

The Restoration Process



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Wyoming Game and Fish



What and How

Stream Selection and Habitat

- Barriers
- Temperature
- Stream Size
- High quality habitat



Restoration of YSC

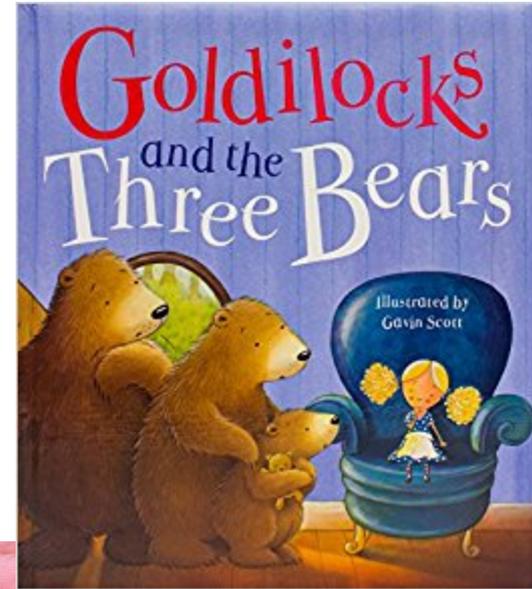
- Techniques
- The process
- Establishment
- “Gold Standard”

Highest Probability of Success and Persistence



Highest Probability of Success and Persistence

- Time
- Cost
- Stream selection and habitat
 - Minimum requirements
 - Can we do it?
 - Minimum effective population size



Minimum Requirement

- Yellowstone Cutthroat Trout
- Temperature
- Barriers
- High quality habitat



Yellowstone Cutthroat Trout

- Biology
 - Spring spawning
- Life-history forms
 - Migratory and Resident
 - Small headwater streams
 - Large rivers
 - Lakes



Temperature

- Optimal temperatures 39-59 °F
 - Growth
 - Recruitment
 - Spawn timing
 - Egg to fry



