GCMRC Monitoring and Research Updates

Scott VanderKooi
Southwest Biological Science Center
Grand Canyon Monitoring and Research Center

Kanab Ambersnail Genetics Report

USGS

Status of Length Structured Mark-Recapture Model (LSMR)

Progress October, 2012

Dr. Steve Martell

USGS

Accomplishments

- ASMR
  - Updated ASMR model with most recent data.
- LSMR
  - Estimated changes in growth and size transition matrixes from tag-recapture data.
  - Abundance estimates with fixed asymptotic size-selectivity (Run1)
  - Abundance estimates with size based selectivity coefficients (Run4)

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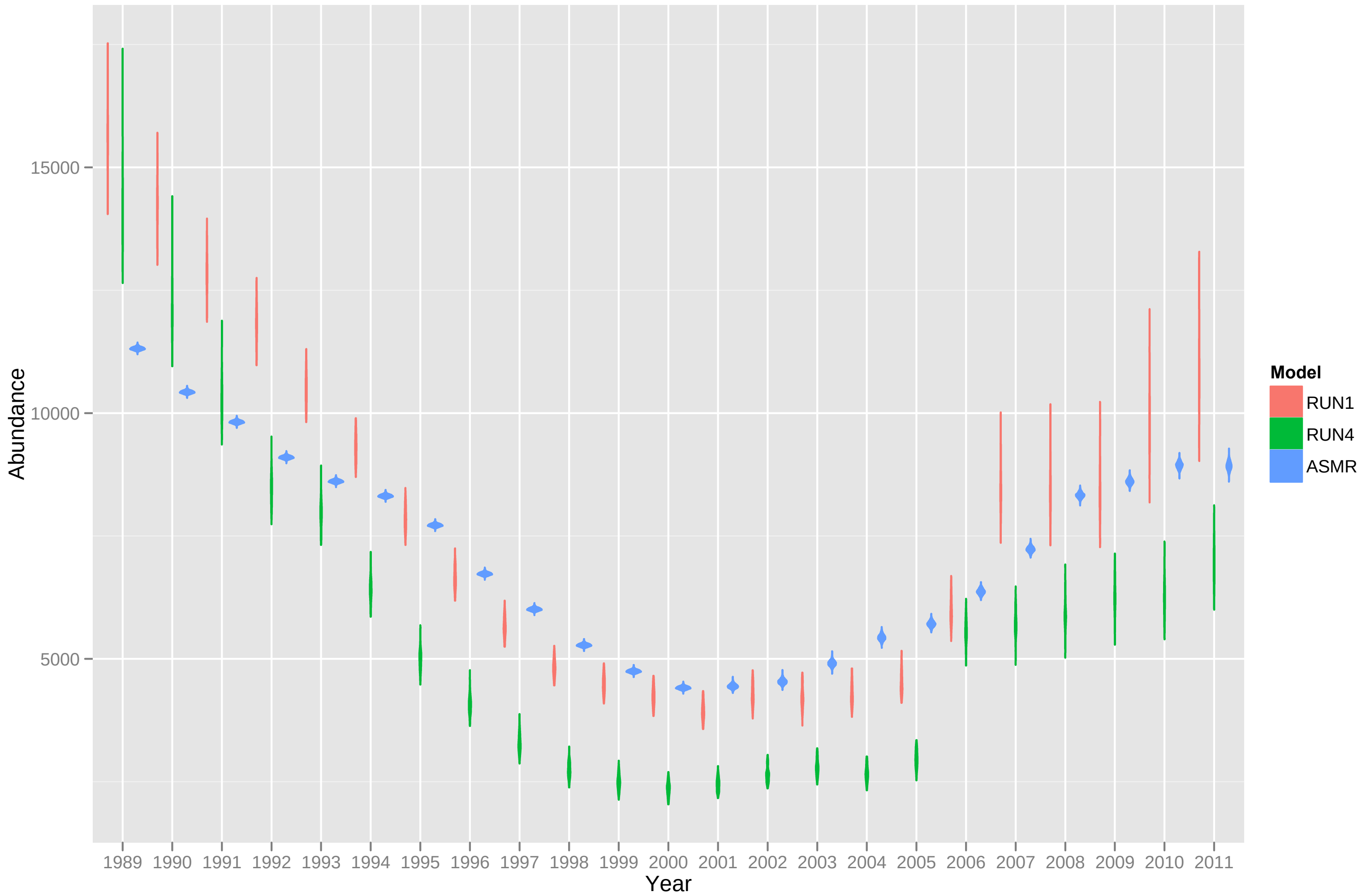
HBC Age-4+ (ASMR) and >200 mm (LSMR)



