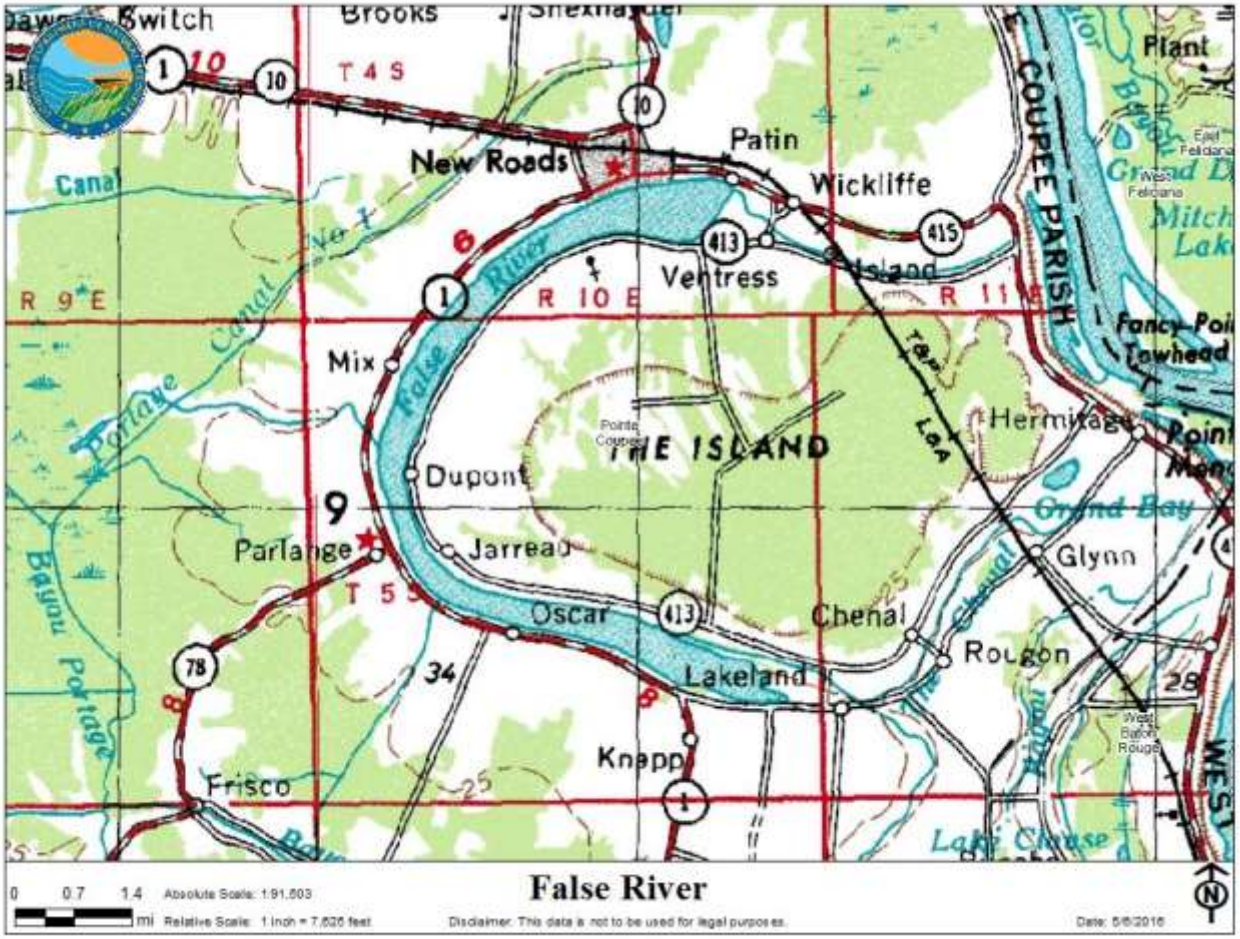
# FALSE RIVER WATER LEVEL MANAGEMENT

FRWC Meeting | March 8, 2017

LDWF Inland Fisheries is recommending the continued use of water level reductions as a management tool to combat adverse effects of siltation and improve sportfish habitat.



