

Salmon Creek Estuary: Study Results and Enhancement Recommendations



Appendices

Appendix A: Salmon Creek Oral History Project
Appendix B: Water Quality Figures

Appendix A: Salmon Creek History and Oral History Summary (Prepared by Kathleen Harrison)

I. The Original Human Residents of Salmon Creek Watershed

The human history of the Salmon Creek watershed must, of course, reach back to the original, indigenous people who were here long before the current era. It is established that Native Americans have been moving through and settling in California for at the very least 12,000 years. Archeological signs of ongoing habitation here in Salmon Creek watershed extend back at least 8,000 years. We know that the natives of this region were adept hunters, gatherers and managers of natural resources. The people of this region of North America did not practice agriculture, but they tended naturally existing populations of plants, trees, and terrestrial and aquatic animal life. Their goals for successful management were to maximize production of the foods and materials useful to humans, maintain a healthy balance in diverse communities of flora and fauna, support the natural cycles and longevity of wild populations, and to honor the many forces that they recognized in nature. They did this with various documented methods of land management. Annual or periodic late-season burning effectively removed brush without killing established trees, prevented the accumulation of detritus that encourages bacterial, viral and fungal diseases in trees, and fertilized the soil with ash, encouraging growth and production of seeds and acorns. Another key method was careful pruning of wild shrubs (coppicing), such as hazel and willow, to take out vulnerable older wood and to shape them for growth that was fresh, straight, and designed to be harvested for making the tools and baskets that were essential to everyday life. The indispensable digging stick was used to both harvest underground food sources (bulbs, tubers, and corms that are the energy storage units of many of our wildflowers) and to disrupt soil for increased productivity of plants bearing edible seeds (perennial grasses and many wildflowers) and those with starchy roots. We know that the careful, fast-moving, seasonal burning of grasslands and coastal prairie continued until General Vallejo of the Spanish era ordered a stop to it in 1836. After that, the fields and meadows of this area were, intentionally (forage) or unintentionally (grazing or weeds), given over to the introduced annual grasses that dominate today.

In pre-colonial times, California was, as now, a richly diverse habitat that could sustain many small to medium-sized communities comfortably. The Ohlone people (sometimes called Costanoan) lived around much of San Francisco Bay, well adapted to life in the marshes and on the water. The Coast Miwok (a branch of the larger Miwok language group that had other linguistically related tribes in the lower Sierras and Central Valley) inhabited what is now western Marin County and

southern Sonoma County, up the coast as far as Duncan’s Landing, which is a coastal point a few miles south of the Russian River.

The Coast Miwok lived all along Salmon Creek, at least up to the Freestone valley. That valley was, as now, a fertile, level, protected area with access to oak woodlands on the lower slopes, where they could collect acorns, their carbohydrate staple. Up the tributaries and canyons, they had redwood and fir forests for hunting and gathering what they needed there, as well as outcroppings of useful minerals, year-round creeks, and an ample salmon supply. Just as we do, our early predecessors had settlements strung all along the creek. They apparently didn’t tend to live in the tall forest, since it didn’t provide the range of natural resources that was available on more open ground, and since they didn’t cut down large trees or use lumber. Their semi-permanent, year-round houses were built with strips of bark from fallen redwood trees, and their summer houses were built with sticks, mud (a method of natural building called “wattle and daub”), and plant materials like grasses, with thatch made of plantain leaves.

We know from early twentieth century accounts that well into the nineteenth century there were villages or recurrent summer encampments along Salmon Creek, with the most upstream being at the top of the Freestone Valley, where the canyon begins to open out, just about where Salmon Creek School is now. A substantial settlement existed where Freestone now stands, but on the east bank of the creek, and was called *Potawa-yowa*, which basically meant “ground.” The people who lived there may have been Olamentko, a somewhat different cultural band than the Coast Miwok. Coast Miwok people were settled, in their seasonally rotating fashion, downstream along Salmon Creek. A summer settlement named *Oye-yomi* (“coyote home”) existed at approximately the current junction of Bodega Highway and Freestone-Valley Ford Road. It was on the right, or north bank of Salmon Creek, and, according to accounts, was vacated during the winter because of the fear of inundation from the creek, indicating that flooding in that area was normal prior to the era of logging and ranching. There were other clusters of families living down by the confluence of Nolan and Salmon Creeks (where Joy Road meets Bodega Highway), on the north bank, very likely also seasonal. The area of the current town of Bodega was a significant settlement, called *Loklo*, or “flat place.” It seems to have been still quite active as an indigenous settlement into at least the 1840s, overlapping in that place for a few decades with the early non-native settlers. There was also an established settlement near the mouth of Salmon Creek, right where we now have the village of Salmon Creek (sometimes still called Ocean View). It was certainly occupied in the late summer and fall, and perhaps year round. It was known as *Pulya-lakum*, or “berry mouth,” which was also the Coast Miwok name for Salmon Creek itself: Berry Mouth. This name is ostensibly a descriptive term, due to the fact that there was very good berry-picking in the creek-mouth region. Tom Smith, an

aged, local Coast Miwok resident was interviewed in 1932, and offered many memories and observations of the area and times to Isabel Kelly, an ethnographer at the time. Tom Smith was born in 1838 and raised in the Bodega Bay area, along with his brothers and cousins, some of whom ran a dock in Bodega Bay into the early decades of the 1900s. (Some of the Smith brothers had the first real fishing boats built for fishing out of Bodega Bay.) He recalled large patches of native blackberry, salmon berry and wild strawberry in the chaparral-covered lower hills around the mouth of Salmon Creek. Given that native languages often use puns in naming, perhaps the term “berry-mouth” described not only the mouth of the creek, but also the mouth of one who grazed on the berries at the mouth of the creek.

Despite the number of historic native communities reported to have existed after 1840 (during the early life of Tom Smith), the area was much more densely populated prior to that, when the first explorers and then the earliest settlers arrived in the region. It is recorded that during the years 1837-1841, and particularly in 1838, a fierce epidemic of smallpox tore through the local indigenous population. It was contracted from Europeans, who had moderate resistance to it and at least could survive it. The horrific statistic is that approximately 38,000 Indians died in the region of Sonoma and Napa counties alone during this epidemic, which comprised up to eighty percent, or even ninety percent, of their population. The records of Mission Solano at Sonoma show that on some days over a hundred Indians were buried there at once. Therefore, it was a survivor of that decimation who told the accounts we have of villages in the Salmon Creek watershed in the 1840s. We don't know if he was telling of villages that existed during his lifetime, or if their previous existence was related to him when he was a child. It is likely that the human population density was significantly higher in Salmon Creek watershed than was documented after that epidemic. It is even possible to extrapolate: perhaps the incredible bounty of salmon in the creeks in the few decades following the centuries of native hunting was the product of a managed environment that was no longer being harvested as it had been for so long. Conceivably, a population explosion occurred of animals and plants used for food and material, which is what would have greeted the newcomers, and then persisted for a few more decades. This is, of course, speculation, based on accounts and the little we know of use patterns in those days.

There were also numerous small settlements along Bodega Bay, as well as up the coast at Scotty Creek. Some of these communities persisted as small reservations, or “Indian *rancherías*” well into the twentieth century. The late David Peri, a Coast Miwok/Pomo/Italian professor of anthropology at Sonoma State University, was a descendant of the well-known Coast Miwok Smith brothers, and told of being raised on a tiny rancheria on the shores of Bodega Bay, in the 1920s. Fishing and harvesting wild plants was part of their lifestyle even then. He said that his father, an Italian

fisherman married to a native woman, always told him to put a bit of something red (a ribbon or bit of rag) on his fishing line, for luck. He wasn't sure which tradition this came from.

To the north of Duncan's Landing, the Kashaya Pomo people maintained an extensive territory that encompassed much of the lower Russian River and the western half of northern Sonoma County and southern Mendocino County, up to and including their remaining territory, the current Kashaya Pomo rancheria above Stewart's Point. The Southern Pomo were inland of the Kashaya, covering much of the middle and upper reaches of the Russian River and surrounding inland territory. The Kashaya Pomo and Coast Miwok people apparently got along well. In one of their annual rituals, held in the month of September, the shamanic leaders (called "doctors" in English) of both tribes met at the cave in the rock on top of Duncan's Point, which protects Duncan's Landing. From that point, one can see south to Point Reyes and far north up the coast, spanning the two tribes' coastal territories. Each year, according to David Peri, leaders would re-affirm their mutual boundary at that spot. It is reported that Coast Miwok people could periodically foray north of their territory, up along the Russian River, to collect certain plants and materials that grew there in particular, without needing to ask permission of their neighbors, so this was an acknowledged but permeable boundary.

A similar understanding apparently existed between the more coastal Coast Miwok and the inland peoples. The closest of these were the inland Coast Miwok (various bands of the Coast Miwok extended to the areas of Forestville, Sebastopol, Petaluma and even as far east as Glen Ellen and Sonoma); the Southern Pomo up the Russian River basin; the Wappo to the northeast; and the Patwin people from farther east. The story goes that because the inland groups did not have direct access to the coast, each early fall ("Indian summer"), small bands would trek westward, some from the Mayacamas Mountains, across the Santa Rosa Plain and the Laguna de Santa Rosa. On a trail that later became Bodega Highway, they came over O'Farrell Hill, and into the Salmon Creek watershed. As late as 1900-1905, according to the childhood memory of an old-time O'Farrell Hill resident who died in the 1980s, a group of inland Indians are said to have made this annual pilgrimage, camping for a night or two in each direction in the redwood grove on the south side of Bodega Highway, just east of the intersection with Barnett Valley Road. Then they would follow trails along Salmon Creek down to the ocean, fishing in the creek and possibly gathering acorns and other materials to later carry home. When they reached the estuary of Salmon Creek, they took advantage of the rich array of birdlife, fish, plants, and whatever they found useful or delicious. They would gather salt from the tide pools, and edible seaweed to preserve for the year ahead. They would dry mussels and abalone, and catch and dry surf fish and other species of fish at the shore. The meat was salted and sun-dried to be carried back to store for the winter, and the

shells were often used to make tools or adornments. The north bank of the mouth of Salmon Creek, at the edge of the parking area on the bluff, is reported to still have much evidence of a having been a *midden*, which is a large pile of cast-off shells of mussels, clams and abalone, covered in earth. When California State Parks built the parking lot on the bluff there, in 1956, many obsidian as well as shellfish remains were unearthed. Many such middens can be found in eroded bluffs both north and south of the mouth of Salmon Creek, and along the entire California coast.

Of course, the people who lived along Salmon Creek and on the Sonoma coast had a similar diet from their local array of wild foods. Likewise, some of the Salmon Creek folks would head inland each year to collect or trade for what they needed: obsidian from Mount St. Helen, medicinal plants that grew only on mountains slopes or by the Laguna de Santa Rosa, and the acorns from other species of oaks than those that grew nearer the coast.

The salmon were very plentiful in Salmon Creek and its tributaries, and definitely a staple food of the Coast Miwok. What we call Tannery Creek was known by the Coast Miwok term for “hole creek.” This implies that there were good fishing holes in Tannery Creek at that time. The people here hunted deer and rabbit, gathered all sorts of food plants, relied heavily on the acorns of tanoak and white oak particularly, and fished in many different ways. Their stream-fishing methods included the following: dip nets, temporary stick weirs that trapped the fish for easy picking, lines and spears with chert tips. (A recent archaeological find at Chanslor Ranch, near the mouth of Salmon Creek, is an excavated chert source with many signs of knapping and tool making, and dates back 8,000 years.) In the estuary, which in its presumably long heyday functioned efficiently as a rearing habitat for salmonids, salmon were often caught by floating on a log raft and catching fish with a spear that had a tip made of stone or deer bone.

According to Coast Miwok Tom Smith, two species of salmon were recognized by his people, both coho and steelhead, along with the resident rainbow trout. Their migrating seasons were well known, and anticipated with prayer ceremonies and first-salmon thanksgiving each year when they reappeared. Methods of fishing included symbolic and magical practices and offerings. Often there is a large rock next to a noted, deep, fishing pool. In some cases, that rock might be identified as “Salmon Mother Rock,” and certain songs were sung to her, the rock, so that she would soothe her salmon and let them come out where they could be caught. Certain men were noted salmon-singers who could coax them out to be caught, and were well paid to do so effectively.

Riparian tree cover was encouraged, as was food production from certain of those trees. Young California bay laurel sprouts (*Umbellularia californica*, also called pepperwood) were sometimes dug up from where they’d sprouted under their

mother tree, and replanted in another spot where the young tree, and later its shade and its abundant bay nuts (a favored food, when baked in earth ovens or pits) could thrive. These were just a few of the many land management practices that preceded the arrival of Europeans to this watershed.

II. The Early Outsiders in Salmon Creek Watershed

Discovery and the Spanish Era

The Spanish had first arrived in Mexico in 1519, and quickly fanned out across it, setting up missions to convert the indigenous people and establishing agricultural haciendas, which were large complexes for living, ranching and farming.

The earliest recognition—termed “discovery”—by Europeans, of our coastal region was in 1579, when Sir Francis Drake was exploring the north coast of California. Although it is not certain where his ship anchored, Drake’s party is known to have encountered peaceful Coast Miwok people on the Marin or Sonoma coast. He reportedly traded beads and trinkets to purchase the land for England, but since the indigenous people didn’t abide by the concept of ownership of land, and since England did not return to settle it before the Spanish did, Drake’s claim was in vain.

Other naval explorers sailed by the Sonoma Coast, but it was almost two hundred years, on October 4, 1775, before a Peruvian-Spanish explorer, Juan Francisco de la Bodega y Cuadra, came along while exploring the North Coast, and saw the unusual feature of the head (now Bodega Head) and found the protected (and, at that time, deep water) bay adjacent to it. He anchored, explored a bit, named the coastal features after himself, and put them on a map. The name Bodega has been carried along ever since. Bodega y Cuadra kept meticulous journals, in which he described what he found in our area: He said the people were mild-mannered, friendly, generous, and appeared well-fed. He wrote that “The hills near this port are entirely naked, but those inland are covered in trees...The plains are rich in verdure and seem to invite cultivation.” So that historic statement corroborates the modern assumption that the hills near the shore were not forested here, as they are to the north. It is interesting that in early October, late in the dry season (as we know it) he finds the “plains” very green. Perhaps this was due to the dominance of perennial bunch grasses, rather than the introduced Mediterranean annual grasses that came later with the Europeans’ range animals and soon replaced the perennial native species.

About that time, the Spanish Franciscan mission system began to reach up through Alta California, establishing the northernmost mission where the town of Sonoma

now stands. Missions far from Salmon Creek—both those at San Francisco and San Rafael—competed with Mission Solano at Sonoma persuasively, and sometimes coercively, for native converts to be their workers. Records show that some Bodega-area Coast Miwok people went to live and work within the missions. Apparently many later returned home, some having promised to attend mass every so often, at least in the case of Mission San Rafael. Many eventually learned to speak Spanish and intermarried with the Spanish and Mexican ranch hands.

But the Spanish colonial system was overtaxed in northern California, and could not effectively colonize what would become western Sonoma County. Their territorial capital was Monterey, and the local seat was Sonoma, although a very large hacienda complex was created by General Vallejo at Petaluma. What we know as west Sonoma County was spoken of by the Spanish *Californios* as the “frontier” and was left largely untouched by Spanish colonization, which meant it was open ground for others.

The Russians Move into Salmon Creek Watershed

Meanwhile, during the first decade of the nineteenth century, Russian colonies were being established in Alaska, where they had to some degree developed a working relationship with the indigenous Aleuts. These island and coastal sea-faring people both converted to Russian Orthodox Christianity and were remarkable hunters of seals and otters. The fur-hunting Russian-Aleut crews hunted their way down America’s northwest coast, following the abundant sea mammal population, and came upon the welcoming climate and relatively friendly native coastal people of what is now Sonoma County. In 1811, Admiral Kuskov located Bodega Bay, so he and his men spent the spring and summer of that year in the Bodega area, apparently getting along fairly well with the local Coast Miwok people. The sizeable year-round colonies in Alaska required food, particularly their favorite staple—wheat—to sustain them, and they needed a longer growing season and fertile ground, which this area provided. In the absence of other European settlements—although he knew it to be within Spanish territory—Kuskov decided to make a foothold here. He renamed Bodega Bay after his benefactor, Romanzov. He planted a Russian flag on the hillock that makes the western edge of Bodega, with Salmon Creek curling around it, and named spot that the Russian word for “No Mud.” We must presume that it was pretty muddy elsewhere for that spot to be singled out! Soon they began to set up a fort with agriculture at Fort Ross, on a defensible coastal point in the territory of the Kashaya Pomo. Bodega Bay was the nearest protected bay to Fort Ross, and so they were linked by Russian settlers who farmed and tanned furs for the next thirty years. The colonies were apparently occupied year-round, but there was much more activity and a seasonal population of colonists and hunters during the growing season.

In fact, Kuskov was correct in assuming that the Spanish were not prepared to defend this edge of their claim. The Russians established small agricultural communities at Freestone and Bodega, which produced wheat, corn, potatoes and tobacco for nearly twenty years. The Russian outpost also colonized Coleman Valley, with log buildings, a vineyard, and probably other crops. As at Fort Ross, the local people helped them collect tanoak bark, setting up tanneries to tan their seal and otter hides, thousands of which were shipped back to Russia to fund the settlements. To collect tanoak bark, the trees are stripped of their bark, and then die or are cut down. The wood was used for firewood and other purposes, but not suitable for lumber. Tannery Creek might well have had its first small tannery when the Russians were present, well before the wave of tanneries that would come with the ingression of other settlers forty years later. The Russians continued to maintain their colonies at Fort Ross and along Salmon Creek until 1841, when various factors built up to make the Russian effort in California too costly to sustain.

Many accounts cite the daunting gopher populations of Freestone, Bodega and Fort Ross, and their ability to thrive in wheat fields, as a key factor in discouraging the Russians. The descendants of these gophers are well known to contemporary farmers and gardeners of the region. (Organic vineyard owners on the crown of O'Farrell hill report that 3,000 gophers have been professionally trapped on their land from 2002-2005! Surely the tunnel systems for such vast underground gopher colonies must have some effect on the watershed. Since their populations do swell with agriculture tillage and food supply, their effect would increase with certain kinds of land uses.)

There were two other primary reasons that the Russians pulled out: First, more settlers were encroaching on their Salmon Creek holdings, as we will see. Second, the smallpox epidemic of 1938-1941 diminished the native population by so much (perhaps as many as ninety percent of the indigenous people died over those several years) that the Russian fur-tanning enterprise did not have enough workers to continue operating their colonies.

As we see from the restored buildings that remain at Fort Ross, the Russians were also the first here to build permanent structures with redwood logs, and so, although on a small scale, they introduced timber harvesting to the Salmon Creek watershed just under two hundred years ago. Their very sound buildings in and near Bodega and in Coleman Valley persisted well into the next colonial era.

With the modest harvest of redwood, and perhaps a substantial amount of tanoak harvested over several decades, the changes in the watershed's forests began. We have no way of knowing how that affected the creeks and wildlife, but an ecological transformation had begun. The nineteenth century in Salmon Creek watershed saw at least as many changes as did the twentieth century.

The Ranchos and the Mexican Period

Meanwhile, the Spanish colonial power structure ruling Mexico was stressed, as Mexicans began to identify themselves as a people independent of the Spanish, and wanted power over their own republic. This struggle left the California territory, and the Spanish-Mexican *Californios*, to their own devices for a while. The Mexican Revolution of 1822 brought Mexico independence, and eventually some shifts in the management of their California territory, which became part of Mexico for the next twenty-four years.

The renowned General Vallejo came north to oversee the area that is Sonoma County, setting up headquarters and ranches in Sonoma and Petaluma. He was worried about the Russians, and so urged three adventurous men to move west to intentionally crowd the Russians in the relatively cozy Salmon Creek watershed. In xx James McIntosh (Irish), James Dawson and James Black (both English) all moved into the area near Freestone and began to farm, build, and pick fights with the Russians. They also picked fights with each other, the most famous being a struggle over whose name was on the deed. Apparently Black, who could read, went to the capital in Monterey to do the paperwork of getting the deeds. It was four years before Dawson, who could not read, discovered that his name had been left off the deed of the land where his farm and the house he'd built with his partner stood. The tale is true that he was so mad, he cut the house in half and dragged his half over to the Estero Americano, where he started over.

A more strategic Mexican response to the Russian incursion and the declining mission system of the late 1830s, was to divide northern California up into vast land grants. These were referred to as *ranchos*, which were bestowed upon men (any man who would become a Mexican citizen) who would vow to claim and manage them, and keep the Russians (and the English, who were prowling the coast, looking for an opportunity) at bay. In 1843, the boundaries of the vast and beautiful Rancho Bodega were designated by the enterprising Captain Stephen Smith, who became an important Yankee forefather of Anglo settlement in Salmon Creek watershed. He was an accomplished ship's captain who brought a Peruvian wife (Manuela Smith), applied for Mexican citizenship, and explored the coastal region from Monterey north. His letter of request for this particular land outlined the boundaries, and suggested his intentions for managing the resources by farming and logging. General Vallejo and the government in Monterey approved the land grant, which encompassed approximately 35,000 acres from the current Marin-Sonoma County boundary, to the far shore of the Russian River, and from Bodega Bay inland to include what is now Bodega. The rest of inland Salmon Creek watershed was part of the land grants called Cañada de Jonive, which included O'Farrell Hill, and Estero Americano, which includes much of that drainage, and is where the economically

important neighboring village of Valley Ford arose. The headwaters of Salmon Creek, up near and above what is now Occidental, were not included in any land grant. It was surrounded by Rancho Jonive and other vast holdings, but the forested areas were not always included in the land grants, since they were not suitable for agriculture, and timberland was not valued by the Spanish tradition as it was by the pioneering Europeans, Canadians and Americans who soon arrived. Many of the rancho names still persist in the place names that we use today, as do the boundaries.

Some American “Yankees” were beginning to move into California in this period, as well as quite a few Irishmen and other Europeans, who took on Mexican citizenship in order to own land. In 1843, John Sutter (later of Sutter’s Fort fame in the discovery of gold in the Sierra foothills) was a canny investor who bought Fort Ross and most everything in it from the departing Russians. Their goods (equipment, weapons, stills, tools and the Gravenstein apple variety that had originally been brought from Russia) were dispersed over the region. Captain Stephen Smith purchased most of the operations that the Russians were leaving behind in the Salmon Creek region. Captain Smith brought with him the newly invented steam engine, the very first in California, and above Salmon Creek he set up a steam-driven timber mill, as well as a steam-driven gristmill to make flour from the wheat cultivation that he took over from the Russians (with plenty of help from the knowledgeable Coast Miwok citizens). He was both enterprising and generous, encouraging the surviving native residents to live in their homes on his land and help him work it, apparently in some arrangement that they felt was fair enough, under the circumstances that dictated change. He also encouraged new settlers to build, farm and start small businesses in the town of “Smith’s Ranch,” which later came to be called Bodega. Reportedly, Smith built sawmills “in a redwood area to the northeast of the village of Salmon Creek,” “northeast of Salmon Creek valley,” and another north of the Bodega area, probably on lower Tannery Creek. A hand drawing of the region in the 1840s shows tall conifers growing right down to the flatland (with just a narrow band of oaks at the edge of the floodplain), so these redwoods and firs were probably the first to go for new building. Some surmise that Joy Woods once reached almost to the town of Bodega. For the past one hundred and sixty-five years, since 1840, the land of Salmon Creek watershed has undergone many changes, through several eras of land use for various purposes.

