SWCA
ENVIRONMENTAL CONSULTANTS

Technical Workgroup Presentation

October 1, 2003

- **Results of a Feasibility Study for Brown Trout Removal in Bright Angel Creek**
- **Phase 2 of Bright Angel Creek Trout Removal and Fish Community Monitoring**
- **Tributary Non-native Removal Feasibility Study**

Results of a Feasibility Study for Brown Trout Removal in Bright Angel Creek

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and
Dr. Jeffrey Cross
Grand Canyon National Park

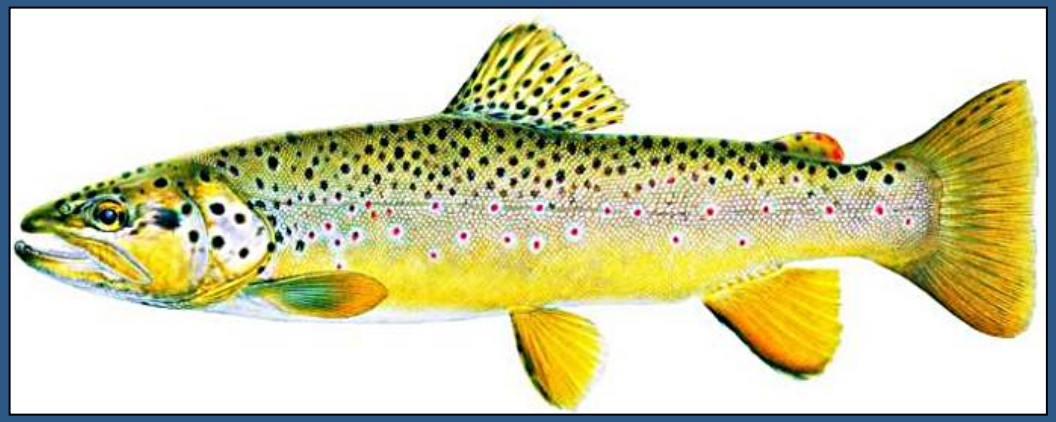
Purpose

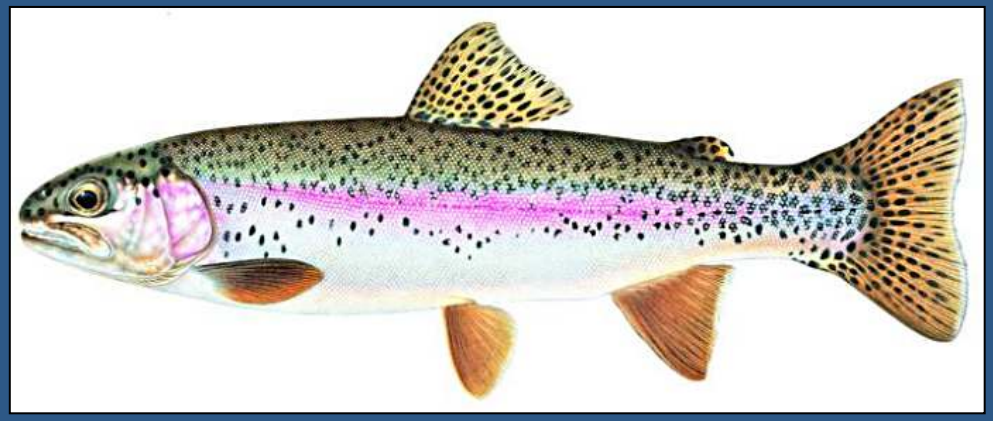
- The National Park Service is charged with preserving and protecting the natural resources within Grand Canyon. In Bright Angel Creek, the fish community has been altered towards non-native salmonids, to the detriment of its native fishes. Construction and operation of a temporary weir in Bright Angel Creek will provide the opportunity to determine if removal of brown trout will benefit native fish survival in Bright Angel Creek.
- Test Feasibility of Removing Brown Trout During Spawning Run
- Test Weir Structure

