Coastal Cutthroat Trout Status Review and ESA listing activity

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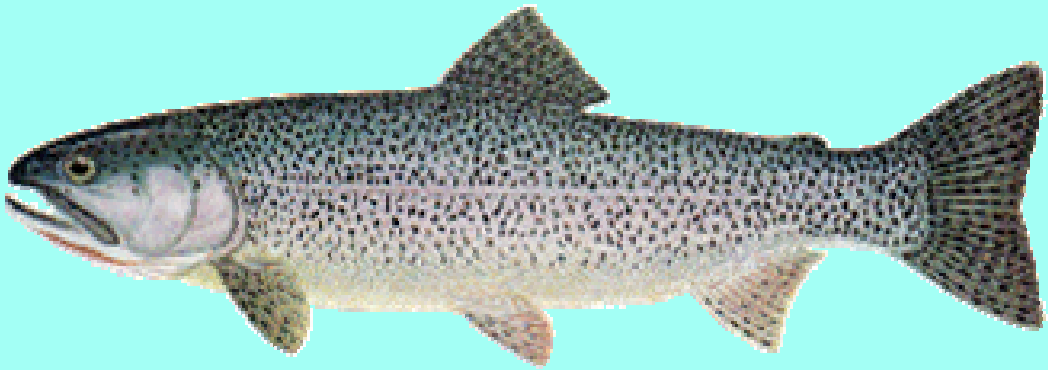
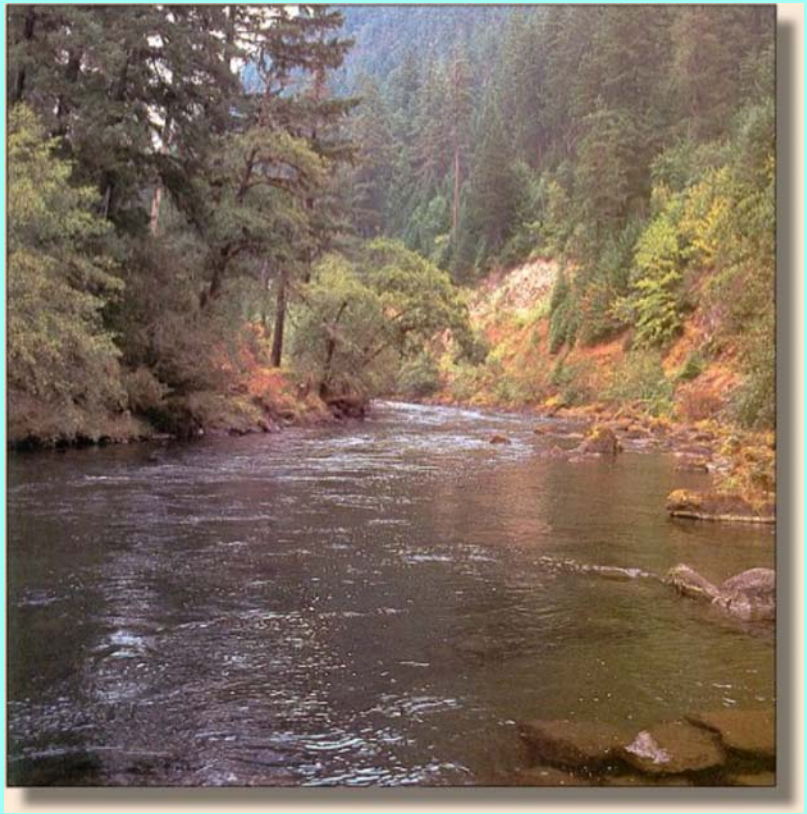


Reedsport, Oregon
October 1995
"Sea-Run Cutthroat Trout Biology, Management, and Future Conservation Symposium"

- **1993 -- Umpqua River CCT were petitioned by ONRC et. al.**

- **1994 -- Status Review of Umpqua CCT completed**



Major issues in Umpqua River Status Review

- **Geographic extent of ESU - were these fish part of a larger ESU?**
- **Alsea River hatchery fish planted into Umpqua River -- did native fish represent original genetic stock?**
- **Available information primarily on sea-run form (e.g. Winchester Dam counts), little if any on resident populations.**

Although all major issues remained more or less unanswered…

Agency listed Umpqua River cutthroat as Endangered Species under ESA in 1996

Coastwide Status Reviews Proposed

- **In 1994, NMFS proposed coastwide review of all Northwest *Oncorhynchus* species.**
- **In 1997 started SR for *O. clarki clarki***
- **Purpose: to determine risk of extinction if present conditions continue**
- **Same year, CCT petitioned for listing by ONRC and others.**

Biological Review Team

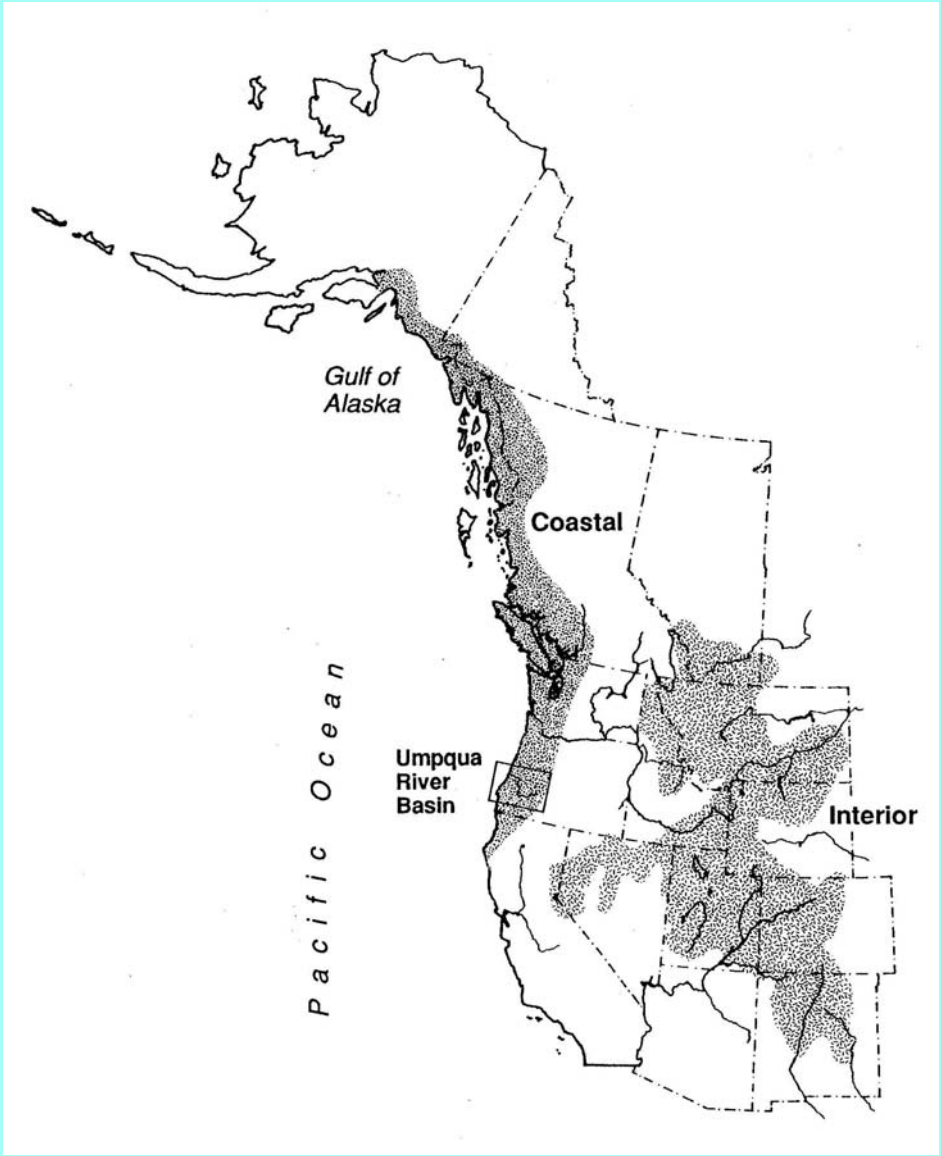
NOAA Northwest Fisheries Science Center
NOAA Northwest Region
United States Forest Service
US Fish and Wildlife Service
NOAA Southwest Fisheries Science Center
NOAA Southwest Region

