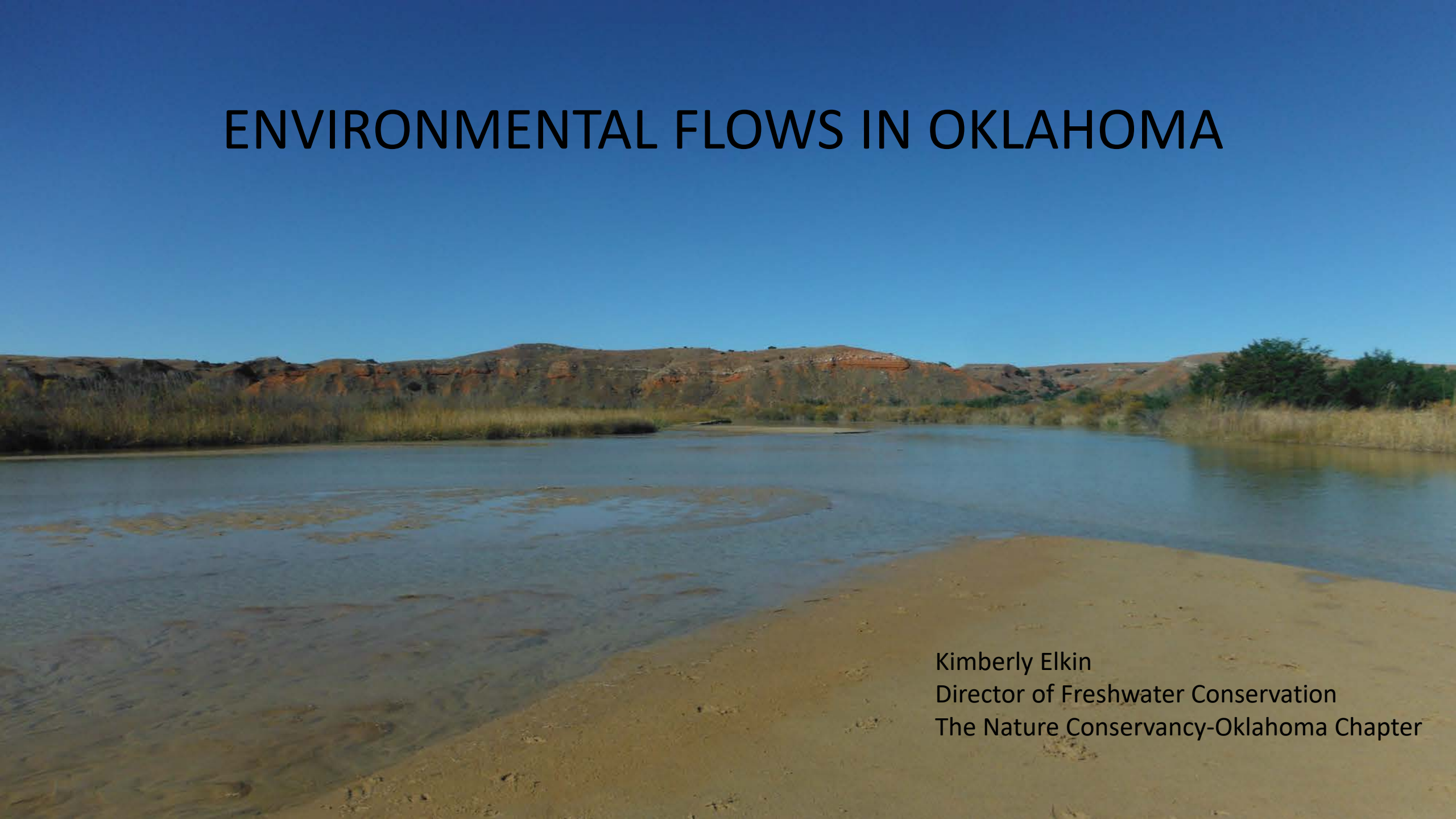
ENVIRONMENTAL FLOWS IN OKLAHOMA



Kimberly Elkin
Director of Freshwater Conservation
The Nature Conservancy-Oklahoma Chapter

OUTLINE

- ❑ Overview of environmental flows
- ❑ Environmental flow projects in Oklahoma
- ❑ Current legislation on environmental flows
- ❑ Challenges to implementing environmental flows
- ❑ Similar states with environmental flow programs
- ❑ Opportunities

