

Rec'd 8-22-88
from Forest Reynolds

2080

DISTRIBUTION OF COHO SALMON IN CALIFORNIA

RECEIVED
CALIF. DEPT. OF FISH & GAME

OCT 03 1988

ARCATA OFFICE

X no need to review

Annual Report
to
California Department of Fish and Game

U.S. Fish and Wildlife Service
California Cooperative Fishery Research Unit
Humboldt State University
Contract No. FG7292

Thomas J. Hassler
Cornelius M. Sullivan
Gary R. Stern
1988

NOTE TO REVIEWERS
NO NEED TO
RUN THIS DOC
THRU DOC
REVIEW PROCESS

BT
10/24/2001

Distribution of Coho Salmon in California

Coho salmon (Oncorhynchus kisutch) provide an extensive commercial and sport fishery along the California coast. Along the Pacific coast (California, Oregon, Washington) in 1976-85, nearly 13% of the estimated total coho salmon catch by trolling and 4% of the sport catch were caught off California (32 Pacific Fisheries Management Council 1986). Most of the production of coho salmon in California is from hatcheries, which produce about 1 million annually (14 Baker and Reynolds; 33 Greenley 1985). The average annual coho salmon population in California--the number of adults caught both at sea and in rivers, plus the number that escape to their homestreams to spawn--has declined to only 100,000 adults (34 Clark 1988). State, federal, and private agencies are developing and using a number of restoration and enhancement programs to increase coho salmon stocks. In order to facilitate restoration efforts, resource managers need to know the distribution of coho salmon in California.

Coho salmon are anadromous along the Pacific coast from Chamalu Bay, Mexico (35 Miller and Lea 1972), to Point Hope, Alaska (36 Hart 1973). In California, coho salmon enter small coastal streams and rivers from the Smith River in the north to the Big Sur River in Monterey County (Figure 1). Coho salmon were rare in the Sacramento River system until the California Department of Fish and Game stocked large numbers of fry into the system in 1956-58 (37 Hallock and Fry 1967). Coho salmon returned to spawn but did not maintain a natural run; the fish have again become scarce and any that enter the Sacramento River should be regarded as strays.

Historically, coho salmon used most of the accessible coastal streams in California. However, they no longer occur in many of these streams and their

