APPENDICES

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Appendix II

Historical References for Native Stream Fishes for the Period 1854-1981, San Francisco Estuary, California

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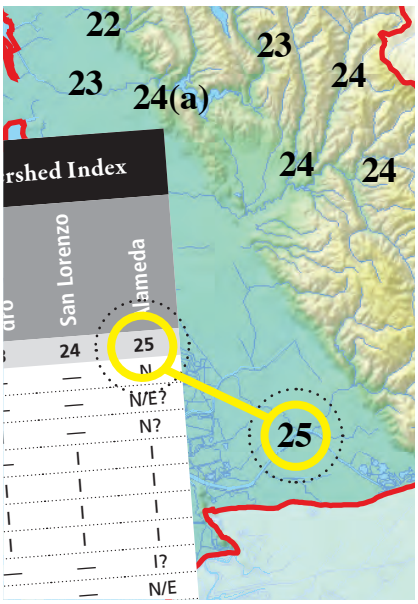
Appendix III

Presence of Fish Species by Watershed, San Francisco Estuary, California



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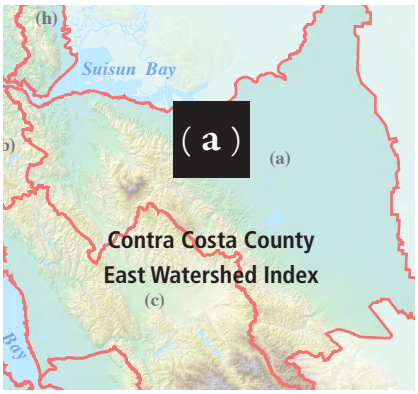
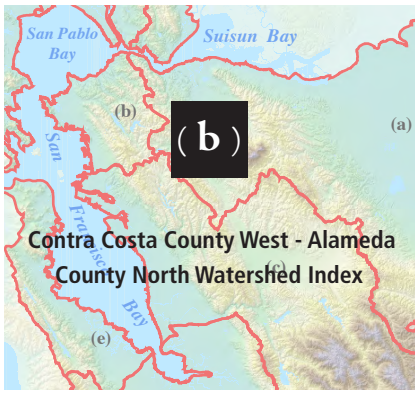
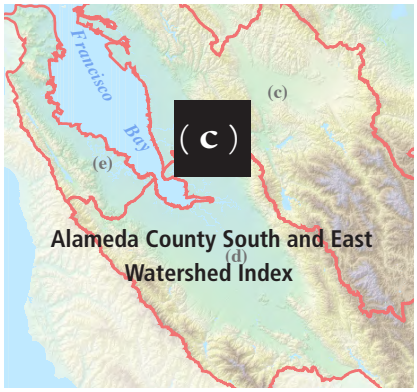
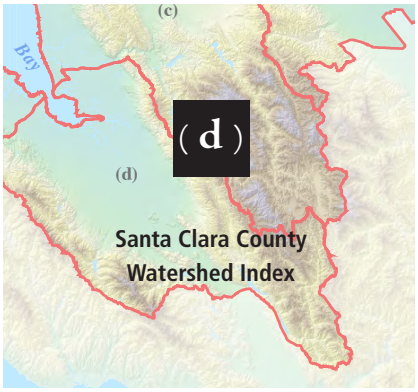
APPENDIX I

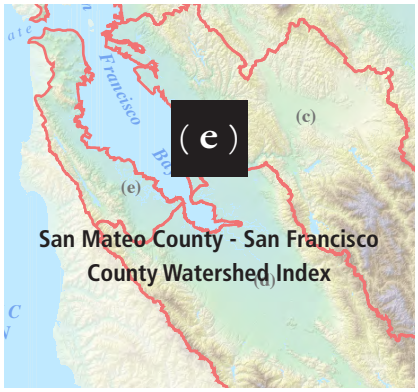
Watersheds of the San Francisco Estuary, California

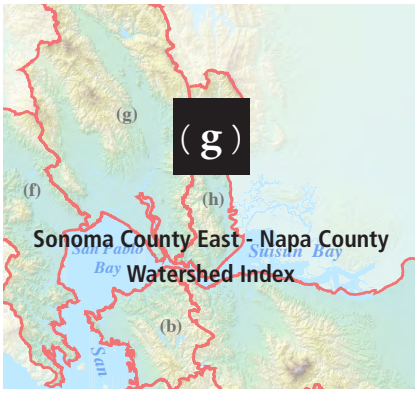


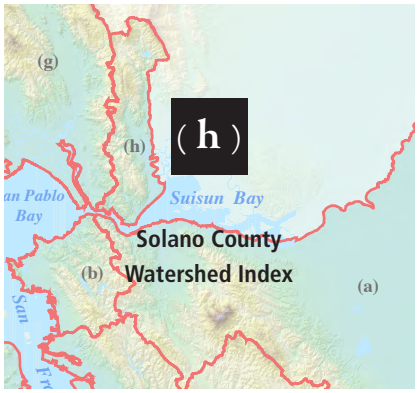












Watersheds of the San Francisco Estaury, California

Map No. wrd0200085.1 February 9, 2004

Data Sources:

Shaded Relief: USGS 30 Meter National Elevation Data
Streams: RiverReach 3, US EPA, USGS, 1:100,000, 1997
Lakes: California Fish & GAME, SWRCB, 1:24000, 1997
Watersheds: California Fish & GAME, RWQCB, DWR 1:24000, 1997
Ocean, Bay: California State Lands Commission, US EPA Region 9, 1:24000, 1994

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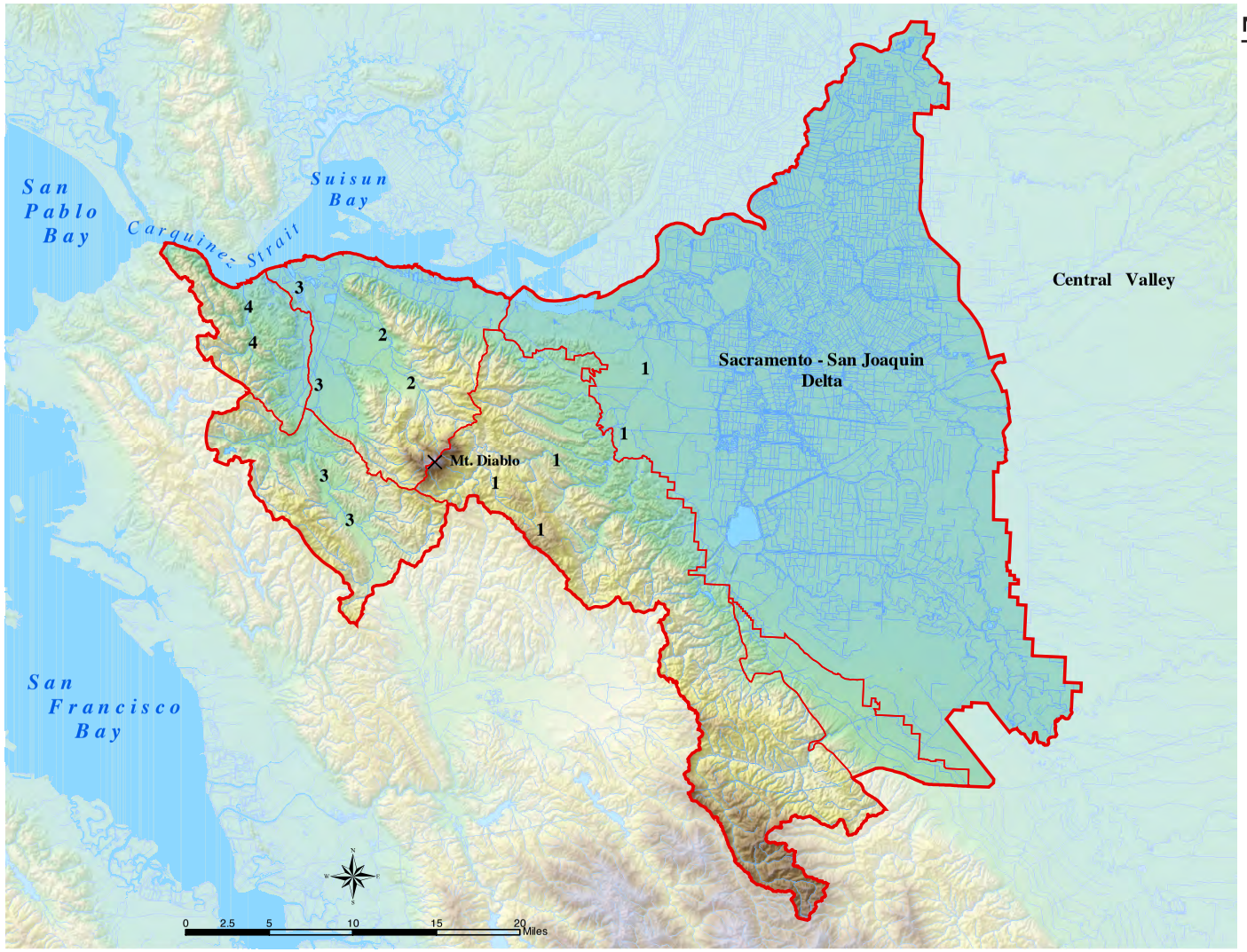
(a) Contra Costa County East Watershed Index



