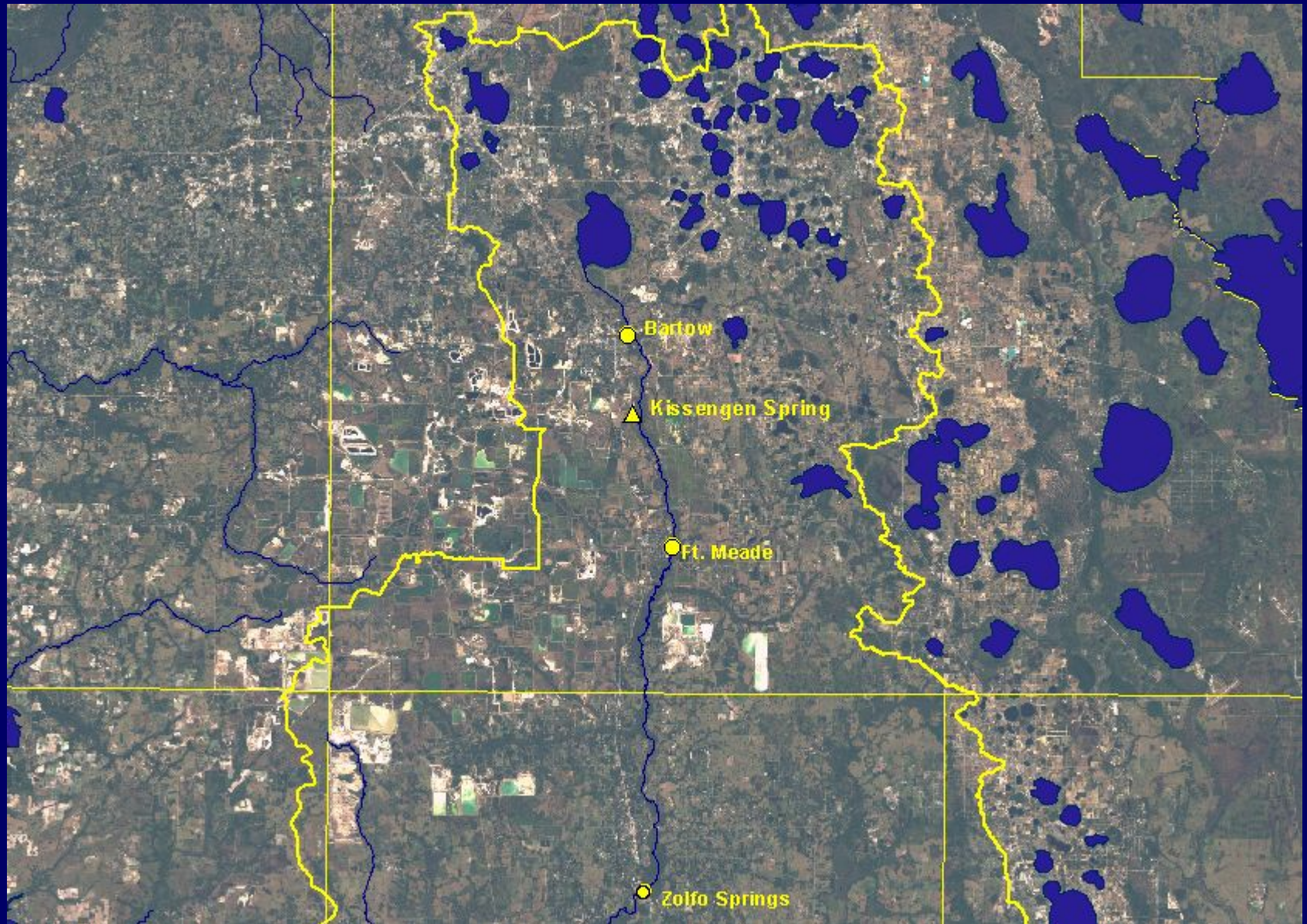


Predicted Change in Hydrologic Conditions along the Upper Peace River due to a reduction in Ground-Water Withdrawals



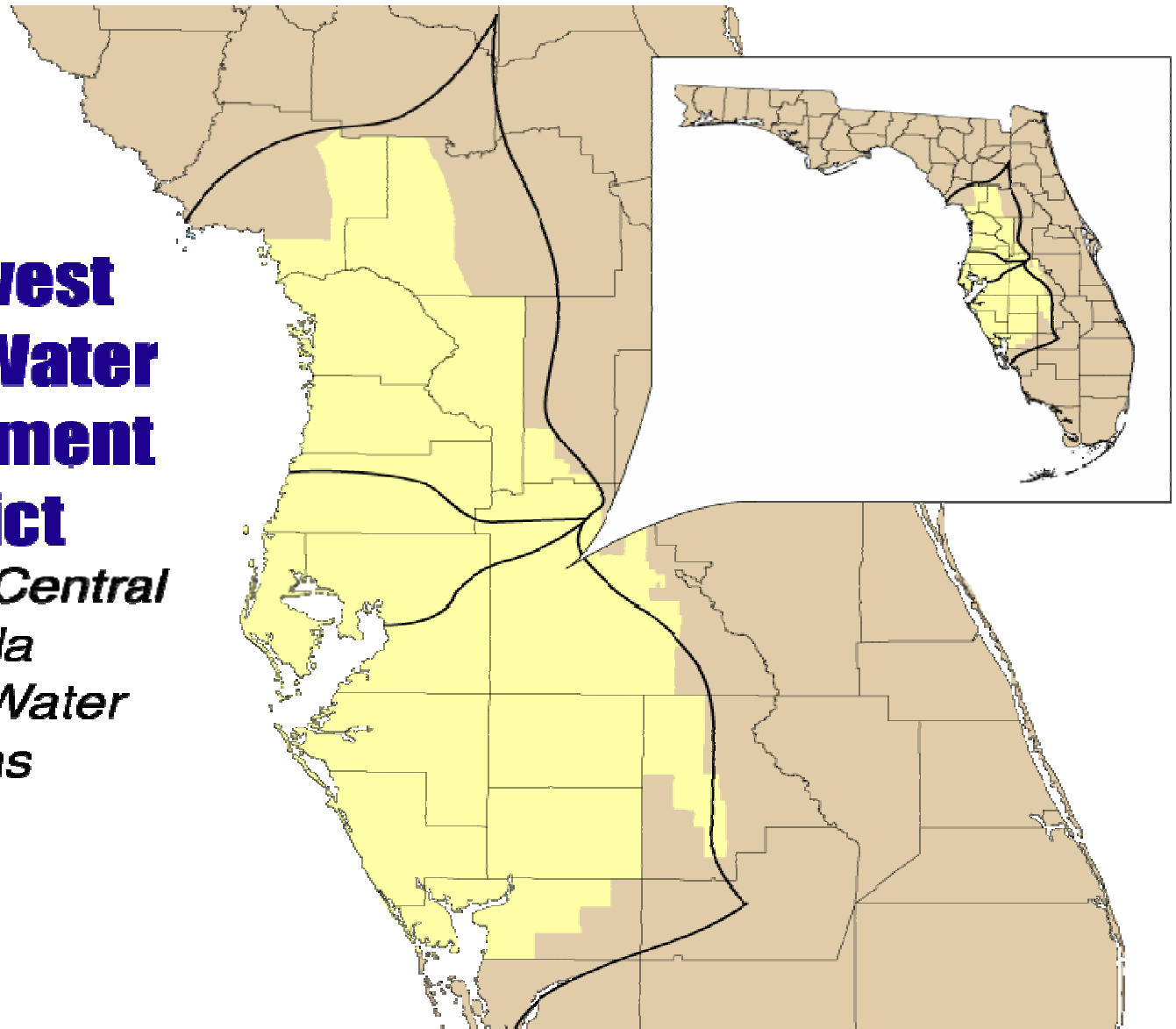
Upper Peace River Basin



- **Physical System**
- **Long-term change in Floridan aquifer level**
- **Reduction in Ground-Water withdrawals to provide springflow and baseflow**