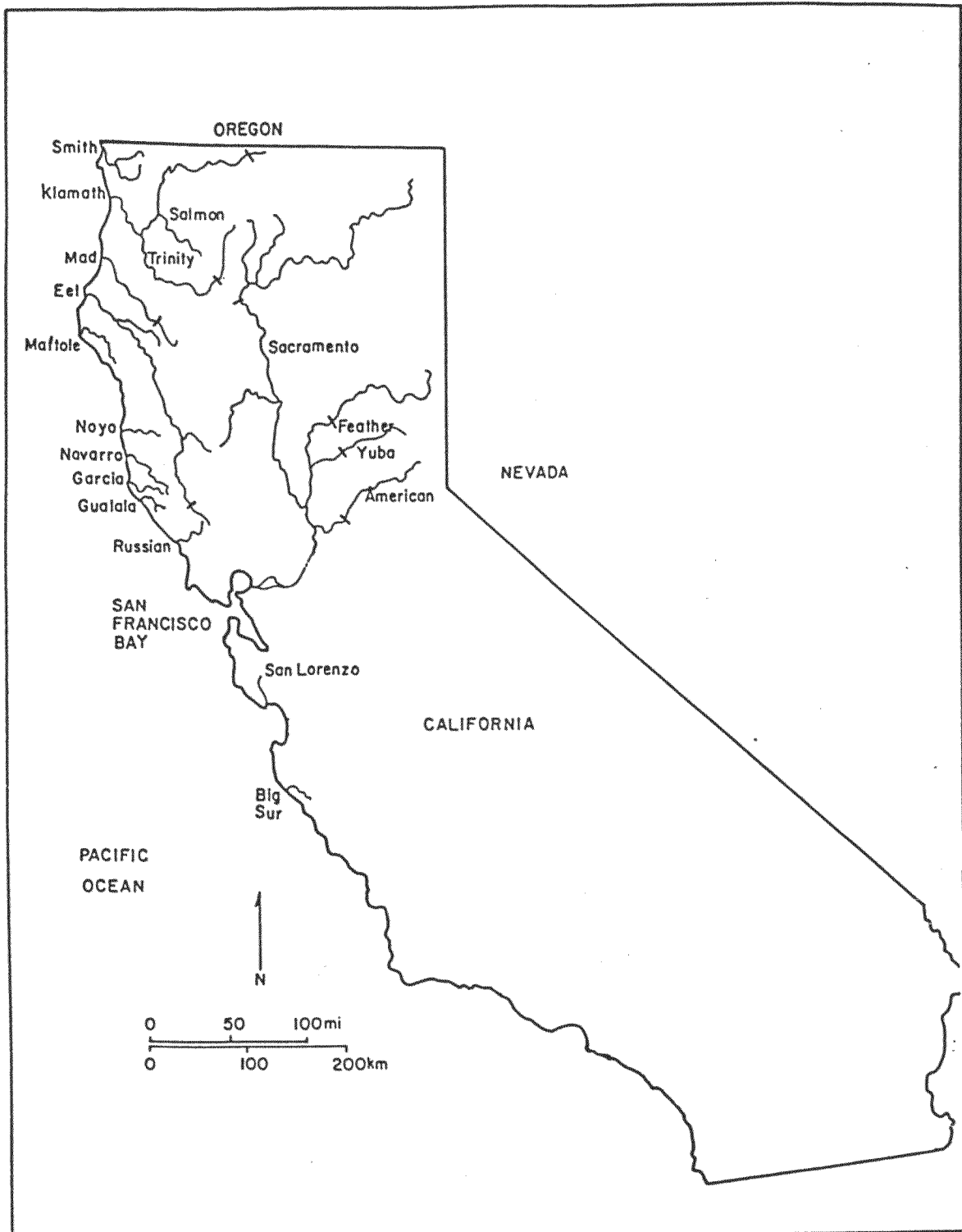


Figure 1. Major spawning rivers of coho salmon in the Pacific Southwest; the species is found in all marine waters of the region (Berger 1982). Short lines perpendicular to rivers represent impassable barriers.

Table 1. Distribution of coho salmon in California by watershed.

Reference	River Tributary
<u>DEL NORTE COUNTY</u>	
1	South Fork Winchuck River
	Illinois River
1	Broken Kettle Creek (trib. to West Fork IR)
1	Elk Creek (trib. to West Fork IR)
1	East Fork IR
1	Dunn Creek
	Smith River
2,3,4,5	SR and tributaries
1,6,7,8	Mill Creek, East and West forks
6	Bummer Lake Creek (trib. to EF)
8	Morrison Creek
7	Rowdy Creek and tributaries
1	Dominie Creek
1	Copper Creek
1	Savoy Creek
1	<u>North Fork SR and tributaries</u>
1	Diamond Creek
1	Peridotite Creek
1	Still Creek
1	<u>Middle Fork SR and tributaries</u>
1	Patrick Creek and tributaries
1	West Fork
1	Shelly Creek
1	Eleven Mile Creek
1	Ten Mile Creek
1	Twelve Mile Creek
1	Griffin Creek
1	Hardscrabble Creek
1	Eighteen Mile Creek
1	Knopki Creek
1	Monkey Creek
1	Myrtle Creek
1	Packsaddle Creek
1	Siskiyou Fork

Table 1. Distribution of coho salmon in California by watershed (continued).