No.	Name
(1)	Marsh Creek
(2)	Mt. Diablo Creek
(3)	Walnut-San Ramon Creek
(4)	Arroyo del Hambre (Alhambra Creek)

Index Map

Data Sources:

Shaded Relief: USGS 30 Meter National Elevation Data
Lakes: California Fish & GAME, SWRCB, 1:24000, 1997

Streams: RiverReach 3, US EPA, USGS, 1:100,000, 1997
Watersheds: California Fish & GAME, RWQCB, DWR 1:24000, 1997

Ocean, Bay: California State Lands Commission, US EPA Region 9, 1:24000, 1994

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(b) Contra Costa County West - Alameda County North Watershed Index

No.	Name
(5)	Canada del Ciervo
(6)	Rodeo Creek
(7)	Refugio Creek
(8)	Pinole Creek
(9)	Garrity Creek
(10)	San Pablo Creek
(11)	Wildcat Creek
(12)	Baxter Creek
(13)	Cerrito Creek
(14)	Codornices Creek
(15)	Strawberry Creek
(16)	Claremont Creek
(17)	Temescal Creek

Index Map

Data Sources:

Shaded Relief: USGS 30 Meter National Elevation Data
Lakes: California Fish & GAME, SWRCB, 1:24000, 1997

Streams: RiverReach 3, US EPA, USGS, 1:100,000, 1997
Watersheds: California Fish & GAME, RWQCB, DWR 1:24000, 1997

Ocean, Bay: California State Lands Commission, US EPA Region 9, 1:24000, 1994

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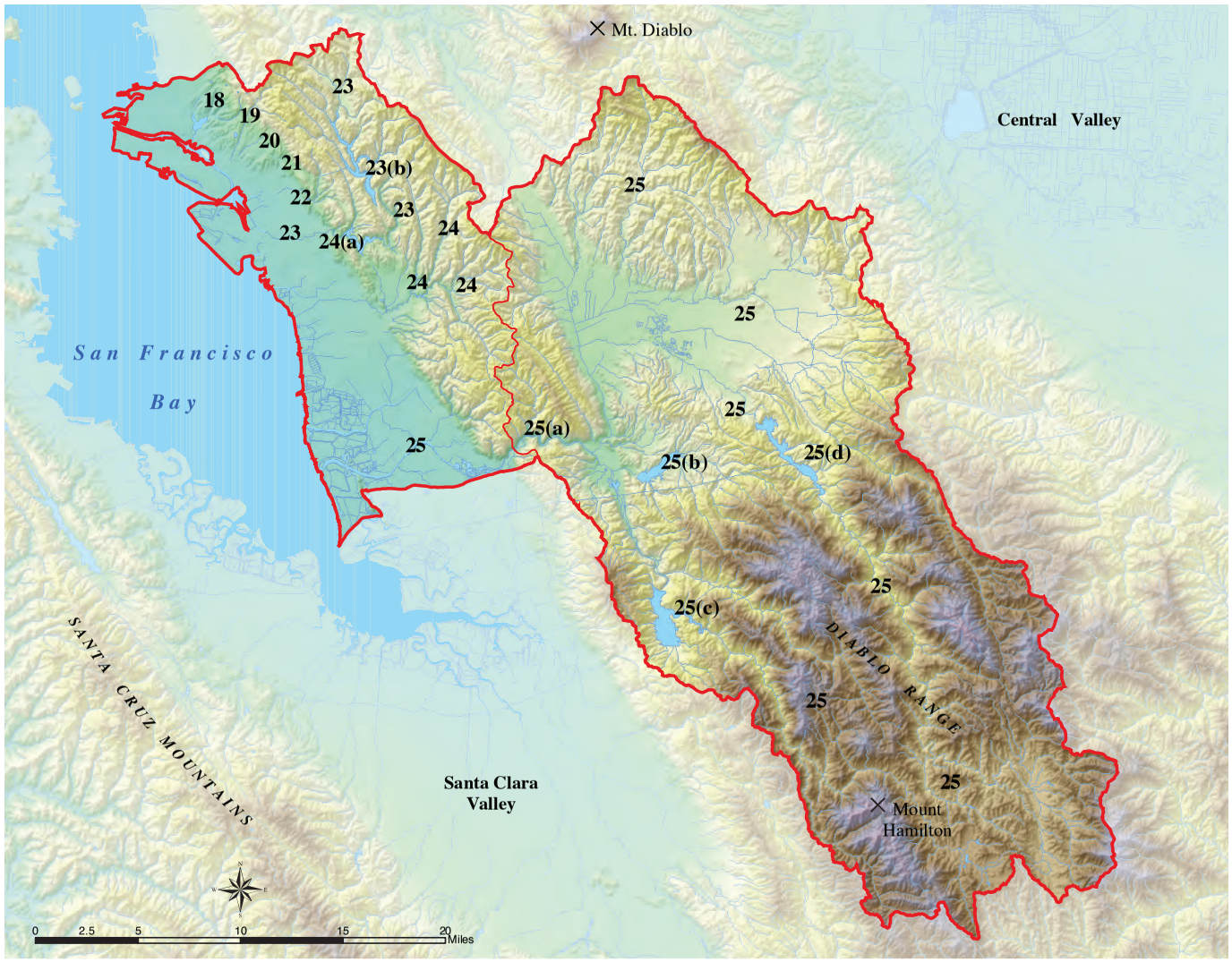
(c) Alameda County South - East Watershed Index



No.	Name
(18)	Glen Echo
(19)	Sausal Creek
(20)	Peralta Creek
(21)	Lion-Horseshoe Creek
(22)	Arroyo Viejo
(23)	San Leandro Creek
	(a) Chabot Lake
	(b) Upper San Leandro Reservoir
(24)	San Lorenzo Creek
(25)	Alameda Creek
	(a) Niles Canyon
	(b) San Antonio Reservoir
	(c) Calaveras Reservoir
	(d) Del Valle Reservoir