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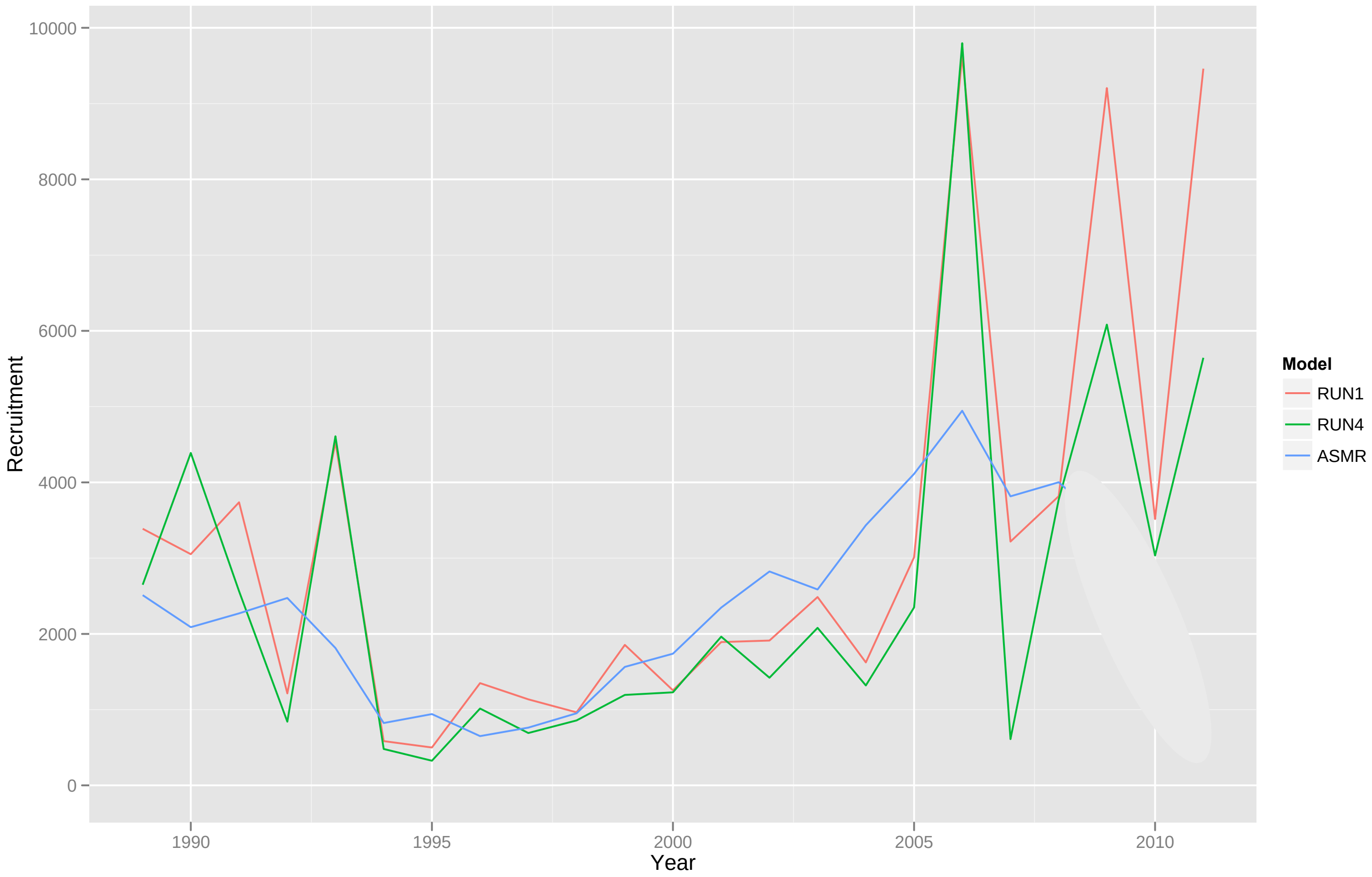
(S. Martell, preliminary data, subject to revision)

