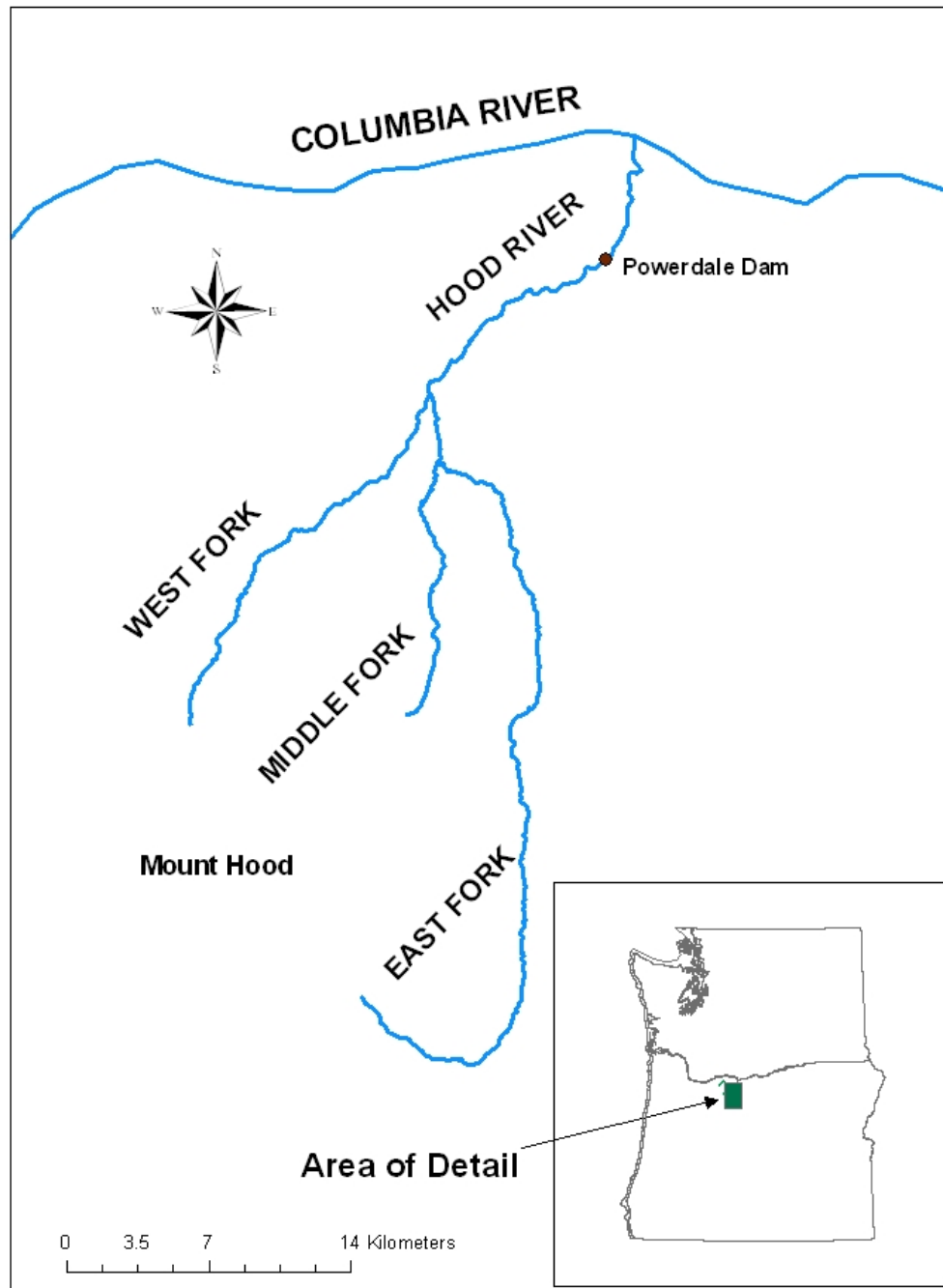


Hood River Production Program: Wild Broodstock Collection Methods



Robert E. Reagan
Oregon Department of Fish and Wildlife



Background

The Hood River Production Program:

- Funded by Bonneville Power Administration to mitigate for losses due to the Columbia River Hydropower System
- Wild Hood River steelhead populations are listed as “Threatened” under the ESA
- Goal: To increase the production of wild summer and winter steelhead
- Strategy: Hatchery supplementation program using wild Hood River steelhead as broodstock

Powerdale Dam

- Complete control of fish above the dam
- Adult counts
- Run timing
- Brood stock collection
- Biological samples



Hood River

Summer and Winter Steelhead

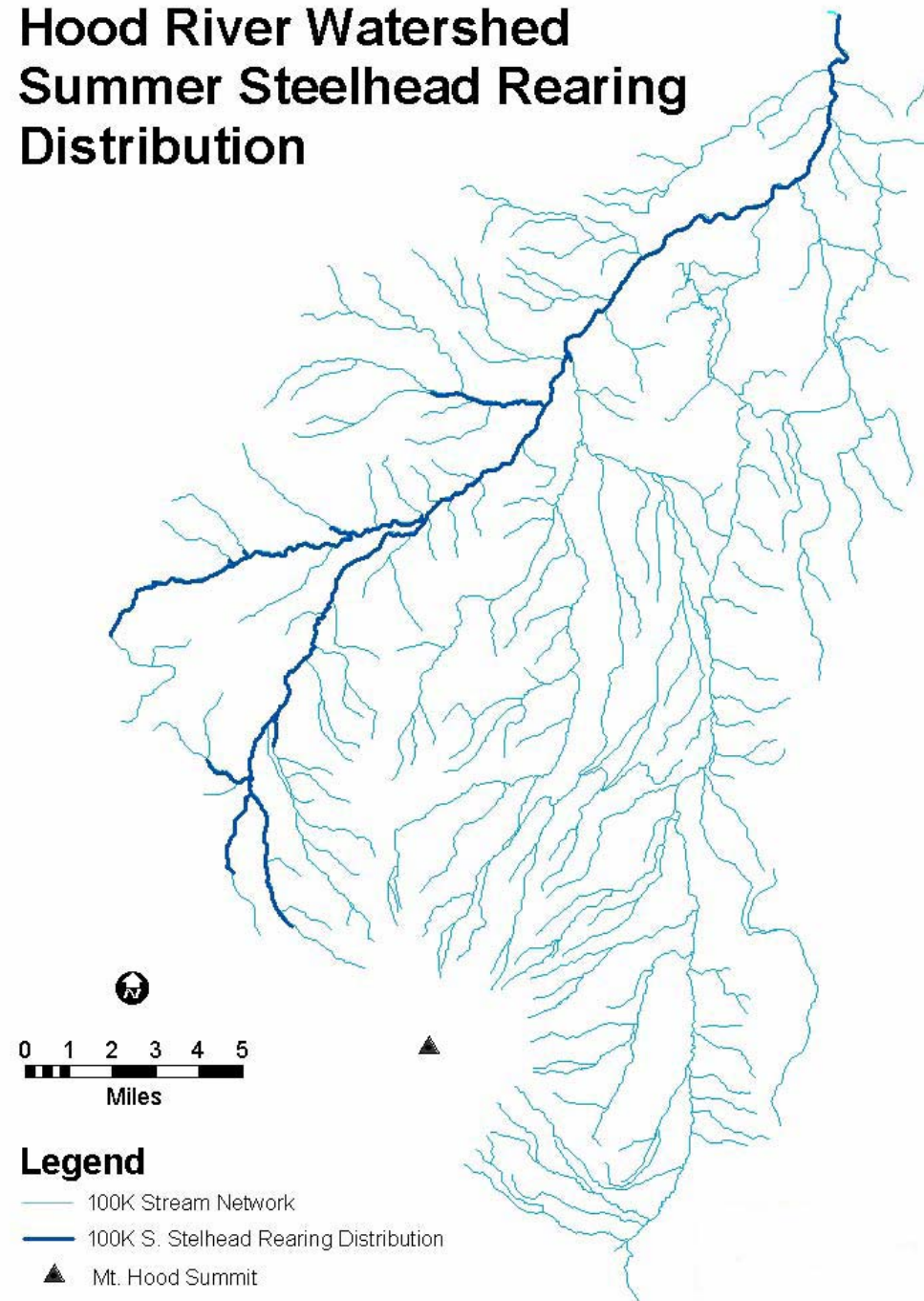
Summer Steelhead:

- Stream type steelhead – matures in freshwater
- Enter the Hood River over an fifteen month period
- Peak migration occurs in June and July
- Spawn from February – May
- West Fork Hood River

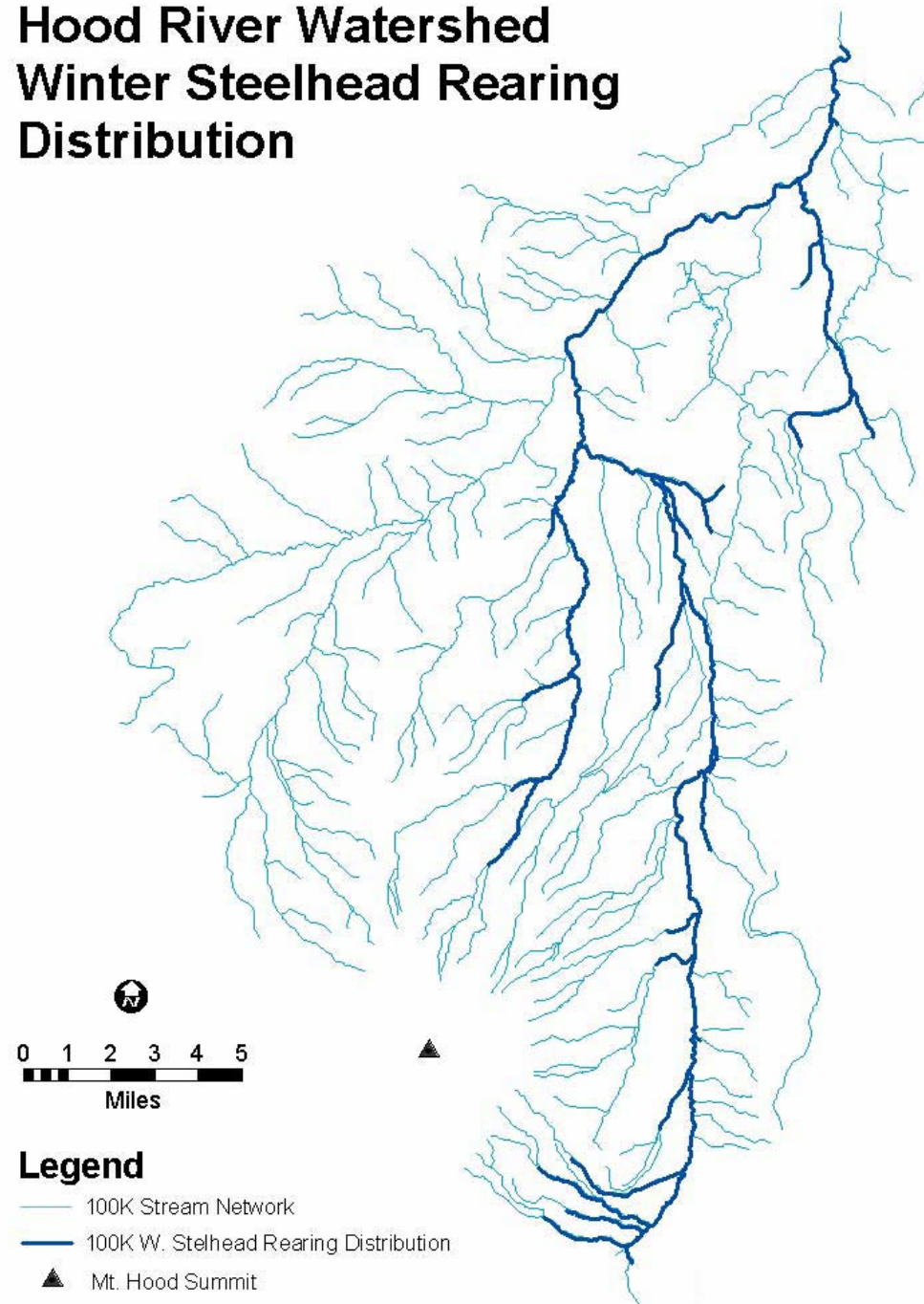
Winter Steelhead:

- Ocean type steelhead – matures in saltwater
- Enters Hood River over an six month period
- Peak migration occurs in April
- Spawn from March – June
- East and Middle Forks Hood River

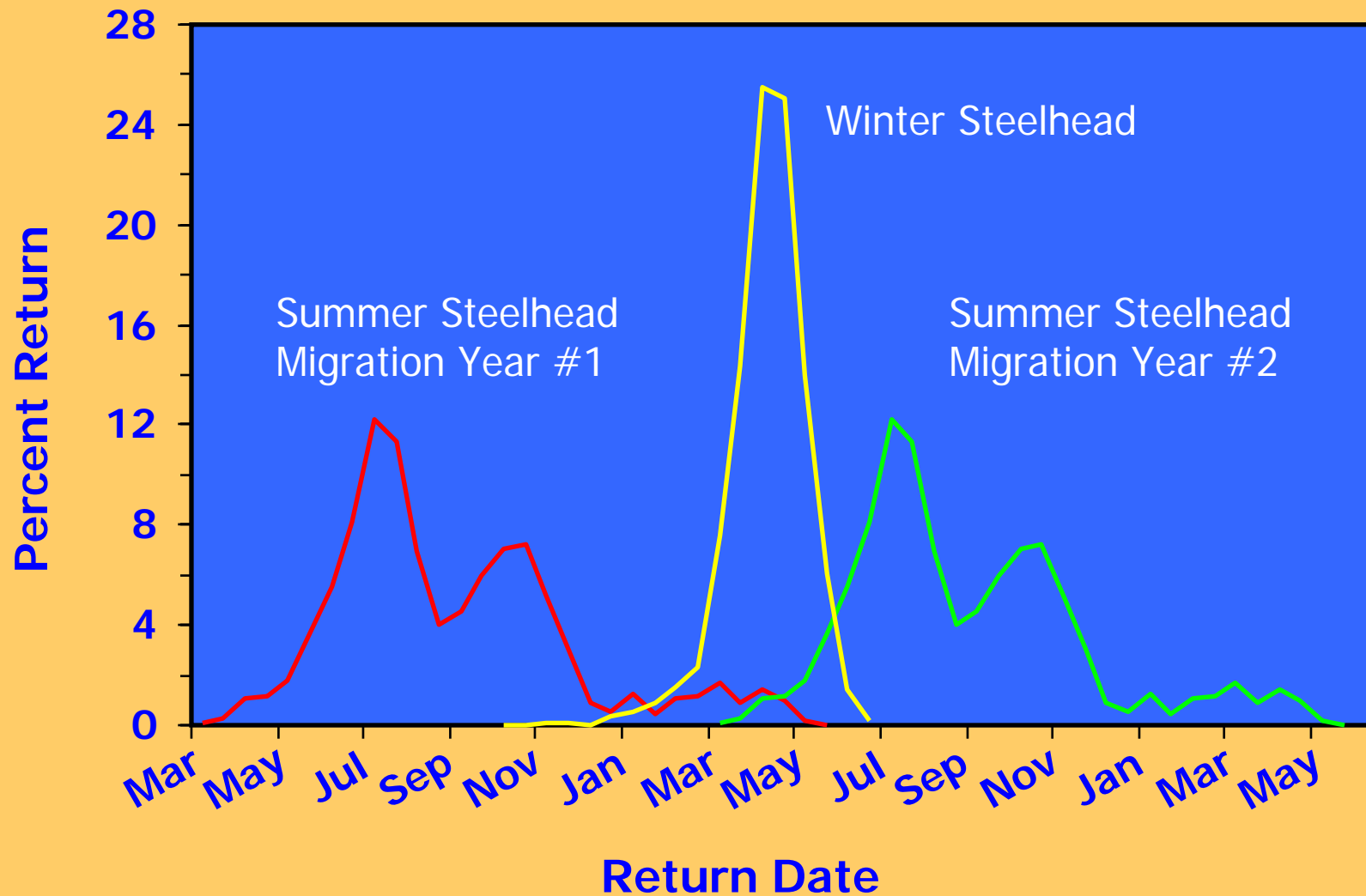
Hood River Watershed Summer Steelhead Rearing Distribution



