Trout Removal in Bright Angel Creek, Grand Canyon National Park: A Potential Recovery Effort for Native Fishes

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Purpose

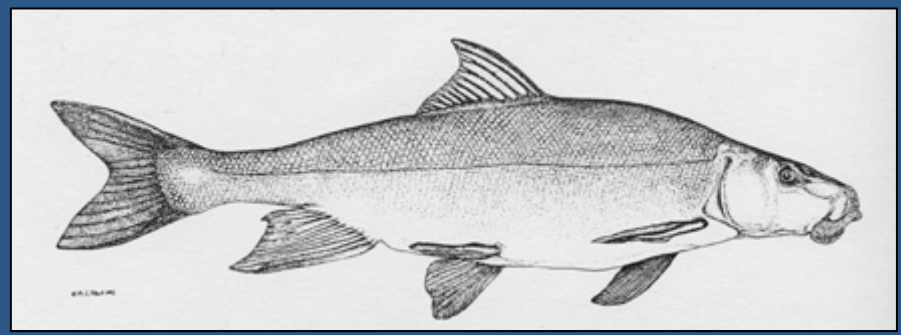
- The National Park Service is charged with preserving and protecting the natural resources within Grand Canyon.

  In Bright Angel Creek, the fish community has been altered towards non-native salmonids, to the detriment of its native fishes.

- Removing non-native salmonids will provide an opportunity for recovery of the native fish community in Bright Angel Creek.

