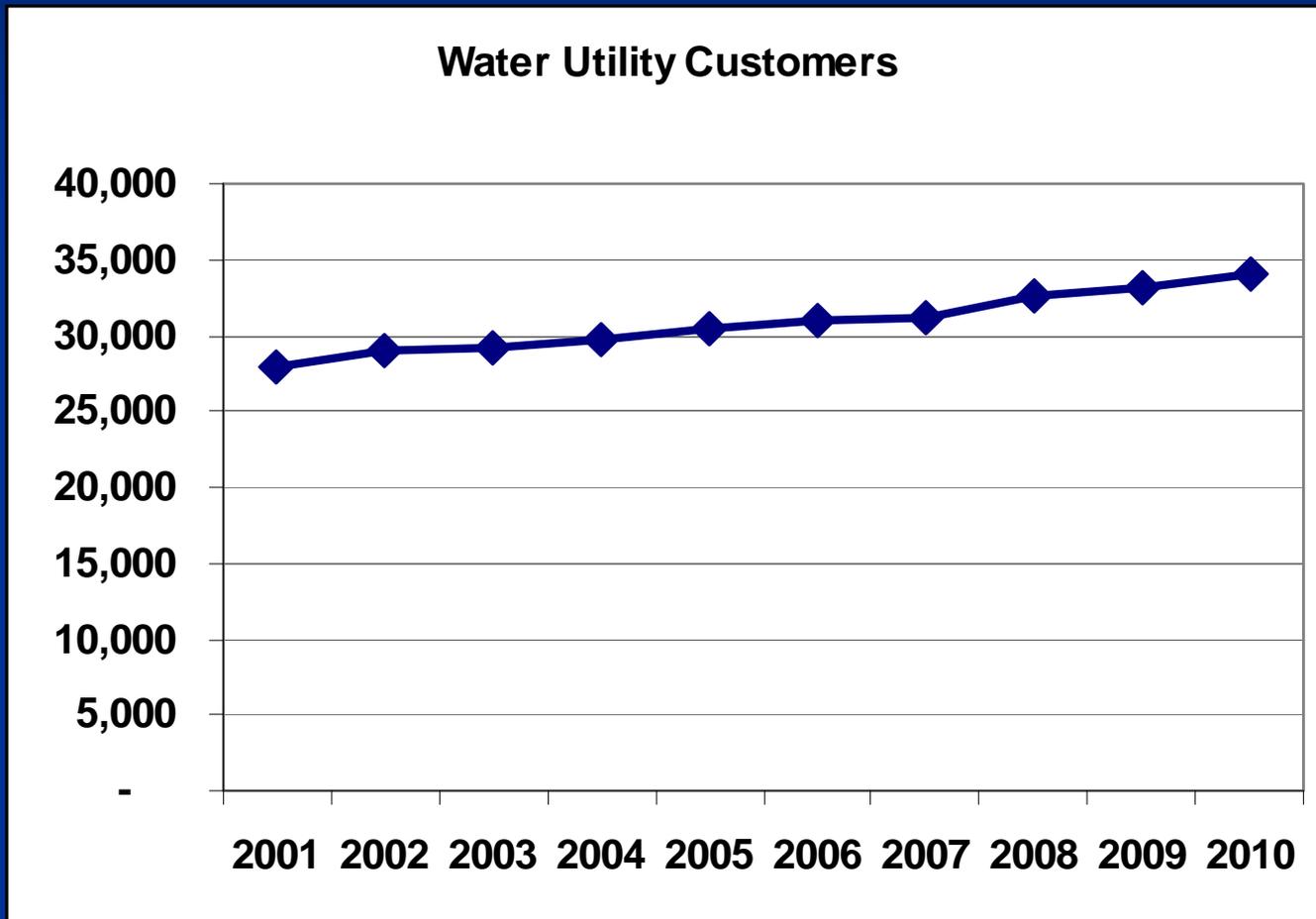
Water Capital Projects

- Installed miles of new larger diameter water mains
- Installed miles of replacement water mains
- Repainted two water storage tanks
- Replaced all large water meters
- Initiated well replacement projects
 - 3 wells completed
 - 6 wells in completion
 - 10 wells under construction

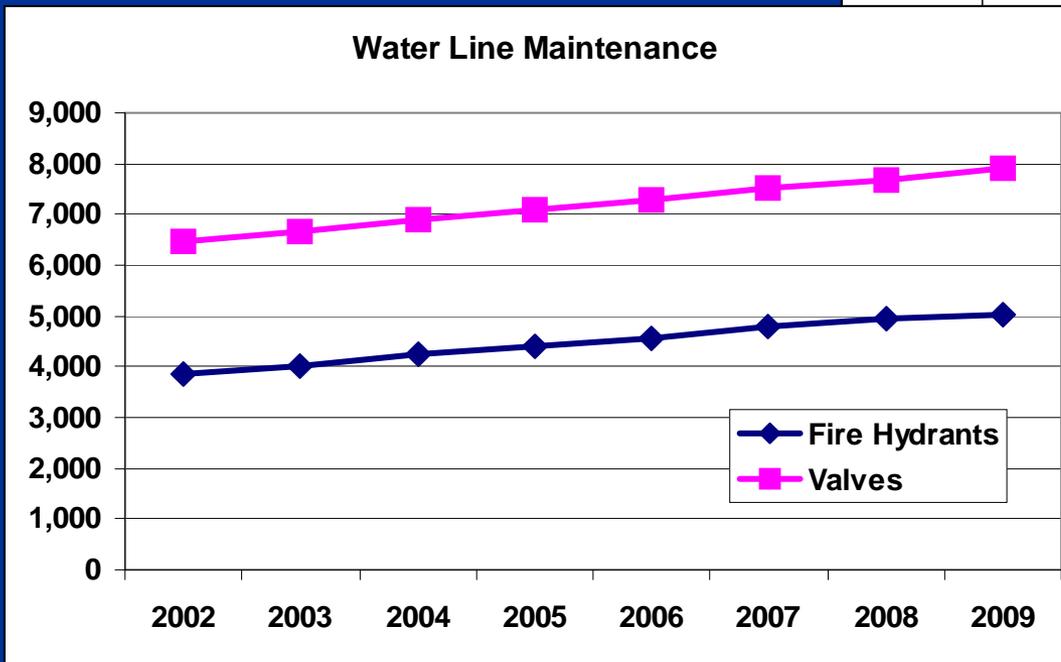
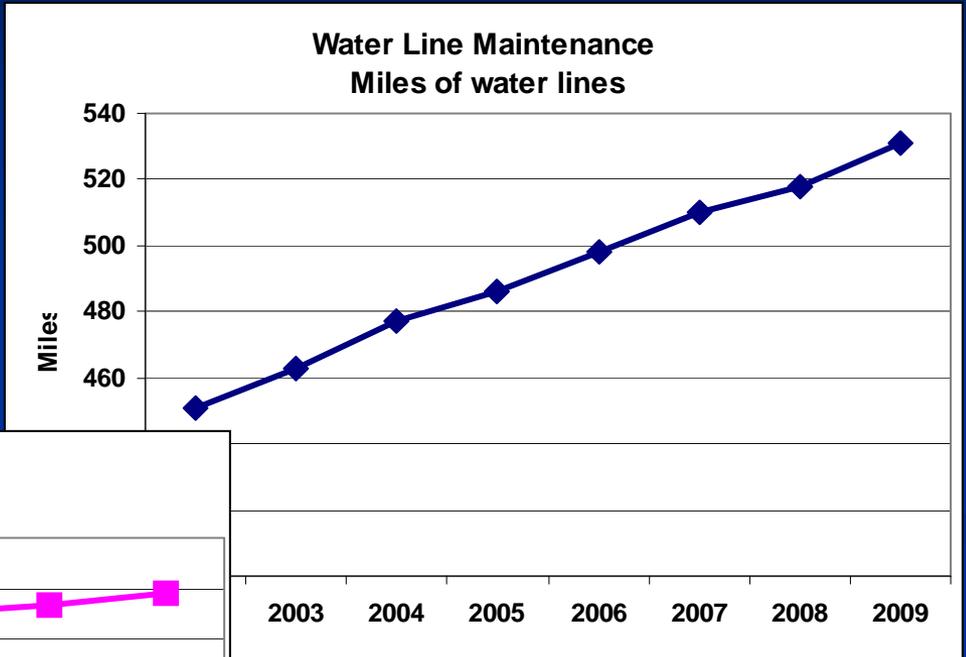
Water Capital Projects

- Applied for and received ARRA funding
 - \$14 million loan from OWRB
 - \$ 2 million in principal and interest free
 - \$12 million at 2.78% interest
- Funds used for Water Treatment Plant rehabilitation – New clarifier, filter replacement, chemical feed units, emergency generator, new electrical, etc.