Reference	River Tributary
<u>DEL NORTE COUNTY (continued)</u>	
Smith River and tributaries (continued)	
1	<u>South Fork SR and tributaries</u>
1	Buck Creek
1	Coon Creek
1	Craigs Creek
1	Hurdy Gurdy Creek
1	Eight Mile Creek
1	Williams Creek
1	Jones Creek
1	Muzzle Loader Creek
1	Prescott Fork
1	Quartz Creek
1,7	Elk Creek (trib. to Pacific Ocean, Crescent City)
	Lake Earl (Crescent City)
7	LE and tributaries
1	Jordan Creek
8	Yonker Creek during 1950's
1,7	Wilson Creek (trib. to Pacific Ocean)
<u>DEL NORTE, SISKIYOU, AND HUMBOLDT COUNTIES</u>	
Klamath River	
1,2,3,9,10	KR and tributaries, to Shasta River (2)
4	20,000 average annual population estimate (1960)
1,9,11	Blue Creek and tributaries
1,9	West Fork
1,9	Potatoe Patch Creek
1,9,11	Nickowitz Creek
11	Crescent City Fork
7,11	Salt Creek
11	Richardson Creek
1,7	High Prairie Creek
1	Hoppaw Creek
1,9,11	Hunter Creek
7	Minot Creek
1,7,11	McGarvey Creek
1	Mynot Creek
1,11	Omagar Creek

Table 1. Distribution of coho salmon in California by watershed (continued).

Reference	River Tributary
<u>DEL NORTE, SISKIYOU, AND HUMBOLDT COUNTIES (continued)</u>	
Klamath River and tributaries (continued)	
1,11	Saugep Creek
1	Tarup Creek
1,11	Turwur Creek
1,11	Waukell Creek
11	Bear Creek
9,11	Ah Pah Creek
9,11	Tectah Creek
9,11	Pecwan Creek
11	Roach Creek
9	Mettah Creek
11	Pine Creek
9	Little Pine Creek
11	Miner's Creek
9	Bluff Creek
9,11	Slate Creek
9,11	Red Cap Creek
9,11	Boise Creek
9,11	Camp Creek
10	Dillon Creek
10	Ukonom Creek
2,10,11	Clear Creek
10	Elk Creek
10,11	Indian Creek and tributaries
10,11	South Fork
11	East Fork
10	Thompson Creek
10,11	Grider Creek
10	West Grider Creek
10,11	Seiad Creek
10,11	Horse Creek and tributaries
10,11	Buckhorn Creek
10	Middle Creek
10	Salt Gulch
10	Bark House Creek
10,11	Beaver Creek
11,11	Humbug Creek
10,11	Cottonwood Creek
10,11	Willow Creek
10	Bogus Creek
10,11	Shasta River
10	Big Springs Creek

Table 1. Distribution of coho salmon in California by watershed (continued).

Reference	River Tributary
<u>DEL NORTE, SISKIYOU, AND HUMBOLDT COUNTIES (continued)</u>	
Klamath River and tributaries (continued)	
2,10	<u>Salmon River and tributaries</u>
2,10,11	Wooley Creek
10,11	Nordheimer Creek
10,11	North Fork SR and tributaries
10	North Russian Creek
10,11	South Russian Creek
10,11	South Fork SR and tributaries
10,11	Knownothing Creek
10,11	Methodist Creek
10,11	East Fork of South Fork SR
10,11	Taylor Creek
2,10,11	<u>Scott River and tributaries</u>
10,11	Tompkins Creek
10	Kelsey Creek
10	Canyon Creek
10,11	Shackleford Creek
10,11	Mill Creek
10,11	Kidder Creek
10	Patterson Creek
10,11	Etna Creek
10,11	French Creek
10	Miners Creek
10,11	Sugar Creek
10	East Fork
10	Big Mill Creek
10	South Fork
<u>HUMBOLDT AND TRINITY COUNTIES</u>	
9,12,11	Trinity River and tributaries
9,11	Scottish Creek
9	Mill Creek
9,11	Hostler Creek
9,11	Tish Tang A Tang Creek
9,11,13	Horse Linto Creek
9	Willow Creek
3	T.R. to Lewiston
14	Rush and Deadwood creeks (possible hatchery strays)
11	Rush Creek
2,11	Browns Creek

Table 1. Distribution of coho salmon in California by watershed (continued).