Barriers

- Impede upstream migration
- Minimum 6 ft
- Natural
- Improved
- Constructed

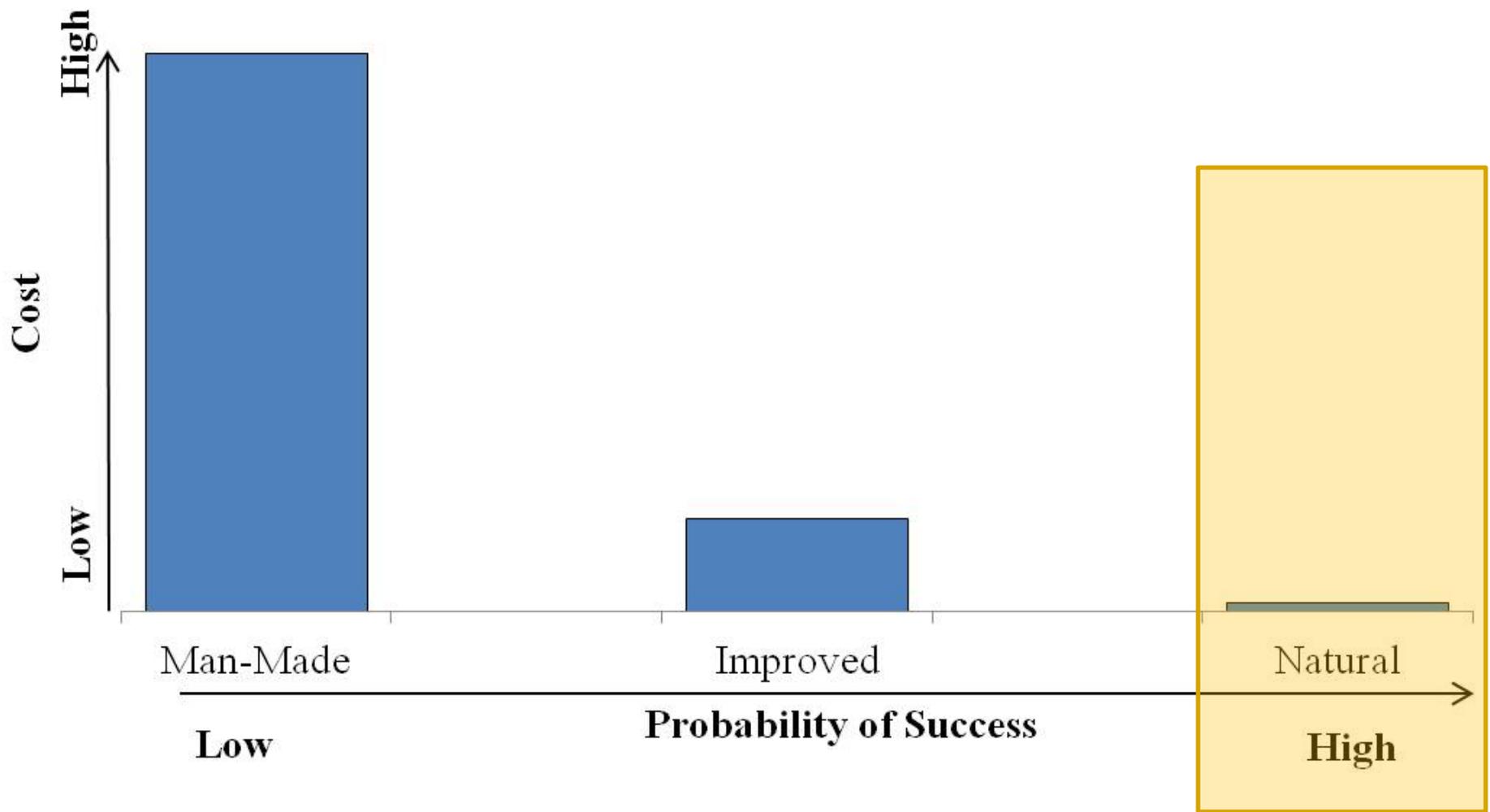






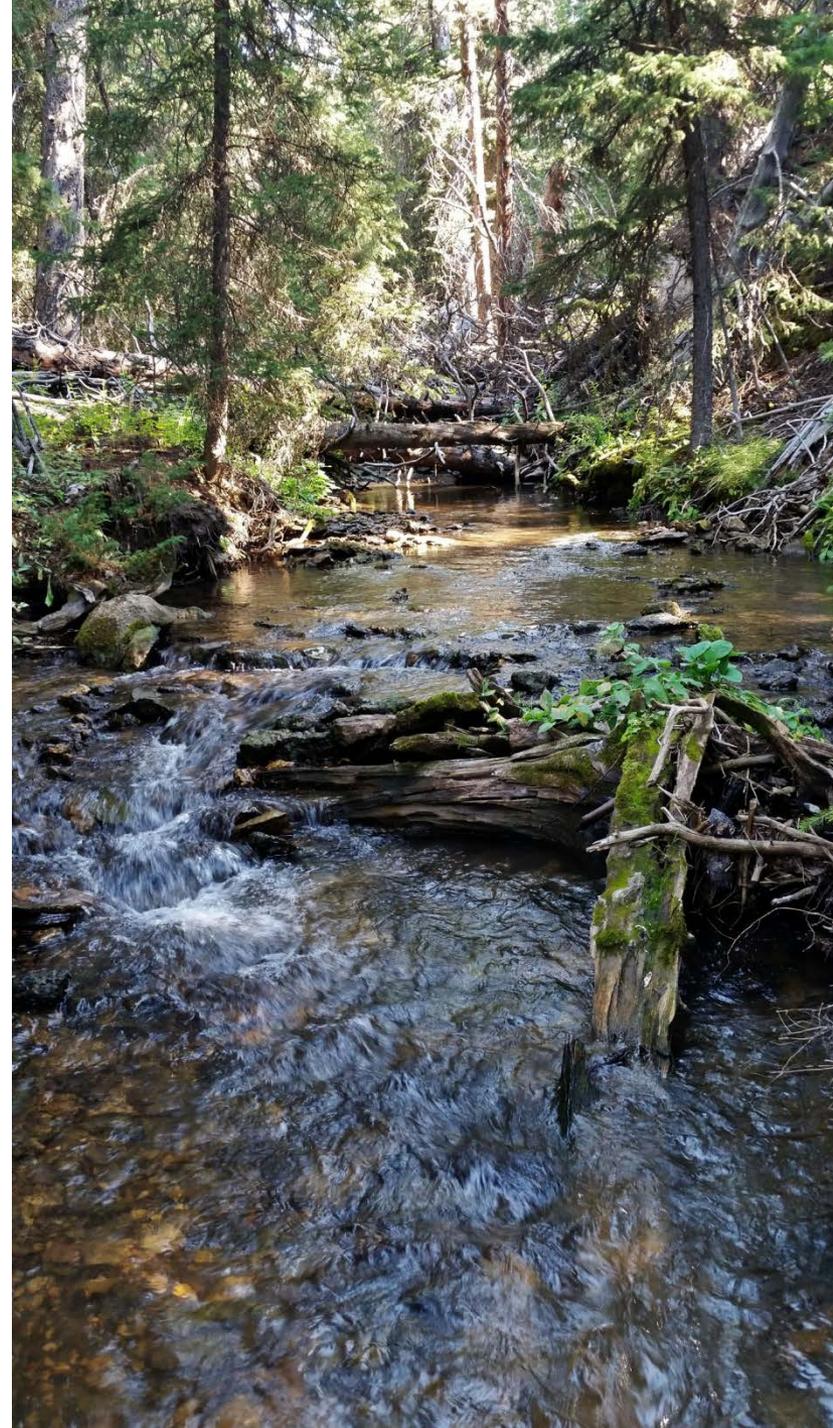


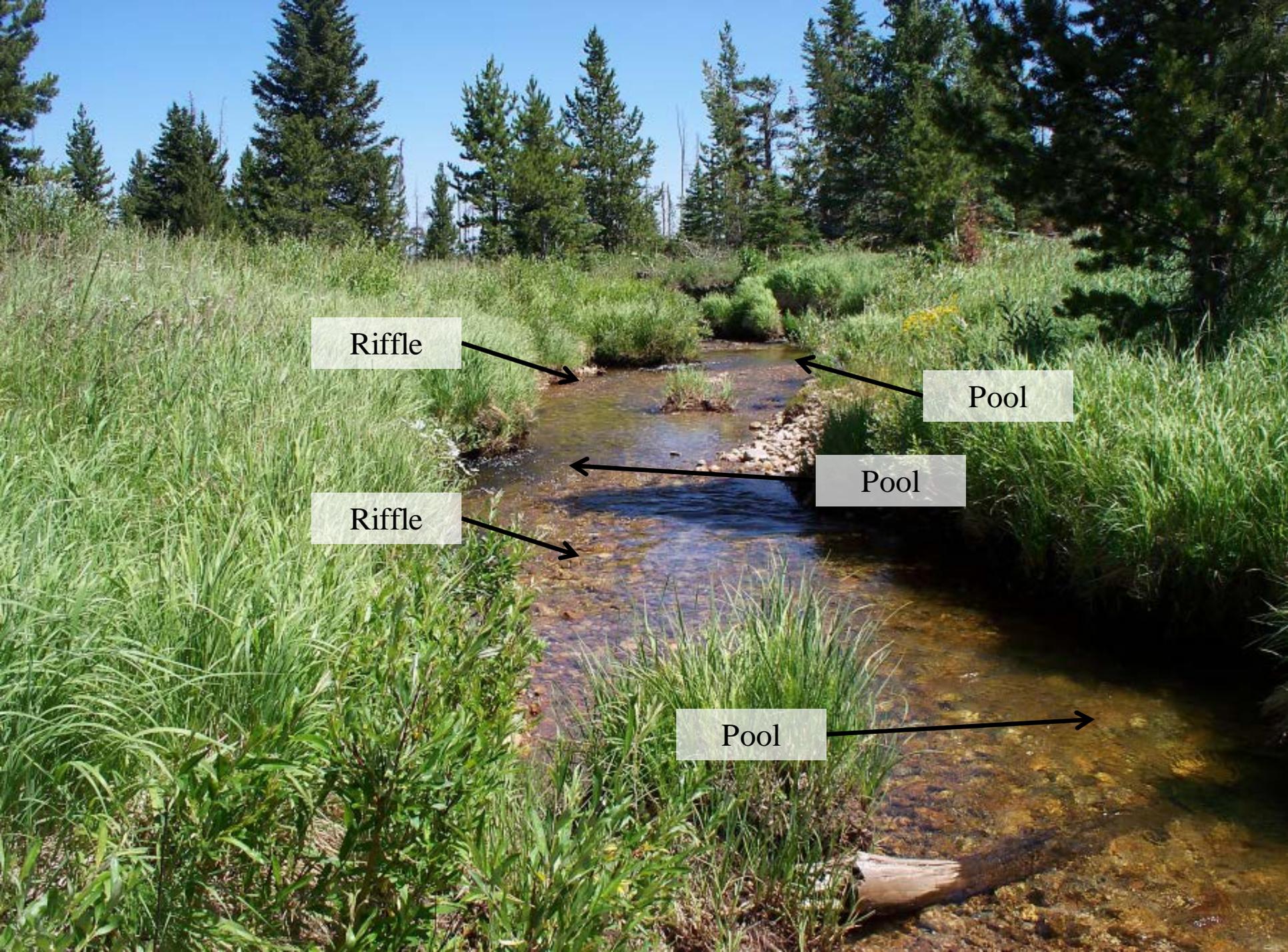




High Quality Habitat

