Surface water working group

Barry Bolton - ODWC
Scott Christenson - USGS
Kim Winton - USGS
Ken Collins - USFW
Jon Craig - ODEQ
Bill Fisher - OSU
Dick Scalf
Ellen Tejan - TNC
Bill Clark - Land Owner

Jack Keeley - OWRB
(Board Member)
Sue Braumiller - NPS
Hayley Dikeman - USFWS
Darryl Carter - CPASA
Paul Mauck - ODWC
Collin Balcombe - BOR
Noel Osborn - OWRB
Phil Moershel - OWRB
Derek Smithee - OWRB

Charge to working group…

Determine what is:

- not likely to degrade or interfere with springs or streams.
- will not reduce the natural flow of water from springs or streams emanating from said basin or subbasin.

Working group recommendation

Groundwater management should be based upon a target of 10 to 25% maximum reduction in baseflow

Workgroup Initial Discussion

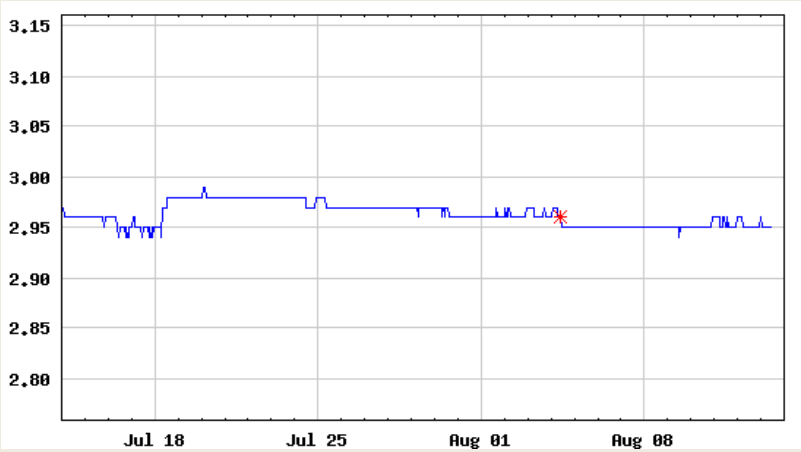
Surface water work group discussion:

- Recreation
- Water Supply
- Fishing
- Ecological Integrity
- Water Quality
- Spring Flow
- Stream Flow

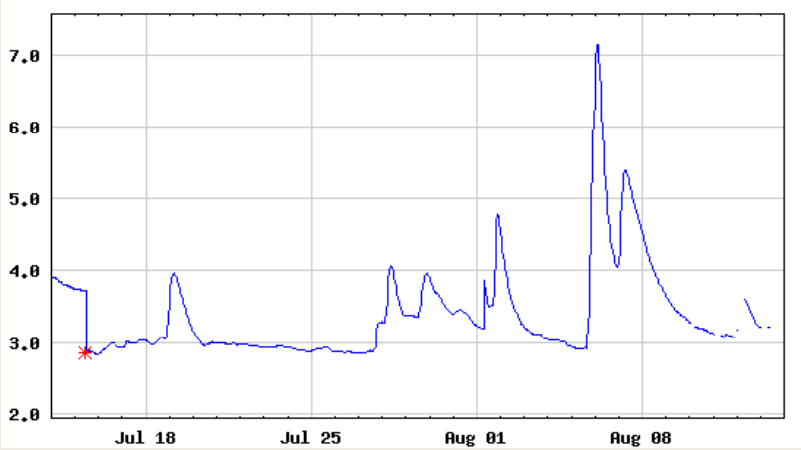
Work group study recommendations:
IHA- Nature Conservancy – evaluate historical flows and variability
IFIM- USGS OSU Coop - assess impacts to spring fauna

Not all hydrographs are created equal

Typical Spring Discharge



Typical Stream Discharge



INDICATORS OF HYDROLOGIC ALTERATION (IHA) ANALYSIS OF SELECTED STREAMS ON THE ARBUCKLE-SIMPSON AQUIFER, SOUTH CENTRAL OKLAHOMA

Ellen C. Tejan

C. Stephen Haase

The Nature Conservancy

Available for review at:
http://www.owrb.ok.gov/studies/groundwater/arbuckle_simpson/pdf/IHAReport.pdf

IHA Study:

Indictors of Hydrologic Alteration (IHA) analysis

- Examined
  - least altered flow regimes
  - existing alterations and
  - trends
- Will serve as a baseline study to evaluate impacts from flow alteration.
- Recommended continued monitoring of streams flows.