Index Map

Data Sources:

Shaded Relief: USGS 30 Meter National Elevation Data
Lakes: California Fish & GAME, SWRCB, 1:24000, 1997

Streams: RiverReach 3, US EPA, USGS, 1:100,000, 1997
Watersheds: California Fish & GAME, RWQCB, DWR 1:24000, 1997

Ocean, Bay: California State Lands Commission, US EPA Region 9, 1:24000, 1994

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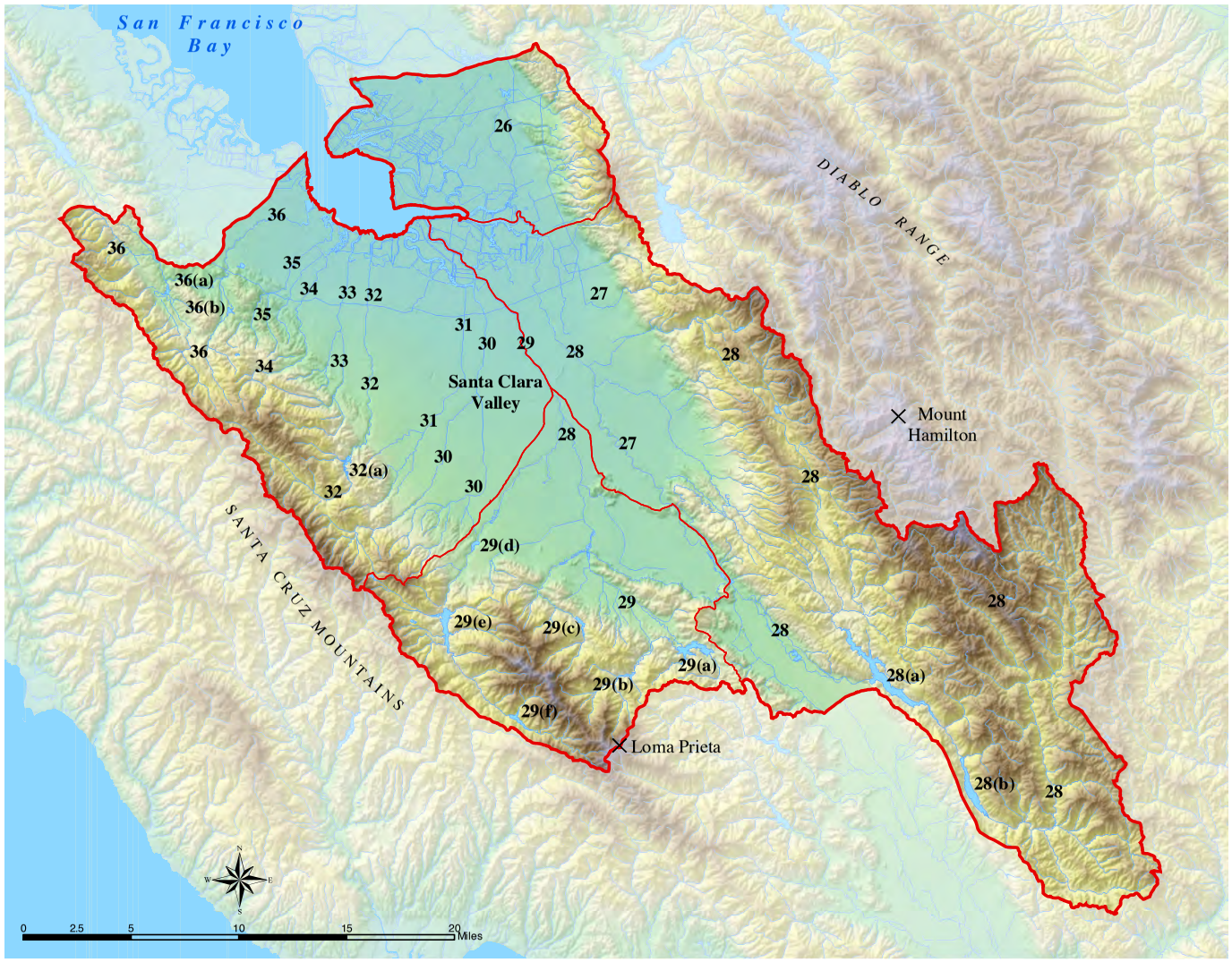
(d) Santa Clara County Watershed Index



No.	Name
(26)	Arroyo La Laguna
(27)	Lower Penitencia Creek
(28)	Coyote Creek
	(a) Anderson Reservoir
	(b) Coyote Reservoir
(29)	Guadalupe River
	(a) Calero Reservoir
	(b) Almaden Reservoir
	(c) Guadalupe Reservoir
	(d) Vasona Reservoir
	(e) Lexington Reservoir
	(f) Lake Elsman
(30)	San Tomas Aquinas - Saratoga Creek
(31)	Calabazas Creek
(32)	Stevens Creek
	(a) Stevens Creek Reservoir
(33)	Permanente Creek
(34)	Adobe Creek
(35)	Matadero - Barron Creek
(36)	San Francisquito Creek
	(a) Searsville Lake
	(b) Felt Lake

Index Map

Data Sources:

Shaded Relief: USGS 30 Meter National Elevation Data
Lakes: California Fish & GAME, SWRCB, 1:24000, 1997

Streams: RiverReach 3, US EPA, USGS, 1:100,000, 1997
Watersheds: California Fish & GAME, RWQCB, DWR 1:24000, 1997

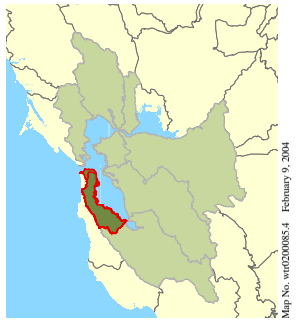
Ocean, Bay: California State Lands Commission, US EPA Region 9, 1:24000, 1994

EPA Region 9 GIS Center

(e) San Mateo County - San Francisco County Watershed Index

No.	Name
(37)	Redwood Creek - Arroyo Ojo de Aqua
(38)	Cordilleras Creek
(39)	Belmont Creek
(40)	Laurel Creek
(41)	San Mateo Creek
	(a) Upper Crystal Springs Reservoir
	(b) Lower Crystal Springs Reservoir
	(c) San Andreas Lake
(42)	Sanchez Creek
(43)	Easton Creek
(44)	Mills Creek
(45)	Colma Creek
(46)	Presidio Creek
(47)	Mountain Lake
(48)	Lake Merced

Index Map



Data Sources:

Shaded Relief: USGS 30 Meter National Elevation Data
Lakes: California Fish & GAME, SWRCB, 1:24000, 1997

Streams: RiverReach 3, US EPA, USGS, 1:100,000, 1997
Watersheds: California Fish & GAME, RWQCB, DWR 1:24000, 1997

Ocean, Bay: California State Lands Commission, US EPA Region 9, 1:24000, 1994

EPA Region 9 GIS Center

(f) Marin County - Sonoma County West Watershed Index

No.	Name
(49)	Coyote Creek
(50)	Arroyo Corte Madera del Presidio
(51)	Corte Madera Creek
(52)	Miller Creek
(53)	Pacheco Creek
(54)	Arroyo de San Jose
(55)	Novato Creek
(55a)	Stafford Lake
(56)	San Antonio Creek
(57)	Petaluma River

Index Map

Data Sources:

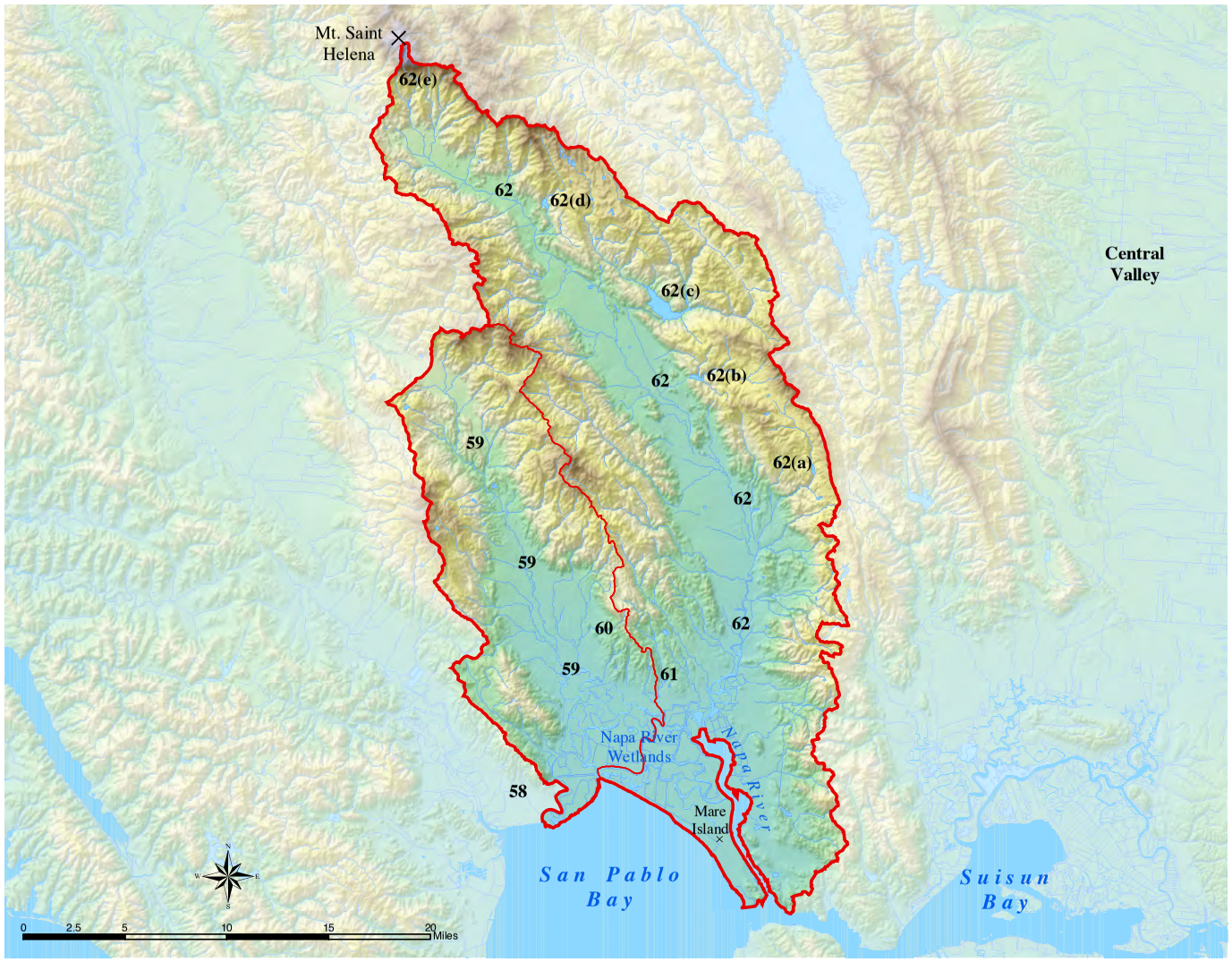
Shaded Relief: USGS 30 Meter National Elevation Data
Lakes: California Fish & GAME, SWRCB, 1:24000, 1997

Streams: RiverReach 3, US EPA, USGS, 1:100,000, 1997
Watersheds: California Fish & GAME, RWQCB, DWR 1:24000, 1997

Ocean, Bay: California State Lands Commission, US EPA Region 9, 1:24000, 1994

EPA Region 9 GIS Center

(g) Sonoma County East - Napa County Watershed Index



No.	Name
(58)	Tolay Creek
(59)	Sonoma Creek
(60)	Schell Creek
(61)	Huichica Creek
(62)	Napa River
	(a) Milliken Reservoir
	(b) Rector Reservoir
	(c) Lake Hennessey
	(d) Bell Canyon Reservoir
	(e) Kimball Canyon Dam

Data Sources:

Shaded Relief: USGS 30 Meter National Elevation Data
Lakes: California Fish & GAME, SWRCB, 1:24000, 1997

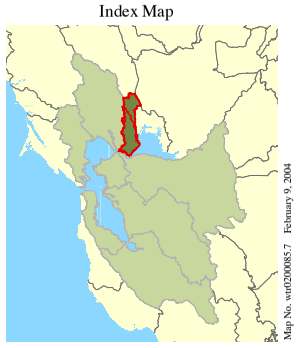
Streams: RiverReach 3, US EPA, USGS, 1:100,000, 1997
Watersheds: California Fish & GAME, RWQCB, DWR 1:24000, 1997

Ocean, Bay: California State Lands Commission, US EPA Region 9, 1:24000, 1994

EPA Region 9 GIS Center

(h) Solano County Watershed Index

No.	Name
(63)	Sulphur Springs Creek
	(a) Lake Herman
(64)	American Canyon Creek
(65)	Green Valley Creek
	(a) Lake Frey
	(b) Lake Madigen
(66)	Suisun Creek
	(a) Lake Curry



Data Sources:

Shaded Relief: USGS 30 Meter National Elevation Data
Lakes: California Fish & GAME, SWRCB, 1:24000, 1997

Streams: RiverReach 3, US EPA, USGS, 1:100,000, 1997
Watersheds: California Fish & GAME, RWQCB, DWR 1:24000, 1997

Ocean, Bay: California State Lands Commission, US EPA Region 9, 1:24000, 1994

EPA Region 9 GIS Center

APPENDIX II

Historical References for Native Stream Fishes for the Period 1854-1981, San Francisco Estuary, California

Historical (pre-1981) distributional records for native stream fishes in Appendix 2 are organized taxonomically by family and species, and in phylogenetic order. Scientific nomenclature and phylogeny follow Moyle (2002). In some instances common names for species (e.g., "suckers", "steelhead", etc.) are used, especially when quoting directly from a historical source. Within an individual species account, records are further organized by watershed and county (ies), beginning with Marsh Creek, in eastern Contra Costa County and continuing clockwise around the Estuary to Suisun Creek, Solano County. Named watersheds and tributary streams are presented in Appendix 1. Within a particular watershed, historical records are further organized chronologically from earliest to most recent record. While the amount of available information varies widely between records, data is typically organized as follows:

Collection locality (individually bolded for convenience), date of collection or source, type of survey (e.g., visual, electrofishing, seine or gill netting, fish kill, fish stocking record, etc.) and record collector(s), (source of information and publication date, followed by page number, if applicable, and for museum collections, collection or file number, followed by the number and size range of specimens, when available). In some instances, complete or partial quotations are directly excerpted from the primary source in order to augment a record; in these cases "quotation marks" are used. Records from the published literature are presented by author followed by publication year and, page number, and the number and size range of specimens, when available. Published sources are included in the Literature Cited section of this study.