These early settlers in the towns and farms of Salmon Creek watershed were of many nationalities: Irish, English, Scottish, Swiss, Danish, German, and American. They bought the land or worked it for years and then finally applied for deeds for their portions of the rancho after Smith died. Many of them are the founders of long-standing West County land-holding families: Finley, Coleman (originally Kolmer), Fitzpatrick, Gleason, McCaughey, O’Farrell, Farrell, and more. The wave of Italian

and Portuguese settlers would come later—some in the 1850s, but more in the 1870s and 1880s—and their names and contributions to this region are still with us too.

As the Russians departed and the Mexican hold on California looked uncertain, other forces were gathering with their own interests: Britain, the United States and even France had ships patrolling the coast, waiting to seize the moment when a change of power might occur. In 1846, right here in Sonoma County, some of the rowdier settlers jumped the gun and declared California an independent republic. That didn't last long, but facilitated the transfer of power to the United States, so California became U.S. territory for the next few years, encouraging American settlement.

Statehood and the Gold Rush Change Everything: 1849-1856

As everyone knows, gold was discovered in the foothills of California's Sierra Nevada in 1848, and by 1849, adventurous souls around the world had dropped their livelihoods and often their families, and headed for the "goldfields" of California. Some struck it rich, but many did not; they looked for agricultural or logging work, sought land to homestead, or with modest earnings bought farmland, timberland, or started small towns and shops across Northern California. The more enduring effect of the Gold Rush was the land rush that accompanied it, and Salmon Creek watershed was no exception.

Many of the smaller parcels in our region came into private ownership in this era. The regions that had never been part of land grants—for example, the forested region around Occidental—became government-owned with statehood in 1851, and could be readily bought and divided.

William "Dutch Bill" Howard was a fortune-hunting Dane who was the first to find his way to the forested saddle ridge that today we know as Occidental. That narrow rise marks the boundary of two watersheds. On the south side, the headwaters to Salmon Creek flow from Joy Ridge down along Bittner Road, then the creek turns south toward Freestone, bounded by the Jonive Ridge on the east. The north side of Occidental carries the headwaters of Dutch Bill Creek that flows north to its confluence with the Russian River. Mr. Howard was the first to cut the tall timber on that ridge, clearing land to homestead a small cattle ranch on what is now the wider, north side of town. Before long, there was space cleared for homes, gardens and enterprises along the new town's main street, which later became a railroad bed and Bohemian Highway. Clearly, many settlers would follow him into this forested upland region, where the small town of "Howard's" (later to be named Occidental) was their social and economic hub.

By 1850, only a few years after it was founded, the village of Smith's Ranch (also called Bodega Corners, and later just Bodega) had 300 settlers residing in town or nearby, so to serve them and to seize opportunity, these businesses were in place: two general stores, three hotels, one livery stable, a meat market, blacksmith shop, a wagoner, two carpenter's shops, shoe shops, barbers, two doctors, a milliner, and agents for the telegraph, the post, and Wells Fargo. By 1860 it had a church too, which still stands: St. Theresa de Avila. One hundred and fifty years ago, Bodega had a nightlife, town dances and well-dressed hotel guests who arrived by stage coach from Sonoma, Santa Rosa, Petaluma and San Francisco!

Many of the areas that had been designated and awarded as ranchos were still untouched in terms of settlement, logging or farming. People began moving into these areas all over Sonoma County, setting up homesteads, planting orchards and vineyards, raising cattle or grazing cows for small dairies. Some rancho owners, such as Capt. Stephen Smith of Bodega, were glad to see the land that they'd claimed being cultivated and communities starting up, but not all owners were. When California became a state in 1851, it took awhile before there was any effective legal structure, coordinating government rules, or elected representatives. The era exemplified all the chaos and opportunity of the frontier. Settlers invested all their resources and labor into land that they didn't actually own, in the hope that it would one day belong to them. All around the region, and in each niche, newcomers assessed the topography, the soil, the water supply and the micro-climate, to determine where they could live out that dream of theirs. Those who came from afar often looked for ideal conditions to do what they already knew how to do, or what their ancestors had done, wherever it was they came from. Lumbermen from Maine and Canada went to the lumber camps that were starting up, or partnered together and bought a parcel of timber to harvest. The methods and tools used were those that they'd used before, except for variations made necessary by the species, particularly the unique redwoods, or the seasonal differences. Similar principals were incorporated into local agriculture, animal husbandry, dairies and processing of goods. The long, dry summers of California's "Mediterranean" climate were a difference that required changes related to water use, but summer fog kept it moist enough in coastal Salmon Creek watershed, that irrigation was not necessary here as it was in inland valleys. The early milled lumber, produce, butter, and even chicks and calves were carried by wagon to Bodega Bay or "dog-holes" off the coastal cliffs, where they were loaded onto ships bound for San Francisco. The road connecting Bodega and Valley Ford to Petaluma was the most active land route serving Salmon Creek watershed. Barges filled with Sonoma County goods went down the Petaluma River to San Francisco and the East Bay, at first weekly and soon daily. Passengers to and from the city most often traveled by stagecoach, but many went by sea, a trip that they say was dreaded because of frequent seasickness.

San Francisco was being built for the first time, and due to the “gold fever” it was growing at an unbelievable rate. In 1849-1850, they say the city doubled its population every ten days. The entire city was a construction area, everything was built of wood, and much of the timber came from our coastal range. It was not the only time that the resources of the north woods supported the building frenzy in “the City.” According to historian James Dallesandro (author of *1906*, a fact-based historical novel about the earthquake), the 1906 earthquake was not the only time that San Francisco met disaster with fire. He says that in fact the city literally “burnt down” six times over the half century between the Gold Rush and the Great Earthquake. Each time, the wooden houses crammed tightly together were replaced, using lumber from the forests of the Peninsula, western Sonoma, and then finally Mendocino and Humboldt counties. All the rest of the development of the Bay Area relied on these forests as well. The appetite for redwoods, especially, meant that over more than a century, timber harvesting and its required transportation and associated industry marched up the coastal range all the way to Eureka and beyond. As we know from right here in the Salmon Creek watershed, secondary and subsequent logging has continued periodically ever since.

III. Just 150 Years: Euro-American Settlers Learn to Live in this Place

1856-1876: Settlers make the forests and the fields their own

Capt. Smith died in 1855 and his widow Manuela, with her many resources and title to Rancho Bodega, quickly remarried. Her new husband was Tyler Curtis, who “managed” the land by selling it off in parcels (mostly 150 to 500 acres each) on through the early 1860s. Many of the next wave of landowners in Salmon Creek watershed acquired land in this way, from the Smith estate. Curtis was widely considered an unlikable opportunist who intentionally drove off the remaining indigenous people. Coast Miwok Indians who had lived relatively well on Capt. Smith’s ranch, were made unwelcome. Stories differ, but it seems they were driven off the land in 1856, and then were forced or chose to move to communities in Lake and Mendocino counties.

Curtis also alienated the various early Bodega settlers, all of whom Capt. Smith had encouraged to farm and build on his community rancho. When Curtis tried to have the occupants, farmers and shop owners of Bodega evicted by a hired militia, three hundred Bodega-area residents rose up to threaten him and the militia with farm tools and shotguns, and he was defeated in his effort to evict them. This 1859 event is known as the “Bodega Uprising,” an effective, symbolic moment in the transition from vast ranchos to the smaller land ownership of so-called “squatters.” Many farming and ranching families “squatted” on land throughout the West County,

building homes, barns, fences and establishing farms, stores, and roads. Similar “Squatters’ wars” between early owners of large tracts and later small farmers erupted in that era in other parts of Sonoma County as well. In the case of Bodega, most settlers stayed to get deeds of their own (although some had to wait through as many as fifteen years of legal wrangling) and went on to build the local ranching and dairy industries.

Early on, dairies became a very important land use and economic force in this watershed. The land and climate were considered perfect for productive, happy cows and the business of providing cream, butter, and milk to the growing Bay Area and North Bay population became a key enterprise of Salmon Creek watershed. This would continue for more than a century. Dairy farms were mostly in the floodplain of Salmon Creek, and the cows naturally had their way with the creek too. Huge barns were built of local redwood (some still stand, held together entirely with wooden pegs or hand-forged metal nails). Although chickens and eggs became the specialty of the Petaluma area, there were chicken ranches here too, and also many pigs were raised in the same area. Pork sausages and hams were sent off to San Francisco by wagon and later by train. All these cottage industries continued into the middle of the twentieth century.

By 1863, Bodega was booming, under the name of “Bodega Corners.” It was surveyed and mapped, with many named streets laid out that were never built or no longer exist. Farming thrived in the climate and soil of the Salmon Creek valley. A newspaper article of 1873 describes to the area as “Emerald fields of potatoes as far as the eye can see.”

The terrible Irish Potato Famine of the 1840s had starved many hundreds of thousands of people, and sent as many to America in search of a better life, so they were an early wave of settlers here too. The Irish-American Finleys—one of the “dynasties” of Salmon Creek watershed—are an example of those who got a chance to buy land when the ranchos started to be broken up. The history of the Finley family’s acquisitions is in the Sonoma County Public Records, and compiled on a family history website. John Finley bought 486 acres of Capt. Smith’s estate from Tyler Curtis in 1863. Within a few years, county records show that Mr. Finley was buying up land from neighbors and increasing his substantial holding. All through the 1860s and early 1870s, he made multiple purchases of 65 to 400 acres each. John Finley was an active landowner and businessman, with many other related Finleys living in the area or collaborating on milling or ranching endeavors. John Finley died in 1910, and some of his descendants divided up the property that he left, also building private roads across parcels, and going through legal processes (including suing each other in court) for easement access. In 1914, right-of-way was sold to A.H. Meeker (the son of pioneering entrepreneur M.C. Meeker of Occidental) and a

Mr. Fitzpatrick (also influential in local history), for access. County records reveal that descendants James and Mary Finley divided and sold off a number of the Finley parcels during the Great Depression, when many landholders had to let go of much of their domains. Typically, a parcel was leased out for several years, while the lessee family earned enough off the land to offer to buy it. The Pedrazzis leased 58 acres of Finley land above the confluence of Finley Creek and Salmon Creek in 1931, and were able to purchase that land—expanded to 150 acres—in 1937, for \$2,500. In 1928, the Finley family leased out one acre of their holdings to build a sawmill, and then sold another seven parcels. By the end of the Depression, in 1937, the Finley piece was significantly smaller than what it had once been.

This subdivision of original larger parcels is typical of the evolution of land ownership in developing rural areas, especially in regions that are “pioneered” and “homesteaded.” This trend combines with other influences, like the ups and downs of the larger regional or national economy, the demise of earlier landholders, the desires of their heirs, and the increase in the human population and the concomitant desire for land. It appears that unless there are absolute over-arching rules in place, each division leads eventually to another division. Roads and easements generate densification. Every subdivision means more road-building, often more logging, more building of structures, more vehicles on the public and private roads, more wells put in, usually more direct water diversion from creeks, and often increased use of resources in general, deforestation, tilling, damming of creeks, or other changes in land use. Land in west Sonoma County continued to be divided up until the 1970s, when the 165-acre limit was laid down as part of the county’s Master Plan for this part of the county. Most of the smaller divisions that pre-date that decision are visibly evident on current parcel maps of the area; they occurred in both the lowland and upland regions adjacent to Finley Creek, Coleman Creek, Fay Creek, Tannery Creek, and along the upper reaches of Salmon Creek. Clearly, most property-owners have wanted access to year-round water. Various people report that until the late 1980s or even the mid-1990s the tributaries of Salmon Creek were indeed flowing year round, except in some cases during a serious multi-year drought (as in the late 1970s).

During the era of Mexican rule, Anglo settlers in West Sonoma County had used pit saws to harvest lumber, and teams of oxen to move the logs. In the 1850s, steam-powered sawmills, steam donkeys (a steam-driven log-pulling device), and commercial logging operations were established here, but teams of twelve oxen or many horses still were very much a part of the life and method of the lumbermen. Tales were told and even written down about the skill of certain heroic, local teamsters and their animals, maneuvering and dragging huge loads of felled logs out of nearly impossible, steep creekbeds and ravines. Both the number of mills and the quantity of lumber produced grew by leaps and bounds over the next forty

years. Logs were dragged from the slopes where they were felled, up or down hills, and through creekbeds to relatively level ground, then pulled along by teams of oxen or horses to a nearby mill. The mills were considered mobile, even though it might take up to a year to construct one, once it had been transported in pieces to its destination.

Once the timber was milled, it was typically loaded onto large wagons and brought to where it could be transported far away. Again, this happened with long, horse-drawn wagons. Rough dirt roads were built on steep banks along Salmon Creek from Joy Ridge to Occidental, and Occidental to Freestone. At some point (likely in the late 1800s, but that is not confirmed), the “Long Bridge” was constructed over Salmon Creek, to connect Joy Road and Bittner Road. It was one lane, and initially served loggers to bring lumber to Occidental. (Older residents such as Harry Lapham and Evelyn LaVine still remember nerve-wracking collisions on that bridge in the 1920s and early 1930s.) Prior to that bridge, in 1866, the new settler and local innovator M.C. Meeker built a sawmill southwest of Occidental, up off today’s Bittner Road (it used to be named Meeker Road), and began logging, milling and building his rather extravagant Victorian home there. In 1867, he built a small, narrow, railroad, a half-mile long, to bring his logs to Occidental. From there, they could be milled for local use or transferred out by wagon.

The 1870s was the golden age of railroad building in this country, and in this county too. People began to think of practical and economic reasons that Salmon Creek watershed should be connected by train to the Bay Area markets: 1) to more easily move the huge, cumbersome loads of lumber; 2) to bring the fresh produce, dairy goods and other regional products to market more quickly, 3) to bring the potential tourists to the north woods to see the great trees, the charming towns, and beyond to the Russian River. An 1873 newspaper article refers to Freestone as the “Gateway to Sawmill Country.” Obviously, it was the land of opportunity for some.

Eager entrepreneurs bought up timberland along the projected route all the way to Cazadero, believing that the railroad would get there eventually, so timber could be harvested and moved out. They put their money into the railroad vision, and the North Pacific Coast Railroad was born, with narrow-gauge tracks to accommodate the twists and turns on the steep hillsides of much of the route.

Between 1873 and 1876, many hundreds of lumberjacks and construction workers moved into this area to harvest the timber for the railroad, to dig the roads and rail beds into the hillsides, to build huge trestles and to lay tracks. The tallest wooden trestle in the western United States was built in what was then called “Brown’s Canyon”—the canyon carved by Salmon Creek between Occidental and Freestone. The redwoods that were cleared to build it were also harvested from the immediate area. One report says that every home in the greater area had one or more boarders

for the several years it took to construct this railroad. Freestone multiplied in size, with several residential hotels. It is reported that thirteen hundred Chinese laborers worked on construction of this project, as well as Irish immigrants and others.

1877-1906: Logging and Agriculture Bring the Railroad and Tourism

The route of the new railroad lay between Tiburon in San Francisco Bay, up through West Marin via stops at Tomales and Valley Ford, to “Bodega Corners” (the depot was actually very near the intersection of today’s Freestone-Valley Ford Road and Bodega Hwy.), then Freestone (which built up hotels and services around it), to Occidental (“Howard’s”), through Camp Meeker to Monte Rio, then west to Duncan’s Mill on the Russian River. Later a branch was extended to Cazadero, to bring the trees out of those steep woods. Local stops were charming and colorful, and consequently provincial tourism thrived.

The primary forest product was redwood lumber, which was not only esteemed throughout California, but also abroad. An early Sonoma county road builder was contracted to build the first railroad into the Andes of Peru, so he ordered ships full of redwood from West Sonoma County to be shipped to Peru, since redwood was the very best and most enduring lumber known to exist. Of course, this continued to be resource our most in-demand, right up to the present. (Even in the 1970s and 80s, it was said that as much local redwood was shipped to Japan as was used in the U.S.)

Douglas fir was another useful timber that our area had in ample supply. A few fir trees as wide as 14 feet were still growing here until the 1920s, but only if they were intentionally spared until that late in the logging era.

A secondary, but very valuable, forest product was the so-called tanoak, or tanbark oak (*Lithocarpus densiflorus*), a species that is common to our conifer and mixed-hardwood forest. It is normally a natural succession species after forest fires or disruption of conifer habitat. Tanoak contains more tannin than any other wood available in this region. Earlier in the nineteenth century, the Russians had used it to tan the otter and seal hides before the otter populations were hunted to near-extinction. Native Kashaya Pomo and Coast Miwok had collected the bark and processed the furs. The tanning process also required a calcium agent to complete the process. In the early years, Kashaya, Coast Miwok and Southern Pomo carried thousands of basket-loads of seashells inland (on foot), to dozens of tanneries from the coast to Healdsburg. The Bay Area tanneries had a huge need for imported tanbark, and these hills of Salmon Creek and Dutch Bill Creek were a primary source for this valuable commodity. The bark would be peeled off the living tree in the spring, when the sap was running, and then the tree would be cut up for cordwood. In the 1870s, skilled Chinese woodcutters arrived to strip the bark off the

trees and cut them up. Their role was soon taken over by many early Italian settlers, who came from a similarly wooded region of Northern Italy, and were extended families of woodcutters and charcoal makers. Charcoal—or partially charred wood—was another commodity that was (and still is, in much of the world) preferred for cooking fuel. The Occidental area produced tanbark and charcoal, processed and warehoused it in Occidental and shipped it out on the train. This enterprise continued, to some degree, until the North Pacific Coast Railroad train stopped coming in 1930. About then, a synthetic compound was developed for tanning leather, and fuel needs shifted.

For the eighty years that tan oaks were heavily harvested, it must have affected the watershed health and species distribution of other trees, chaparral and open grassland. With the redwoods and Douglas fir being cut down at such a rate, naturally tan oak would thrive, but with it being cut too, we aren't sure how the succession of forest species occurred, or how this persistent, intensive harvesting of tree species affected the watershed as a whole.

In 1877, after the huge influx of workers that they area had seen during the building of the railroad, Occidental had only about fifty residents, and continued to grow slowly from there. Although a few Italian immigrants had arrived earlier, most began coming in the 1880s. They brought skills that aided the economy here and continued to push the changes in land use. Men who knew how to strip bark worked in the tanbark or charcoal industry. Others worked as ranch and dairy hands, and saved up to buy their own land. We have many descendants of these early Italian families in farming, ranching, and the stores and businesses of our region.

As Simone Wilson states in *Sonoma County: The River of Time*, “As redwoods in easily accessible areas became scarce, improvements in technology enabled loggers to reach deeper into more remote areas to harvest timber.” Of course, that implies that the bigger trees that were easier to get to were gone, and even though second growth could eventually be harvested, there were undoubtedly still remaining old-growth redwood trees and giant Douglas firs in harder to reach places. Very large sawmills were actually portable, and could be constructed on a leveled area near fine stands of harvestable timber. In Coleman Valley, for instance, four mills under four different owners were active there over several decades. In each case, a rough road was built to the desired site, the mill was brought there in pieces on wagons pulled by oxen or horses, it was built using lumber cut from the immediate area to create the structure for the mill machinery, trees within reach were felled, teams of oxen pulled them up the hillside or through the creekbeds to the mill, where the logs were cut into saleable or manageable lumber, then that was pulled out to where wagons or, later, trains or trucks could carry it to the dealers.

We have photographs of early mills, including some of those in Coleman Valley, but we can only guess at the immediate and long-term effects of logging in such a manner. Of course, this timber is what built Bodega and Occidental, but also Santa Rosa and San Francisco.

The bucolic Coleman Valley provides a close-up example of the history of logging and lumber mills in the Salmon Creek watershed. In 1877, the Coleman Valley mill (then owned by another Smith family) produced 15,000 board feet of lumber per day. From 1883 to 1896, Francis Glynn owned the Coleman Valley mill (on 360 acres), which he reportedly logged “until the timber readily accessible to the mill was depleted.” Ironically, some might say, after depleting Coleman Valley, Glynn went on to be our Sonoma County Fifth District Supervisor for eight years. In 1894, Charles Fuller ran the Coleman Valley mill, producing 25,000 board feet per day. Then, as was typical after totally harvesting redwoods and suitable firs, the mill turned to making shingles, fence posts, pickets and boxes. These could be made from the ends and from smaller trees. The last major mill in Coleman Valley was Frank Sturgeon’s mill, which was at the southwest end of the valley from 1913 to 1923, and logged the “Sugarloaf” area to the west of it.

In the later nineteenth century, some people started to wonder about the rate at which humans were impacting nature. This was the era of early environmentalism in the West—the era of John Muir, the establishment of national parks, Yosemite, and more. The voice of caution arose in various aspects of Sonoma County life, which is reported in newspapers of the time. As early as 1876, there were meetings, protests, and letters to the editor regarding the “slaughter” of hundreds of salmon and steelhead at a time in Santa Rosa Creek, using dynamite. An editorial questions whether so much logging near the coast might not be affecting the inland climate. In the 1890s, the county began to define fishing limits and seasons.

Two major environmental disasters occurred in the Salmon Creek watershed in the early 1900s. First, in the year 1900, a forest fire rampaged over a huge area of the upper watershed. It began at the Francesci Ranch on Coleman Valley Road, due to fall burning of waste at the vineyard there. The fire caught a fir tree root, flared and jumped the road to the south, and spread quickly to reach nearly to Freestone, over through Joy Woods to near Bodega, and in total scorched thirty ranches. The hills were still so bare that when the Great Earthquake of 1906 hit, and people here camped outside for fear of aftershocks, they could sit on hilltops and watch the glow of San Francisco burning for the next three days.

1907-1930: Thriving Dairies, Automobiles and Roads

Judging from the relative lack of historic information about this period, it was relatively prosperous and calm—kind of a spell where “no news is good news.”

Stability has been established in the dairies of the region. Every town had a creamery, they say, and we know that the many dairies of the stretch between Freestone and Bodega were thriving. Cream and butter from this area were judged the best in California, and the year-round grazing potential made it the ideal, renowned dairy environment.

In 1909, one out of every 108 residents in Sonoma County owned an automobile, but only six were registered in Sebastopol, and even fewer west of that. For many farmers, the first motor vehicle they owned was a flatbed truck, but in muddy, sandy or steep places they still had to hitch a team of horses up to a loaded truck to get it through a bad spot.

The development of the North Bay owes a lot to visionary businessman Frank Doyle, who was instrumental in getting the roads improved throughout Sonoma County, including in the Bodega and Bodega Bay area. He also believed that the Geysers would someday power a string of factories, that an ample *oil* supply would be discovered in Sonoma County, and that someday there would be a bridge built across the Golden Gate. In fact, he was a key player in making that third wish come true.

But the growing number of people on the road in motor vehicles increased the wear-and-tear on the existing roads and created the demand for better and more roads. In 1917, renowned Bodega citizen and entrepreneur, H.C. McCaughey, “bemoaned the fact that more frequent auto travel was tearing up the roads at an accelerated pace and that members of the Ocean View club were no longer willing to navigate the sandy road to Salmon Creek.” Cars were such a novelty, that they were used in all sorts of activities: a 1913 photograph taken somewhere in Sonoma County shows a Model T parked right in the middle of a creek channel, with water up to the hub-caps and a very well-dressed couple fishing with poles from the open seats.