**“Water level management for black bass has been adopted by more than half of the state agencies in the USA.”** (Noble, R.L. 2002. Reflections on 25 years of progress in black bass management.)

**“Most managers seek to: (1) draw down water levels in late summer or fall, (2) establish terrestrial vegetation by seeding or recolonization, (3) flood vegetation in spring, & (4) maintain high water for as much of the growing season as possible.”**
(Jenkins, R.M. 1970. Reservoir Fish Management.)

# Potential benefits of using water level manipulations as a lake management tool:

- Increase sportfish production
- Improve substrate for spawning habitat and aquatic vegetation growth
- Improve pre-spawn body condition of predatory sportfish due to increased availability of forage
- Reduce accretion in the lake by compacting sediments and decomposing organic matter, thus creating depth
- Reduce turbidity by consolidation of exposed sediment
- Establishment of herbaceous terrestrial plants

## Increase sportfish production:

"The result of a drawdown can be a sharply increased biomass and individual sizes of gamefish, and a reduction in biomass or abundance of rough fish and stunted panfish or other planktivores. These fishery changes can mean a better sports fishery, clearer water, and fewer algal blooms.

Water level drawdown is an effective and well established fish management technique. It is used to enhance the growth of predatory fish, to control the density of forage fish, and to assist in the management of nuisance species such as common carp." (Cooke, G.D. 1993. Restoration & Management of Lakes & Reservoirs, 2nd Ed.)

# Improve substrate for spawning habitat & aquatic vegetation growth:

"Water level drawdown results in a compacted substrate, which after refill, provides a firm base for rooted aquatic macrophytes, a suitable material for gamefish breeding grounds, and a bottom that will provide for an increased diversity of benthic invertebrates." (Fox, et al. 1977. Lake drawdown as a method of improving water quality.)

# Improve substrate for spawning habitat & aquatic vegetation growth:

"Most species of macrophytes have roots in the sediments which are used for obtaining carbon, phosphorus, nitrogen, iron, manganese, & other micronutrients. Leaves are the sites of uptake of carbon, calcium, potassium, & other essential nutrients." (Barko, et al. 1991. Sediment interactions with submersed macrophyte growth and community dynamics.)

"Excessive external nutrient loading can produce algal blooms, shading, and a reduction in macrophyte biomass." (Cooke, G.D. 1993. Restoration & Management of Lakes & Reservoirs, 2nd Ed.)

## Improve pre-spawn body condition of predatory sportfish due to an increased availability of forage:

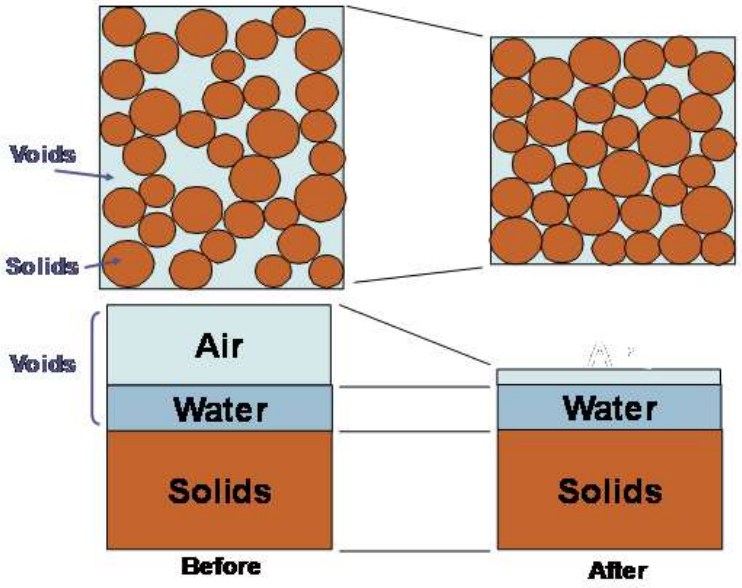
"Predation reduces populations of overabundant forage fish when they are forced from cover in shallow water & concentrated in open water. Enhanced predator-prey interactions may increase predator growth rates." (Keith, W.E. 1975. Management by water level manipulation)