INSTREAM FLOW COUNCIL DEFINITION OF ENVIRONMENTAL FLOWS

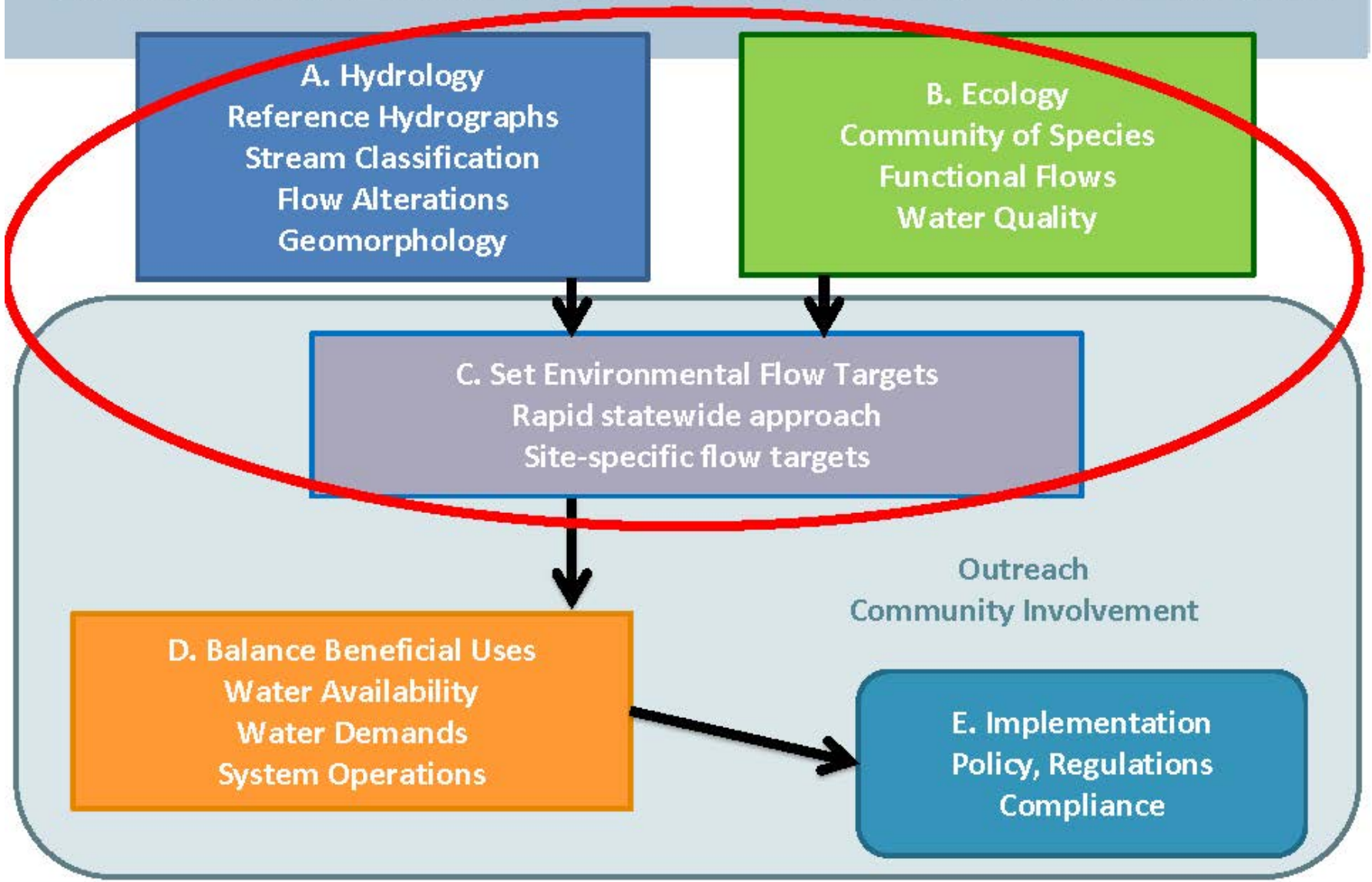
Water flowing in a stream

- Riverine Components:

Hydrology → Biology → Geomorphology → Water Quality → Connectivity

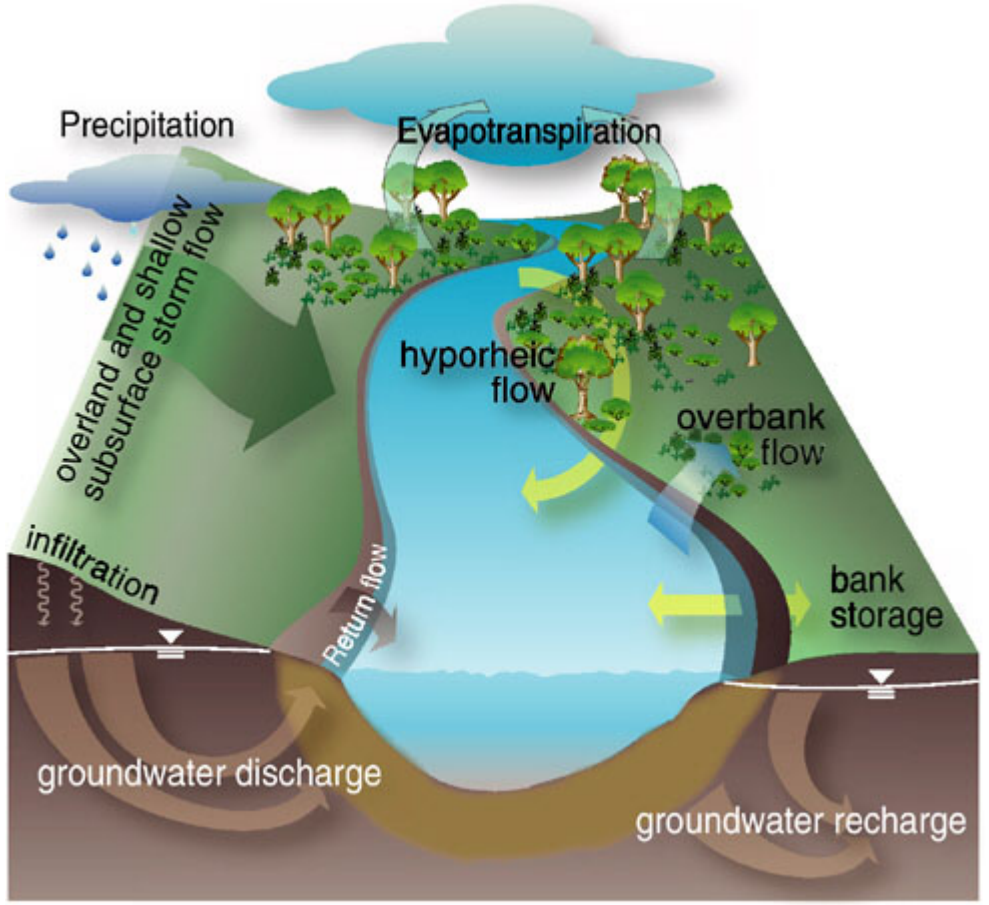
- Legal/Institutional
- Public Involvement

California Environmental Flows Framework



TERMINOLOGY USED FOR INSTREAM FLOWS

- Environmental Flows
- Instream Flows
- Fish and Wildlife Flows
- Fish and Recreational Flows
- Non-consumptive Use
- Minimum Flows