Reference

River
Tributary

HUMBOLDT AND TRINITY COUNTIES (continued)

Trinity River and tributaries (continued)

11,12	New River
11,12	Manzanita Creek
12	Indian Creek
11	Canyon Creek
11	North Fork Trinity River
11	Supply Creek
11	Campbell Creek
2,3,9,	<u>South Fork T.R. and tributaries</u>
11,12,15	
12	~~Ectapom~~ <i>EITAPOM</i>
12	Pelletreau Creek
11,12	Hayfork Creek
12	Olsen Creek
12	Butter Creek
11,12	Rattlesnake Creek

HUMBOLDT COUNTY

Redwood Creek (trib. to Pacific Ocean)

3,9,16	RC and tributaries
4	2,000 average annual population estimate
2,9	Lackes Creek
2,9,16,17	Prairie Creek and tributaries
9	Little Lost Man Creek
9	Lost Man Creek
9	Mae Creek
9	Godwood Creek
8	Browns Creek
8	StreeLow Creek
9,16	Tom McDonald Creek
9,16	Bridge Creek
9,16	Panther Creek
16	Coyote Creek

McDonald Creek (trib. to Stone Lagoon)

9	Fresh Creek
---	-------------

Little River and tributaries (Crannell)

9	South Fork
9	Lower South Fork
9	Upper South Fork

Table 1. Distribution of coho salmon in California by watershed (continued).

Reference

River
Tributary

HUMBOLDT COUNTY (continued)

Mad River

2,3,4,9	MR and tributaries
4	Warren Creek
9	Lindsay Creek and tributaries
9	Grassy Creek
9	Squaw Creek
9	Mather Creek
9	Hall Creek and tributaries
9	Noisy Creek
9	Mill Creek
9	North Fork MR and tributaries
9	Sullivan Creek
9	Long Prairie Creek
9	Leggit Creek
9	Quarry Creek
9	Dry Creek
9	Canon Creek
9	Maple Creek
9	Boulder Creek
9	Palmer Creek
8	Black Creek
8	Powers Creek
8	Kelley Creek
9	Strawberry Creek (trib. to Pacific Ocean, Arcata)

Humboldt Bay

8	Arcata oxidation ponds since 1972
9	Cochran Creek (trib. to Fay Slough)
9,16,18	Elk River and tributaries
9,16	North Fork
9	South Fork
9	Little South Fork
9,16,18	Freshwater Creek and tributaries
9	Graham Gulch
9	Cloney Gulch
8	McCready Gulch
8	Falls Gulch
8	South Fork FC
8	Little Freshwater Creek
9,18	Jacoby Creek
9	Jolly Giant Creek

Table 1. Distribution of coho salmon in California by watershed (continued).

Reference	River Tributary
<u>HUMBOLDT COUNTY (continued)</u>	
	Humboldt Bay (continued)
9	Martin Slough (trib. to Swain Slough)
9	Ryan Creek (trib. to Ryan Slough)
9,18	Salmon Creek
8	College of Redwoods Creek
8	Rocky Gulch Creek
<u>HUMBOLDT AND MENDOCINO COUNTIES</u>	
	Eel River
9,12,19,20	ER and tributaries
4	15,000 average annual population estimate
8	Shaw Creek (trib. of Eel River Estuary)
9	Salt River and tributaries
9	Russ Creek
9	Reas Creek
9	Howe Creek
9	Atwell Creek
8	Jordan Creek
9	Chadd Creek
9	Larabee Creek
8	Kekawaka Creek
5,20	Outlet Creek
20	Broaddus Creek
21	Price Creek
21	Larabee Creek
19	Rocktree Creek (trib. to Tomki Creek)
19	String Creek
9	Newman Creek
9	Jewett Creek
2,3,9,14, 19,20,21	<u>South Fork ER and tributaries</u>
19,22	Hollow Tree Creek and tributaries
19,22	Huckleberry Creek
19	Mule Creek
19,22	Redwood Creek
19	Waldron Creek
19	Walters Creek
19	Butler Creek
22	Bonds Creek
22	Michaels Creek