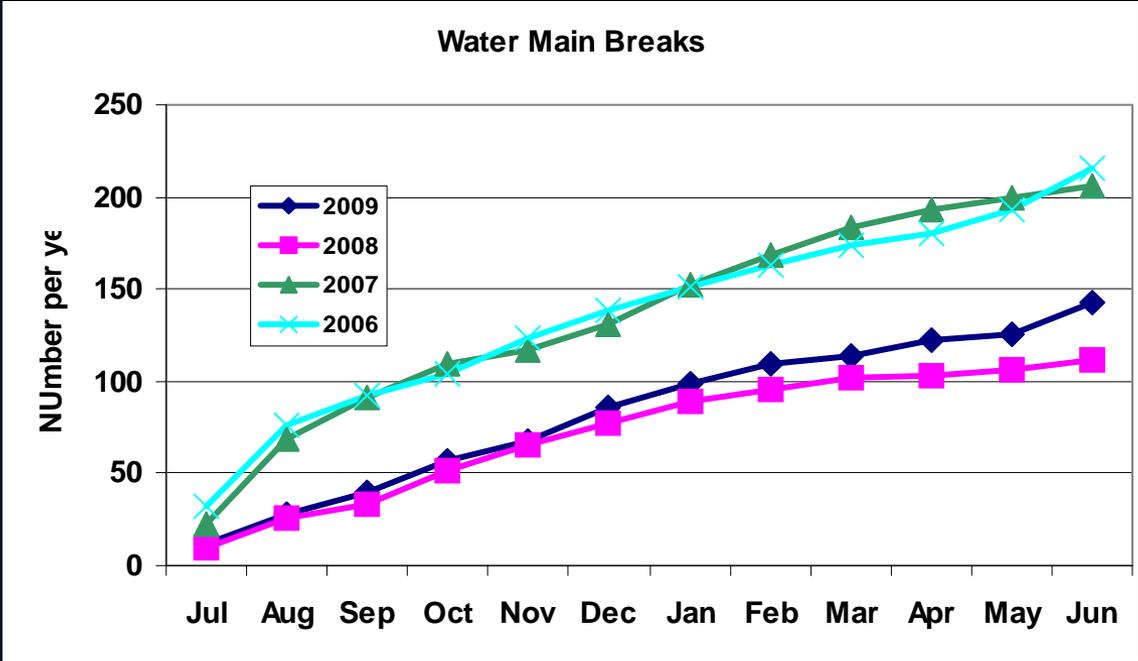
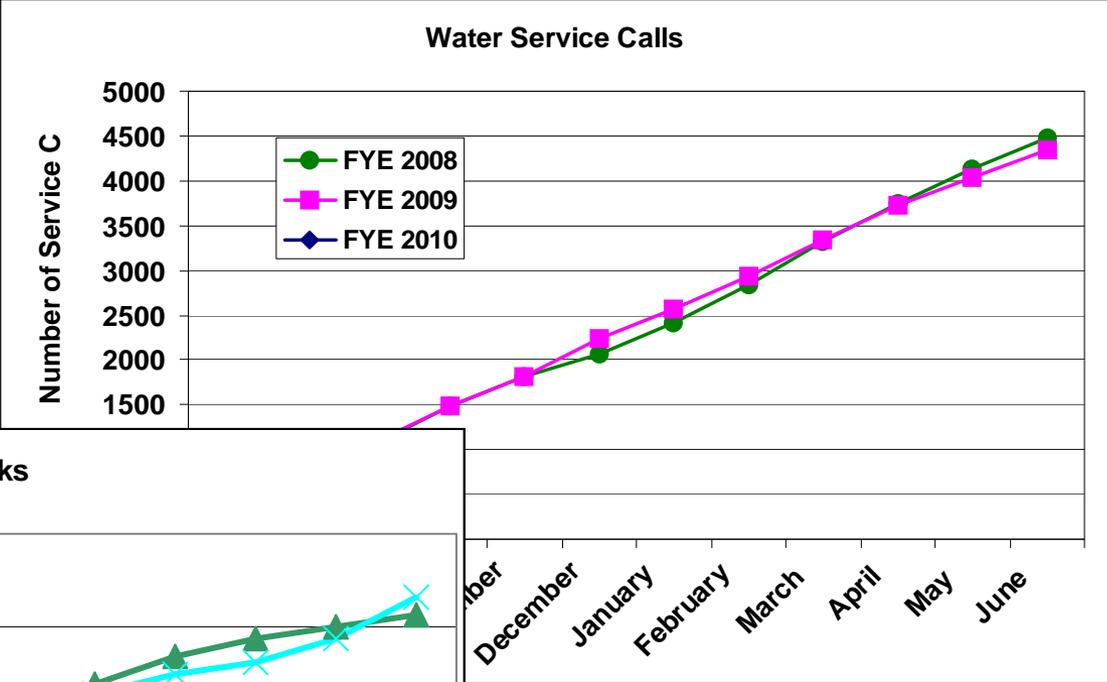
Water Utility Customers



Water Line Maintenance



Water – Line Maintenance

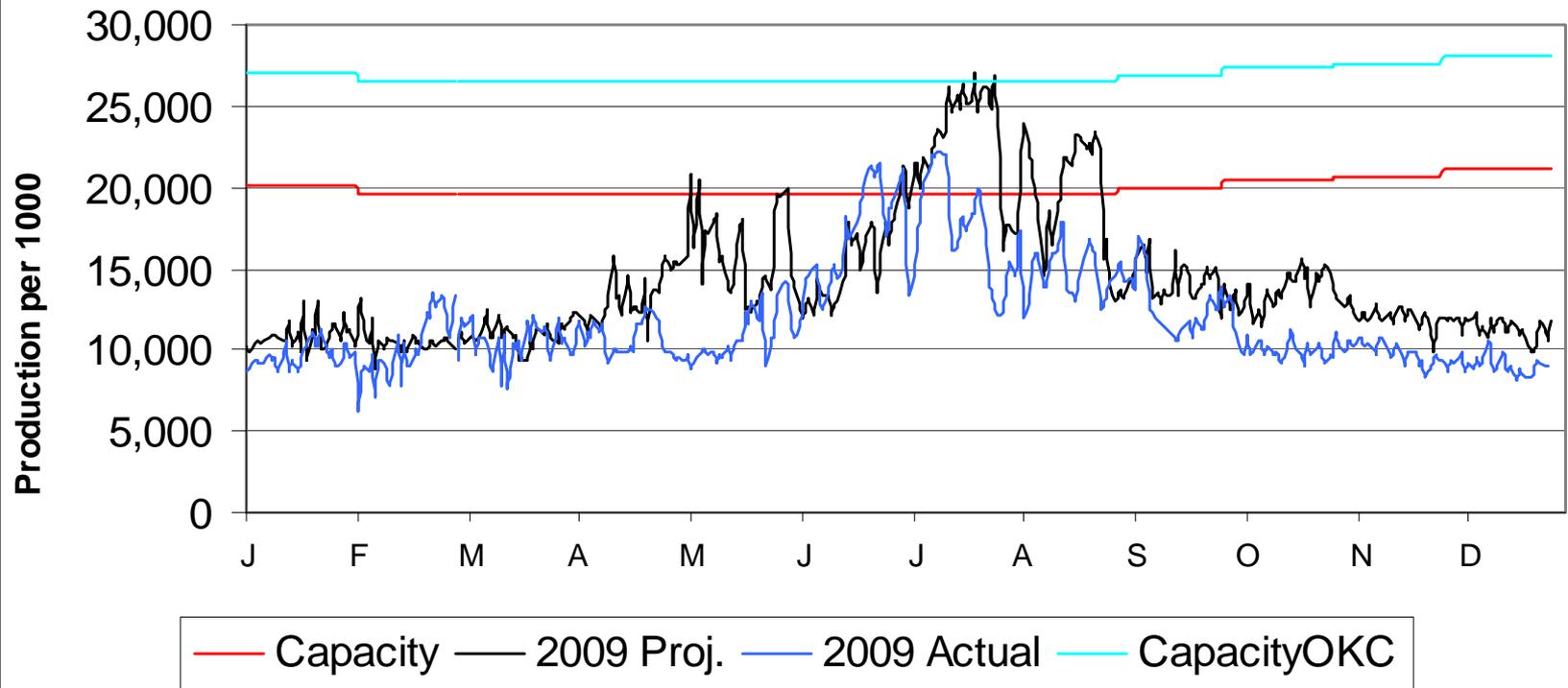


Water Sources

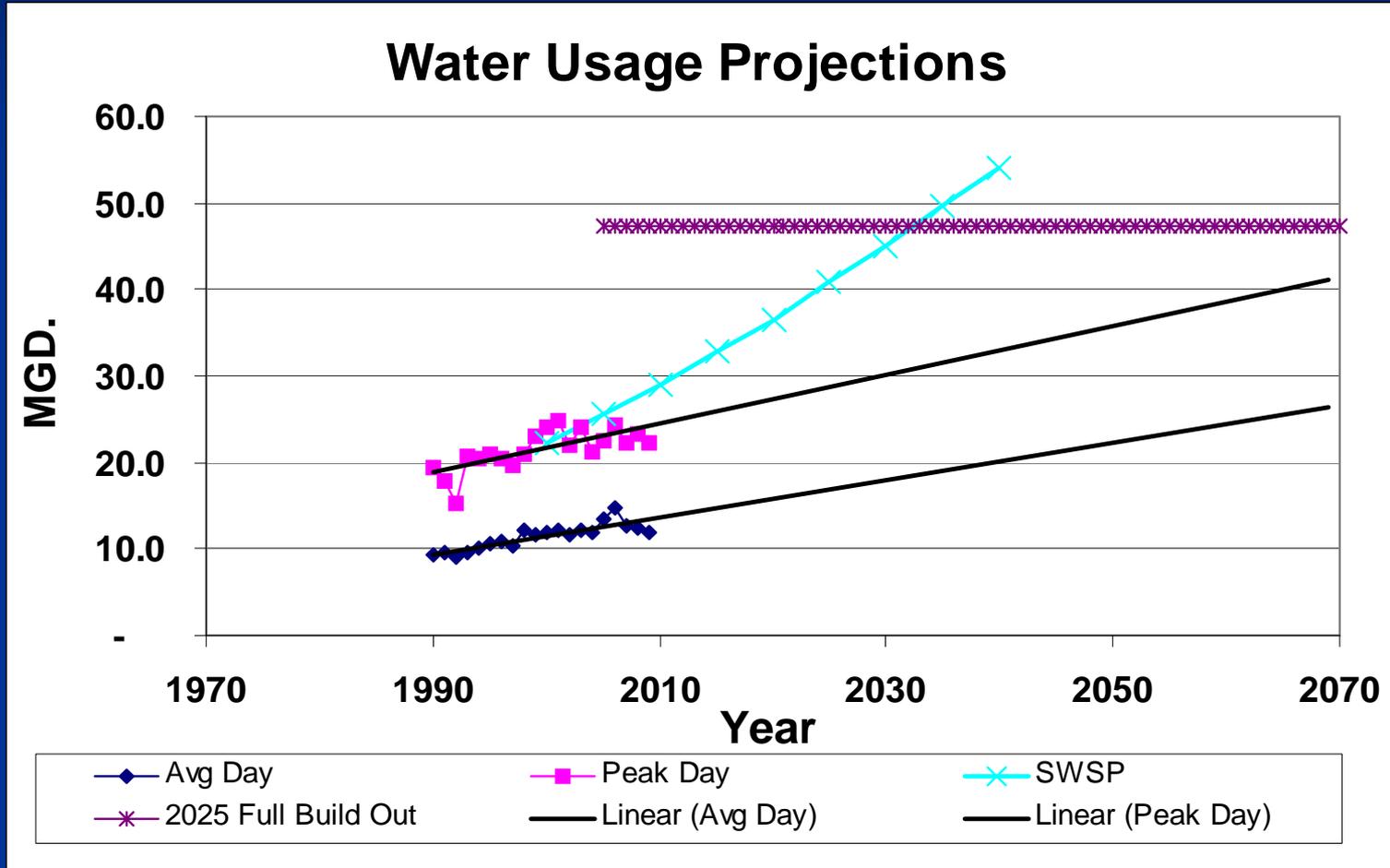
- Lake Thunderbird 72%
- Wells – Garber Wellington 26%
- OKC 2%