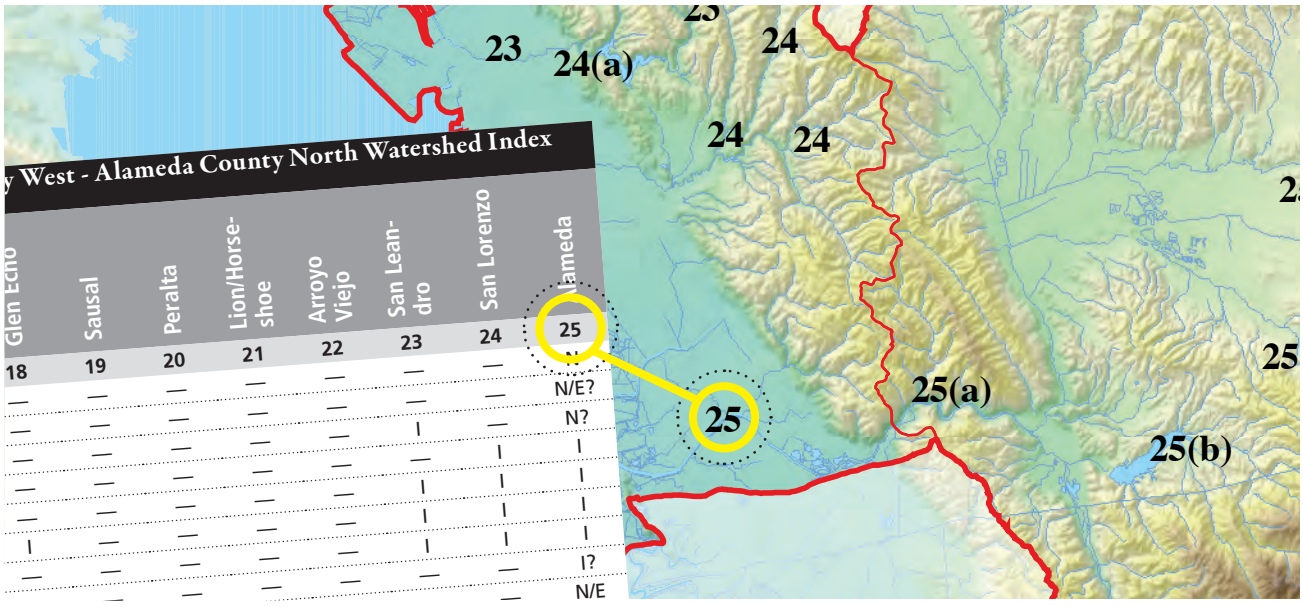
Historical records housed in museums and universities and in agency files for Estuary streams and selected portions of San Francisco Bay were collected from the sources are listed alphabetically below. Acronyms contained in the various records precede each source.

Note: **Appendix II** may not include all historical records documented in the literature after 1981. These records are cited in the main body of the report and may be found within **Section Vii. Literature Cited**.

ANSP	Academy of Natural Sciences, Philadelphia, PA;
BNMH	British National Museum of Natural History, London, Great Britian
CAS	California Academy of Sciences, San Francisco, CA;
CDFG	California Department of Fish and Game, Stream and Lake and Reservoir Files (Yountville, Menlo Park, and Monterey offices, CA);
CNHM	Chicago Field Museum of Natural History Museum, IL;
CU	Cornell University, NY;
FLMNH	Florida Museum of Natural History, FL;
IU	Indiana University, Natural History Survey, IND (housed at CAS);
KU	Kansas University Natural History Museum, KS;
MNHN	Museum of Natural History, Netherlands;
NRM	Swedish Museum of Natural History, Ichthyology Section;
SFSU	San Francisco State University, CA (records provided by Margaret Bradbury);
SIO	Scripts Institute of Oceanography, CA
SJSU	San Jose State University, CA (records provided by Jerry J. Smith);
SNSU	Sonoma State University, CA (records provided by John D. Hopkirk);
SSU	Sacramento State University, CA (records provided by Martin R. Brittan);
SU	Stanford University, CA (housed at CAS);
UCB	University of California, Berkeley (housed at CAS);
UCDPM	University of California, Davis (records provided by Peter B. Moyle);
UH	University of Hamburg, Ichthyology Collection, Germany;
UMMZ	University of Michigan, Museum of Zoology, Fish Division;
USNM	United States National Museum (Smithsonian Institution) of Natural History, Fish Collection, Washington, D.C.;
YPM	Peabody Museum of Natural History, Yale University, CT;
ZMH	University of Hamburg, Germany;

Appendix III

Presence of Fish Species by Watershed, San Francisco Estuary, California



Note:

The **number** associated with each stream name corresponds to numbering on maps within **Appendix I**. Listings of native and nonnative species within watersheds are complied from historical and recent records. The author accepts responsibility for any omissions and errors. The author also acknowledges that fish species may be added and/or deleted from the list as more information is developed from additional field sampling and museum research, and from natural and human-induced species' range contractions and expansions.

(a and b) pg. 175 - 176

Presence of Fish Species in Watersheds of Contra Costa County East and West Watershed Index

Common Name	Marsh	Mt. Diablo	Walnut/San Ramon	Arroyo Hambre	Canada del Cierbo	Rodeo	Refugio	Pinole	Garrity	San Pablo	Wildcat	Baxter
	1	2	3	4	5	6	7	8	9	10	11	12
Pacific lamprey	—	—	N?	—	—	—	—	—	—	—	—	—
White sturgeon	—	—	N	—	—	—	—	—	—	—	—	—
Common carp	—	—	I	—	—	—	—	I	—	I	I	I
Goldfish	—	—	I	—	—	—	—	I	—	—	—	—
Golden shiner	—	—	I	—	—	—	—	I	—	—	I	—
Fathead minnow	—	—	I	—	—	—	—	—	—	—	—	—
Thicktail chub	N/E	—	N/E	—	—	—	—	—	—	—	—	—
Hitch	N	—	N	—	—	N	—	—	—	—	I/E	—
California roach	N	N	N	N	—	N	—	N	—	N	—	—
Sacramento blackfish	N	—	N	—	—	—	—	—	—	—	—	—
Sacramento splittail	N	—	N	—	—	—	—	—	—	N?	N?	—
Hardhead	N/E	—	—	—	—	—	—	—	—	N/E	N/E	—
Sacramento pikeminnow	N	—	N	—	—	N	—	N	N	N	N	—
Sacramento sucker	N	N	N	N	—	N	—	N	—	N	N	—
Channel catfish	—	—	—	—	—	—	—	—	—	—	I	—
White catfish	—	—	I	—	—	—	—	I	—	—	—	—
Brown bullhead	—	—	—	—	—	—	—	I	—	I	—	—
Black bullhead	—	—	I	—	—	—	—	—	—	—	—	—
Delta smelt	—	—	N?	—	—	—	—	—	—	—	—	—
Coho salmon	—	—	N/E	—	—	—	—	—	—	N/E	—	—
Chinook salmon	N	—	N	N	—	—	—	—	—	—	—	—
Rainbow trout	N?	N	N	N?	—	—	—	N	—	N	N	—
Rainwater killifish	—	—	I	I	—	I	—	I	I	—	—	I
Western mosquitofish	I	I	I	I	—	I	I	I	I	I	I	I
Inland silverside	—	—	I	I	—	—	—	I	—	—	—	—
Threespine stickleback	N	N	N	N	—	N	N	N	N	N	N	N
Striped bass	I	I	I	—	—	—	—	—	I	—		—
Sacramento perch	N/E	—	N/E	I	—	—	—	—	—	—	I	—
Black crappie	—	—	I	—	—	—	—	—	—	—	I	—
Green sunfish	I	—	I	—	—	I	—	I	—	—	I	—
Bluegill	I	—	I	—	—	—	—	—	—	I	I	—
Pumpkinseed	—	—	I	—	—	—	—	—	—	—		—
Redear sunfish	—	—	I	—	—	—	—	—	—	—	I	—
Largemouth bass	—	—	I	—	—	—	—	—	—	I	I	—
Yellowfin goby	—	—	I	I	—	—	—	I	I	—	—	—
Longjaw mudsucker	—	—	—	—	—	—	—	—	N	—	—	—
Shimofuri goby	—	—	I	—	—	—	—	—	—	—	—	—
Chameleon goby	—	—	I	—	—	—	—	—	—	—	—	—
Staghorn sculpin	—	—	N	—	—	—	—	—	—	—	—	N
Prickly sculpin	—	N	N	—	—	—	—	N	—	N	—	—
No. native species	**12**	**5**	**17**	**5**	**?**	**5**	**1**	**6**	**3**	**9**	**6**	**2**
No. introduced species	**4**	**2**	**19**	**5**	**?**	**3**	**1**	**10**	**4**	**5**	**11**	**3**
Total species	**16**	**7**	**36**	**10**	**?**	**8**	**2**	**16**	**7**	**14**	**17**	**5**