Table 1. Distribution of coho salmon in California by watershed (continued).

Reference

River
Tributary

HUMBOLDT AND MENDOCINO COUNTIES (continued)

South Fork Eel River and tributaries (continued)

9,21	Bull Creek and tributaries
9	Squaw Creek
9	Albee Creek
9	Mill Creek
21	2 unnamed creeks between Salmon Creek and Indian Creek - the downstream of these two creeks has occurrence up 4 miles and the upstream creek has occurrence in all areas.
21	Indian Creek up 4 miles
19,21	Ten Mile Creek and tributaries
19	Mud Springs Creek
19	Big Rock Creek
19	Cahto Creek
19	Mill Creek
19	Streeter Creek
21	3 unnamed tributaries across from Elder Creek
21	Rock Creek
19	Mill Creek
19	Grist Creek
19	Haun Creek
19,20	Indian Creek
19,20	Jack of Hearts Creek
19	Kenny Creek
19	Little Charlie Creek
19	Low Gap Creek
19	McCoy Creek
19,21	Rattlesnake Creek
19	Cummings Creek
16,19	Redwood Creek and tributaries
9	Seely Creek
9	China Creek
19	Rock Creek
19	Standley Creek
19	Taylor Creek
16,19,20	Wildcat Creek
19	unnamed trib. to WC
19	Barnwell Creek
19	Bear Creek
19	Bear Pen Creek
19	Cub Creek
19	Cedar Creek
19	Deer Creek

Table 1. Distribution of coho salmon in California by watershed (continued).

Reference	River Tributary
<u>HUMBOLDT AND MENDOCINO COUNTIES (continued)</u>	
South Fork Eel River and tributaries (continued)	
19	Dutch Charlie Creek
9	Fish Creek
9	Redwood Creek
9	Bear Canyon Creek
9	Sprowl Creek and tributaries
9	Warden Creek
9	Little Sprowl Creek
9	West Fork Sprowl Creek
9	East Branch of South Fork
9	Durphy Creek
9	Milk Ranch Creek
20	Piercy Creek
8	Dean Creek
8	Schofield Creek
2,3,14,20	<u>Middle Fork ER</u>
Van Duzen River	
2,3,9	VDR and tributaries
9,11	Yager Creek and tributaries (YC to Lawrence Creek and the two tribs. to the Van Duzen just above Yager Creek)
9	Wilson Creek
9	Copper Mill Creek
9	Lawrence Creek
9	Fielder Creek
9	Root Creek
9	Grizzly Creek
9	Stevens Creek
9	Hoagland Creek
9	Little Larabee Creek
Bear River (trib. to Pacific Ocean, Cape Mendocino)	
9	BR and tributaries
9	Bonanza Gulch
9	South Fork
9	Hollister Creek
9	Guthrie Creek (trib. to Pacific Ocean, Ferndale)

Table 1. Distribution of coho salmon in California by watershed (continued).