Humpback Chub Recruitment



(S. Martell, preliminary data, subject to revision)

LSMR Preliminary Findings

- Growth increment data suggest increases in growth rates since ~ 2001.
- Trends in abundance between LSMR and ASMR are similar for fish > 150 mm.
- Estimated natural mortality rates are much higher in LSMR (0.21-0.27) Vs. ASMR (0.08-0.13)
- Greater uncertainty in abundance estimates (as expected) using a length-based model.
- Greater recruitment variability in length-based model.

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(S. Martell, preliminary data, subject to revision)

Fish Sampling Fall 2012

- RTELSS Sampling in Glen Canyon
- HBC Aggregation Sampling
- Natal Origins/Juvenile Chub Monitoring
- Lees Ferry Electrofishing
- Diamond Down Mainstem Electrofishing
- HBC Monitoring in the Little Colorado River
- Natal Origins RBT Marking Trip

Natal Origins/Juvenile Chub Monitoring

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Natal Origins – Rainbow Trout Data

	April, 2012			July, 2012			September, 2012		
Reach	Catch	pCap	N/km	Catch	pCap	N/km	Catch	pCap	N/km
I (Lees Ferry)	4,421	0.08	6,952	4,405	0.04*	14,213*	5891	-	-
II (~ 20 Mile)	3,945	0.07	6,852	3,961	0.1	3,860	7,810	-	-
III (~ 40 mile)	2,689	0.13	2,313	2,730	0.14	2,375	3,938	-	-
IVa (Upstream LCR)	376	0.21	352	428	0.19	479	437	-	-
IVb (Downstream LCR)	55	0.17	90	99	0.21	98	79	-	-
Total	11,486			11,623			18,155		

(*Estimates of pCap and density affected by equipment issues)

