

National Park Service
U.S. Department of the Interior
Grand Canyon National Park



Bright Angel Creek Non-Native Trout Reduction Grand Canyon National Park

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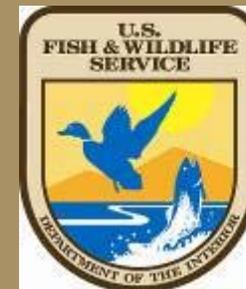


Joe Tomelleri Illustrations

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Cooperators

- Funded by Reclamation and NPS



- Volunteers (several thousand hours)

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Project Background

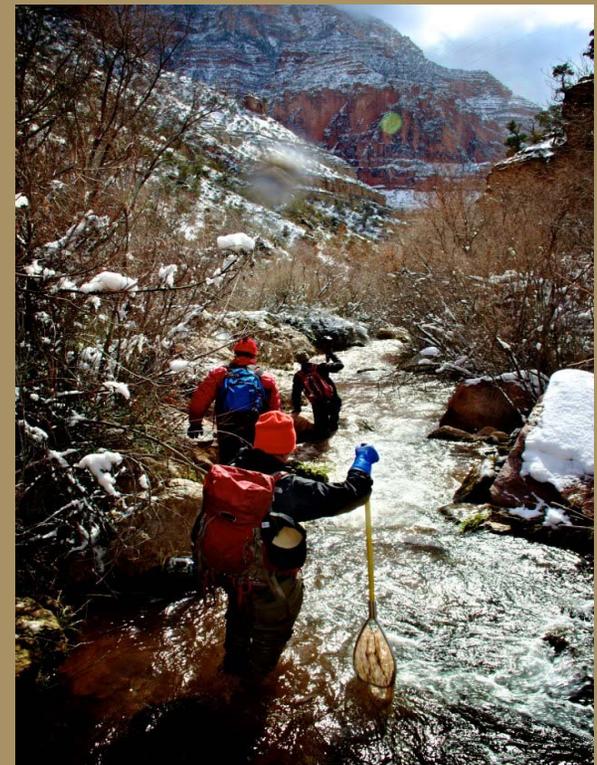
- Trout initially introduced to GCNP, 1920's and 1930's
 - Greatest concentration of Brown Trout occurs in Bright Angel Creek and its confluence with the Colorado River
 - Brown Trout prey on and may compete with native fish (Whiting et al. 2014, Yard et al. 2011)
- Non-native trout control: Conservation Measure for Humpback Chub in Biological Opinion (USFWS 2008, 2011)
- NPS Comprehensive Fisheries Management Plan (CFMP) 2013

Goals and Methods

- Conduct comprehensive trout reduction efforts in BAC and the BACI for 5 consecutive years.
- Through the reduction of non-native fish:
 - Enhance and restore native fish populations in BAC
 - Contribute to overall conservation of Humpback Chub
- Components
 - Installing and operating a weir
 - Electrofishing for monitoring and removal in BAC
 - Electrofishing for monitoring and removal in BACI

Monitoring Metrics

- Non-native fish:
 - Overall reduction of the non-native fish population in BAC
 - Changes in abundance and size structure over time
- Native fish:
 - Maintain or increase native fish
 - Evaluated by abundance, recruitment & survival
- Adaptive Management Strategy
 - Evaluation project results
 - Possible adaptation of methods to achieve desired outcomes



Weir

- October 1st – March 1st
 - Checked twice daily



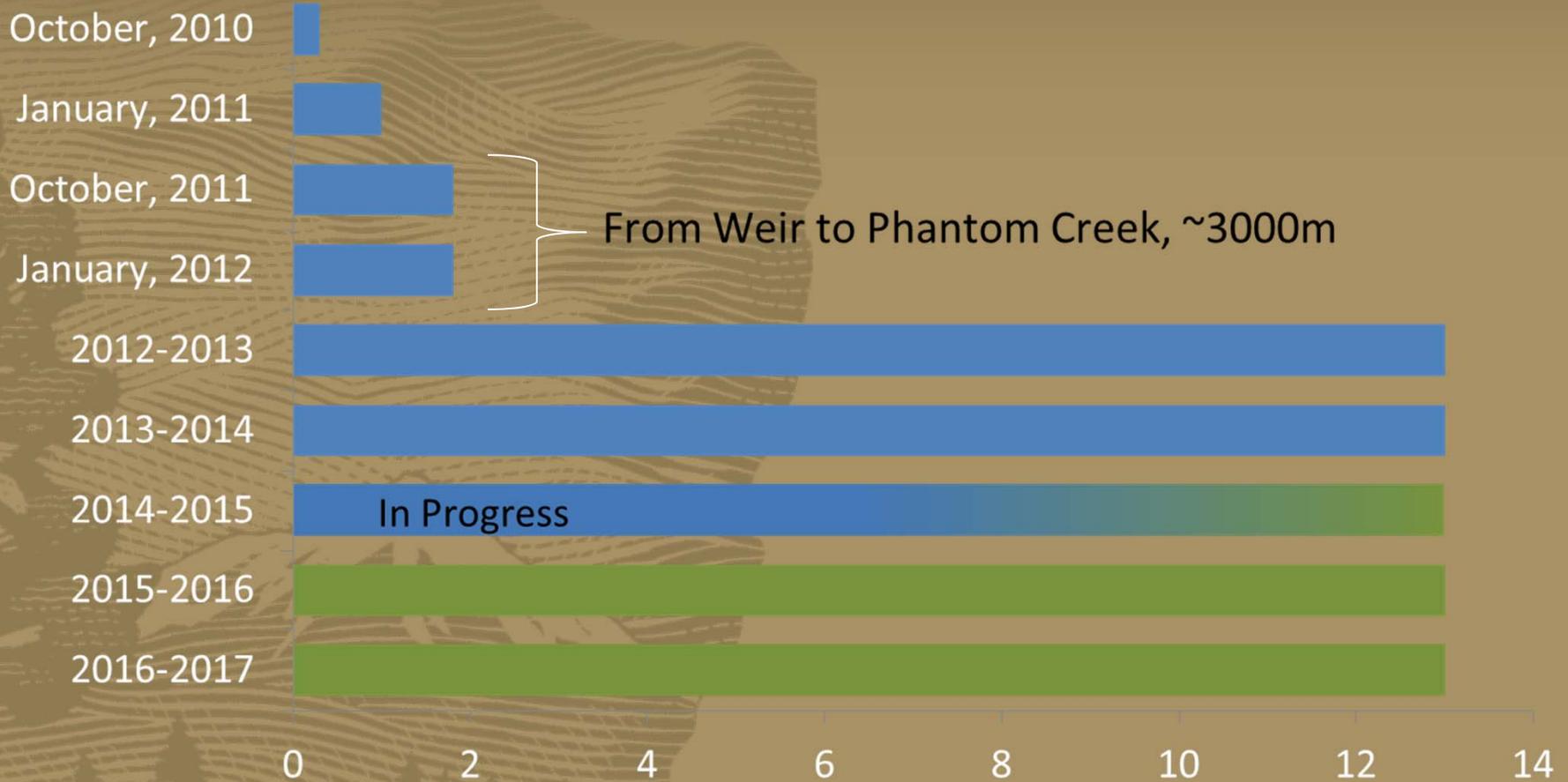
| | | BNT | RBT | BHS | FMS |
|-----------|-----------------------|-----|-----|-----|-----|
| 2012-2013 | NPS | 176 | 36 | 0 | 0 |
| 2013-2014 | NPS | 13 | 12 | 0 | 7 |
| 2014-2015 | NPS (As of 1/12/2015) | 71 | 53 | 12 | 0 |

A group of approximately ten people are wading in a shallow, rocky stream, performing electrofishing. They are wearing waders, hats, and carrying gear like buckets and backpacks. Some are holding long-handled electrofishing electrodes. The water is clear and flows over reddish-brown rocks. The background shows a natural stream bank with some vegetation.