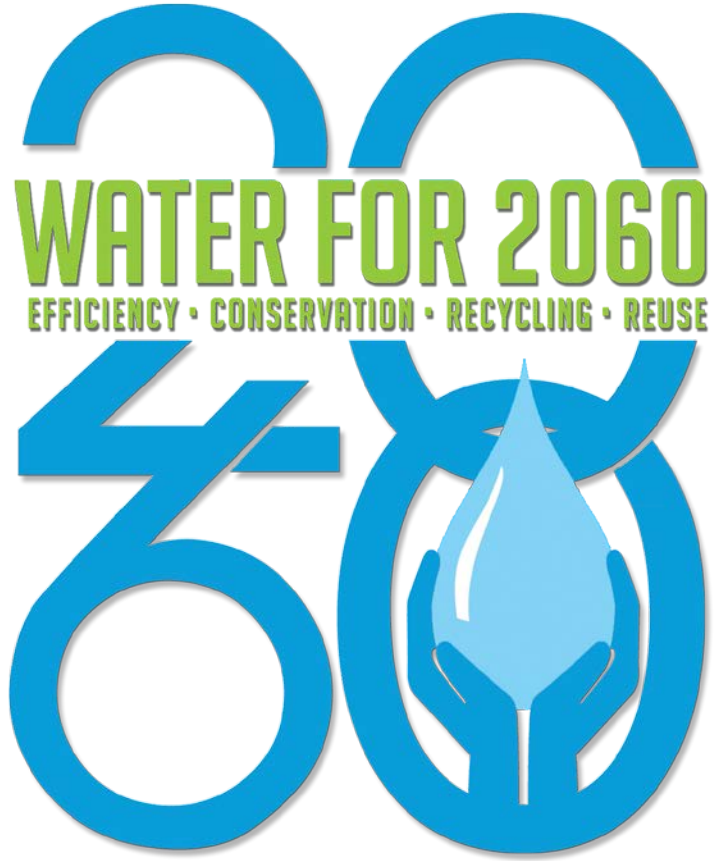
BARREN FORK ENVIRONMENTAL FLOW

BARREN FORK ENVIRONMENTAL FLOW TIMELINE

Year	Organization	Outcome
1981	OWRB	Response to dependable yields of Lake Tenkiller Reservoir & preserving free flowing nature of Baron Fork
1981	Adair County Rural Water District #5	Applied for surface water permit
1990	OWRB	Amended rules on ORW's & Scenic Rivers to minimum 50 cfs for Baron Fork to sustain fish
1994	Adair County Rural Water District #5	Applied for an additional water diversion
1998	OSU- Layher, W.G. Study	Protested Adair water permit due to study showing 75 cfs needed from July-Oct.
2000	OSU- Fisher et al. Study	Study showed 30-75 cfs needed during low flows
2003	Public review and OWRB	Future water withdrawal permits set to 50 cfs @ Eldon gaging station or Tenkiller Reservoir @ or above 632 MSL

OKLAHOMA COMPREHENSIVE WATER PLAN PRIORITY RECOMMENDATIONS

- Water Project & Infrastructure Funding
- Regional Planning Groups
- Excess & Surplus Water
- **Instream/Environmental Flows**
- State/Tribal Water Consultation & Resolution
- Water Conservation, Efficiency, Recycling & Reuse Water
- Supply Reliability
- Water Quality & Quantity Monitoring

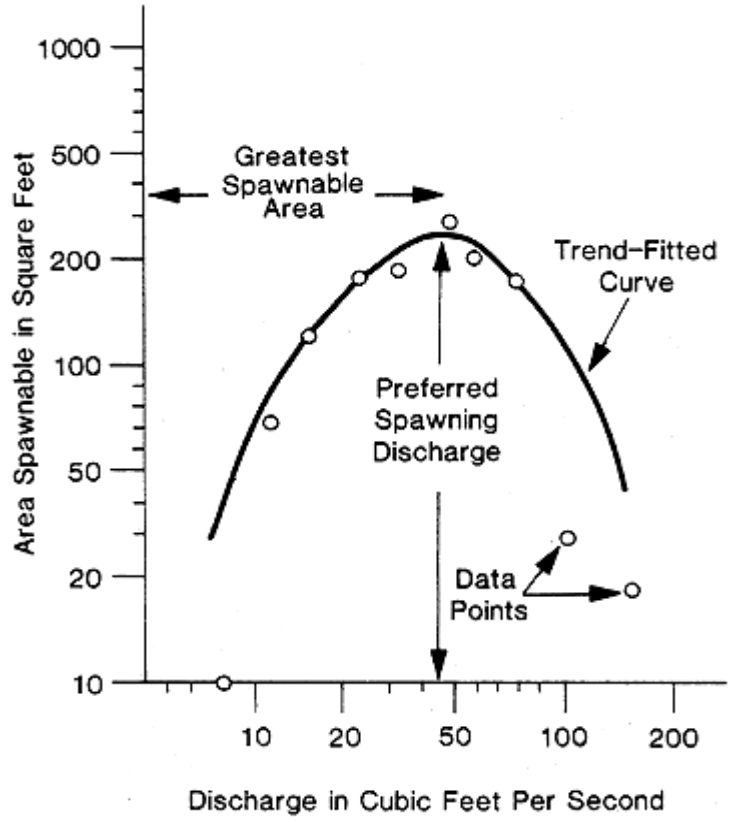


UPPER ILLINOIS RIVER INSTREAM FLOW PILOT PROJECT

- OWRB and ACOE funded
- Carollo Engineering facilitated meetings
- IF Technical Workgroup assisted in data analysis
- May 2017 final report by Ch2m Hill
- IFIM and PHABSIM
- Target fish species and habitat suitability modeling

INSTREAM FLOW INCREMENTAL METHODOLOGY (IFIM)