The increasing popularity and number of motor vehicles put a lot erosive and financial pressure on the rather delicate dirt roads of the West Sonoma County. In the 1920s, the county government recognized that improving and maintaining roads was perhaps its major job, and the county budget and taxes began to reflect that. They were slow, as ever, to get to the far west of Sonoma County, but by 1926, a lot of road-building activity was completed, including the building of culverts, bridges, and rock work. For years, there was pressure to bring Salmon Creek Road all the way to the coast, but it hung up at the Welling Ranch and never went through (which is probably just as well, for the sake of the creek, the estuary, and the fish, at least). In 1926, there was an official opening ceremony for the roads from Bodega to the coast, and for the Coast Highway to the ferry at the mouth of the Russian River. Coleman Valley Road remained privately owned and for several more decades was gated by the ranchers who maintained it.

Tourism was no longer just for the hotel crowd, and had turned toward summer camps or just independent family tent-camping. The mouths of both Salmon Creek and Scotty Creek were destinations for long-term summer camping. Gradually, tents became cabins (they were literally covered in wood sometimes), shelters became outhouses, and impermanent dwellings became permanent. Dirt and sand tracks became roads. At Salmon Creek, the coast road from Bodega Bay (which was known as just “Bay” at least through the 1930s) to Salmon Creek Village was being covered by the sand dunes drifting eastward. Eventually, the old road was closed off at the south end, and the access from Bodega Bay moved eastward down to the sheltered side of the mound that is the site of Salmon Creek Village. This road is Hwy. One, and the bridge over which the highway crosses the estuary also was moved (a new one was built) upstream a couple of hundred feet. According to some verbal reports, there have been three bridges over the years.

George McChristian and Jabez Churchill hand dug the first well in Salmon Creek Village in about 1920, on McChristian’s property, which was the stagecoach stopover for Salmon Creek. With shovels, they went deep enough to find the layer of fresh ground water that sits higher than the water level in the very nearby estuary. Sand kept drifting into the well, so in about 1930, it is said that they imported dune grass to help catch the sand and keep it from encroaching on homes, gardens, roads and everything. Stories differ on everything about the dune grass: the dates of planting, who brought it in, the species (more than one, possibly), and the country of origin of the dune grass (New Zealand, the Mediterranean, Golden Gate Park), but it is widely presumed to have come from another country and to have been partially effective in holding back the sand.

After many years of discussion, the Golden Gate Bridge was finally approved and built, completed in 1937. This was cause for great celebration and a massive increase in automobile traffic and road building in the North Bay. Salmon Creek Watershed was no exception. The renowned beauty of the bucolic countryside and the stunning redwoods (those that were left after decades of harvest and some re-growth) drew hundreds of people each day to the region. Hotels sprang up again in towns along the roads, and the importance of sound bridges and culverts with increased with the added road traffic. As in the earlier road-building era of the 1870s, cutting through the hills and streams of the watershed, and widening and grading dirt roads, surely created disruptions and long-term sources of sediment during dusty summers and winter rains.

In 1920, a conservative-voting but hard-drinking American populace voted in the restrictions of Prohibition. This region—already known for its vineyards, wines, hops production and breweries—was hard hit economically. Salmon Creek watershed had some vineyards in the hills around the tributaries, and even some

characteristic labels (Indian Mound Winery at the Stecker Ranch off Joy Road was one of them), but not as many as were inland. A great many of the grape-growers and vintners of Sonoma County went broke in the early Prohibitions days, but every household legally retained the right to produce 200 gallons per year of wine, and most did produce at least that much. More remote, forested areas like the canyons that feed into Salmon Creek, were natural areas to set up hidden stills to produce “moonshine.” Some say that there were stills “all over the place” in those hills, and that Fitzpatrick Lane used to connect Joy Road down along Fitzpatrick Creek, to Salmon Creek Road near Bodega, but it provided access to so many stills and purveyors of illegal alcohol that it was closed off and to this day has not been a through road for the public. One must presume that the good water of our watershed was used in the production of these fine, local brews. Blackberry brandy was produced in quantity in our area. One old-timer said that the “gentlemen of Bodega were known for their sweet drinks.” Alcohol was also smuggled in off the coast, mostly coming from Canadian ships three miles out on international waters, with fishing boats running them and the shore, dodging federal revenueurs, and unloading at the same “dog-holes” or rough coastal landing spots that the very early lumber trade had used. There was even a surreptitious distribution system set up, that delivered alcohol to certain customers in the large milk cans and wagons of the Bodega Creamery.

1930-1945: Depression, Wartime and Resource Conservation

This period was not one of radical change in land use in the watershed. Established dairies apparently continued to thrive, and were what the area was best known for. Dairies created in the 1890s and early 1900s were often kept in the same family for several generations, some even into the present. When land changed hands, parcels were usually made smaller, as a result of economic changes and old families or their descendants selling off portions of land.

The Great Depression, in the 1930s, brought changes to West Sonoma County, just as it did to the rest of the country. Apparently, as some ranchers found it financially difficult to maintain marginally profitable cattle herds, they were replaced with sheep, along with the effect of their grazing closer to the ground. In the 1940s, during World War II, wool was in huge demand for the soldiers, so ranchers were encouraged to produce as much as possible, and more conversion to sheep ranching occurred here. The military and the public also needed butter, so the dairies of Salmon Creek were asked to just produce as much as possible, without particular concern for even the traditional practices. It is reported, anecdotally, that the dairy farmers here were told take short cuts to increase production and “Just run the manure into the creek—it’ll take it away.”

During the Depression, Public Works projects were carried out under President Roosevelt's WPA, often by the CCC (Civil Conservation Corps), which was basically an army of young men who lived in rural camps and worked, for \$30 a month, on assigned construction projects that were considered to be for public benefit, such as bridges, culverts, walls and roads. One local camp was at Greenwood, a small settlement that used to exist east of Freestone, on Bodega Hwy., just at the eastern foot of O'Farrell Hill. Many projects across the West County and along the coast were planned and carried out by these workers. A decade later, during the War, this camp and others were used to house troops who patrolled the country roads and beaches and did maneuvers with tanks and trucks on Salmon Creek roads and fields.

Another national program that evolved into an important local force was the development of Resource Conservation Districts. These were initiated to conserve soil particularly, since it was the resource that was most at risk during the droughts of the Dust Bowl period. Coming out of the Great Depression, a federal program—the Natural Resource Conservation Service—was formed to preserve and restore soil quantity and quality for agriculture and ranching. So in 1941, local ranchers and civic leaders formed the Gold Ridge Resource Conservation District, dedicated to provide a conduit for landowners to receive guidance and state and federal money that is directed to be used in restorative programs. To this day, the local RCD wields important influence on farmers and ranchers, helping them solve and anticipate problems. In recent years, the Gold Ridge RCD has also effectively moved into the arena of environmental restoration, with many riparian projects. Their website [www.carcd.org/wisp/goldridge] tells about their past and present priorities:

Gold Ridge RCD: *Past projects* include gully erosion repairs, pond structures for manure management on dairies and riparian fencing. The priorities for *future projects* include in-stream habitat work, habitat typing and stream surveys, development of watershed groups, riparian development, land management workshops and continued projects to reduce sedimentation.

Sedimentation reduction projects include re-grading of roads, culvert replacement, and advice to landowners about steps they can take to reduce erosion on their properties. RCD projects in Salmon Creek watershed include in-stream large-woody debris restoration work in Tannery Creek, Fay Creek, Salmon Creek, and currently in the Salmon Creek Estuary. In the twenty-first century Salmon Creek watershed, the Gold Ridge RCD has become an important partner in restoring a higher degree of health to the watershed.

In 1934, Salmon Creek Beach was made part of a new California State Park system. This included a ten-mile stretch of the Sonoma Coast, from Bodega Bay to Jenner, at

the mouth of the Russian River. The park was later expanded to include even more coastal hill and dune country.

The traditions of the Italian families in the region shed light on the long-standing stability of this era. In many cases, there was a way they did things—ways of loving the land they live on, and their traditional methods of working the land—that these rooted families passed down, along with the ownership of land held by previous generations. Those who were raised here in the 1930s through the 1950s say that even then, every family still had its gardens, its chickens, its cows for milk, cattle for beef, deer could be hunted, and fish were easily available in the creek. Residents of the area of Salmon Creek were pretty self-sufficient for several generations. Evalyn Casini of Bodega tells how in the 1930s and even the 1940s, there was just one trip a month to Petaluma, to buy a big sack of sugar, a big sack of flour, and few other things. Tony Mache tells how they traded with each other for whatever they didn't produce, and they helped each other with big projects, harvests, or problems. Tom Bertolini, raised on Salmon Creek ranches in the 1960s, remembers a similar spirit in working the land and helping each other. These traditions are hard to let go of, and strong feelings persist about modern rules and recommendations versus traditional agricultural methods and environmental concerns.

1946-1966: Peace, Prosperity and Good Fishing

With World War II over, soldiers returned home to set up households and start families, and newcomers flooded into California, including Sonoma County. Sleepy Salmon Creek Village, which was mostly made up of small homes or summerhouses built to the eastern side of the current community, doubled in size as people built new homes on the western side, closer to the beach and dunes and higher up on the hill. Local residents still refer to this dichotomy as “Old Town” and “New Town.” Some traditional summer visitors came to settle down there year-round, just as they did around Occidental and “up on the River,” (a common phrase that refers to the Russian River). Schools continued to be the original one-room schoolhouses tucked around the West County until 1957, when most were closed and consolidated into Harmony Elementary School in Occidental. High school students went to Analy High school in Sebastopol or Tomales High school in Tomales. (For a hundred years, from the 1850s until 1957, schools name Coleman Valley, Potter, Watson, Valley Ford, Freestone, Meeker, and Jonive served the young people of Salmon Creek watershed.)

Dairies were still very functional and a key source of employment in the Salmon Creek watershed. In the 1950s, no fewer than a dozen dairies were operating in the flood plain of Salmon Creek, in the few miles between Freestone and Bodega. In 2006, we have two dairies still operational. Also in the 1950s, with the post-war

popularization of synthetic fibers, the wool market declined and so gradually so did the grazing of sheep in such large numbers and over so much of the upland watershed.

A major and very public political wrestling match brought this area in to the newspapers of 196x. Pacific Gas & Electric had decided to put a nuclear power plant right on Bodega Head, and went deep enough with the purchase, design and construction that they were in the process of excavating a huge hole for cooling the reactor. It makes a great story, in which an unlikely but determined individual stood up to a powerful utility company and gathered supporters as she did so. PG&E waged a long and renowned battle with one of the coast's most formidable and beloved citizens—Bodega Head rancher Rose Gaffney—and lost. The discovery by opponents that the site was right on the San Andreas Fault sealed the fate of the power plant. It was the first organized, collective action of citizens with environmental concerns here on the Sonoma Coast.

After the battle was won, the partial excavation on Bodega Head became known as “The Hole in the Head.” The University of California began looking at Horseshoe Cove on Bodega Head as a suitable site for a state-of-the-art marine biology laboratory, which landowner Rose Gaffney was fully supportive of. In 196x, the U.C. Davis-Bodega Bay Marine Lab opened for research, headed by marine biologist Dr. Cadet Hand, who was interviewed for this project. Dr. Hand ran the lab for twenty-five years, initiated and supported important research projects there, and retired in 198x. The library there is named after him. Dr. Hand and his wife Winnie had already been vacationing annually at Salmon Creek Village since 1946, built their permanent home there in the 1960s, and live there in retirement now. The view from their living room window is the Salmon Creek lagoon and the north end of the sand dunes.

Significant wildfires occurred in Salmon Creek watershed in 1961 and 1965. The first of those was called the Robertson Fire, which spread to include 4,008 acres, about half of which was in the Salmon Creek watershed. Fire maps show that it affected the tributary watersheds of Tannery, Fay and Coleman Valley creeks, but was mostly on the western slopes of Fay Creek. In 1965, the 1,840 acre Coleman Valley Fire took out many of the trees on the ridge between Fay and Coleman Valley creeks, and burned far down to the southwest, almost to Salmon Creek itself. It is likely that erosion followed the scorching that exposed the ridges and steep upper canyons, and that sediment was contributed to the tributaries and to Salmon Creek in the rains following these fires. Residents of the Wheeler Ranch, high in the watershed of Finley Creek, recall that following the fire, representatives of the state recommended that thousands of Monterey Pine (*Pinus radiatus*) seedlings be liberally planted over the scorched countryside. Bill Wheeler has reported that he

and a crew replanted “the East Canyon” with thirty thousand trees! Since Monterey pine is a fast-growing, short-lived species that is not native to this north coast region, and since it is highly susceptible to beetles and rot, it is no longer favored as a forest restoration species. Hundreds—or thousands—of aged Monterey pines now make up part of the mixed succession forest of these higher slopes of the north side of the watershed, along with Douglas fir, native tanoak, coast live oak, redwood, bay laurel, madrone, Ceonothus, and hazel, in addition to all the chaparral areas and the coastal prairies.

Rancher Tony Mache has observed the salmonids passing up and down the creek all of his life, since he was raised and still lives on his family’s ranch, on the left bank of the main stem of Salmon Creek, near the old Watson School southwest of Freestone. He says that they used to be so reliably plentiful that his grandma would start to make dinner, then send him on down to the creek with his pole, to catch a fish for dinner, with the certainty that he’d be back in twenty minutes with the main course. Tony says that in the 1950s, Salmon Creek where it passed through the Maches’ land was 5 ft. deep with 15 ft. deep pools, with fish and good habitat in them. Now, the same reach of the creek is 25 ft. deep, with mostly vertical, eroded banks and little in the way of pools or gravel. County Flood Control crews used to come each year, to help the landowners clear willows out of the center of the channel, which, says rancher Tony Mache, successfully kept the creek from flooding. Now (2006), he says that it floods every year, inundating part of his pasture and taking a lot of soil with it each time. He appreciates the riparian revegetation project that Doug Gore and Dragonfly Stream Enhancement have established there, on the left bank, using willows and willow baffles to re-create the channel and hold back the erosion of his adjacent field. Tony acknowledges that the stream bank restoration work has been very beneficial to his land.

Charles Beck reports that in the 1950s, where Salmon Creek estuary flows under the bridge at Highway One, the water was reliably 18 ft. deep. He says he occasionally dove off the bridge with other friends in those days, so can vouch for the ample depth.

There are many reports that people remember when there were so many coho and steelhead that they could “pitchfork” them out of the stream and into a truck bed. This was true, they say, until at least the late 1950s, if not later. Others recall fisherman waiting inside the breaking sand bar in November, ready to fish with their potato forks (a long-handled, three-tined potato harvesting tool). A couple of old residents recall that they “always” had fresh-caught salmon for Thanksgiving, implying that historically, the sand bar opened (or was opened with help from local fishermen) by the third week of November.

During the 1960s and 1970s, our society was going through cultural change and the “Hippie Era,” which brought people “back to the land.” Many came back to the land here in west Sonoma County, and that accounted for some changes in land use. Communes such as Wheeler Ranch, Star Mountain, Bodega Pastures and OceanSong sprouted up. People tried to understand what it meant to let land be “wild,” or “natural,” and how to “live lightly on the land.” Everyone continued (as we all still continue), to learn that land and its elemental resources—most of all, water and vegetation—all work together with the people who live there, and that some form of conscious land management is necessary to the health of the whole system.

Redwoods that had been cut in the 1870s or 80s re-grew to a size that they could be harvested again in the 1920s, and then again later in the twentieth century. In the 1950s, the Chenoweth Mill in Bodega logged and milled redwoods that Chenoweth suspected were second-growth from the early Russian timber harvest. They got the stump-sprouted trees dated in 1958, and found that they were indeed 135 growth rings (years) old, which put them back to 1823 when last cut. Lots of people worked at the Chenoweth Mill, and remember the big old incinerator burning the slash. Many of the Italian and Irish descendants in Bodega area worked there right up to when it closed in about 1970, in addition to one or two other jobs that helped make ends meet. Early hippies who moved into the area and needed work also put in their time there, and remember it fondly as a paying job you could get locally.

1970-1981

The 1970s saw an exodus from the cities, mostly of young people wanting to live closer to nature and in small towns. The counter-culture of the time brought another layer of newcomers to West Sonoma County, some of them living communally in the Salmon Creek watershed, up on the ridges and slopes of what would become Wheeler Ranch, Bodega Pastures, Star Mountain, and later, OceanSong. This added to the sparse human population, changed the schools and small towns, and added a lot of environmentally aware folks to the local citizenry. Old-timers and newcomers had to learn to adjust to each other. Just as at every other historic junction, there were people who fished or just observed the creeks, and those who made decisions about how to use the land for gardening or grazing. Tourism began to flourish again, especially at Bodega Bay, which needed more water to support its increasing population. Wells were drilled across from the Welling Ranch on lower Salmon Creek, with a pump house to send the water over the hill to Bodega Bay. These wells have been controversial for some time, and the volume of water that they draw is an issue in many private conversations about the health of Salmon Creek and the state of the salmon.

An ample water supply had always been a problem for the town of Bodega too. Private wells on the south side of town have kept the rest of the town in water for

the past twenty years or so. For over a century of development of the area, everyone anywhere near the creek just pulled their water directly from the creek, or so people say.

The last full runs of steelhead, or what residents at that time considered ample enough to be “normal,” occurred in the 1970s. Joy Road resident Charles Beck, who has been a keen observer of Salmon Creek and the estuary since his childhood there in the late 1940s, and Cadet Hand, an avid creek fisherman as well as marine biologist, both report that the numbers of steelhead diminished substantially after the period of the mid-1970s. A very serious regional drought continued for several years (1975-1977), long enough to have interrupted reproductive life cycles for coho, and to have influenced steelhead. At times there was very little water in the creek’s summer flow, and some pools dried up completely.

Bodega resident Tom Bertolini, who grew up living on ranches along Salmon Creek Road, and lives there still, explored the creek and all the tributaries with his friends and cousins all through his youth, and fished whenever he could. Tom offers great, detailed descriptions of daily life in Bodega and along the creek in the “good old days” of the 1950s through the 1970s. He clearly remembers lots of salmon and steelhead spawning in the clean, pebbly creekbeds, and the young fish safely waiting out the summers in cool, sheltered pools that had enough water to keep them alive and well. He says that Fish & Game biologists would come along now and then and just ask him and his fishing friends how fishing was, what sizes they were getting, where the best holes were, when the fish showed up, etc. The kids and local stream and estuary fishermen were really acting as assistants to Fish & Game, by observing the fish and environment, noting lots of details, and sharing their “field surveys” with the officials. When, through regulations, fishing was effectively brought to an end in Salmon Creek, the long era of popular interaction with the species, the detailed observations of flow and habitat, and the importance of the riparian environment in the public mind also was diminished.

1982-1996

Everyone who lived in Bodega or Salmon Creek in early 1982 seems to remember the historic rainfall and subsequent flooding of January 14, 1982. It seems that the rain fell very hard and very fast for many hours (variously reported as nine to twelve inches in twenty-four hours) in both the upper and the lower watershed *simultaneously* (a relatively rare occurrence, since the ridges and Occidental have a different rainfall pattern than the lowlands). This simultaneous dumping of rainwater and runoff into upland and lowland creeks overloaded the carrying capacity of the natural hydrological system and caused the most pronounced flooding that anyone has reported in and around Bodega. It also brought down massive amounts of sediment from the tributaries into Salmon Creek, depositing it

in the channels below. Bill Cox, a primary California Department of Fish & Game biologist for North Marin and Southern Sonoma, recalls that there were deltas of sediment below some of the tributaries.

Dr. Cadet Hand, founding marine biologist of the U.C. Davis Bodega Bay Marine Lab and resident of Salmon Creek Village since the 1960s, tells how the estuary filled with sediment and, especially below the bridge the marsh became terrestrial, due to the deposits left behind.

Apparently, according to theories of the residents, the build-up of old, disrupted material (downed logs, woody debris, and fine sediment accumulation) of the ridges and the upper tributaries—particularly Tannery Creek, Coleman Valley Creek, and Finley Creek—at last broke loose from their decades-old log-jams and layers high up in the watershed, and ended up as debris piles and alluvial fans below the confluence of those creeks with Salmon Creek, and most noticeably in the estuary itself. One hypothesis is that at least part of the amazing amount of material could have been from as long ago as the logging boom of the 1870s, piling up in the steep uplands until conditions combined to wash it all down the canyons. Due to the force and volume of the rain and the inability of the modified hills to absorb it, the debris in the headwaters of the tributaries broke loose, apparently taking with it with all the sediment that it was holding back and probably causing the erosion of much more. Although accounts differ about the suddenness of the change at the estuary, several observers contend that the “lagoon” (the common term for the estuary below the narrows at the bridge) changed radically in breadth and depth. They report that what was previously tidal marsh, and therefore more water than earth, abruptly became “terrestrial upland,” or solid ground that remains above the normal water level, where dry-land plants now take hold. This effect was and still is most visible in the area downstream of the bridge where Hwy. 1 crosses Salmon Creek. Overnight, the footing of the north side of the bridge was blown out by the intensity of the stream flow, causing the closure of the highway and the bridge itself for several weeks. People say—and it is quite obvious in comparing older photographs—that the channel under this bridge was narrowed substantially when the earthen footing was built to support it, replacing the much longer stretch of pilings that supported the previous bridge and let much more water through. Following this 1982 storm, electricity was out for several weeks at Salmon Creek Village, and access to Hwy. One there was closed for weeks. This storm of January, 1982, is the most significant storm event that anyone mentions in all the verbal accounts of weather from the 1970s onward, except perhaps for the drought of 1974-1977.

As late as 1987, water for Freestone residents was being pulled directly from the creek. A local newspaper article of the time reports that the monthly water bill for

Freestone residents was still only \$5 per month, but the water quality was a problem. According to the article, visible silt and the occasional salamander managed to make it through the pipes! People were organizing to get a proper, filtered, water storage system.

Again, accounts differ, but the last coho salmon were seen in the Salmon Creek watershed late in this period. Bill Cox (CDF&G), who performed summer stream surveys each year during this time in the streams that he had access to (particularly Tannery Creek and Fay Creek) reports that the last coho he documented was in 1994. Rumor has it that perhaps a coho was last caught in 1996. Apparently none have been seen in this watershed for at least ten years. A later drought in the mid-1990s may have been the last straw for the coho, but there are so many factors that it is certainly hard to say. Still, it does seem to be a topic on which opinions flow freely.

Bill Cox has paid focused attention to Tannery Creek for twenty-six years, and says that through the mid-1990s, he always saw ample summer flow in that creek, but that something has changed since then, since the summer pools no longer form as they did before. He postulates that something has changed in the upland of the Tannery Creek sub-watershed that has caused the flow to dry up, and that sometimes now in summer there is hardly any water in the creek. Water diversions and/or wells for the increasing number of upland homes and vineyards are a possibility. Several residents mention with concern the greatly increased number of homes built in the Bodega region, both above and below the confluence of Tannery Creek and Salmon Creek. Previously large ranches have been divided up into smaller parcels and 5-10 acre “ranchettes.” Of course these homes and gardens draw water from the water table.