Bright Angel Creek Annual Electrofishing Effort

- October –February
 - 8-10 people, ~120 days

Bright Angel Creek Annual Electrofishing Effort



From Weir to Phantom Creek, ~3000m

In Progress

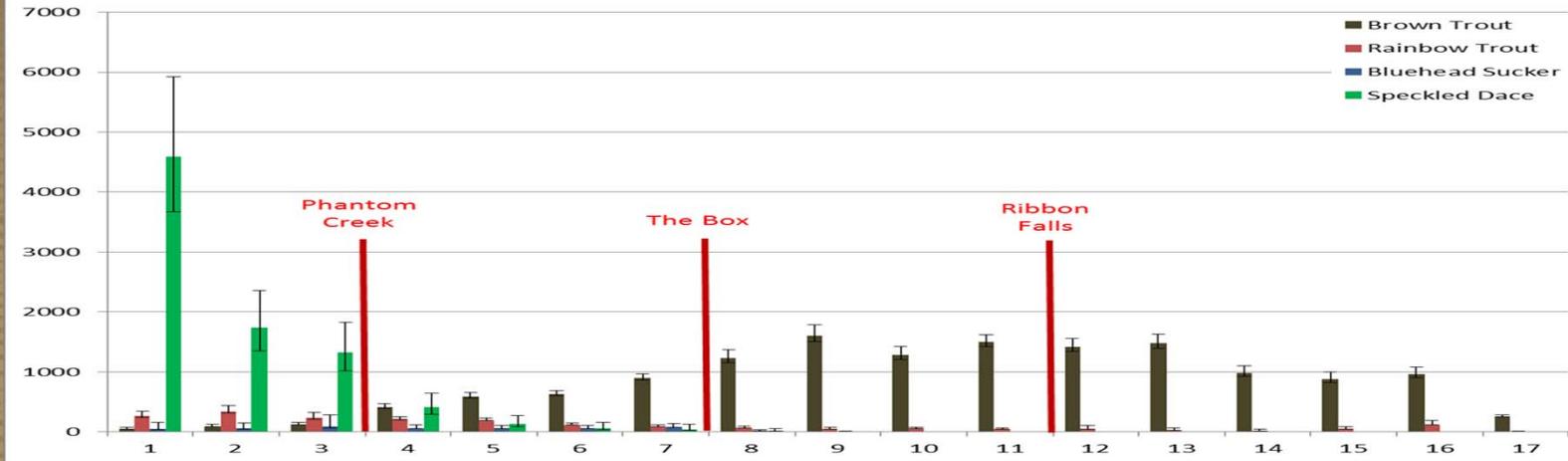
Bright Angel Creek = ~13 miles/21 km

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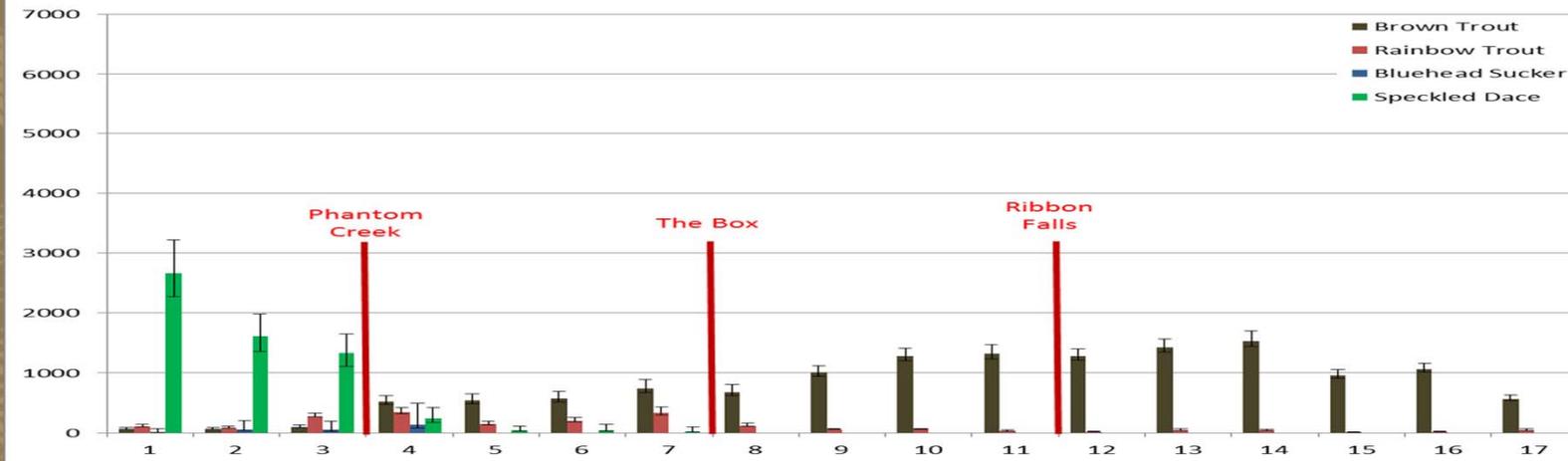
Population Estimates

Estimated Fish Density/1000m

Population Estimates For All Species 2012-2013



Population Estimates For All Species 2013-2014

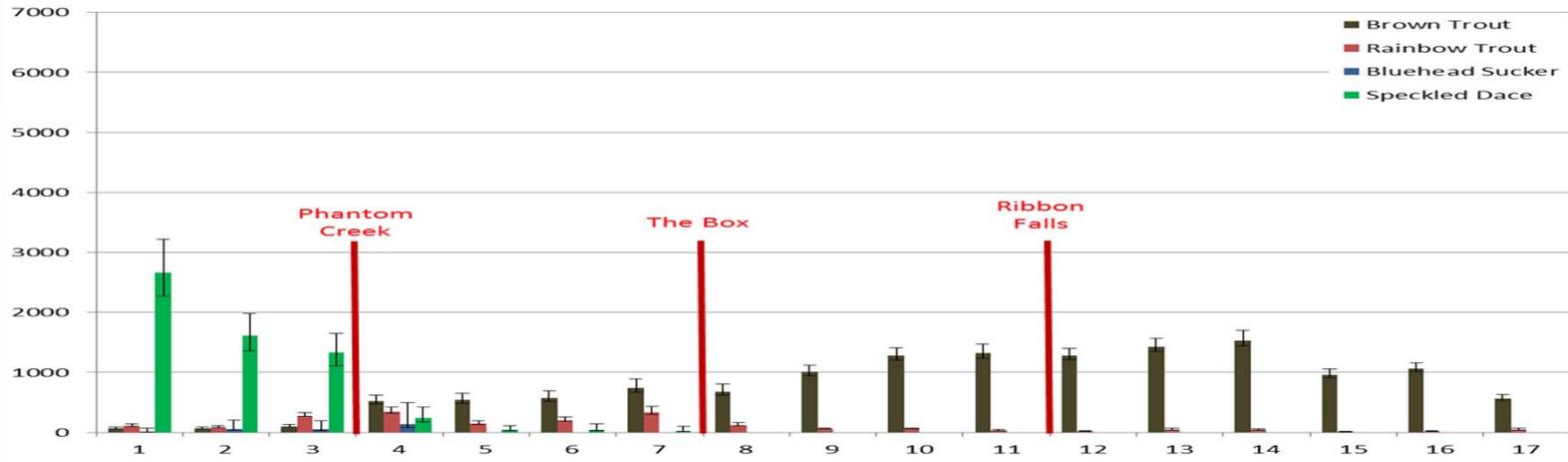


Meters x 1000 from the Mouth to Headwaters

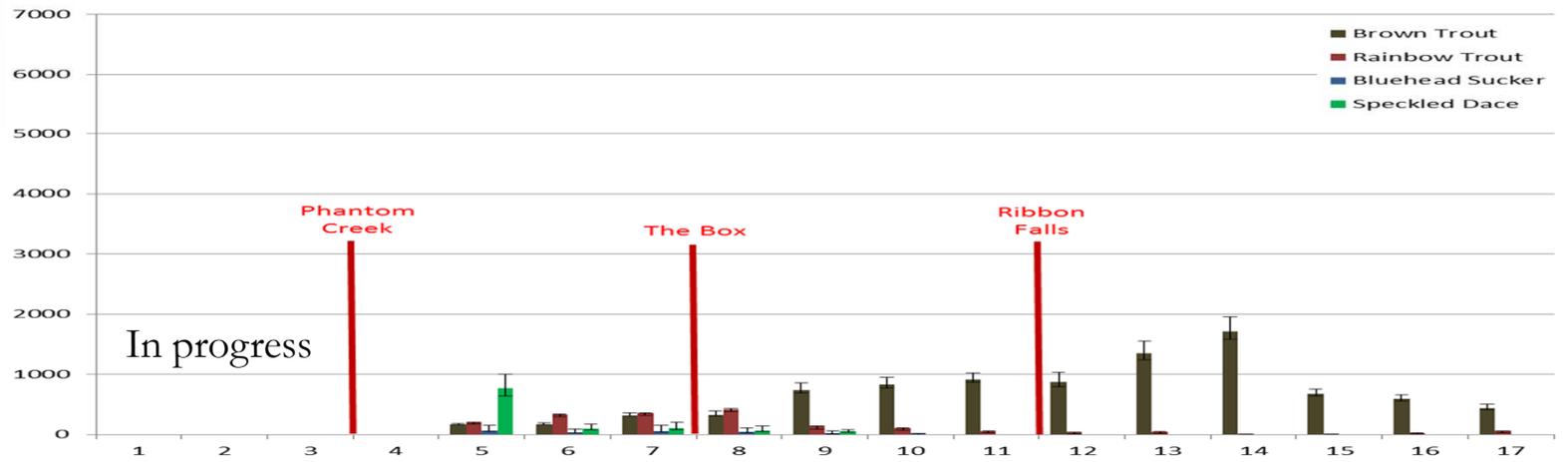
Population Estimates

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Population Estimates For All Species 2013-2014