## Reduce accretion in the lake by compacting sediments & decomposing organic matter, thus creating depth:

“Periodic long-term exposure of sediment by fluctuating water levels may consolidate flocculent sediment and potentially increase capacity.” (Miranda, L.E. 2016. Res. fish habitat management)

## Reduce turbidity by consolidation of exposed sediment:

"Consolidation changes the sediment in such a way that its effect on some parameters of water quality is reduced. Consolidation provides for lower turbidities, higher dissolved oxygen values, lower temperatures, and reduced phytoplankton after lake refill." (Fox, et al. 1977. Lake drawdown as a method of improving water quality)



## Establishment of herbaceous terrestrial plants:

“Herbaceous terrestrial plants that become established on suitable substrates after a drawdown are beneficial. These plants provide spawning and nursery sites for fish after inundation. They also provide food & refuge for bacteria, zooplankton, benthos, fish and birds; substrates for attached algae; nutrients for aquatic primary production. Establishment of herbaceous terrestrial vegetation after drawdown is also important for erosion control, aesthetic purposes, & nutrient retention. When reflooded, areas with vegetation cover are less apt to contribute to turbidity.”

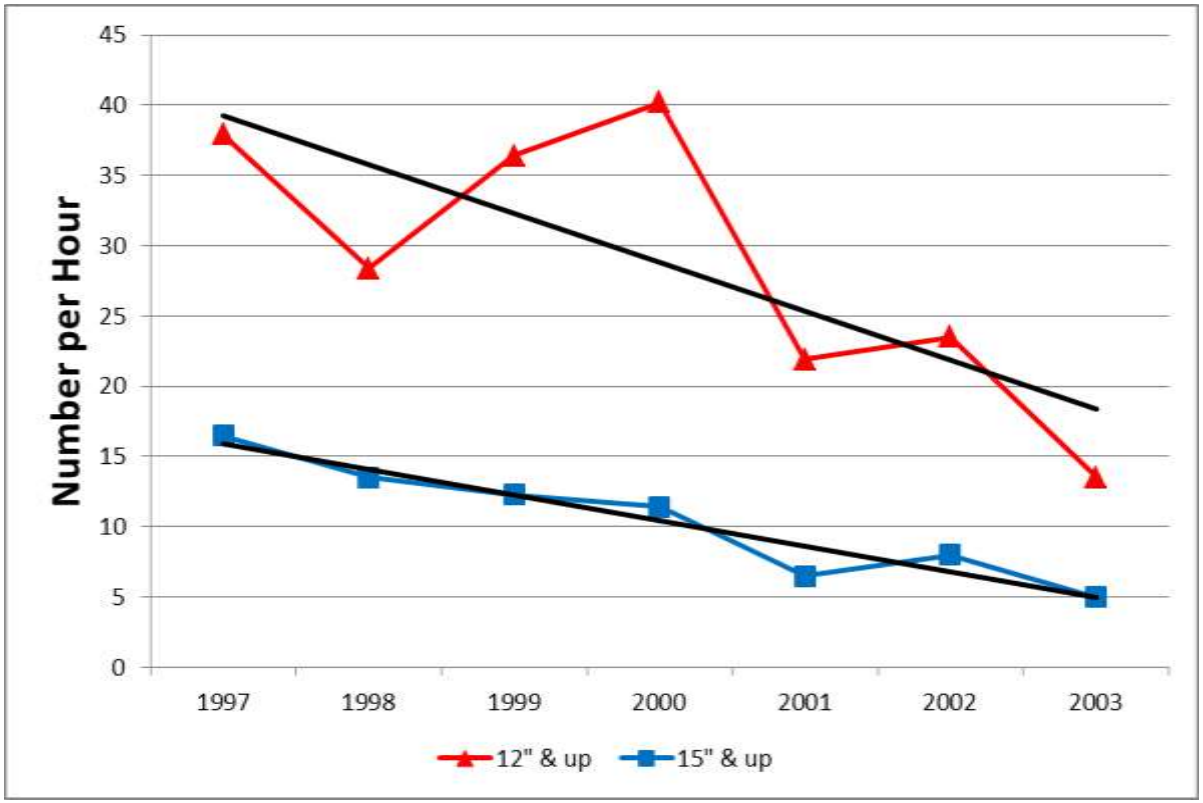
(Miranda, L.E. 2016. Res. Fish habitat management)