Native Fishes in Bright Angel Creek

Speckled dace



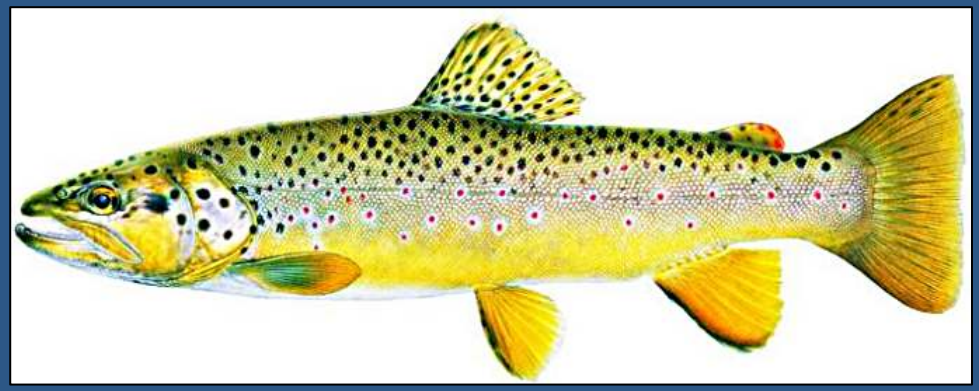
Flannelmouth sucker

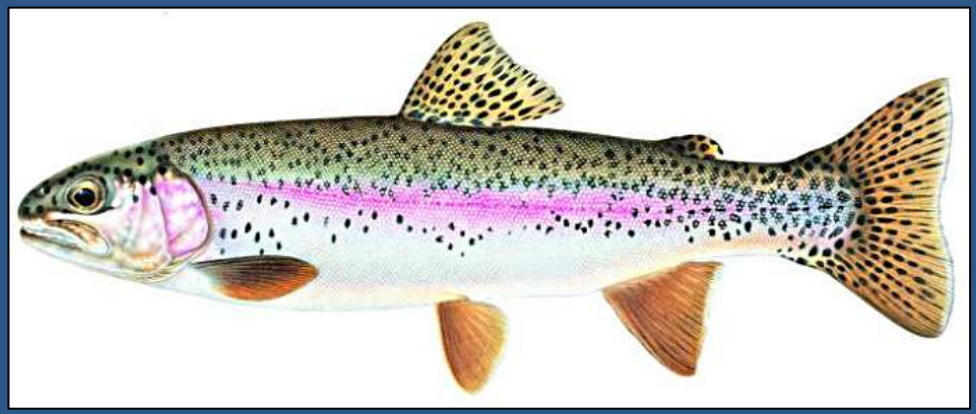
Bluehead sucker

Humpback chub

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

Brown Trout

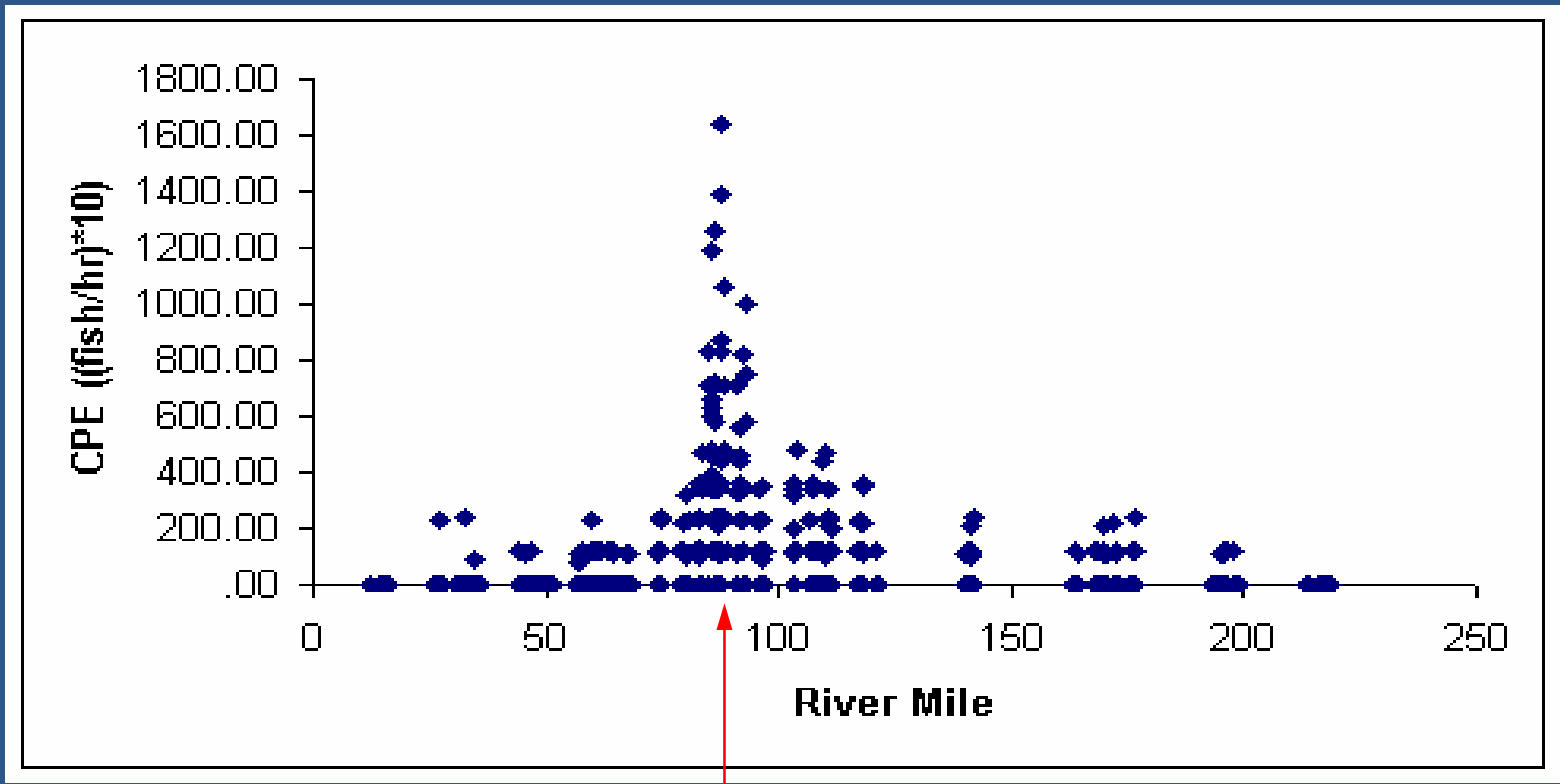




Rainbow Trout

2002 Electrofishing CPE in Colorado River

Preliminary Data from Arizona Game and Fish Department



Trout removal efforts involve three main components

- Construction and Operation of a Temporary Weir in Bright Angel Creek
- Bright Angel Creek Trout Removal and Fish Community Monitoring
- Native Fish Habitat Restoration in Selected Grand Canyon Tributaries

Methods Used for Operation of the Temporary Weir in Bright Angel Creek

- Constructed and installed a temporary weir above the lower foot bridge.
- Operated weir continuously from November 18, 2002–January 21, 2003.
- Checked weir and processed fish twice per day: morning and evening.
- Created and posted a fact sheet at Phantom Ranch, coordinated efforts with NPS staff, and maintained communication with the public.

Upstream View of Weir in Place

View Downstream

View Upstream from Bridge

Fish Handling Protocol

Natives

- Measure (TL, FL)
- Weigh (g)
- Scan for PIT tag; tag, if needed.
- Release above weir

