

## LIST OF FIGURES

- Figure 1-1. Map of the San Lorenzo River watershed
- Figure 2-1. The Santa Cruz Mountains Bioregion
- Figure 2-2. Protected areas within the San Lorenzo River Watershed.
- Figure 2-3. Primary land uses in the vicinity of the District's surface water sources
- Figure 2-4. District-owned watershed land is typically forested, rugged, and steep
- Figure 2-5. Monthly minimum, maximum and average flows diverted from the District's northern system creeks
- Figure 2-6. Annual minimum, maximum and average flows diverted from northern system creeks, from 1984 – 2006.
- Figure 2-7. Location of the Olympia ground water basin
- Figure 2-8. Location of the Quail Hollow ground water basin
- Figure 2-9. Location of the Pasatiempo wellfield
- Figure 3-1. Mean annual precipitation (inches/year) on Ben Lomond Mountain
- Figure 3-2. San Lorenzo River average daily flows for the month of October, 1937-1997, measured at Big Trees
- Figure 3-3. San Lorenzo River average daily flows for the month of December, 1937-1997, measured at Big Trees
- Figure 3-4. The old Olympia quarry immediately west of the District's Olympia wells
- Figure 3-5. Recharge area for the Olympia well field
- Figure 3-6. Quail Hollow well 5A recharge area
- Figure 3-7. Quail Hollow well 4A recharge area
- Figure 3-8. Recharge area for Pasatiempo well 6.
- Figure 3-9. Recharge area for Pasatiempo well 7.
- Figure 3-10. Three Geologic areas and major fault zones of the San Lorenzo River watershed.
- Figure 3-11. Composite stratigraphic section of tertiary rocks of the central Santa Cruz Mountains northeast of San Gregorio fault
- Figure 3-12. Geology of the District's stream diversion watersheds
- Figure 3-13. Sediment yield rating curve for the San Lorenzo River at Big Trees\*
- Figure 3-14. Synthetic suspended sediment yield for the San Lorenzo River at Big Trees\*
- Figure 3-15: Distribution of landslides and debris flows from January 1982 storms.
- Figure 3-16. Development by decade and cumulatively for the San Lorenzo River watershed .
- Figure 3-17. Source water protection zones for Peavine, Silver, and Foreman creek intakes.
- Figure 3-18. Source water protection zones for Clear and Sweetwater creek intakes.

Figure 3-19. Areas with reported annual agricultural pesticide and herbicide use in Santa Cruz County, 2002.

Figure 4-1. Typical mixed conifer forest in the San Lorenzo River watershed.

Figure 4-2. Undisturbed forest floor in a mature forest on District watershed land.

Figure 4-3. The rare sandhills community at the District-owned Olympia watershed lands.

Figure 4-4. Chaparral and riparian woodland habitat at the District-owned Olympia watershed lands.

Figure 4-5. Riparian habitat in Quail Hollow above the District's well.

Figure 4-6. Class 2 logs and their structural features important for habitat.

Figure 4-7. Number of coho salmon found in a stream in relation to amount of instream wood.

Figure 4-8. Large redwood logs forming instream wood.

Figure 4-9. Large instream wood creates habitat favorable to native salmonids.

Figure 4-10. An example of good potential instream wood along the San Lorenzo River.

Figure 4-11. Counting fish in Zayante Creek.

Figure 4-12. Stages of standing snags, and classes of decomposition of downed logs.

Figure 5.1 Cal Fire's proposed fire hazard severity zones for Santa Cruz County.

Figure 6.1 The Holmes Limekilns in Felton.

Figure 6.2 Flume in the San Lorenzo Valley circa 1870.

Figure 7-1. The carbon cycle.

Figure A-1. Adult steelhead netted in the middle mainstem near Ben Lomond.

Figure A-2. Pacific lamprey from the San Lorenzo River.

Figure A-3. Life cycles of coho salmon and steelhead.

Figure A-4. Ocean and freshwater phases of steelhead.

Figure A-5. Small young-of-the-year coho salmon and steelhead captured in Bean Creek .

Figure A-6. Reach\* and site designations in the San Lorenzo River drainage.

Figure A-7. Morphological changes in ocean and freshwater life stages of coho salmon.

Figure A-8. Streambank erosion on the upper San Lorenzo River.

Figure A-9. Bedrock scoured pool in the middle San Lorenzo River.

Figure A-10. Linear relationship between streamflow at the Big Trees Gage and fall density of yearling (smolt-sized) juvenile steelhead in the middle mainstem San Lorenzo River.

Figure A-11. Linear relationship between annual minimum daily streamflow at Big Trees gage and fall density of yearling (smolt-sized) juvenile steelhead, in the middle mainstem San Lorenzo River.

Figure A-12. Linear relationship between annual minimum streamflow and young-of-the-year steelhead density in Zayante Creek.

Figure A-13. Concrete apron at the Highway 9 culvert.

Figure A-14. Location of identified fish passage impediments on the San Lorenzo River and its major tributaries.