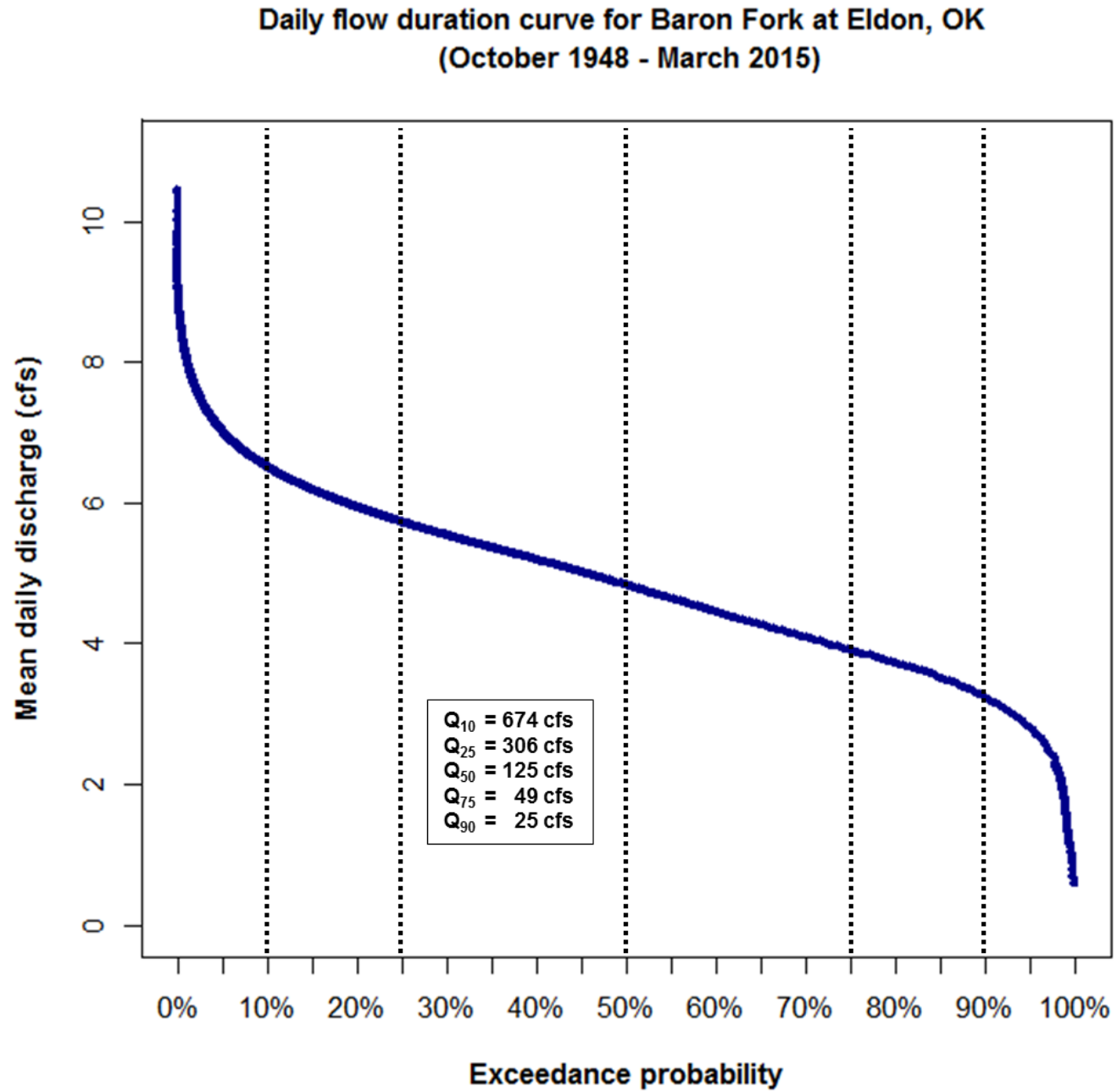
- Habitat quality based on stream hydraulics
- Incremental changes in water flow and effects on available habitat of species studying
- Microhabitat: water velocity, water depth, substrate, cover in riffles, pools, runs
- Macrohabitat: water quality, stream size, stream gradient