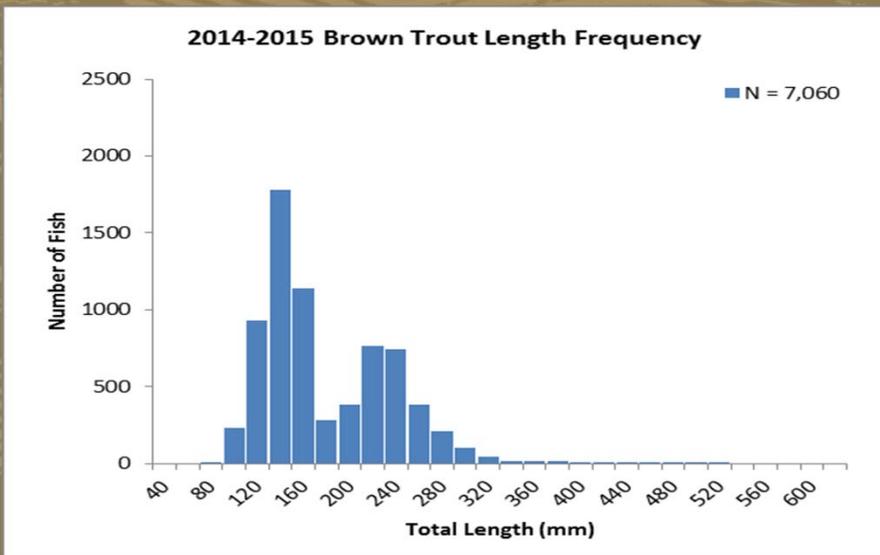
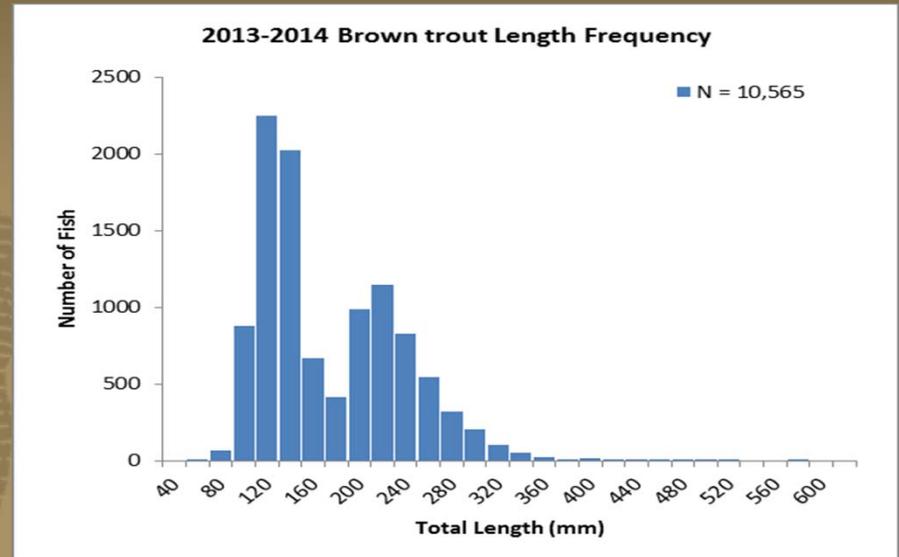
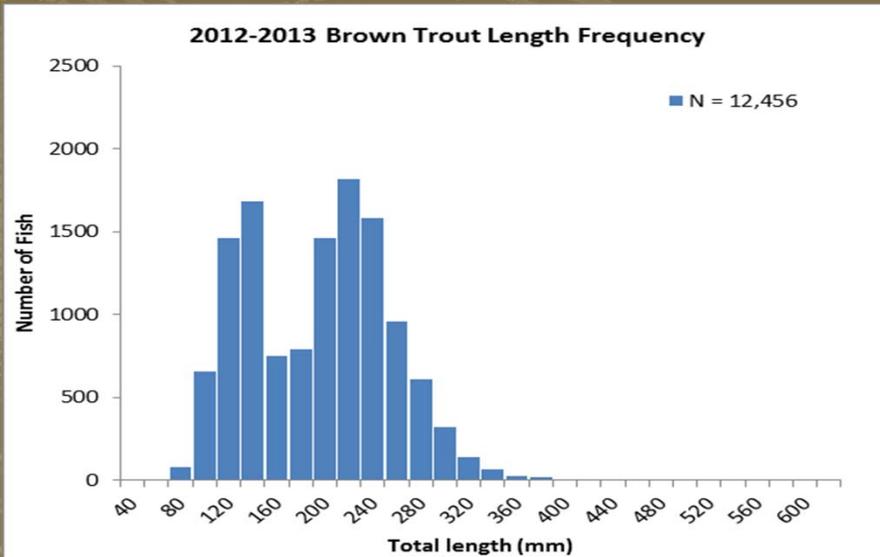


Population Estimates For All Species 2014-2015



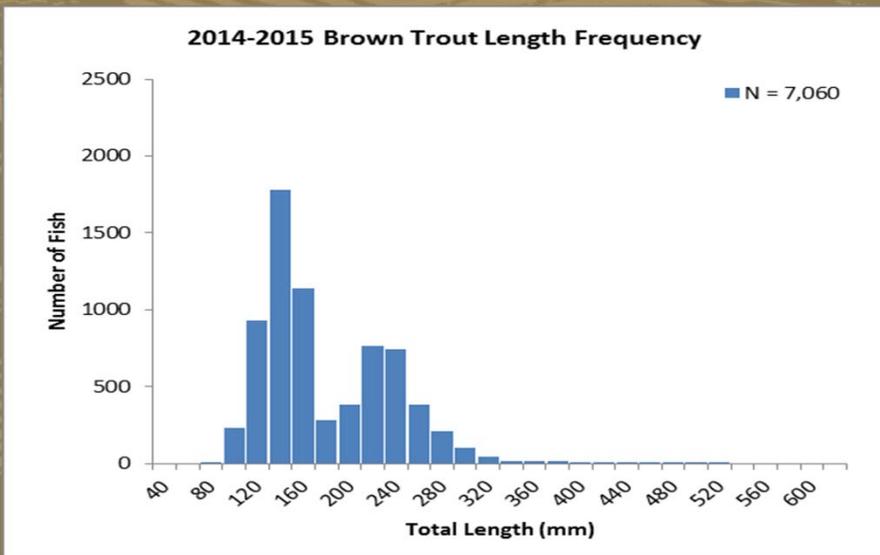
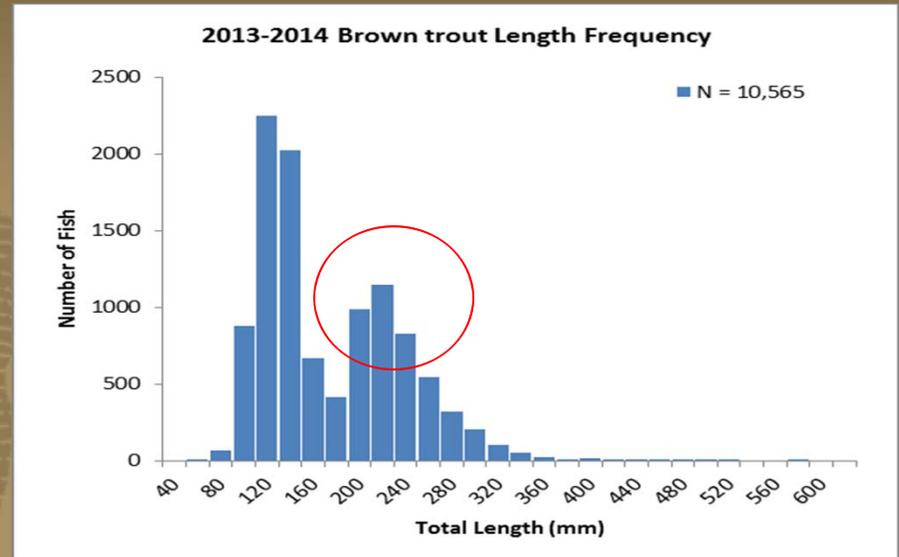
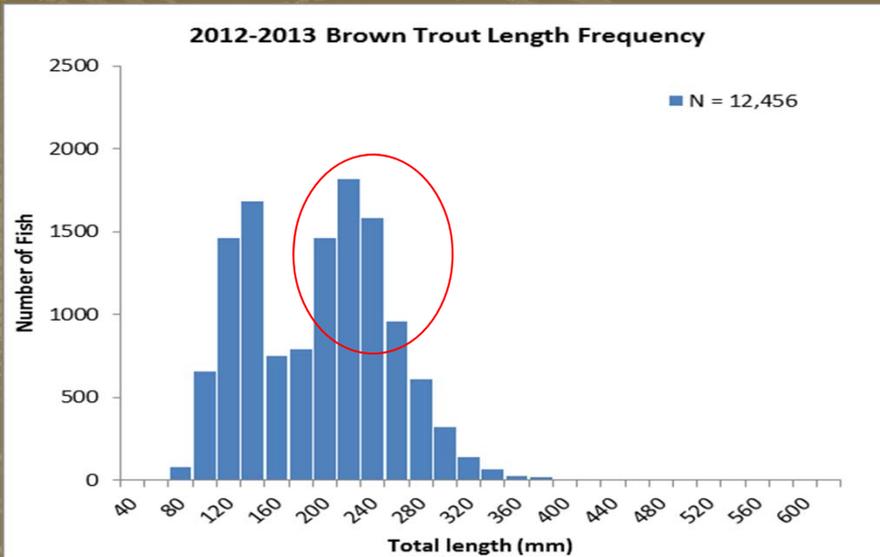
Meters x 1000 from the Mouth to Headwaters