# Other drawdown case studies & examples:

- In Louisiana in 2014/2015, 13 lakes underwent drawdowns as a management tool for various reasons (vegetation control, bottom oxidation, substrate consolidation,  pier/bulkhead/ramp improvements)

# Lake Bistineau:

- Drawdowns began in 2004 due to a declining fishery and excessive vegetation




**Pre drawdown LMB CPUE**

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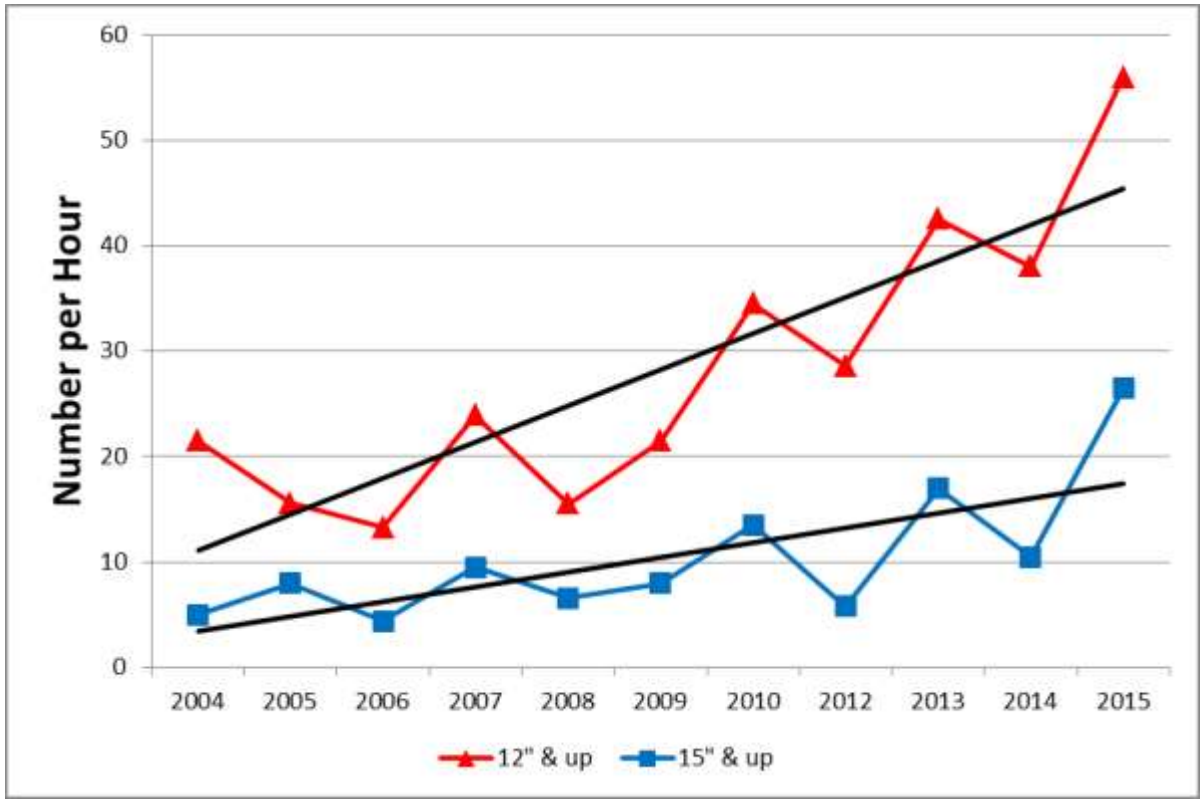