2009 Water Usage

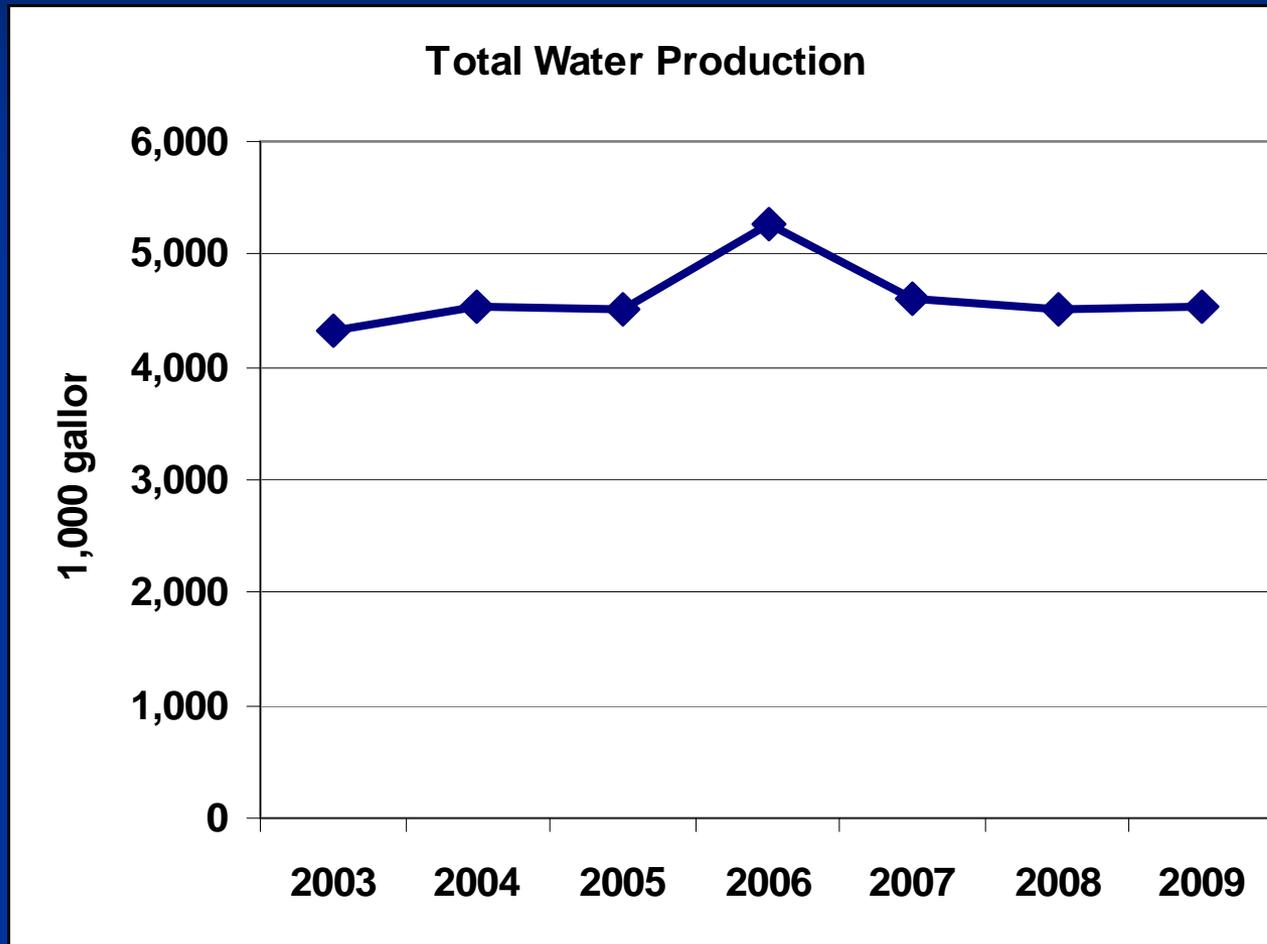
NUA Actual vs Projected 2009



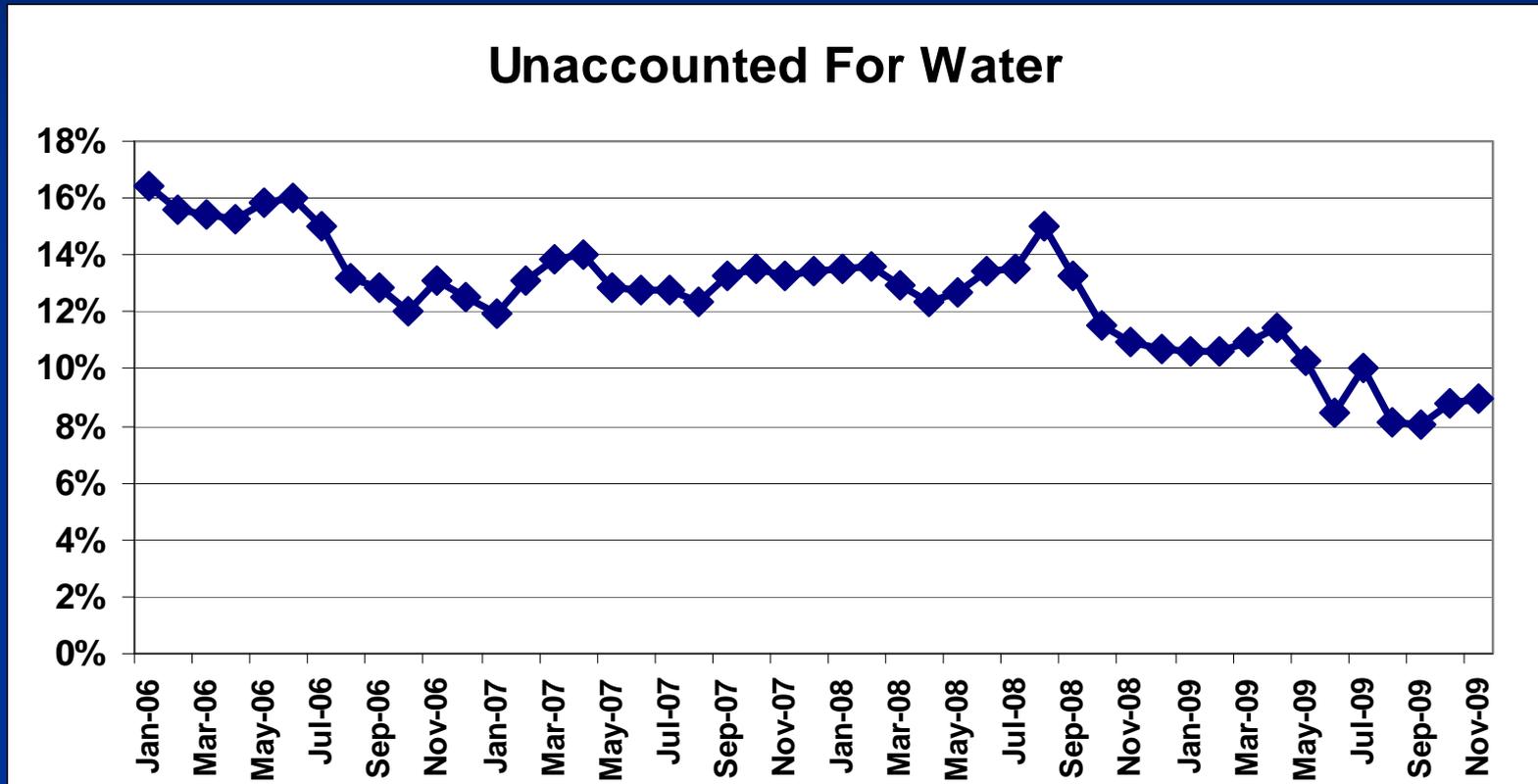
Norman water usage



Total Water Production

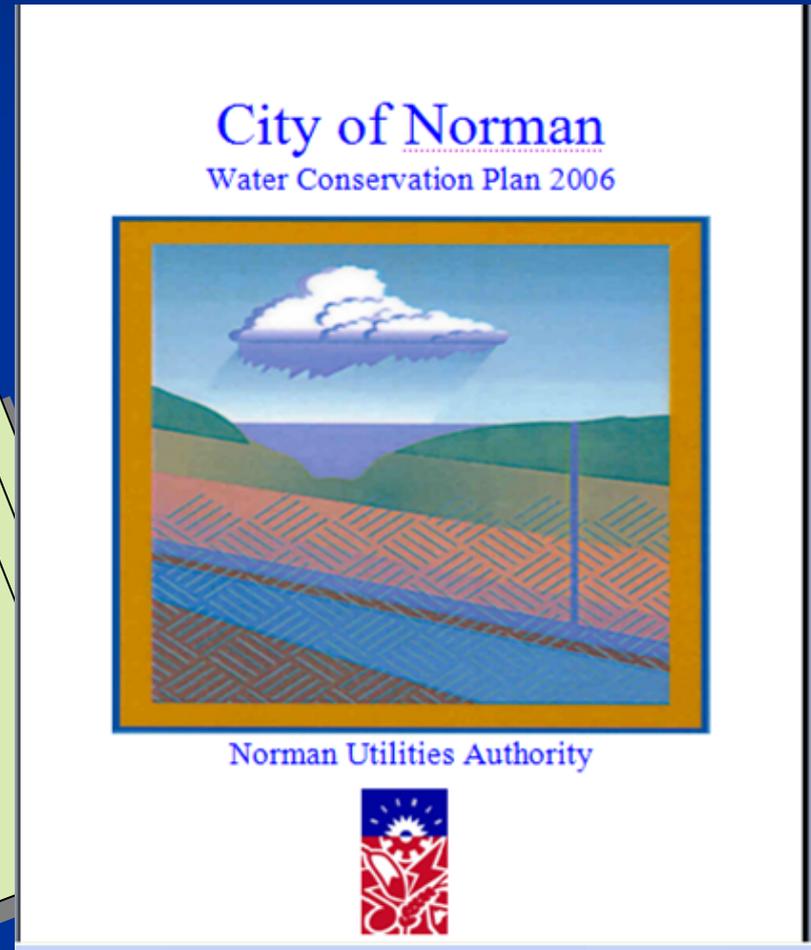


Unaccounted for Water



Water Conservation

- Update Water Conservation Plan
- ECAB Conservation Research
- Public Education



Water Conservation

- Existing Plan
 - Metering Program 2000
 - Plumbing fixtures 1997
 - Leak Repair
 - Education – newspaper, schools, etc.
 - Reuse for golf course
 - Water rates - inverted block 1999 rate
- rate increase 2006

Water Conservation

- New Additions
 - Irrigation ordinances
 - Odd/Even watering days
 - Meter Replacement Program
 - Water Reuse at the WWTP
 - Griffin Park lake
 - Westwood Golf course
 - Updates to City Ordinances