Hood River Watershed Winter Steelhead Rearing Distribution



Wild Adult Steelhead Returns to Powerdale Dam



Broodstock Collection Summer and Winter Steelhead

Methods:

- Run Timing
- Phenotypic Traits (Physical Characteristics)
 - Coloration
 - Relative Sexual Maturity
 - Scale Condition

Limitations:

- Difficult During Periods of Overlap
- Potential for Crossbreeding





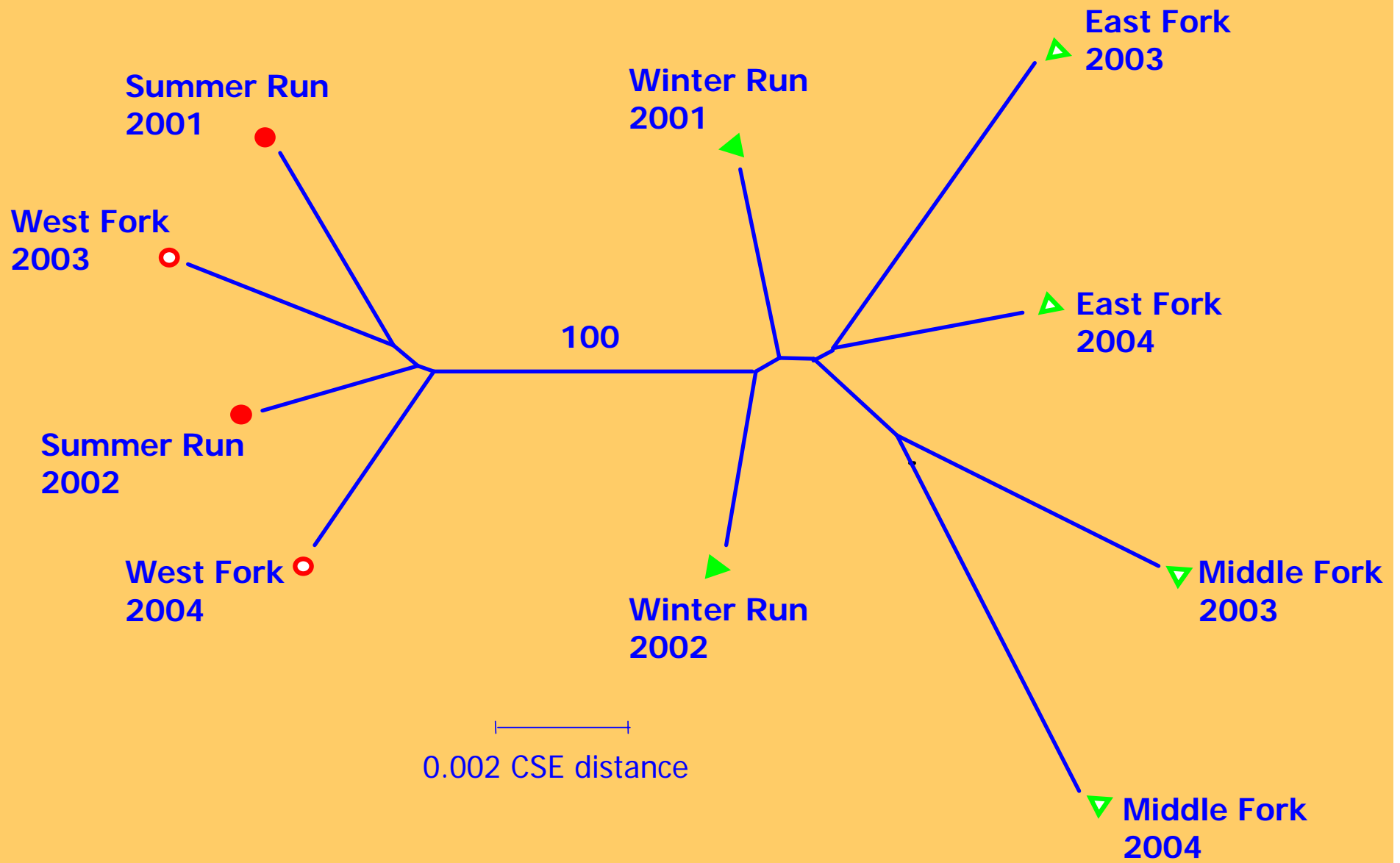


Genetic Distinction of Summer and Winter Steelhead

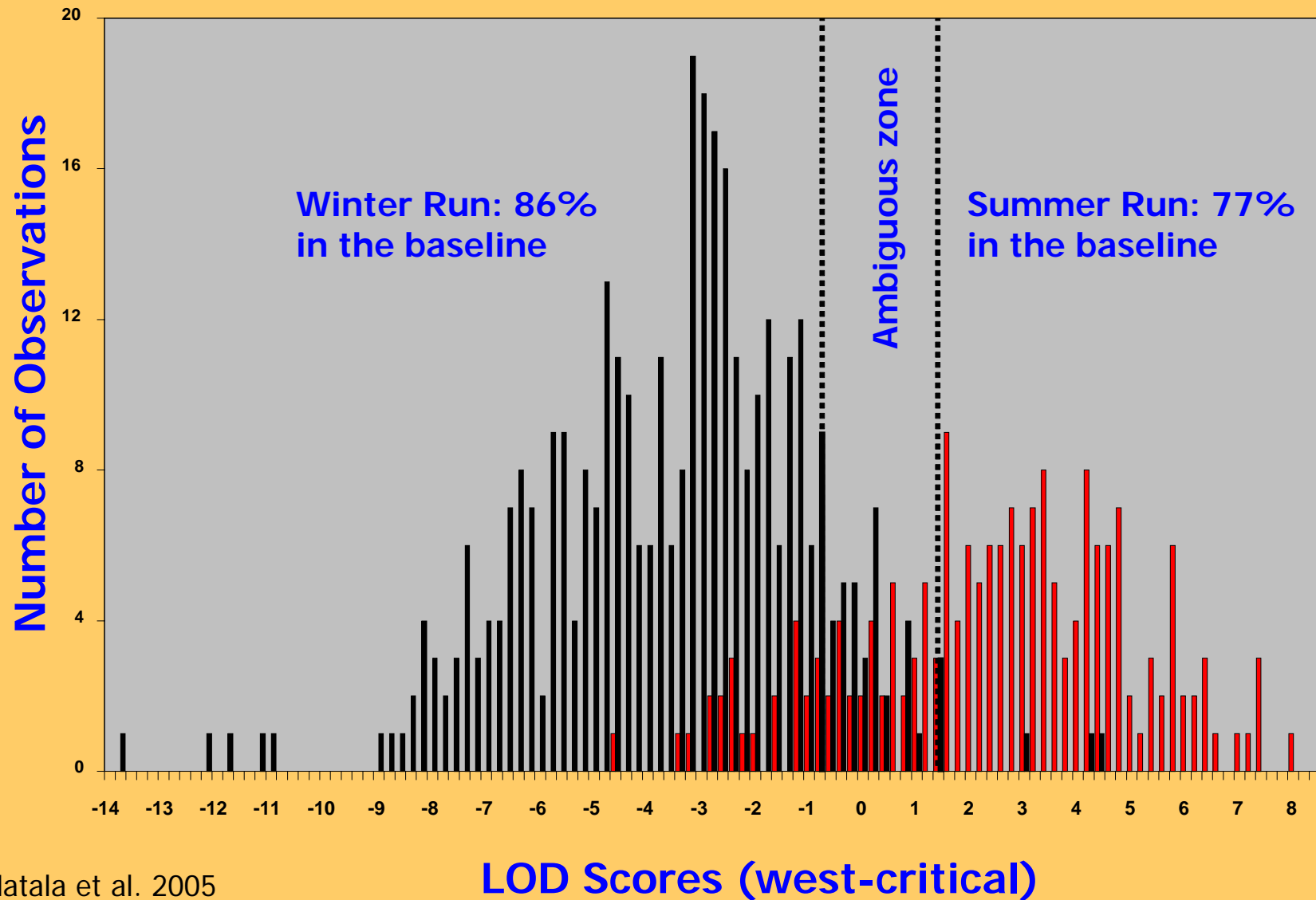
U.S. Fish and Wildlife, Conservation Genetics Laboratory,
Abernathy Fish Technology Center