**Post drawdown LMB CPUE**

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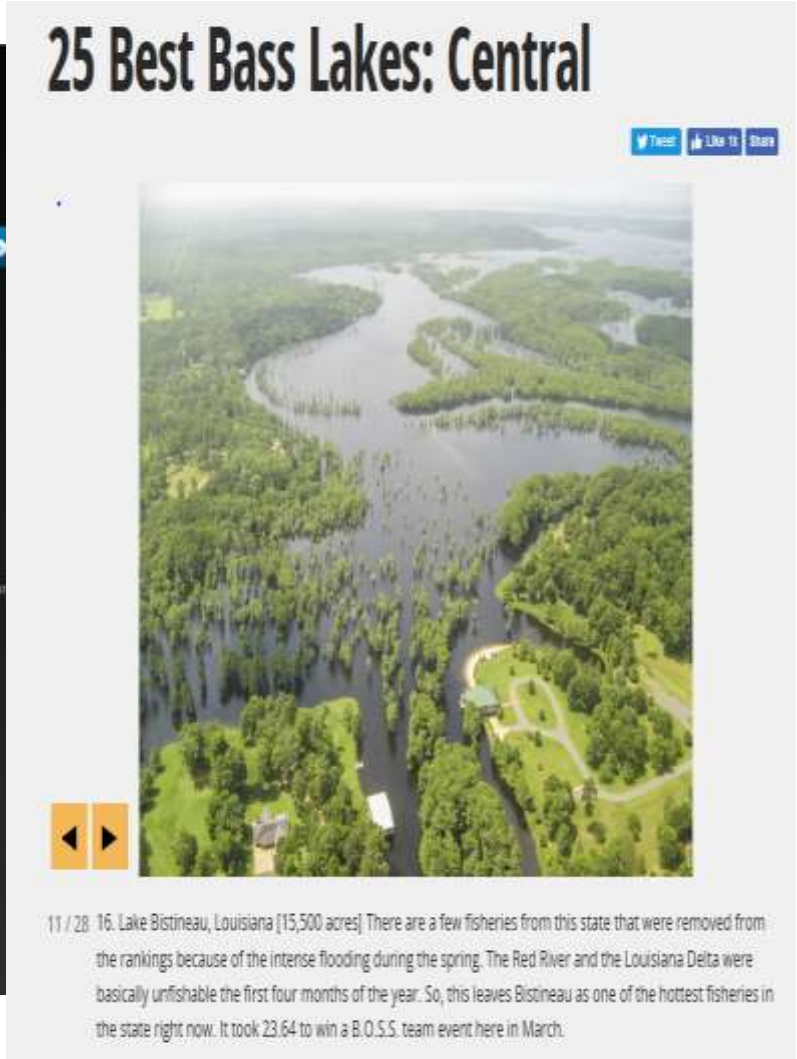


## Toledo Bend:

- In 2011, the lake was 14’ below pool (previously only 6’)
- In succeeding years (May to May), the number of LMB harvested in the Lunker Bass Program:
  - 2012-2013 – 61
  - 2013-2014 – 78
  - 2014-2015 – 89
  - 2015-2016 – 139