Water Wells

Previous

Well #	Flow (gpm)	Flow (TGD)
1	189	272.2
2	310	446.4
3	235	338.4
4	249	358.6
5	192	276.5
6	239	344.2
7	159	229.0
8	235	338.4
10	134	193.0
11	112	161.3
12	164	236.2
13	190	273.6
14	177	254.9
15	215	309.6
16	143	205.9
18	136	195.8
19	210	302.4
20	155	223.2
21	144	207.4
23	160	230.4
25	100	144.0
31	196	282.2
32	182	262.1
33	200	288.0
34	229	329.8
35	140	201.6
36	241	347.0
37	211	303.8
38	230	331.2
39	186	267.8
40	217	312.5
HP1	100	144.0
HP3	160	230.4
TOTAL FLOW		8.8 MGD

December 2005

Well #	Flow (gpm)	Flow (TGD)
1	189	272.2
2	310	446.4
3	235	338.4
4	249	358.6
5	192	276.5
6	239	344.2
7	159	229.0
8	235	338.4
10	134	193.0
11	112	161.3
12	164	236.2
13	190	273.6
14	177	254.9
15	215	309.6
16	143	205.9
18	136	195.8
19	210	302.4
20	155	223.2
21	144	207.4
23	160	230.4
25	100	144.0
31	196	282.2
32	182	262.1
33	200	288.0
34	229	329.8
35	140	201.6
36	241	347.0
37	211	303.8
38	230	331.2
39	186	267.8
40	217	312.5
HP1	100	144.0
HP3	160	230.4
TOTAL FLOW		6.67 MGD

January 6, 2006

Well #	Flow (gpm)	Flow (TGD)
1	189	272.2
2	310	446.4
3	235	338.4
4	249	358.6
5	192	276.5
6	239	344.2
7	159	229.0
8	235	338.4
10	134	193.0
11	112	161.3
12	164	236.2
13	190	273.6
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16	143	205.9
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19	210	302.4
20	155	223.2
21	144	207.4
23	160	230.4
25	100	144.0
31	196	282.2
32	182	262.1
33	200	288.0
34	229	329.8
35	140	201.6
36	241	347.0
37	211	303.8
38	230	331.2
39	186	267.8
40	217	312.5
HP1	100	144.0
HP3	160	230.4
TOTAL FLOW		4.4 MGD

New Wells

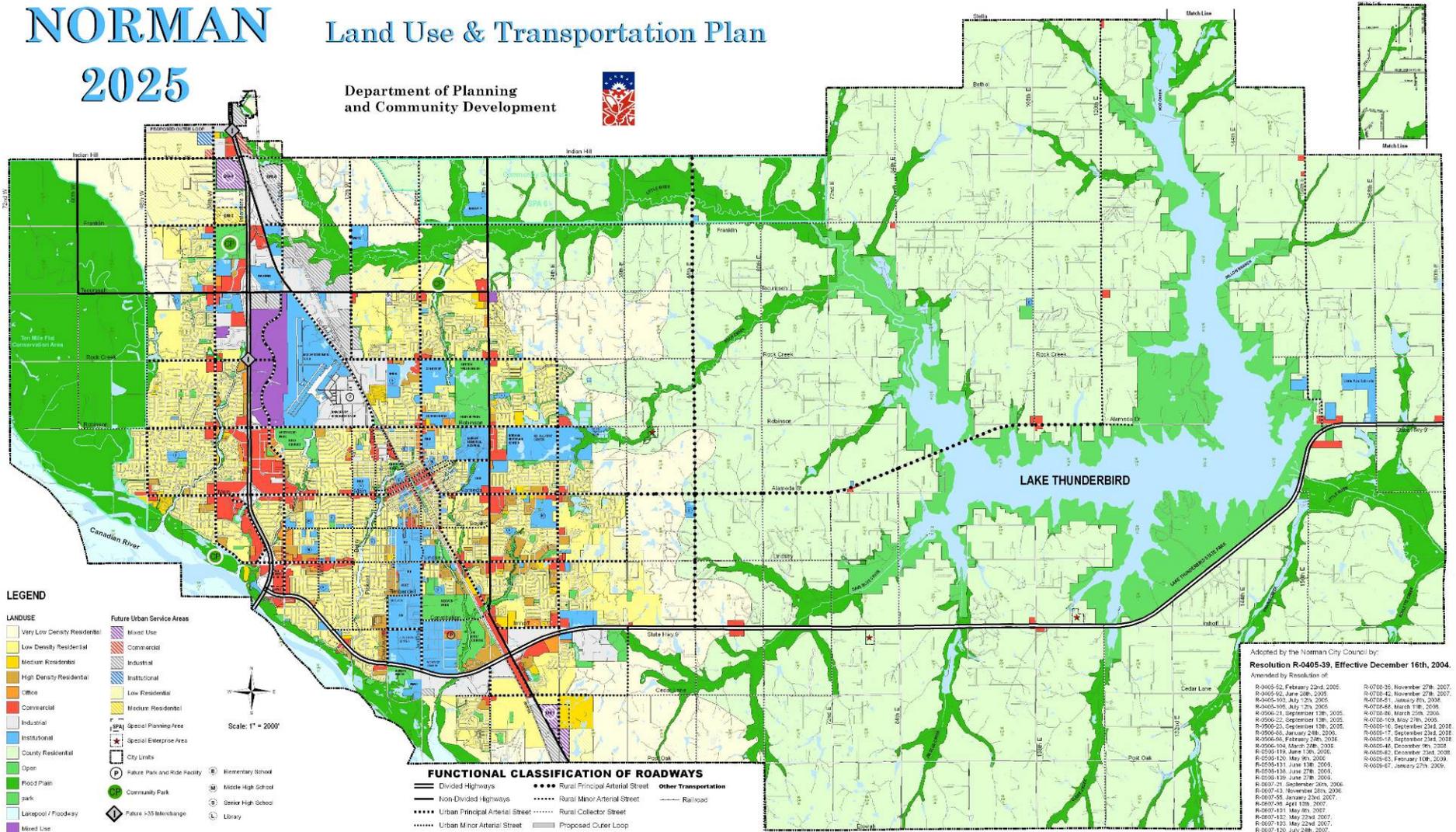


New Supply



NORMAN Land Use & Transportation Plan 2025

Department of Planning and Community Development



LEGEND

LANDUSE

- Very Low Density Residential
- Low Density Residential
- Medium Residential
- High Density Residential
- Office
- Commercial
- Industrial
- Institutional
- Courty Residential
- Open
- Flood Plain
- Park
- Lakeport / Floodway
- Mixed Use

Future Urban Service Areas

- Mixed Use
- Commercial
- Industrial
- Institutional
- Low Residential
- Medium Residential
- Special Planning Area
- Special Enterprise Area
- City Limits
- Future Train and Ride Facility
- Elementary School
- Middle High School
- Senior High School
- Library
- Future +30 Interchange

Scale: 1" = 2000'

FUNCTIONAL CLASSIFICATION OF ROADWAYS

- Divided Highways
- Non-Divided Highways
- Urban Principal Arterial Street
- Urban Minor Arterial Street
- Rural Principal Arterial Street
- Rural Minor Arterial Street
- Rural Collector Street
- Proposed Outer Loop
- Other Transportation
- Railroad

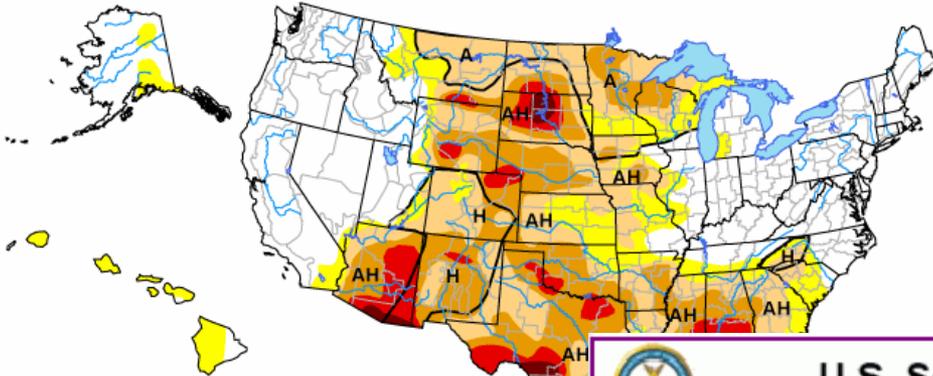
Adopted by the Norman City Council by
Resolution R-0405-39, Effective December 16th, 2004.
 Amended by Resolution of

R-0405-62, February 22nd, 2005	R-0702-35, November 27th, 2007
R-0405-62, June 28th, 2005	R-0702-42, November 27th, 2007
R-0405-103, July 12th, 2005	R-0702-61, January 6th, 2008
R-0405-105, July 12th, 2005	R-0702-66, March 7th, 2008
R-0504-21, September 18th, 2005	R-0702-66, March 20th, 2008
R-0506-22, September 13th, 2005	R-0702-169, May 27th, 2008
R-0506-25, September 13th, 2005	R-0802-02, September 23rd, 2008
R-0506-45, January 24th, 2006	R-0802-17, September 23rd, 2008
R-0506-46, February 28th, 2006	R-0802-42, September 23rd, 2008
R-0506-104, March 7th, 2006	R-0802-46, December 9th, 2008
R-0506-119, June 13th, 2006	R-0802-62, December 23rd, 2008
R-0506-120, May 9th, 2006	R-0802-62, February 10th, 2009
R-0506-121, June 13th, 2006	R-0802-67, January 27th, 2009
R-0506-134, June 27th, 2006	
R-0506-139, June 27th, 2006	
R-0607-21, September 20th, 2006	
R-0607-42, November 20th, 2006	
R-0607-55, January 24th, 2007	
R-0607-58, April 15th, 2007	
R-0607-101, May 6th, 2007	
R-0607-102, May 23rd, 2007	
R-0607-112, May 23rd, 2007	
R-0607-120, July 28th, 2007	
R-0607-122, August 29th, 2007	
R-0607-122, August 29th, 2007	
R-0607-122, August 29th, 2007	

Map prepared by the City of Norman
 MapInfo, Intergraph Systems, February 1994, 1995.

U.S. Drought Monitor

July 18, 2006
Valid 8 a.m. EDT



Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

Drought Impact Types:

- Delineates dominant impacts
- A = Agricultural (crops, pastures, grasslands)
- H = Hydrological (water)

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

<http://drought.unl.edu/dm>

Author: Richard H....



Rel...