INSTREAM FLOW ASSESSMENT OF STREAMS DRAINING THE ARBUCKLE-SIMPSON AQUIFER

William L. Fisher,

Titus S. Seilheimer

U. S. Geological Survey

Oklahoma Cooperative Fish and Wildlife Research Unit

Available for review at:
http://www.owrb.ok.gov/studies/groundwater/arbuckle_simpson /pdf/Arbuckle-SimpsonInstreamFlow.pdf

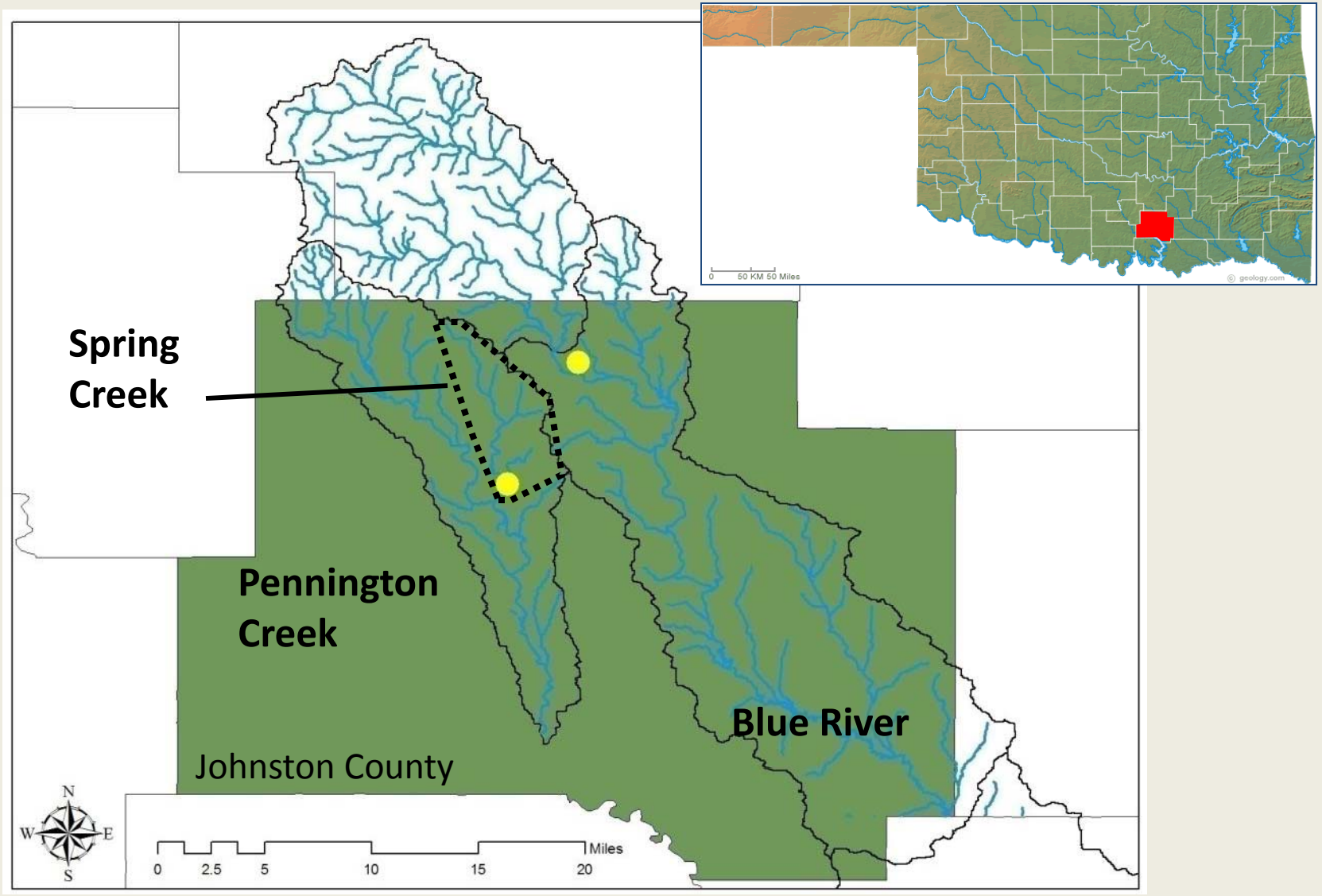
Objectives

How will groundwater withdrawal affect spring-dependent fish species?

1. Field measure quality and quantity of fish habitat
2. Model impacts of different flow scenarios on fish habitat

Fisher & Seilheimer

Study Sites



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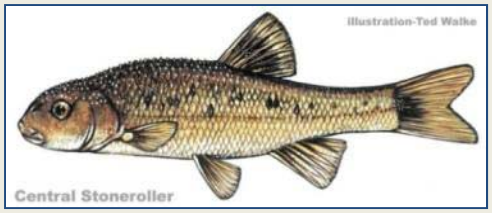
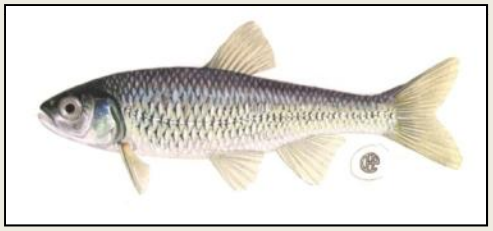
Spring Fish Species Selection