Reference

River
Tributary

HUMBOLDT AND MENDOCINO COUNTIES (continued)

9

McNutt Gulch (trib. to Pacific Ocean, Petrolia)

HUMBOLDT COUNTY

Mattole River

9

MR and tributaries

4

2,000 average annual population estimate

9

Bear Creek

9

Stansberry Creek

9

North Fork

9

Mill Creek (Petrolia)

8

Thompson Creek

8

Westland Creek

9

Clear Creek

9

Conklin Creek

9

McGinnis Creek

9

Indian Creek

9

Squaw Creek

9

Pritchard Creek

9

Granny Creek

9

Saunders Creek

9

Woods Creek

9

Upper North Fork

9

Oil Creek

9

Devils Creek

9

Rattlesnake Creek

9

Honeydew Creek

8

Baker Creek

9

Bear Trap Creek

9

Dry Creek

9

Middle Creek

9

Westlund Creek

9

Gilham Creek

9

Fourmile Creek

9

Sholes Creek

9

Harrow Creek

9

Grindstone Creek

9

Mattole Canyon

9

Blue Slide Creek

9

Bear Creek

9

Big Finley Creek

9

Eubank Creek

9

Bridge Creek

Table 1. Distribution of coho salmon in California by watershed (continued).

Reference	River Tributary
<u>MENDOCINO COUNTY (continued)</u>	
Albion River	
19	AR and tributaries
19	Marsh Creek
19	Railroad Gulch
19	Railroad Gulch
19	North Fork
19	South Fork
19	Buckhorn Creek (trib. to Pacific Ocean, Mendocino)
	Unnamed tributary to Buckhorn Creek
19	Doyle Creek (trib. to Pacific Ocean, Mendocino)
19,20	Little River (trib. to Pacific Ocean, Mendocino)
Navarro River	
2,3,20	NR and tributaries
19	Rancheria Creek and tributaries
19	Ham Canyon Creek
19	Horse Creek
19	Minnie Creek
19	Camp Creek
19	German Creek
19	Indian Creek and tributaries
19	Gut Creek
19	Dick Creek
19	North Fork IC
19	Mill Creek
19	<u>North Fork NR and tributaries</u>
19	Little North Fork
19	North Branch of North Fork
19	South Branch of North Fork
19	Bridge Creek
19	John Smith Creek
19	Robinson Creek (trib. to Anderson Creek)
20	North Fork Flynn Creek
19	Greenwood Creek (trib. to Pacific Ocean, Elk)

Table 1. Distribution of coho salmon in California by watershed (continued).

Reference

River
Tributary

MENDOCINO COUNTY (continued)

19	Elk Creek (trib. to Pacific Ocean, Navarro)
19	Three Springs Creek
19	Soda Fork
19	Sulpher Fork
19	Brush Creek (trib. to Pacific Ocean, Point Arena)
2,3,19,20	Garcia River
19	Mallo Pass Creek (trib. to Pacific Ocean, Mallo Pass)
19	Schooner Gulch (trib. to Pacific Ocean, Saunder's Reef)
6	North Fork SG
19	Seaside Creek (trib. to Pacific Ocean, Inglenook)
19	Frazer Creek
19	Whale Gulch (trib. to Pacific Ocean, Bear Harbor)
19	Fish Rock Gulch (trib. to Pacific Ocean, Gualala)

MENDOCINO AND SONOMA COUNTIES

Gualala River

2,17,19, 20,25	GR and tributaries
19	Doty Creek (trib. to Little North Fork GR)
17,25	<u>South Fork GR and tributaries</u>
25	Franchini Creek (trib. to Buckeye Creek to SF)
17	Sproule Creek
25	Marshall Creek
25	<u>Wheatfork GR and tributaries</u>
17,25	Haupt Creek
25	House Creek
17,25	Fuller Creek
17,25	North Fork FC
17,25	South Fork FC
17,25	Fort Ross Creek (trib. to Pacific Ocean, Fort Ross)
17,19,20	Russian Gulch (trib. to Pacific Ocean, Arched Rock)
19	Middle Branch
19	East Branch

Table 1. Distribution of coho salmon in California by watershed (continued).