U.S. Seasonal Drought Outlook

Drought Tendency During the Valid Period

Valid December 17, 2009 - March 2010

Released December 17, 2009



KEY:

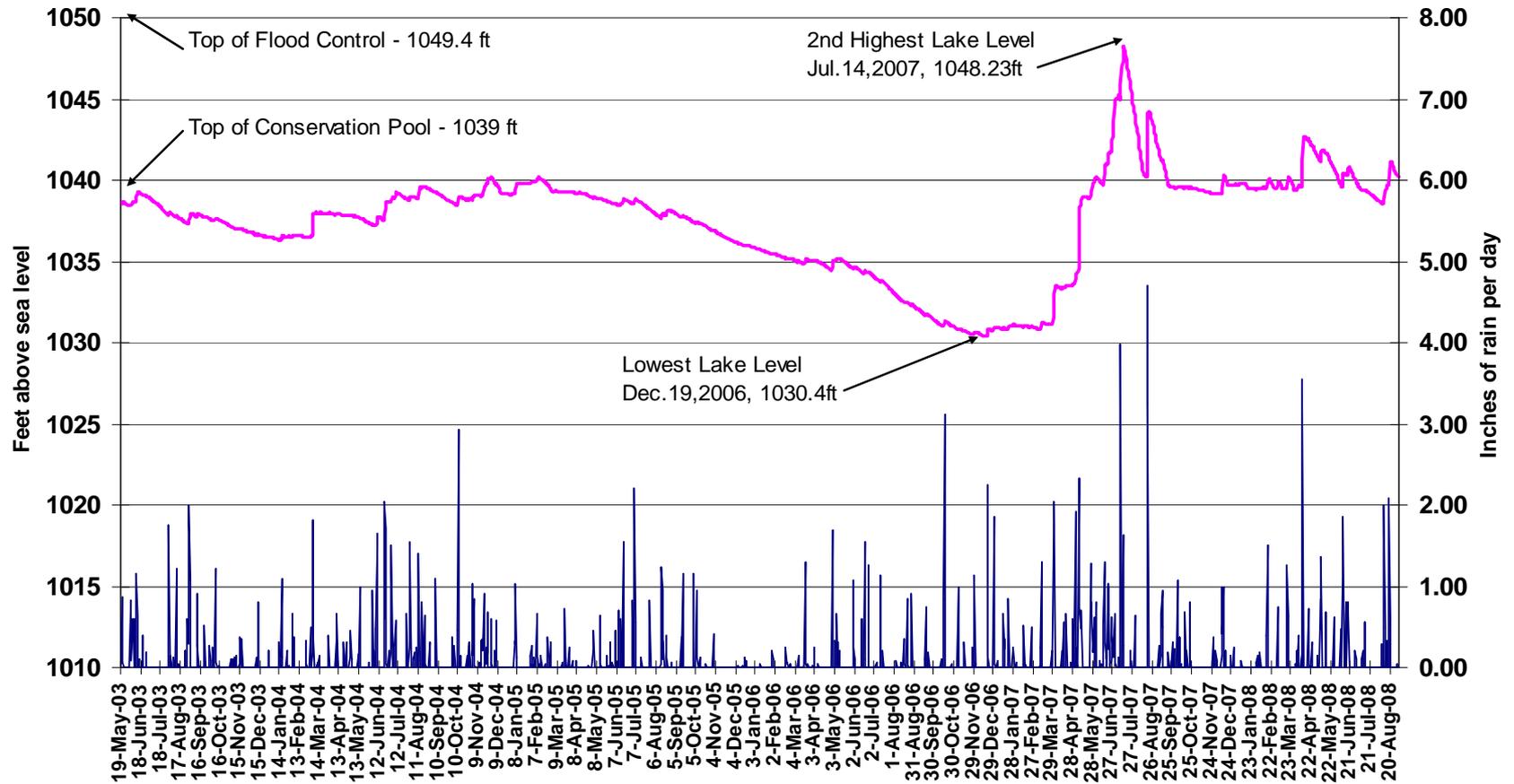
- Drought to persist or intensify
- Drought ongoing, some improvement
- Drought likely to improve, impacts ease
- Drought development likely

No Drought Posted/Predicted

Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Short-term events -- such as individual storms -- cannot be accurately forecast more than a few days in advance. Use caution for applications -- such as crops -- that can be affected by such events. "Ongoing" drought areas are approximated from the Drought Monitor (D1 to D4 intensity). For weekly drought updates, see the latest U.S. Drought Monitor. NOTE: the green improvement areas imply at least a 1-category improvement in the Drought Monitor intensity levels, but do not necessarily imply drought elimination.

Lake Thunderbird Lake Level and Rain Data

May 2003 to Present

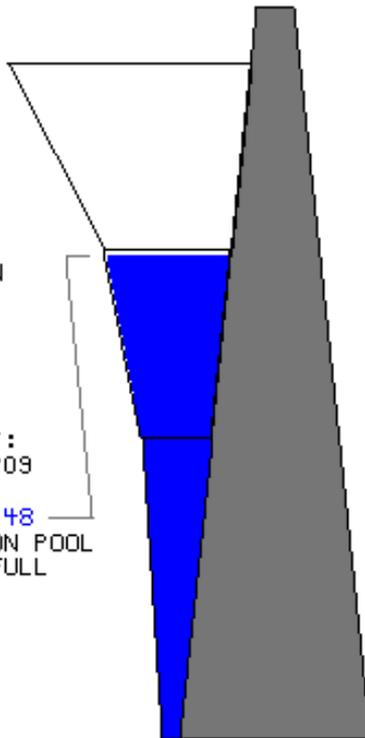


NRMO2 : Lake Thunderbird

ELEVATION AT
THE TOP OF
THE FLOOD
CONTROL
POOL :
1049.40 FT

NORMAL ELEV.
AT THE TOP
OF THE
CONSERVATION
POOL :
1039.00 FT

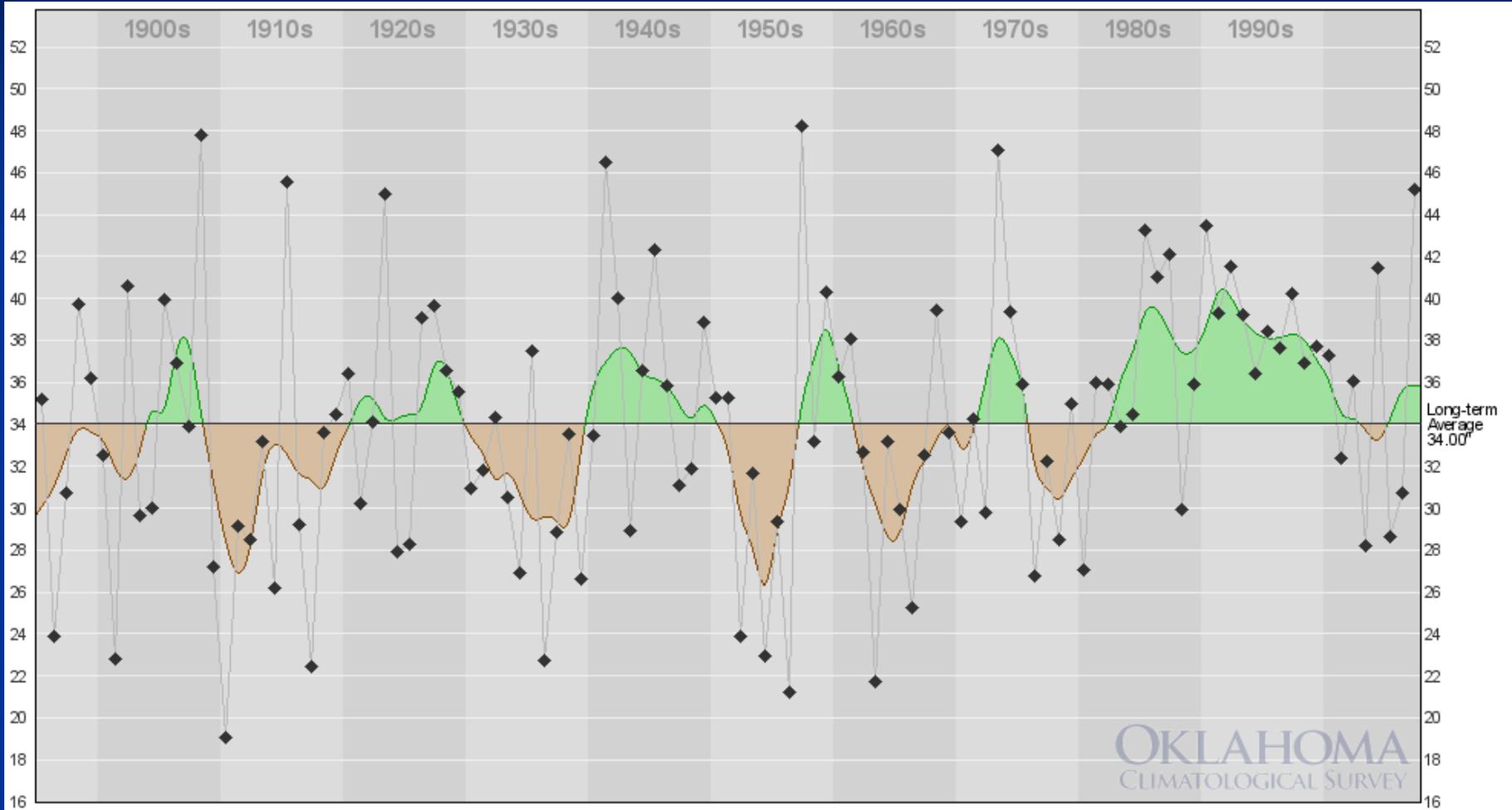
MOST CURRENT :
DATE: 22SEP09
TIME: 1500
ELEV: 1038.48
CONSERVATION POOL
IS 97.06% FULL



Current Readings:

- Pool elevation is 1038.48 feet on Tuesday 22Sep09 Time: 1500 hours.
- At this elevation the total amount of water stored in Lake Thunderbird is 116480 acre-feet.
- Reservoir release is 0 cubic feet per second on Tuesday 22Sep09 Time: 1500 hours.
- Conservation pool is 97.06% full.
- Conservation storage filled is 102840 acre-feet which is equivalent to 7.53 inches of runoff over the entire drainage basin.
- Conservation storage empty is 3120 acre-feet which is equivalent to 0.23 inches of runoff over the entire drainage basin.