Status Review, 1999

Orlay W. Johnson, Ann M. Garrett, W. Stewart Grant, Kathleen Neely, Mary H. Ruckelshaus, Greg Bryant, F. William Waknitz and Jeffery Hard

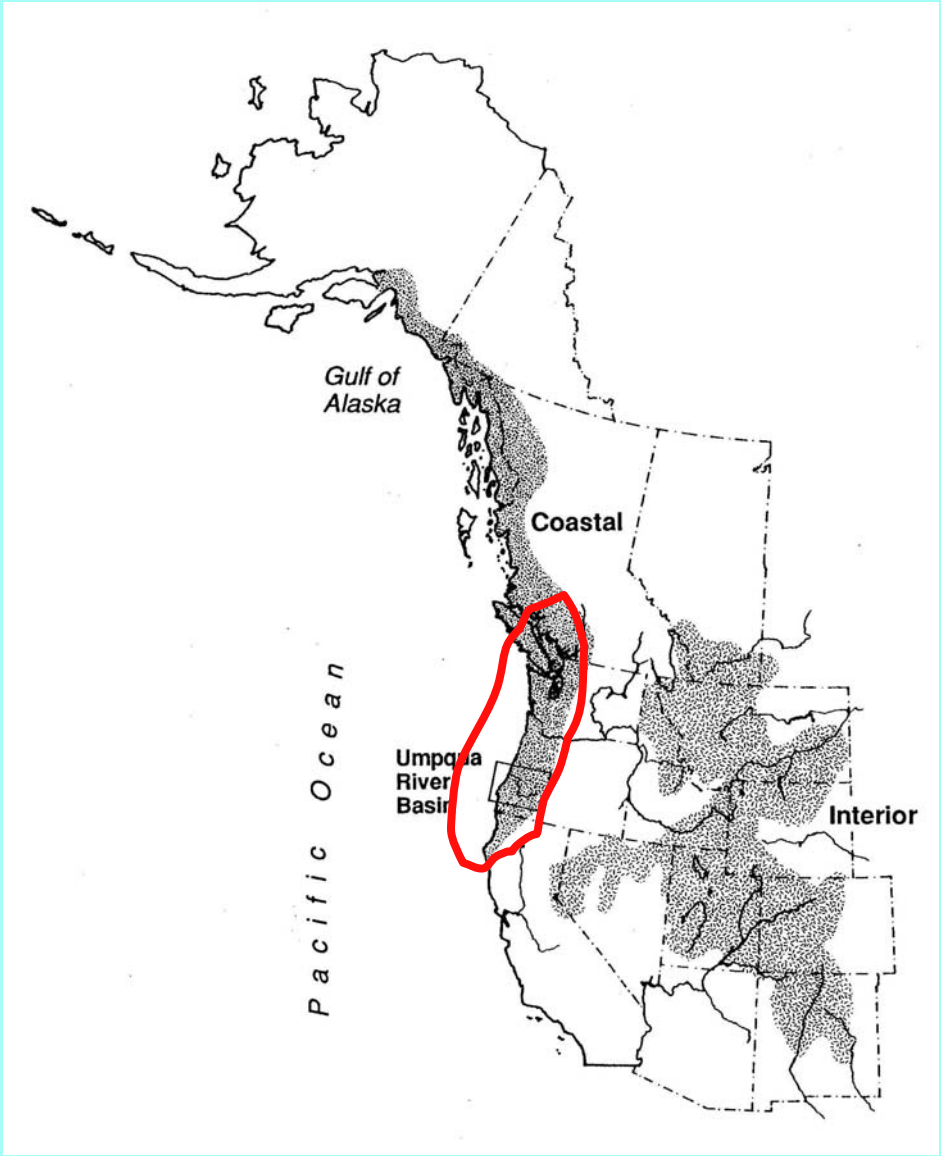
Range of CCT --

Prince William Sound, Alaska to Eel River California
(Behnke 1992)



Range of CCT --

and extent of Coastwide Status Review



Objective of Status Review is to determine if listing warranted

1. Is the entity in question a "species" as defined by the ESA?

2. If so, is the "species" threatened or endangered?

What is a Species?

Evolutionarily Significant Unit (ESU)

- **Reproductively isolated from other populations, and**
- **Represents an important component of the evolutionary legacy of the species.**