Bright Angel Creek

Nonnative Fishes in Bright Angel Creek
Stocked in 1920s and 1930s

Brown Trout

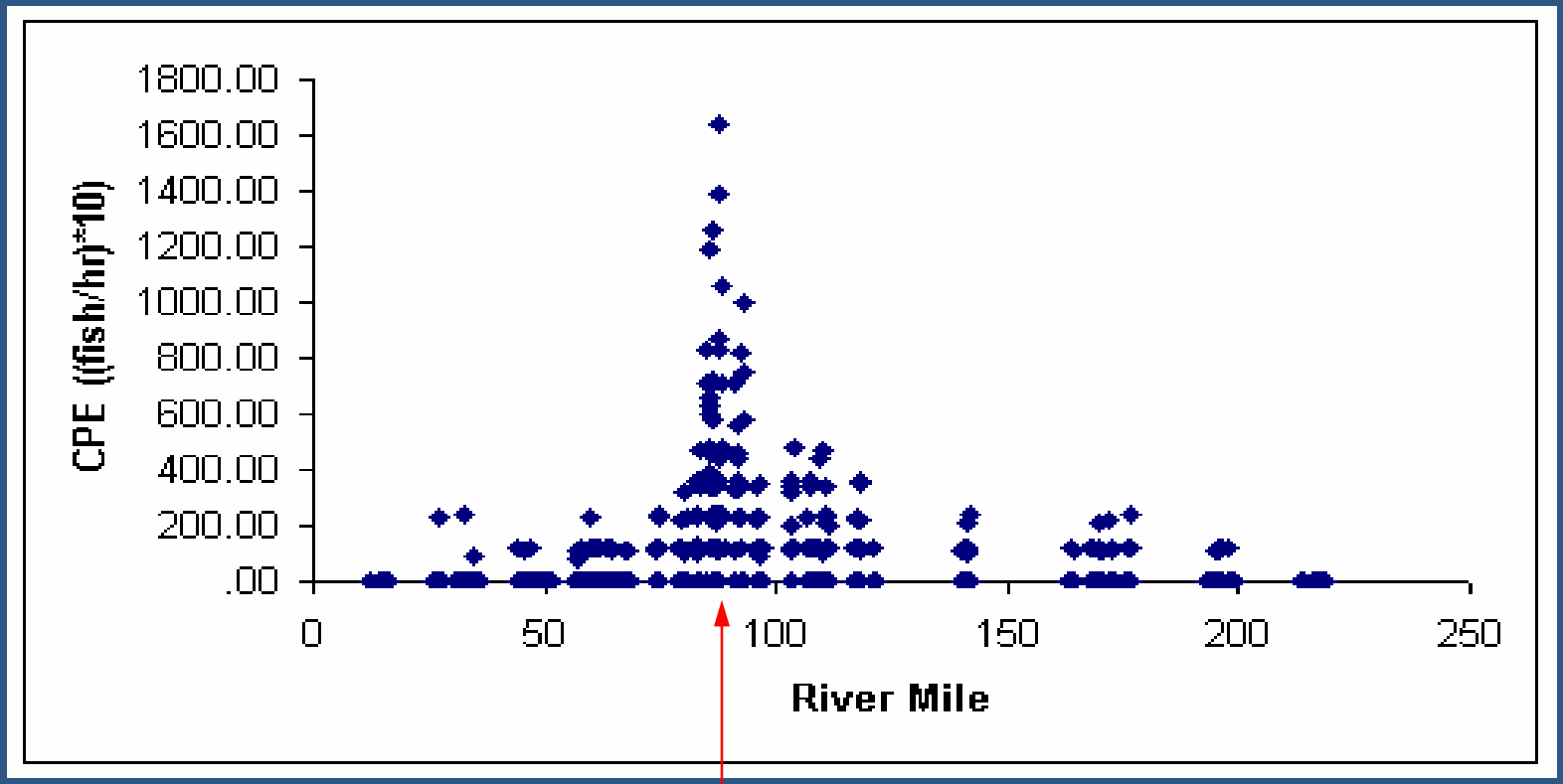




Rainbow Trout

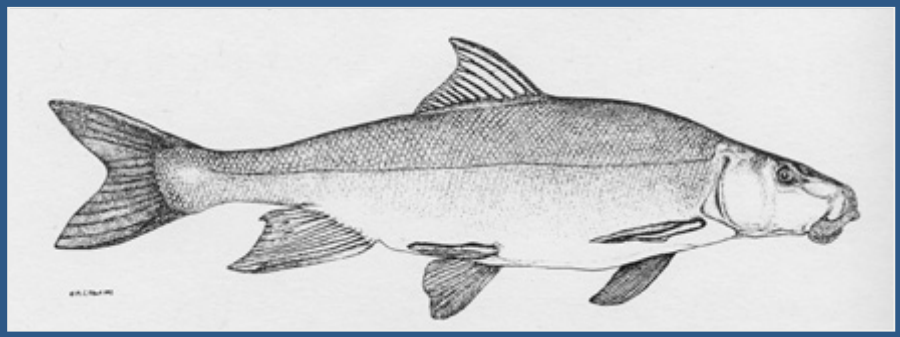
2002 Electrofishing CPE in Colorado River