1997-2006

In the past decade, many people’s expertise and speculation has focused on the issues of salmonids and the health of our creeks, as well as how the creek is just the visible water circulatory system of an entire watershed. Again, in an interview, Bill Cox has a perspective:

“We need to understand how we all have an effect on the watershed; how we can all make changes to reduce the impact that we have. It’s like the road issue: it’s not usually where the road crosses the stream that’s the problem; it’s where the road goes through the watershed. Maybe there’s a little gully coming down, a little rivulet that only flows when it’s pouring rain. Those are the things that are far away from the stream, but they ultimately lead to the stream, that’s why I said earlier that *I practice fisheries management on the*

mountaintop, because everything that is going on in the watershed ultimately has, or may have, an impact on our streams.”

Some of the ranchers are working with the RCD, Fish & Game, and other riparian restoration efforts. Some of the landowners with rural dirt roads are participating in projects to minimize erosion. The local community has shown that they are interested in the data being collected about the creek, the estuary, and the health of the remaining steelhead and other species. Some residents have been glad to offer oral histories, filled with opinions as well as memories; others have been as resistant to questions as they are to the interests of environmentalists and “those watershed people.” The challenge we all face in restoring healthy balance to a watershed is cultural as well as environmental. Suggestions to this interviewer have included: better communication from the scientists; better listening to the old-time residents who are sharing observations about how it was before, and how and when it changed; and ongoing discussion about what are we collectively willing to do to bring it back. People like it when their opinion is sought, even if it just serves as an outlet for complaining about the way it is now. This Salmon Creek study has made some important steps on the cultural and social levels as well as with their scientific assessment. Since cooperation from landowners is key to the success of any restoration effort, this project is on the right track in terms of how it is gradually bringing various kinds of stakeholders into the conversation about what is to become of Salmon Creek.

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Contributors to this history project:

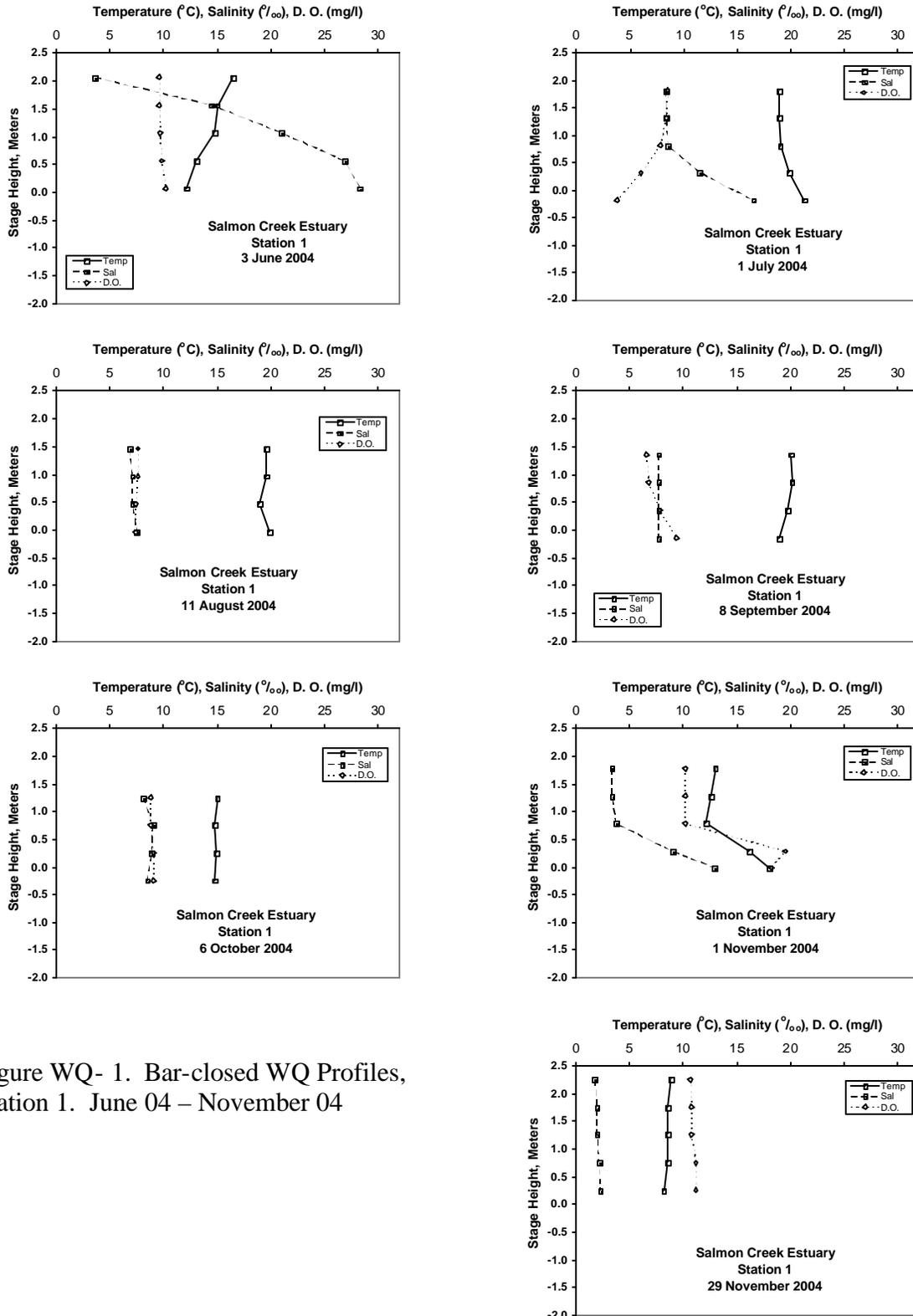
- Interviews contributed by Charles Beck, Tony Mache, Nancy Conzett, Tom Bertolini, Michael Fawcett, Bill Cox, Dr. Cadet Hand.
- Conversational comments and perspectives contributed by George Gross, David Feinberg, Harry Lapham, Evelyn LaVine, Theresa Beldon, David Peri, Kathleen Kraft, Kurt Erikson, Richard Retecki, Darlene LaMont.
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- Video comments (from Kurt Erikson's "Salmon Creek Old Timers" video) contributed by Evalyn Casini, Ruth McCaughey Burke, Harry Lapham, Ed Pozzi

Appendix B: Water Quality Figures

- Figure WQ-1. Bar-closed WQ Profiles, Station 1, June 04 – November 04.
Figure WQ-2. Bar-closed WQ Profiles, Station 2. June 04 – November 04.
Figure WQ-3. Bar-closed WQ Profiles, Station 3, June 04 – November 04.
Figure WQ-4. Bar-closed WQ Profiles, Station 4. June 04 – November 04.
Figure WQ-5. Bar-closed WQ Profiles, Station 5. June 04 – November 04.
Figure WQ-6. Bar-closed WQ Profiles, Station 6, June 04 – November 04.
Figure WQ-7. Bar-closed WQ, Profiles, Extra Stations. 29 November 04.
Figure WQ-8. Bar-closed datasonde records, Station 1, June 2004 – November 2004.
Figure WQ-9. Bar-closed datasonde records, Station 2, June 04 – November 04.
Figure WQ-10. Bar-closed datasonde records, Station 3, June 2004 – November 2004.
Figure WQ-11. Bar-closed bottom temperatures, Station 4, June 04 – November 04.
Figure WQ-12. Bar-closed bottom temperatures, Station 5, June 04 – November 04.
Figure WQ-13. Bar-closed bottom temperatures, Station 6, June 04 – November 04.
Figure WQ-14. Bar-open WQ Profiles, Station 1, December 04 – June 05.
Figure WQ-15. Bar-open WQ Profiles, Station 2. January 05 – June 05.
Figure WQ-16. Bar-open WQ Profiles, Station 3. January 05 – June 05.
Figure WQ-17. Bar-open WQ Profiles, Station 4. January 05 – June 05.
Figure WQ-18. Bar-open WQ Profiles, Station 5. January 05 – June 05.
Figure WQ-19. Bar-open WQ Profiles, Station 6. January 05 – June 05.
Figure WQ-20. Bar-open datasonde records, Station 1, December 04 – April 05.
Figure WQ-21. Bar-open datasonde records, Station 2, December 04 – May 05.
Figure WQ-22. Bar-open datasonde records, Station 3, December 04 – May 04.
Figure WQ-23. Bar-open bottom temperatures, Station 4, December 04 – May 04.
Figure WQ-24. Bar-open bottom temperatures, Station 5, December 04 – May 04.
Figure WQ-25. Bar-open bottom temperatures, Station 6, December 04 – May 05.
Figure WQ-26. Ocean tides, estuary stage, and rainfall, February through May 2005.
Figure WQ-27. Ocean tides, estuary stage, and rainfall, June through September 2005.
Figure WQ-28. Bar-closed WQ Profiles, 22 September 05.
Figure WQ-29. Comparison of summer stage heights between 2004 and 2005.
Figure WQ-30. October through June monthly rainfall summary, 2003-2004 and 2004-2005 seasons compared with the average rainfall for the 10 previous years.

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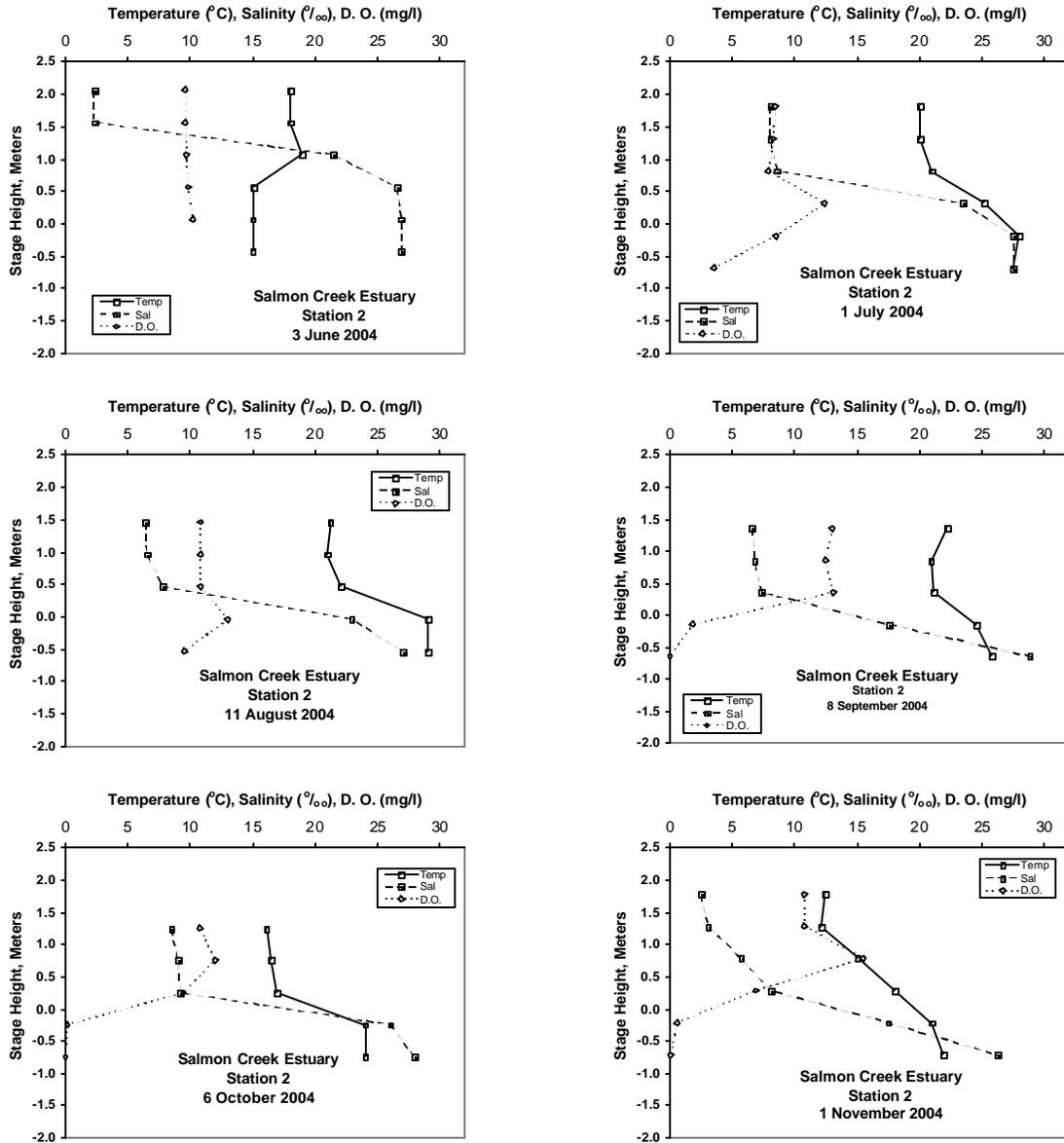
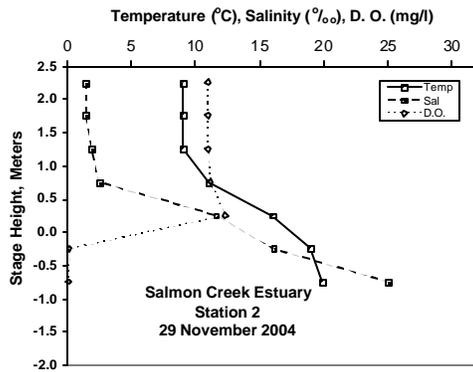


Figure WQ-2. Bar-closed WQ Profiles, Station 2. June 04 – November 04

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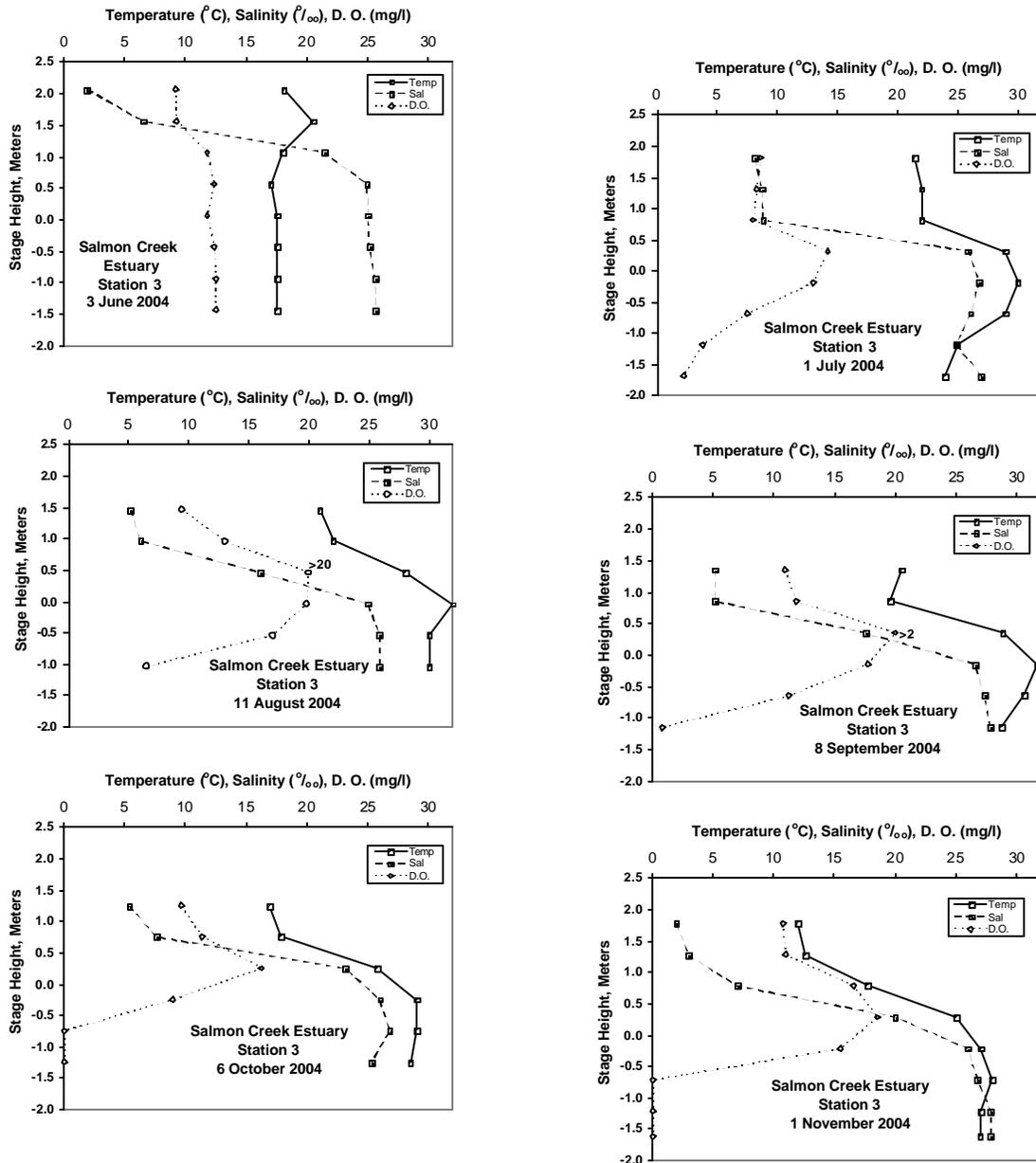
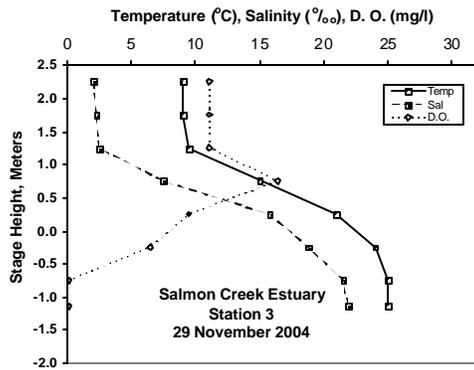


Figure WQ-3. Bar-closed WQ Profiles, Station 3. June 04 – November 04

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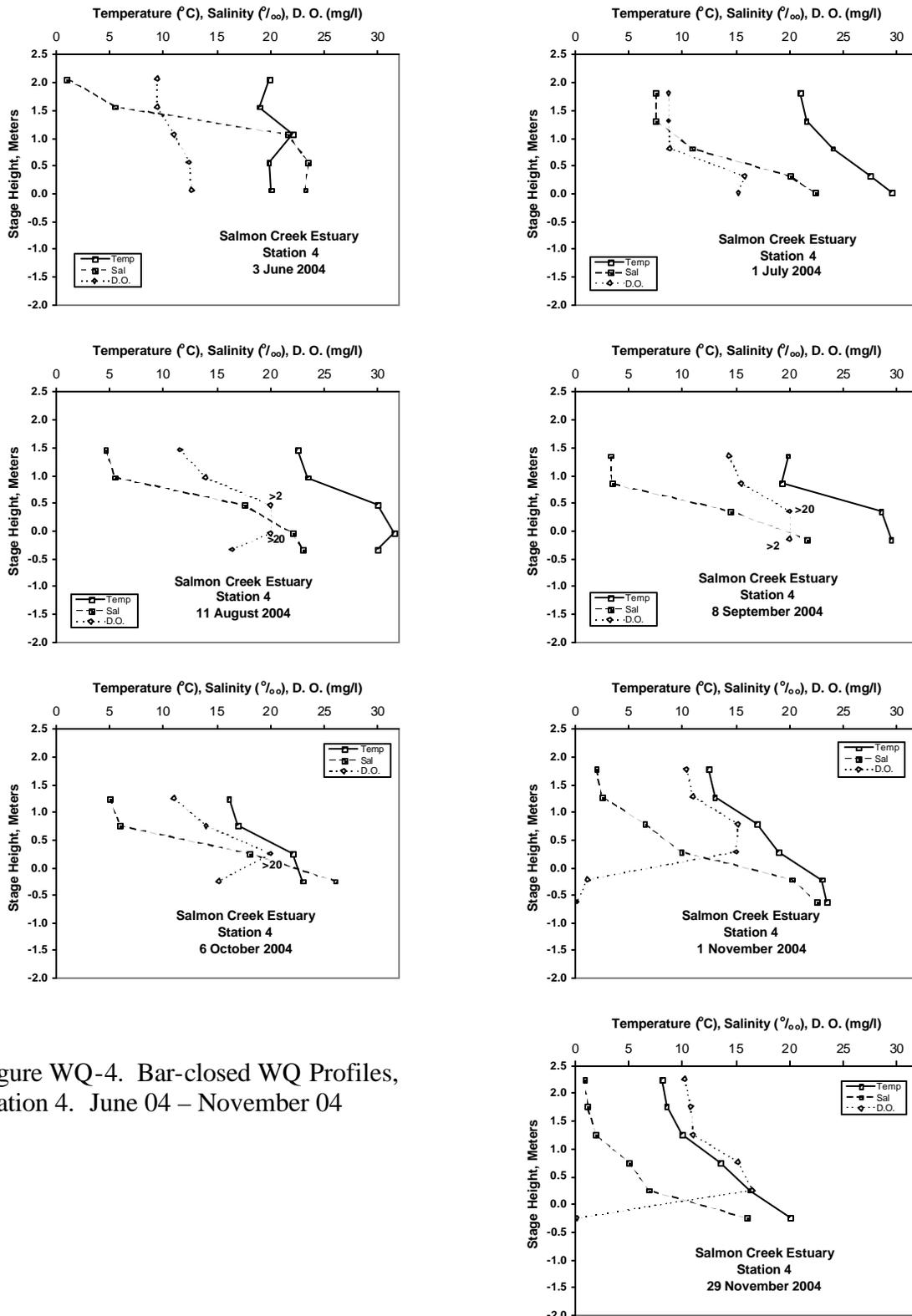


Figure WQ-4. Bar-closed WQ Profiles, Station 4. June 04 – November 04

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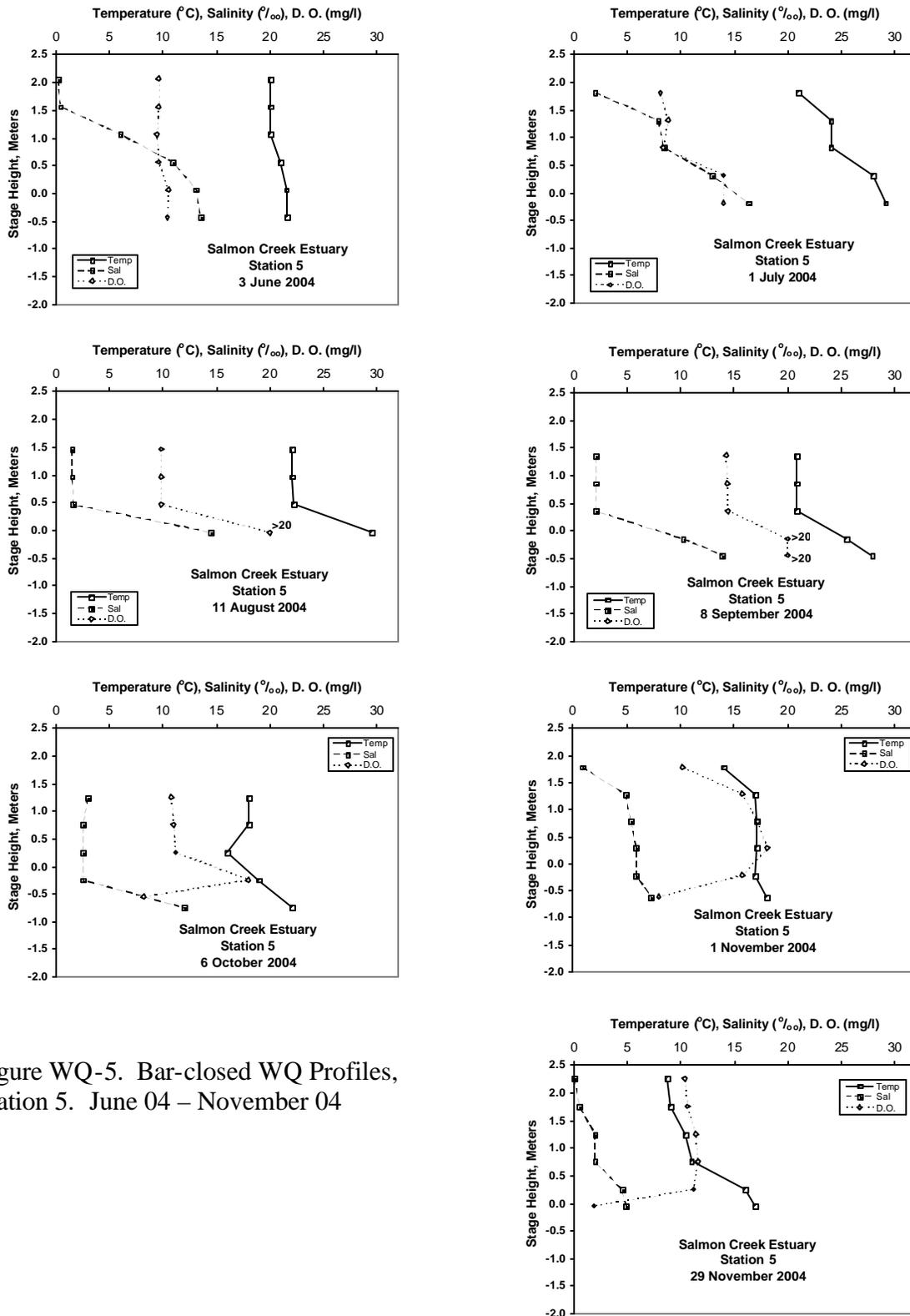