For Species Identification looked at

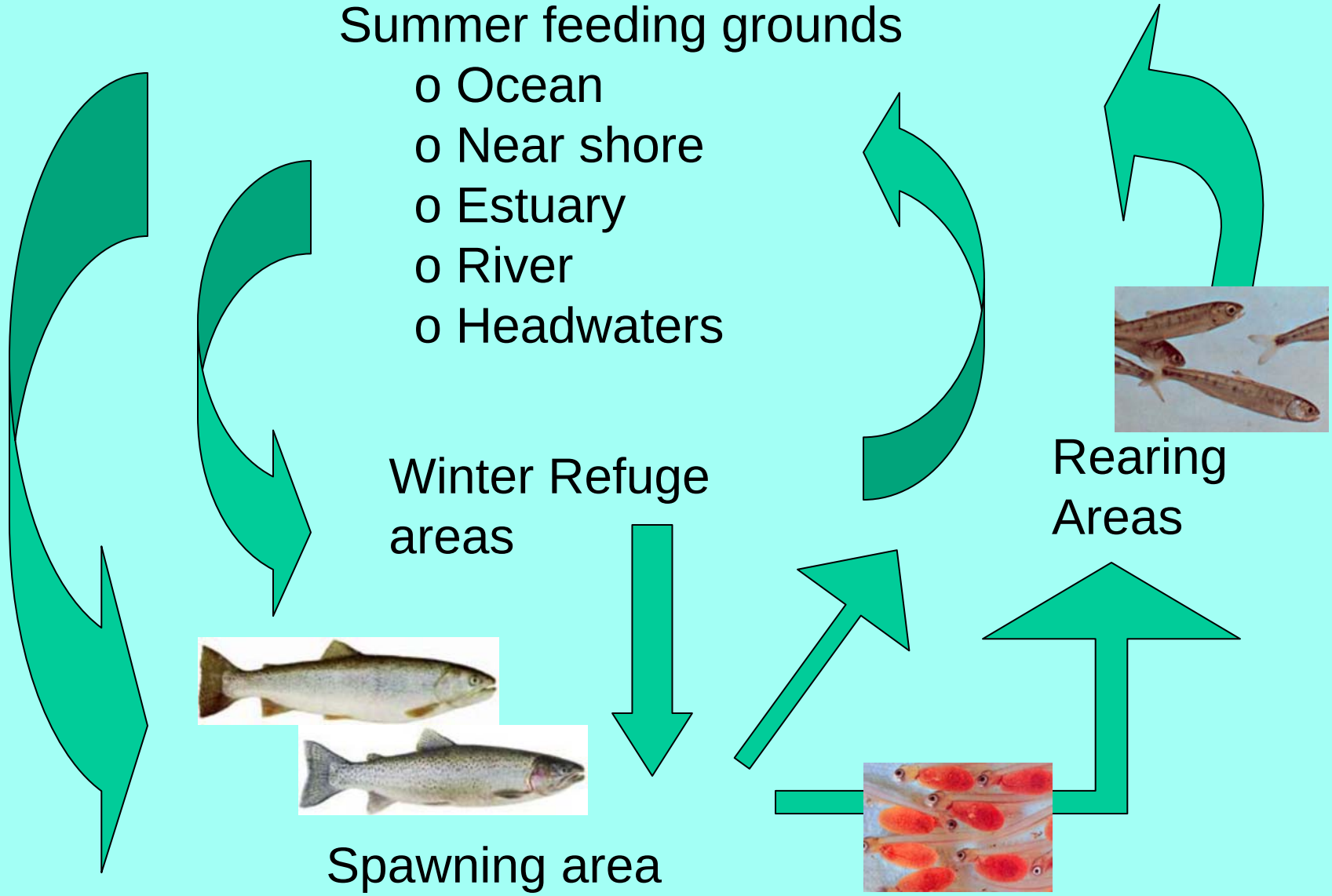
1) **Environmental factors**
   e.g. geology, Ecoregion, and biogeography
2) **Life History**
3) **Genetic relationships**
4) **Demographic factors**

Nomenclature

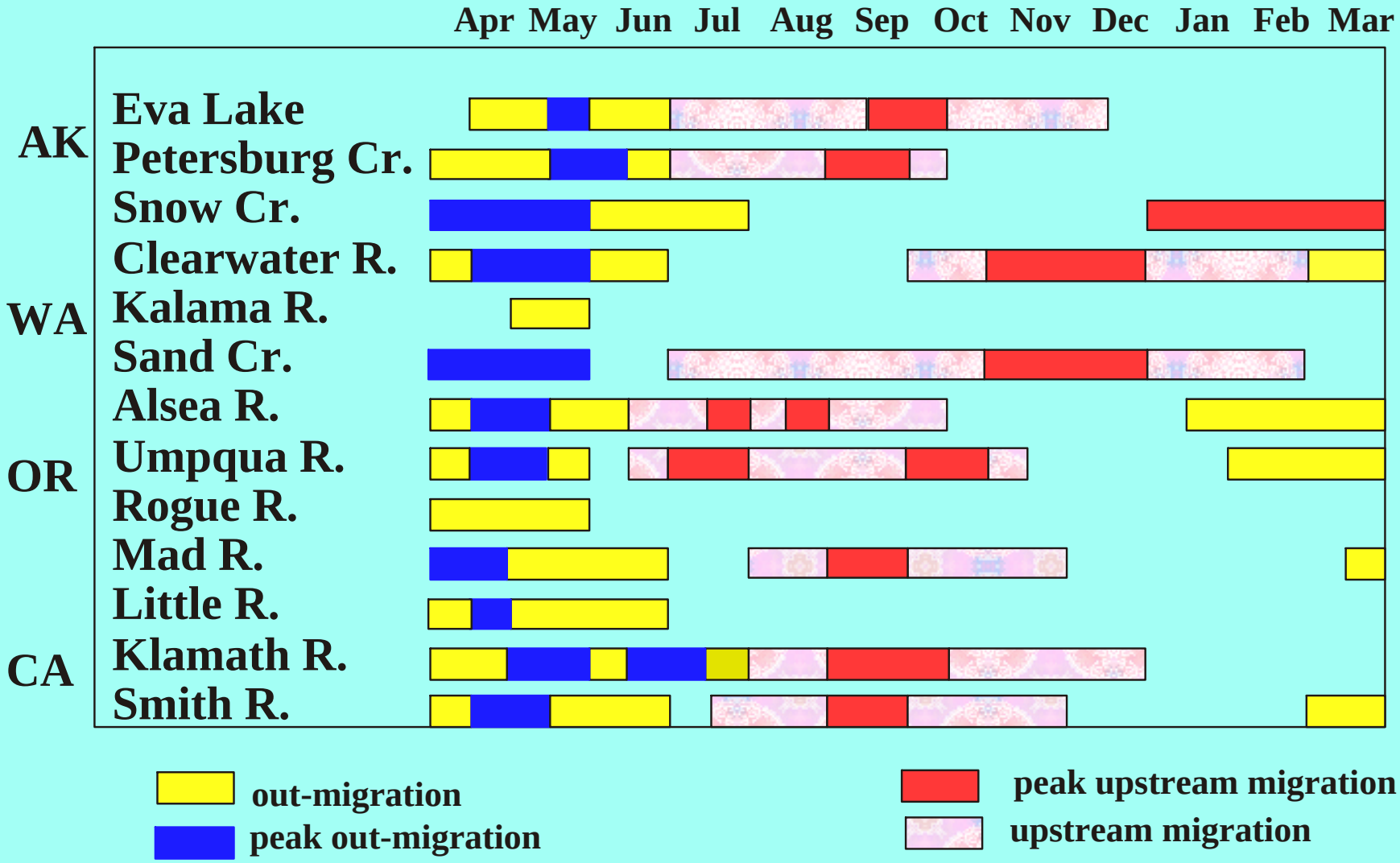
- **Non-migrant or resident forms**

- **Migrants or highly mobile forms**
  - **Anadromous or sea-run**
  - **Lake, adfluvial, or lacustrine**
  - **River, fluvial, or potamodromous**