Abbreviations: N, native; I, nonnative; E, extinct in watershed; ?, status uncertain.

(**b** and **c**) *pg. 176 - 177*

Presence of Fish Species in Watersheds of Contra Costa County West - Alameda County North, South and East Watershed Index

Common Name	Cerrito	Codornices	Strawberry	Claremont	Temescal	Glen Echo	Sausal	Peralta	Lion/Horse-shoe	Arroyo Viejo	San Lean-dro	San Lorenzo	Alameda
	13	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
Pacific lamprey	—	—	—	—	—	—	—	—	—	—	—	—	N
River lamprey	—	—	—	—	—	—	—	—	—	—	—	—	N/E?
White sturgeon	—	—	—	—	I	—	—	—	—	—	I	—	N?
Threadfin shad	—	—	—		—	—	—	—	—	—	—	I	I
Common carp	—	—	—	—	I	—	—	—	—	—	I	I	I
Goldfish	—	—	—	—	I	I	—	—	—	—	I	I	I
Golden shiner	—	—	—	—	I	—	—	—	—	—	I	I	I
Tui chub	—	—	—	—	—	—	—	—	—	—	—	—	I?
Thicktail Chub	—	—	N/E	—	N/E	—	—	—	—	—	—	—	N/E
Hitch	—	—	—	—	I*	—	—	—	—	—	N	—	N
California roach	—	—	N/I	—	—	—	—	—	—	—	—	N	N
Sacramento blackfish	—	—	—	—	—	—	—	—	—	—	—	—	N
Sacramento splittail	—	—	—	—	—	—	—	—	—	—	—	—	N/E
Hardhead	—	—	—	—	—	—	—	—	—	—	—	—	N?
Sacramento pikeminnow	—	—	—	—	—	—	—	—	—	—	—	N	N
Speckled dace	—	—	—	—	—	—	—	—	—	—	—	—	N/E?
Sacramento sucker	—	—	N/I	—	—	—	—	—	—	—	N	N	N
Channel catfish	—	—	—	—	I*	—	—	—	—	—	I	I*	I*
White catfish	—	—	—	—	—	—	—	—	—	—	—	—	I*
Brown bullhead	—	—	—	—	—	—	—	—	—	—	—	I*	I
Black bullhead	—	—	—	—	—	—	—	—	—	—	—	—	I*
Coho salmon	—	—	N/E	—	—	—	—	—	—	—	N/E	N?/E	N/E
Chinook salmon	—	—	—	—	—	N?	—	—	—	—	N/E	—	N
Rainbow trout	—	N	N/E	—	N/E	—	N	N	N	N?/E	N	N	N
Brown trout	—	—	—	—	—	—	—	—	—	—	—	—	I?
Brook trout	—	—	—	—	—	—	—	—	—	—	—	—	I/E
Rainwater killifish	I	—	—	—	—	—	—	—	—	—	—	—	I
Western mosquitofish	I	I	—	—	I	I	—	—	—	I	—	I	I
Inland silverside	—	—	—	—	—	—	—	—	—	—	I		I
Threespine stickleback	N	N	N/I	—	N	N	—	N	—	N	N	N	N
Striped bass	I	—	—	—	—	—	—	—	—	—	—	—	I
Sacramento perch	—	—	N/E	—	N/I	—	—	—	—	—	—	—	N/E?
Black crappie	—	—	—	—	I*	—	—	—	—	—	I	I*	I*
White crappie	—	—	—	—	—	—	—	—	—	—	—	I*	—
Warmouth	—	—	—	—	—	—	—	—	—	—	I	I*	—
Green sunfish	—	—	—	—	I	I	—	—	—	—	I	I	I
Bluegill	—	—	—	—	I	—	—	—	—	—	I	I	I
Redear sunfish	—	—	—	—	I	—	—	—	—	—	—	I*	I
Largemouth bass	—	—	—	—	I	—	—	—	—	—	I	I*	I
Smallmouth bass	—	—	—	—	—	—	—	—	—	—	—	I	I
Redeye bass	—	—	—	—	—	—	—	—	—	—	—	—	I*
Bigscale logperch	—	—	—	—	—	—	—	—	—	—	—	—	I
Shiner perch,	—	—	—	—	—	—	—	—	—	—	—	—	N
Tule perch	—	—	—	—	N/I/E	—	—	—	—	—	—	—	N?
Yellowfin goby	—	—	—	—	—	—	—	—	—	—	—	—	I
Longjaw mudsucker	—	—	—	—	—	—	—	—	—	—	—	—	N
Staghorn sculpin	—	—	—	—	—	—	—	—	—	—	—	—	N
Prickly sculpin	—	N	N/I	—	—	—	—	—	—	—	N	N	N
Riffle sculpin	—	—	—	—	—	—	—	—	—	—	N?	—	N?
Starry flounder	—	—	—	—	—	—	—	—	—	—	—	—	N
No. native species	**1**	**3**	**8**	**0**	**5**	**2**	**2**	**2**	**1**	**2**	**8**	**7**	**24**
No. introduced species	**3**	**1**	**0**	**0**	**13**	**3**	**0**	**0**	**0**	**1**	**11**	**15**	**24**
Total species	**4**	**4**	**8**	**0**	**17**	**5**	**2**	**2**	**1**	**3**	**19**	**22**	**48**

Abbreviations: N, native; I, nonnative; E, extinct in watershed; ?, status uncertain. Emboldened font identifies populations at risk of extinction

* Primarily a reservoir species, but locally common in streams.