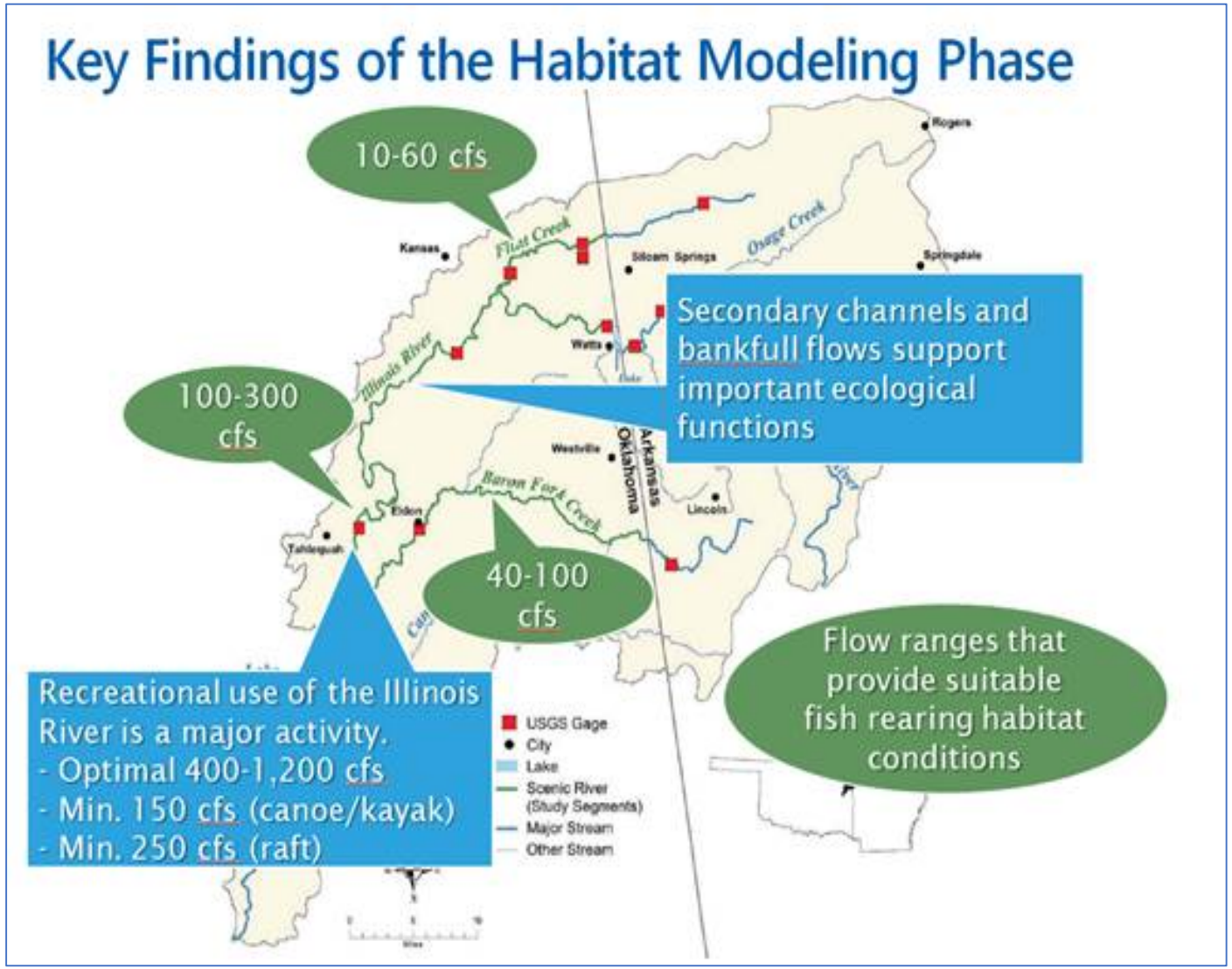
Bishop & Scott, 1973

Physical Habitat Simulation Model (PHABSIM)

- Hydrological and biological models to predict changes in habitat over discharge ranges
- Determine biological effects of streamflow alteration
- Component of IFIM

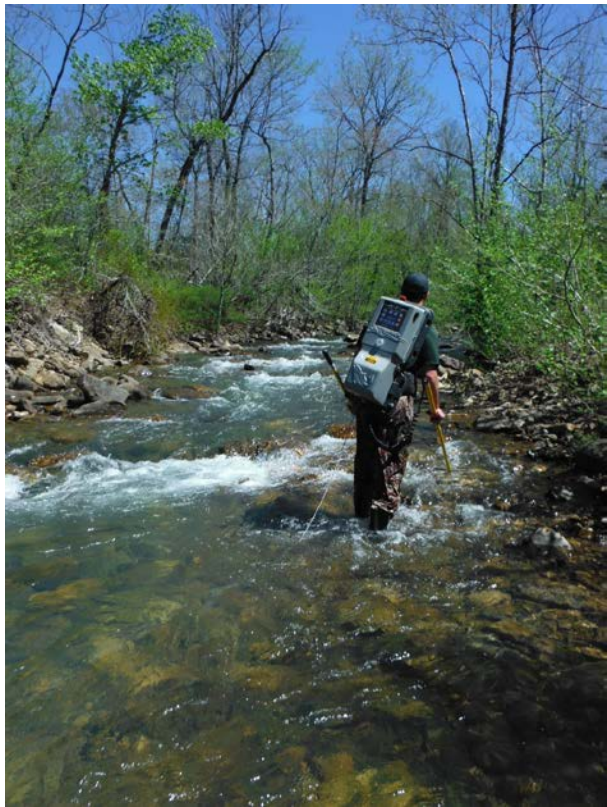

Daily flow duration curve for Baron Fork at Eldon, OK
(October 1948 - March 2015)
Mean daily discharge (cfs)
0
2
4
6
8
10
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Exceedance probability
Q10 = 674 cfs
Q25 = 306 cfs
Q50 = 125 cfs
Q75 = 49 cfs
Q90 = 25 cfs