- Fine Scale
 - Pools
 - Riffles
 - All life stages
- Large Scale
 - Stream size
 - Isolate
 - Meta-population





Riffle

Pool

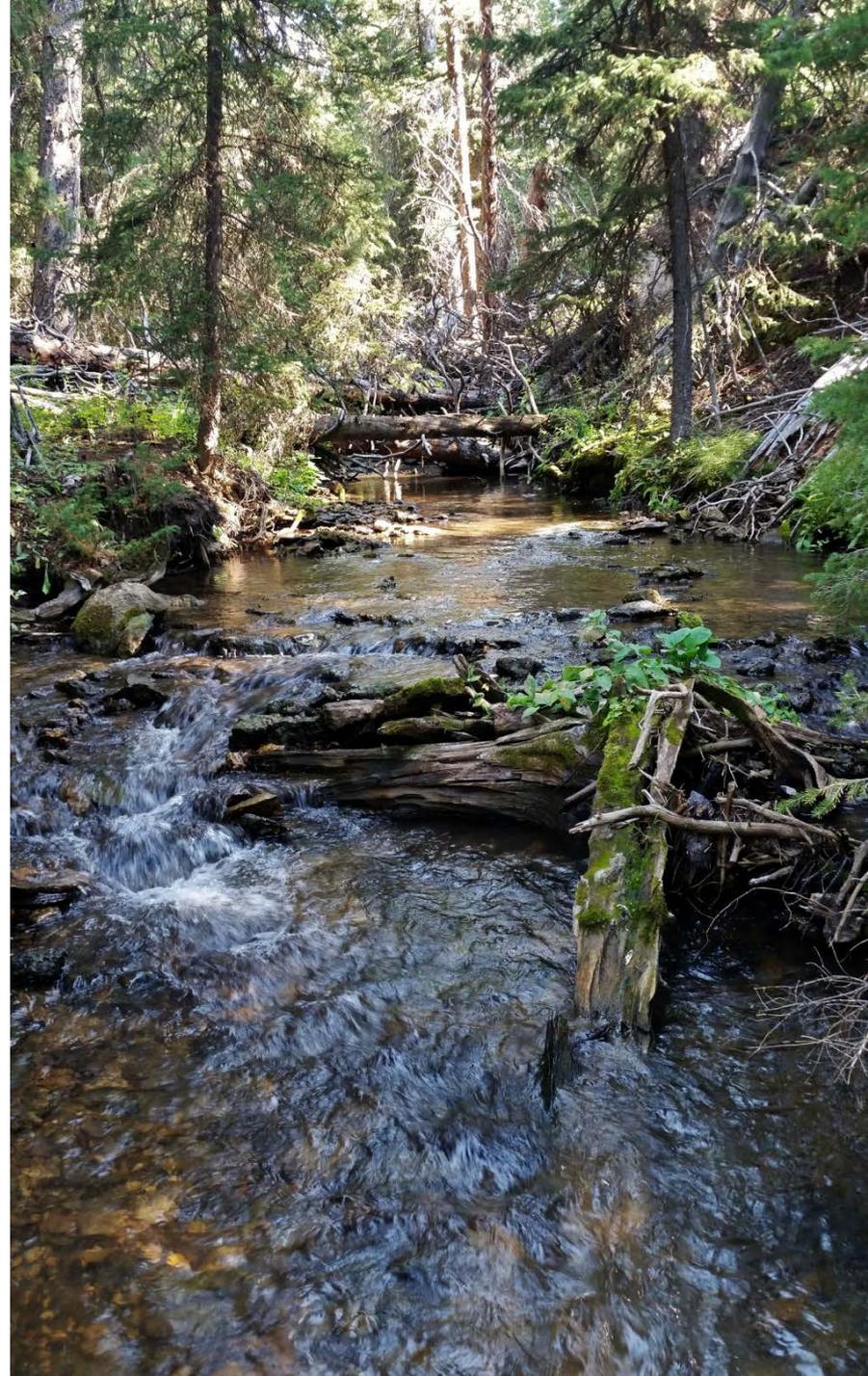
Pool

Riffle

Pool









Large Scale Habitat

– Who Cares?