Figure WQ-5. Bar-closed WQ Profiles, Station 5. June 04 – November 04

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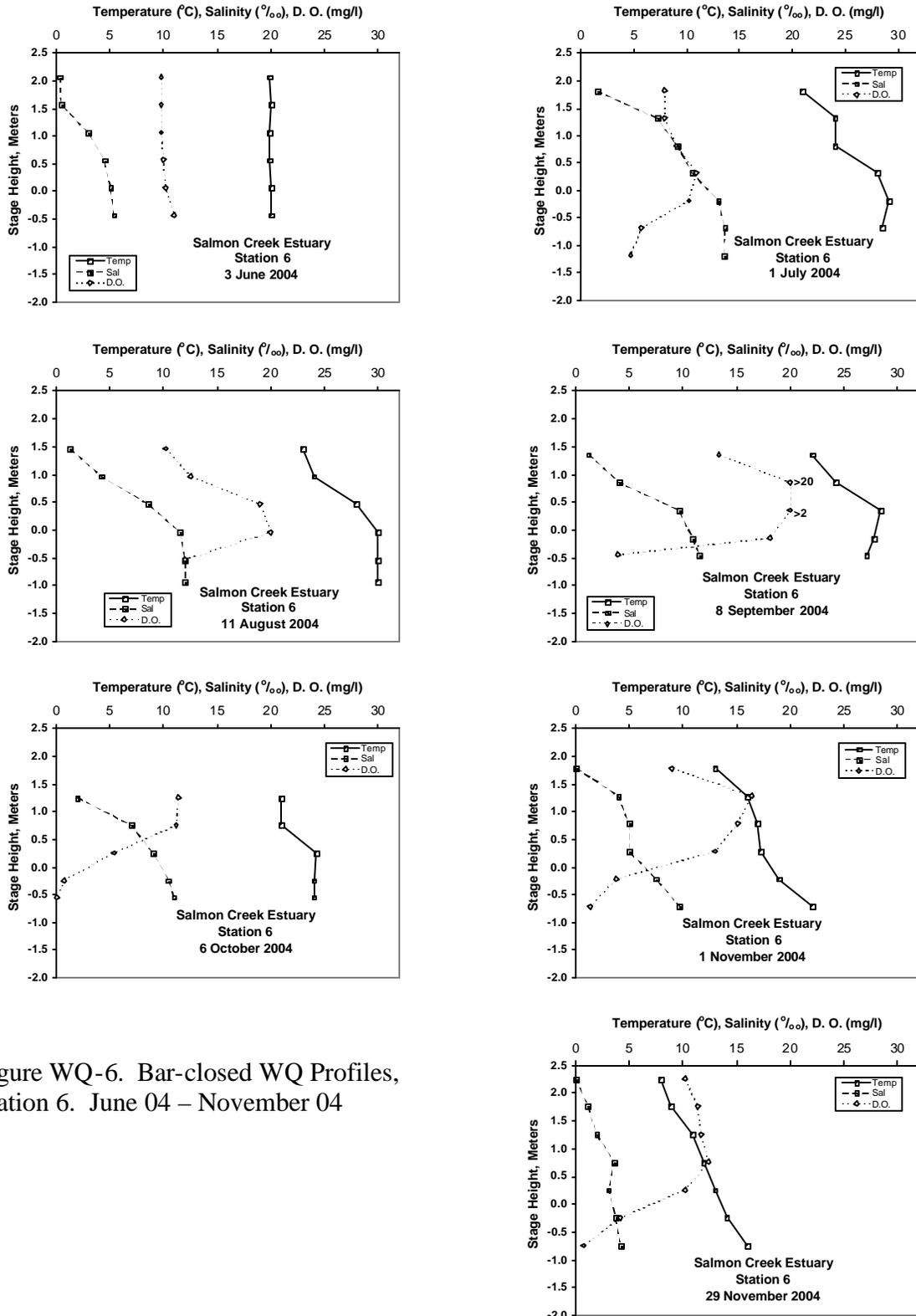


Figure WQ-6. Bar-closed WQ Profiles, Station 6. June 04 – November 04

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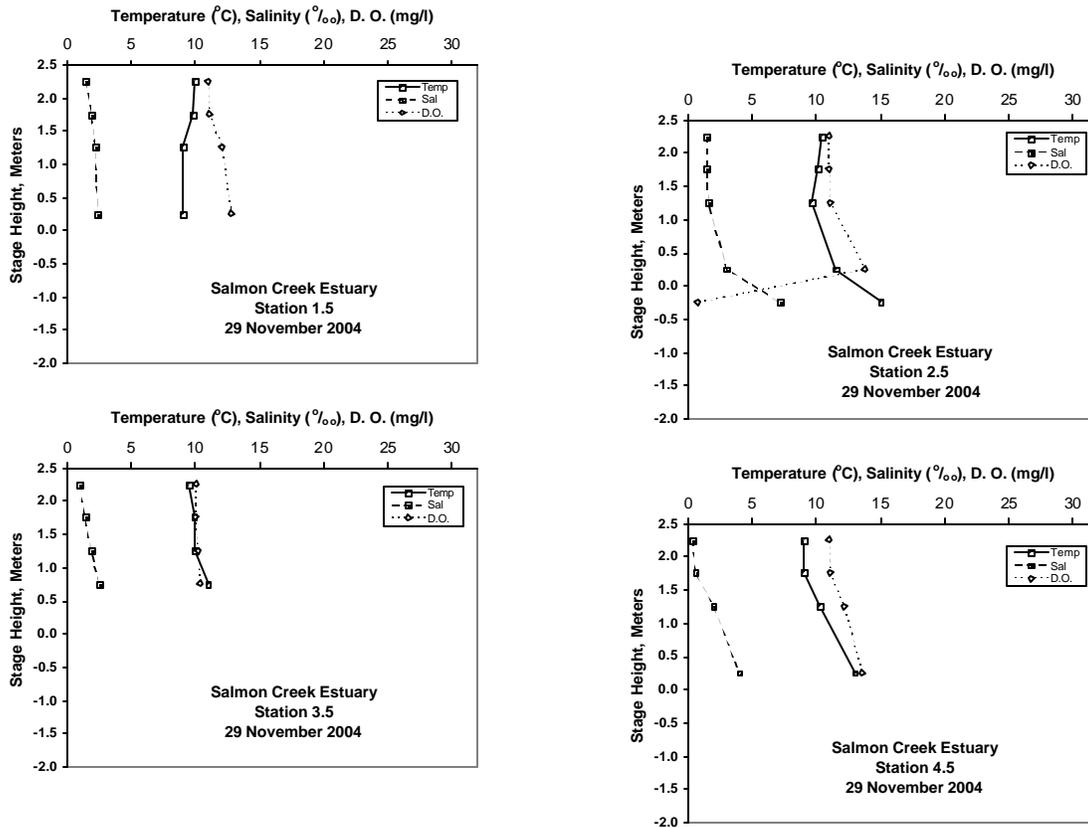
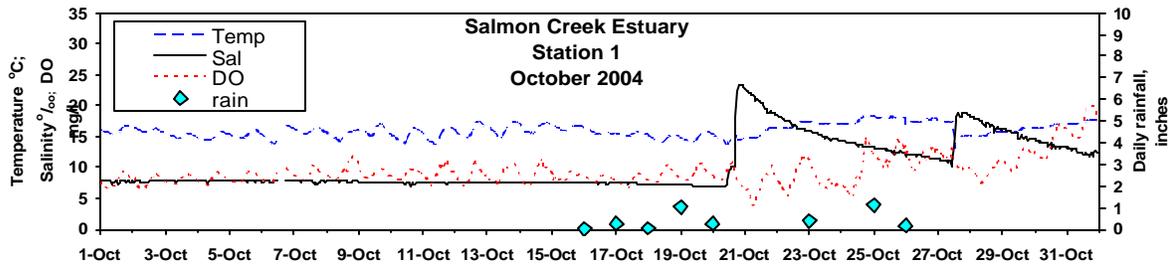
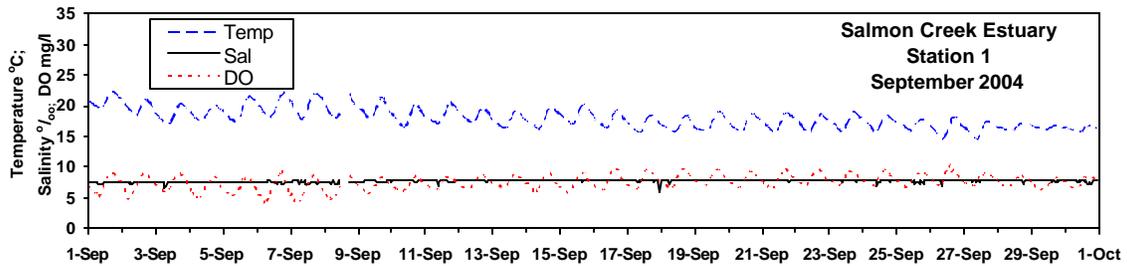
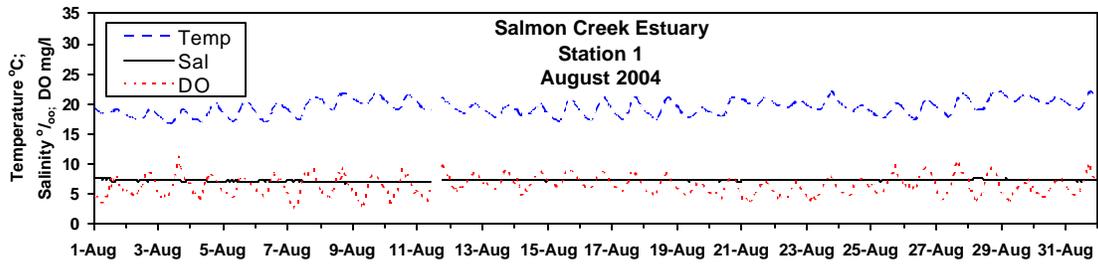
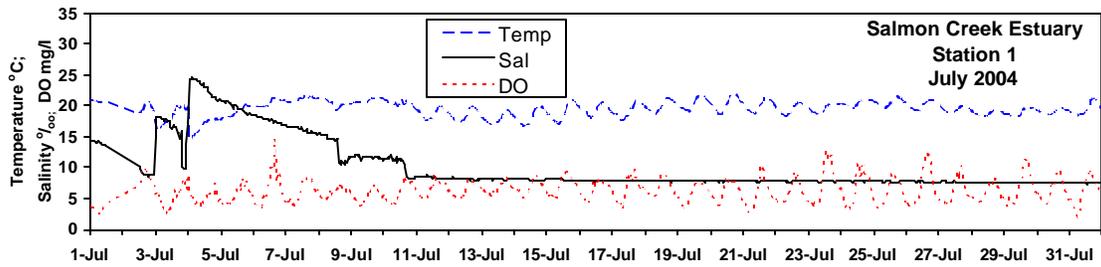
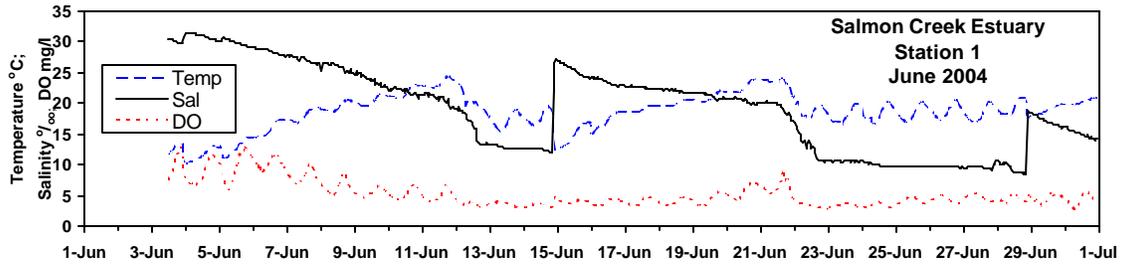


Figure WQ-7. Bar-closed WQ, Profiles, Extra Stations. 29 November 04

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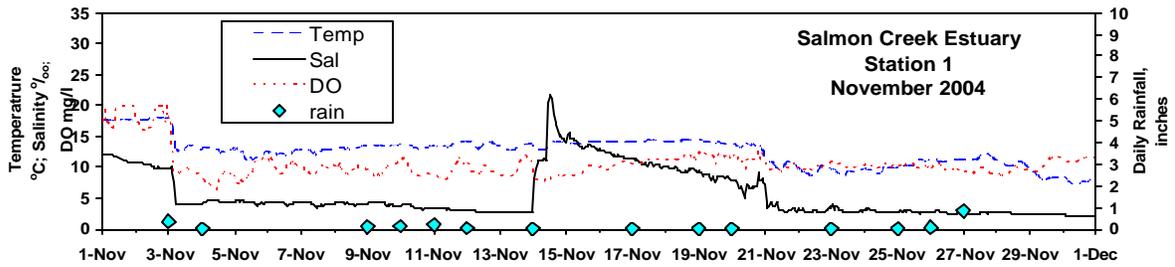
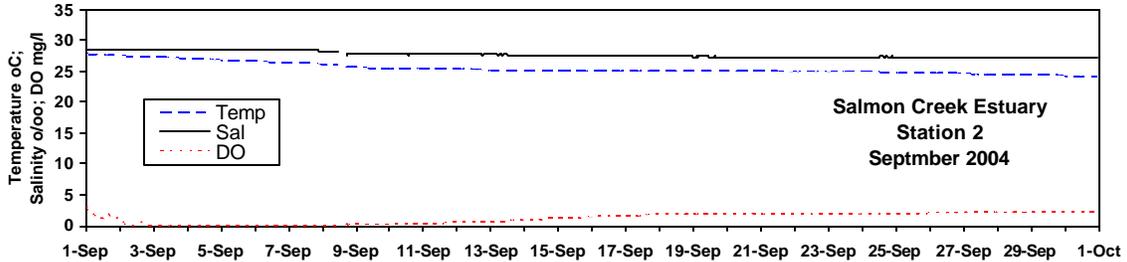
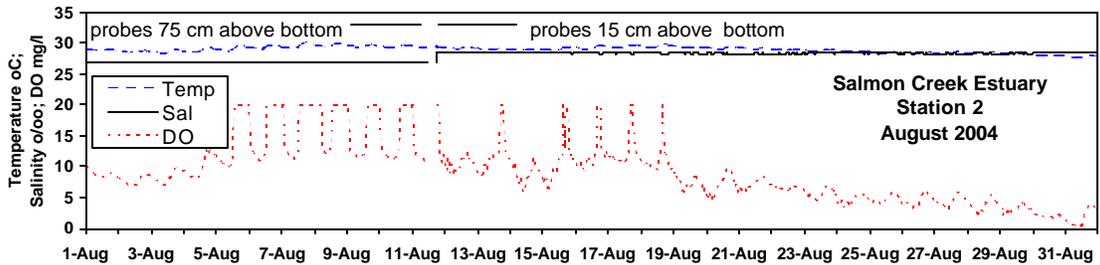
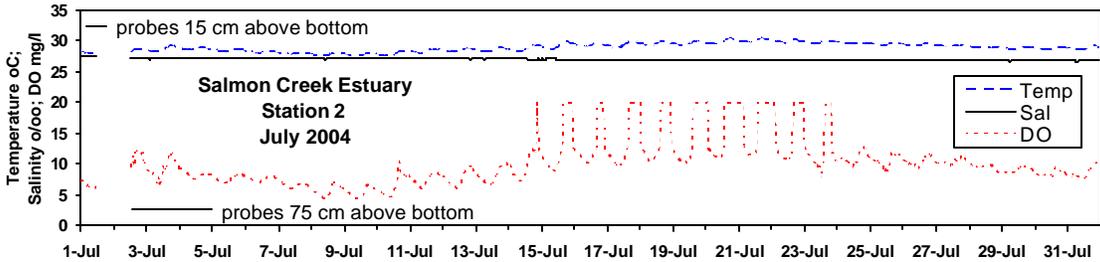
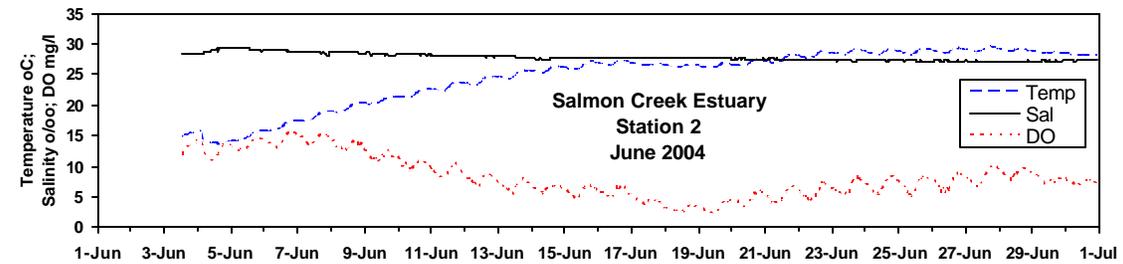


Figure WQ-8. Bar-closed datasonde records, Station 1, June 2004 – November 2004.



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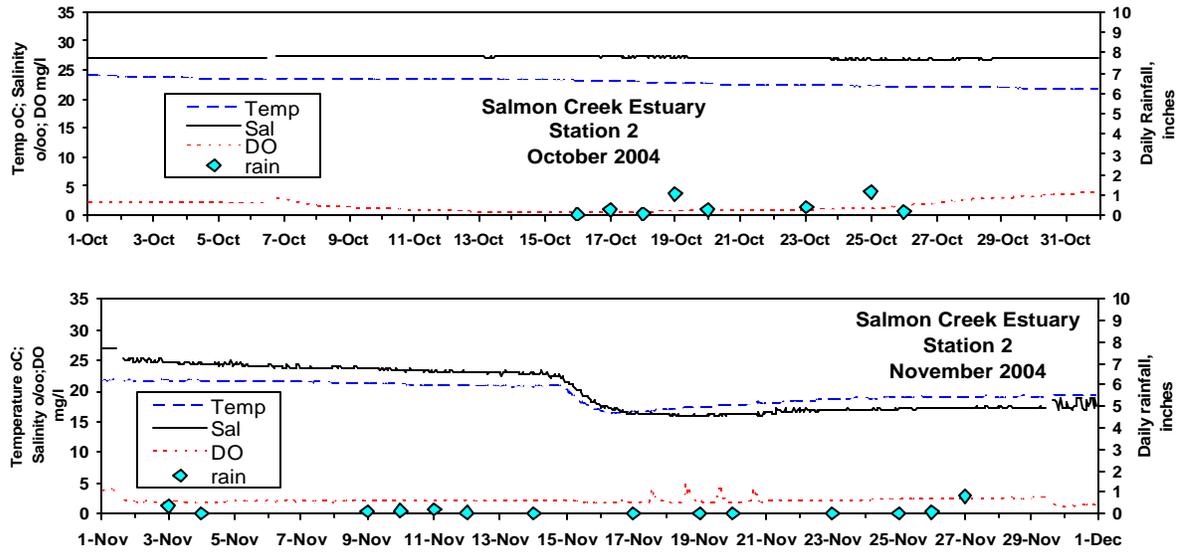
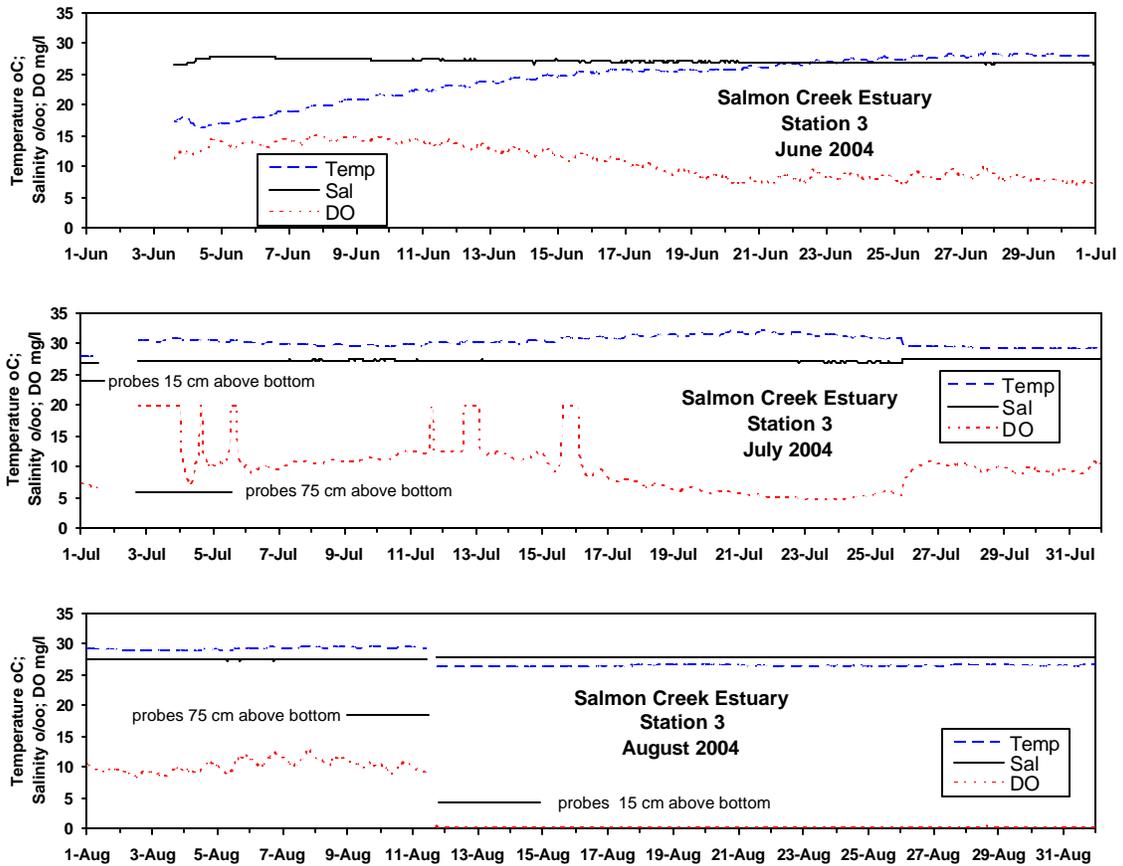


Figure WQ-9. Bar-closed datasonde records, Station 2. June 04 – November 04.