UPPER ILLINOIS RIVER INSTREAM FLOW PILOT PROJECT FLOW RECOMMENDATIONS

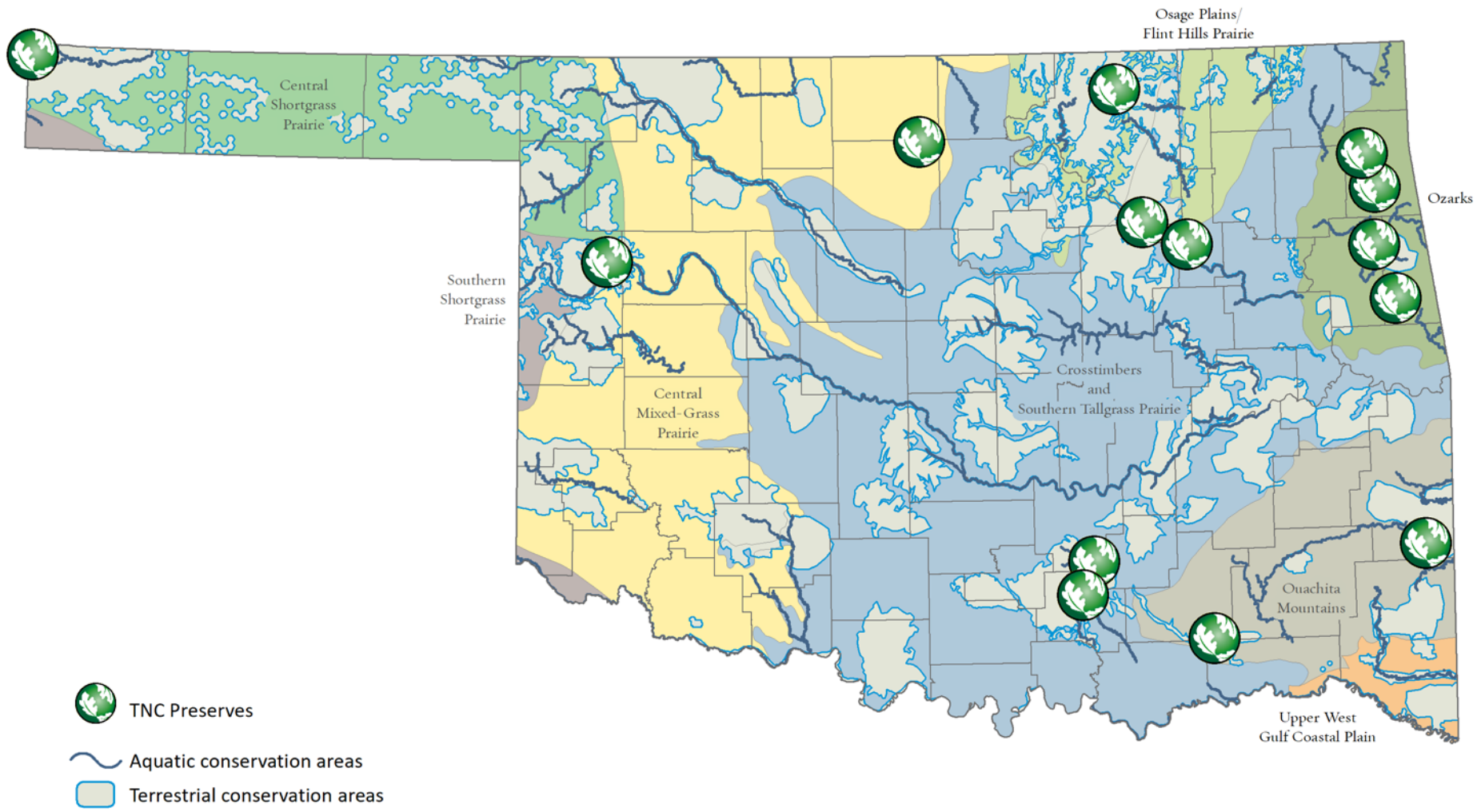


THE NATURE CONSERVANCY-OKLAHOMA CHAPTER ENVIRONMENTAL FLOW PROJECTS

- Freshwater Conservation Program started in June 2012
- Baseline data needed for preserves
- Data for internal purposes only and for active management by Preserve Directors
- Three year studies at 6 preserves
- Transition to leadership and collaborative focus
- Work across political boundaries