Preliminary Data from Arizona Game and Fish Department



Native Fishes in Bright Angel Creek

Speckled dace


Flannelmouth sucker

Bluehead sucker

Humpback chub

Methods

- Construct temporary weir
- Install above lower foot bridge
- Operate weir continuously from Nov 18, 2002 – January 21, 2003
- Check weir and process fish twice per day: morning and evening
- Public contacts

Upstream View of Weir in Place

View Downstream

View Upstream from Bridge

Example of Fact Sheet Posted at Phantom Ranch

BRIGHT ANGEL CREEK - TEMPORARY FISH WEIR

PURPOSE AND NEED: The National Park Service is charged with preserving and protecting the natural resources within Grand Canyon. Active, hands-on management of resources is at times required to achieve this goal. In Bright Angel Creek, the fish community has been altered towards non-native salmonids, to the detriment of its native fishes. Construction and operation of a temporary weir in Bright Angel Creek will provide the opportunity to determine if removal of brown trout will benefit native fish survival in Bright Angel Creek.

FAQs:

What is a weir? A weir is a barrier to fish movement with an attached cage to capture and hold live fish.

Why are the trout being removed? Fish surveys have shown declines in native fishes concurrent with increases in brown trout. Brown trout are predators on the young and small native fish. Removal may increase the survival and numbers of native fish in BAC, and help to restore the fish community.

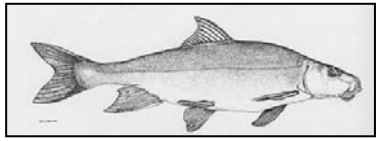
What happens to the fish? The trout are taken from the cage and euthanized. They are measured and weighed, and examined for tags or marks. They are disposed of outside the park.

What about the rainbow trout? Rainbow trout will be released upstream.

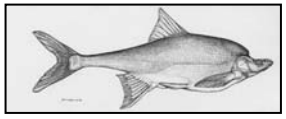
What are the native fish? The native fishes include the flannelmouth sucker, bluehead sucker, and speckled dace. The endangered humpback chub may once have lived in Bright Angel Creek; they still are occasionally found in the Colorado River nearby.

Who is responsible for this project? The National Park Service is funding this project. The contract to conduct the work and analyze the results was awarded to SWCA, an environmental consulting firm based in Flagstaff Arizona.

FLANNELMOUTH SUCKER



HUMPBACK CHUB



CONTACTS

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Fish Handling Protocol
Nonnatives

- Brown and Rainbow Trout:
  - Measure (TL, FL)
  - Weigh (g)
  - Check for adipose clip
  - Scan for PIT tag
  - Examine for sex and sexual condition
  - Release rainbow trout above weir
- Brown Trout only:
  - Remove stomach, examine contents
  - Preserve stomach in ethanol if fish remains are present
  - Dispose of fish by packing in salt to be transported out of the Park by NPS