Brown Trout Size Structure



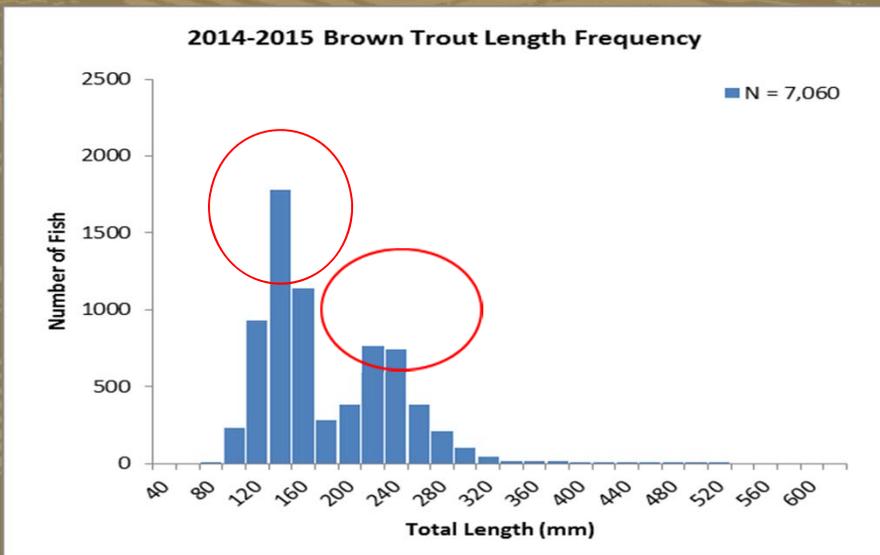
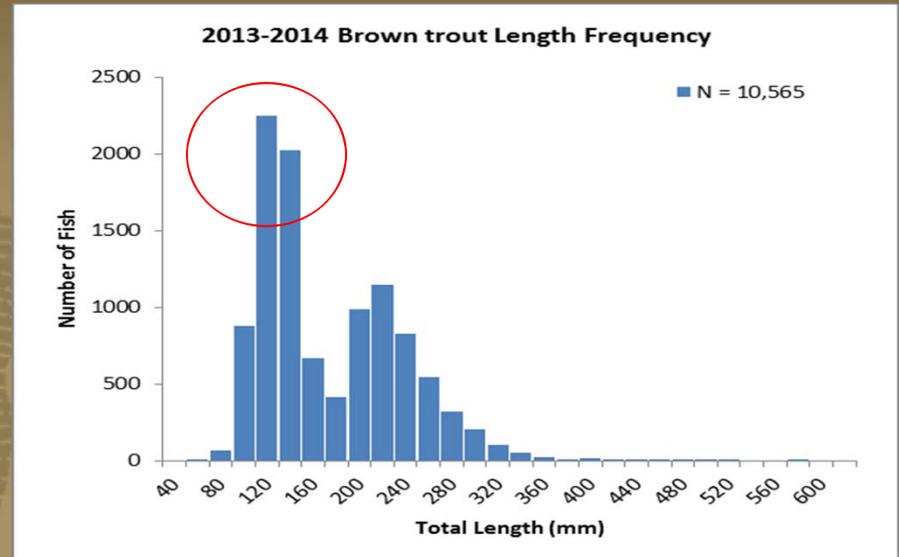
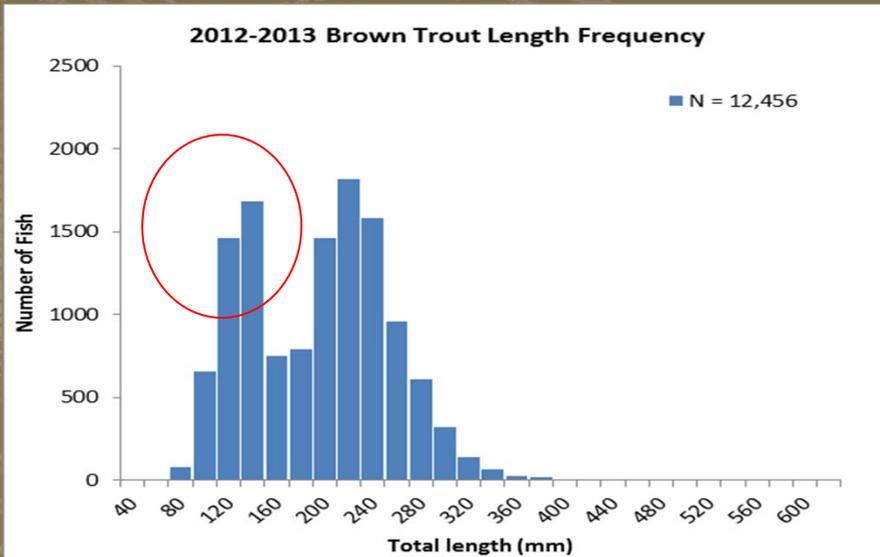
* Incomplete data for 2014-2015-in progress

Brown Trout Size Structure



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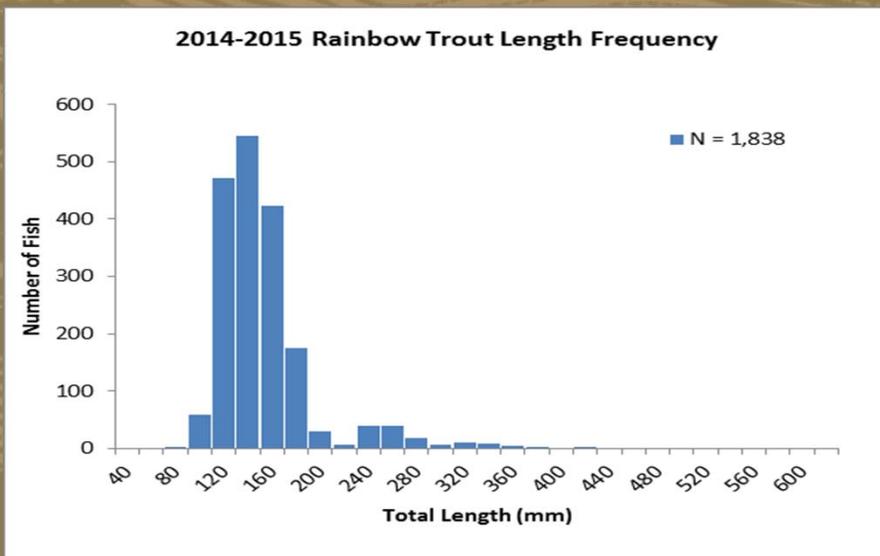
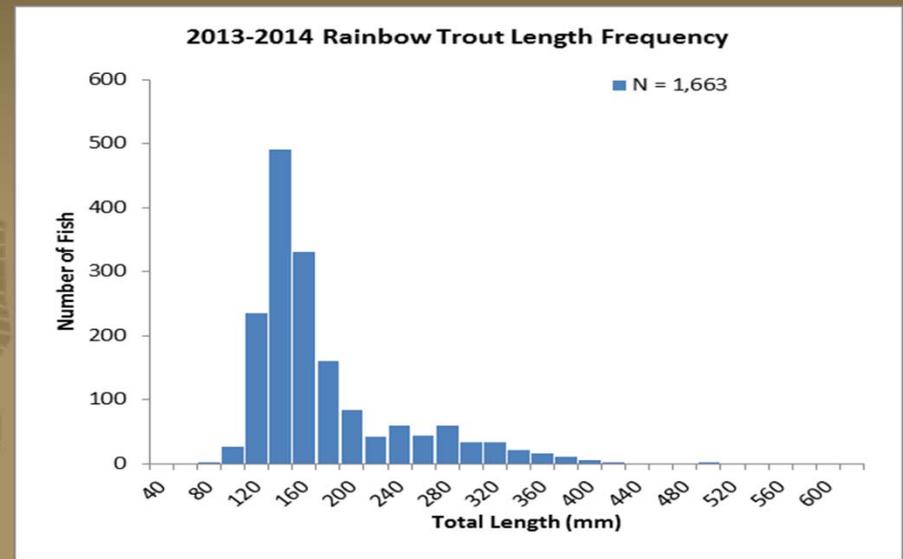
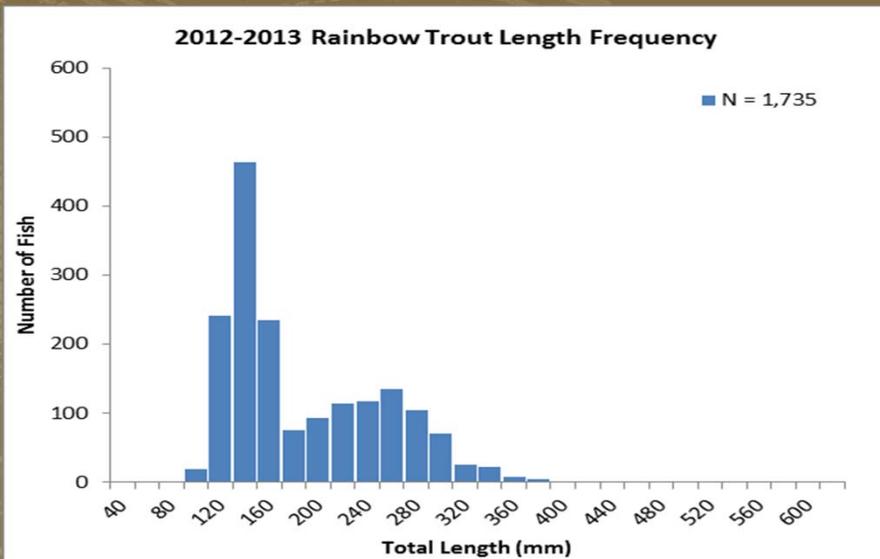
Brown Trout Size Structure