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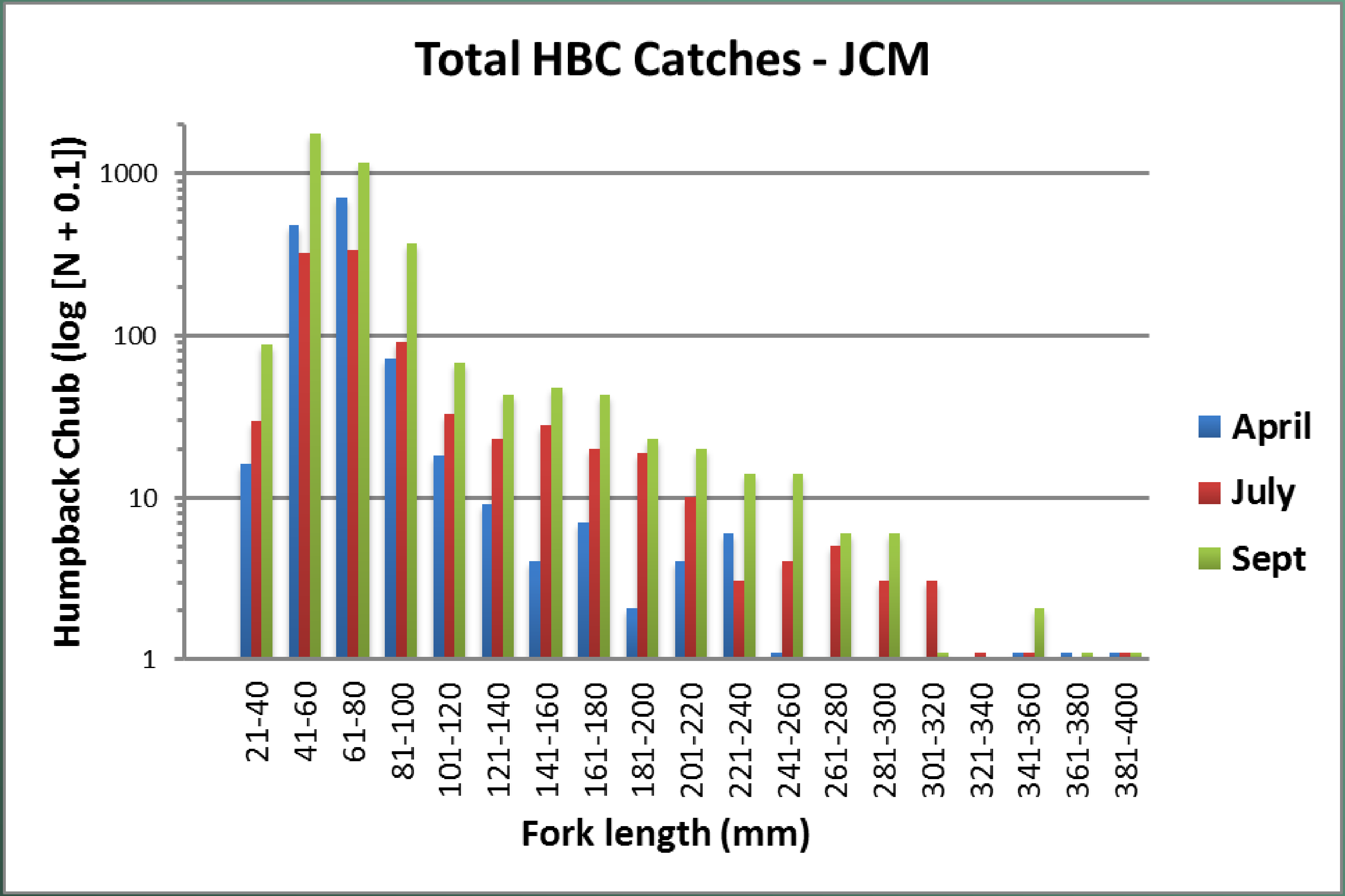
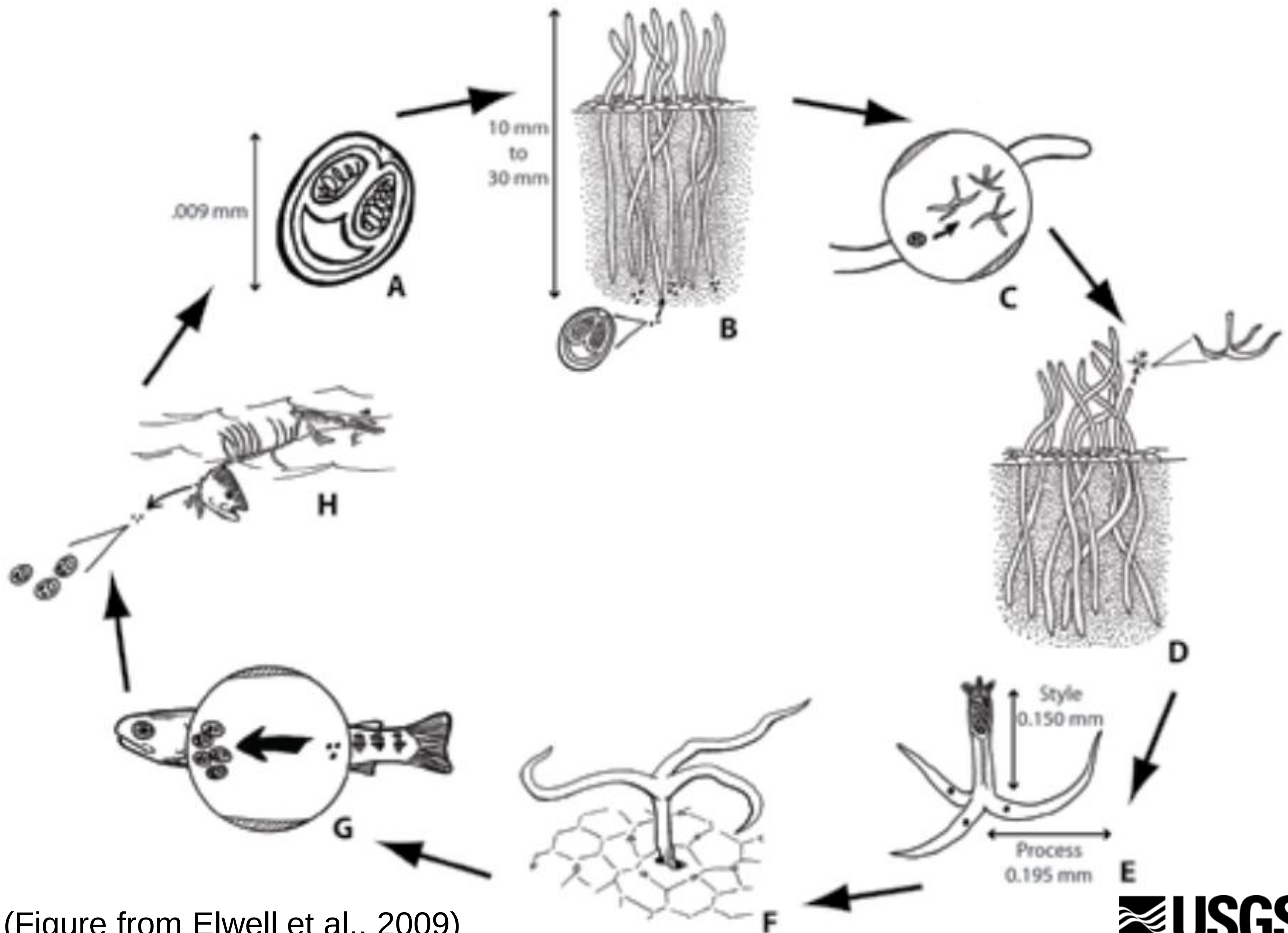
(Preliminary Data from Korman et al. 2012, Unpublished)