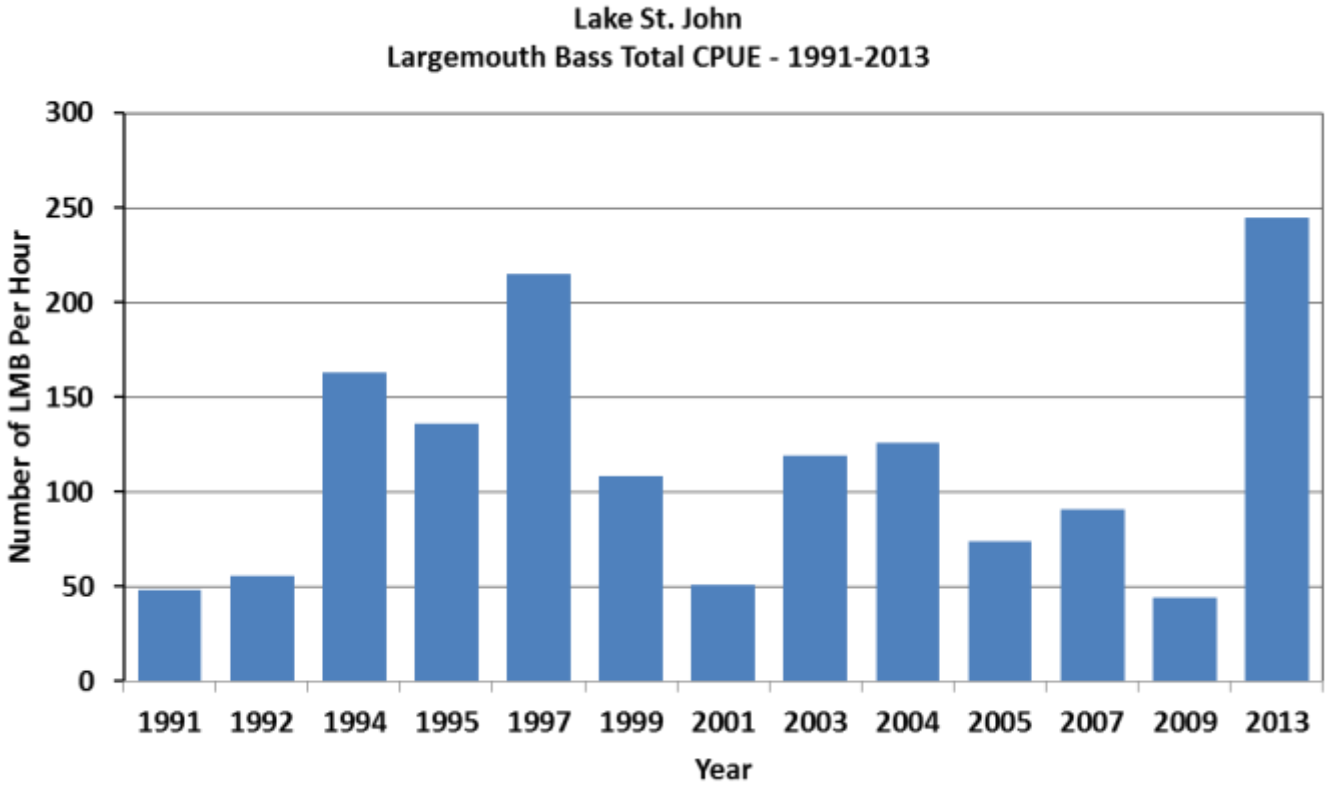
*Keep in mind that:

TB – 186 K acres

FR – 3 K acres

# Lake St. John:

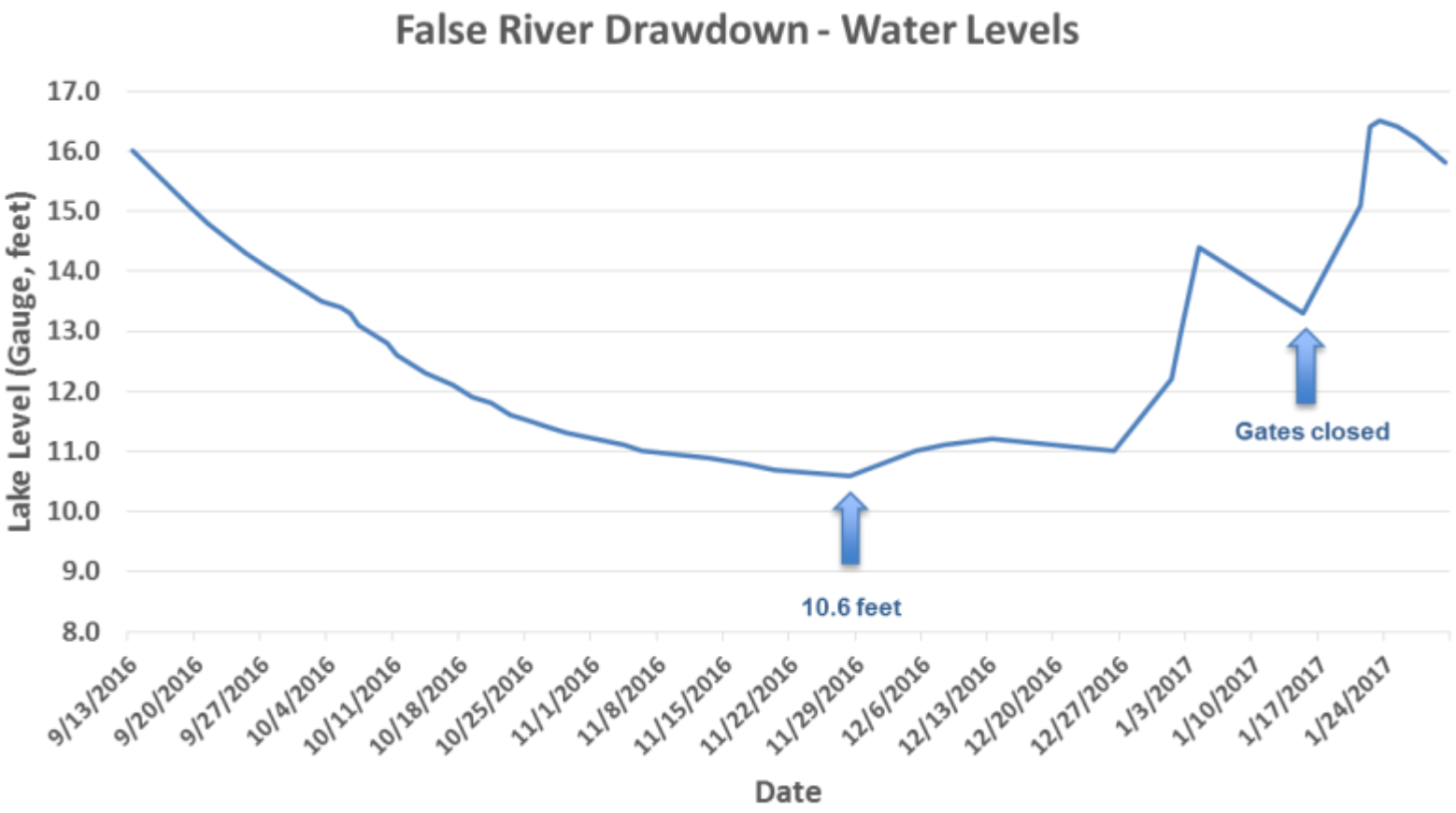
- An inactive oxbow in Concordia Parish, with annual drawdowns from 1983 to 1998-increasing LMB CPUE until drawdowns stopped – then decreasing until 2013 (drought in 2011)



## Lake Tohopekaliga, Florida:

- Channelization lead to organic sediment build-up/loss of submerged aquatic vegetation → fish food organisms declined in abundance/diversity → sport fishing declined
- Drawdowns implemented
- After re-flooding terrestrial/semi-aquatic plants that flourished during sediment exposure → invertebrate population increased sharply, fishing success increased sharply → estimated value of fish alone $6 mill.
- Benefits lasted several years, but…
- Ecological succession occurred as stable water levels were resumed, so…
- Drawdowns implemented at regular intervals

# False River Drawdown 2016-2017:



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- Exposure estimates → 10 to 20 % is typical
  - False River estimate ~ 400 acres / 12.5%

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# False River Drawdown 2016-2017:

- Fish kills
  - Vast majority of affected fish were threadfin shad
  - Low DO events caused by → hot weather + high water temps + stratification + newly disturbed lake sediments = lake inversion fish kills
  - Events should decrease over time with water level reductions at regular intervals