Compensatory response = shift to smaller size classes

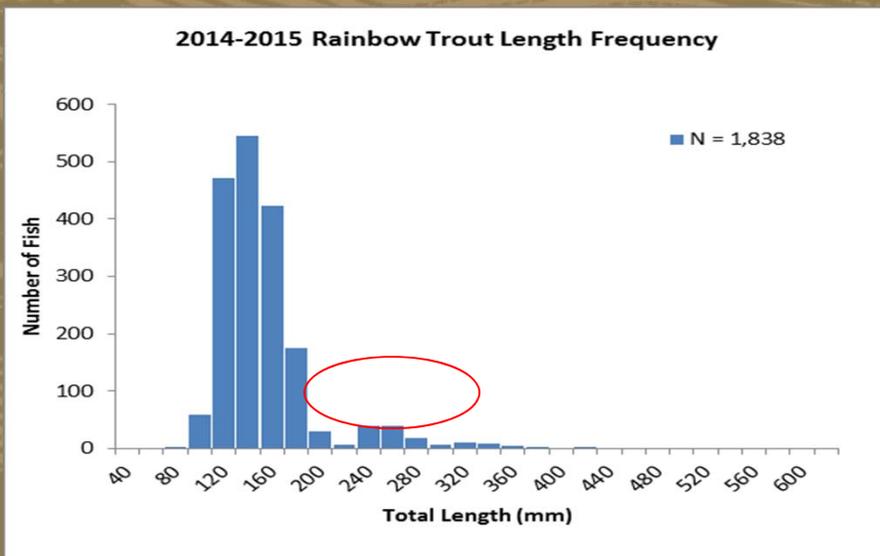
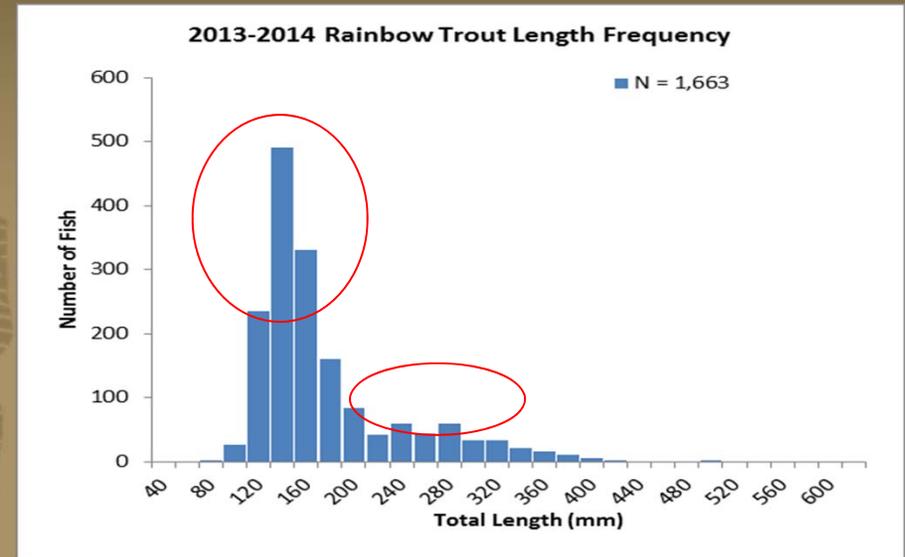
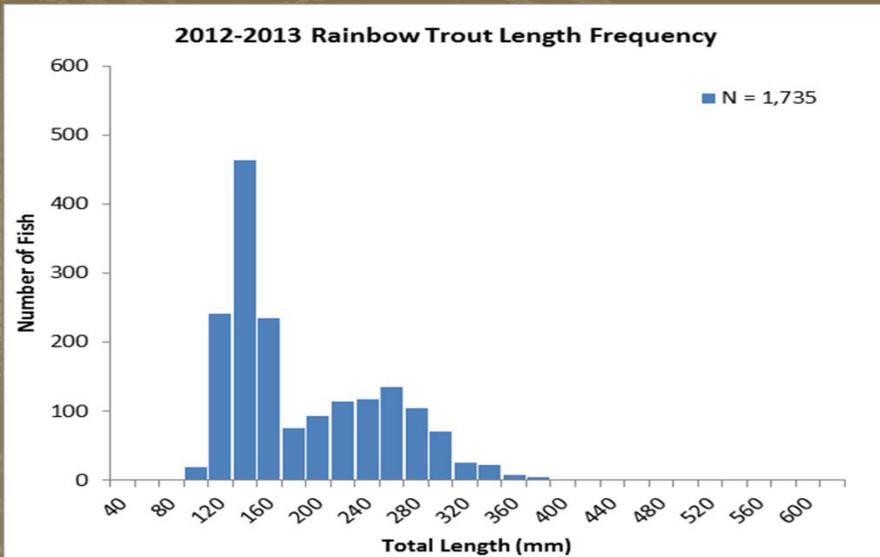
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Rainbow Trout Size Structure



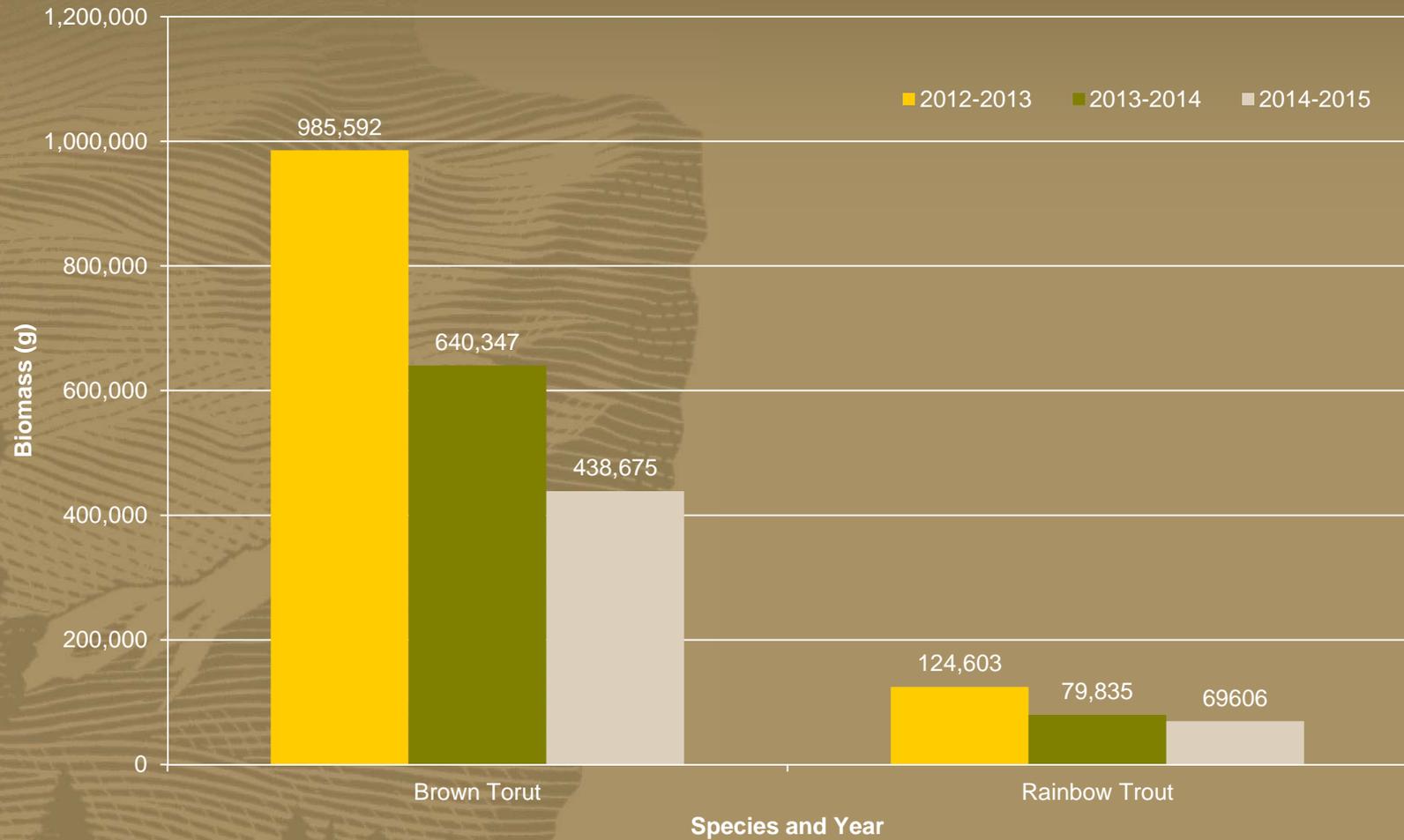
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Rainbow Trout Size Structure