Life History Patterns - Opportunistic and Plastic



Timing of Cutthroat Trout Movements



Collection Sites for Genetic Samples

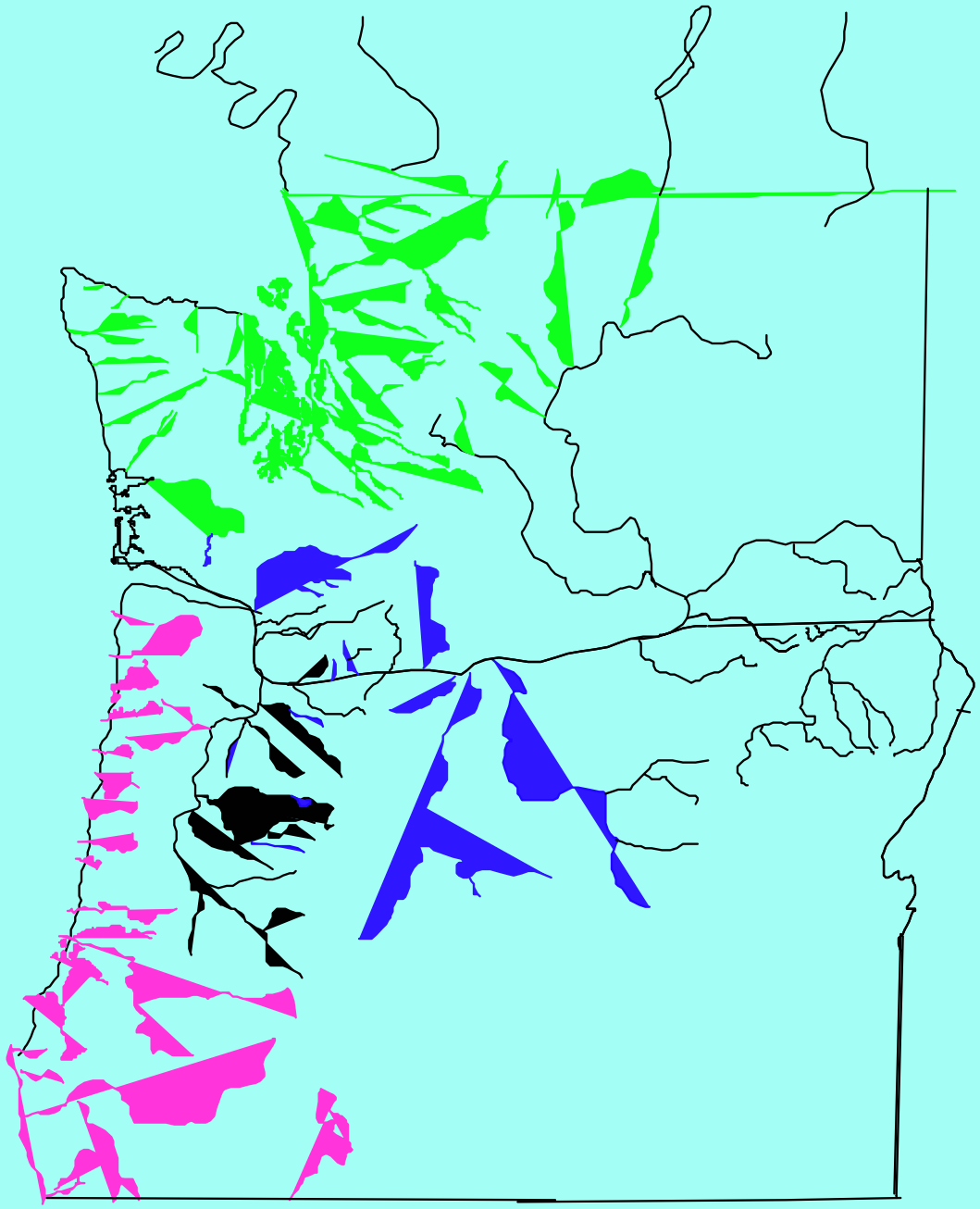
British Columbia - 1

Washington - 46

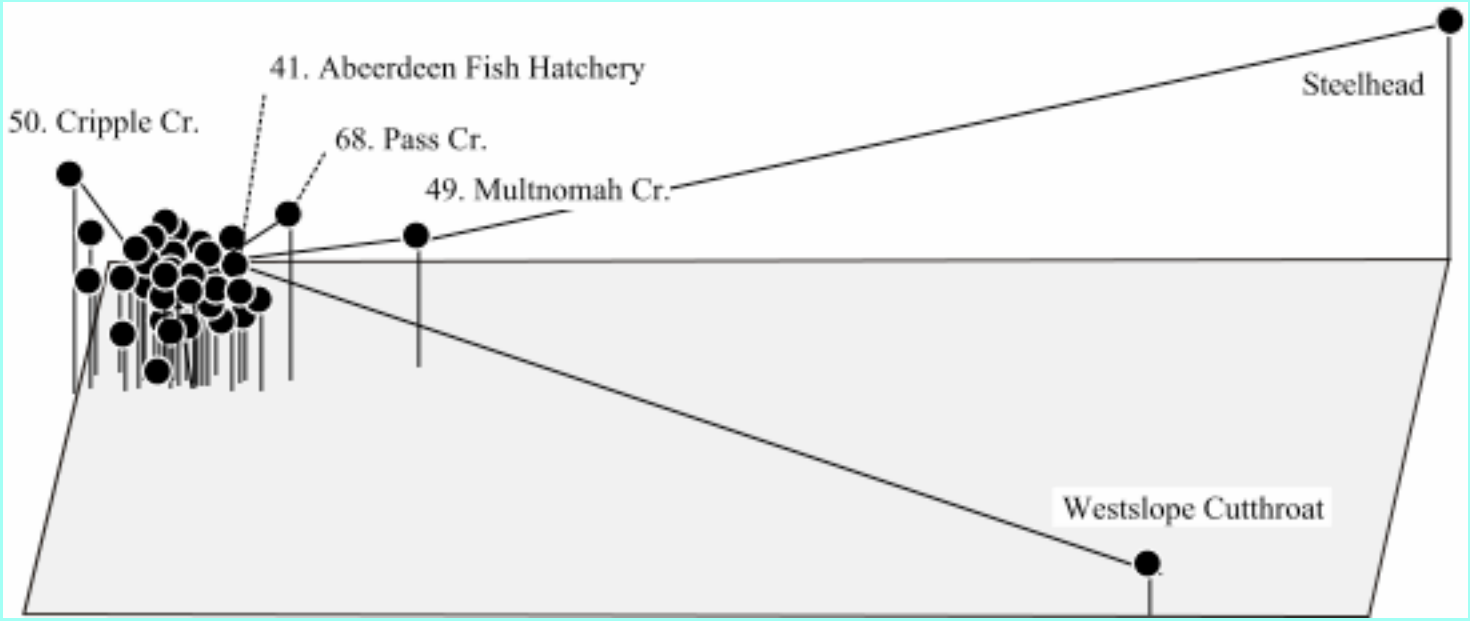
Oregon - 45

California - 6

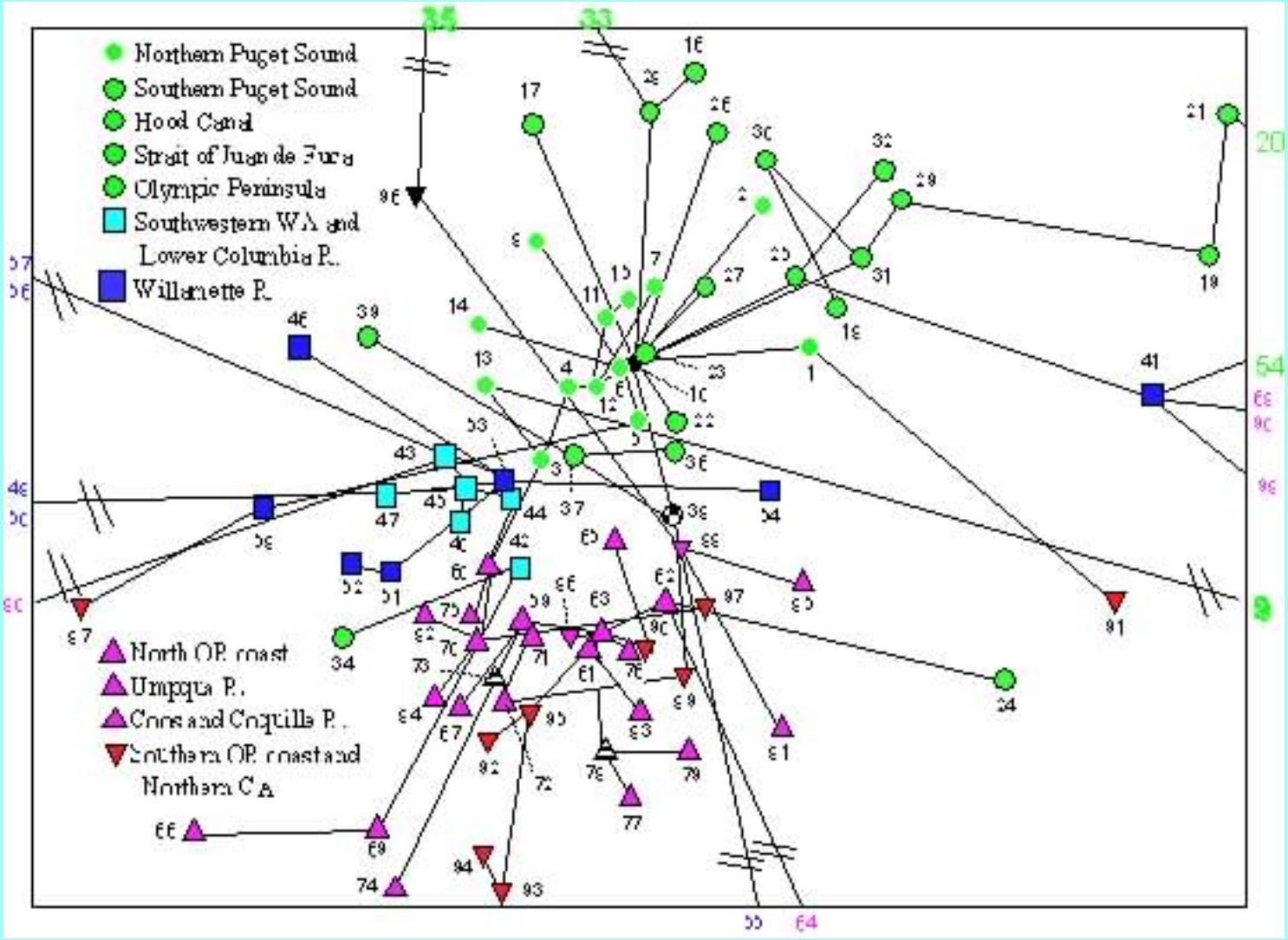
50± fish/site



CCT Compared to Steelhead and Westslope Cutthroat



Two dimensional scaling plot of Nei's genetic distance with all samples included