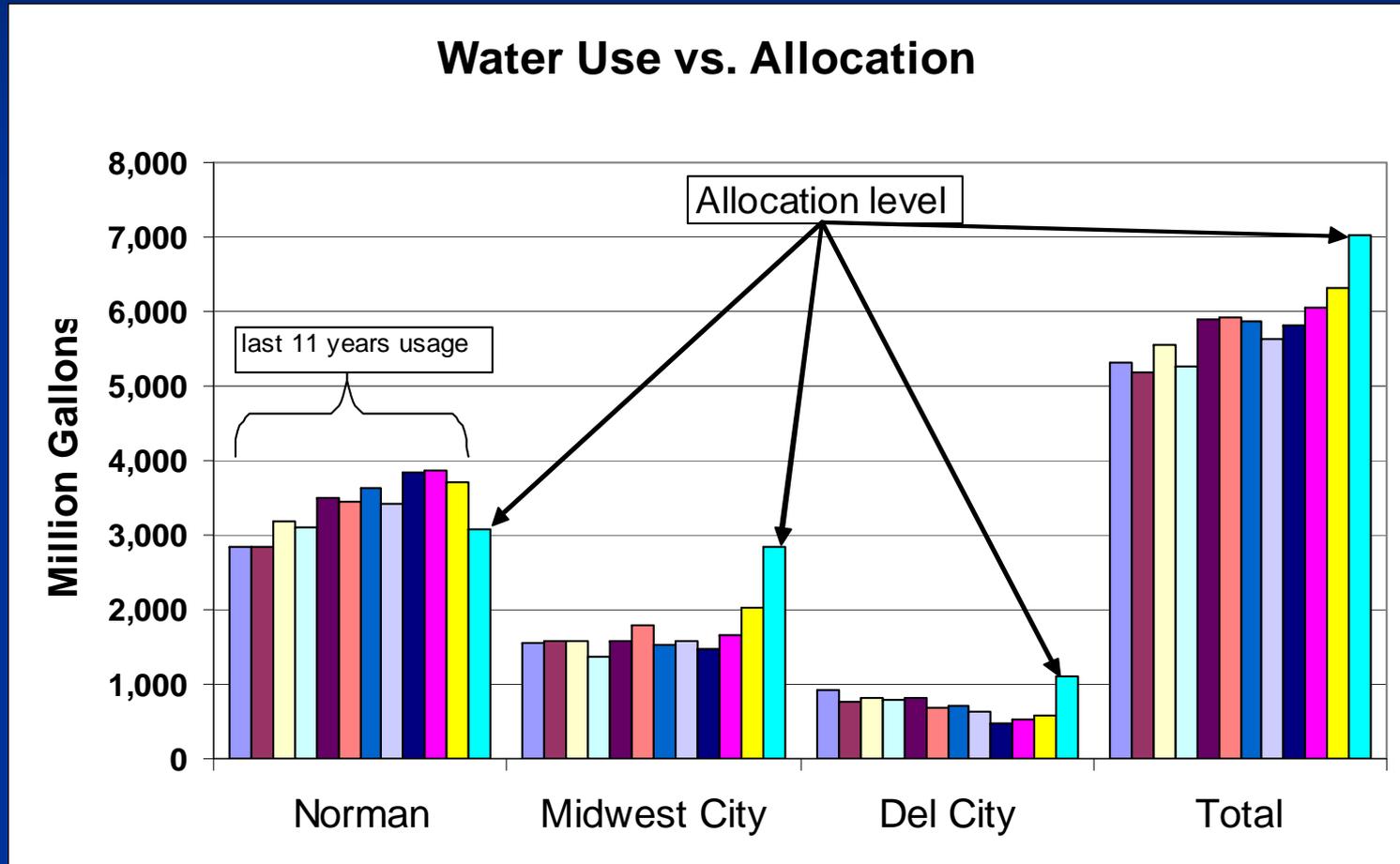
Oklahoma Precipitation



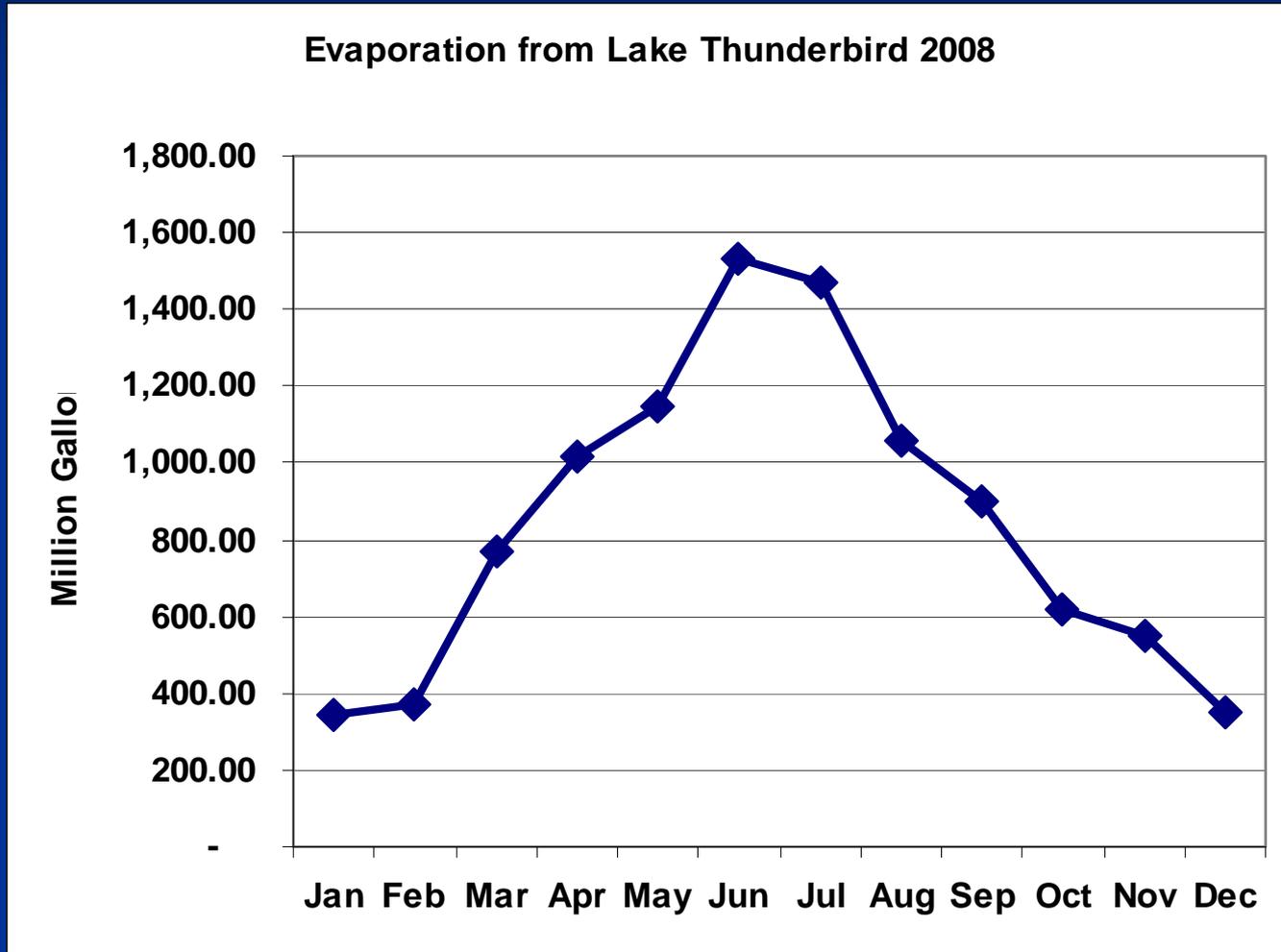
Annual Precipitation History with 5-year Tendencies
Oklahoma Statewide: 1895-2007

- Wetter historical periods
- Drier historical periods
- Individual Annual precipitation value

Water Use from Lake Thunderbird



Lake Thunderbird Water Loss



City of Norman, Oklahoma

Norman 2040 Strategic Water Supply Plan



February 2001

Presented By:
Norman Utilities Authority



2040 Strategic Water Supply Plan

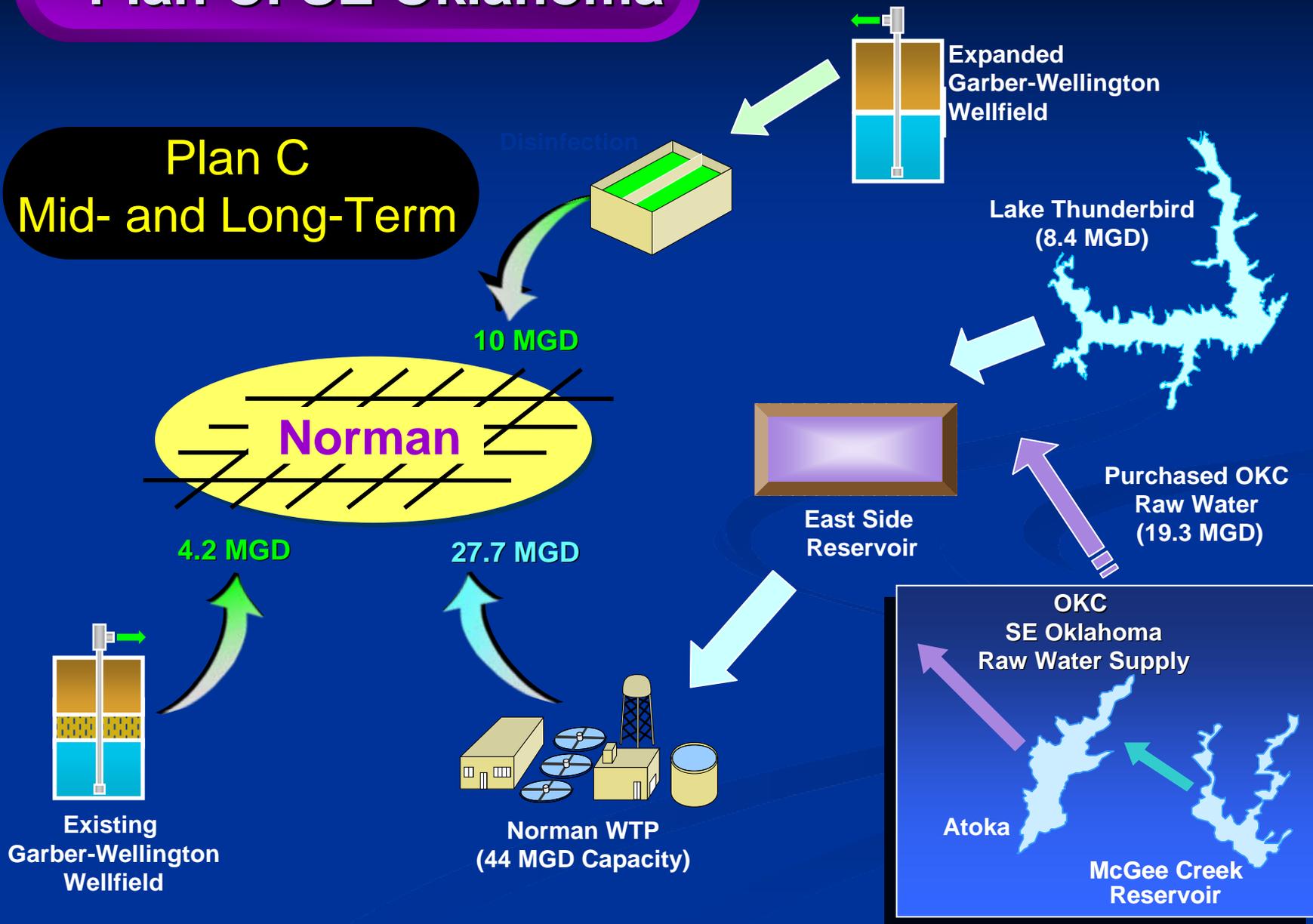
- Baseline Development
- Existing System Assessment
- Alternatives Evaluation
 - 17 possible water resource alternatives were identified
 - Each alternative evaluated and characterized based on quality, location, storage capacity, yield, cost policy, etc.