Central stoneroller
Campostoma anomalum



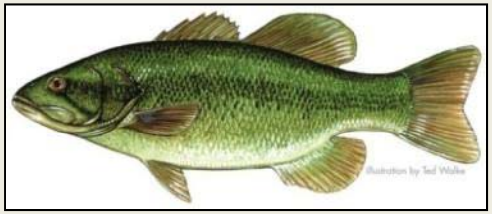
Striped shiner
Luxilus chrysocephalus

Southern redbelly dace
Phoxinus erythrogaster

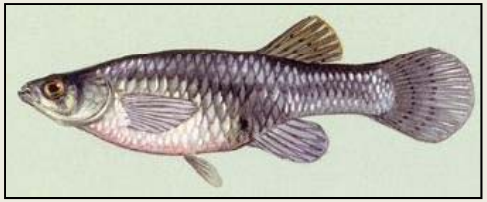
Redspot chub
Nocomis asper

Orangethroat darter
Etheostoma spectabile

Least darter
Etheostoma microperca



Largemouth bass
Micropterus salmoides



Western mosquitofish
Gambusia affinis

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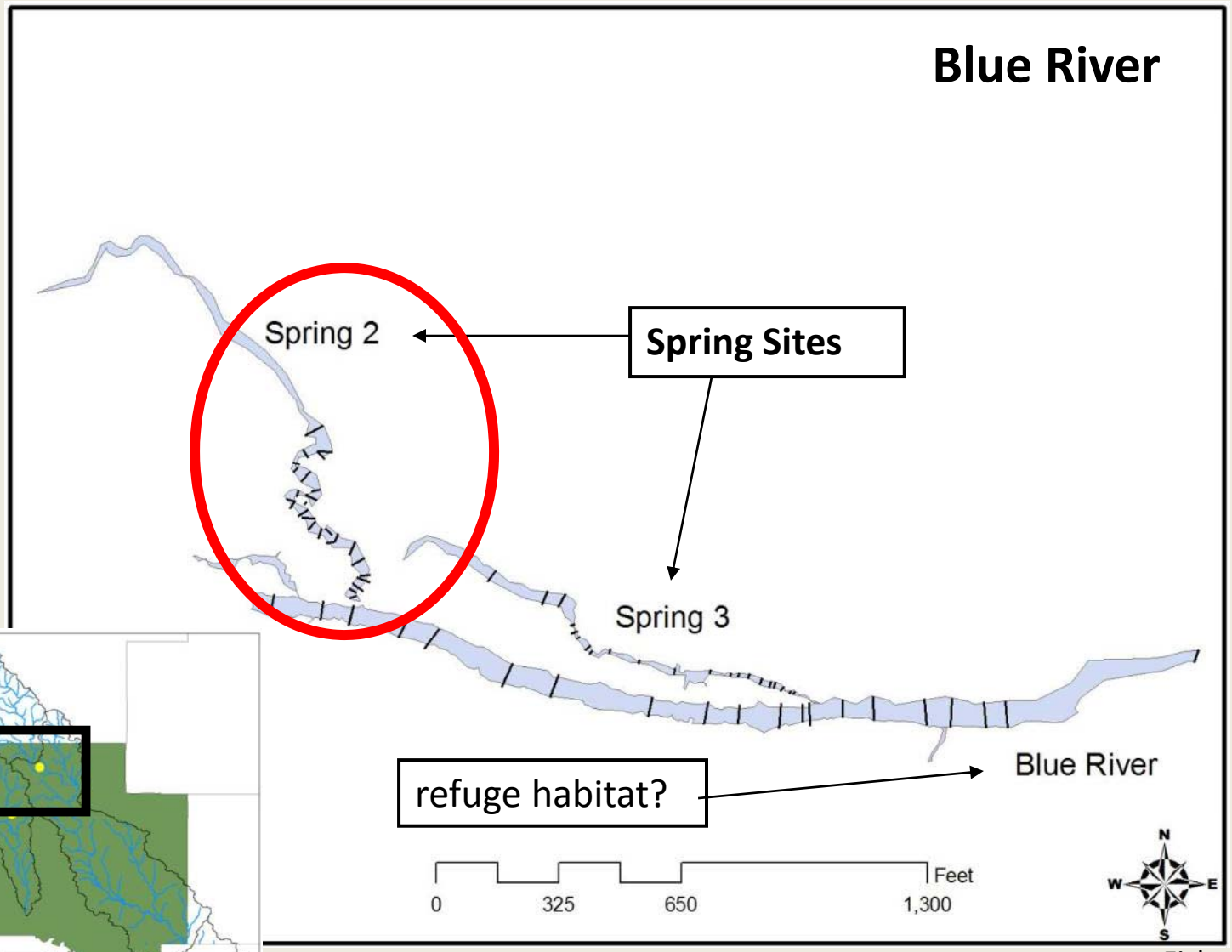
How is habitat quantified?