Mainstem Juvenile Chub Monitoring



(Preliminary Data from Korman et al. 2012, Unpublished)

Whirling Disease & Implications



(Figure from Elwell et al., 2009)

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Biology and Key Facts

- Only infects salmonids and *Tubifex tubifex*
- Rainbow trout highly susceptible; brown trout carry parasite, usually asymptomatic
- Young, small fish most susceptible; resistance increases with age and growth
- One infected fish can carry millions of myxospores

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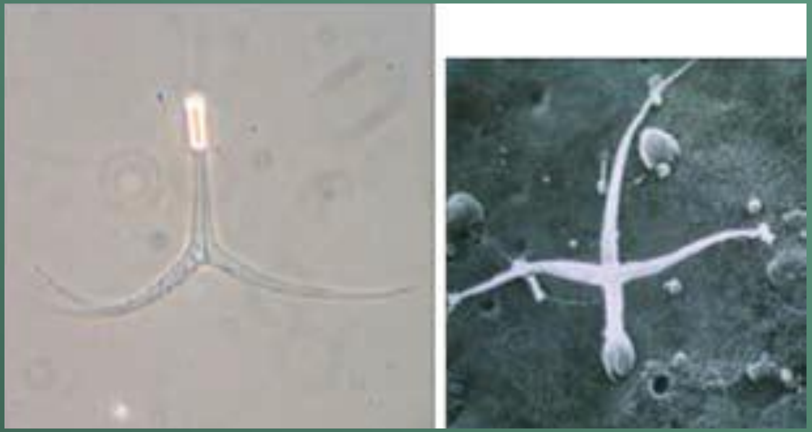
Environmental Factors

- Triactinomyxon production highest at 10-15 °C
- Silt and clay best habitat for *T. tubifex* and triactinomyxon production
- *T. tubifex* abundance associated with high levels of organic material
- Scouring flows displace *T. tubifex* and habitat



(Images from Elwell et al., 2009)

Management Actions and Risk of Spreading Whirling Disease

- Live removal and relocation of trout – high risk of spreading disease
  - Colorado River trout population infected
  - Millions of myxospores per infected fish
  - No treatment once infected

Management Actions and Risk of Spreading Whirling Disease

- **High-Flow Experiments – low risk of spreading disease**
  - **Downstream spread already occurring – fish movement and drift of triactinomyxons**
  - **Flushing flows disrupt parasite's life cycle – displace *T. tubifex,* scour out fine sediments and organics preferred by worms**
  - **Lower infection prevalence and severity at higher flows**
  - **Mostly larger, older trout downstream – more resistant to disease**

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Questions?