Presence of Fish Species in Watersheds of Santa Clara County Watershed Index

Common Name	Arroyo la Laguna	Lower Peni-tencia	Coyote	Guadalupe	San Tomas Aquinas/Sara-toga	Calabazas	Stevens	Permanente	Adobe	Matadero/Bar-ron	San Francis-quito
	26	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
Pacific lamprey	—	—	N	N	—	—	—	—	—	—	—
Western brook lamprey	—	—	N/E?	—	—	—	—	—	—	—	—
White sturgeon	—	—	N	N	—	—	—	—	—	—	—
Threadfin shad	—	—	I	I*	—	—	—	—	—	—	—
American shad	—	—	I	N	—	—	—	—	—	—	—
Common carp	—	I	I	I	I	—	I	I	I	—	—
Goldfish	I?	—	I	I	I	I	I	—	—	—	—
Golden shiner	—	—	I	I	I	—	—	—	—	—	—
Fathead minnow	—	—	I	—	—	—	—	—	—	—	—
Red shiner	—	—	I	I	—	—	—	—	—	—	—
Thicktail chub	—	—	N/E	—	—	—	—	—	—	—	—
Hitch	N	—	N	N	N	—	N	—	—	—	N?
California roach	N	—	N	N	N	N?	N	N	N	N	N
Sacramento blackfish	—	—	N	N	—	—	—	—	—	N	—
Sacramento splittail	—	—	N/E?	N/E?	—	—	—	—	—	—	—
Sacramento pikeminnow	—	—	N	N	—	—	N	—	—	—	N/E?
Speckled dace	—	—	N/E	—	—	—	—	—	—	—	N/E?
Sacramento sucker	—	—	N	N	N	—	N	N	N	N	N
Channel catfish	—	—	I	I*	—	—	I*	—	—	—	—
White catfish	—	—	I*	I*	—	—	—	—	—	—	—
Brown bullhead	—	—	I	I	—	—	—	—	—	—	I
Black bullhead	—	—	—	I*	—	—	—	—	—	—	—
Yellow bullhead	—	—	I?	—	—	—	—	—	—	—	—
Longfin smelt	—	—	N	N	—	—	—	—	—	—	—
Pink salmon	—	—	—	N?	—	—	—	—	—	—	—
Coho salmon	—	—	N/E	N?/E	—	—	—	—	—	—	N/E
Chum salmon	—	—	—	N?	—	—	—	—	—	—	—
Chinook salmon	—	—	N	N	N/E?	—	—	—	—	—	N?
Rainbow trout	—	N/E	N	N	N	N/E	N	N/E	N/E	N/E	N
Brown trout	—	—	I/E?	I/E?	—	—	I/E	—	—	—	—
Rainwater killifish	—	—	I	I	I	—		I	I	I	I
Western mosquitofish	I	I	I	I	I	I	I	I	I	I	I
Inland silverside	—	—	I	I	—	—	I*	—	—	—	—
Threespine stickleback	N	—	N	N	N	N	N	N	N	N	N
Striped bass	—	—	I	I	—	—	—	—	—	—	—
Sacramento perch	—	—	N/E	—	—	—	—	—	—	—	N/E
Black crappie	—	—	I*	I*	—	—	—	—	—	—	I*?
White crappie	—	—	I*	I*	—	—	—	—	—	—	—
Green sunfish	—	—	I	I	—	—	I	—	—	I	I
Bluegill	—	—	I	I	—	—	I	I	—	I	I
Pumpkinseed	—	—	I	I*	—	—	—	—	—		I?
Redear sunfish	—	—	I*	I*	—	—	—	—	—	I	I?
Largemouth bass	—	—	I	I	—	—	I	—	—	—	I
Smallmouth bass	—	—	I	I	—	—	—	—	—	—	—
Bigscale logperch	—	—	I	—	—	—	—	—	—	—	—
Shiner perch	—	—	N	N	—	—	—	—	—	—	—
Tule perch	—	—	N	N	—	—	—	—	—	—	—
Yellowfin goby	—	—	I	I	—	—	—	—	—	—	—
Longjaw mudsucker	—	—	N	N	—	—	—	—	—	—	—
Staghorn sculpin	—	—	N	N	—	—	—	—	—	—	—
Prickly sculpin	—	—	N	N	—	—	—	—	N	N	N
Riffle sculpin	—	—	N	N	—	—	—	—	—	—	N
Starry flounder	—	—	N	N	—	—	—	—	—	—	N
No. native species	**3**	**1**	**24**	**23**	**6**	**3**	**6**	**4**	**5**	**6**	**13**
No. introduced species	**2**	**2**	**26**	**23**	**5**	**2**	**9**	**4**	**3**	**5**	**9**
Total species	**5**	**3**	**50**	**46**	**11**	**5**	**15**	**8**	**8**	**11**	**22**

Abbreviations: N, native; I, nonnative; E, extinct in watershed; ?, status uncertain. Emboldened font identifies populations at risk of extinction.

* Primarily reservoir resident, but locally common in streams.

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Presence of Fish Species in Watersheds of San Mateo-Santa Francisco County Watershed Index

Common Name	Redwood/Arroyo Ojo de Agua	Cordilleras	Belmont	Laurel	San Mateo	Sanchez	Easton	Mills	Colma
	37	**38**	**39**	**40**	**41[a]**	**42**	**43**	**44**	**45**
Pacific lamprey	—	—	—	—	N?	—	—	—	—
California roach	—	—	—	—	N	—	—	—	—
Sacramento sucker	—	—	—	—	N	—	—	—	—
Coho salmon	—	—	—	—	N/E	—	—	—	—
Rainbow trout	—	—	—	—	N			N?	—
Rainwater killifish	I	I	I	I	I	I	—		I
Western mosquitofish	I	I	I	I	I	—	—	I	I
Threespine stickleback	N	N	N	N	N	N	—	—	N
Green sunfish	—	—	—	—	—	I	—	—	—
Redear sunfish	—	—	—	—	—	I	—	—	—
Tule perch	—	—	—	—	N/E?	—	—	—	—
Yellowfin goby	—	—	—	—	—	—	—	—	I
Staghorn sculpin	—	—	—	—	N	—	—	—	N
Prickly sculpin	—	—	—	—	N	—	—	—	—
Riffle sculpin	—	—	—	—	N/E?	—	—	—	—
No. native species	**1**	**1**	**1**	**1**	**10**	**1**	**?**	**1**	**2**
No. introduced species	**2**	**2**	**2**	**2**	**2**	**4**	**?**	**1**	**3**
Total species	**3**	**3**	**3**	**3**	**12**	**5**	**?**	**2**	**5**

[a]Known stream fishes only. Fish species found in Crystal Springs Reservoir not included. Abbreviations: N, native; I, nonnative; E, extint in watershed; ?, status uncertain.

(e) pg. 179

Presence of Fish Species in Watersheds of San Francisco County Watershed Index

Common Name	Presidio	Mountain Lake	Lake Merced
	46	**47**	**48**
American shad	—	—	I
Common carp	—	—	I
Goldfish	—	—	I
Golden shiner	—	—	I
Hitch	—	—	N/I?
California roach	—	—	N/I?
Sacramento blackfish	—	—	N/I?
Sacramento spittail	N/E[1]	—	—
Sacramento sucker	—	—	N/I?
White catfish	—	—	I
Rainbow trout	—	—	I
Western mosquitofish	—	—	I
Threespine stickleback	N	N	N
Sacramento perch	—	—	N/I?
Green sunfish	—	—	I
Bluegill	—	—	I
Largemouth bass	—	—	I
Tule perch	—	—	N/I?
Tidewater goby	—	—	N/E
Prickly sculpin	—	N	N
No. native species	**2**	**2**	**9(+6?)**
No. introduced species	**0**	**0**	**10**
Total species	**2**	**2**	**19**

Abbreviations: N, native; I, nonnative; E, extinct in watershed; ?, status uncertain.

[1]Crissey Field tidal marsh?