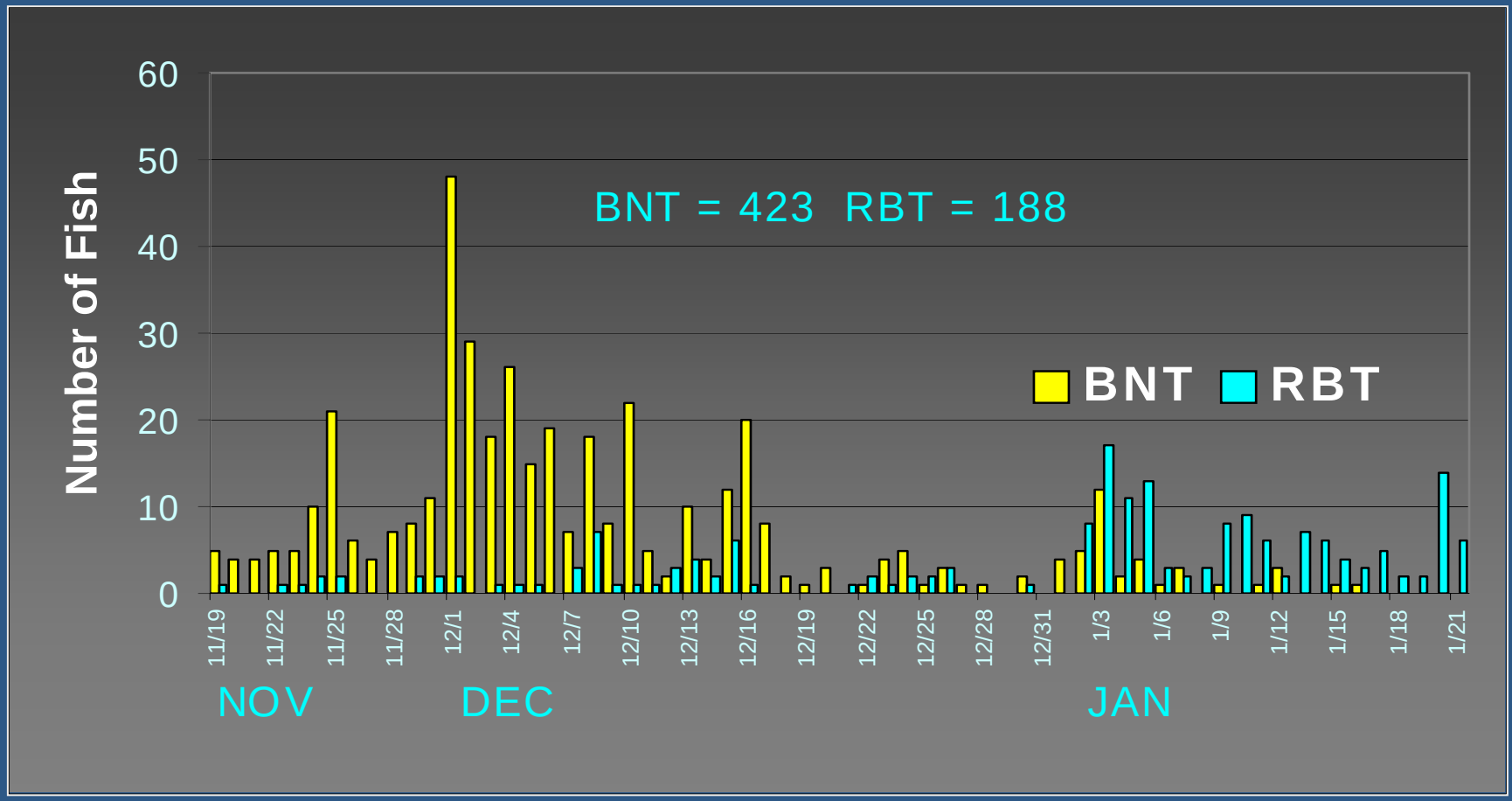
Fish Handling Protocol
Natives

- Native Fishes:
  - Measure (TL, FL)
  - Weigh (g)
  - Scan for PIT tag, Tag if needed
  - Release above weir