**Southwest
Florida Water
Management
District**

*with West-Central
Florida
Ground-Water
Basins*



Upper Peace River Cross-Section

✕ Hydrologic Section

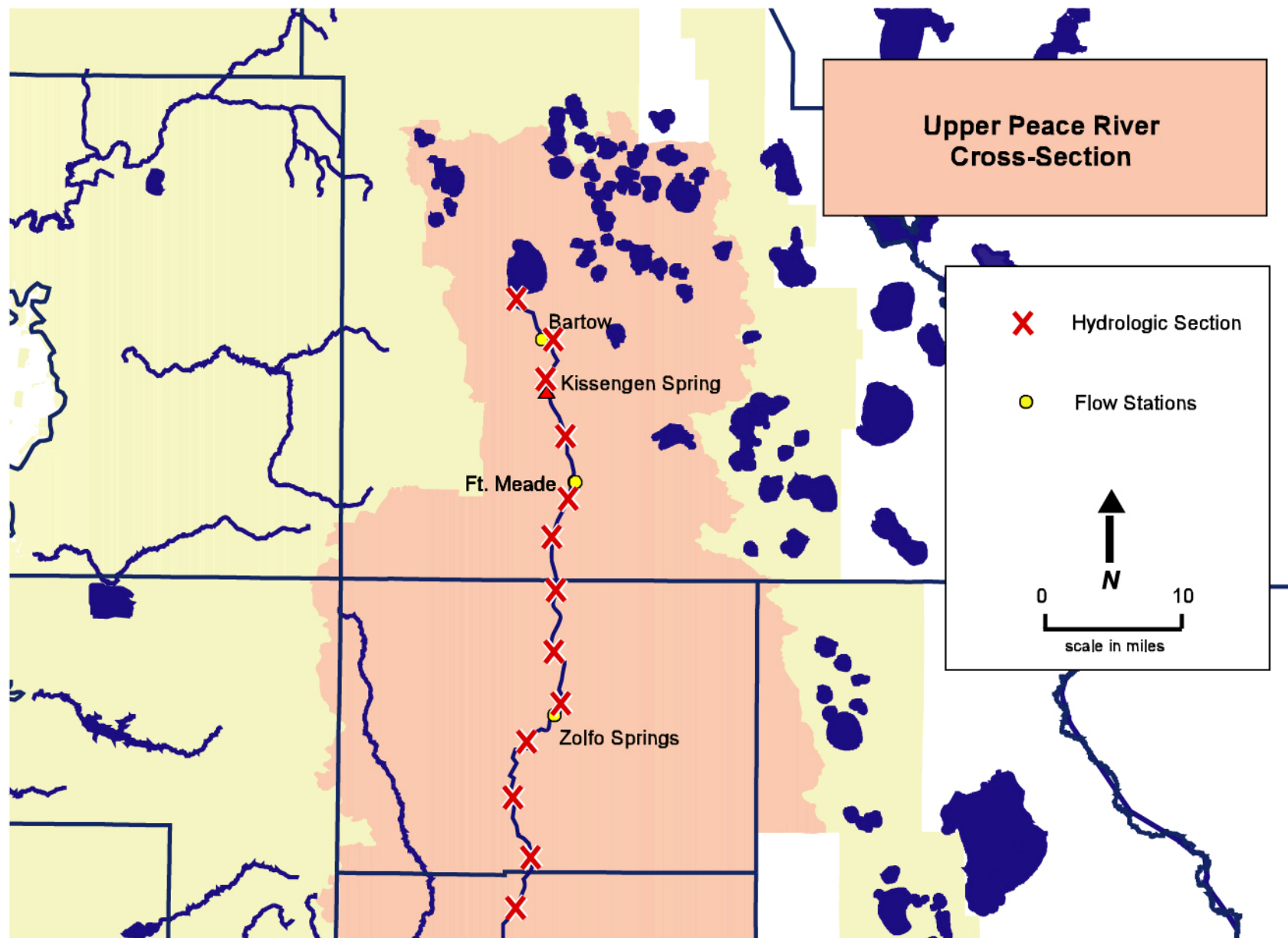
● Flow Stations



0

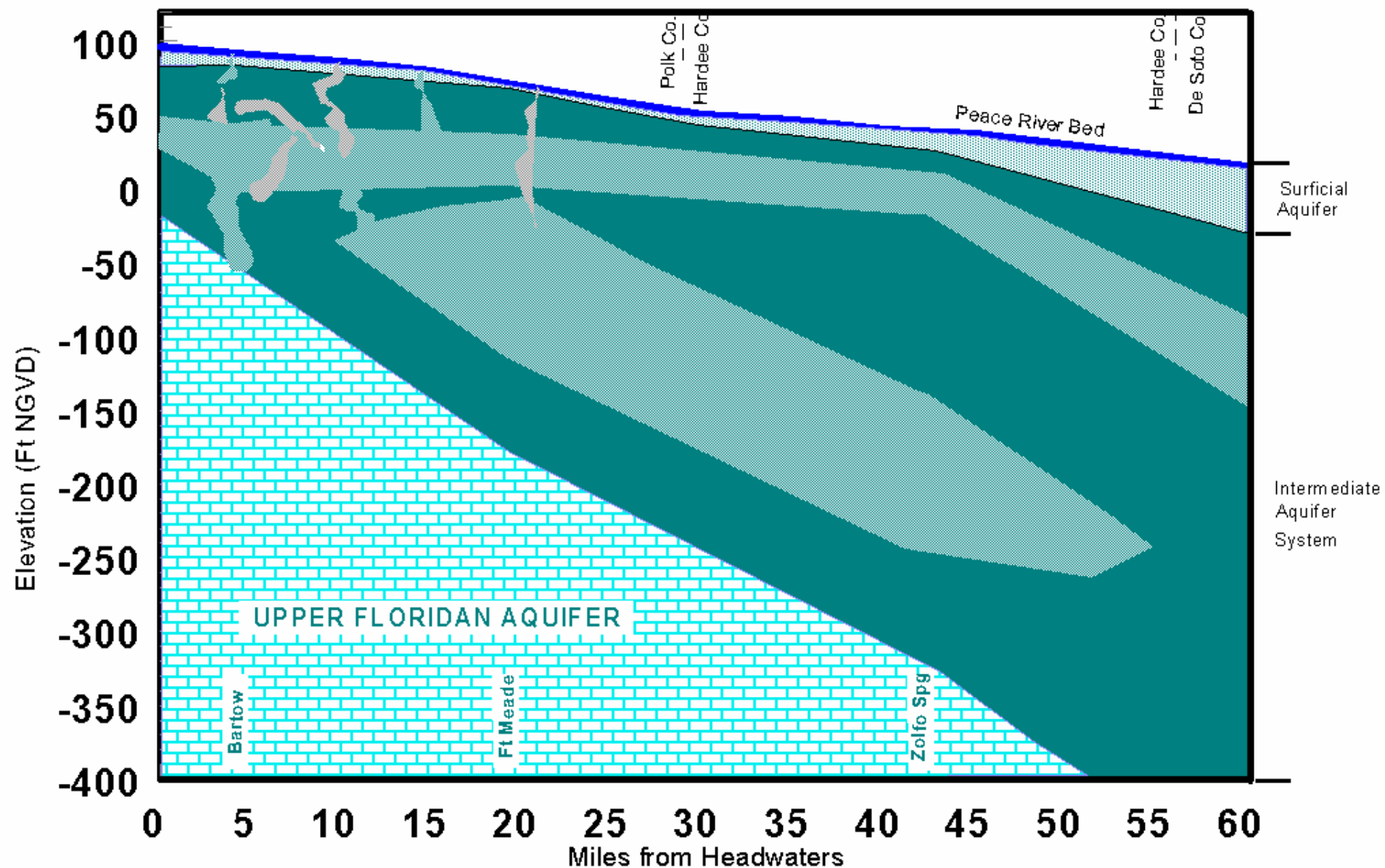
10

scale in miles

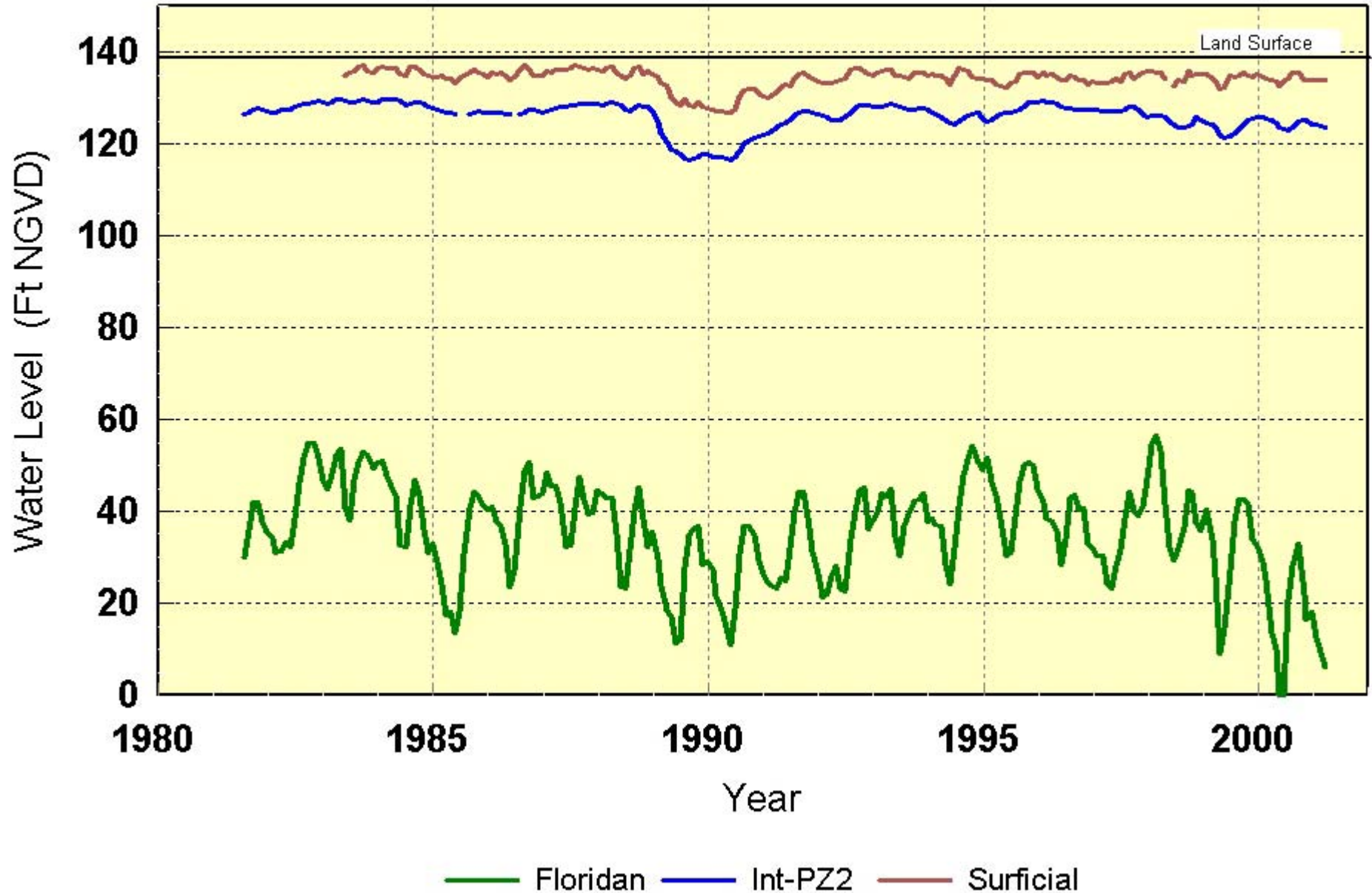


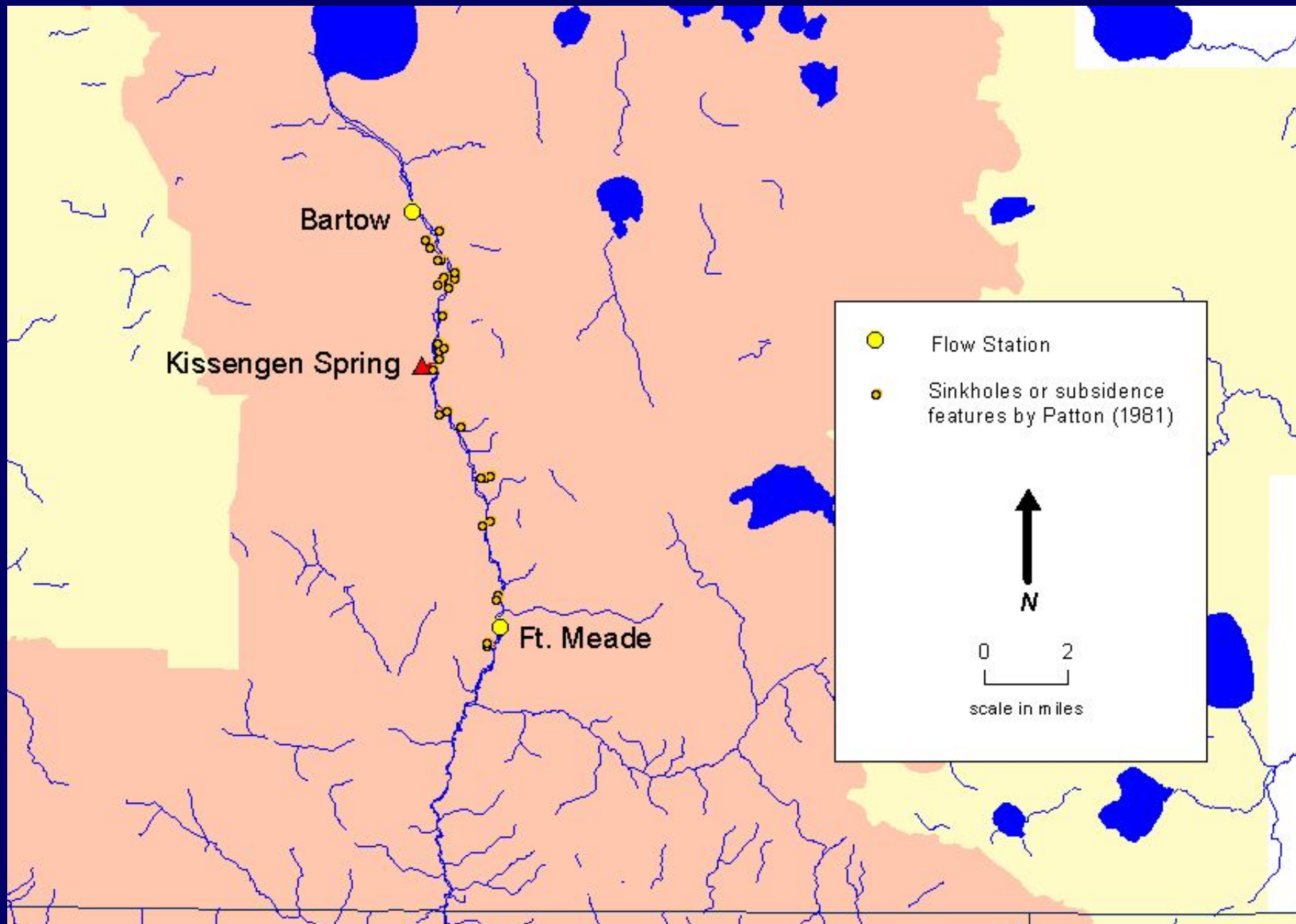
North

South



Romp 40 at Four Corners Aquifer Water Levels

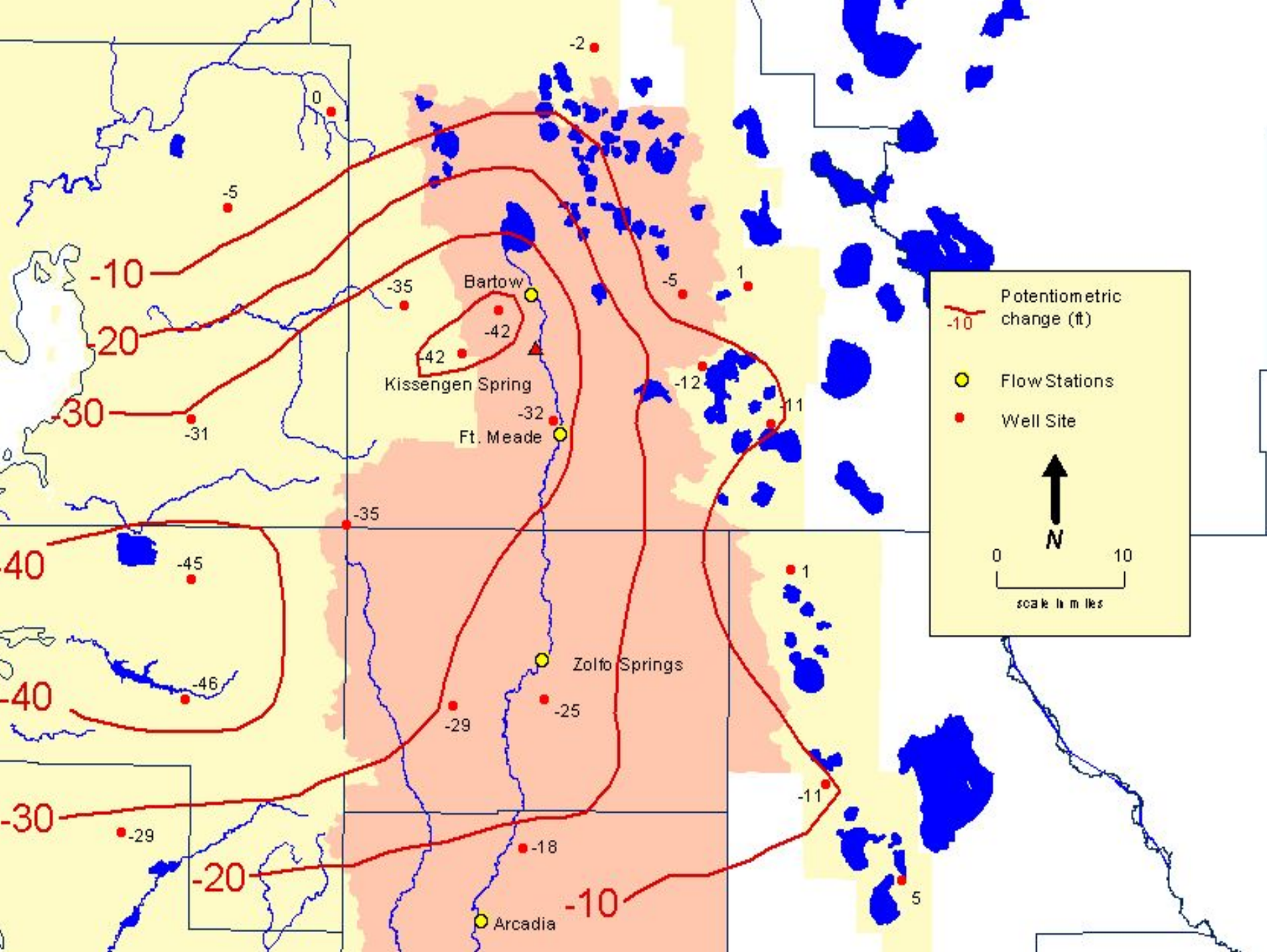




Hydrogeologic Conditions

- **Regional hydraulic connection between the surface and Floridan aquifer is poor**