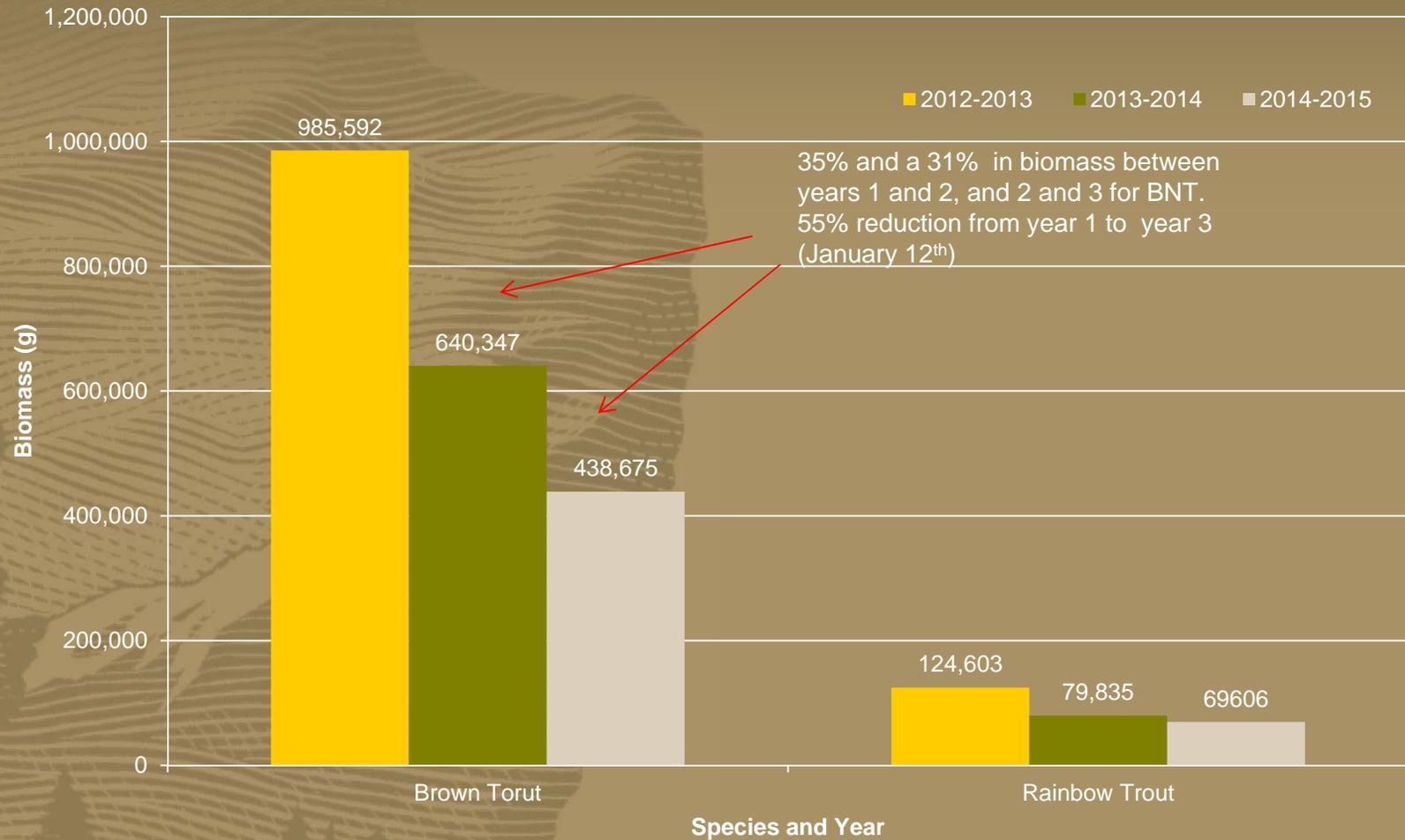


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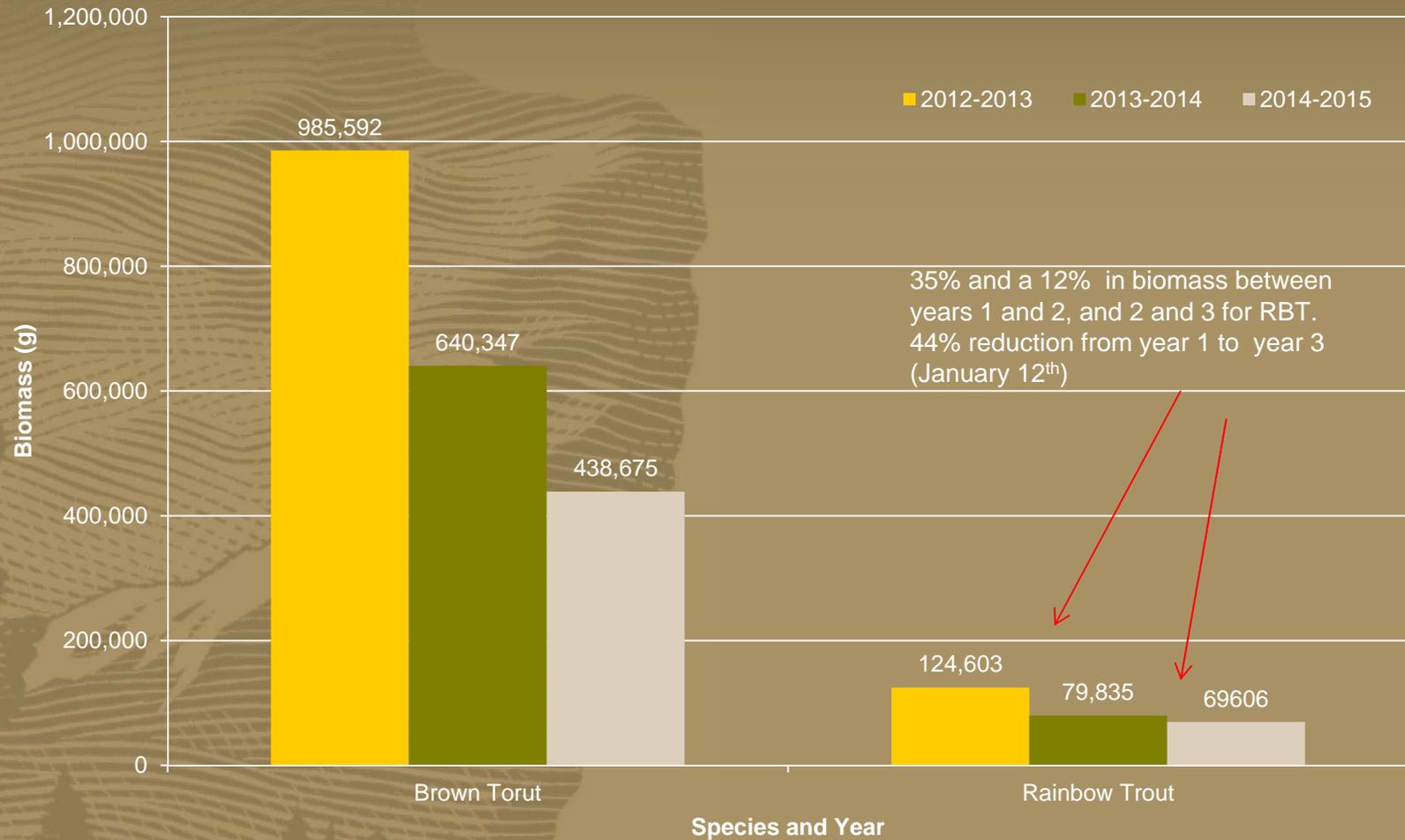
Biomass of Trout Removed



Biomass of Trout Removed

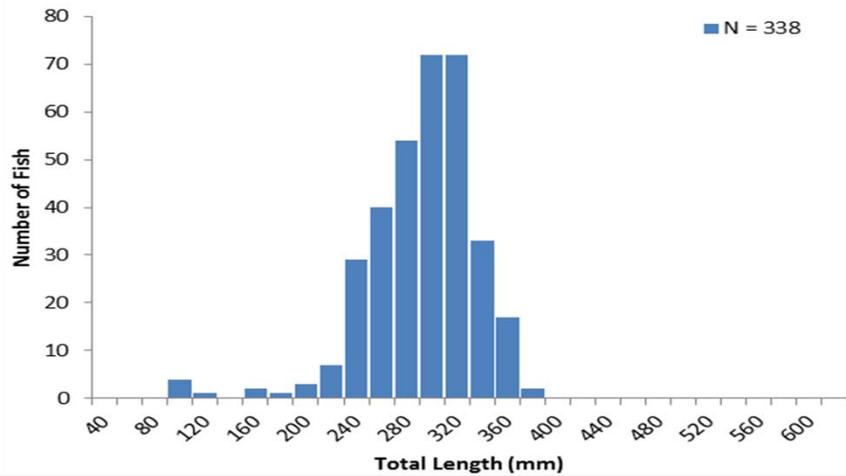


Biomass of Trout Removed

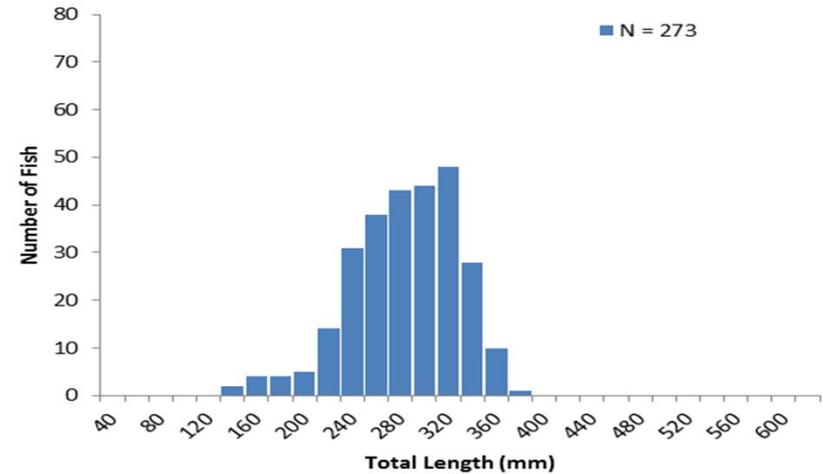


Bluehead Sucker Size Structure

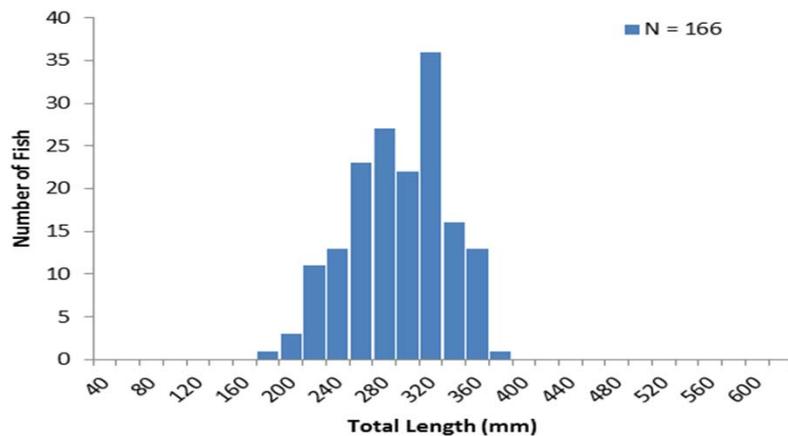
2012-2013 Bluehead Sucker Length Frequency