Nonnative Fishes in Weir

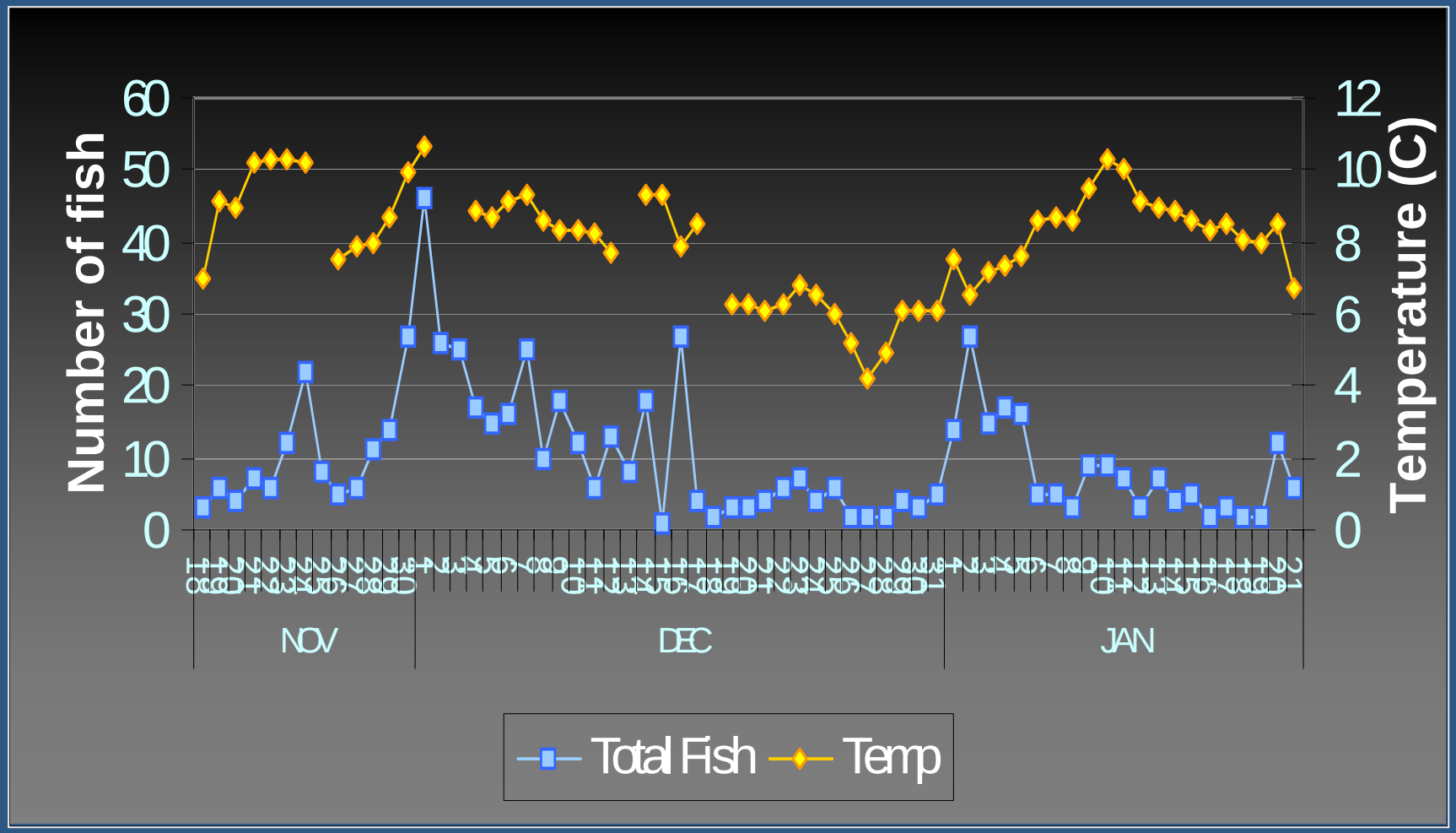
Brown and Rainbow Trout Captured

November 18, 2002–January 21, 2003



Water Temperatures and Fish Captures

November 18, 2002–January 21, 2003

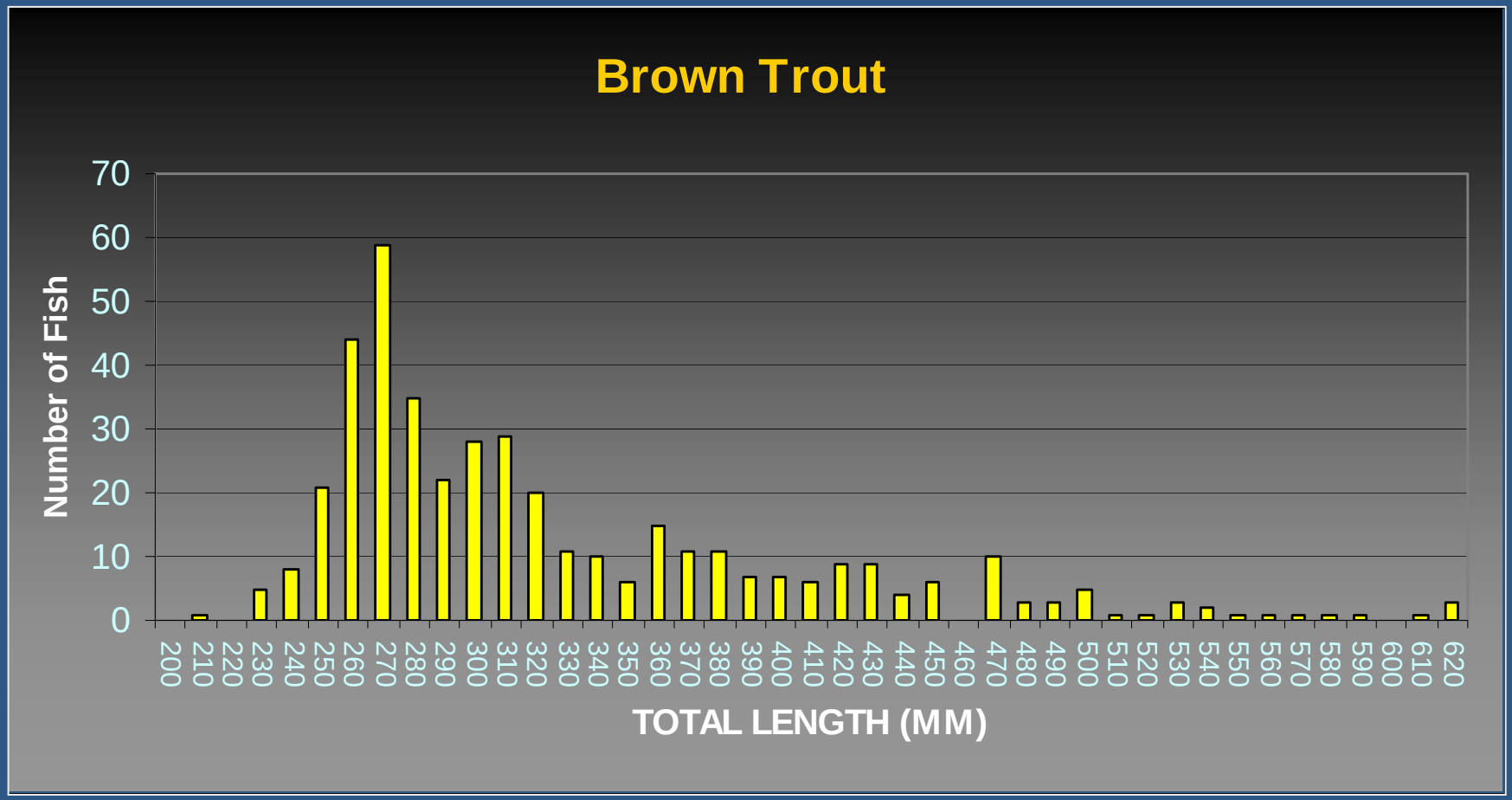


Preliminary Results

November 18, 2002–January 21, 2003