Fish Handling Protocol

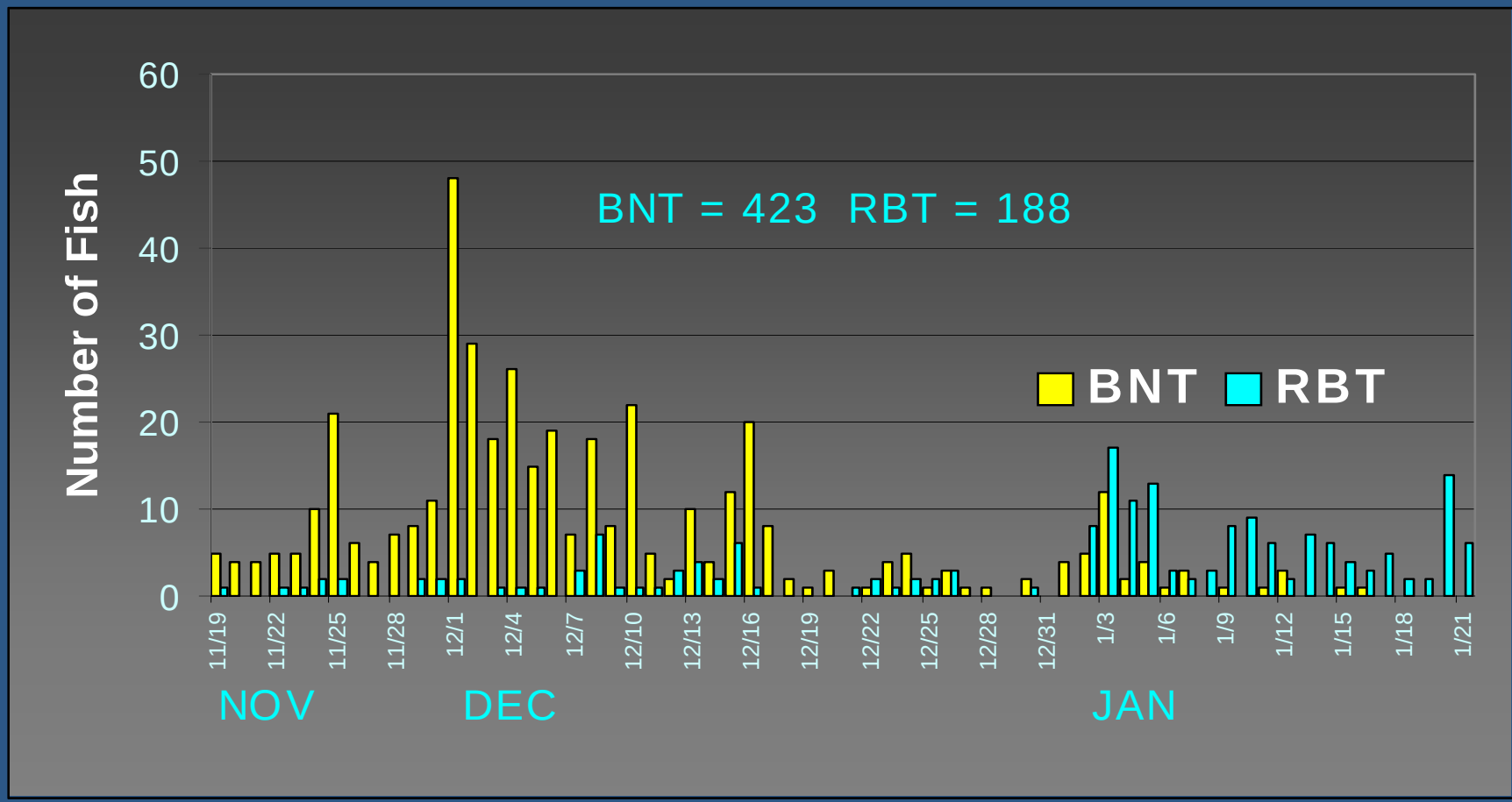
Nonnatives

- 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

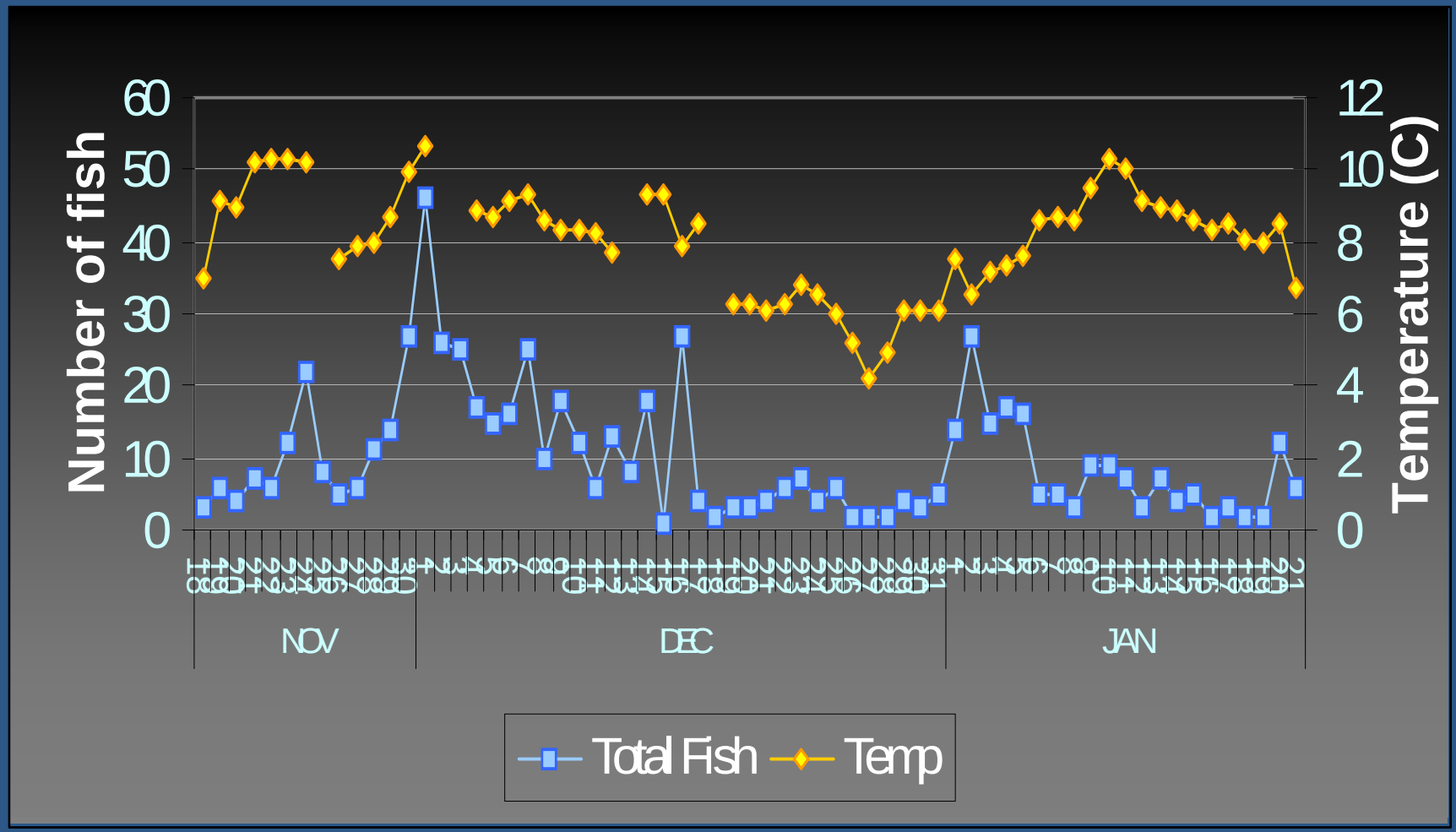
Brown and Rainbow Trout Captured

November 18, 2002–January 21, 2003



Water Temperatures and Fish Captures

November 18, 2002–January 21, 2003