Reference	River Tributary
<u>MENDOCINO AND SONOMA COUNTIES (continued)</u>	
17,25	Scotty Creek (trib. to Pacific Ocean, Duncan Mills)
	Russian River
2,3,17, 19,25	RR and tributaries
19,25	Dry Creek
17,25	Dutch Bill Creek
17,25	Freezeout Creek
17,25	Austin Creek and tributaries
17,25	East Austin Creek
25	Gilliam Creek
17,25	Kidd Creek
25	Kohute Gulch
25	Red Slide Creek
17,25	Mark Slide Creek
25	Mission Creek (trib. to Hulbert Creek)
17,25	Sheephouse Creek
25	Unnamed tributary to SC
17,25	Willow Creek
19	East Fork
19	West Fork
17	Green Valley Creek
19	<u>West Fork RR and tributaries</u>
19	Mariposa Creek
19	Rocky Creek
19	Salt Hollow Creek
19	York Creek
19	Corral Creek
19	Fisher Creek
	Salmon Creek (trib. to Pacific Ocean, Valley Ford)
2,17,25	SC and tributaries
17,25	Coleman Valley Creek
17,25	Fay Creek
17,25	Finley Creek
17	Tannery Creek
2	Valley Ford Creek (trib. to Pacific Ocean, Valley Ford)

Table 1. Distribution of coho salmon in California by watershed (continued).

Reference	River Tributary
<u>MARIN COUNTY</u>	
17,26	Bolinas Lagoon Pine Gulch Creek
17,26	Redwood Creek (trib. to Pacific Ocean, Pt. Bolinas)
17,26	Walker Creek (trib. to Tomales Bay)
26	WC and tributaries
26	Salmon Creek
26	Arroyo Sausal Creek
	Lagunitas Creek (trib. to Tomales Bay)
2,3,17,26	LC and tributaries
17,26	Devils Gulch Creek
26	Haggerty Gulch Creek
26	Nicasio Creek
17,26	San Geronimo Creek
17	Olema Creek
<u>SAN MATEO COUNTY</u>	
27,28,29	Pescadero Creek (trib. to Pacific Ocean, San Gregorio)
27	Gazos Creek (trib. to Pacific Ocean, Franklin Point)
29	Butano Creek (trib. to Pacific Ocean)
28	San Vicente Creek (trib. to Pacific Ocean)
29	San Gregorio Creek (trib. to Pacific Ocean)
<u>SANTA CRUZ COUNTY</u>	
2,28,29,30	Waddell Creek (trib. to Pacific Ocean) East Branch
2,28,29	Scott Creek (trib. to Pacific Ocean)
2,28,29,30	San Lorenzo River Hare Creek (trib. to Boulder Creek to SLR)
14,29	Monterey Bay Soquel Creek
14	Aptos Creek

Table 1. Distribution of coho salmon in California by watershed (continued).