- **Sinkholes and solution features from Bartow to Ft. Meade**
- **Hydraulic connection between river and Floridan aquifer greatest from headwaters to Homeland**

Long-term changes in Floridan aquifer water levels

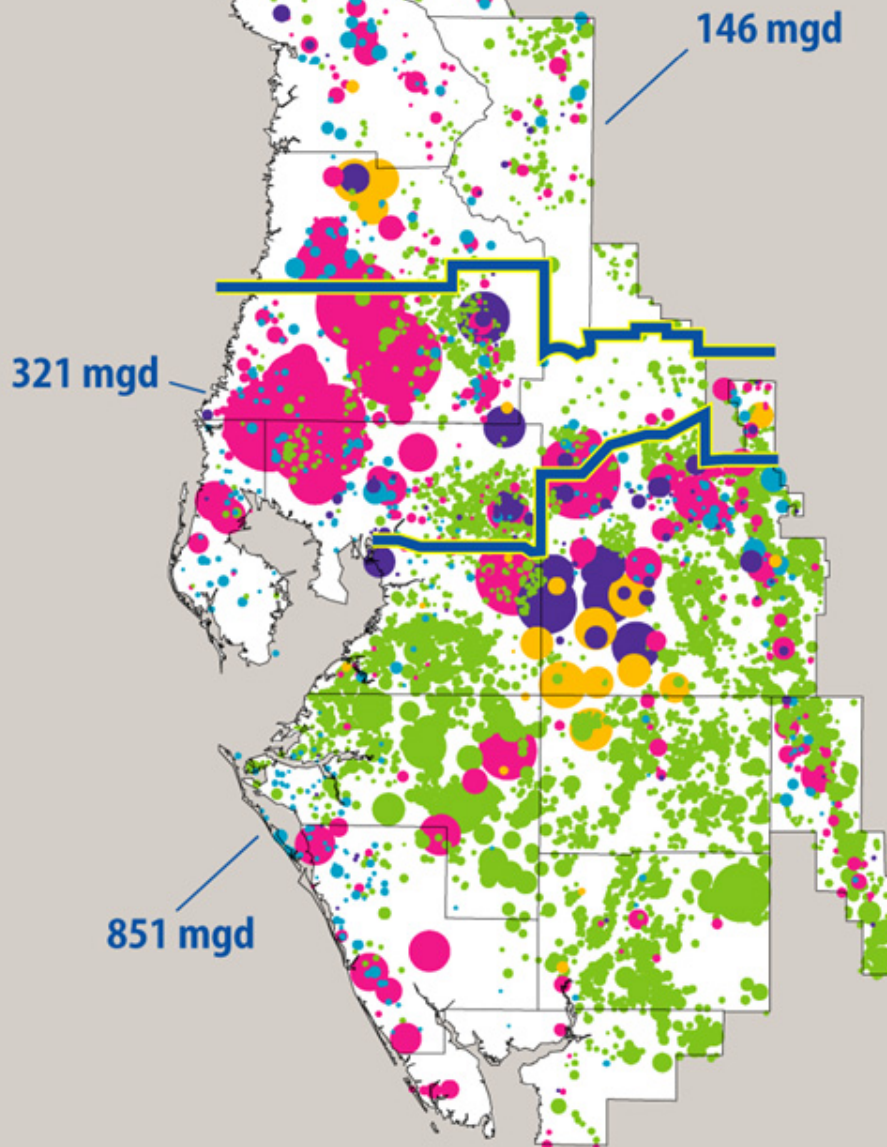
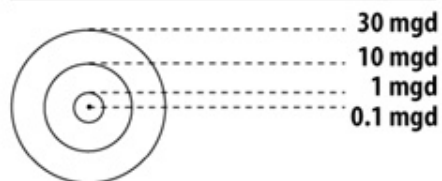


2000 Estimated Groundwater Withdrawals

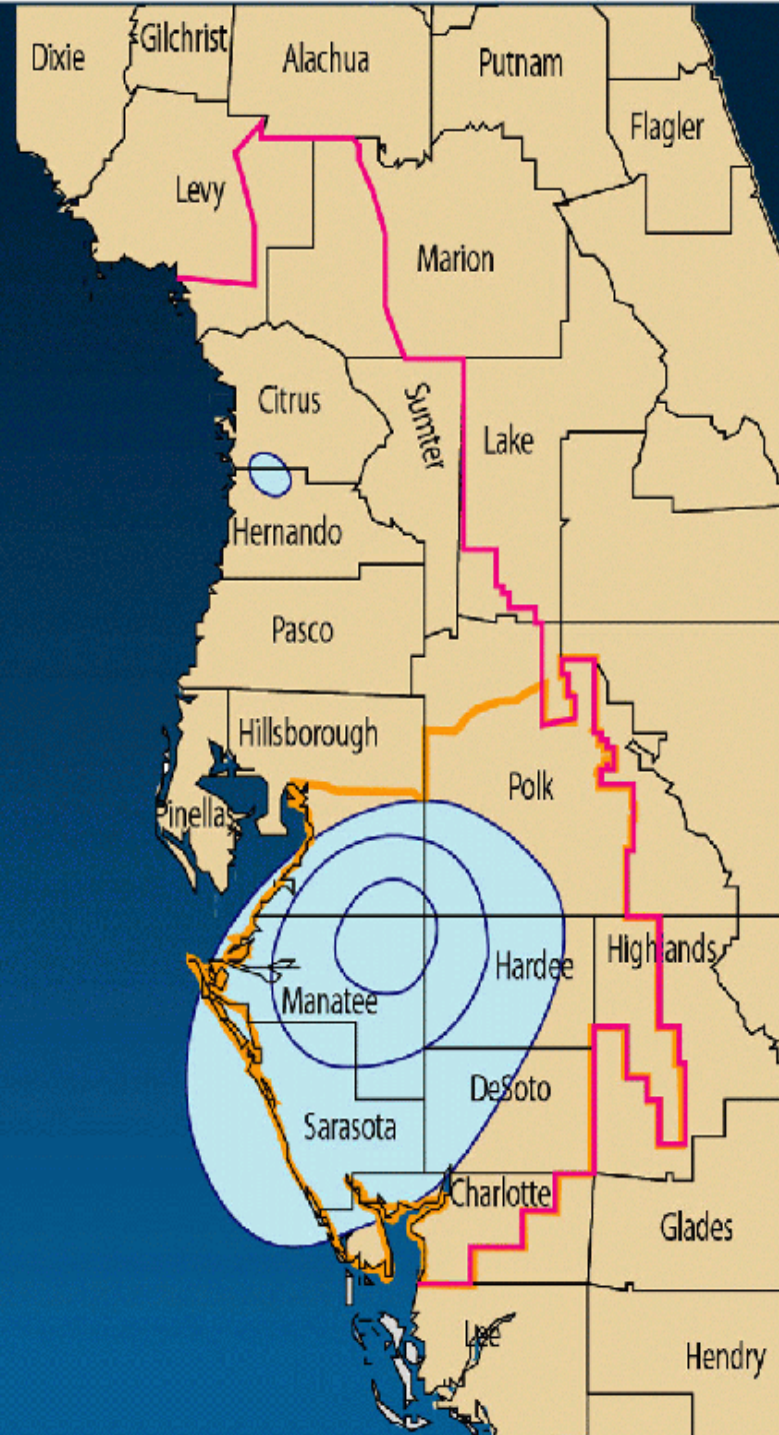
Water Use Type

- Recreational
- Public Supply
- Industrial
- Agricultural
- Mining

Pumping (continuous scale)



Comparison Of Effect Of Pumping 30 MGD



(Adapted from P.D. Ryder, 1985:
USGS Professional Paper 1403-F)