CCT collections contained *cutthroat* X rainbow trout hybrids

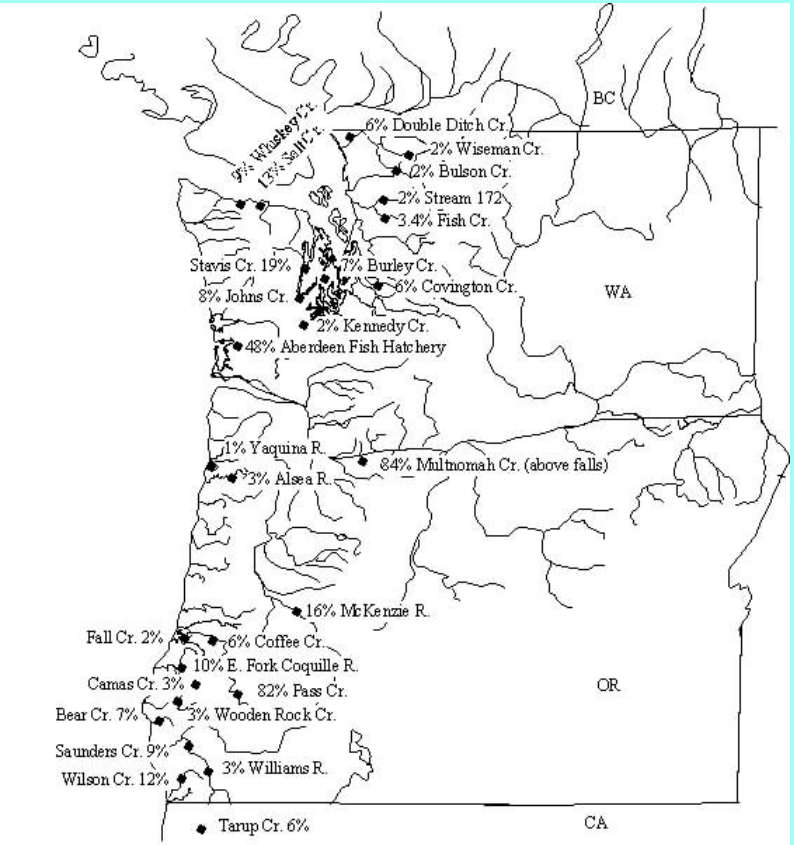


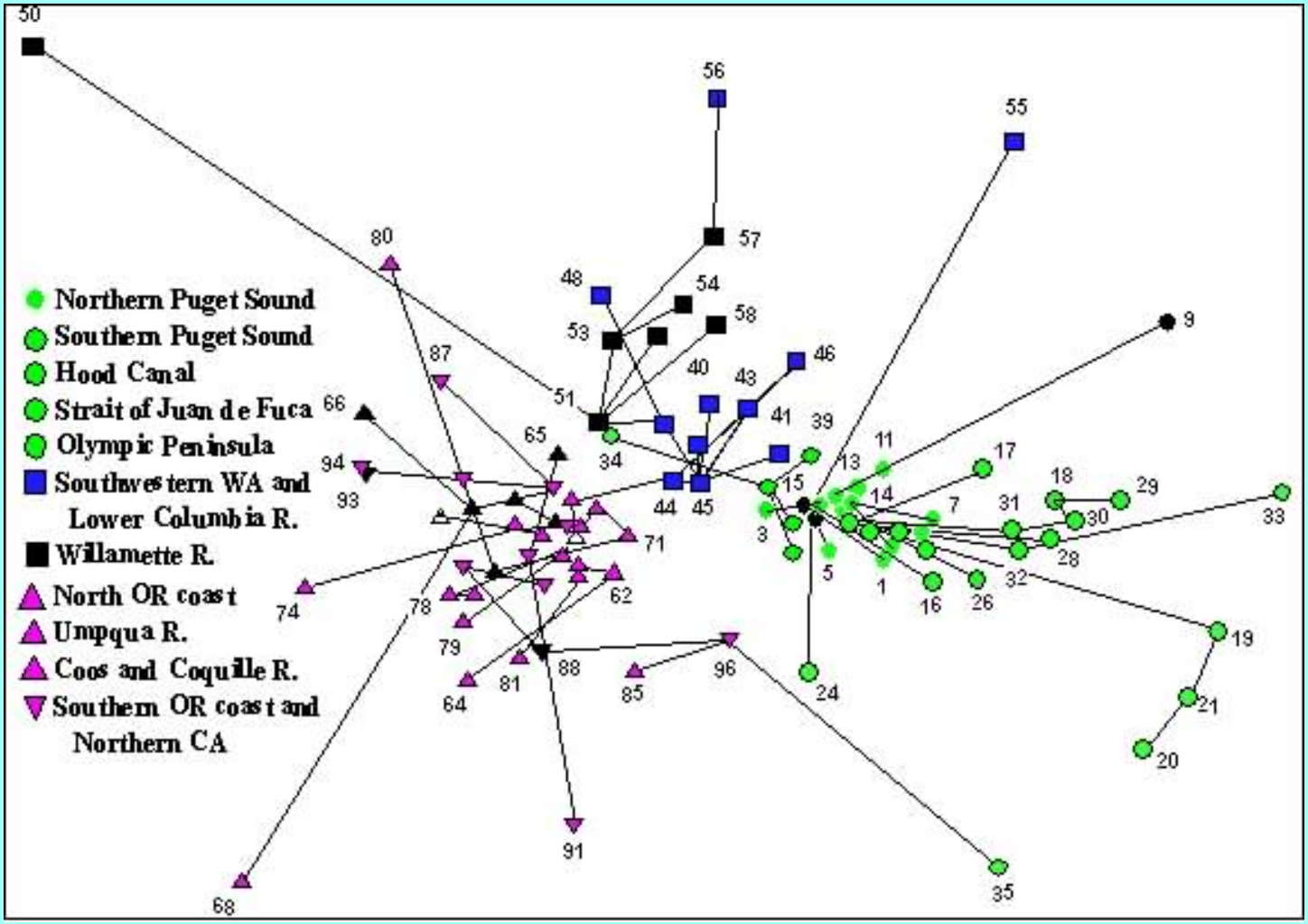
Figure G4. Percentage of hybrid fish in 29 of 97 (29%) samples of putative coastal cutthroat trout in the NMFS-ODFW-WDFW coastwide allozyme data base. Hybrid fish were identified by the presence of steelhead alleles at eight loci showing strong allele frequency differences between coastal cutthroat trout and steelhead.