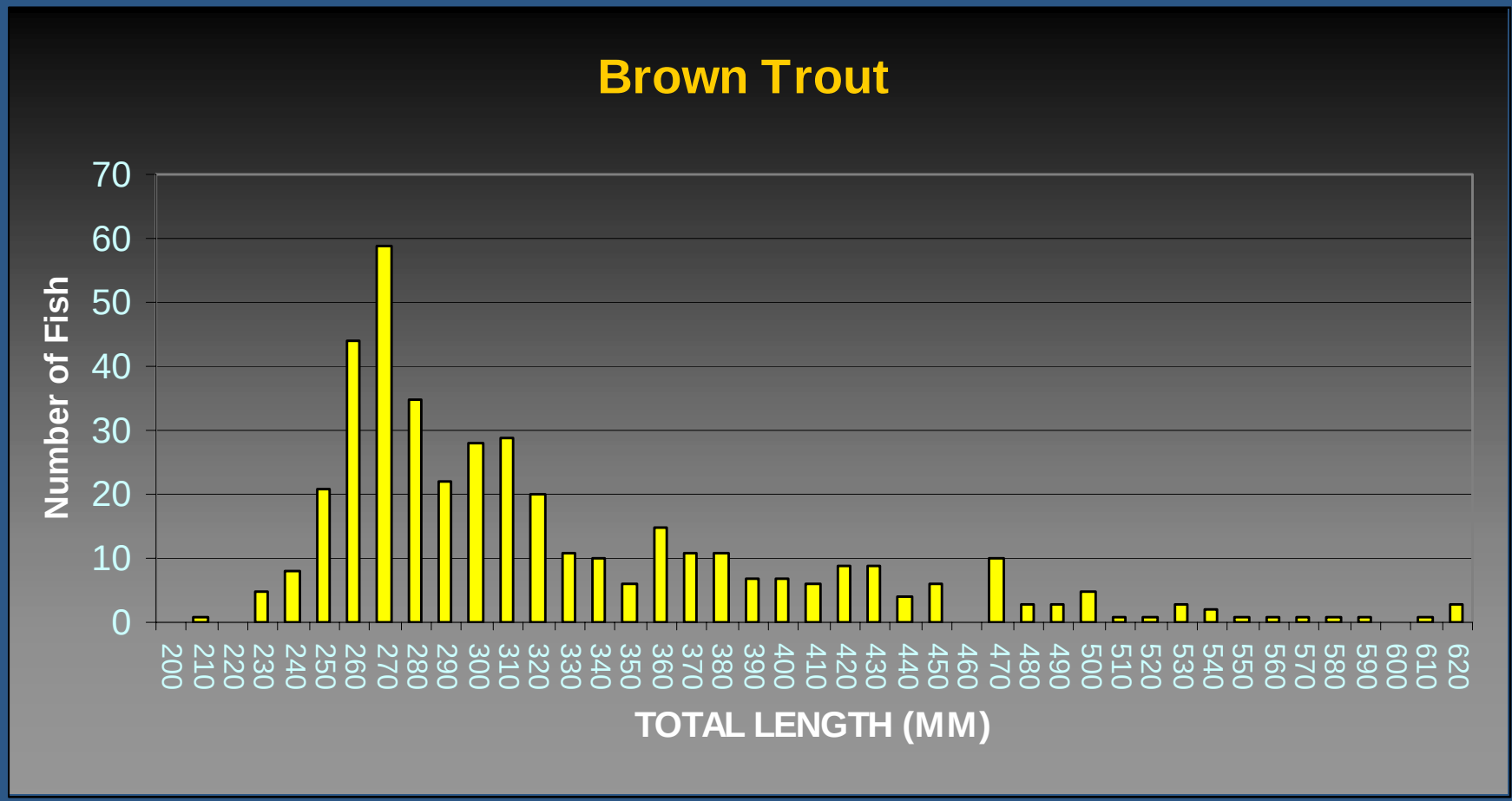


Summary Results

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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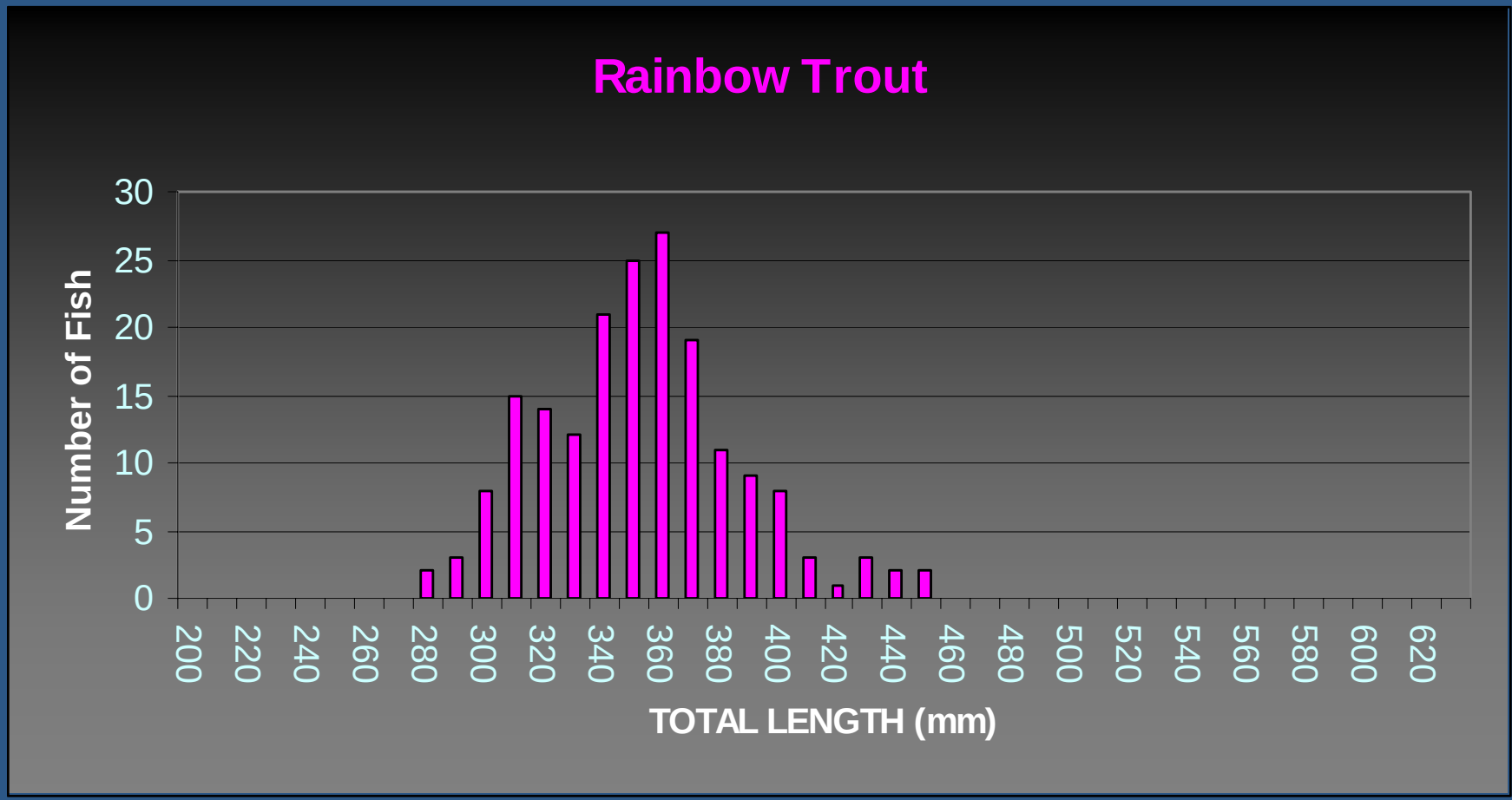


Recaptured Brown Trout (12/422=2.8%)

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 from Use of a Temporary Weir