Feasibility study: genetic assignment test to identify ecotype
of Hood River steelhead collected for broodstock

- Determine if the two populations are distinct
- Establish a suite of microsatellite loci
- 95% accuracy desired – how many fish will this eliminate?



Distribution of LOD by Ecotype



US Fish and Wildlife

Results:

- Hood River steelhead can be genetically assigned to either summer or winter run with 95% accuracy
- Baseline contains 77% summer run and 86% winter run
- Small percentage of run undetermined (ambiguous)

Recommendations

- Collect additional broodstock to compensate for ambiguous fish
- Send broodstock tissue samples to Abernathy FTC for rapid-response genotype analysis
- Retain fish that can be genetically assigned to ecotype for broodstock
- Return “ambiguous” fish to river to spawn naturally



United States Department of the Interior FISH AND WILDLIFE SERVICE

Conservation Genetics Laboratory, Abernathy Fish Technology Center
1440 Abernathy Creek Road, Longview, WA 98632
Phone: (360) 425-6072, Fax: (360) 636-1855



Rapid Response Genetic ID - Hood River Steelhead Trout (*O. mykiss*).

*LOD \geq 0.79 provides 95% confidence for summer run (SR) assignments

*LOD \leq -1.25 provides 95% confidence for winter run (WR) assignments

P (1) = summer run (SR) Origin

P (2) = winter run (WR) Origin

? = could not assign

Sample Information						Analysis & Results		Reported by: Andrew P. Matala, Fishery Geneticist			
Date Collected	Date Received	Date Reported	Scale #	Card #	Sex	likelihood P(1)	likelihood P(2)	Odds ratio P(1)/P(2)	Log Odds Ratio (LOD)	95% confidence*	Ecotype Assignment
4/27/05	4/27/05	4/29/05	50518	EO833-1	F	7.58E-21	1.97E-21	3.84191	-0.584547	NO	?
6/2/04	2/12/05	2/28/05	04-2554	EO734-4	F	3.79E-12	1.46E-17	3.00E+05	5.41	YES	SR
6/18/04	2/12/05	2/28/05	04-3116	EO734-20	F	8.69E-11	4.56E-14	1.91E+03	3.28	YES	SR
6/23/04	2/12/05	2/28/05	04-3355	EO735-10	F	1.28E-10	3.25E-12	39.265	1.59	YES	SR
6/28/04	2/12/05	2/28/05	04-3632	EO736-2	F	5.43E-18	2.99E-18	1.81787	0.26	NO	?
8/28/04	2/12/05	2/28/05	04-4621	EO762-3	F	2.35E-24	1.96E-26	119.6	-2.08	YES	WR
9/4/04	2/12/05	2/28/05	04-4722	EO762-6	M	7.89E-16	4.13E-18	190.9	-2.28	YES	WR

Summary

- Broodstock collection methods using physical characteristics allowed for the possibility of cross breeding summer and winter steelhead
- US Fish and Wildlife study determined it was feasible to genetically assign Hood River steelhead to either summer or winter run with 95% accuracy
- Protocols modified to include sending tissue samples to USFWS for rapid-response genotype analysis
- Broodstock genetically assigned to either summer or winter ecotype used for hatchery program, ambiguous fish returned to river to spawn naturally

The Hood River Production Program is funded
by Bonneville Power Administration



Oregon Department of Fish and Wildlife
Confederated Tribes of the Warm Springs, Oregon
US Fish and Wildlife Service