Species	Number of Females (% ripe) (% running)	Number of Males (% ripe) (% running)	Sex Unknown (% ripe)	Total (% ripe) (% running)
Brown trout	245 (95.9) (64.1)	173 (94.2) (95.7)	5 (0)	423 (92.9) (79.1)
Rainbow trout	40 (97.5) (85.0)	93 (100) (96.8)	55 (0)	188 (70.2) (65.9)
Bluehead sucker	0	0	1 (0)	1

Length Frequency



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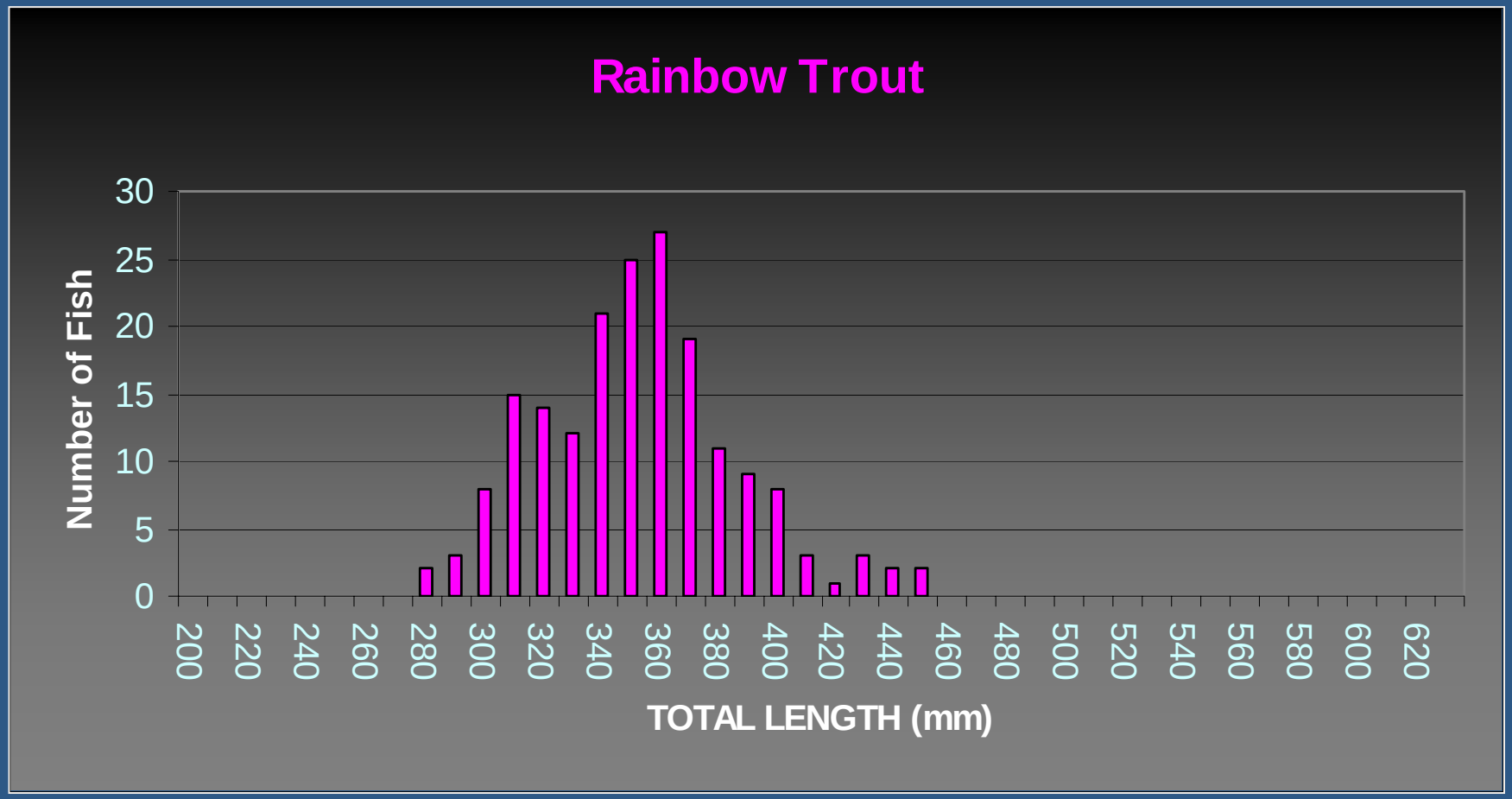