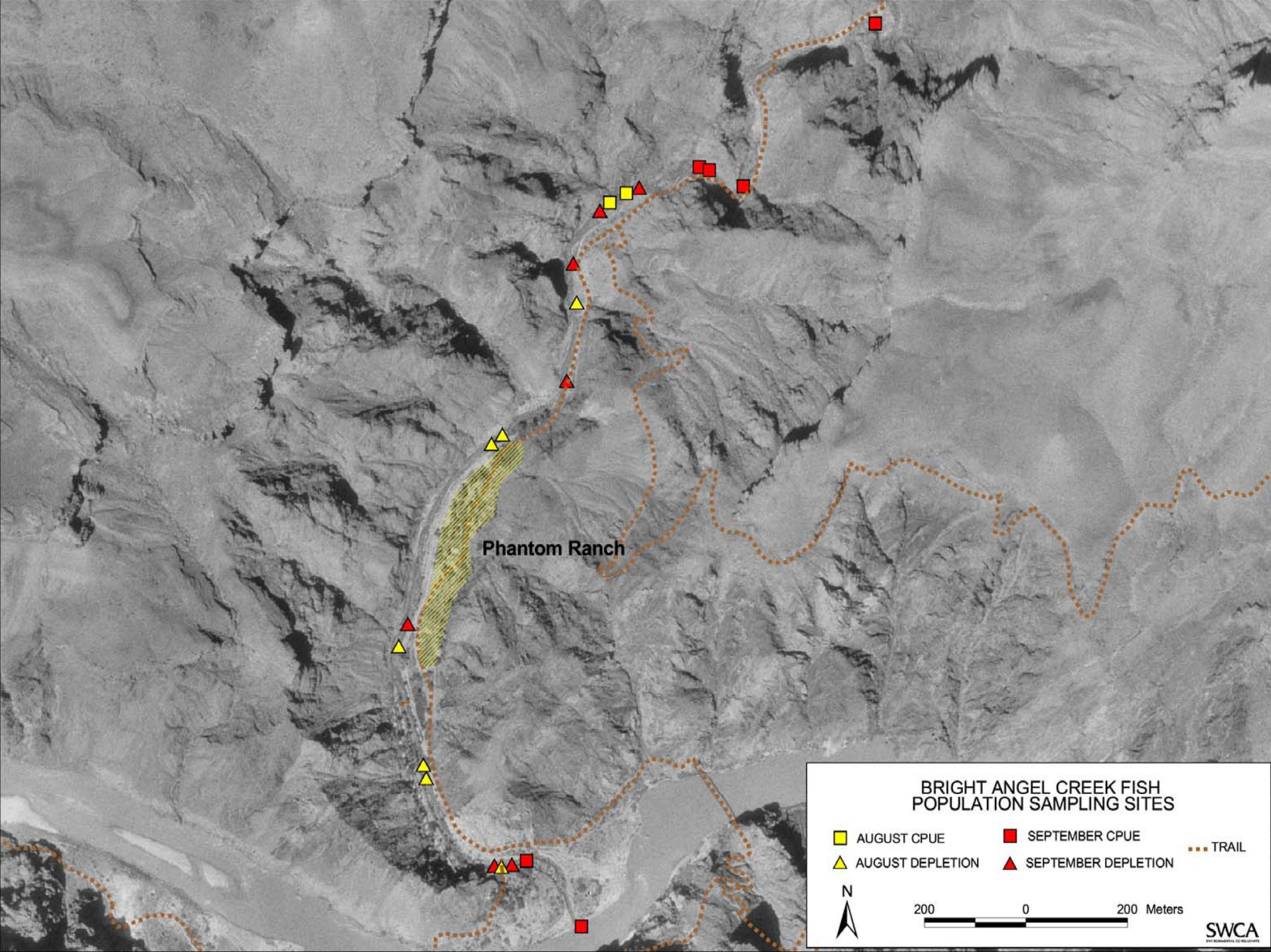
- Weir structure was successful and proved efficient for removal of spawning brown trout.
- Controversial with some members of the public.
- **Future work requires NPS approval of results.**
- NEPA required for future management actions by NPS.