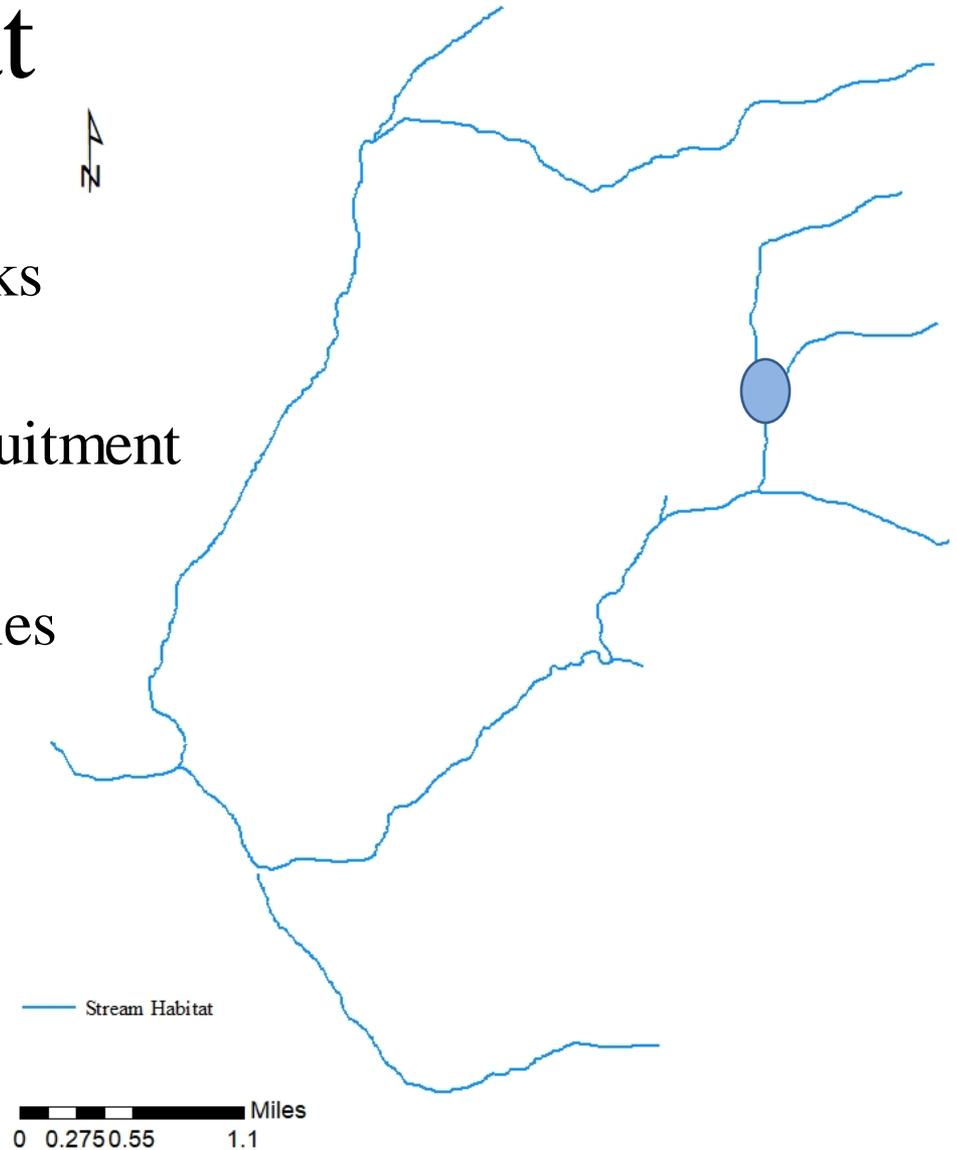
- Reduce genetic bottlenecks
- Diversity
- Reduced growth and recruitment

– Isolate

- Minimum of 5 stream miles

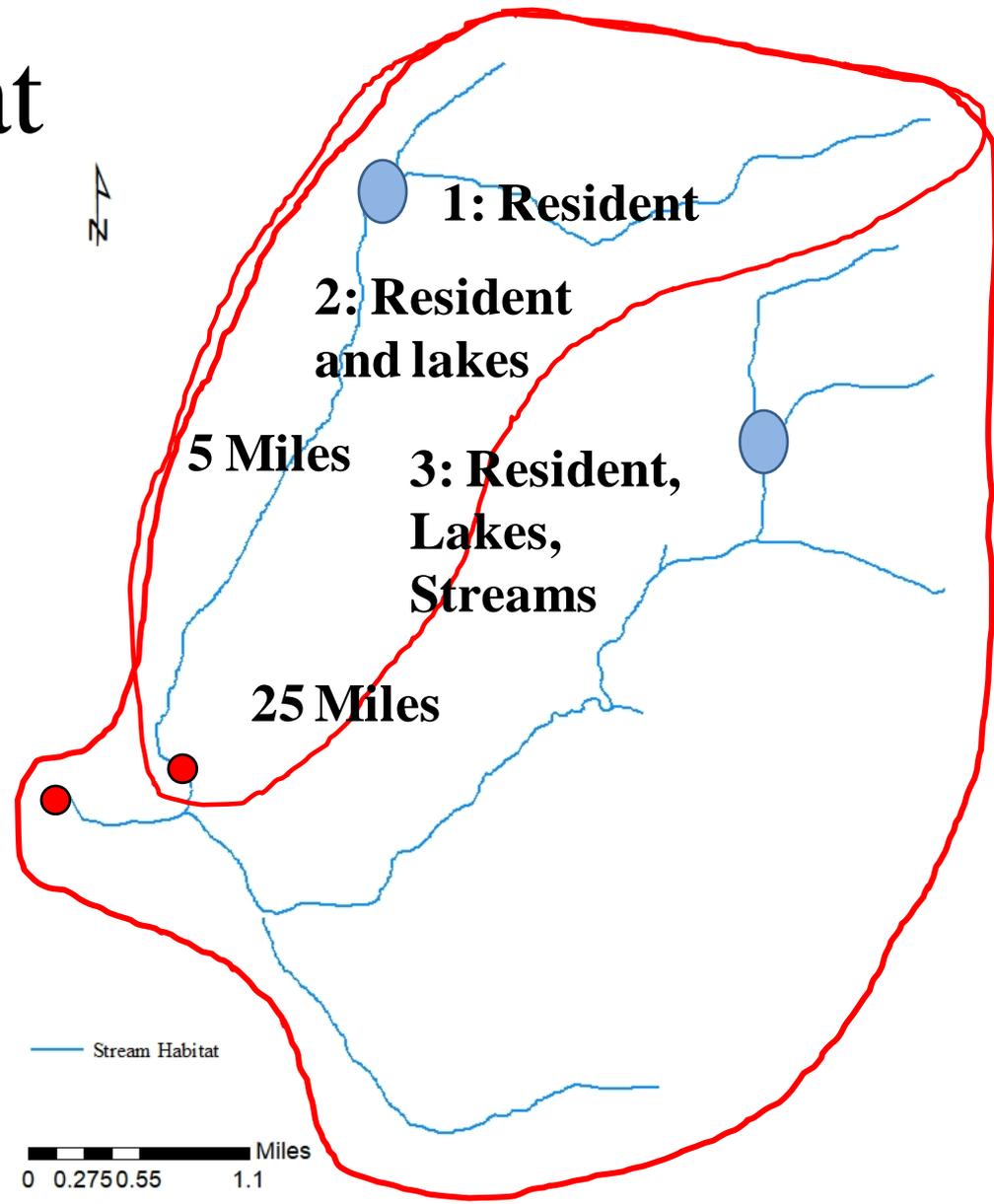
– Meta-population

- 25 miles
- 3 or greater streams
- Connectivity
- 3 Life-history forms
- Hoback-Red Mule Deer
- Steelhead-rainbow trout