Reference

River
Tributary

MONTEREY COUNTY

3 Carmel River

3 Big Sur River

INLAND CALIFORNIA

3,31 Sacramento River

References

1. Boberg, J., and C. Kenyon. 1979. Stream Inventory: Del Norte County. California Department of Fish and Game.
2. Atkinson, C.E., J.H. Rose, and T.O. Duncan. 1967. Pacific salmon in the United States. Salmon of the North Pacific Ocean - Part IV. Spawning populations of North Pacific salmon. International North Pacific Fisheries Commission. Bulletin 23:43-223.
3. Berger, J. ed. 1982. Anadromous salmonid genetic resources: an assessment and plan for California. California Gene Resources Program. National Council of Gene Resources, Berkeley. 168 pp.
4. United States Fish and Wildlife Service. 1960. A preliminary survey of fish and wildlife resources of northwestern California. Portland, Oregon. 104 pp.
5. Moreau, Joe. 1988. Six Rivers National Forest Gasquet, California. Personal communication.
6. Burns, J.W. 1971. The carrying capacity for juvenile salmonids in some northern California streams. Calif. Fish Game 57:44-57.
7. Waldvogel, Jim. 1988. California Sea Grant Marine Advisor, Crescent City, California. Personal communication.
8. California Department of Fish and Game, Eureka, California, files.
9. Boberg, J., and C. Kenyon. 1979. Stream Inventory: Humboldt County. California Department of Fish and Game.
10. Boberg, J., and C. Kenyon. 1979. Stream Inventory: Siskiyou County. California Department of Fish and Game.
11. CH2M Hill. 1985. Klamath River Basin Fisheries Resources Plan. U.S. Department of Interior.
12. Boberg, J., and C. Kenyon. 1979. Stream Inventory: Trinity County. California Department of Fish and Game.
13. Hart, Mike. 1988. Humboldt State University Fisheries Department, Arcata, California. Personal communication.
14. Baker, P., and F. Reynolds. 1986. Life history, and status of coho salmon in California. California Department of Fish and Game Report to the California Fish and Game Commission.
15. Healey, Terry. 1988. California Department of Fish and Game Redding, California. Personal communication.
16. Hofstra, Terry. 1988. Redwood National Park Arcata, California. Personal communication.

17. Cox, Bill. 1986. California Department of Fish and Game, Sebastopol, California. Personal communication.
18. Ellingwood, Jud. 1988. Humboldt Fish Action Council, Eureka, California. Personal communication.
19. Cherr, and Griffin. 1979. Stream Inventory: Mendocino County. California Department of Fish and Game.
20. Jones, Wendy. 1988. California Department of Fish and Game, Ukiah, California. Personal communication.
21. United States Army Corps of Engineers. 1980. Eel River Basin resource analysis. Corps of Engineers, San Francisco.
22. Flosi, Gary. 1988. California Department of Fish and Game, Weott, California. Personal communication.
23. Snyder, Robert. 1988. California Department of Fish and Game, Yountville, California. Personal communication.
24. Barnhart, Roger. 1988. U.S. Fish and Wildlife Service, Arcata, California. Personal communication.
25. Cherr, and Griffin. 1979. Stream Inventory: Sonoma County. California Department of Fish and Game.
26. Cherr, and Griffin. 1979. Stream Inventory: Marin County. California Department of Fish and Game.
27. Cherr, and Griffin. 1979. Stream Inventory: San Mateo County. California Department of Fish and Game.
28. Smith, Jerry. 1988. San Jose State University, San Jose, CA. Personal communication.
29. Ulmer, Lynda. 1988. California Department of Fish and Game, Ben Lomond, California. Personal communication.
30. Cherr, and Griffin. 1979. Stream Inventory: Santa Cruz County. California Department of Fish and Game.
31. Hassler, T.J. 1987. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (Pacific Southwest)--coho salmon. U.S. Fish Wildl. Serv. Biol. Rep. 82(11.70). U.S. Army Corps of Engineers, TR EL-82-4. 19 pp.
32. Pacific Fisheries Management Council. 1986. Review of 1985 ocean salmon fisheries. Pacific Fisheries Management Council, Portland, Oreg.
33. Greenley, J.C. 1985. Locations of local and regional salmonid stocks. Pages 153-159 in R.H. Stroud, ed. Proceedings of the tenth annual marine recreational fisheries symposium. National Coalition for Marine Conservation, Inc. Savannah, Ga.

34. Clark, J. ed. 1988. Restoring the balance. California Advisory Committee on Salmon and Steelhead Trout. Sausalito, CA. 84 pp.
35. Miller, D.J., and R.N. Lea. 1972. Guide to the coastal marine fishes of California. Calif. Dep. Fish Game Fish Bull. 157. 249 pp.
36. Hart, J.R. 1973. Pacific fishes of Canada. Fish. Res. Board Can. Bull. 180. 740 pp.
37. Hallock, R.J., and D.H. Fry, Jr. 1967. Five species of salmon Oncorhynchus, in the Sacramento River, California. Calif. Fish Game 53:5-72.