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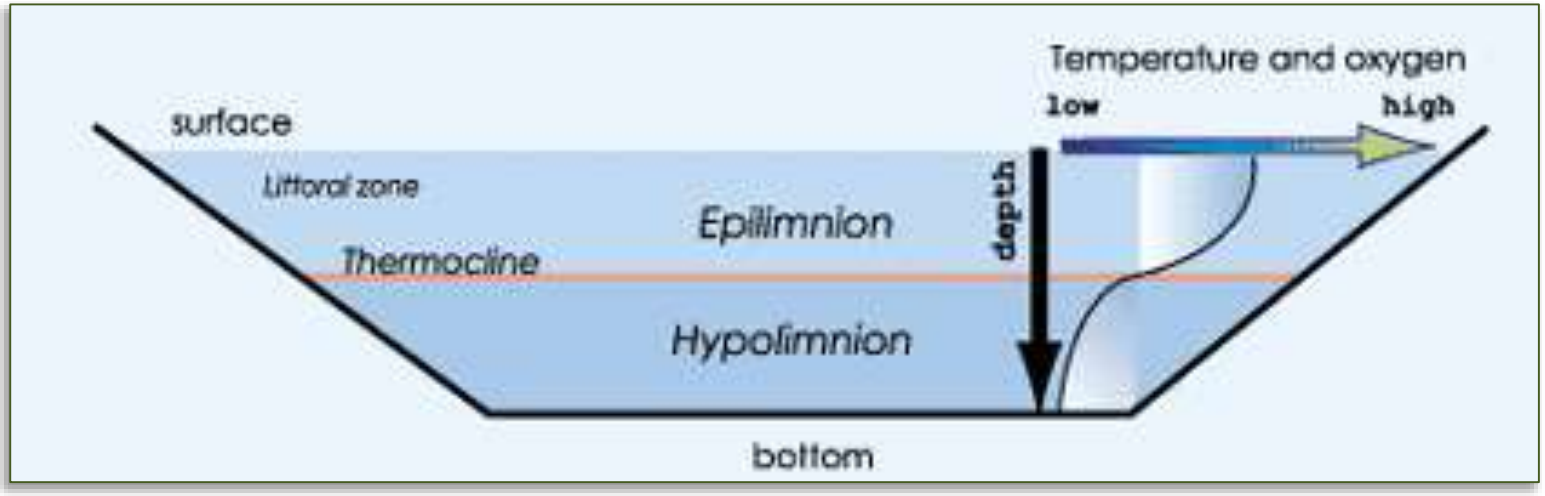


- Low temp/DO in hypolimnion
- Higher temp/DO in epililimnion (thickness of this layer was reduced by drawdown)
- With a reduction in water level, previously undisturbed lake sediments are now in suspension → increasing oxygen demand further

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- Vast amounts of terrestrial & semi-aquatic vegetation observed – particularly in those areas exposed in ‘14

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# False River Drawdown 2016-2017:

- Drying / consolidation / compaction of sediments
  - PVC stake soil consolidation measurements used to determine magnitude
  - 10 stations across different substrate types
  - Up to 3” observed on N end of lake / 2” on S end
  - More firm substrates (sandy clay) consolidated as well / up to 1”

# False River Drawdown 2016-2017:

- Drying / consolidation / compaction of sediments

*same location

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# False River Drawdown 2016-2017:

- Shell, gravel, sand exposed due to sediment compaction/consolidation and organic decomposition
- Excellent for nesting fishes

# False River Drawdown 2016-2017:

- Shell, gravel, sand exposed

Area still inundated

8’ away from above area, but has been exposed

# False River Drawdown 2016-2017:

- Shell, gravel, sand exposed

# False River Drawdown 2016-2017:

- Evidence of water level changes in the past

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# False River Drawdown 2016-2017:

- Other activities concurrent with drawdown:
  - LDWF stocking → bluegill (314K) , redear (75K)
  - Public launch improvements
  - LDEQ water quality monitoring

# False River Drawdown 2016-2017:

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# False River:

- Future LDWF activities post initial drawdown:
  - Spring 2017 electrofishing samples
  - Summer 2017 seine samples
  - Continued stocking → LMB, HSB, crappie
  - Artificial reef construction – summer 2017
    (structure material courtesy of Entergy & Atmos)

## False River Drawdown (future plans):

- Ideally 2 out of the next 3 years – then schedule would be set to an interval of every 3 to 5 years
  - Future adjustments would be tied to fisheries/habitat responses
  - Possibility of a 2017-2018 drawdown is dependent upon timing of proposed dredging. A drawdown would be counter-productive (need water to dredge)
  - Pending a more precise estimate of when dredging can begin, no determination has been made for implementation of a drawdown in 2017-2018.

# LDWF Communication:

- Several ways to stay informed:
  - Email and text alerts for LDWF news releases: www.wlf.louisiana.gov/signup
  - Twitter / Facebook / Youtube