2013-2014 Bluehead Sucker Length Frequency

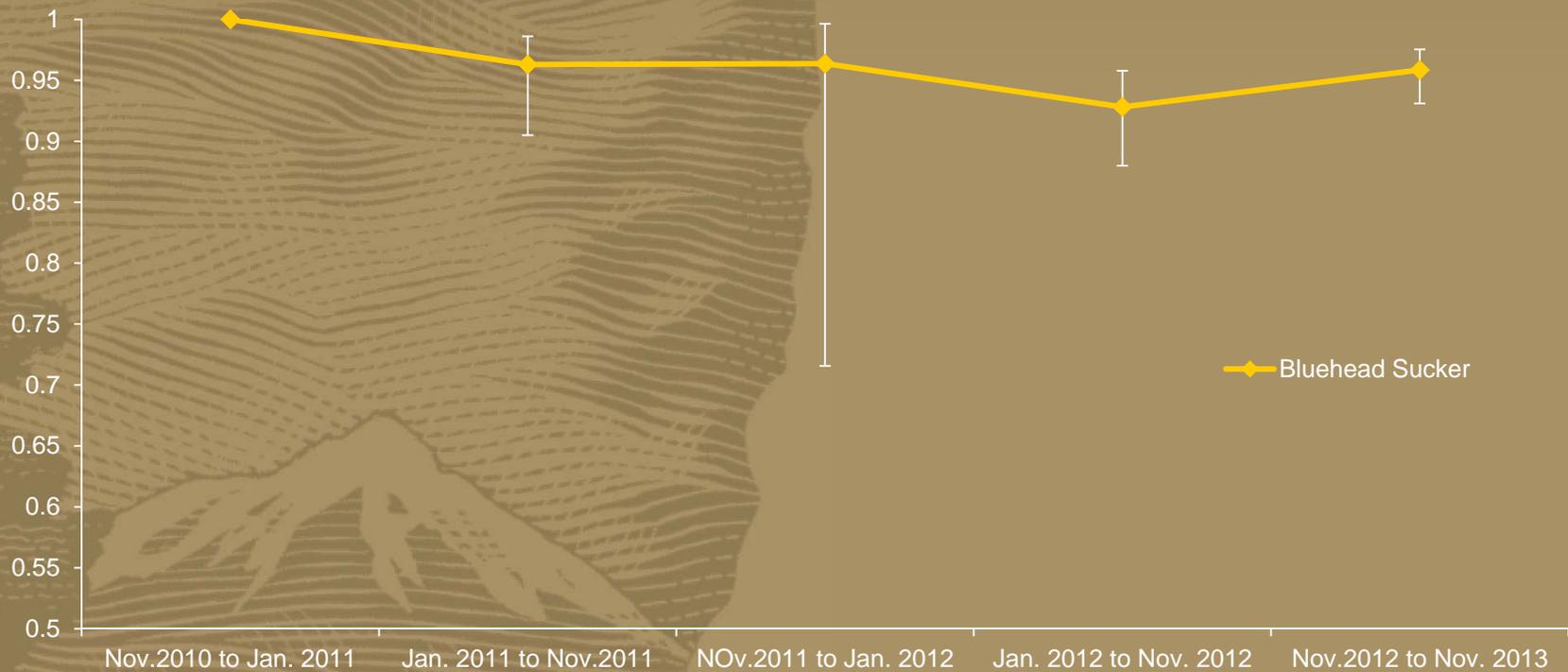


2014-2015 Bluehead Sucker Length Frequency



* Incomplete data for 2014-2015-in progress

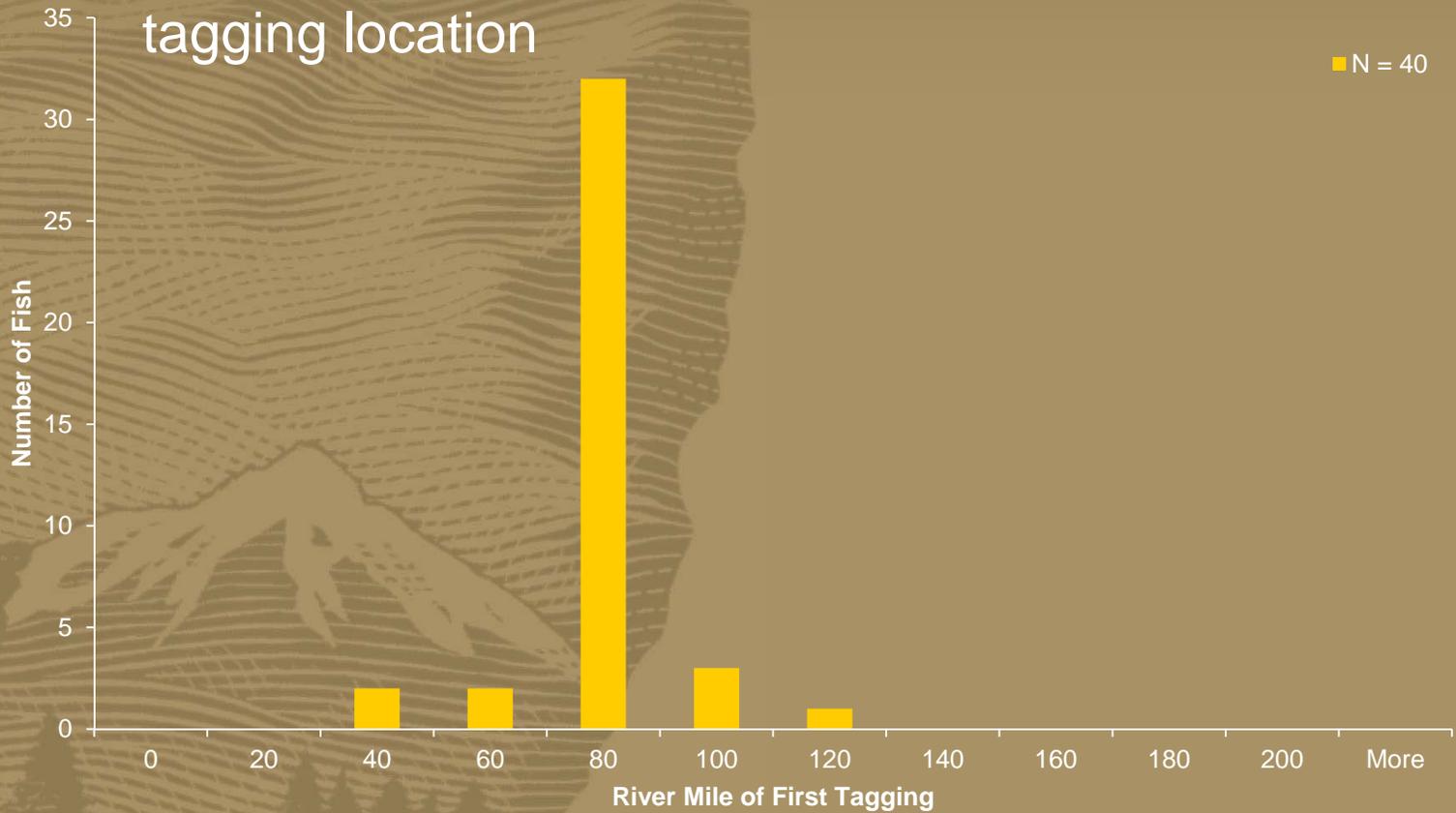
Bluehead Sucker Survival



Trout Recaptures –

■ 2011-2015:

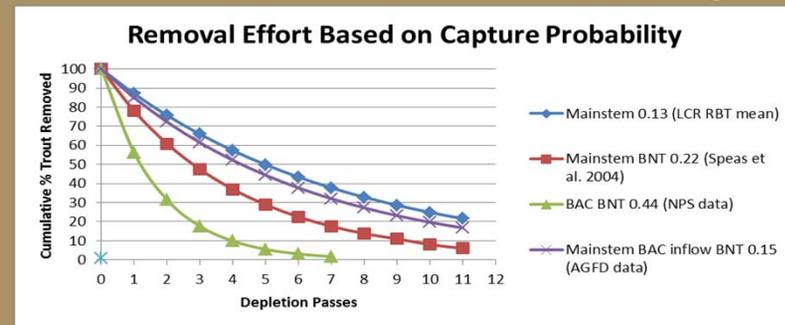
■ 52 Recaptured Trout in BAC-40 records of initial tagging location