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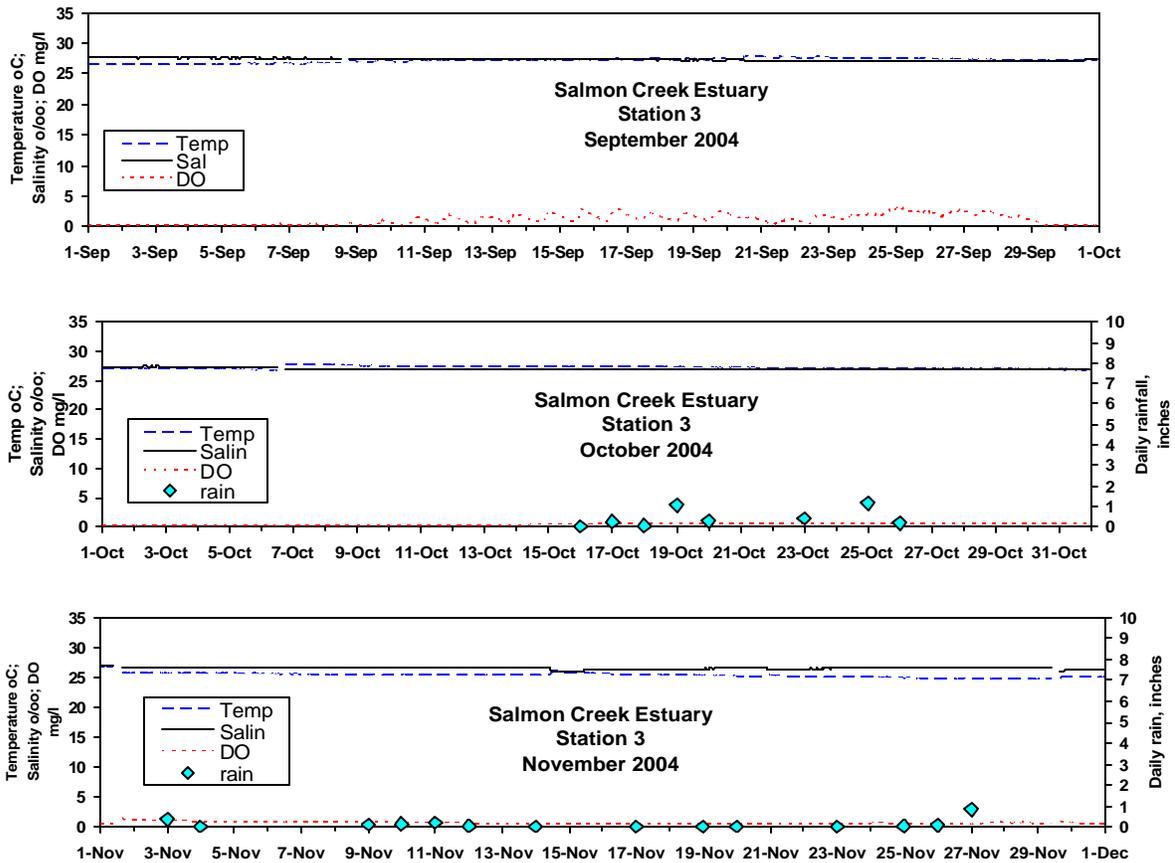
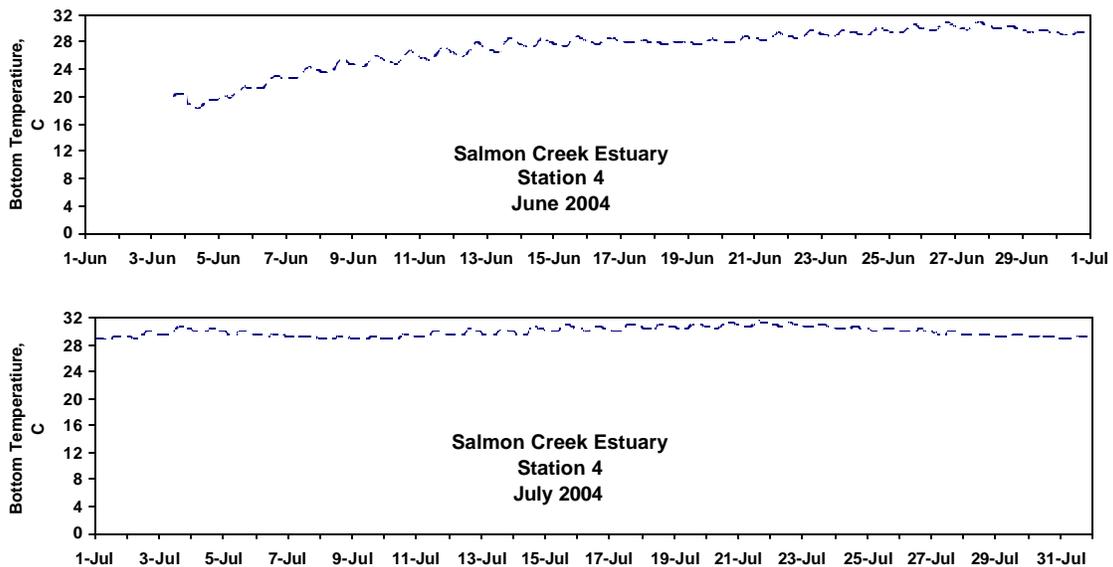


Figure WQ-10. Bar-closed datasonde records, Station 3, June 2004 – November 2004.



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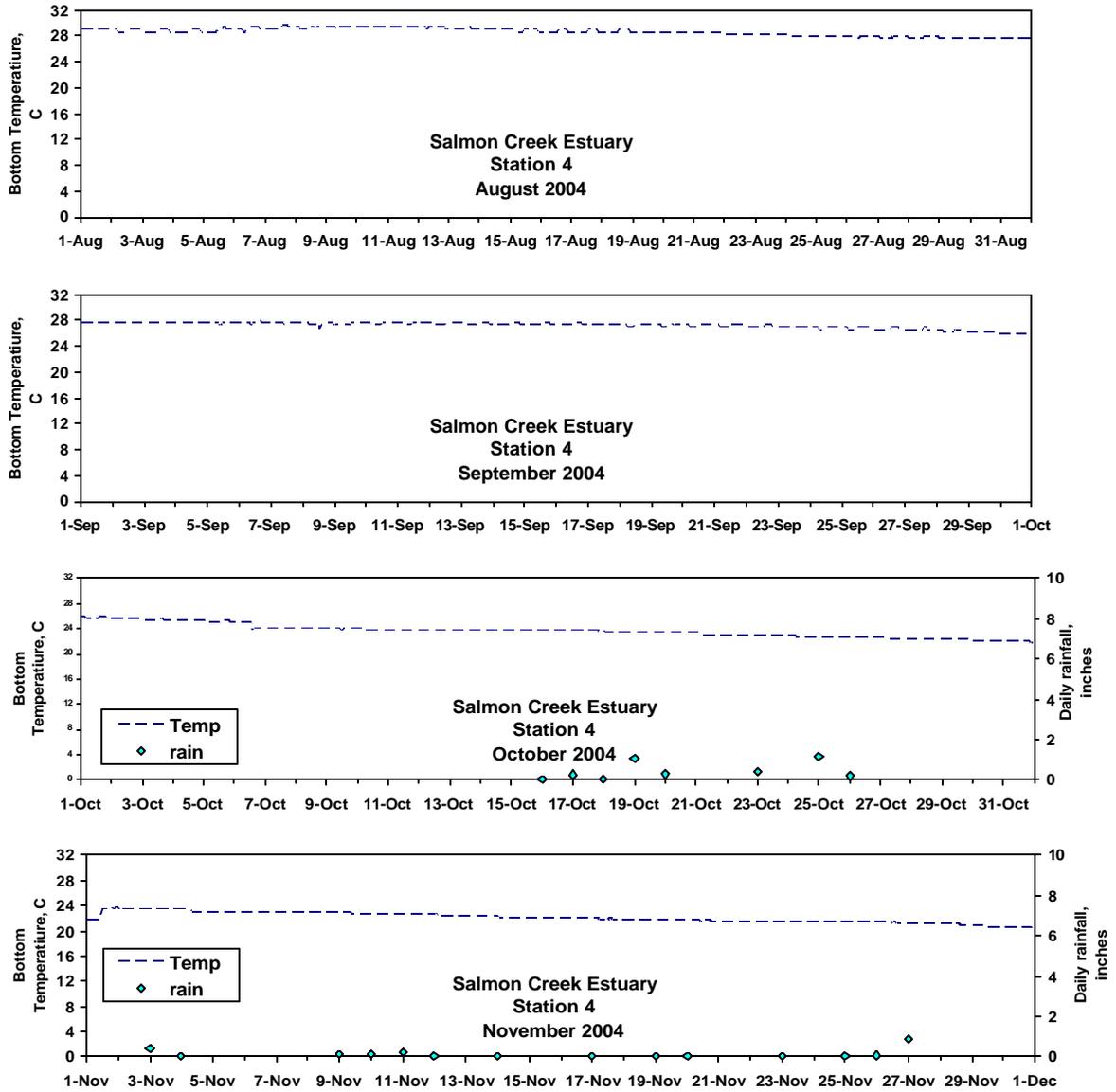
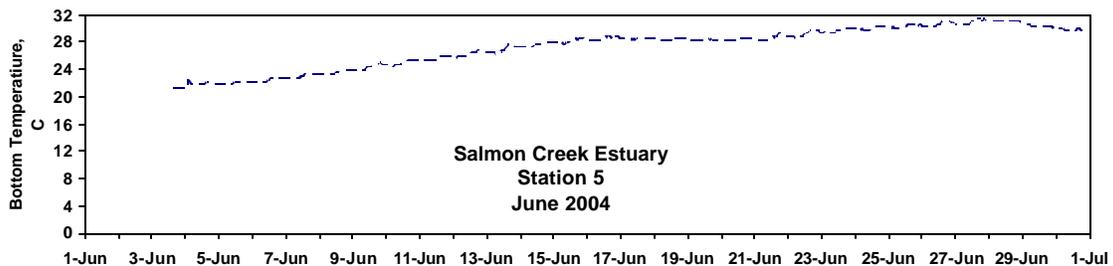


Figure WQ-11. Bar-closed bottom temperatures, Station 4, June 04 – November 04.



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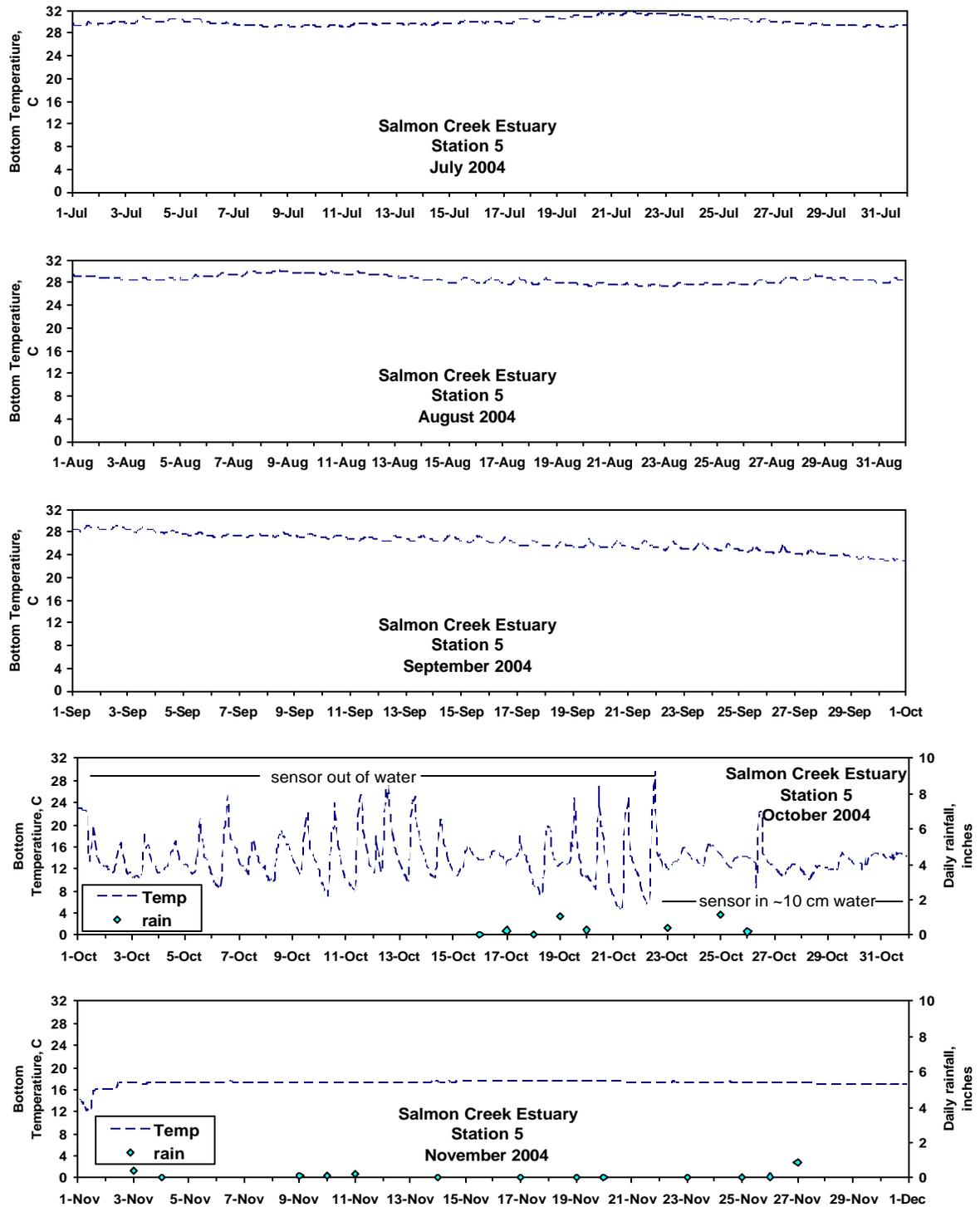
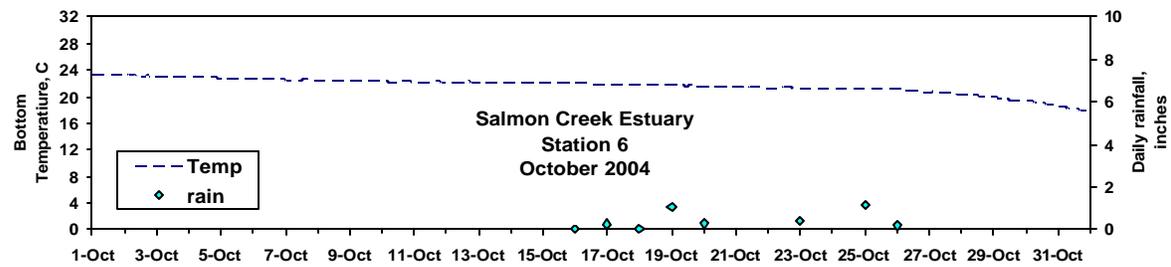
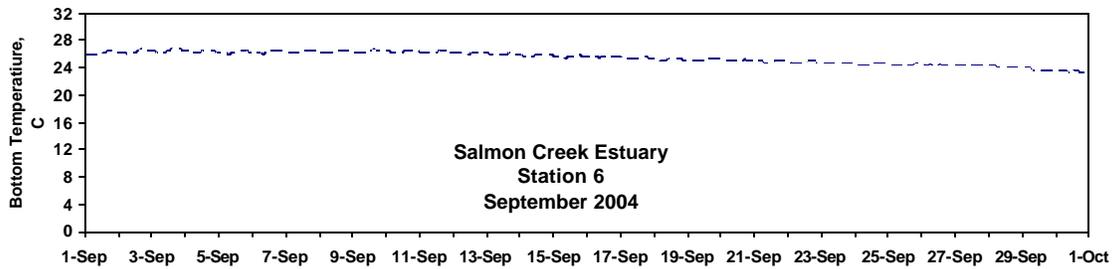
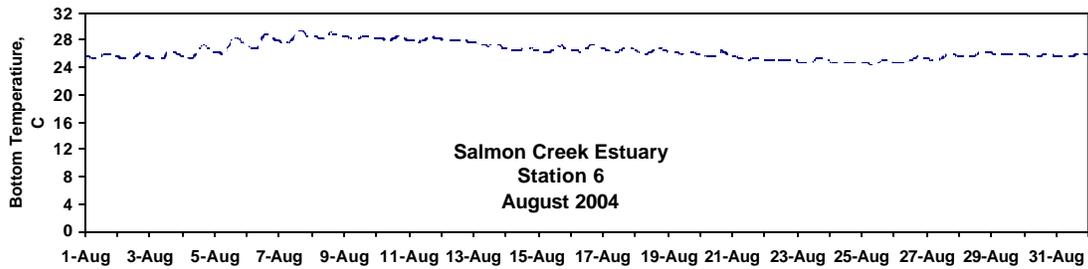
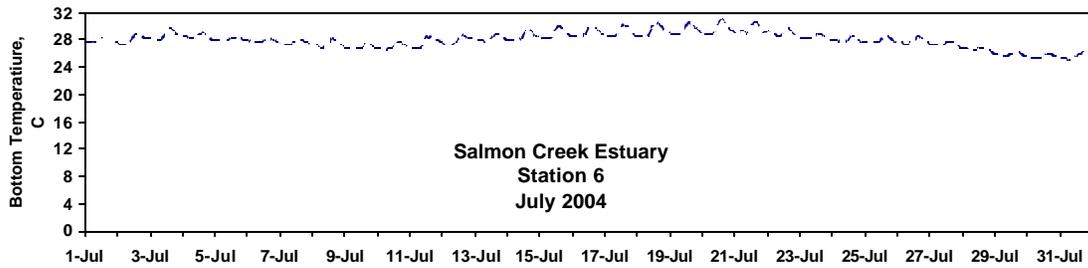
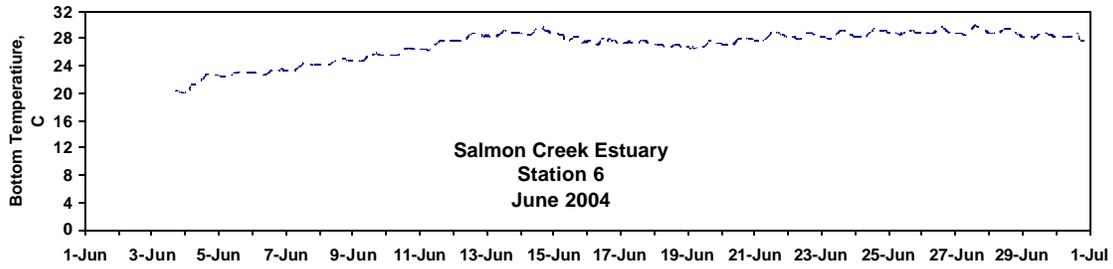


Figure WQ-12. Bar-closed bottom temperatures, Station 5, June 04 – November 04.

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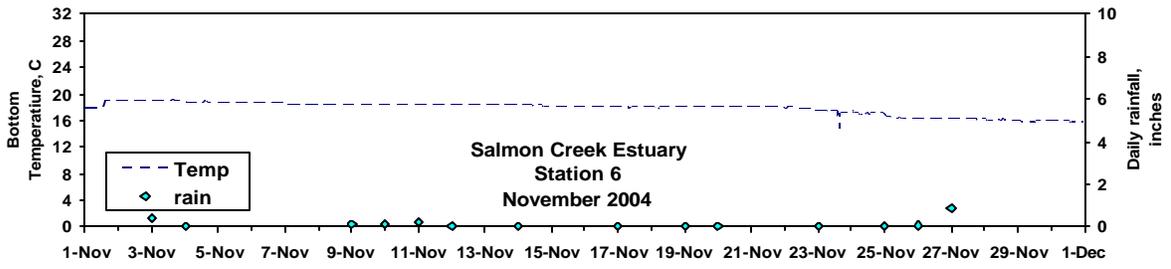


Figure WQ-13. Bar-closed bottom temperatures, Station 6, June 04 – November 04.