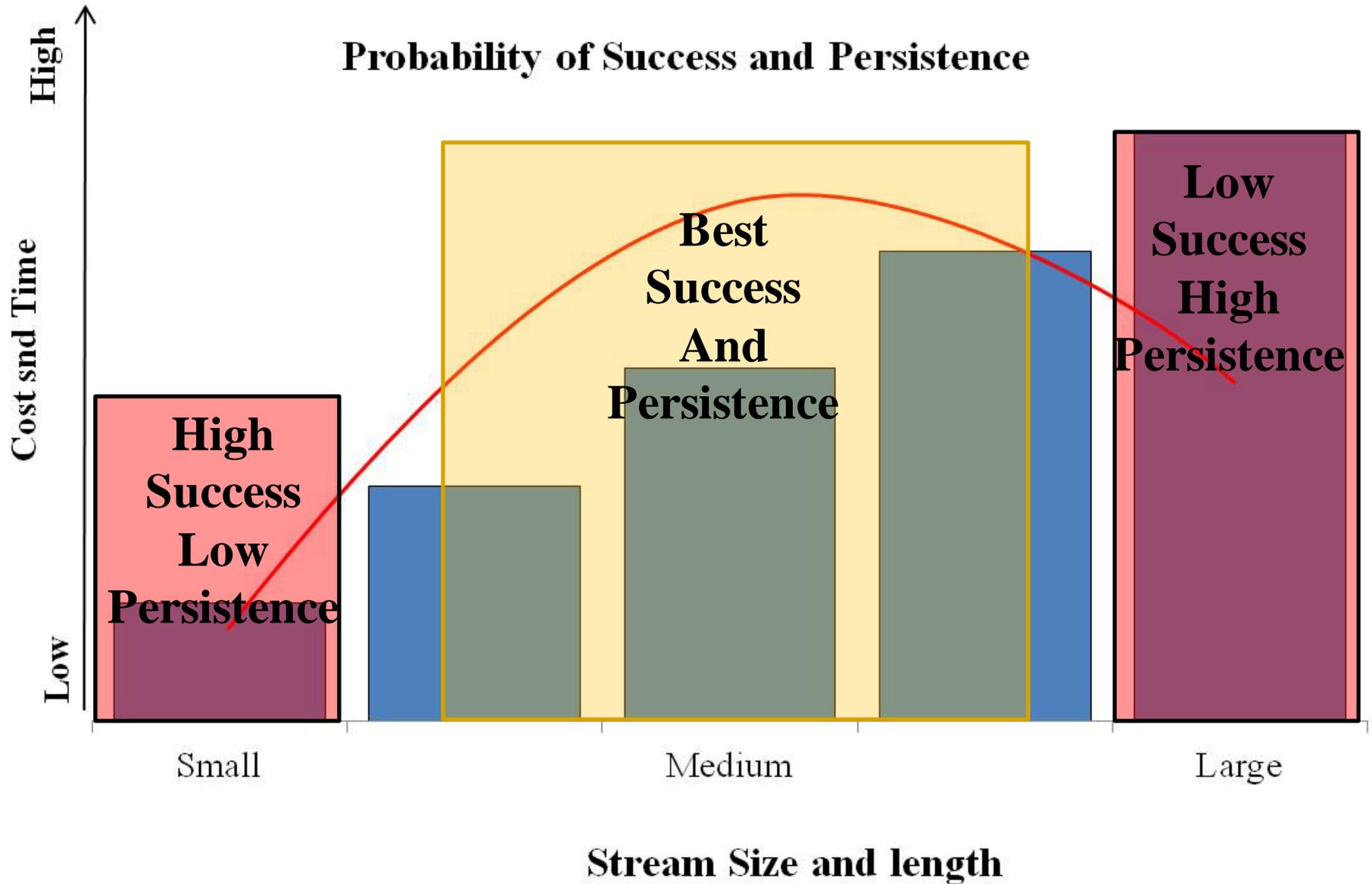
Large Scale Habitat

- Isolate
 - Minimum 5 miles
- Meta-population
 - 25 miles
 - 3 or greater streams
 - 3 Life-history forms
 - Resident
 - Migratory
 - Lake and Streams