29% of samples contained hybrids

Range 1-84%
Multnomah Cr. 84%
Pass Cr. 82%
Aberdeen Cr. 48%

Second generation introgression

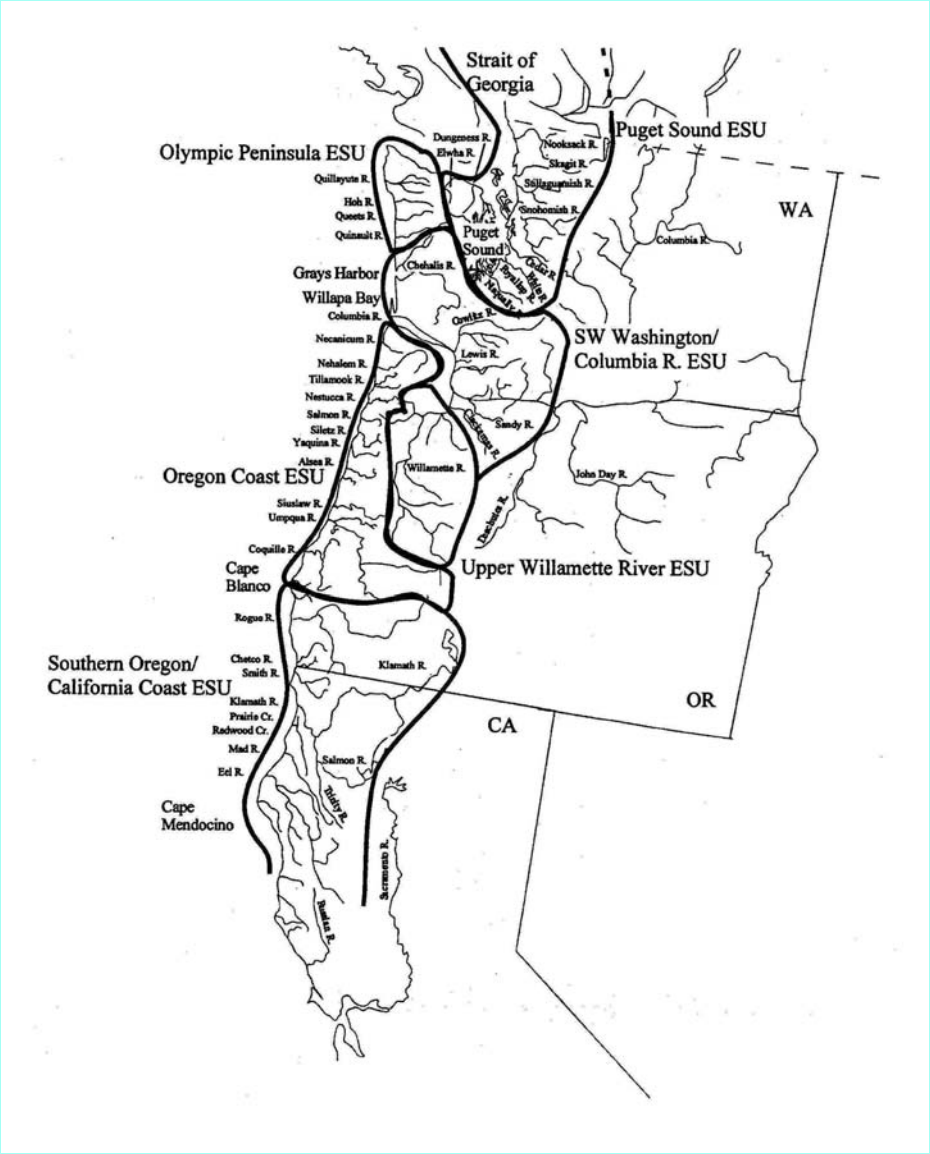
Two dimensional scaling plot of Nei's genetic distance with hybrids excluded



BRT able to identify 6 ESUs

1) **Puget Sound - Strait of Georgia**
2) **Olympic Peninsula**
3) **Southwestern WA - Columbia R.**
4) **Upper Willamette River**
5) **Oregon Coast**
6) **Southern OR/CA Coasts**