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Bright Angel Inflow– Electrofishing

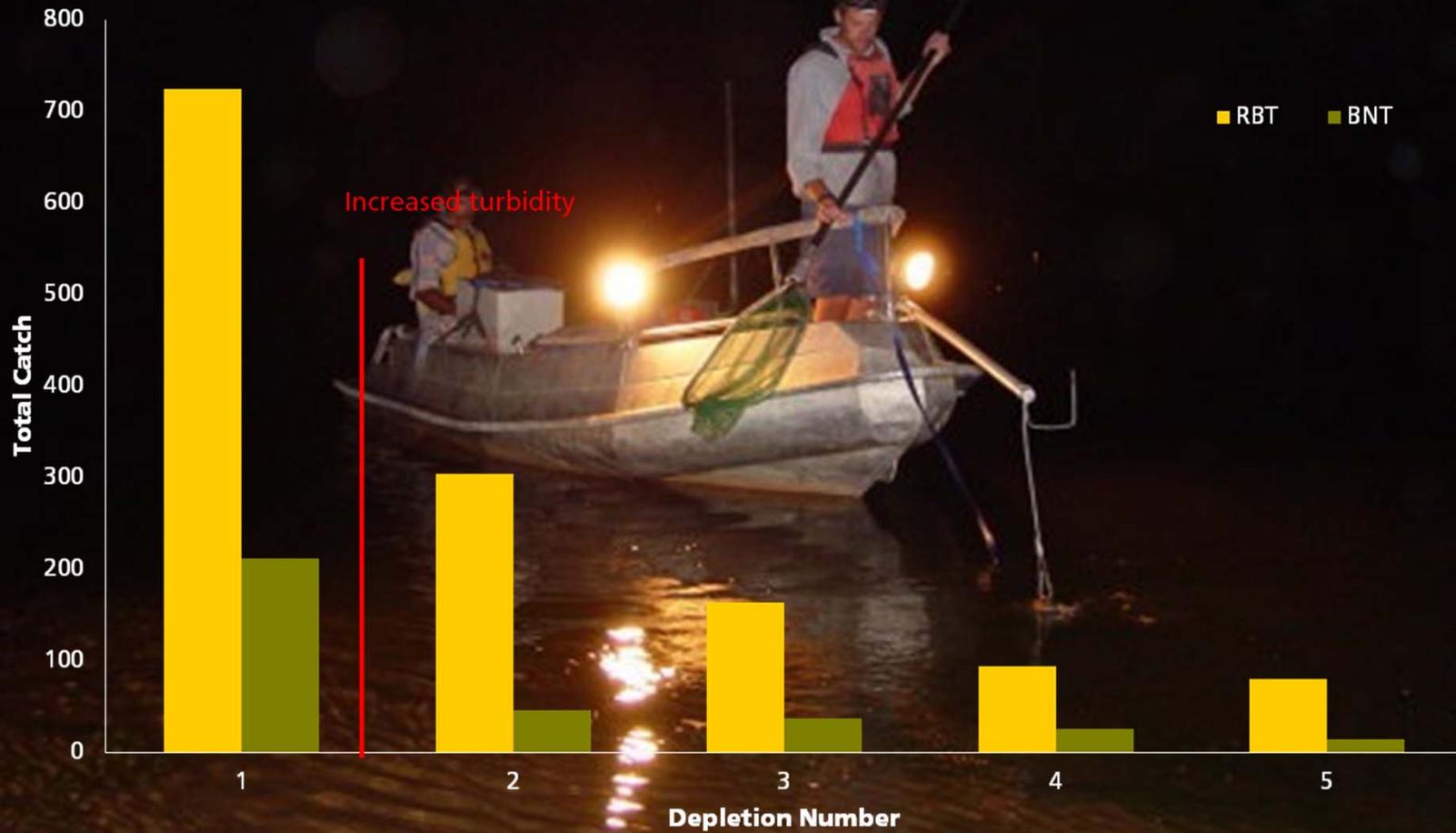
- Cooperative effort with GCMRC
 - 2013-2014 Pilot study
 - Goal of 80% trout reduction = 10 depletions (20 nights) with
- November-early December (trout aggregated)
- High Flow Experiment – cut removal trip in half
- Flooding in tributaries = muddy water
- Result = 2 nights/1 pass of clear water electrofishing
 - 10 total nights



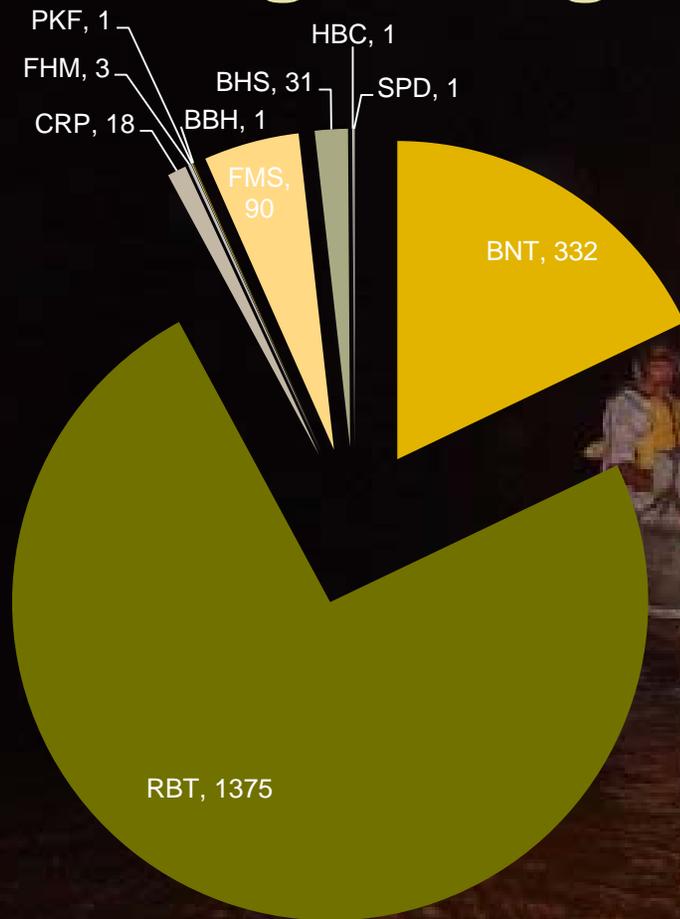
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Bright Angel Inflow– Electrofishing

Catch by Depletion



Bright Angel Inflow– Electrofishing



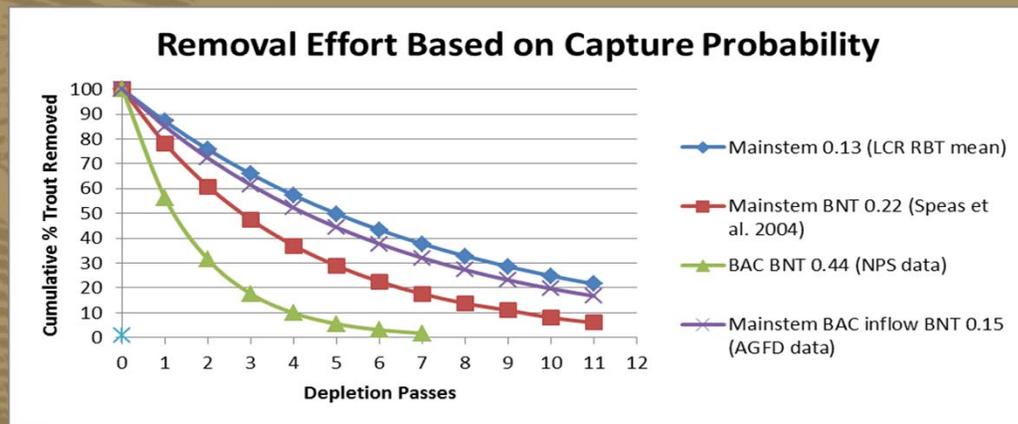
52 Recaps

- 11 RBT tagged in inflow
- 1 BBH-75 mile
- 1 CRP-Inflow
- 31 BNT tagged in inflow
- 1 at 102 mile
- 1 at 138 mile to -11 to BACI



Bright Angel Inflow– Electrofishing

- 2014-2015
- Cooperative effort with GCMRC
- Modified sampling
 - Sampling moved to February to avoid HFE conflicts
 - Trip is focused on areas with highest abundance
 - Bright Angel Creek to Horn Creek Rapid
- A goal of 80% trout reduction = 10 depletions (10 nights)



Beneficial Use



- To date: > 40,000 trout to beneficial use



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Summary –

- Nearing completion of 3rd year of comprehensive trout reduction efforts, with 2 more years left.....
 - Efficiently removing trout in BAC using electro-fishing
 - Evidence of compensatory response
 - Size class shift
 - Decreased biomass
- Electro-fishing doesn't appear to be impacting native fish negatively
 - Bluehead Sucker survival is high
 - Speckled Dace abundance remains high
- Future
 - Continue reduction efforts for 2 more years and evaluate

Questions?



Phantom Ranch Boat Beach, circa 1911

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Bright Angel Inflow– Electrofishing