Upper Peace River Cross-Section

X Hydrologic Section

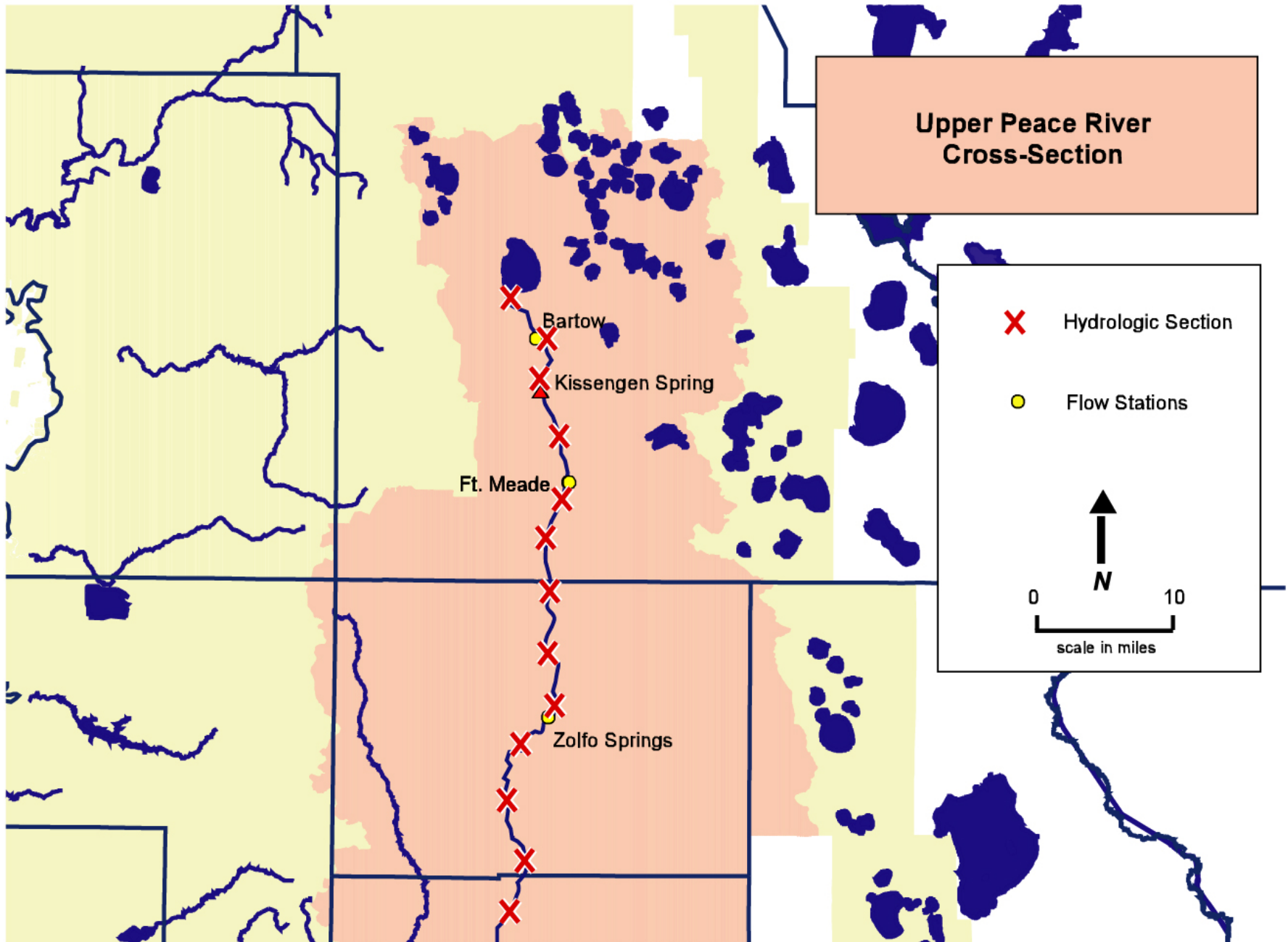
● Flow Stations

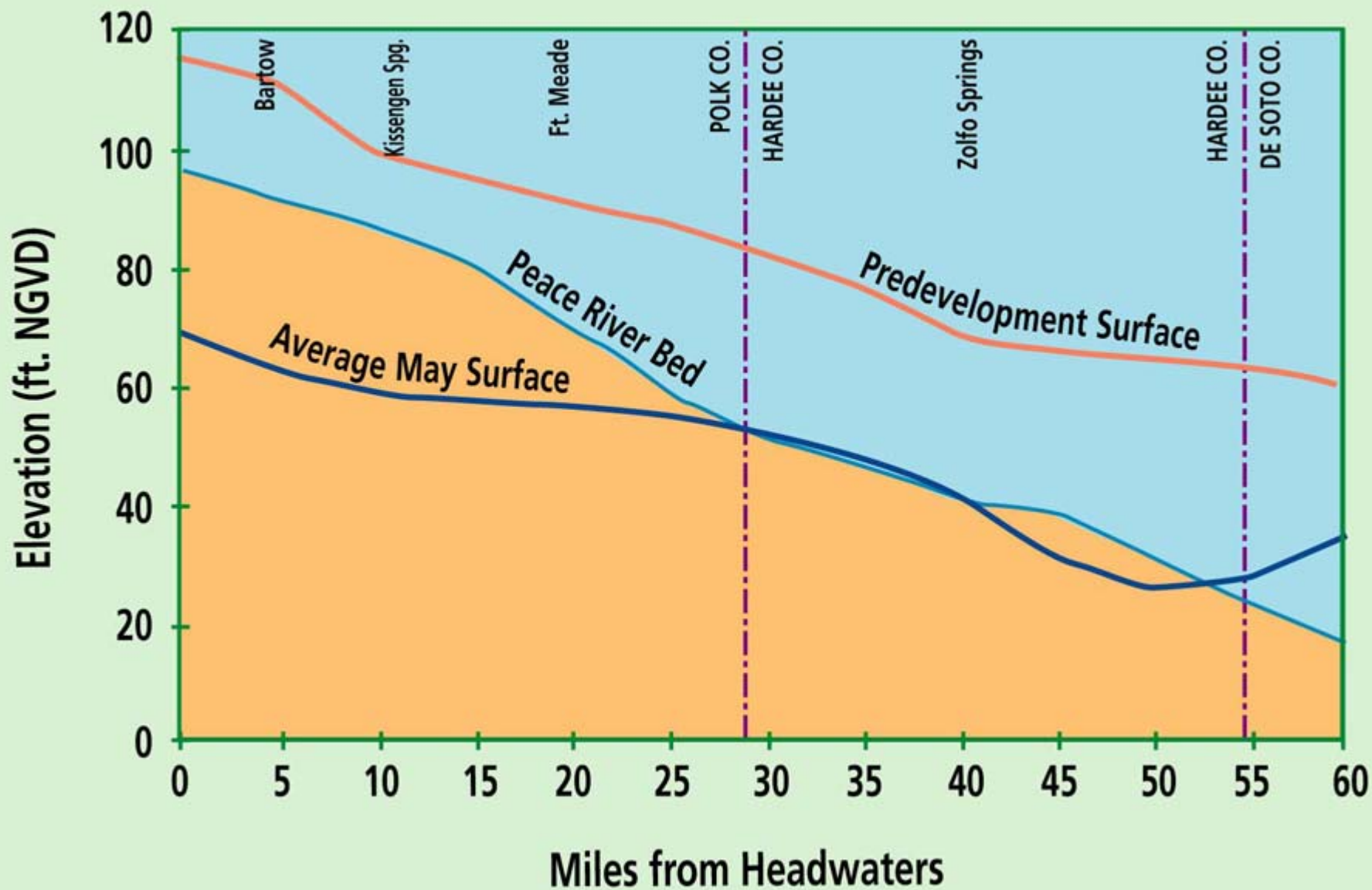


0 10

scale in miles

Bartow
Kissengen Spring
Ft. Meade
Zolfo Springs



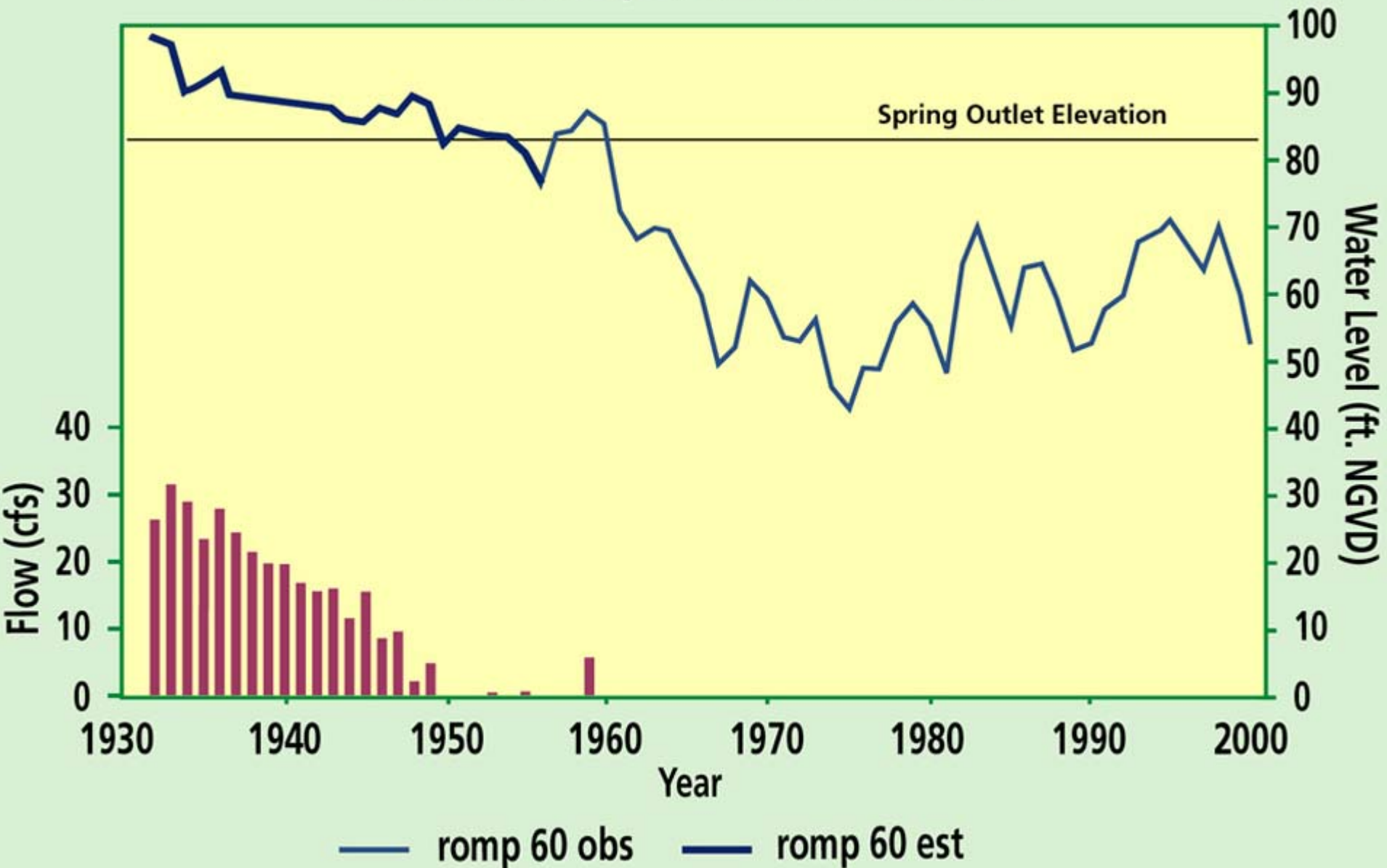