Recommendations

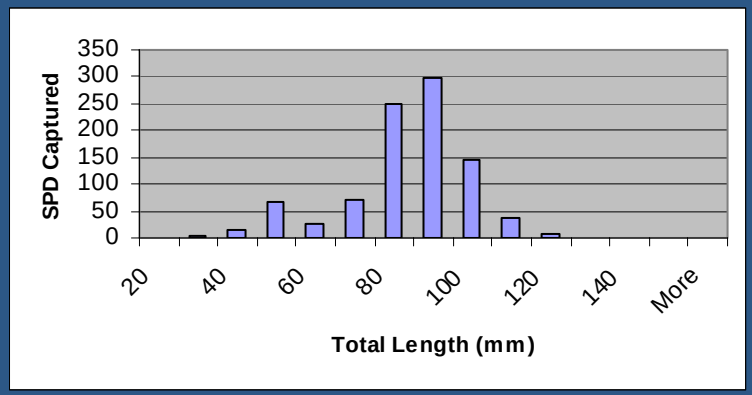
- Earlier installation of weir to bracket spawning period.
- Native fish monitoring in Bright Angel Creek.
- Population estimates of salmonids in Bright Angel Creek
- Coordination with main channel fish monitoring program (GCMRC)

Trout Removal in Bright Angel Creek

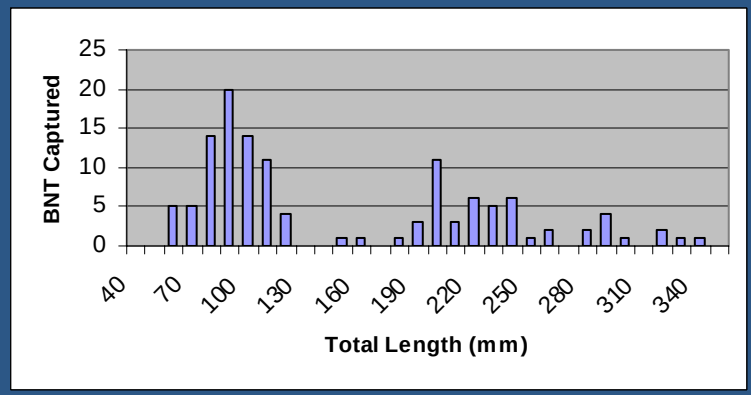
- Conducted baseline population estimates of fish community in late Summer 2003.
- NEPA compliance is underway.
- Trout removal management action will begin in late Fall 2003, including mechanical removal with backpack electrofishing.


Phantom Ranch
BRIGHT ANGEL CREEK FISH
POPULATION SAMPLING SITES
AUGUST CPUE
AUGUST DEPLETION
SEPTEMBER CPUE
SEPTEMBER DEPLETION
TRAIL
N
200
0
200 Meters
SWCA