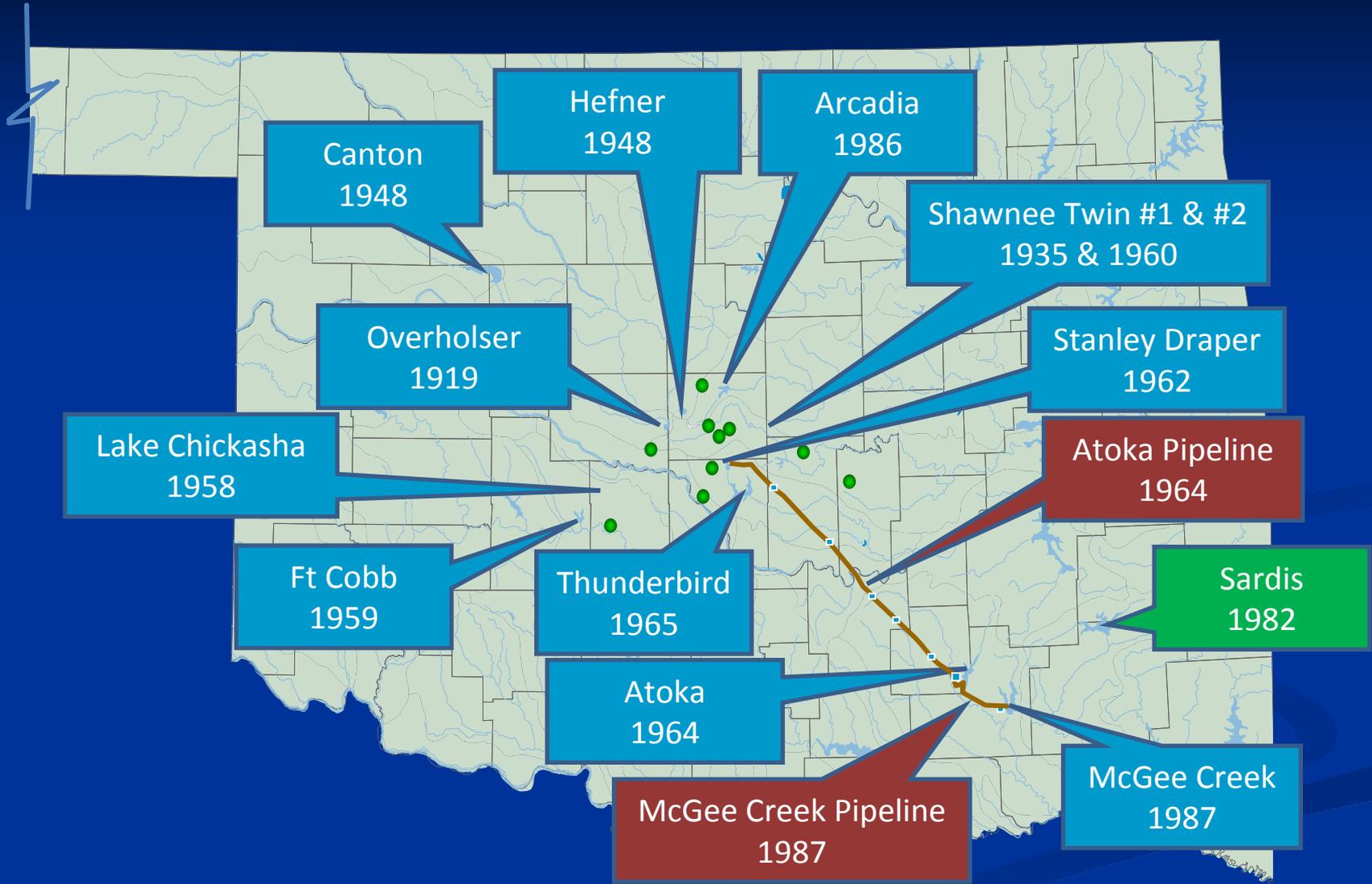
Strategic Water Supply Plan

- Water Resource Alternatives
 - A – Do nothing
 - B – Garber-Wellington Aquifer
 - C – Southeast Oklahoma
 - D – Hugo reservoir
 - E – South Canadian, one treatment plant
 - F – South Canadian, two treatment plant

Plan C: SE Oklahoma

Plan C
Mid- and Long-Term







GOLDSBY



COWRA

Central Oklahoma Water Resource Authority

PO Box 851331
Yukon, OK 73085-1331



Central Oklahoma Water Supply Study

Participants

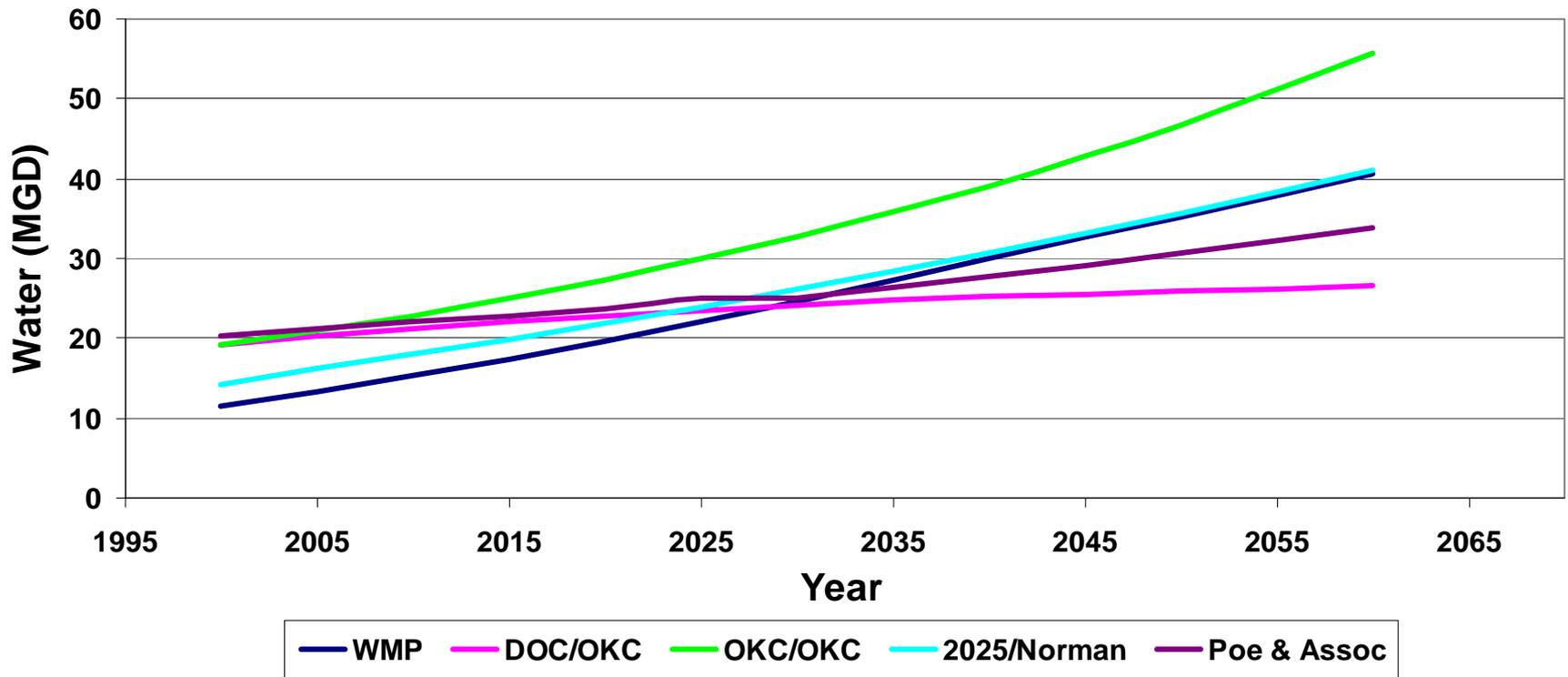
2000 Census Population

<u>City</u>	<u>Population</u>	<u>%</u>
Chickasha	15,850	1.8%
COWRA	50,400	5.7%
Del City	22,100	2.5%
Edmond	68,300	7.7%
MidWest City	54,100	6.1%
Moore	41,100	4.6%
Norman	95,700	10.8%
Oklahoma City	506,100	56.9%
Seminole	6,900	0.8%
Shawnee	28,700	3.2%
TOTAL	889,250	100.0%

COWRA represents Mustang,
Yukon
El Reno
Piedmont
Union City
Calument

City of Norman Water Demand

Total Water Demand Projections



City of Norman

System Demand Calculations;