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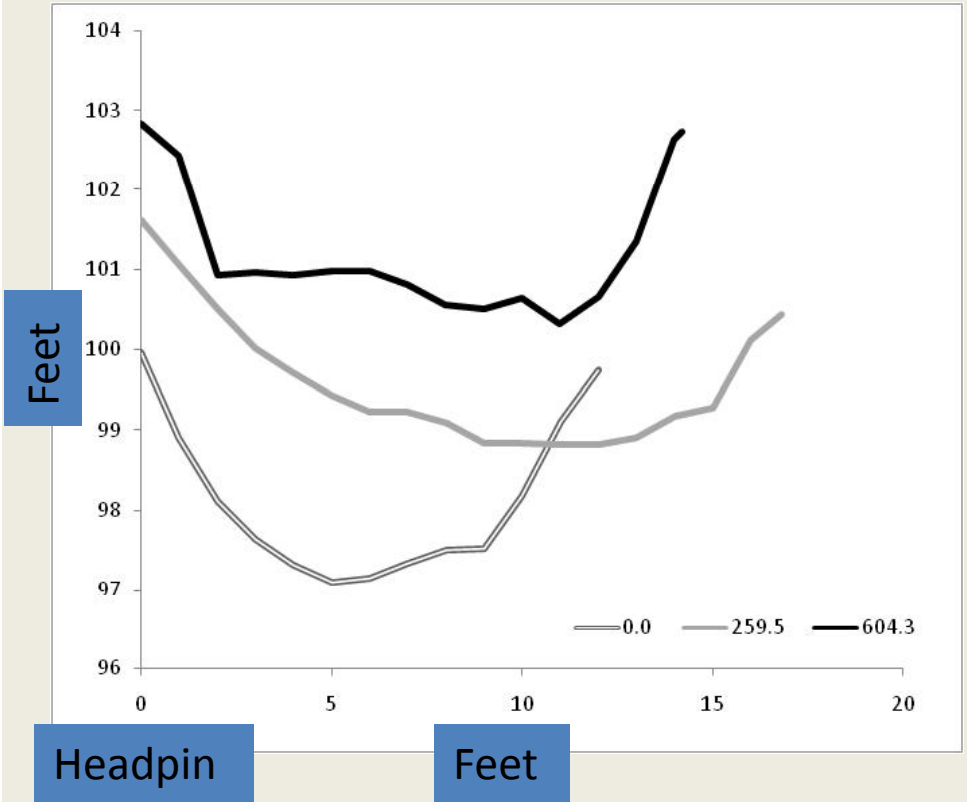
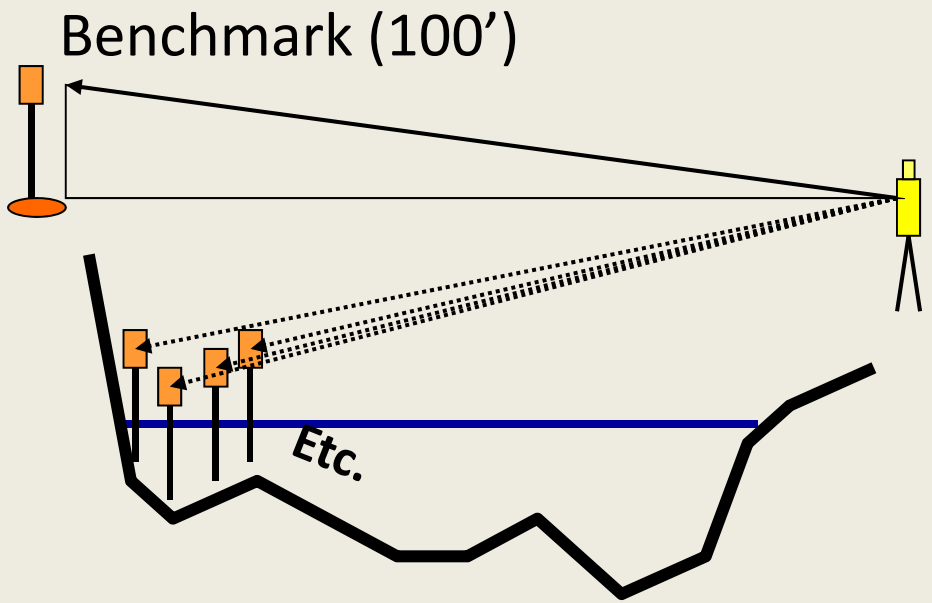
Methods