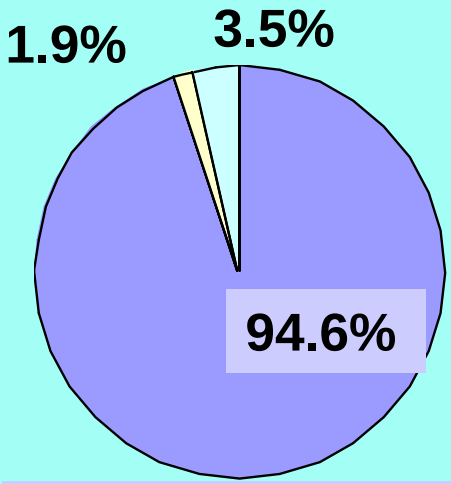
Map Of ESUs


Strait of Georgia
Olympic Peninsula ESU
Puget Sound ESU
Dungeness R.
Elwha R.
Nooksack R.
Skagit R.
Stillaguamish R.
Snohomish R.
Quillayute R.
Hoh R.
Queets R.
Quinault R.
Puget Sound
Columbia R.
WA
Chehalis R.
Grays Harbor
Willapa Bay
Columbia R.
Hood Canal
Green R.
Puyallup R.
White R.
Nisqually R.
Cowlitz R.
SW Washington/
Columbia R. ESU
Necanicum R.
Nehalem R.
Tillamook R.
Nestucca R.
Salmon R.
Siletz R.
Yaquina R.
Alsea R.
Lewis R.
Clackamas R.
Sandy R.
Oregon Coast ESU
Willamette R.
John Day R.
Siuslaw R.
Umpqua R.
Deschutes R.
Coquille R.
Cape Blanco
Upper Willamette River ESU
Rogue R.
Chetco R.
Smith R.
Klamath R.
Southern Oregon/
California Coast ESU
OR
Klamath R.
Prairie Cr.
Redwood Cr.
Mad R.
Eel R.
CA
Salmon R.
Trinity R.
Cape Mendocino
Sacramento R.
Russian R.

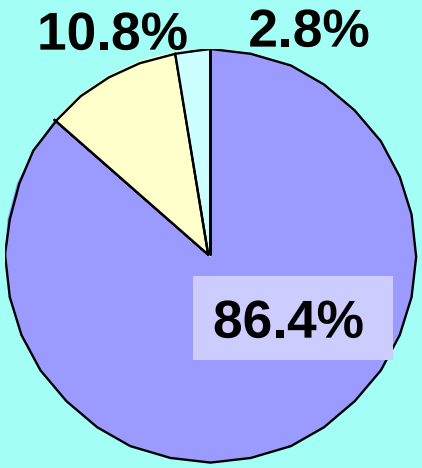
Factors Evaluated in Risk Determination

- Genetic integrity
- Demography
- Habitat
- Ecological Interaction
- Artificial Propagation
- Recent Events (e.g. overfishing, management regulations, catastrophic events)

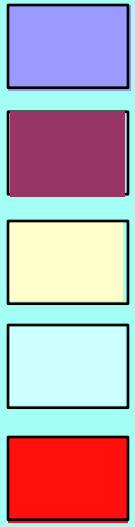
Gene Diversity



Coho Salmon



Chinook Salmon



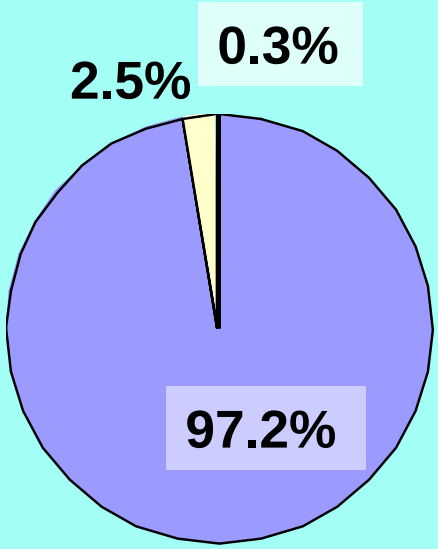
Within populations

Among streams within rivers

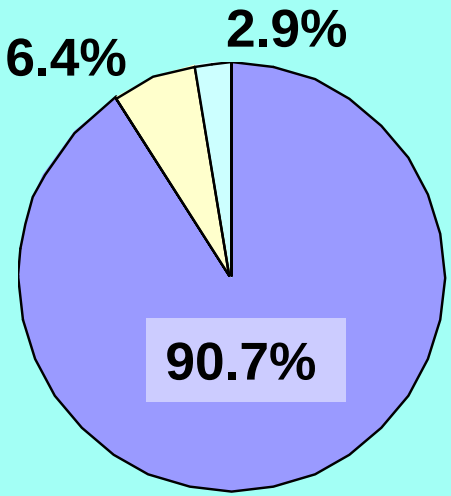
Among ESUs

Among rivers within ESUs

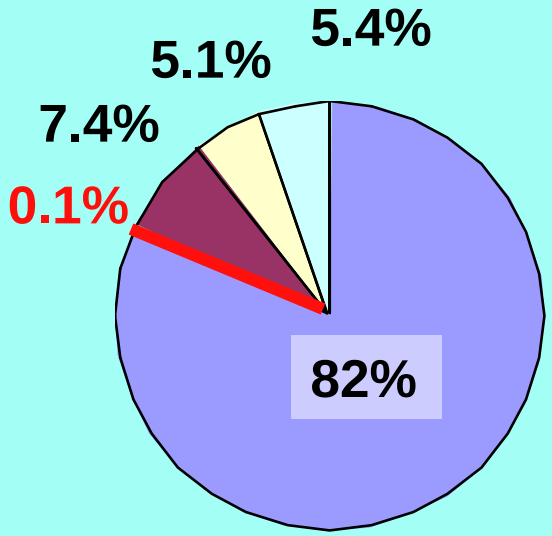
Between fish above and below barriers



Chum Salmon



Steelhead



CCT

Population Differentiation (Fst) Between Anadromous and Resident Brown Trout

Region	Resident Fst	Anadromous Fst
British Isles 0.147	0.16	
French Atlantic	0.298	0.016
Norway Atlantic	0.369	0.073
Norway	0.410	0.009
Sweden	0.443	0.026
Sweden	0.355	0.06
Mean**	**0.337**	**0.057**

In: S. Grant, J.L. Garcia-Martin, F. Utter, 1998

Similar Differences Between Anadromous and Resident CCT

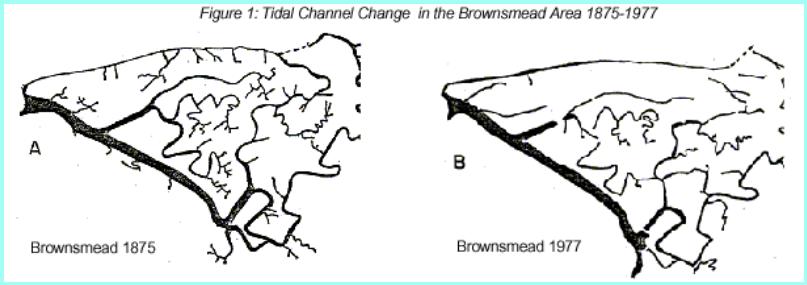
	FST	Reference
Resident		
CCT	0.28	Lattrell (in prep)
Brown T.	0.29	Carlsson & Nilsson (01)
Anadromous		
CCT[1]	0.12	Wenburg (1998)
Bull T. [2]	0.06	Spruell et al. (1999)
CCT	0.03	Wenburg & Bentzen (01)

[1] includes one stream resident population

[2] adfluvial and anadromous populations

(from J. Latterell et al.. In prep.)