Figure A-15. Trend in total number of juvenile steelhead per year for the mainstem San Lorenzo River from 1996-2001.

Figure A-16. Trends in the index of adult steelhead returns projected for the San Lorenzo River, based on year of juvenile production.

## LIST OF TABLES

- Table 2-1 Connections, populations served by the northern and southern water systems
- Table 2-2. Monthly minimum, maximum and average flows diverted from northern system creeks, from 1984 -2006.
- Table 2-3. Annual minimum, maximum and average flows diverted from District northern system creeks, from 1984 – 2006.
- Table 3-1. Monthly rainfall record for Ben Lomond 4 NOAA Station, Water Years 1973-2007 (Inches)
- Table 3-2. Average precipitation and streamflow for District surface water supply creeks
- Table 3-3. Characteristics and erosional variables of geologic units in the San Lorenzo River watershed.
- Table 3-4. Estimated sediment yield in the San Lorenzo River watershed, by subwatershed and source category.
- Table 3-5. Description of erosion sources in the San Lorenzo River watershed.
- Table 3-6. Sediment source estimates in the San Lorenzo River watershed.
- Table 3-7. Sediment source categories and estimated contributions.
- Table 3-8. Sediment erosion from road cuts in the Zayante study area.
- Table 3-9. Aquifer rock types and their naturally occurring water quality limitations.
- Table 4-1. Special species of the sandhills and sand parkland habitats.
- Table 4-2. Endangered species in Santa Cruz County.
- Table 4-3. Status of bat species observed in the San Lorenzo River watershed.
- Table 4-4. Special status animal species of the sandhills communities.
- Table 4-5. Special status wildlife species and their predicted occurrence on the City of Santa Cruz watershed lands.
- Table 4-6. Guide to determining decay class of downed logs in a forest.
- Table 4-7. Santa Cruz County invasive exotic\* plants.
- Table 5-1. Mean fire intervals (MFI) in various vegetation types by historic fire regime in the Monterey Bay area.
- Table 7-1. Global carbon stocks in vegetation and soil carbon pools down to a depth of 1 m.
- Table 7-2. Emissions avoidance through conservation of existing stocks: Forest conservation-protection.
- Table 7-3. Forestry practices that sequester or preserve carbon.

- Table A-1. Forest practices outside the fog belt and their potential impacts to stream environments, habitat quality, and salmonid growth and survival.
- Table A-2. Coastal forest practices in the fog belt and their potential impacts to local coastal stream environments, habitat quality, and salmonid growth and survival.
- Table A-3. Baseline riparian tree canopy closure in the San Lorenzo River watershed. (Refer to map in Figure 4-6).
- Table A-4. Habitat proportions and percent contribution of juvenile production to adult steelhead index of mainstem segments and major tributaries of the San Lorenzo River watershed\*
- Table A-5. Terms used in aquatic habitat typing.
- Table A-6. Habitat proportions & percent contribution of juvenile production to adult steelhead index of mainstem segments & major tributaries of the San Lorenzo River watershed\*
- Table A-7. Limiting factors affecting rearing habitat quality variables on the San Lorenzo River.
- Table A-8. Assessment of limiting factors for the San Lorenzo River and major tributaries.
- Table A-9. Estimated reduction in fish numbers in the middle reaches of the mainstem San Lorenzo River due to sedimentation (A)\* and streamflow extraction (B).\*\*
- Table A-10. Estimated\* average daily maximum flow extractions (in cfs) at Fish Enhancement Strategy monitoring reaches.
- Table A-11. Estimated instantaneous flow extractions in September and associated estimates of reduced density for yearling-sized young-of-the-year fish (YOYs) at mainstem river sites and reduced total YOY density at tributary sites.
- Table A-12. Description and locations of identified fish passage barriers on the San Lorenzo River and its major tributaries.
- Table A-13. Passage impediments\* identified by Community Action Board staff in summer 2001 on the San Lorenzo River mainstem
- Table A-14. Number of stocked juvenile steelhead and coho smolts in the San Lorenzo River mainstem, 1959-2000.
- Table A-15. Estimates and indices of returning adult steelhead and adult coho salmon to the San Lorenzo River.
- Table A-16. Estimated trend in juvenile steelhead (rounded to nearest 500), by size-class, in the San Lorenzo River mainstem\* for fall 1981, 1994-2001, and in San Lorenzo River tributaries for fall 1998-2001.
- Table A-17. Estimated trend of juvenile steelhead, by age-class, in the San Lorenzo River mainstem\* for fall 1996-2000, and in San Lorenzo River tributaries for fall 1998-2000.
- Table A-18. Estimated trend of juvenile steelhead (rounded to nearest 100), by size-class, in the San Lorenzo River middle and upper mainstem\* and 4 upper tributaries (Zayante, Bean, Boulder and lower Bear) for fall 1998-2005.
- Table A-19. Conservative index of adult steelhead returns to mainstem San Lorenzo River.