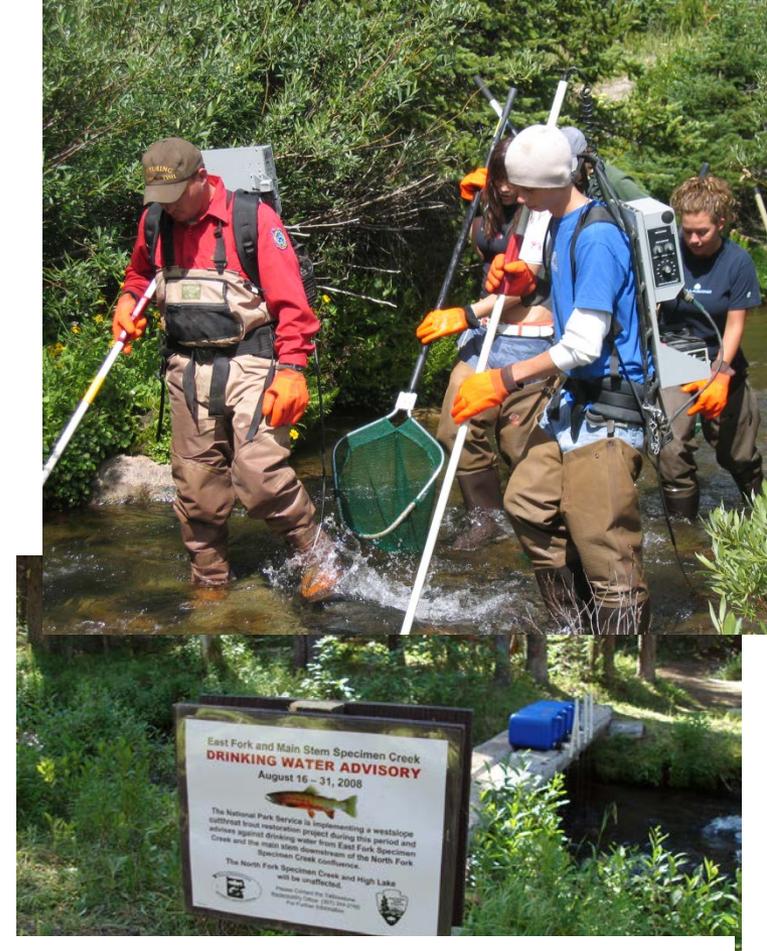
Stream Selection

Probability of Success and Persistence



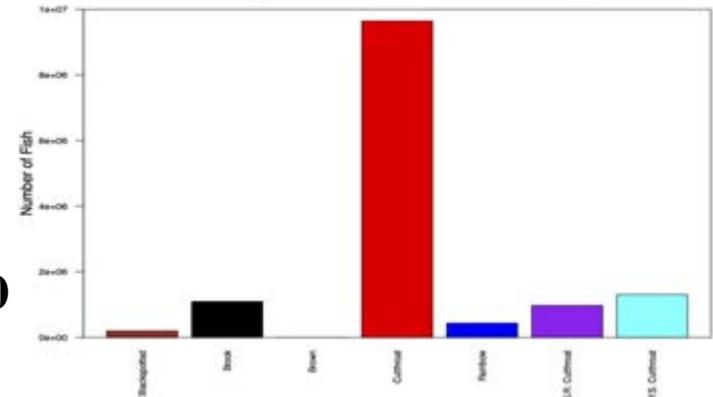
Restoration Techniques

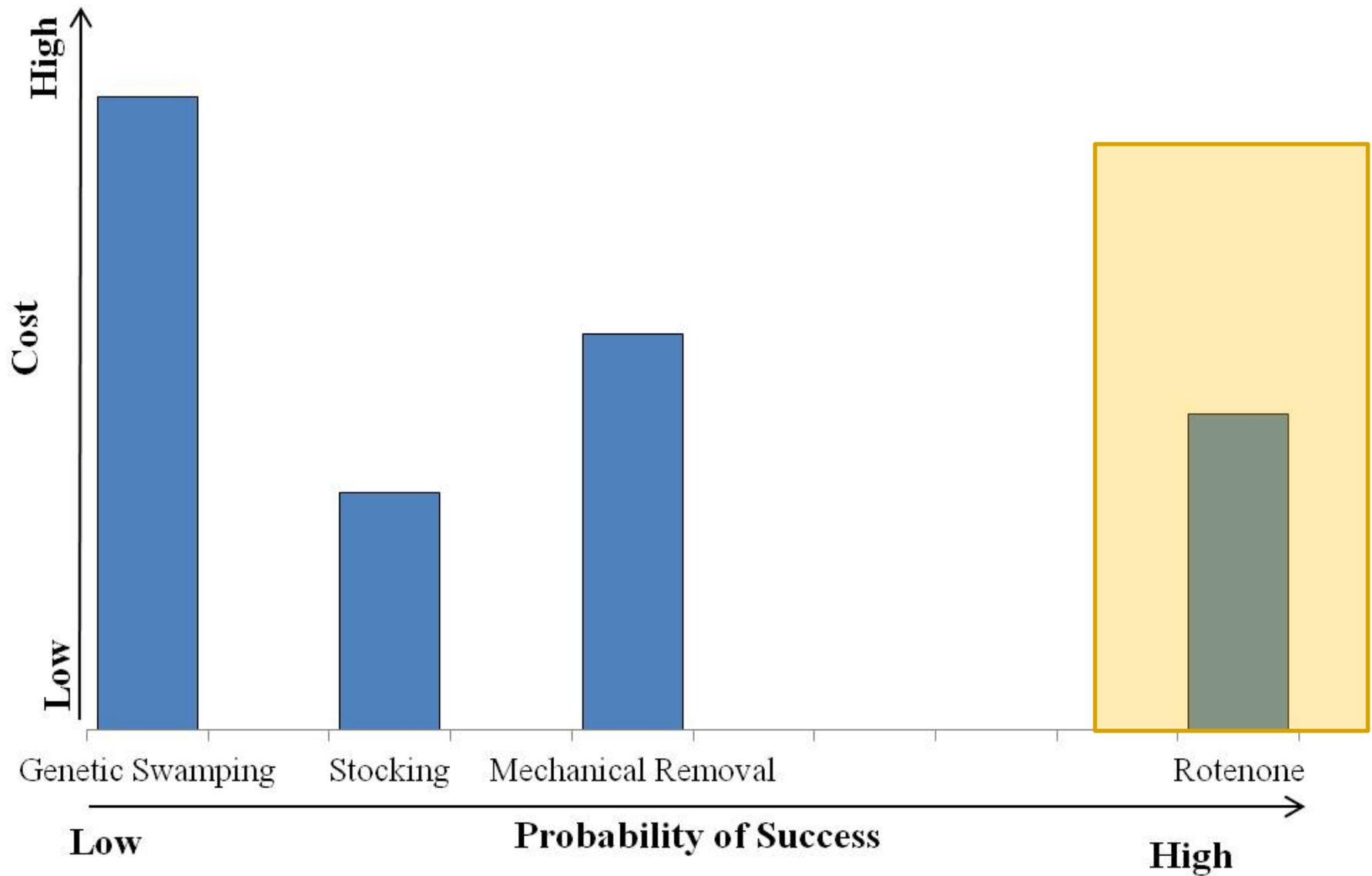
- Stocking
 - Widespread in 90's
 - North Fork
- Intense electro-shocking
 - 30-80% efficiency
 - Soda Butte Creek
- Genetic swamping
 - Theoretical
- Dewatering
- Piscicides
 - Rotenone