Recaptured Brown Trout (12/422=2.8%)

Species	Recapture	Original Capture (AGFD)		
	TL at Recapture	Date of Capture	RM* at Capture	TL at Capture
BNT	402	6/5/00	53.9	300
BNT	308	6/9/00	87.35	285
BNT	285	12/23/00	97.5	253
BNT	334	2/22/02	87.8	315
BNT	311	2/23/02	95.8	300
BNT	348	2/27/02	120.7	310
BNT	282	4/14/02	91.8	281
BNT	290	4/14/02	93.1	287
BNT	305	3/14/01	96.8	295
		2/23/02	96.5	304
BNT	350	Adipose clip only, no PIT tags found.		
BNT	351	Adipose clip only, no PIT tags found.		
BNT	352	Adipose clip only, no PIT tags found.		

* RM at mouth of BAC = 87.8

Preliminary Conclusions and Recommendations

- Weir structure successful
- Efficient at removing spawning brown trout
- Controversial with some public
- Future work requires NPS approval of results
  - NEPA required for future management actions by NPS
  - Our Recommendations:
    - Earlier installation of weir to bracket spawning period
    - Native fish monitoring in Bright Angel Creek
    - Population estimates of salmonids in BA creek
    - Coordination with main channel fish monitoring program (GCMRC)

Acknowledgements

- Bureau of Reclamation, Upper Colorado Region for initial funding
- Grand Canyon National Park staff for logistic support
- SWCA staff; Matt Lauretta, Suzanne Rhodes, Mary Anne Mcleod, Gabe Valdes, volunteers
- Phantom Ranch staff

Phase 2 Bright Angel Creek Trout Removal

- Conducted Baseline Population Estimates of Fish Community in Late Summer 2003
- NEPA Compliance Underway
- Begin trout removal management action in late fall 2003 including mechanical removal with backpack electrofishing.

2004–2007

- Spring of Each Year Use a Weir to Capture Native Suckers Entering Bright Angel Creek
- Summer Baseline Population Monitoring of Fish Community to Track Response to Trout Removal

2004–2007

- Continue Fall/Winter Trout Removal Using Weir and Backpack Electrofishing
- Expand Removal Efforts Upstream (Roaring Springs Reach)

Native Fish Habitat Restoration in Selected Grand Canyon Tributaries

- Winter 2004 Begin with Reconnaissance Trip to Evaluate Potential Tributaries
- Two Trips Each in 2004 and 2005
- Determine the Feasibility of Non-native Fish Removal for Tributaries