(f) pg. 180

Presence of Fish Species in Watersheds of Marin County - Sonoma County West Watershed Index

Common Name	Coyote	Arroyo Corte Madera del Presidio	Corte Madera	Miller	Pacheco	Arroyo San Jose	Novato	San Antonio
	49	**50**	**51**	**52**	**53**	**54**	**55**	**56**
Pacific lamprey	—	—	N?	—	—	—	—	—
Common carp	—	—	I	I	—	—	—	—
California roach	—	N	N	N	—	N	N	N
Sacramento pikeminnow	—	N	N	—	—	—	N	—
Sacramento splittail	—	—	—	—	—	—	—	N?
Sacramento sucker	—	—	N	N/E	—	N	N	—
Coho salmon	—	N/E	N/E	—	—	—	—	—
Chinook salmon	—	—	N	—	—	N	—	—
Rainbow trout	N?/E	N	N	N	N?/E	N	N	N/E
Rainwater killifish	—	I	I	—	—	—	I	—
Western mosquitofish	—	I	I	—	—	I	I	I
Inland silverside	I	—	—	—	—	—	—	—
Threespine stickleback	N	N	N	N	N	N	N	N
Striped bass	—	—	—	—	—	—	I	—
Sacramento perch	—	—	N/E	—	—	—	—	—
Black crappie	—	—	I?	—	—	—	—	—
Green sunfish	—	—	—	—	—	—	I	—
Tule perch	—	—	N/E	—	—	—	—	—
Tidewater goby	—	—	N/E	—	—	—	N/E	—
Longjaw mudsucker	—	—	N	—	—	—	—	—
Staghorn sculpin	—	N	N	N	—	—	—	—
Prickly sculpin	—	N	N	N	—	N	N	—
Riffle sculpin	—	—	N	N	—	—	—	—
Starry flounder	—	—	N	—	—	—	—	—
No. native species	**2**	**7**	**16**	**7**	**2**	**6**	**7**	**4**
No. introduced species	**1**	**2**	**4**	**1**	**0**	**1**	**4**	**1**
Total species	**3**	**9**	**20**	**8**	**2**	**7**	**11**	**5**

Abbreviations: N, native; I, nonnative; E, extinct in watershed; ?, status uncertain. Emboldened font identifies populations at risk of extinction.

(f and g) pg. 181

Presence of Fish Species in Watersheds of Sonoma County West, East - Napa CountyWatershed Index

Common Name	Petaluma	Tolay	Sonoma	Schell
	57	58	59	60
Pacific lamprey	N	—	N	—
River lamprey	—	—	N/E?	—
Green sturgeon	N	—	—	—
White sturgeon	N	—	N	—
Threadfin shad	I	—	—	—
American shad	I	—	—	—
Common carp	I	—	I	—
Goldfish	I	—	—	—
Golden shiner	I	—	—	—
Fathead minnow	I	—	—	—
California roach	N	—	N	N
Sacramento blackfish	N	—	—	—
Sacramento splittail	N	—	N?	—
Sacramento pikeminnow	N	—	N	—
Sacramento sucker	N	—	N	—
Brown bullhead	I	—	—	—
Delta smelt	N	—	—	—
Longfin smelt	N	—	—	—
Coho salmon	—	—	N?/E	—
Chinook salmon	N	—	N	—
Rainbow trout	N	—	N	N
Brown trout	—	—	—	I?
Rainwater killifish	I	—	—	—
Western mosquitofish	I	—	I	I
Inland silverside	I	—	—	—
Threespine stickleback	N	N	N	N
Striped bass	I	—	I	—
Black crappie	I	—	—	—
Green sunfish	I	—	I	—
Bluegill	I	—	I	—
Largemouth bass	I	—	I	—
Bigscale logperch	I	—	—	—
Shiner perch	N	—	N	—
Tule perch	N	—	N	—
Yellowfin goby	I	—	I	—
Longjaw mudsucker	—	—	N	—
Shimofuri goby	I	—	—	—
Chameleon goby	I	—	I	—
Staghorn sculpin	N	—	N	—
Prickly sculpin	N	—	N	—
Riffle sculpin	N	—	N	—
Coastrange sculpin	N/E?	—	—	—
Starry flounder	N	—	N	—
No. native species	**20**	**1**	**18 (2?)**	**3**
No. introduced species	**19**	**0**	**8**	**2**
Total species	**39**	**1**	**26**	**5**

Abbreviations: N, native; I, nonnative; E, extinct in watershed; ?, status uncertain.

(g) pg. 181

Presence of Fish Species in Watersheds of Napa County Watershed Index

Common Name	Huichica	Napa
	61	62
Pacific lamprey	N	N
River lamprey	—	N
White sturgeon	—	N
Threadfin shad	—	I
American shad	—	I
Common carp	—	I
Goldfish	—	I
Golden shiner	—	I
Thicktail chub	—	N/E
Hitch	—	N
California roach	N	N
Sacramento blackfish	—	N
Sacramento splittail	—	N
Hardhead	—	N
Sacramento pikeminnow	—	N
Sacramento sucker	—	N
Channel catfish	—	I
White catfish	—	I
Brown bullhead	—	I
Black bullhead	—	I
Delta smelt	—	N
Wakasagi	—	I
Longfin smelt	—	N
Coho salmon	—	N?/E
Chum salmon	—	N
Chinook salmon	—	N
Rainbow trout	N	N
Brown trout	—	I?
Rainwater killifish	—	I
Western mosquitofish	—	I
Inland silverside	—	I
Threespine stickleback	N	N
Striped bass	—	I
Sacramento perch	—	N/E
Black crappie	—	I*
White crappie	—	I*
Green sunfish	I	I
Bluegill	I	I
Redear sunfish	—	I
Largemouth bass	I	I
Smallmouth bass	—	I
Shiner perch	—	N
Tule perch	—	N
Tidewater goby	—	N?/E
Yellowfin goby	—	I
Longjaw mudsucker	—	N
Shimofuri goby	—	I
Staghorn sculpin	—	N
Prickly sculpin	—	N
Riffle sculpin	—	N
Coastrange sculpin	—	N?/E
Starry flounder	—	N
No. native species	**4**	**28**
No. introduced species	**3**	**24**
Total species	**7**	**52**

Abbreviations: N, native; I, nonnative; E, extinct in watershed; ?, status uncertain.

* Primarily a reservoir resident, but locally common in streams.

(h) *pg. 182*

Presence of Fish Species in Watersheds of Solano County Watershed Index

Common Name	Sulphur Springs	American Canyon	Green Valley	Suisun
	63	**64**	**65**	**66**
Pacific lamprey	—	—	N	N
Common carp	—	—	I	I
Golden shiner	—	—	—	I
Fathead minnow	—	—	—	I
Hitch	—	—	—	N
California roach	—	N	N	N
Sacramento blackfish	—	—	—	N
Sacramento pikeminnow	—	—	N	N
Sacramento sucker	—	N	N	N
Delta smelt	—	—	—	N
Chinook salmon	—	—	—	N
Rainbow trout	N/E?	N?	N	N
Rainwater killifish	—	—	I	I
Western mosquitofish	—	—	I	—
Inland silverside	—	—	I	—
Threespine stickleback	—	N	N	N
Striped bass	—	—	—	I
Black crappie	—	—	—	I*
Green sunfish	—	—	—	I
Bluegill	—	—	—	I
Largemouth bass	—	—	—	I
Tule perch	—	—	N	N
Yellowfin goby	—	—	I	—
Prickly sculpin	—	N	N	N
Riffle sculpin	—	—	N	—
No. native species	**1**	**5**	**9**	**12**
No. introduced species	**0**	**0**	**5**	**8**
Total species	**1**	**5**	**14**	**21**
Percent native species	**100**	**100**	**64**	**58**

Abbreviations: N, native; I, nonnative; E, extinct in watershed; ?, status uncertain. [1]Reservoir fishes not included.

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above
Fish sample station, Arroyo Hondo Creek, Alameda County.

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