Stocking in the North Fork Shoshone River Drainage

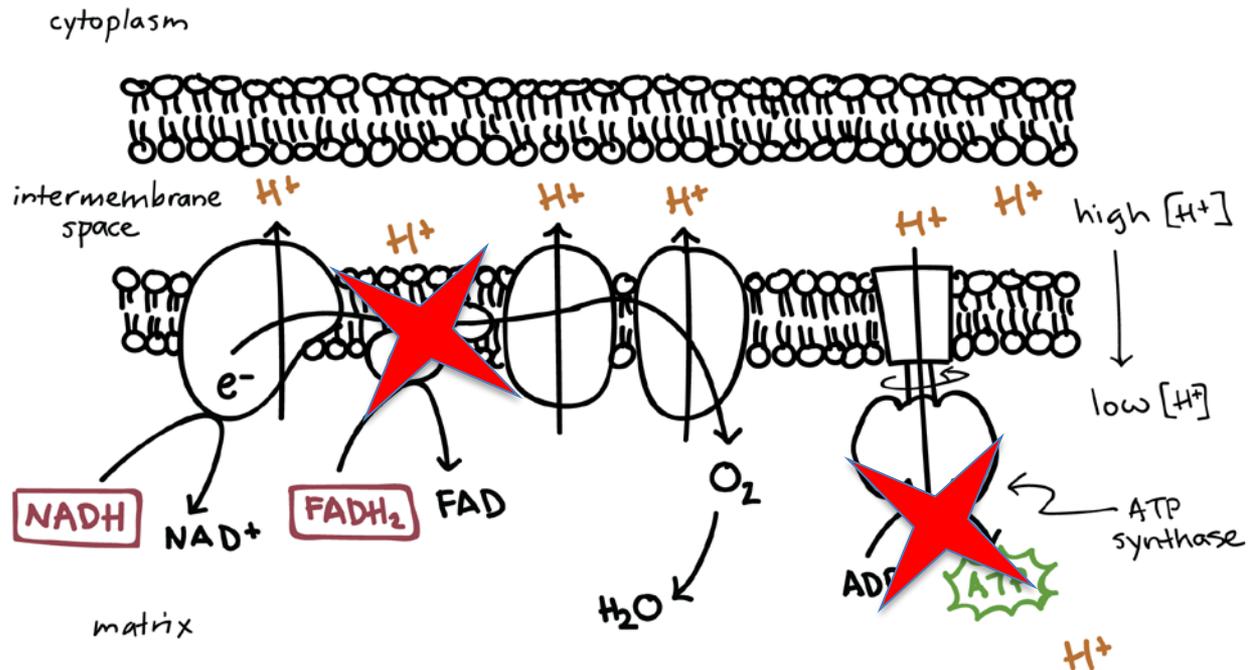
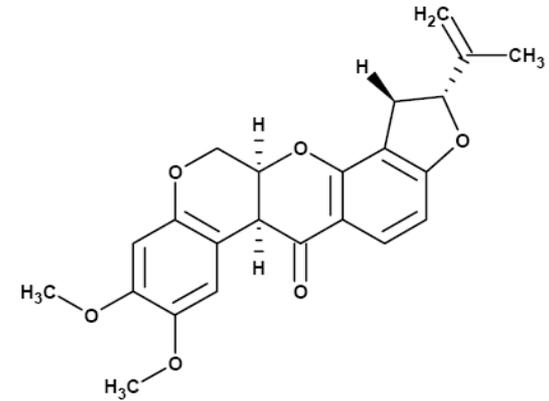
**Total
Number
Stocked:
13,666,510**





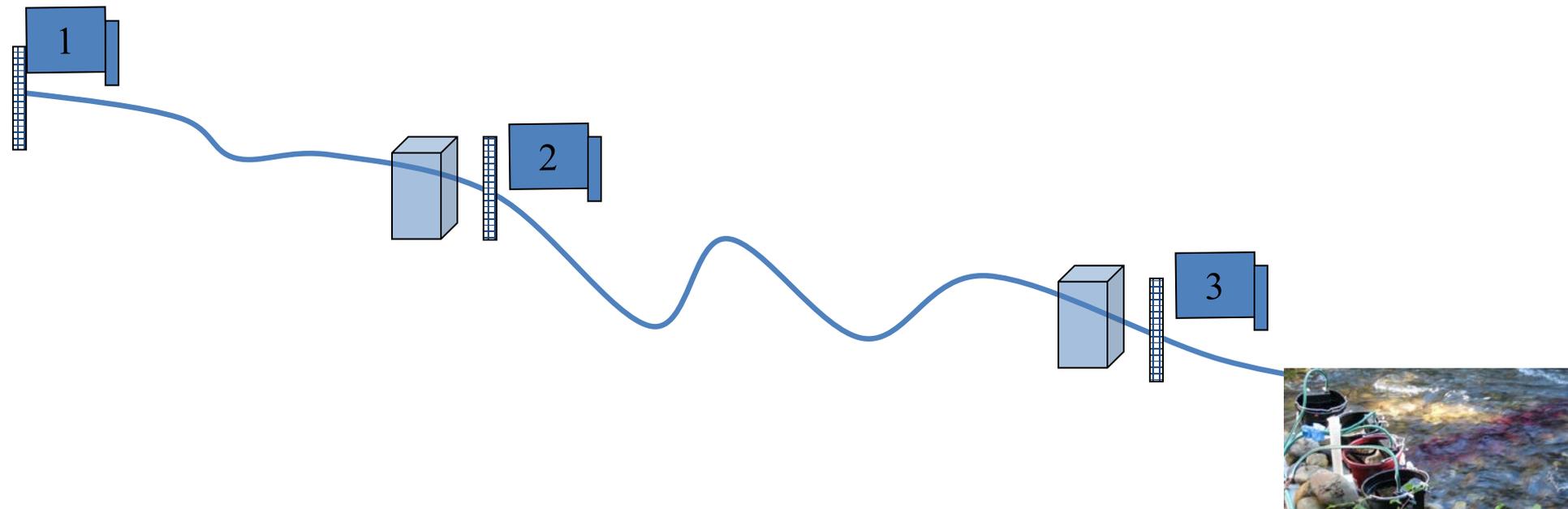
Rotenone

- Naturally occurring
- Causes tissue anoxia
- Natural breakdown
 - Temperature
 - Photolysis



Rotenone Treatment

- Treatment area
- Treatment design
 - Series of independent drip stations
 - De-activation