1. Channel structure
   - Elevation survey





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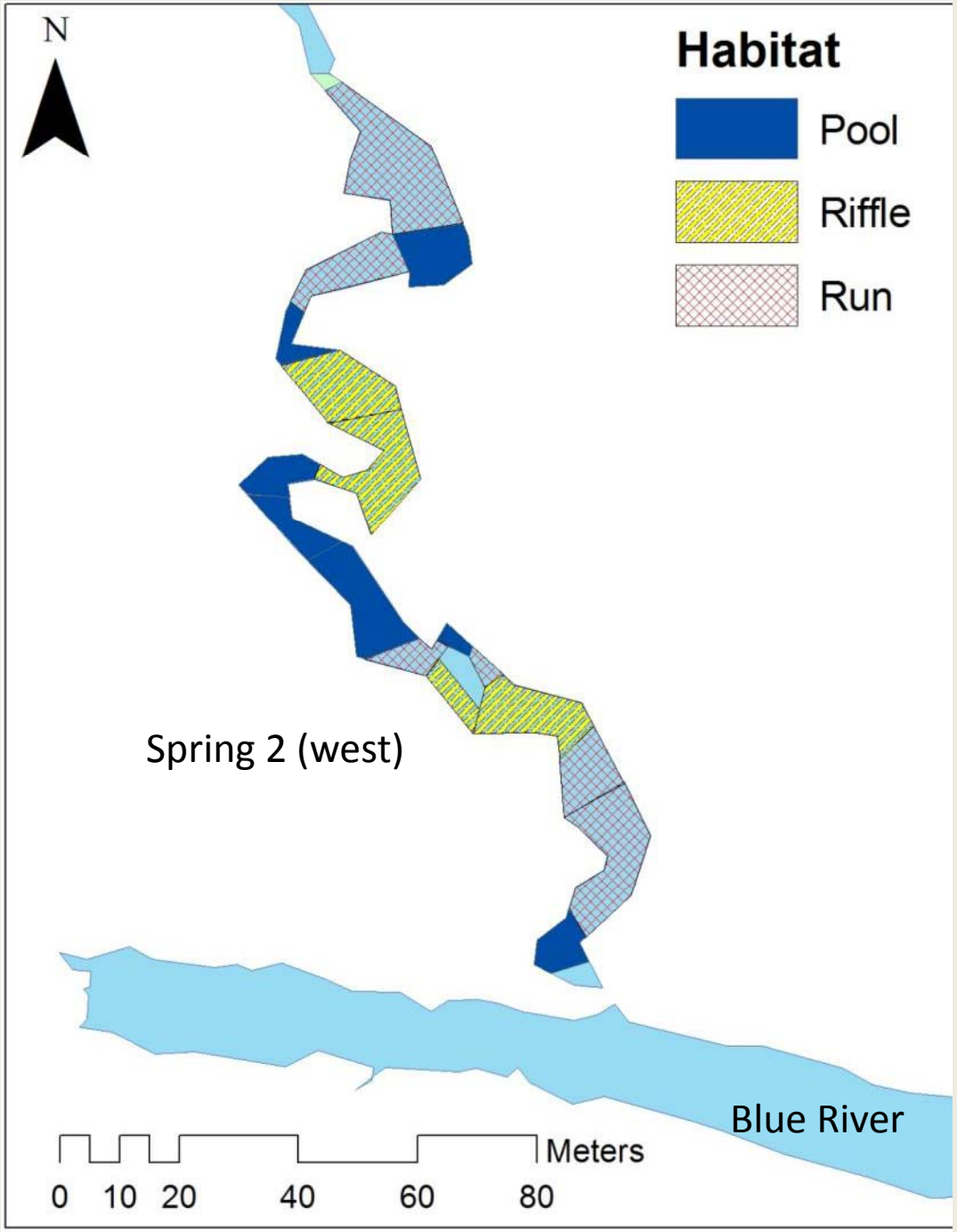

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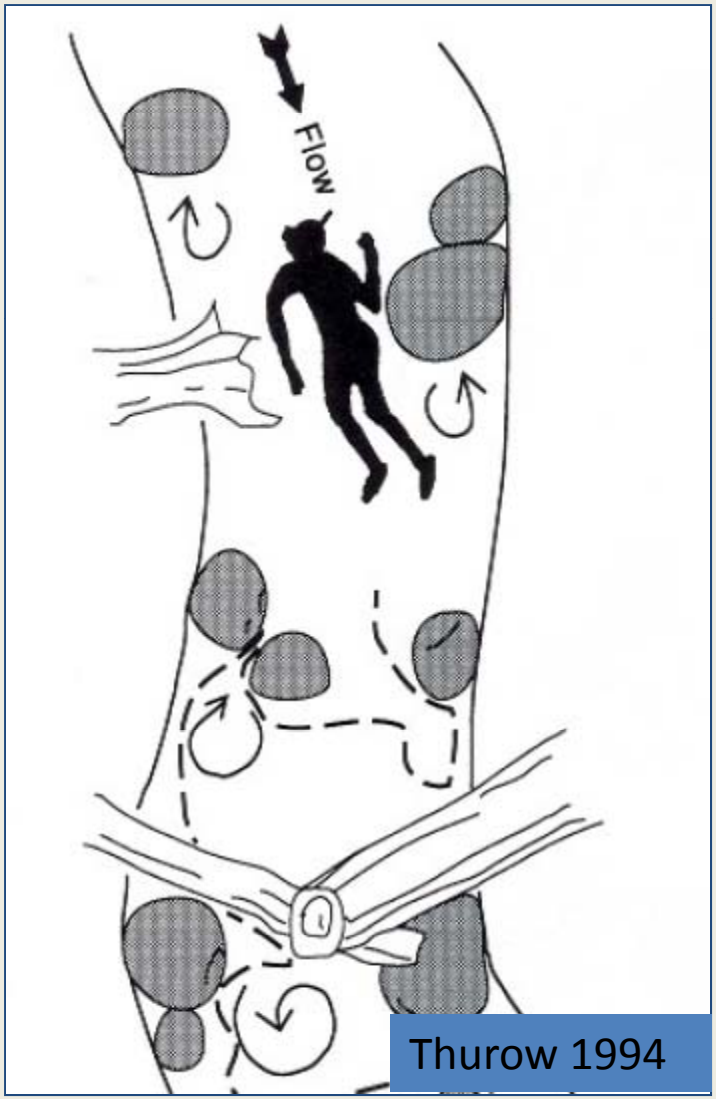
Habitat Suitability