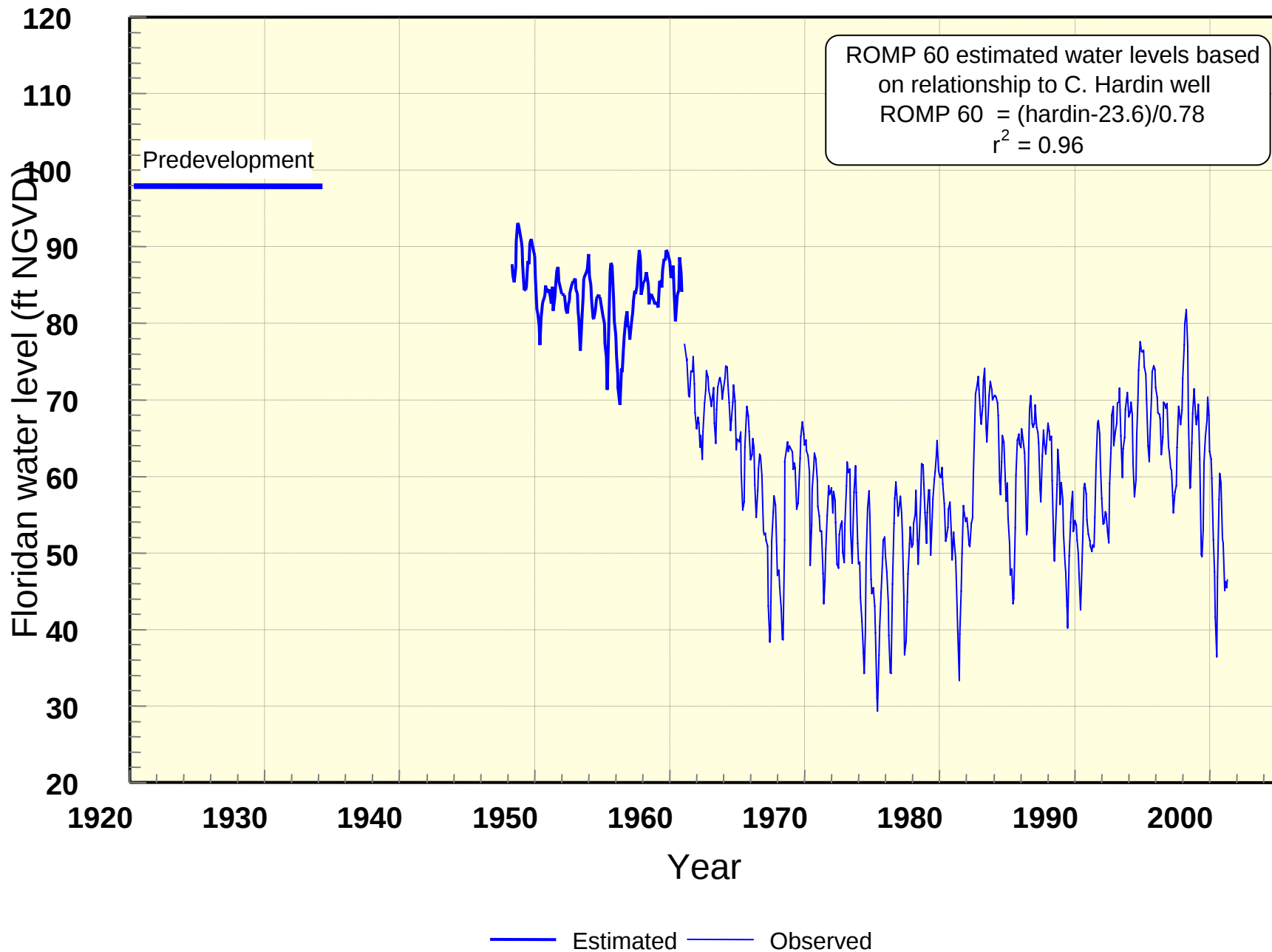


Losing Stream

**Reduction in existing
Ground-Water withdrawals to
provide springflow and baseflow
contributions**

Kissengen Springflow & Floridan Aquifer Water Levels

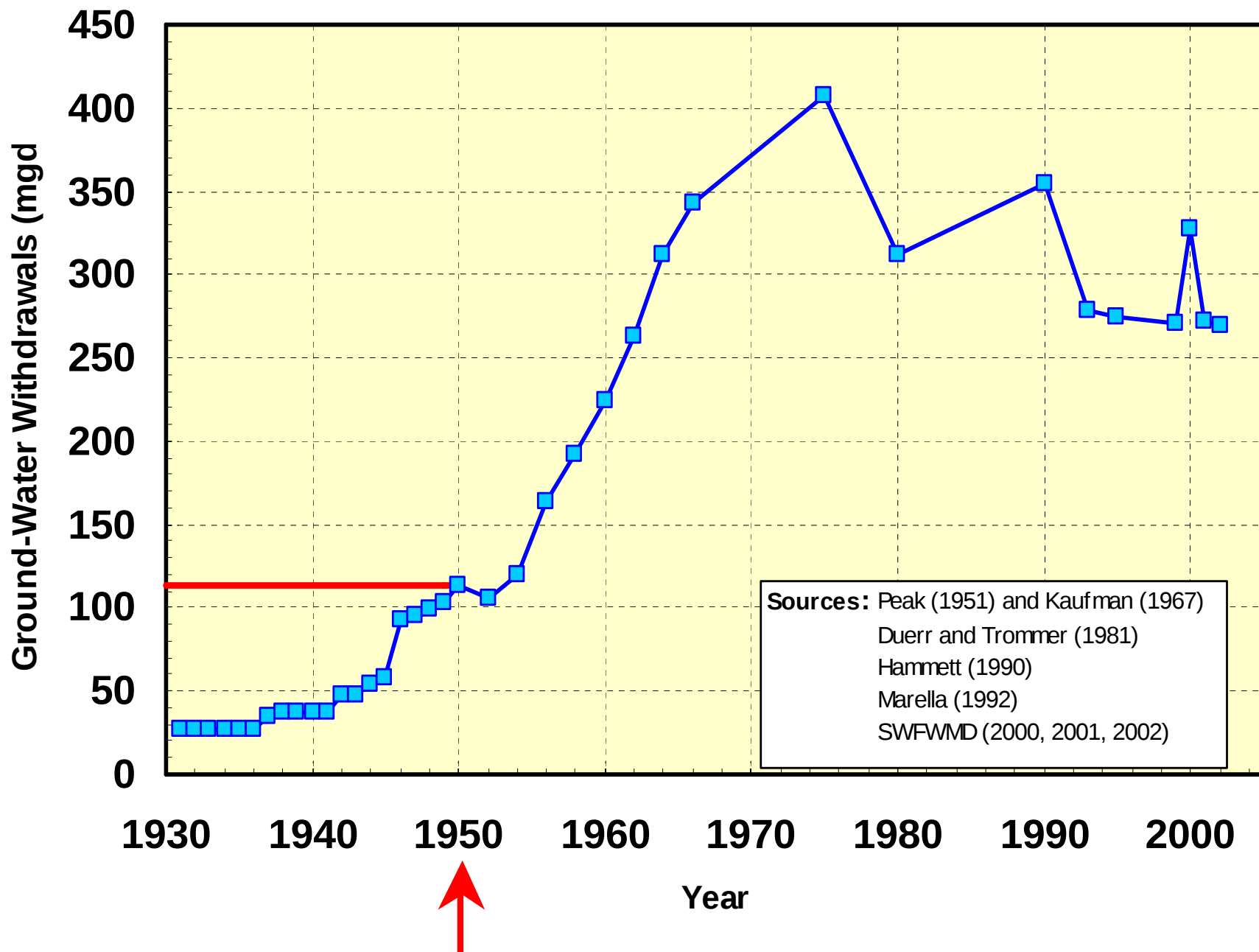