Methods

- Electrofish Reaches for Population Estimates Using Removal Method
- Removal All Trout Species and Other Non-natives
- Determine Baseline Fish Populations in Tributaries

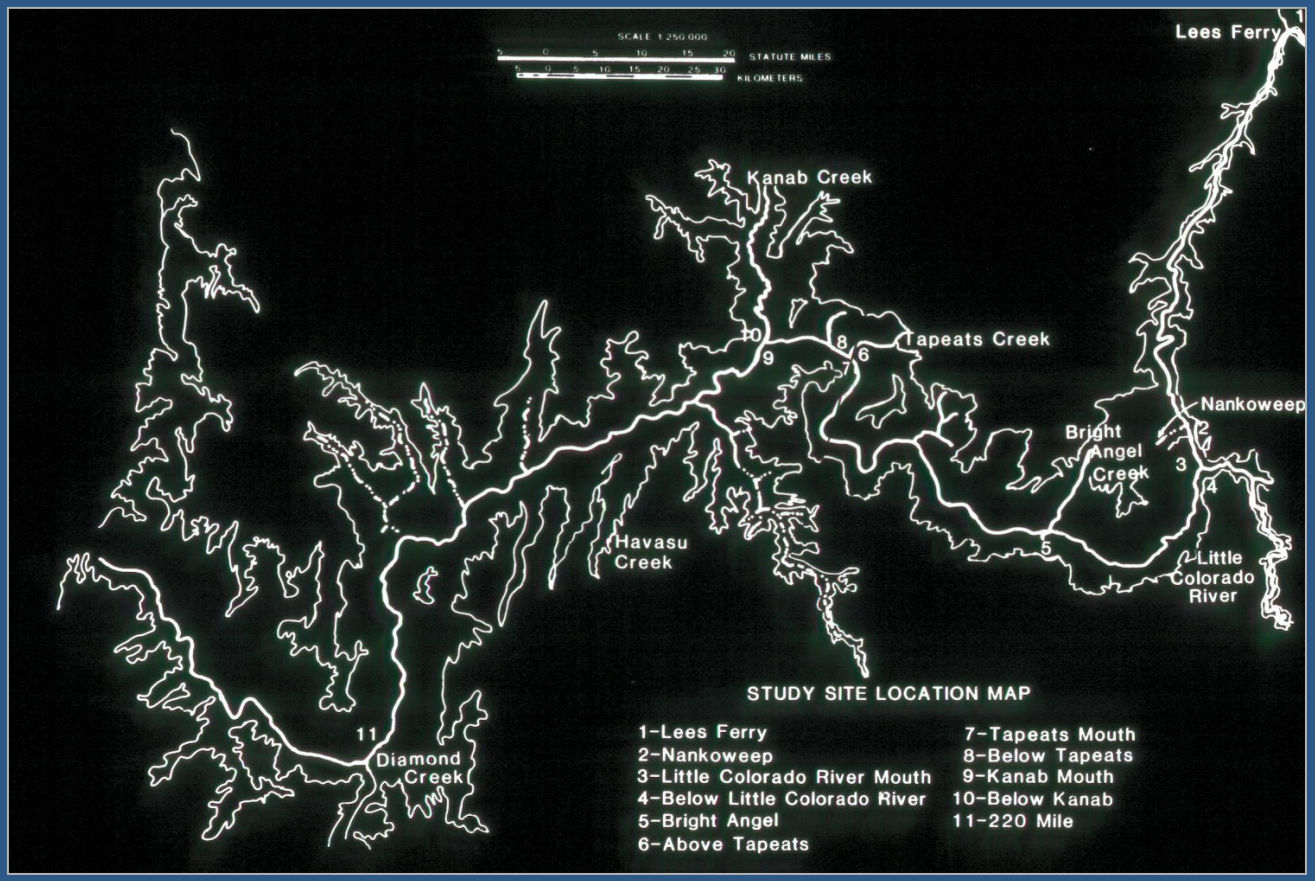
For Each Tributary

Use Two 4–6 Person Crews

- One Crew Based from River Camp (working the lower 2–3 miles)
- One Crew Based from a Remote Camp Supported by Backpacking in All Gear

Selected Tributaries Include:

- Clear Creek
- Shinumo Creek
- Tapeats Creek
- Havasu Creek (?)



Project Goals

- Determine the Feasibility of Reducing Non-native Fishes in Grand Canyon Tributaries
- Develop a Long-term Action Plan for Controlling and Managing Non-native Fishes in Key Grand Canyon Tributaries