Habitat use

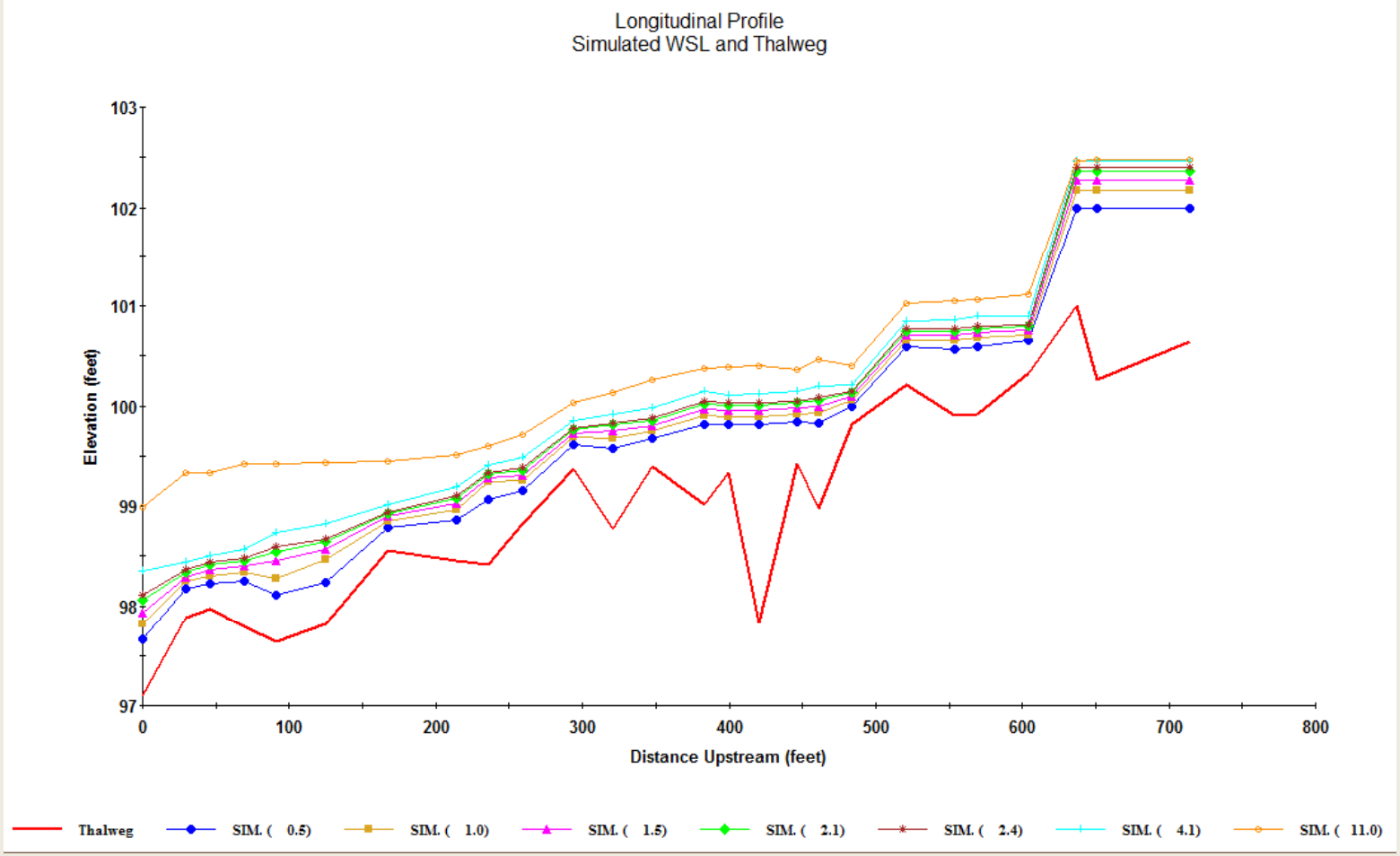
- Visual observation

Habitat type

- Velocity
- Depth
- Cover
- Substrate



Simulated Water Elevation



Step-backwater (WSP) model – pools
Manning's equation model – riffles/runs

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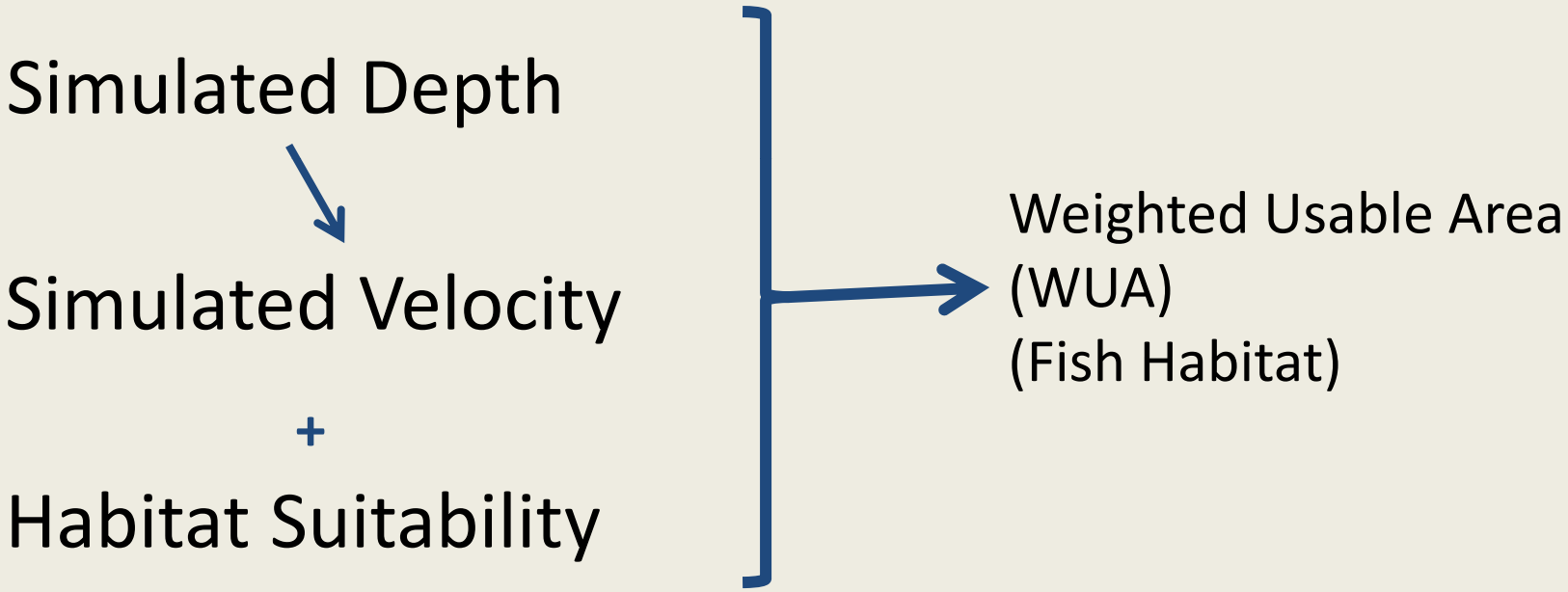
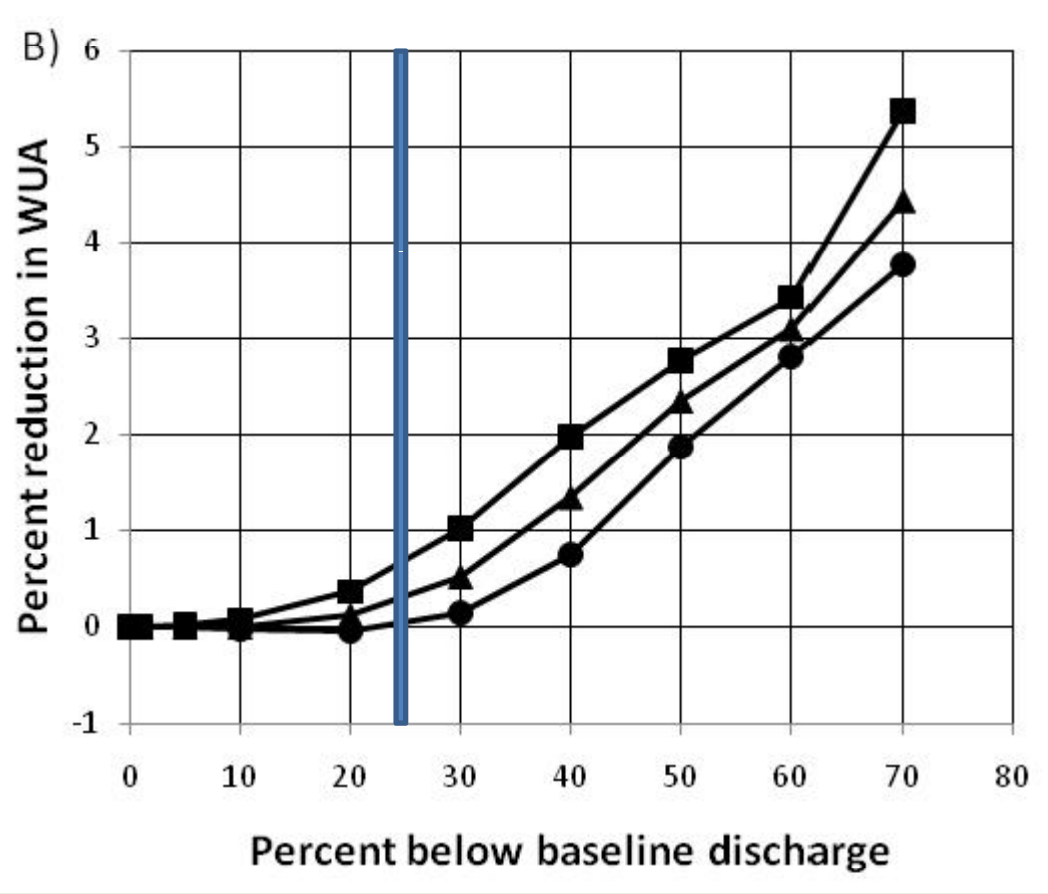
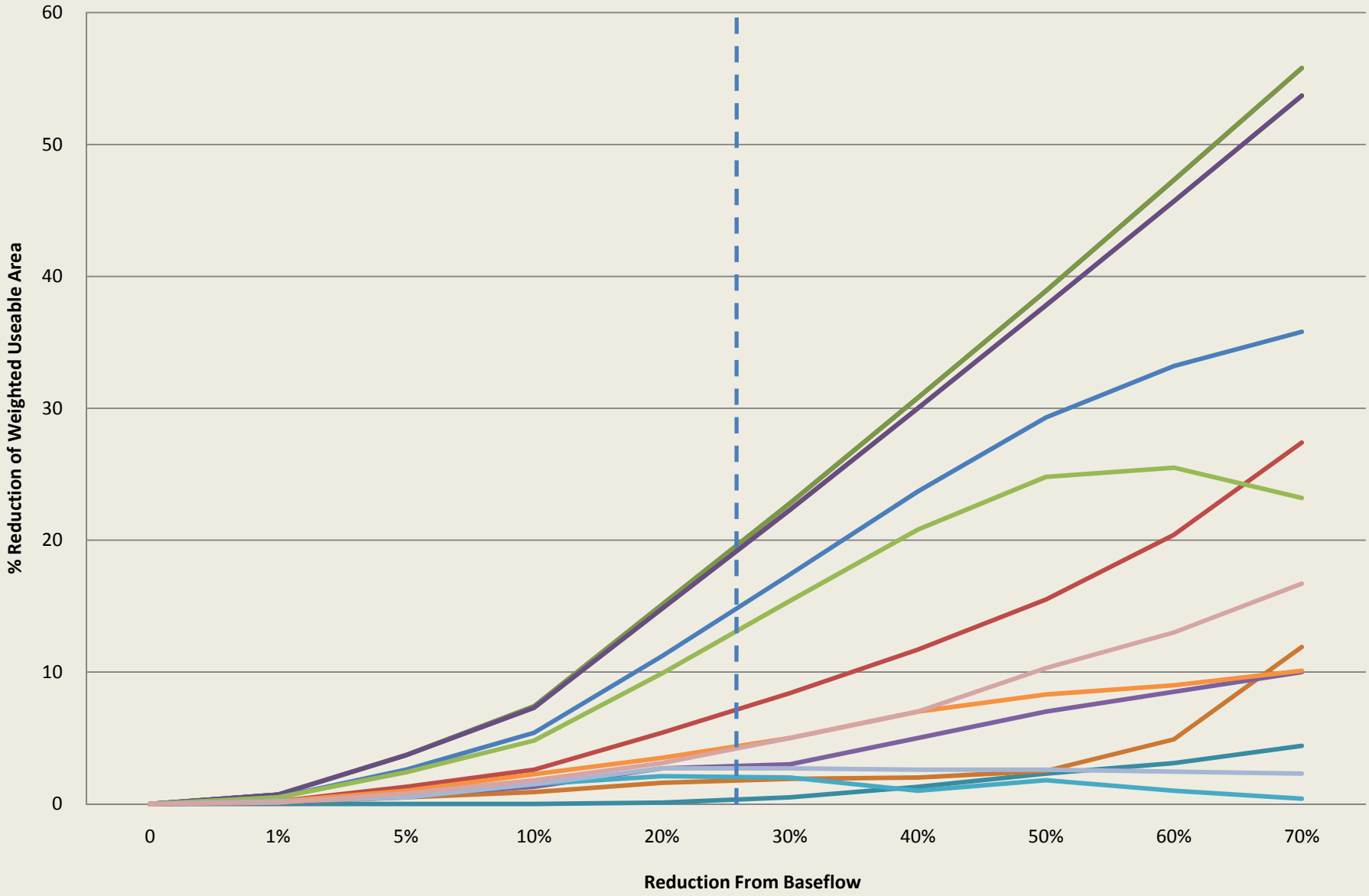
Physical Habitat Simulation(PHABSIM)



Spring 3 dace



Site and Species WUA Impacts at 25% Flow



Conclusion

- From a technical perspective, it was generally agreed that no substantial impact would occur if the 75% exceedance of total flow were reduced between 10 and 25%.
- The group encouraged adaptive management and a spring, stream and groundwater monitoring program to assure that these resources react as expected post implementation.
- There was also some discussion about possibly establishing buffer zones or special protection areas.

In Simple Terms

A maximum of 25% reduction in baseflow should result in limited impact to spring and stream habitat

Special Thanks

- Working group
- Bill Fisher & Titus Seilheimer
- Ellen Tejan & C. Stephen Haase
- Landowners who provided access

Questions???

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