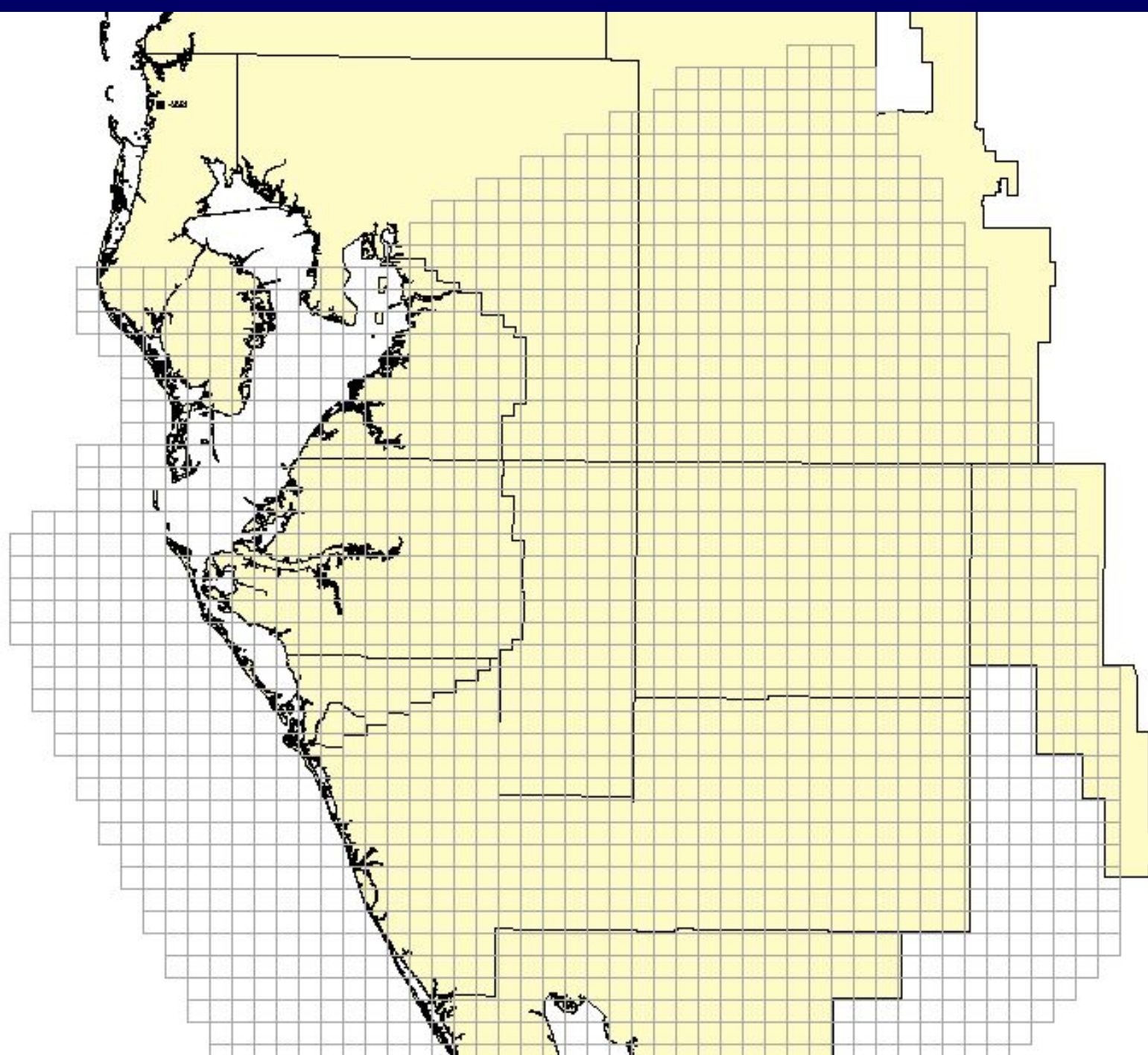


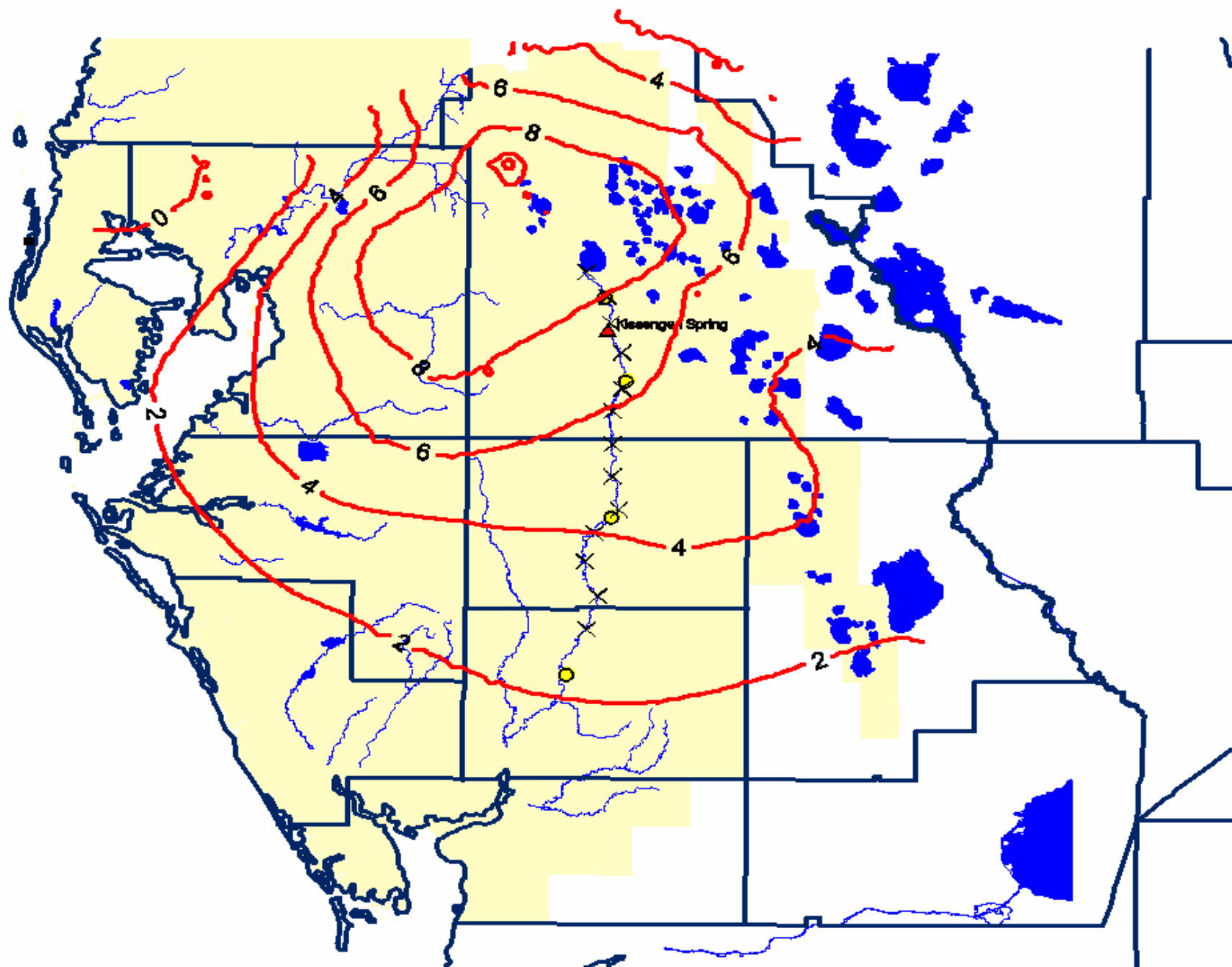


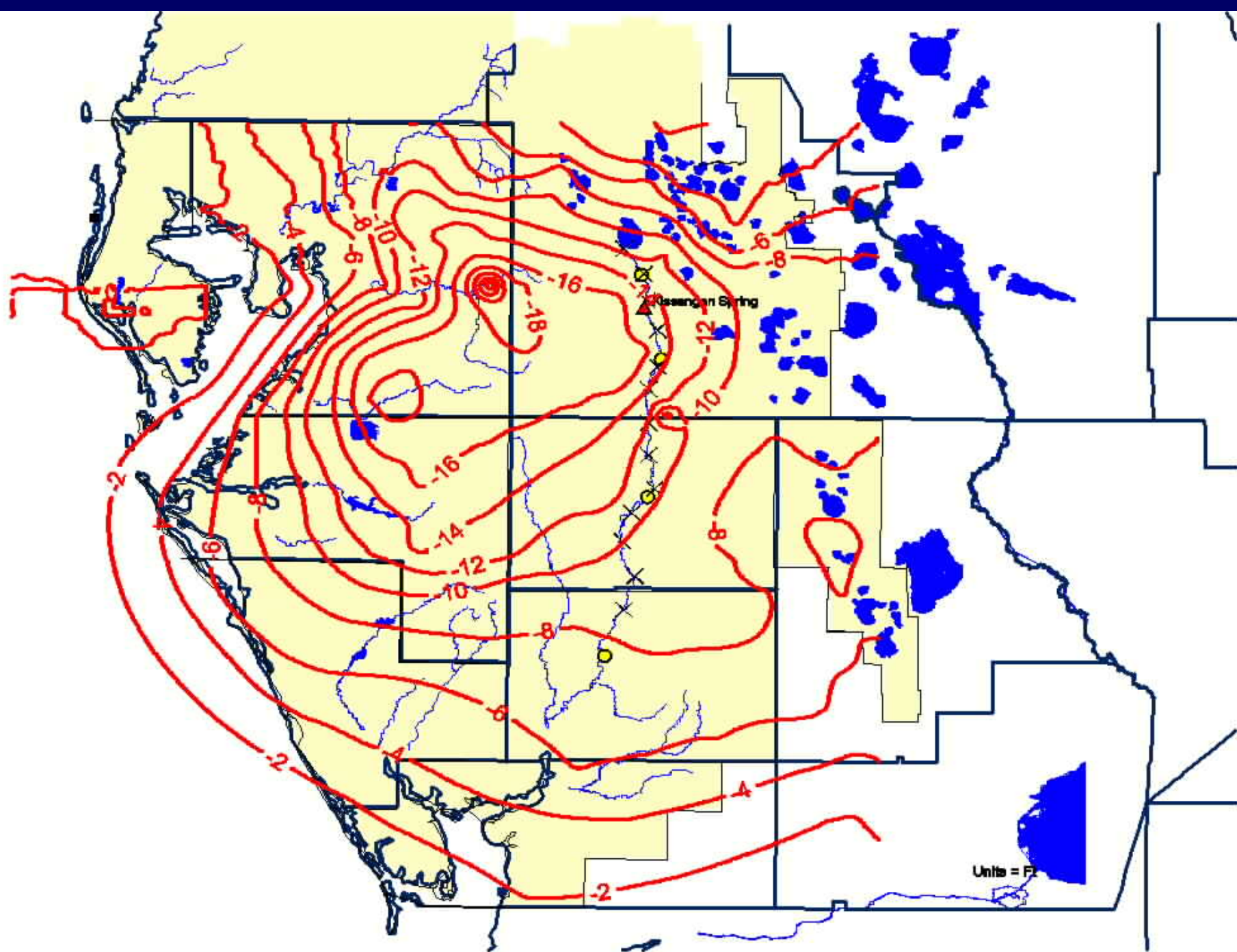
a corner of Kissengen Springs 1894

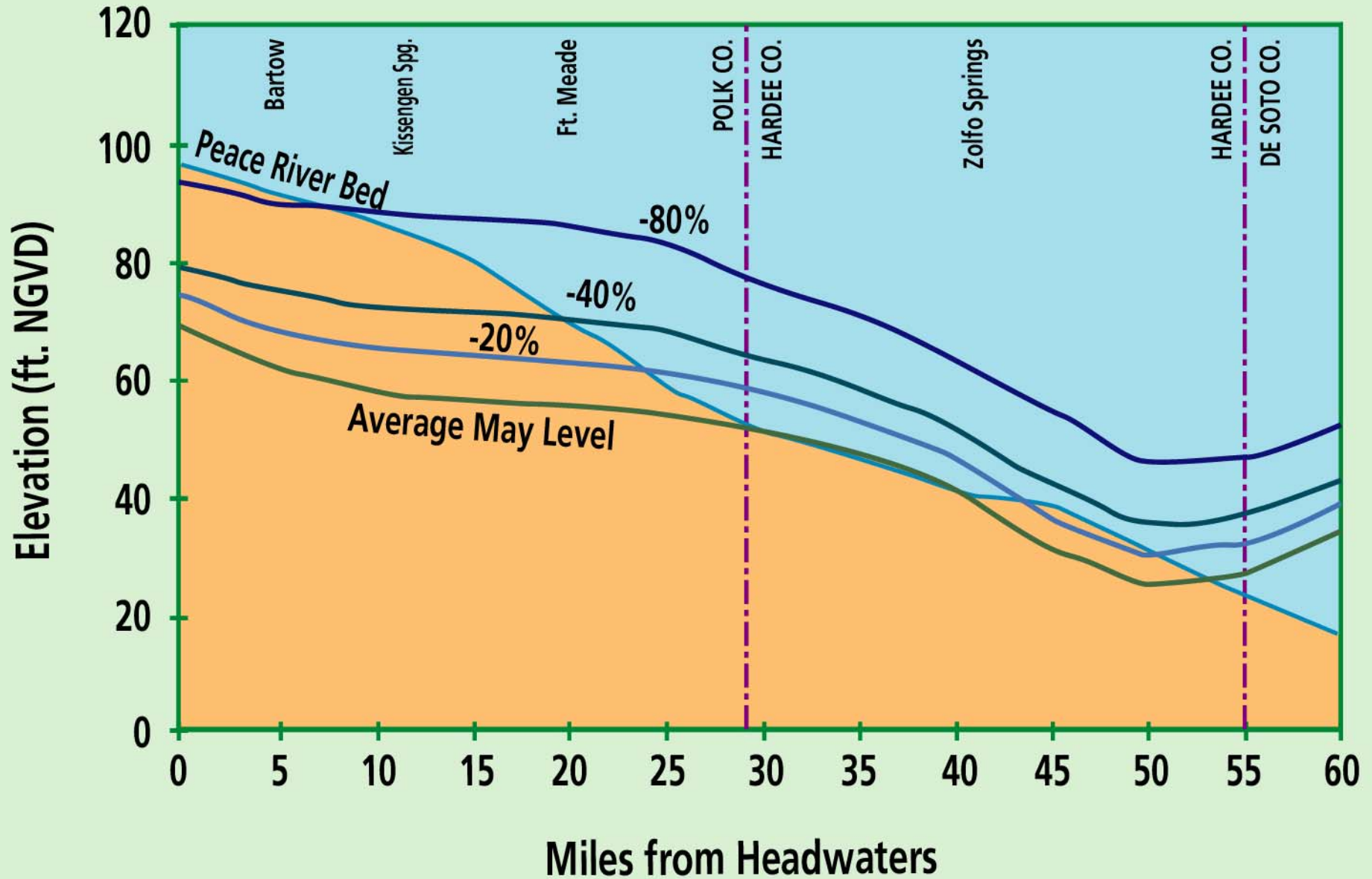
Kissengen Springs (1894) - gaining stream