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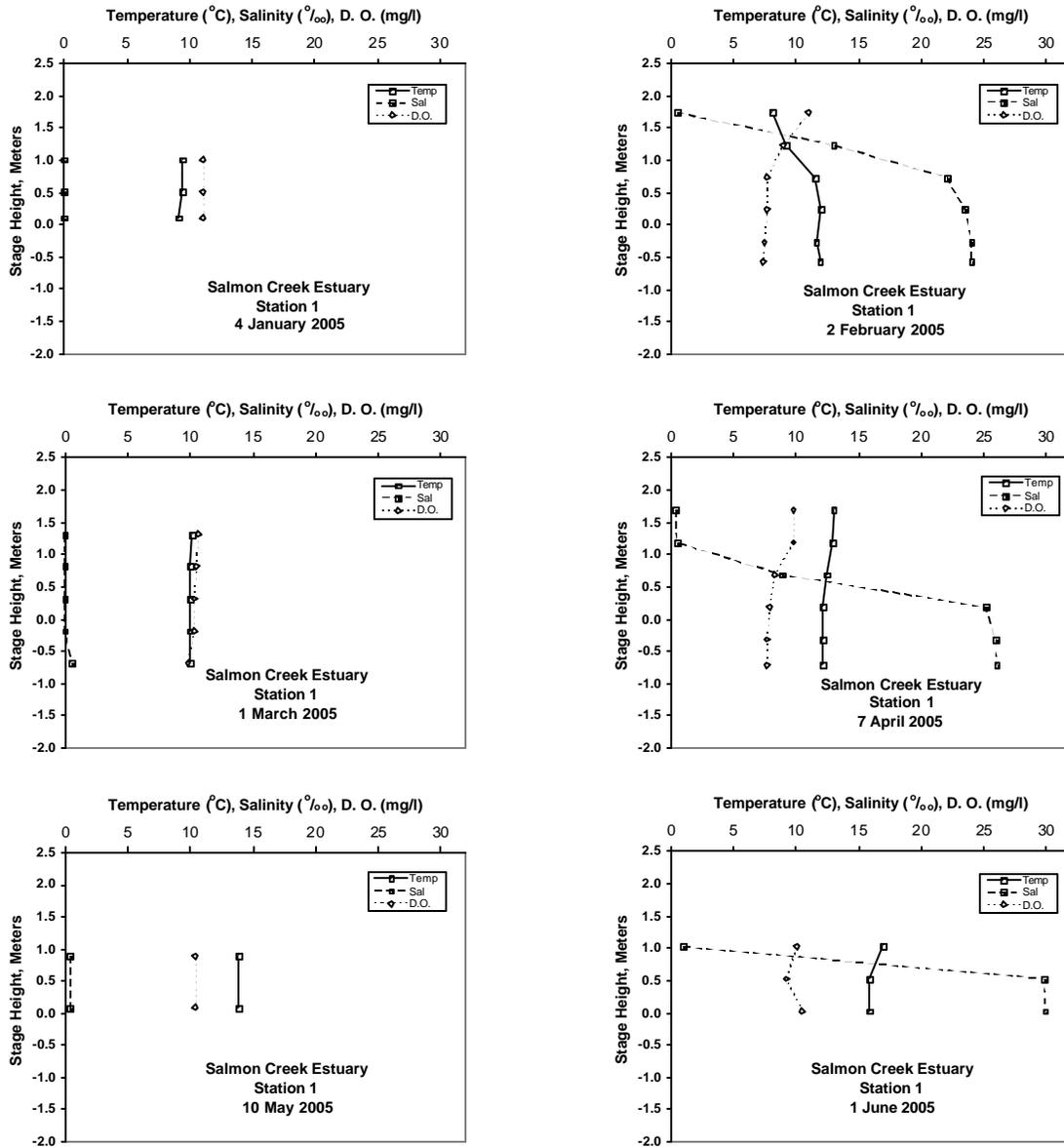


Figure WQ-14. Bar-open WQ Profiles, Station 1. January 05 – June 05

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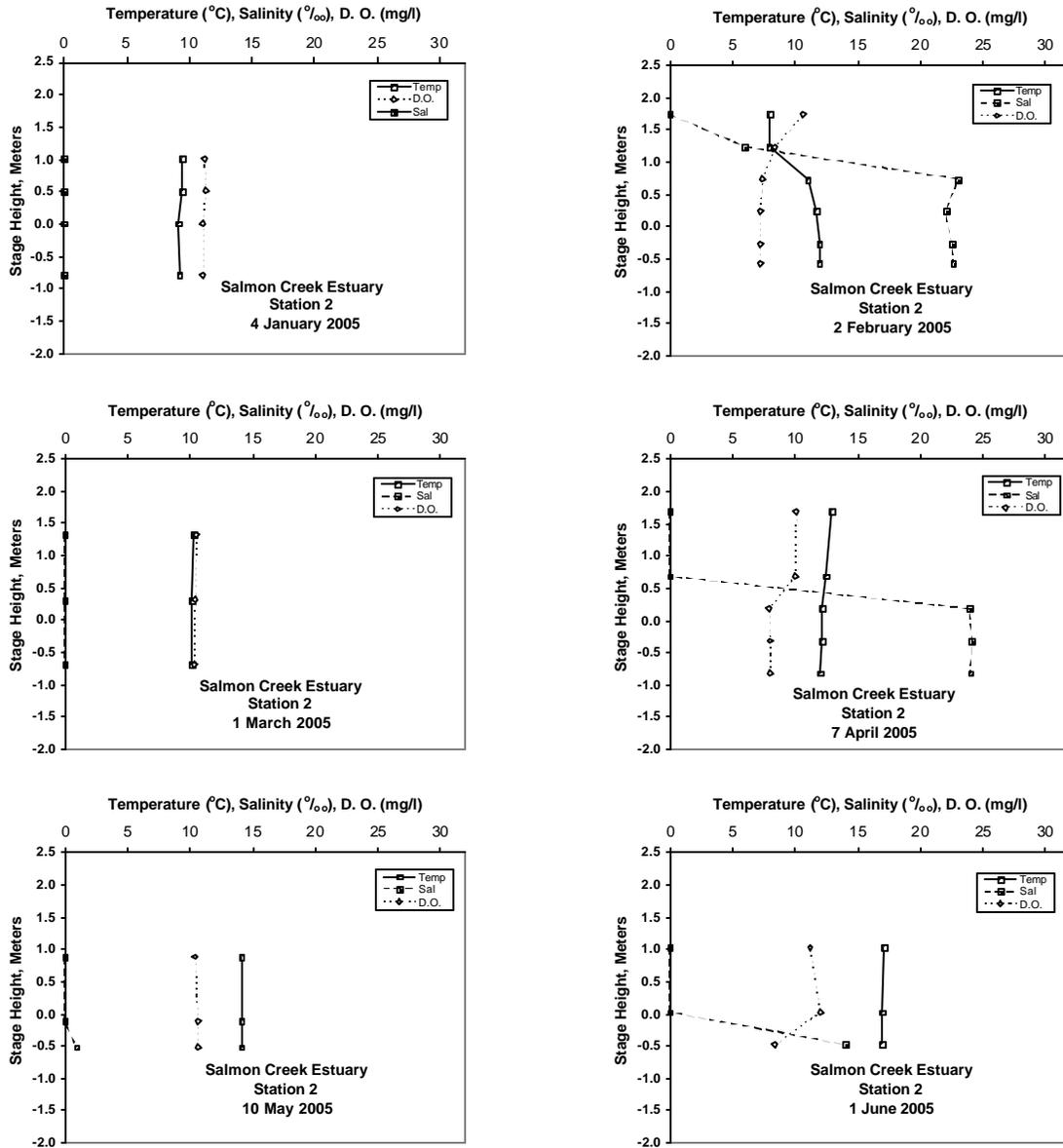


Figure WQ-15. Bar-open WQ Profiles, Station 2. January 05 – June 05

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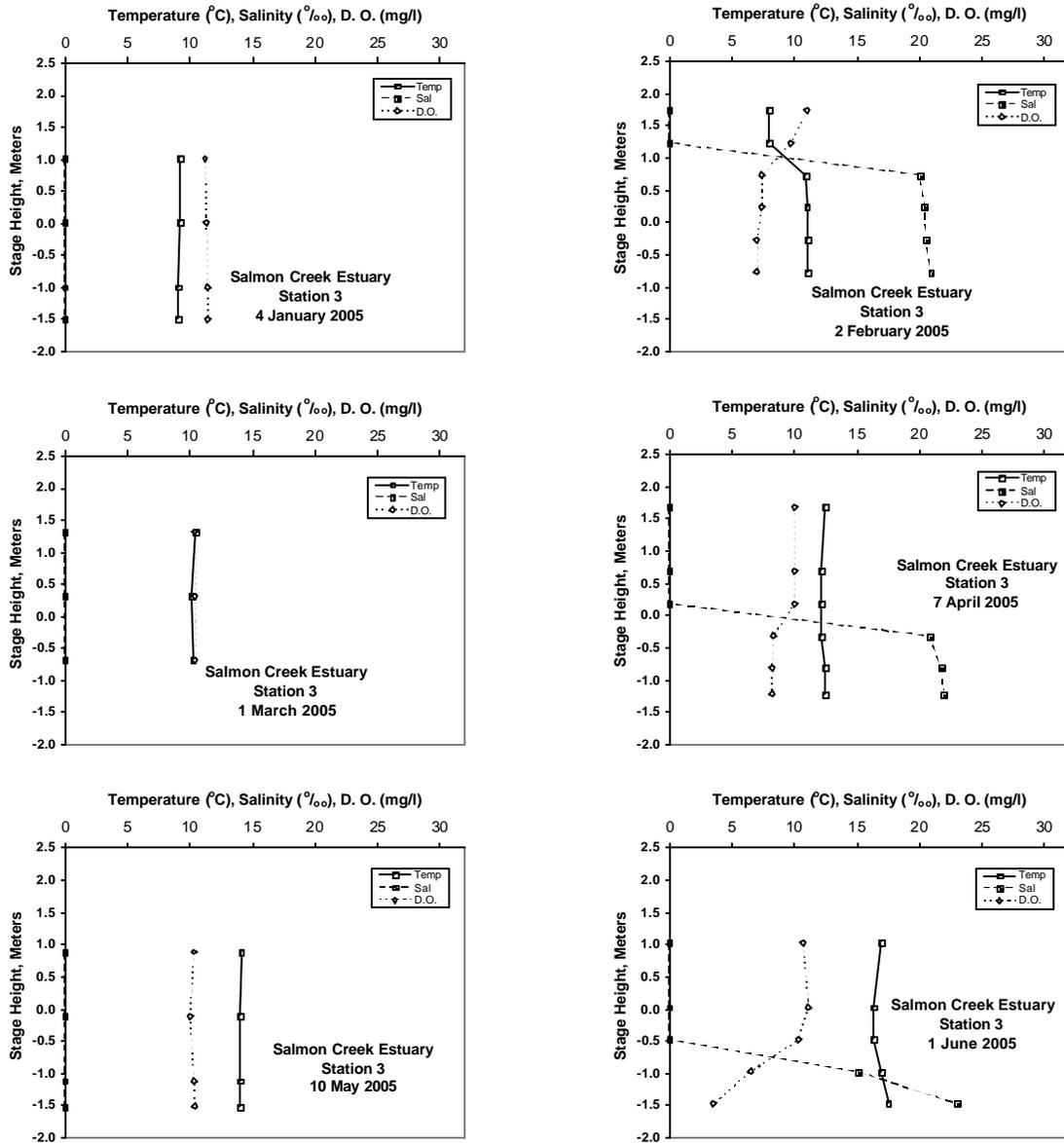


Figure WQ-16. Bar-open WQ Profiles, Station 3. January 05 – June 05

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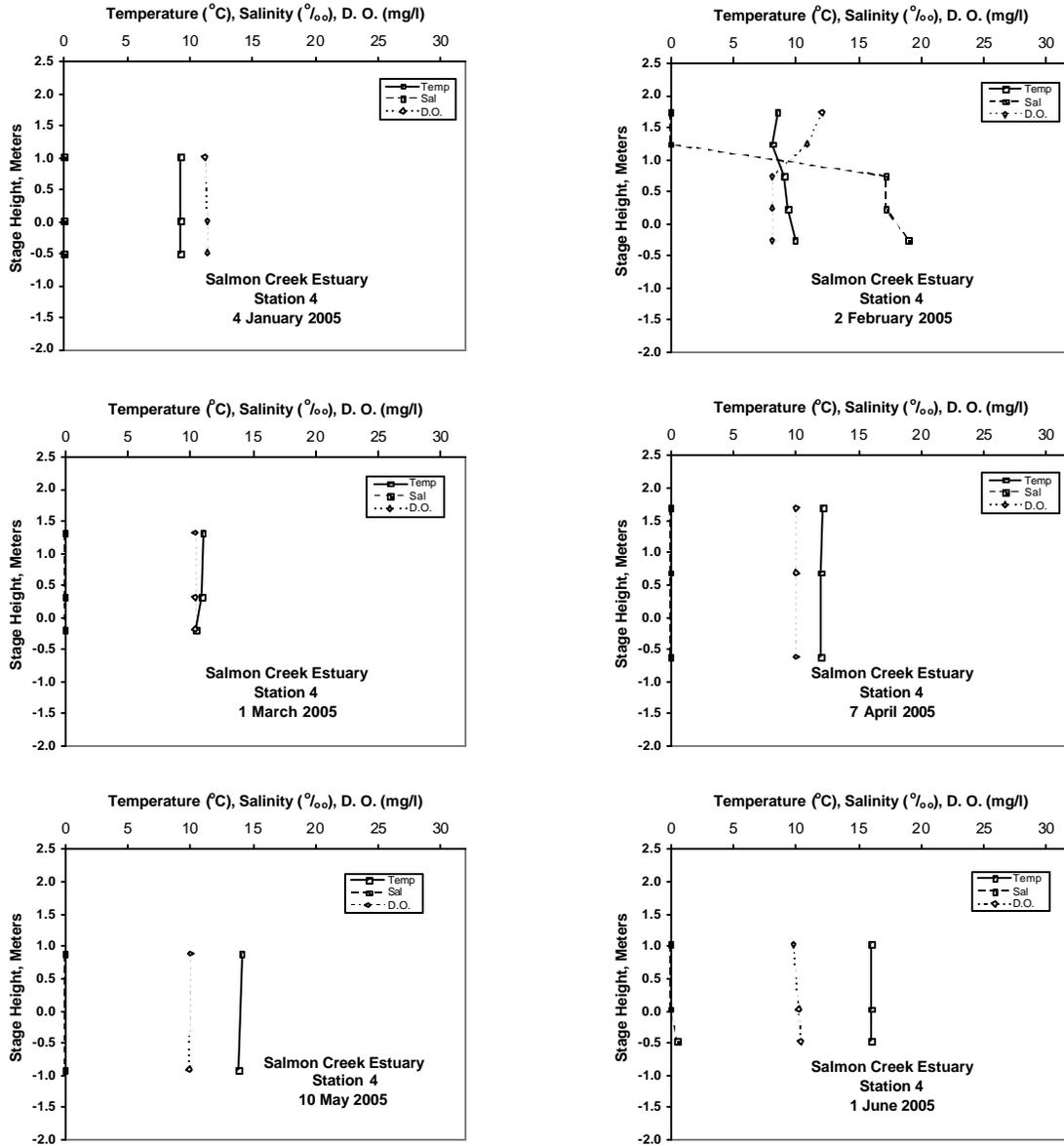


Figure WQ-17. Bar-open WQ Profiles, Station 4. January 05 – June 05

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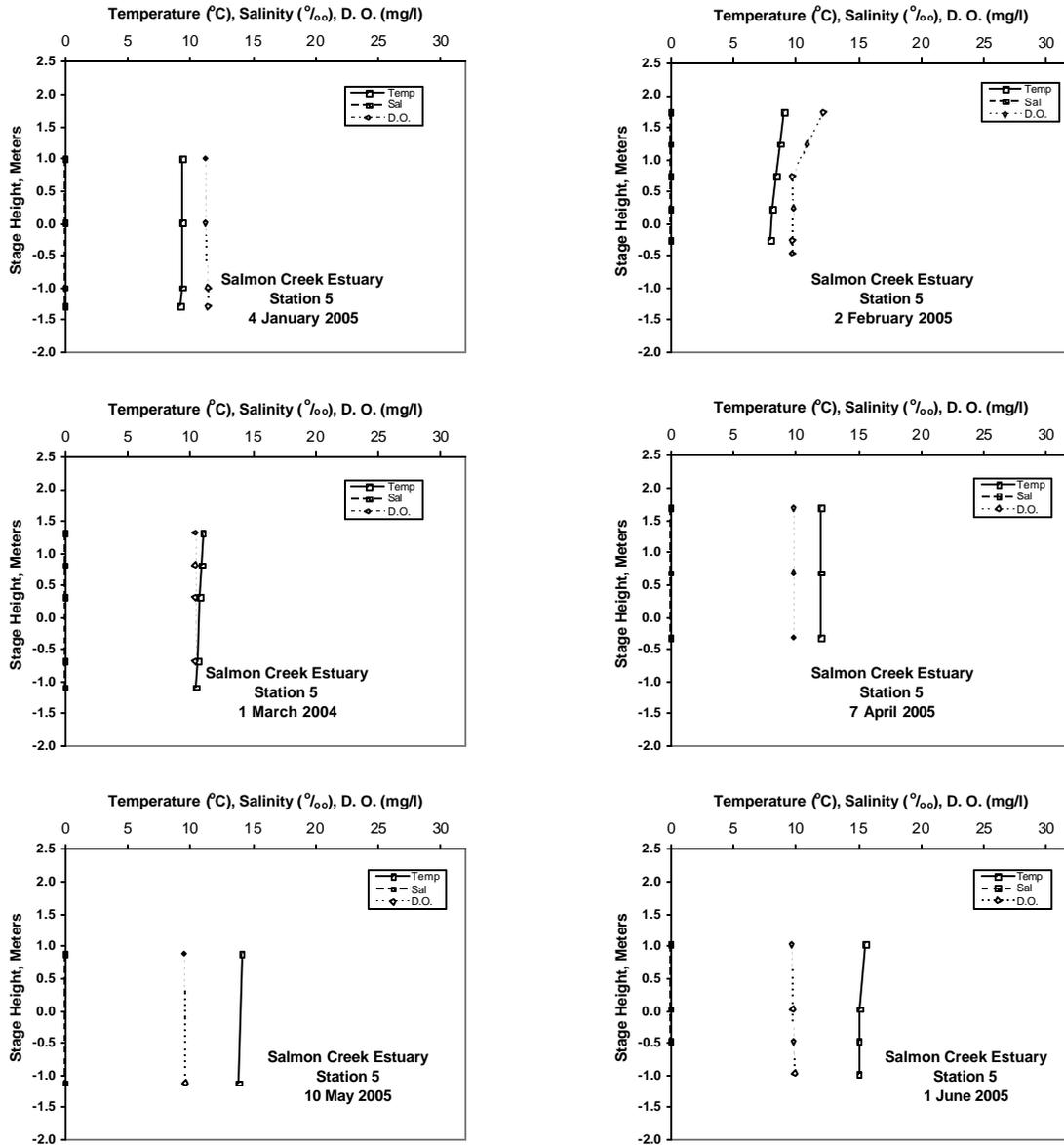


Figure WQ-18. Bar-open WQ Profiles, Station 5. January 05 – June 05

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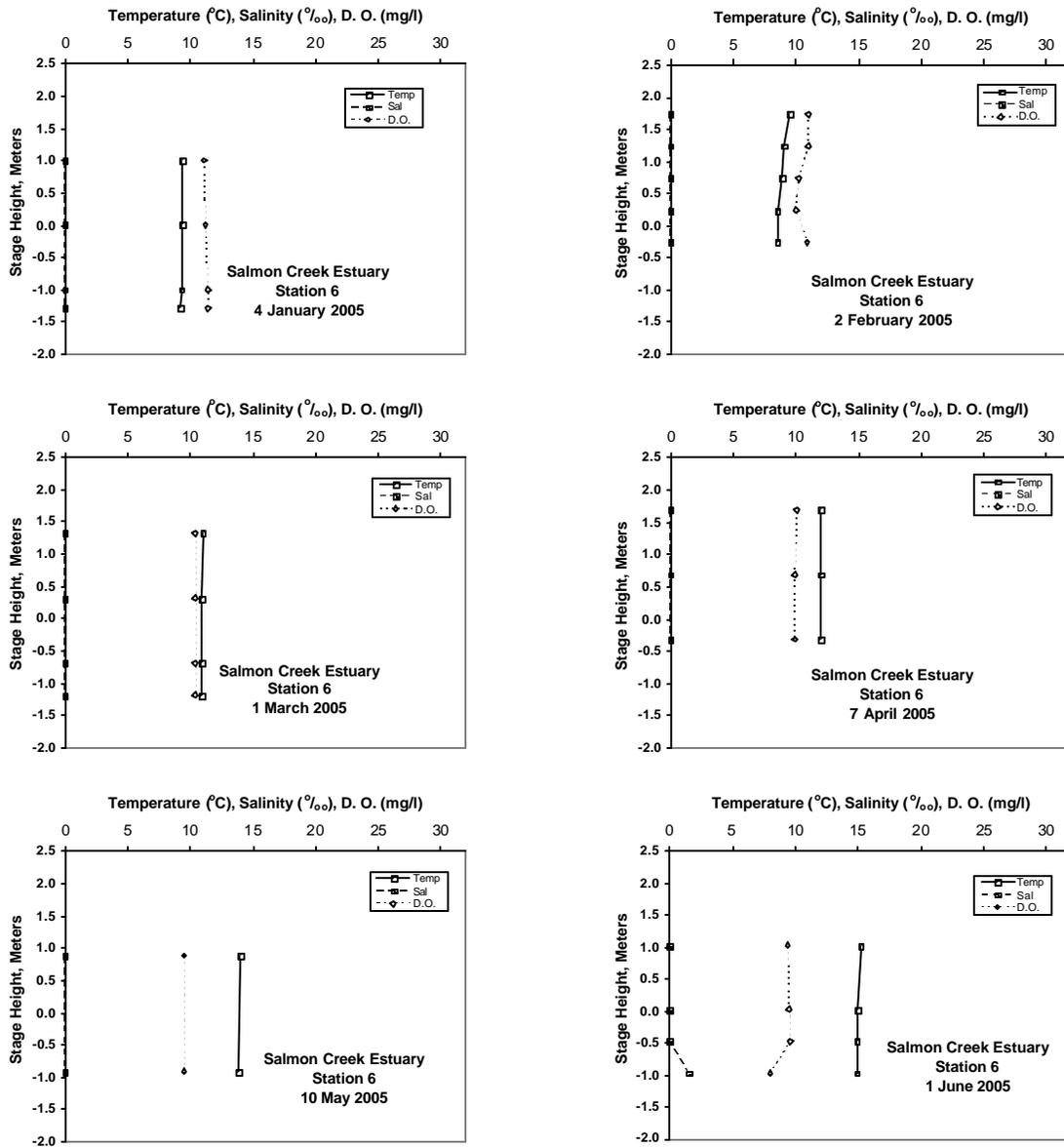