Population

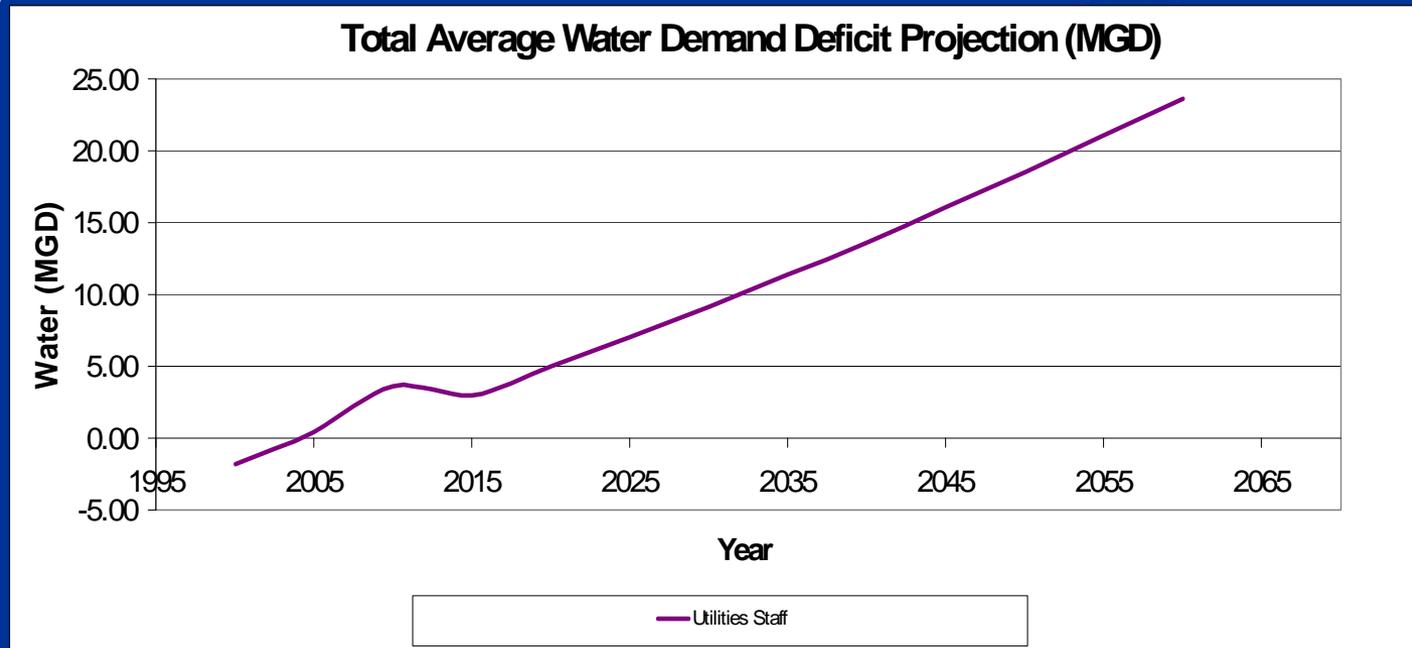
Per Capita Demand

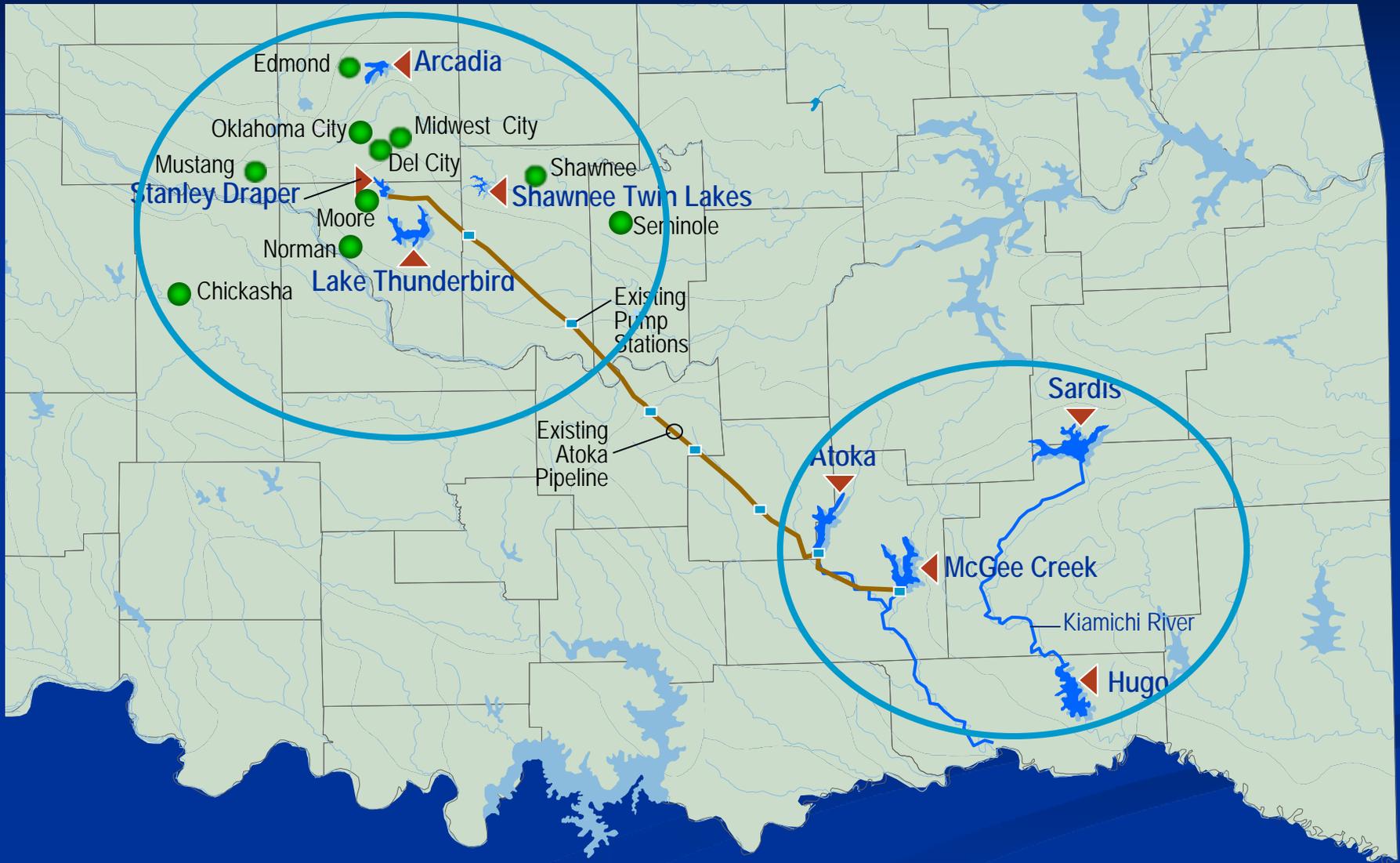
Average Day Demand

Lake Capacity

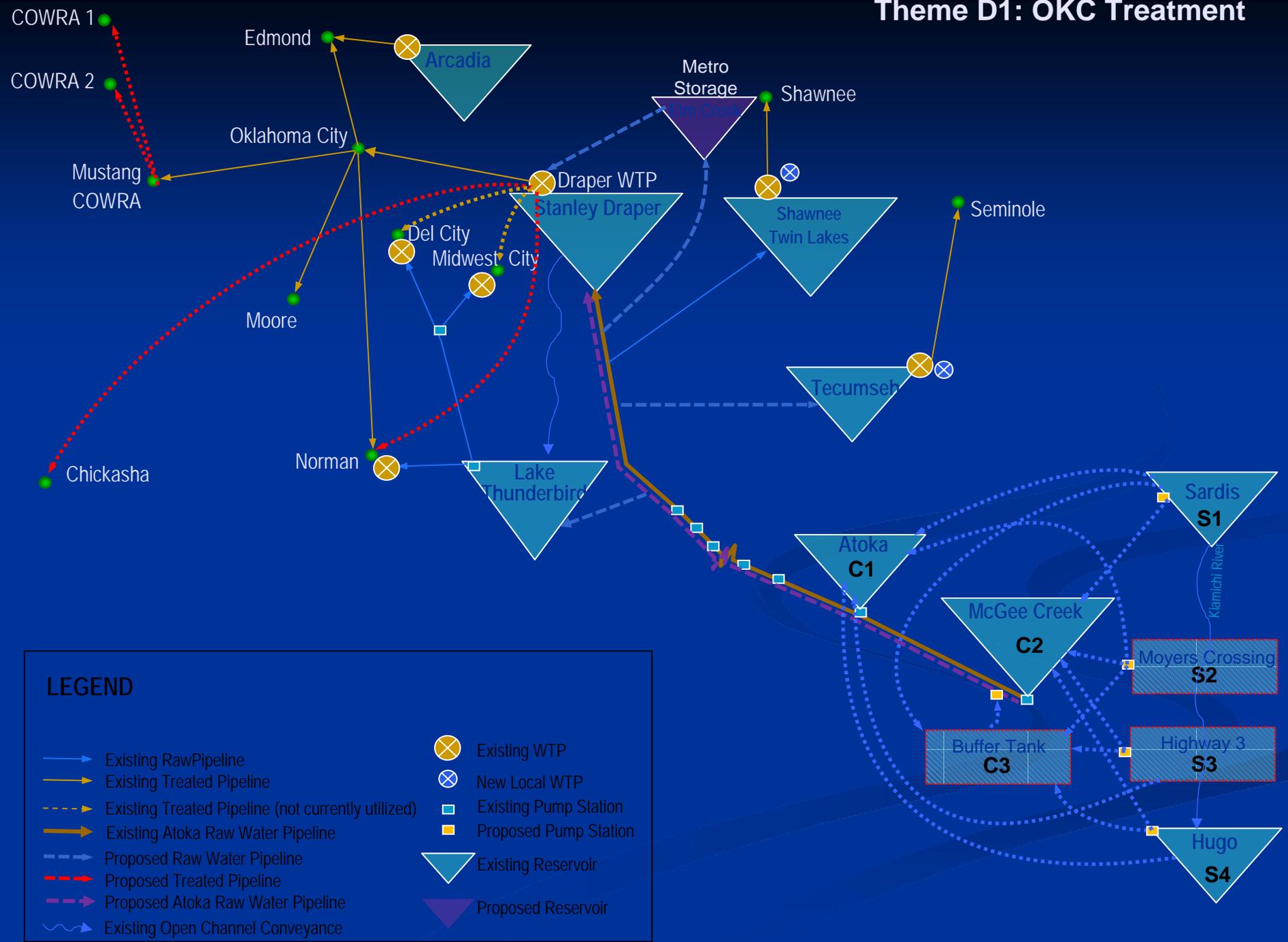
Well Capacity

Deficit





Theme D1: OKC Treatment



LEGEND

- Existing Raw Pipeline
- Existing Treated Pipeline
- Existing Treated Pipeline (not currently utilized)
- Existing Atoka Raw Water Pipeline
- Proposed Raw Water Pipeline
- Proposed Treated Pipeline
- Proposed Atoka Raw Water Pipeline
- Existing Open Channel Conveyance
- Existing WTP
- New Local WTP
- Existing Pump Station
- Proposed Pump Station
- Existing Reservoir
- Proposed Reservoir

Future thoughts

- Reuse
- Brackish Waters



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