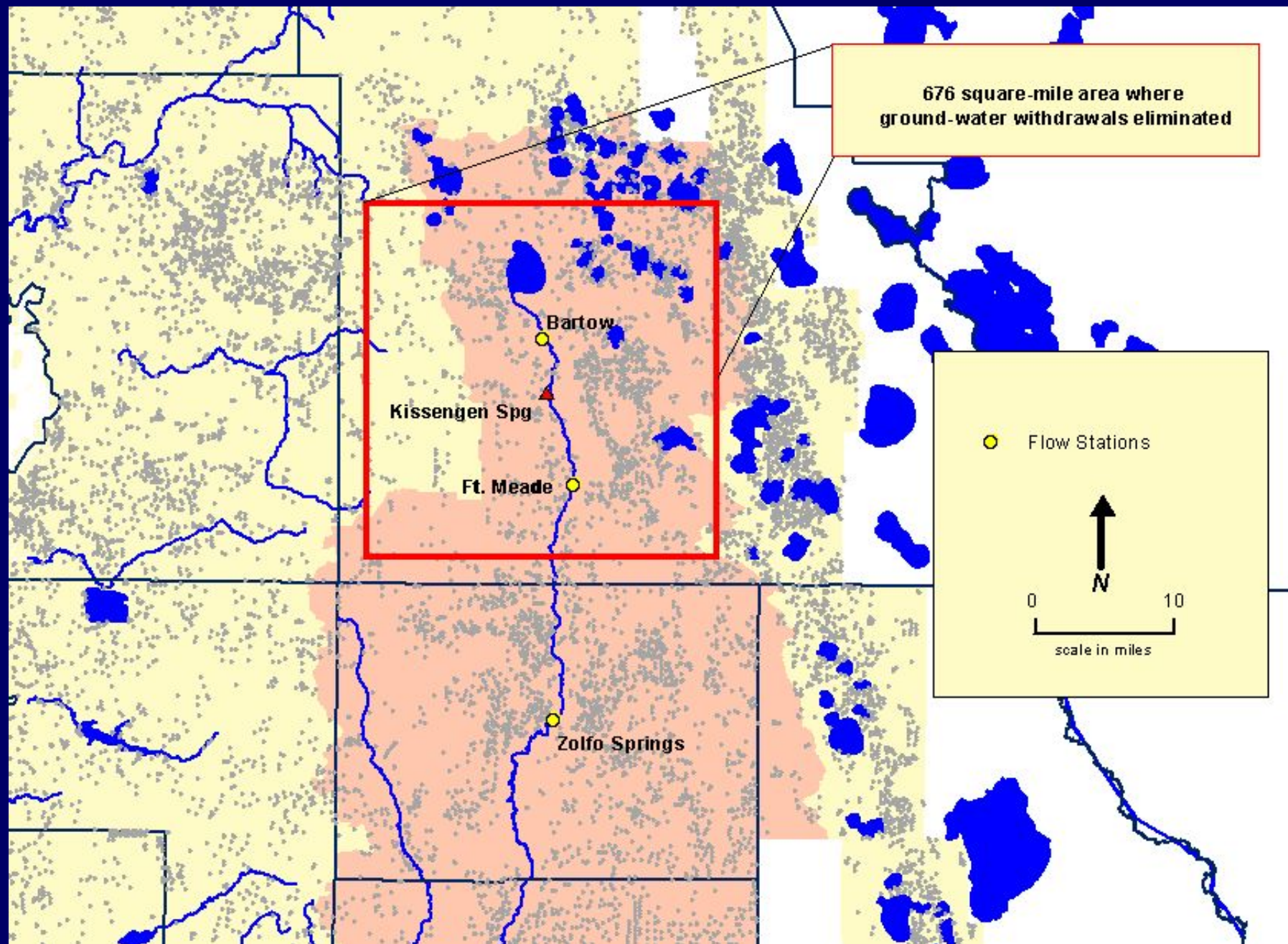


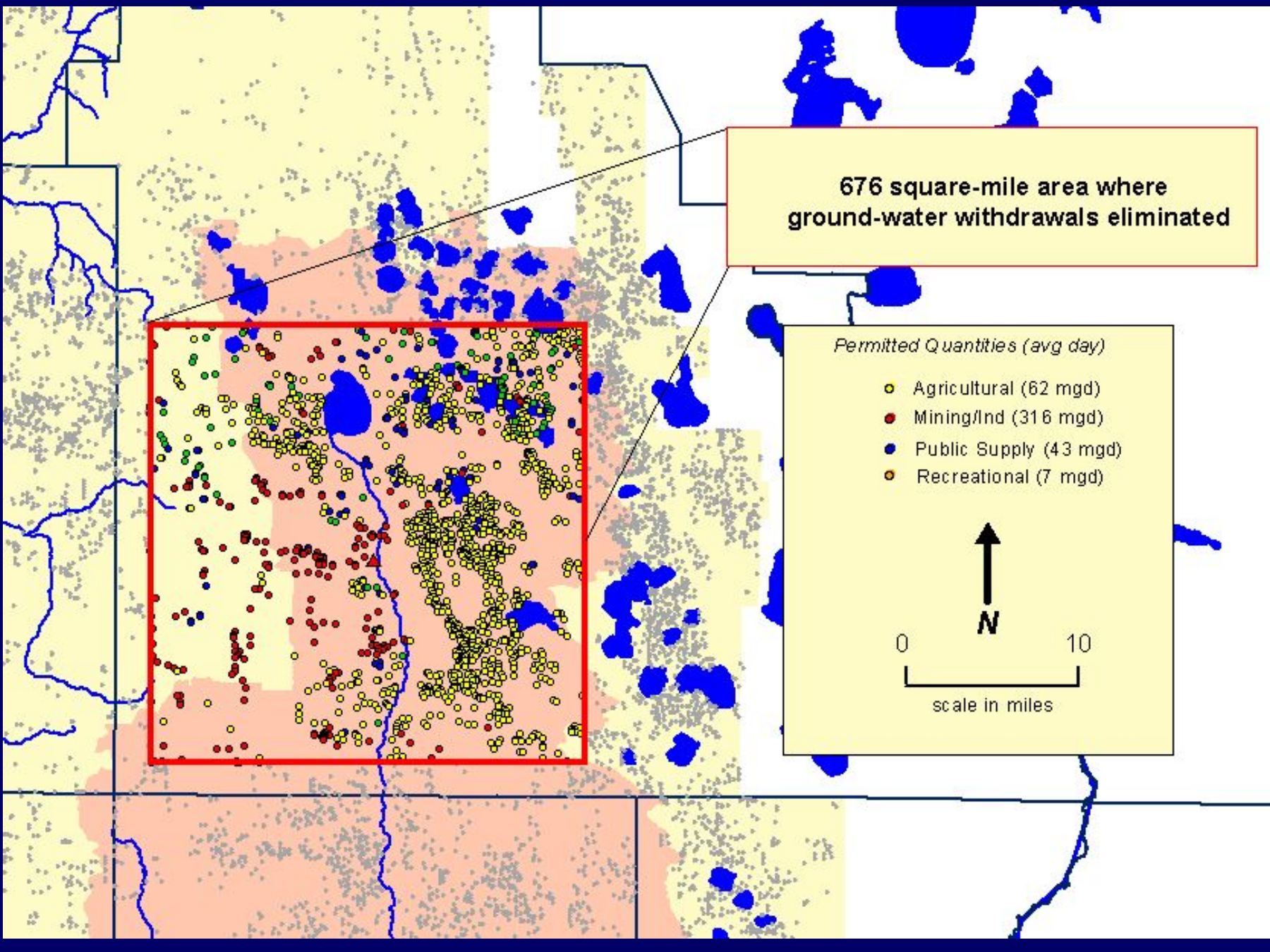




Upper Peace River Scenarios

Ground-Water Withdrawal Cutback in April- May		Return of Upward Flow Potential from Floridan Aquifer (miles)		Potential Flow at Kissengen Spring
		Heavily Impacted Section	Entire Length	
-20%	200 mgd	0	5	No
-40%	400 mgd	0	10	No
-80%	800 mgd	10	20	Yes

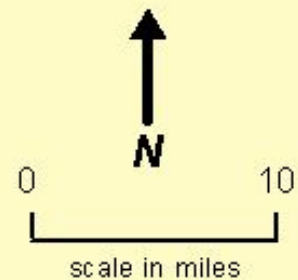


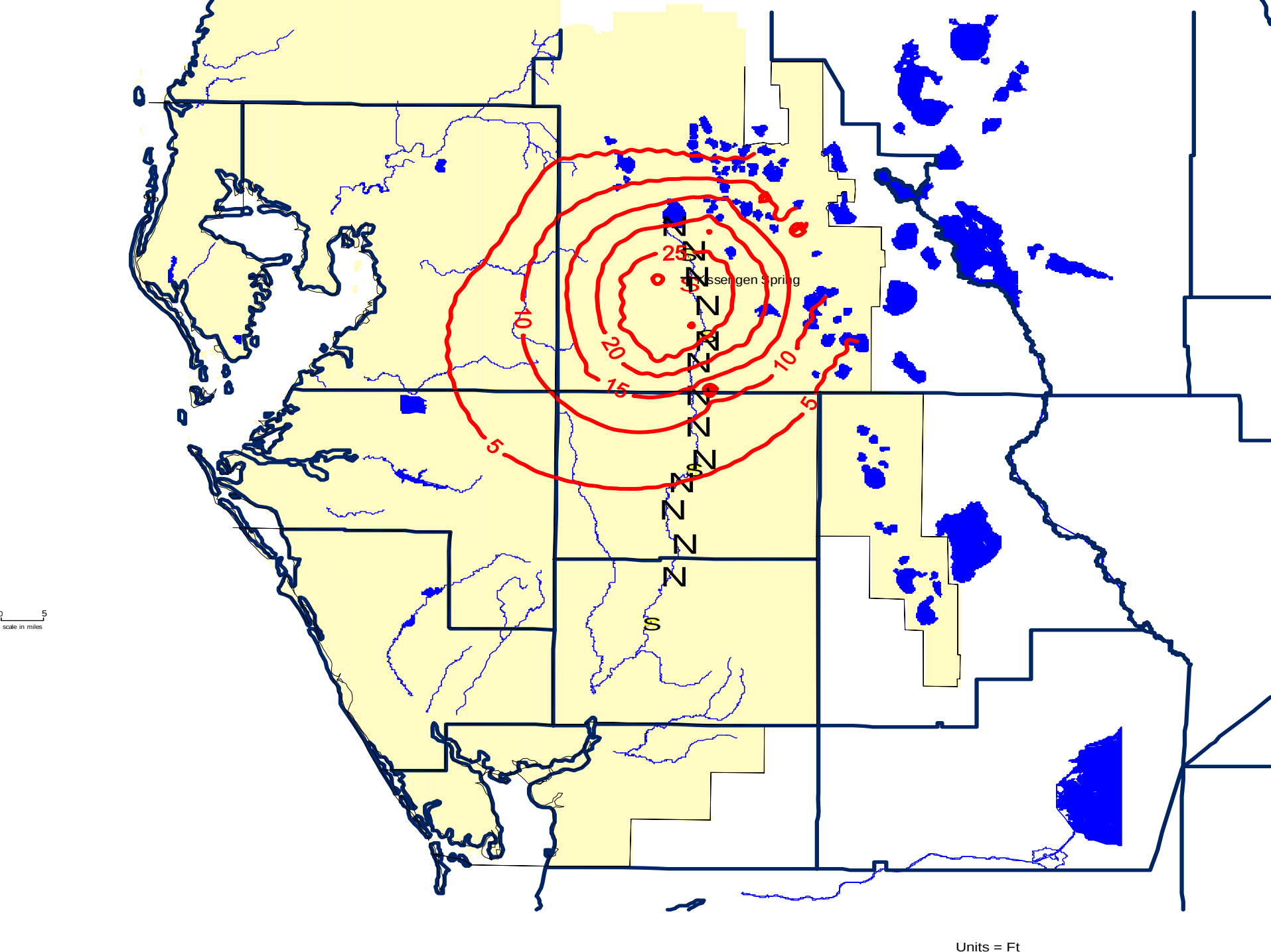


**676 square-mile area where
ground-water withdrawals eliminated**

Permitted Quantities (avg day)