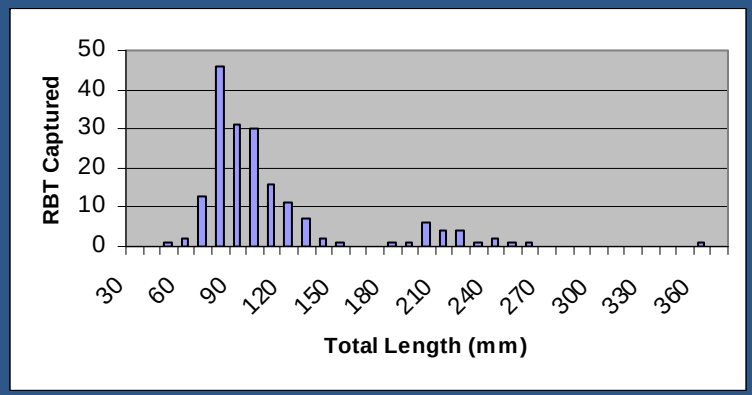
Length Frequency Histograms



Speckled Dace

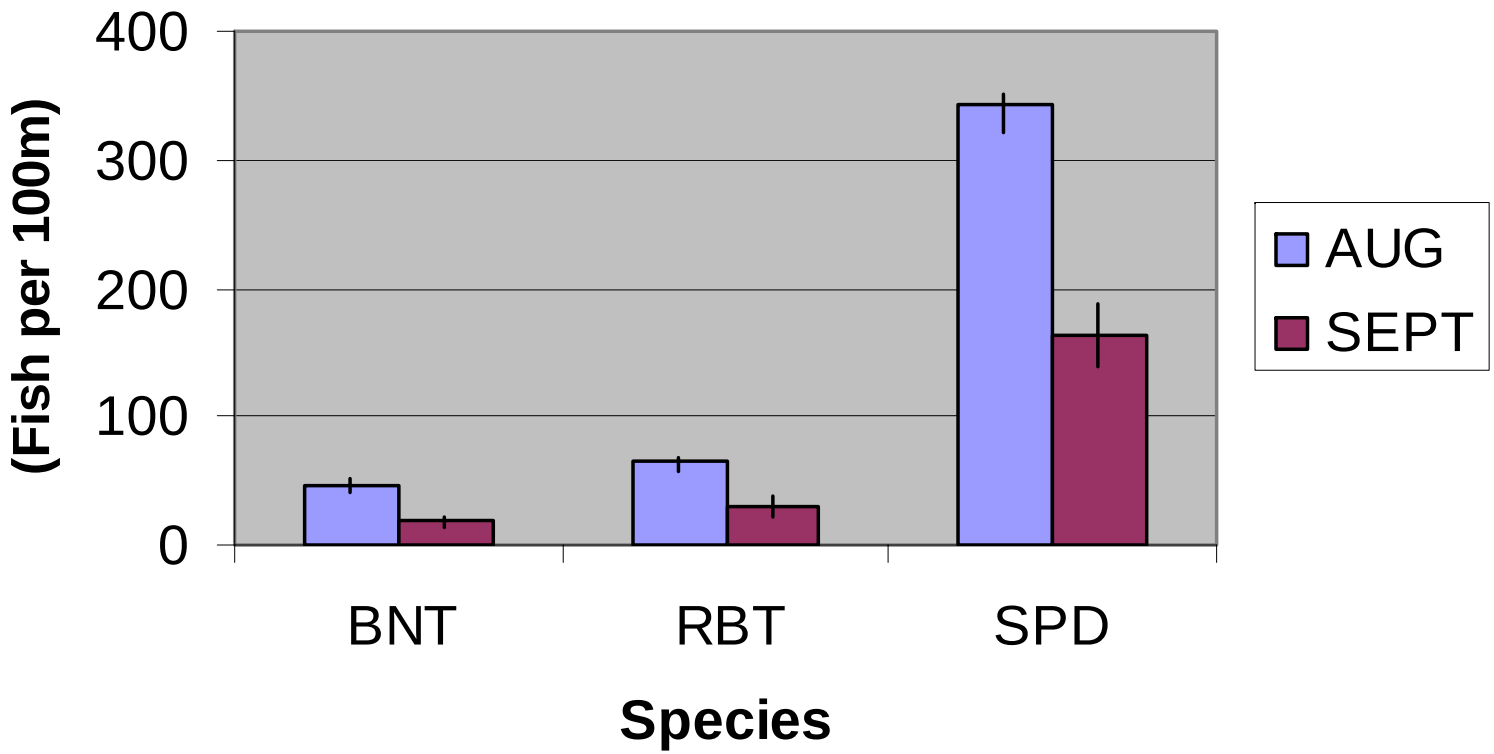


Brown Trout



Rainbow Trout

Population Estimate of Fish Caught in Bright Angel Creek Summer 2003



Trout Removal Efforts for 2004–2007

- Spring of each year, use a weir to capture native suckers entering Bright Angel Creek.

- Conduct summer baseline population monitoring of the fish community to track response to trout removal.