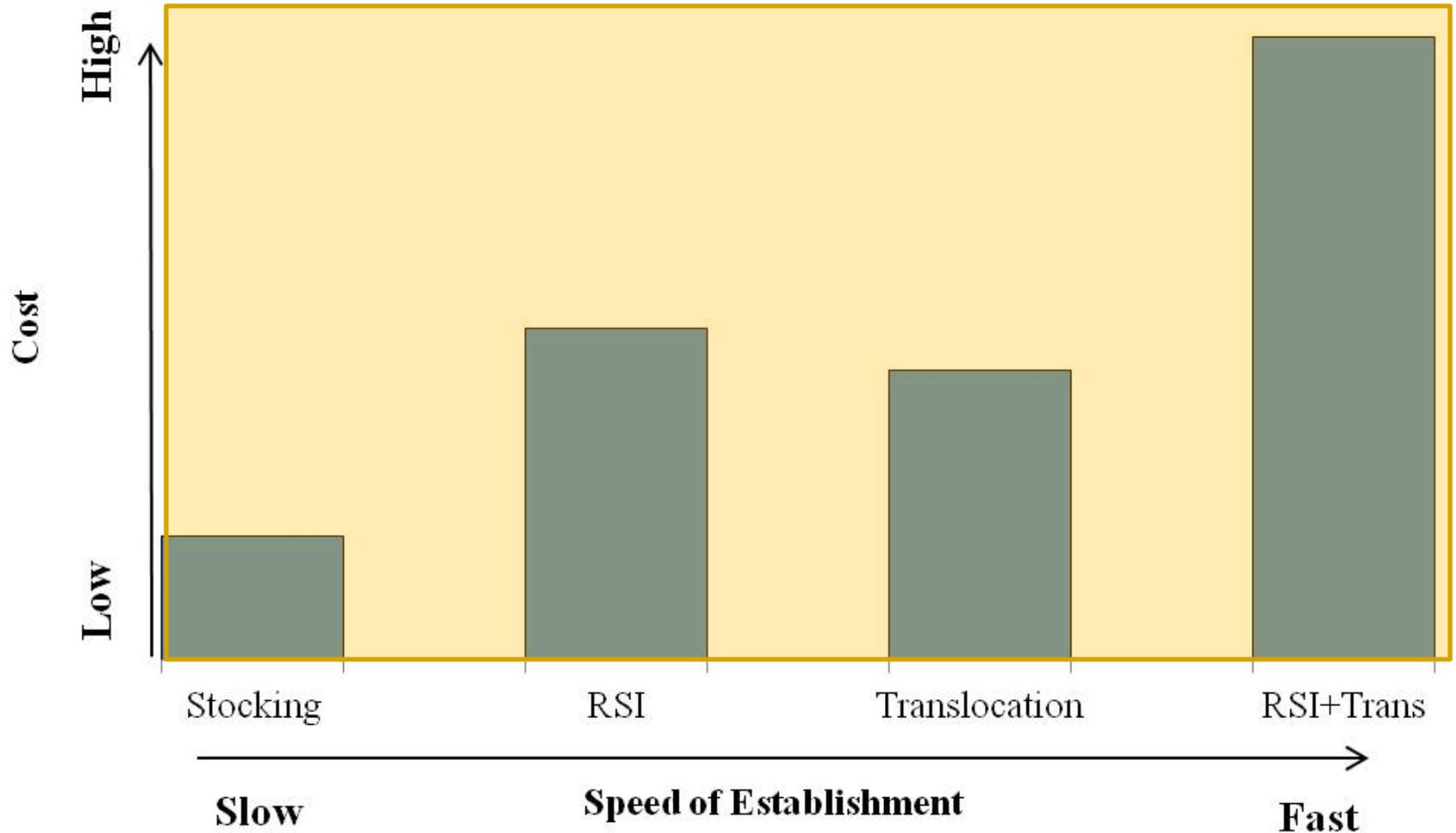


Establishing Population

- Stocking
- Translocation
 - Nearest neighbor
- RSI

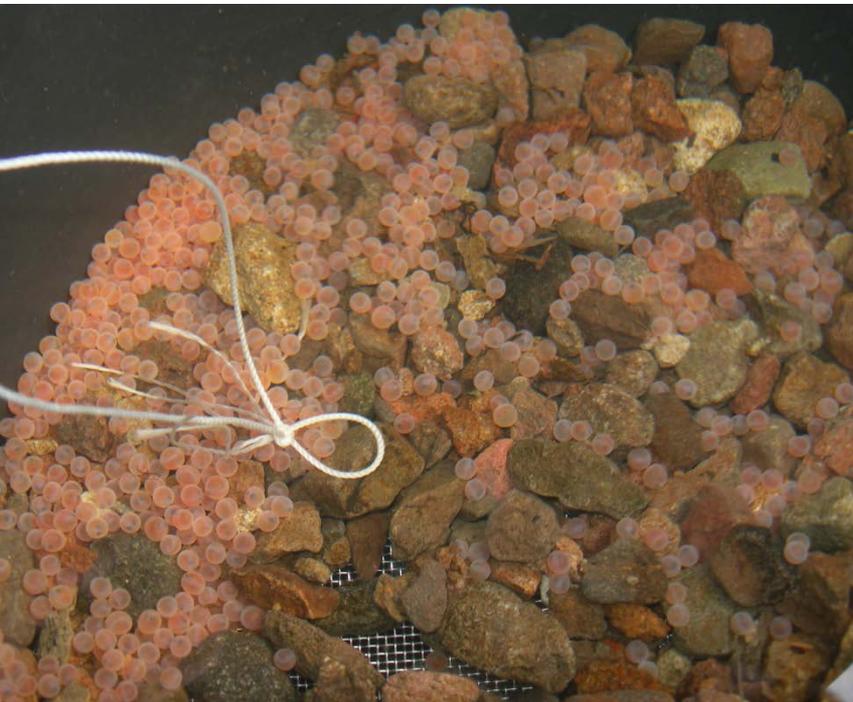


Available Tools



Establishing Populations

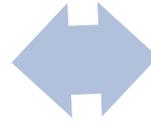
- Remote Site Incubators (RSI)



“Gold Standard”

Stream Selection and Habitat

- Natural barrier
- 39-59 °F
- Small – Medium Streams/lakes
- High quality habitat



Restoration of YSC

- Existing populations
- Rotenone
- Stocking, RSI, relocation

Highest Probability of Success and Persistence





Questions?