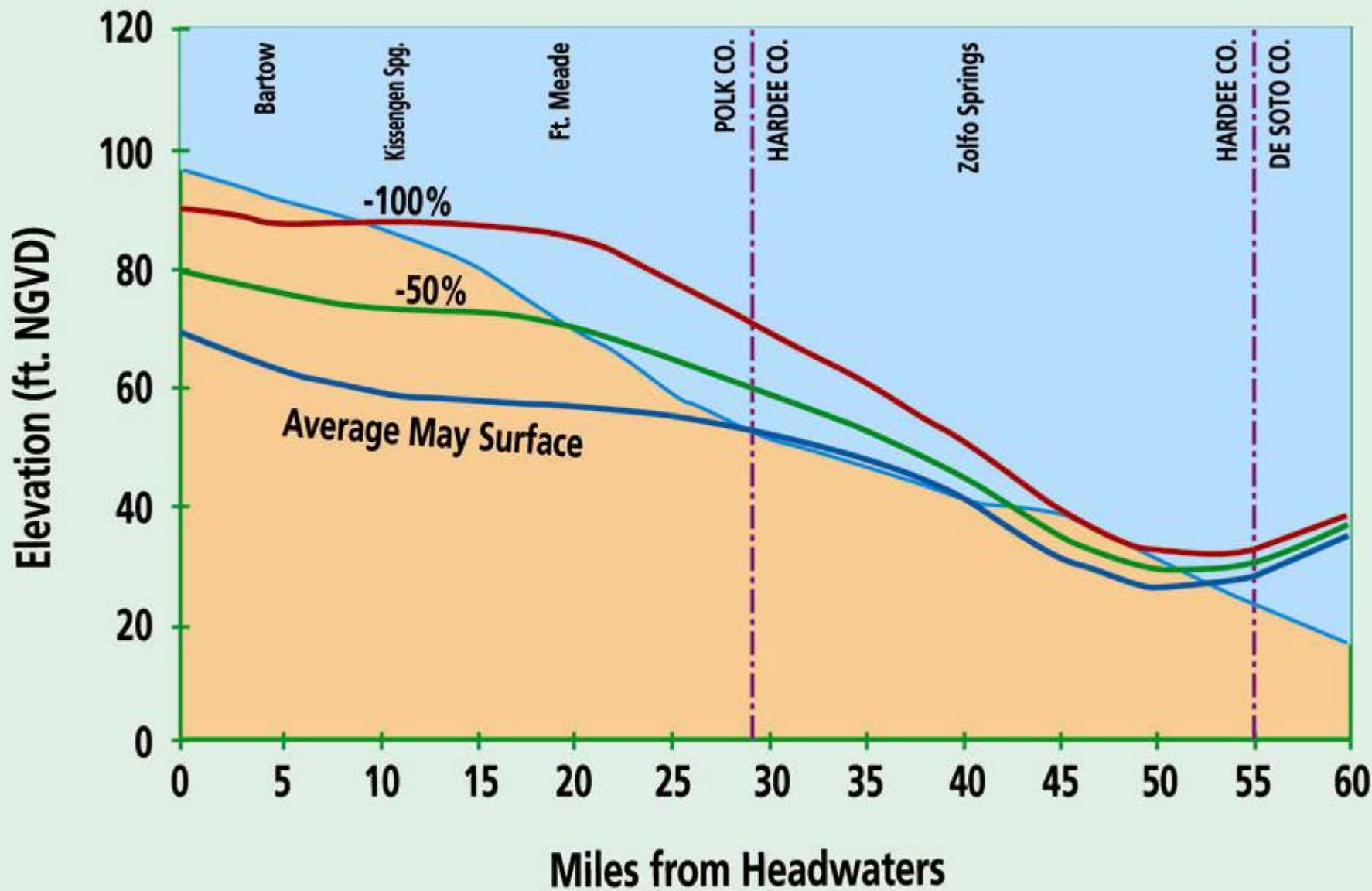
- Agricultural (62 mgd)
- Mining/Ind (316 mgd)
- Public Supply (43 mgd)
- Recreational (7 mgd)





5
scale in miles

Units = Ft



Upper Peace River Scenarios

Ground-Water Withdrawal Cutback in April- May		Return of Upward Flow Potential from Floridan Aquifer (miles)		Potential Flow at Kissengen Spring
		Heavily Impacted Section	Entire Length	
-50%	105 mgd	0	8.5	<i>No</i>
-100%	210 mgd	9	19	Yes

Summary

- **Hydraulic connection between the surface and Floridan aquifer is poor except from Headwaters to Homeland**
- **Long-term decline in Floridan aquifer level of 30 to 40 feet**

Kissengen Spring

- Spring flow averaged 30 cfs (19 mgd) prior to 1937 and gradually declined until 1950 when it ceased continuous flow
- For return of partial flow
 - 60% reduction in existing use
 - total elimination of pumpage in 676 sq. mile area

Upward Flow Potential

- **During the Spring Dry Season (April-May)**
- **Headwaters to Ft. Meade Section (18 miles)**
 - **80% reduction in existing use to provide upward flow along 10 miles**
 - **total elimination of pumping in 676 sq. mile area will provide upward flow along 9 miles**

Management Decisions

- **The SWFWMD Governing Board decided that it was not practical to reduce existing ground-water withdrawals to restore baseflow**
- **The Board directed staff to develop water resource projects to augment river flow**
 - **storing and releasing more flows from Lake Hancock**
 - **creating offstream reservoirs on reclaimed mining lands**
 - **berming off sinkholes**

Restoration Strategies

Restoration Strategies

- Mandate across the board reductions in ground-water withdrawals
- Reduce ground-water withdrawals over time and replace with alternative sources
- Do not restore spring flow and meet the upper Peace River minimum flow through other means.

Mandate Across the Board Reductions in Ground-Water Withdrawals

- Year 2000 Ground-Water Use in Polk County
by Category (mgd)

<u>Use Sector</u>	<u>Use in 2000</u>	<u>70% Reduction</u>
– Agriculture	144	43
– Public Supply	84	25
– Mining	34	10
– Industrial	41	12
– Recreation	9	3
• Total	312	93

Mandate Across the Board Reductions in Ground-Water Withdrawals

- Seventy percent cutback in ground-water withdrawals in the portion of Polk County in the SWFWMD.
 - Severe impact to public health, safety, and welfare
 - Severe economic impact
 - Litigation firestorm

**Reduce Ground-Water Withdrawals Over
Time and Replace with Alternative Sources**

Reduce Ground-Water Withdrawals Over Time and Replace with Alternative Sources

- **Alternative Sources**
 - Capture/Storage of Surface Water
 - Reclaimed Water
 - Conservation
 - Brackish Ground-Water Desalination
 - Seawater Desalination

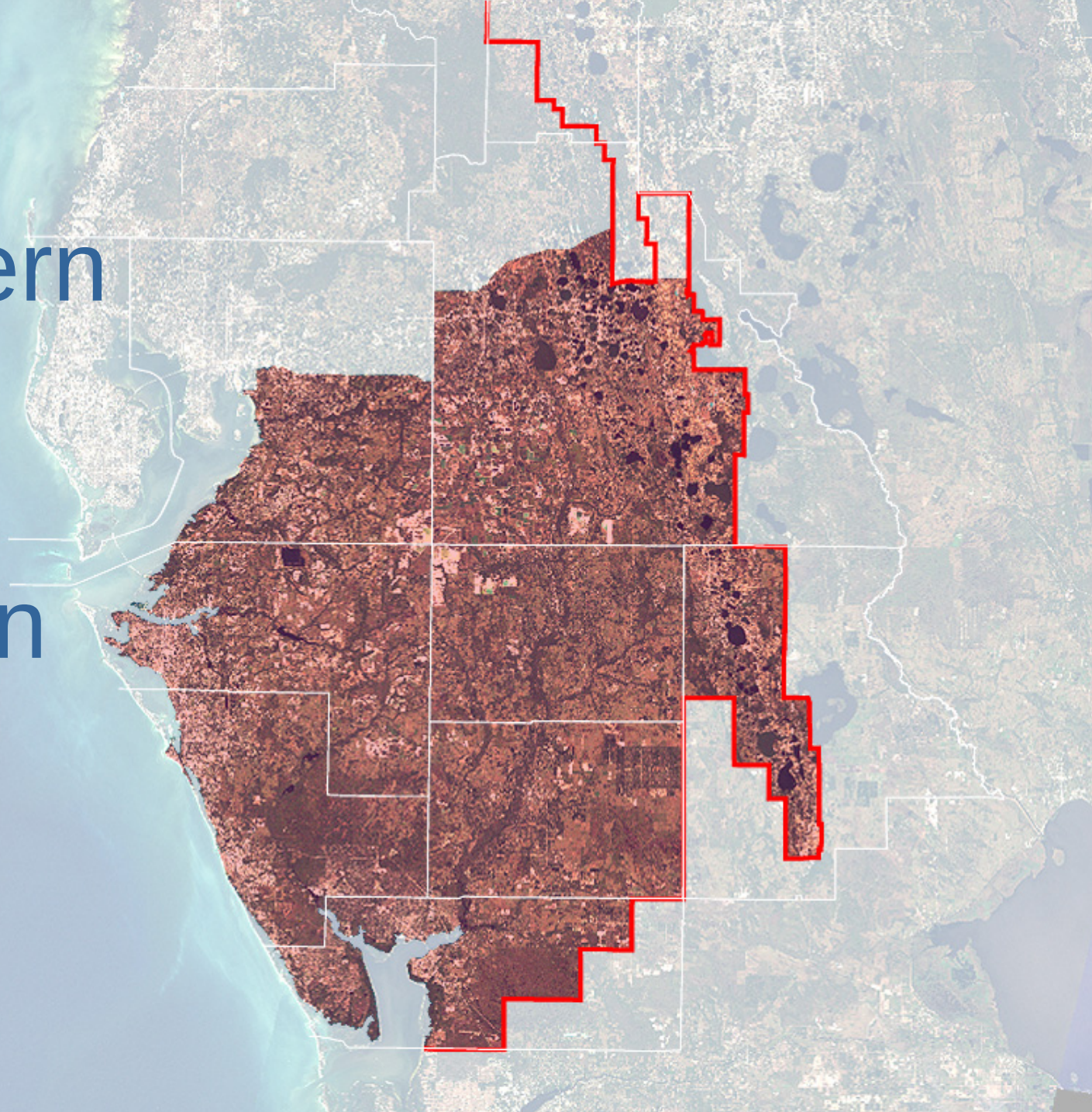
Reduce Ground-Water Withdrawals Over Time and Replace with Alternative Sources

- **Cost of Replacing 200 mgd of Ground-Water with Alternative Sources**
 - The cost of producing 1 mgd of an alternative water supply is \$8 million (SWFWMD Regional Water Supply Plan).
 - Developing 200 mgd of alternative supplies would cost \$1.6 billion.

Reduce Ground-Water Withdrawals Over Time and Replace with Alternative Sources

- Availability of Alternative Supplies in Interior Counties is Limited.

Southern Water Use Caution Area



Reduce Ground-Water Withdrawals Over Time and Replace with Alternative Sources

- **Alternative Sources Available to Polk County by 2020 (mgd)**

– Capture/Storage Peace River	10+
– Reclaimed Water	19
– Conservation	20
– Brackish Ground-Water Desalination	?
– Seawater Desalination	0

Total	49+
--------------	------------

Reduce Ground-Water Withdrawals Over Time and Replace with Alternative Sources

- Available alternative sources (2020) +49 mgd
- Additional demand in Polk Co. (2020) -56 mgd
- Ground-water cutback to achieve spring flow -200 mgd

Water Supply Deficit -207 mgd

Do Not Restore Spring Flow and Meet Upper Peace River MFL Through Other Means.

- Upper Peace River MFL Recovery Strategy
 - Increasing Storage in Lake Hancock
 - Creating Storage on Mined Lands
 - Restoring/Reconnecting Mined Lands
 - Restoring Historical Storage Lost Due to Drainage Improvements

Cost: \$100 - \$200 million