Habitat Changes



Source: Changes in Columbia River Estuary Habitat Types (D. Thomas, 1983)

Source: Lower Columbia River Estuary Partnership

- **Degradation of river and estuarine habitats**
- **Increased water temps**
- **Loss of up-stream spawning area access (quality and quantity)**
- **Paucity of available data at time of SR**

Examples of Ecological Interactions

- **Hatchery coho -- Streams with continuing releases of coho fry also had declining trends in CCT.**
- **Increases in sea lion and harbor seal predation**
- **Exotic species or species' expansions due to changing environments**
- **Hatchery versus wild cutthroat interactions**

Demographic changes

- Change in type of population structure
- Change or loss of spawning areas
- Change in life history/age structure
- Change in relationship of anadromous versus resident or river migrating types
- Lost of anadromous populations

ESU Risk Conclusions

- **Three ESUs were not considered to be at risk of extinction in foreseeable future.**
- **Upper Willamette River ESU was not evaluated due lack of information**
- **Oregon Coast -- was less secure, but not currently at risk of extinction.**
- **And…**

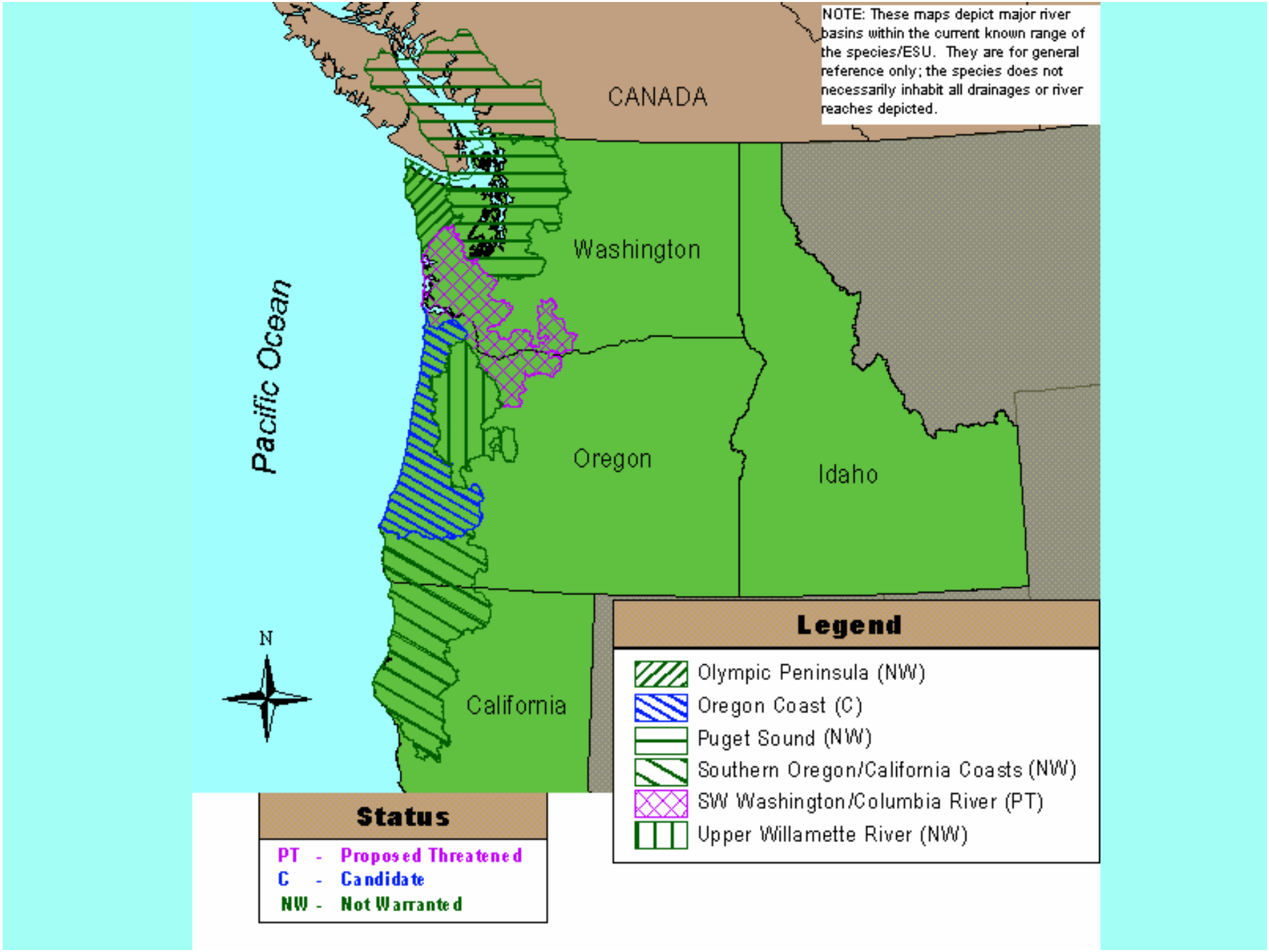
SW WA/Columbia River considered at risk of extinction if conditions did not change.

- **Steep declines in anadromous CT abundance**
- **Hybridization with *O. mykiss***
- **Degradation & loss of habitat - estuary, near shore and river.**
- **Negative ecological interactions (e.g. pike minnow and hatchery coho salmon).**
- **Paucity of information related to risk and demographics of resident fish.**

Joint NMFS / USFWS Listing Proposal 1999

- **Southwestern WA/Columbia River ESU - proposed for listing as Threatened under ESA**
- **Oregon Coast ESU - Candidate list**
- **Umpqua ESU - became part of larger Oregon Coast ESU and was delisted.**
  - **This delisting does not imply that the Umpqua population is "healthy," but instead acknowledges that it is part of a larger ESU.**

- **USFWS assumes sole jurisdiction - July 20th 1999**


NOTE: These maps depict major river basins within the current known range of the species/ESU. They are for general reference only; the species does not necessarily inhabit all drainages or river reaches depicted.
CANADA
Washington
Oregon
Idaho
California
Pacific Ocean
N
Legend
Olympic Peninsula (NW)
Oregon Coast (C)
Puget Sound (NW)
Southern Oregon/California Coasts (NW)
SW Washington/Columbia River (PT)
Upper Willamette River (NW)
Status
PT - Proposed Threatened
C - Candidate
NW - Not Warranted