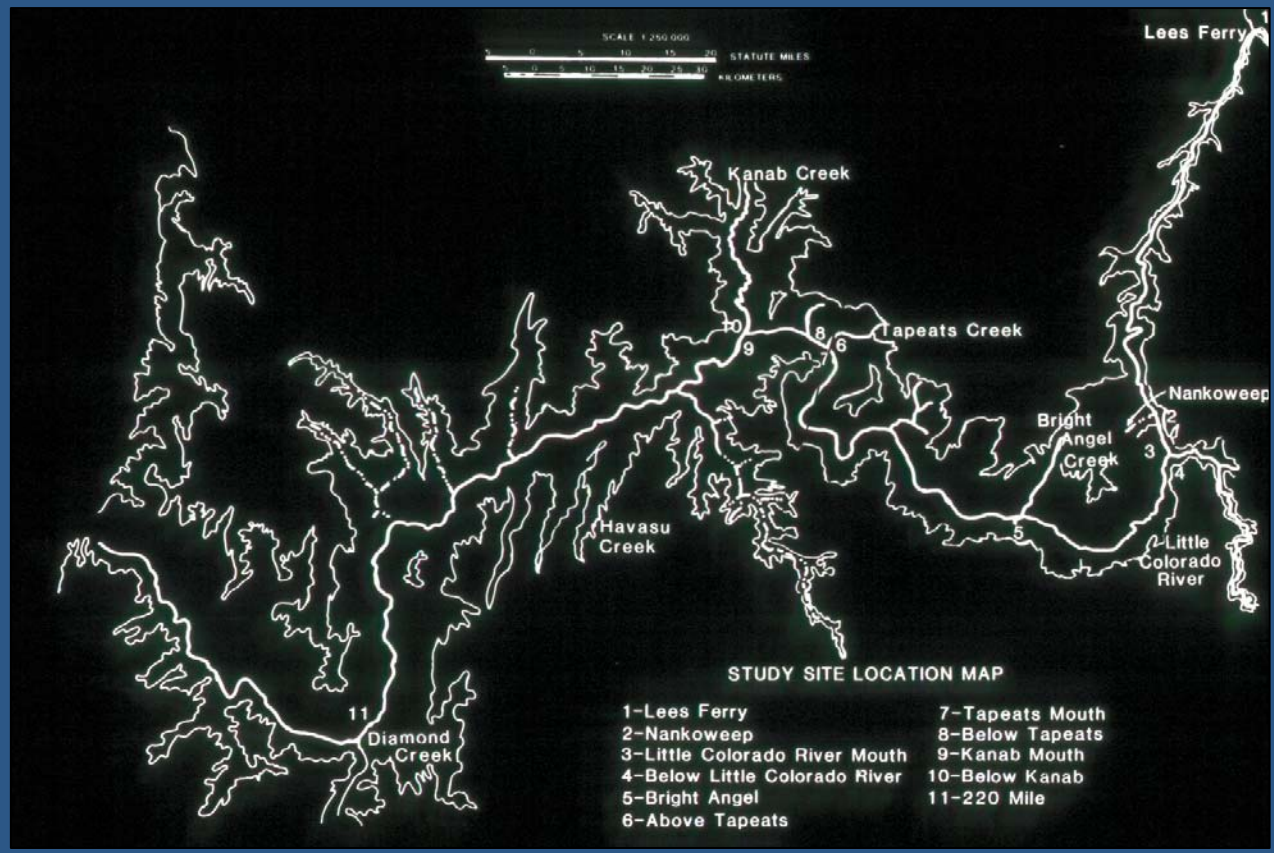
Trout Removal Efforts for 2004–2007

- Continue Fall/Winter trout removal using a weir and backpack electrofishing.
- Expand removal efforts upstream (Roaring Springs reach).

Native Fish Habitat Restoration in Selected Grand Canyon Tributaries

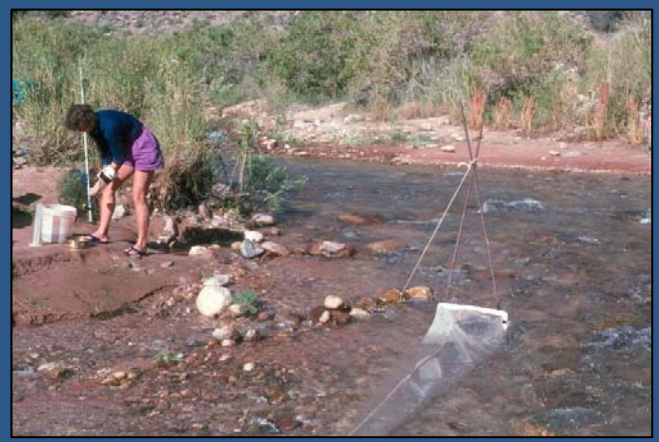
Selected tributaries include:

- Clear Creek
- Shinumo Creek
- Tapeats Creek
- Kanab Creek



Methods for Native Fish Habitat Restoration in Selected Tributaries

- In Winter 2004, conduct reconnaissance trip to evaluate potential tributaries.
- Conduct two trips in both 2004 and 2005.
- Determine the feasibility of non-native fish removal for tributaries.



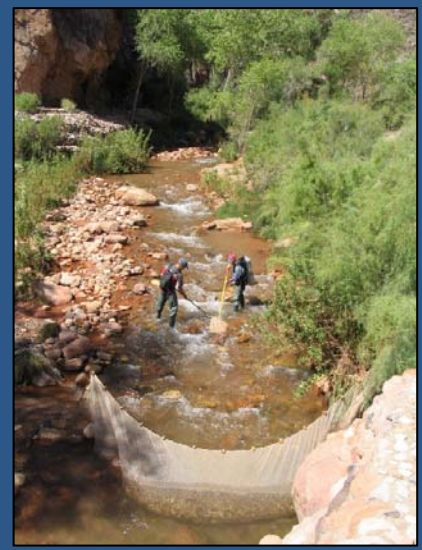
Methods for Native Fish Habitat Restoration in Selected Tributaries

For each tributary, use two 4–6 person crews:

- One crew based from river camp (working the lower 2–3 miles); and
- One crew based from a remote camp supported by backpacking in all gear.

Methods for Native Fish Habitat Restoration in Selected Tributaries

- Electrofish reaches for population estimates using removal method.
- Remove all trout species and other non-natives.
- Determine baseline fish populations in tributaries.



Goals for Native Fish Habitat Restoration Efforts

- 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.

Acknowledgements

- Bureau of Reclamation, Upper Colorado Region for initial funding
- Grand Canyon National Park staff for logistic support
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