Oklahoma Chapter Portfolio of Conservation Areas



2019 OKLAHOMA LEGISLATION

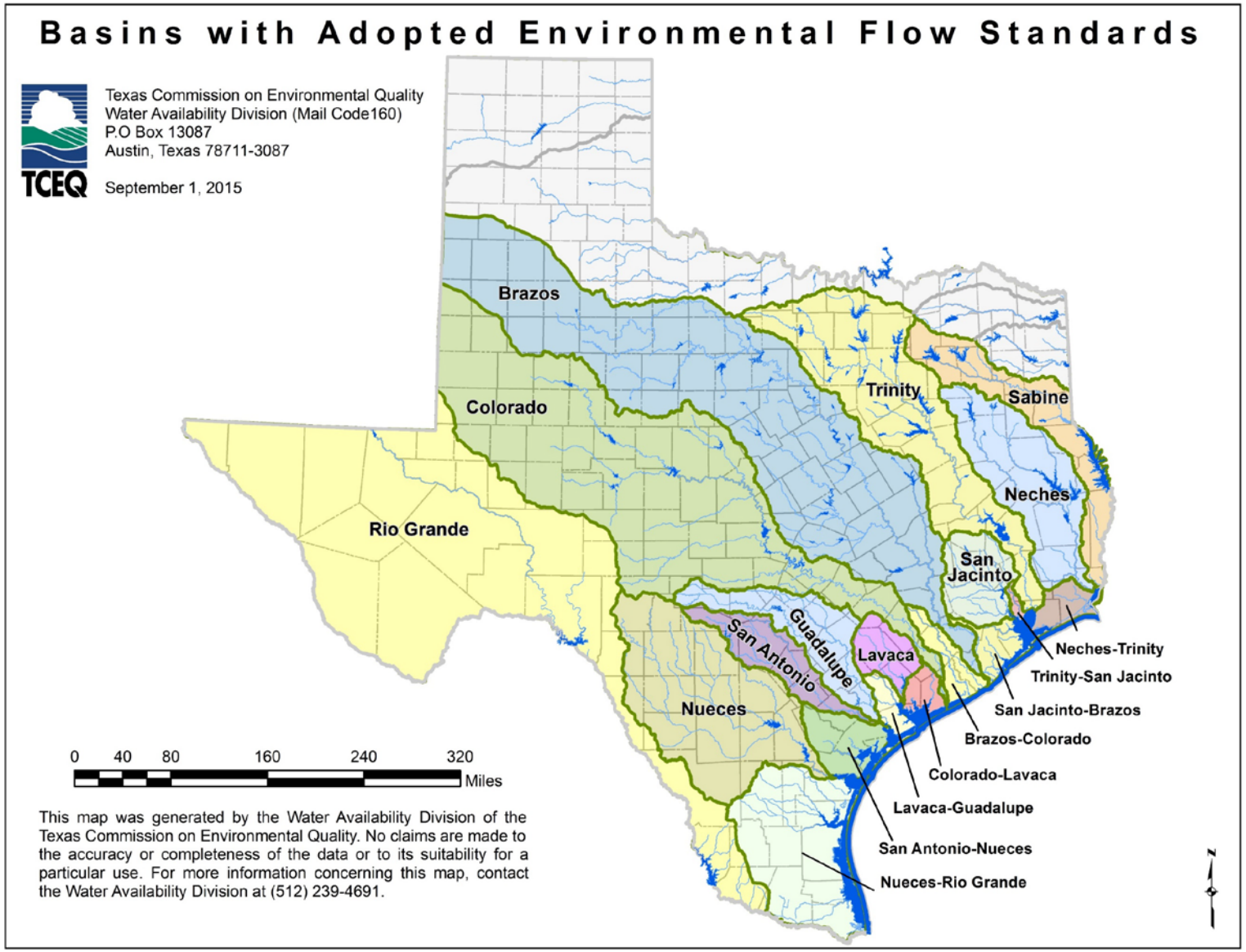
- Several bills introduced

"Instream flow program" means an ongoing program in which a treasured stream is monitored for compliance with instream flow determinations and biological assessments are conducted to determine if adjustments to instream flows are needed

The Nature Conservancy
Protecting nature. Preserving life.®

- Monitoring a select number of bills for review

TEXAS ENVIRONMENTAL FLOW PROGRAM



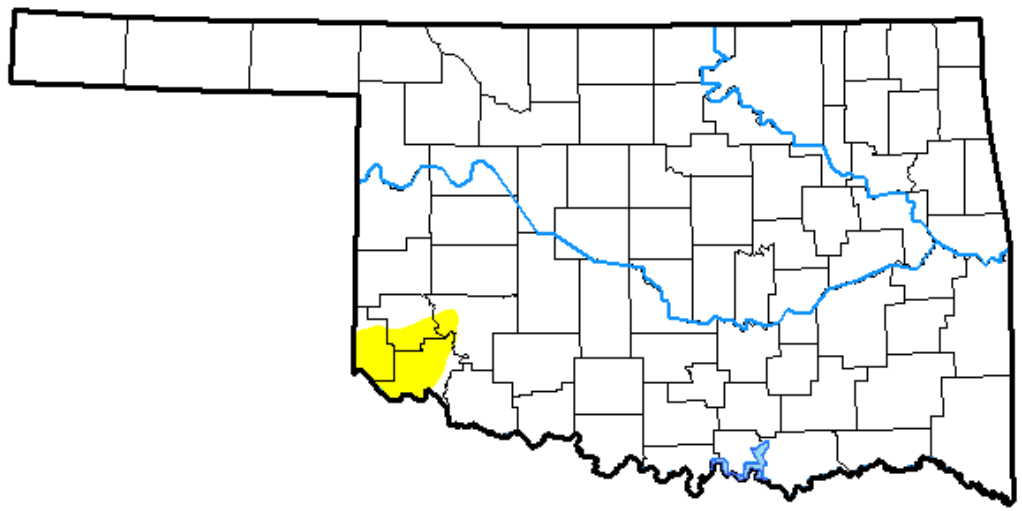
UTAH ENVIRONMENTAL FLOW PROGAM

Working within the existing Utah water rights system (Lane, B.A. et al. 2018)

- Acquiring a water source, either through existing water rights (leased donated, or sold) or unappropriated water
- Shepherding water from the source to the instream use location while preventing intermediary users from filing on or diverting the water
- Incentivize water conservation (source) - An instream flow lessor encourages a water rights holder to conserve water
- Water savings can occur through efficient irrigation technology, metering secondary water use, irrigation scheduling, or rate changes
- Voluntary landowner incentive programs
- Water banking, split season irrigation, FERC relicensing
- HB 117 and HB 58 expansion for instream flows and protecting agricultural users

U.S. Drought Monitor

Oklahoma



March 26, 2019

(Released Thursday, Mar. 28, 2019)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	97.87	2.13	0.00	0.00	0.00	0.00
Last Week *03-19-2019*	99.36	0.64	0.00	0.00	0.00	0.00
3 Months Ago *12-25-2018*	50.34	49.66	5.08	0.00	0.00	0.00
Start of Calendar Year *01-01-2019*	94.85	5.15	0.00	0.00	0.00	0.00
Start of Water Year *09-25-2018*	72.93	27.07	9.11	4.16	0.00	0.00
One Year Ago *03-27-2018*	40.71	59.29	47.60	42.29	34.93	14.79

Intensity:

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

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

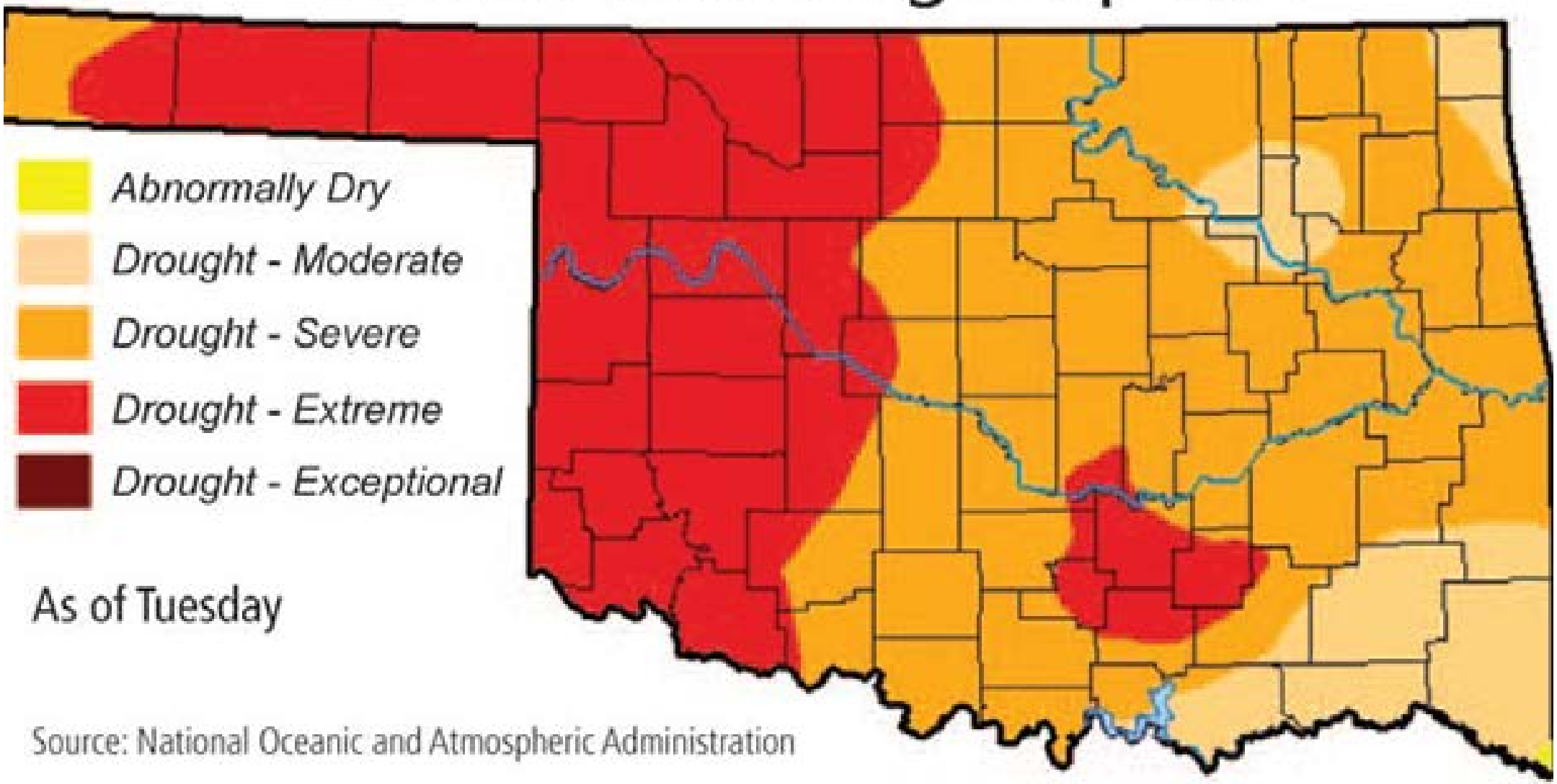
Author:

Eric Luebehusen

U.S. Department of Agriculture

http://droughtmonitor.unl.edu/

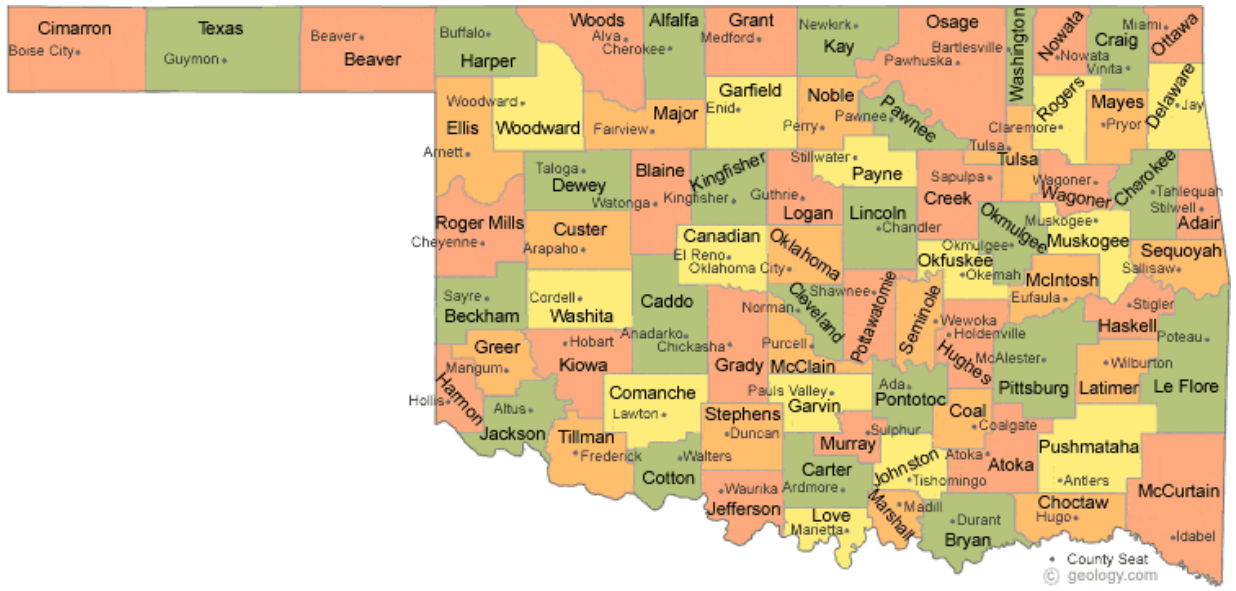
Oklahoma drought update



Source: National Oceanic and Atmospheric Administration

CHALLENGES IN OKLAHOMA

- Opponents of environmental flows
- Adding flow to water quality standards
- Metering of all water withdrawals
- Enforcement of permit requirements
- Review of grandfathered water withdrawals
- Incorporate traditional or local knowledge with scientific studies
- Additional studies on watersheds with high consumptive use
- Extreme weather events



OPPORTUNITIES FOR OKLAHOMA

- Technical workgroups and advisory workgroup already established
- Priority recommendation in the 2012 OCWP
- Pending environmental flow application on Pennington Creek
- First time legislation has been introduced in 2019
- Educational opportunities with stakeholders and the general public


Questions???
Contact: kelkin@tnc.org