Figure WQ-19. Bar-open WQ Profiles, Station 6. January 05 – June 05

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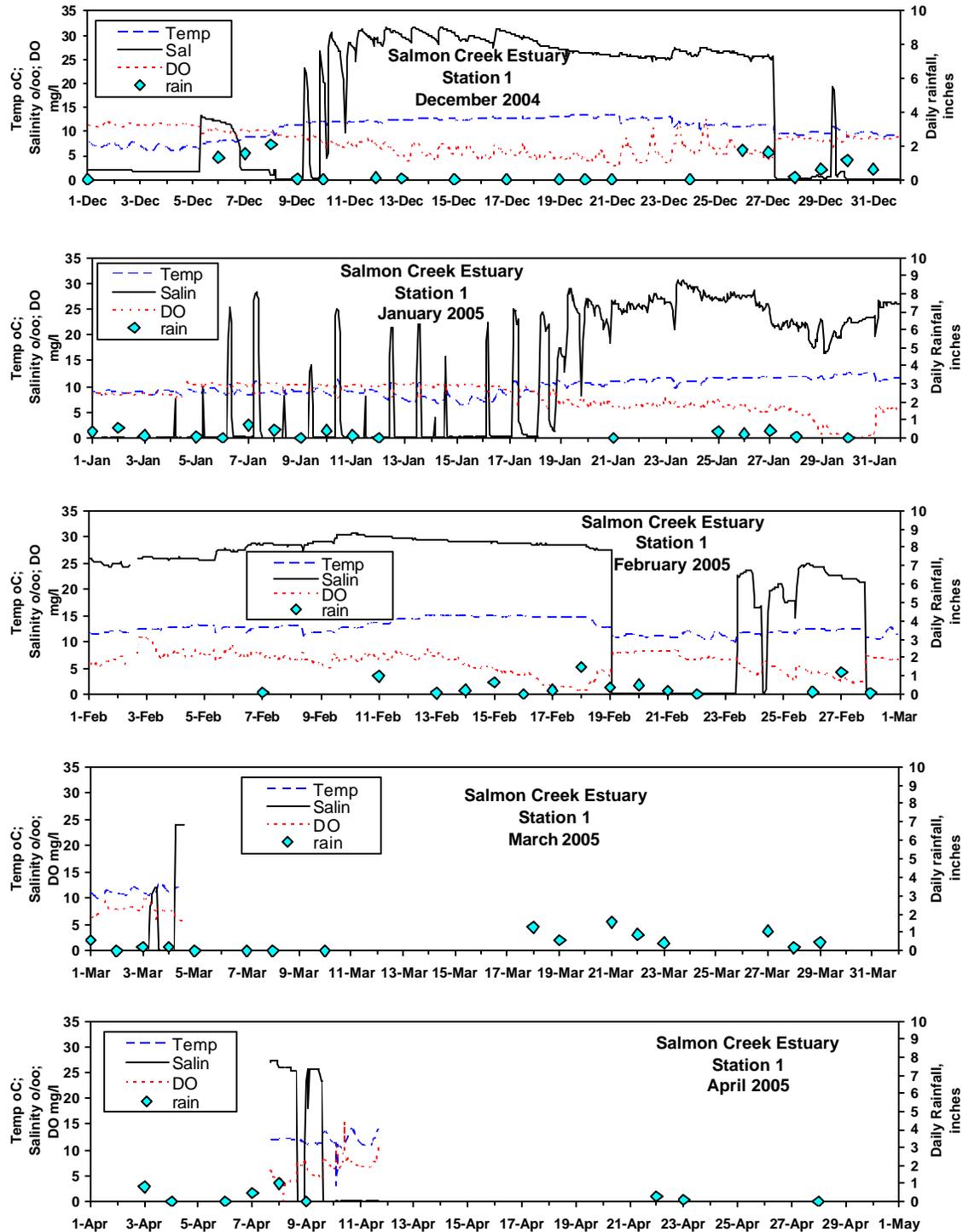
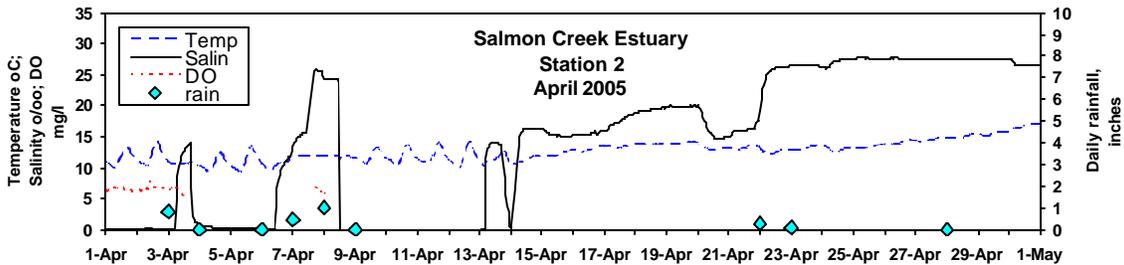
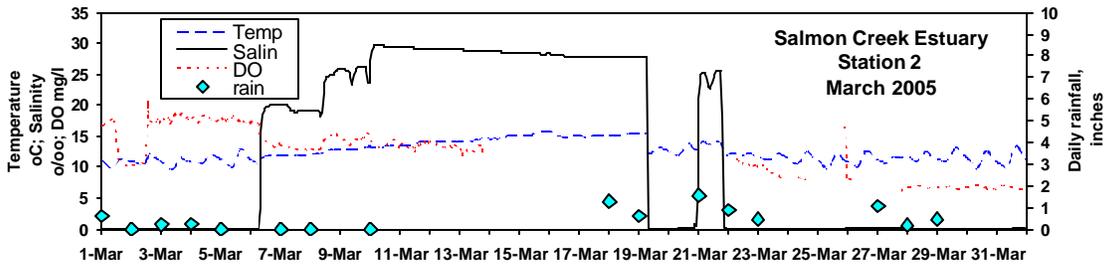
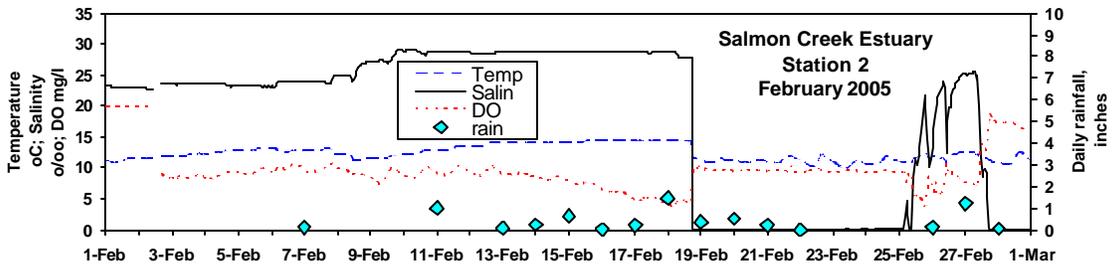
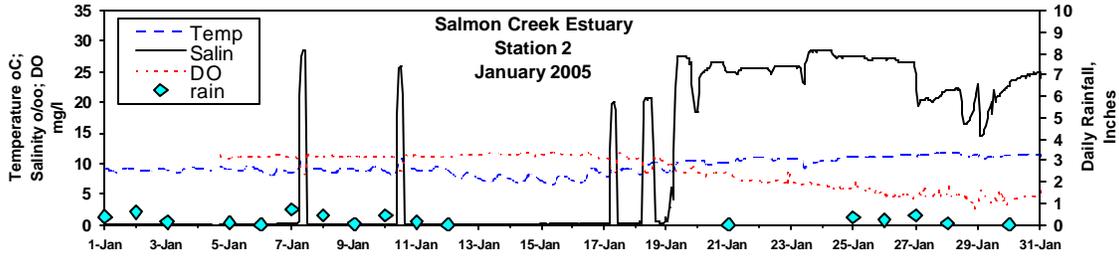
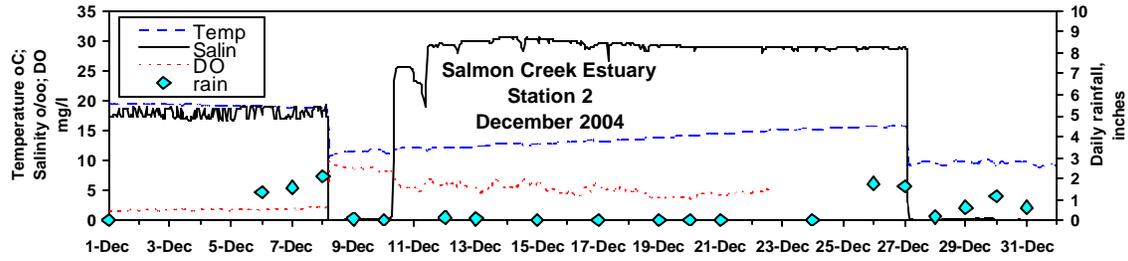


Figure WQ-20. Bar-open datasonde records, Station 1, December 04 – April 05.

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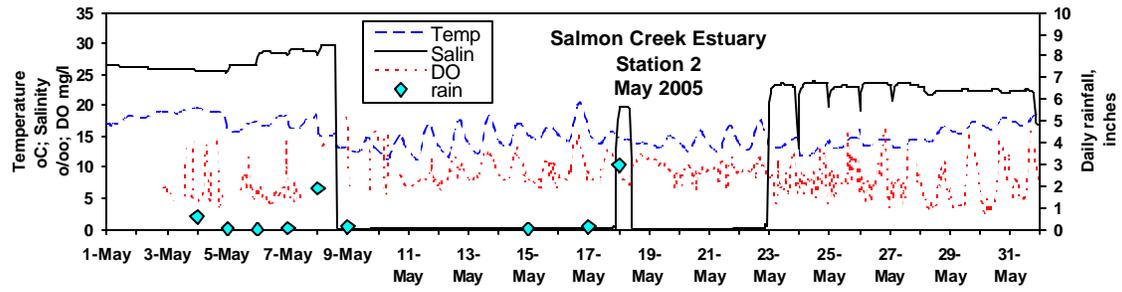
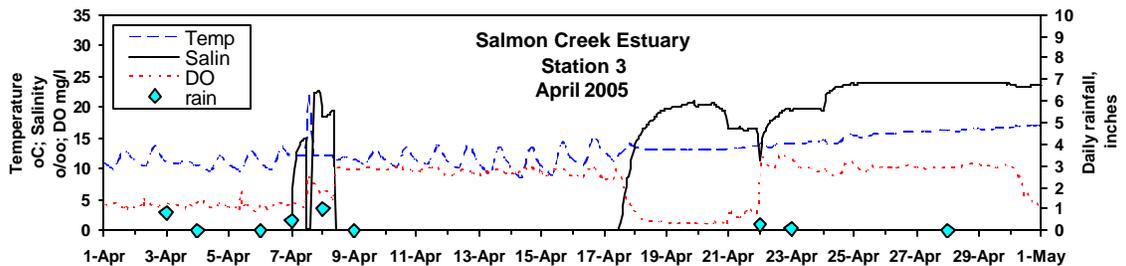
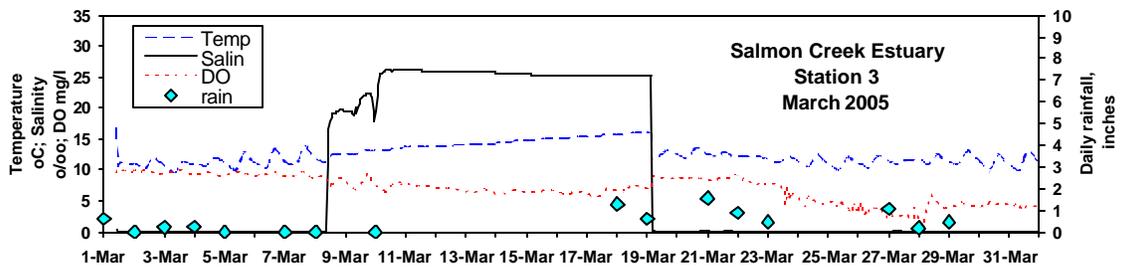
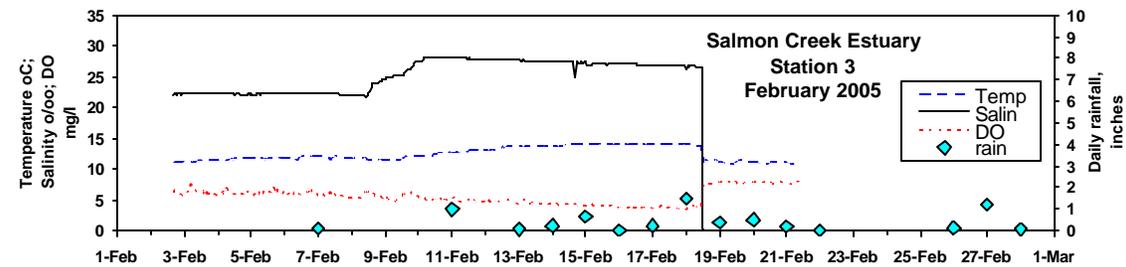
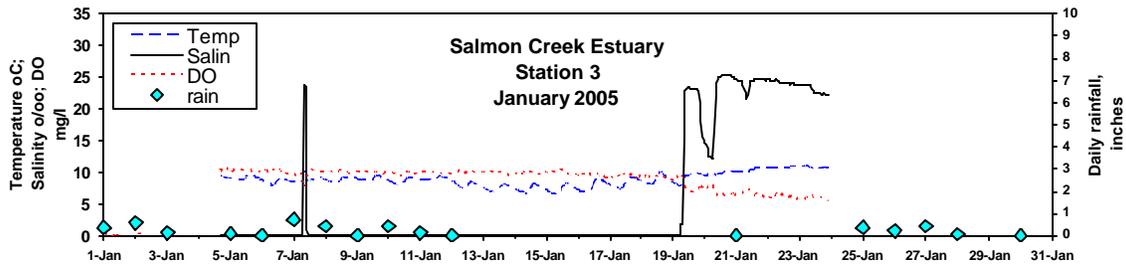
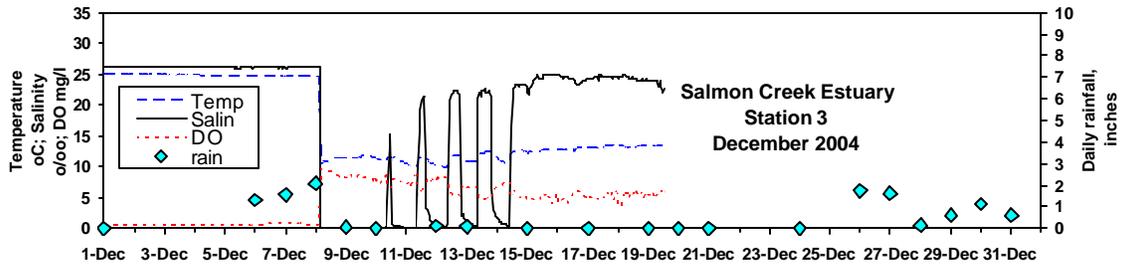


Figure WQ-21. Bar-open datasonde records, Station 2, December 04 – May 04.

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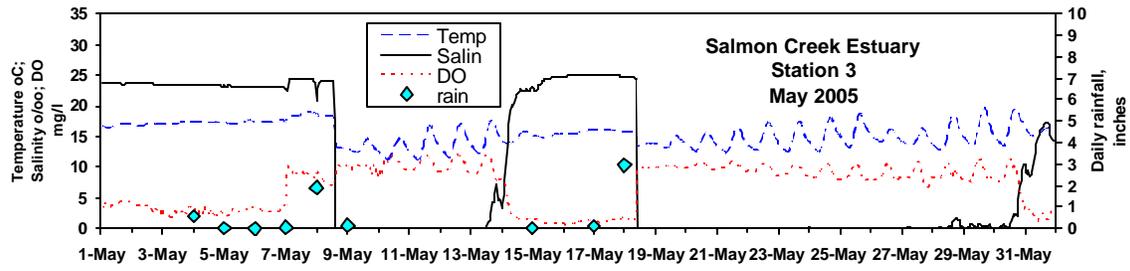
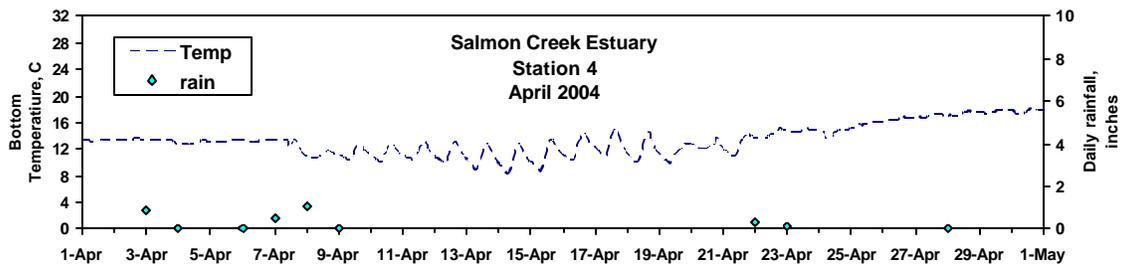
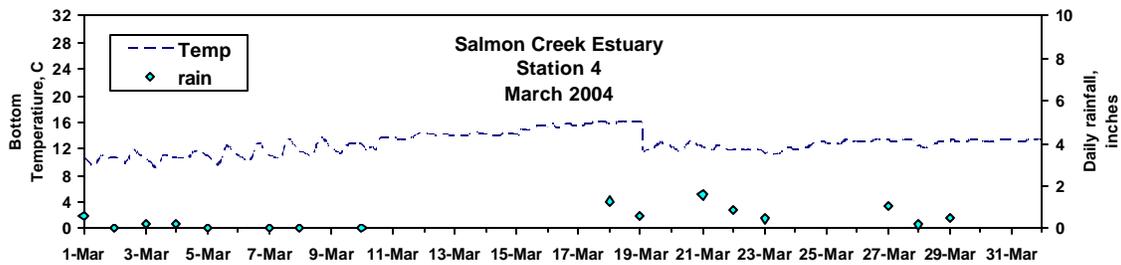
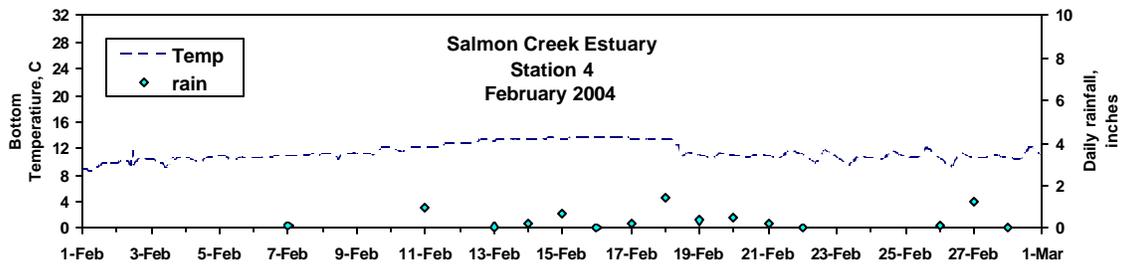
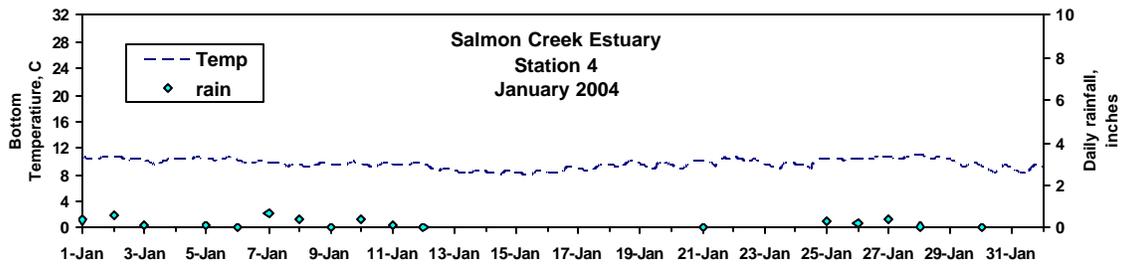
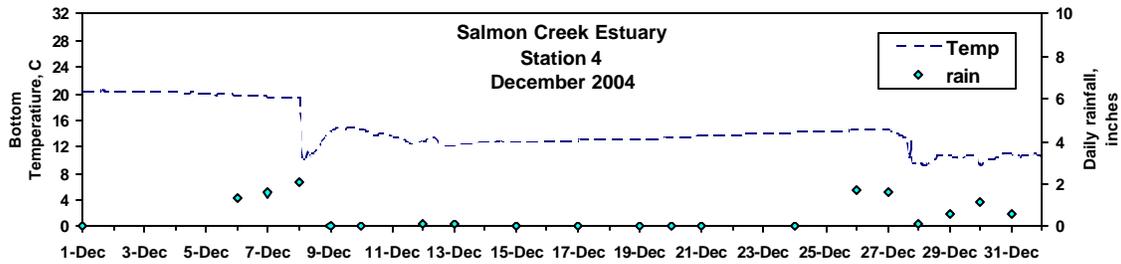


Figure WQ-22. Bar-open datasonde records, Station 3, December 04 – May 05.

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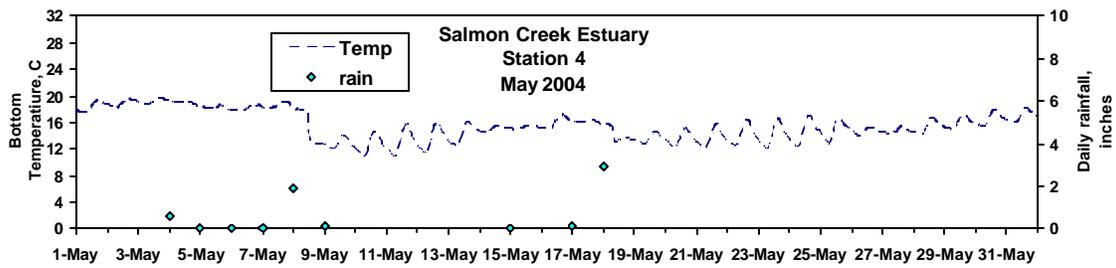
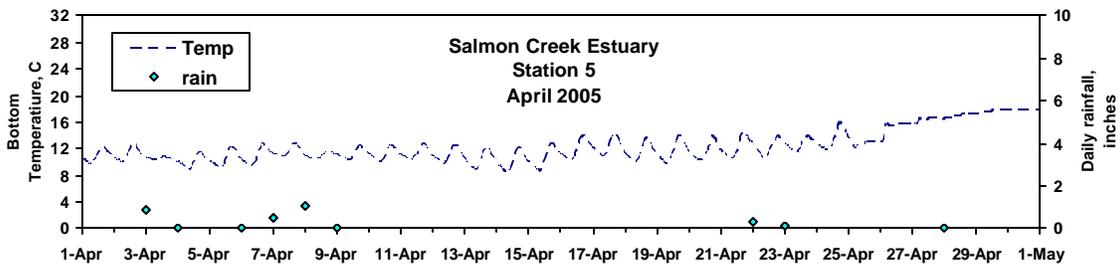
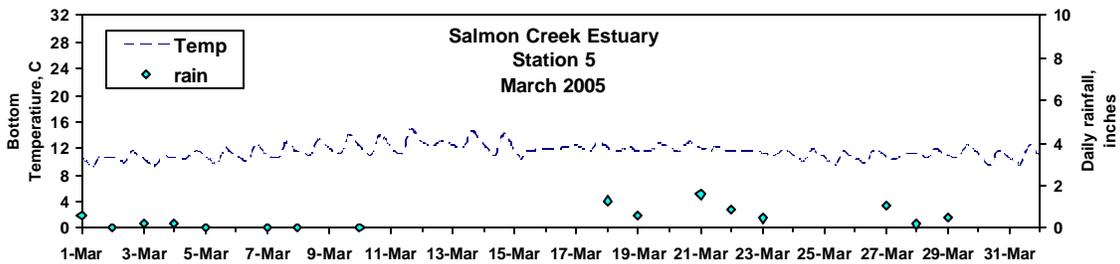
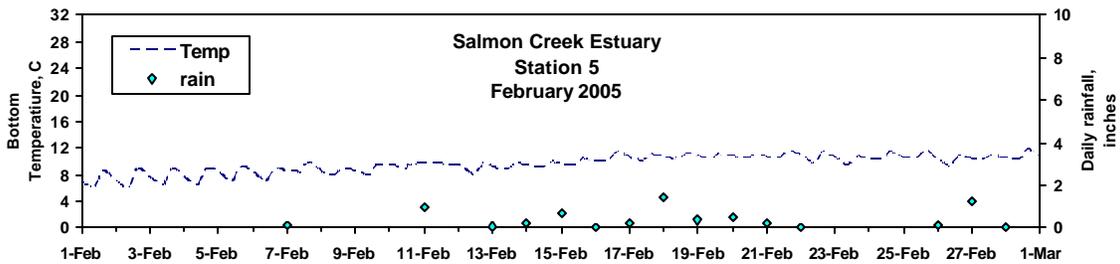
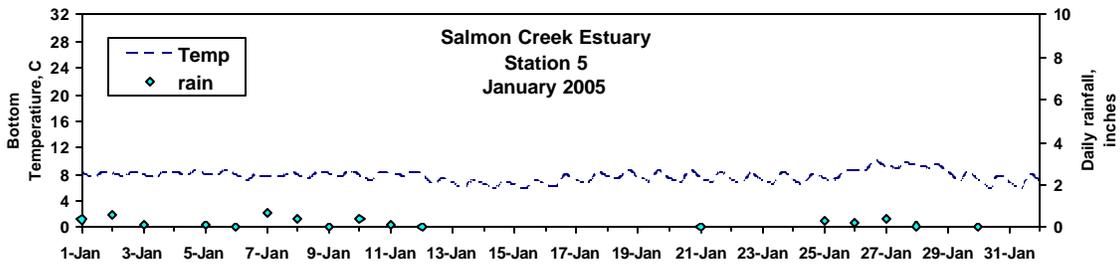
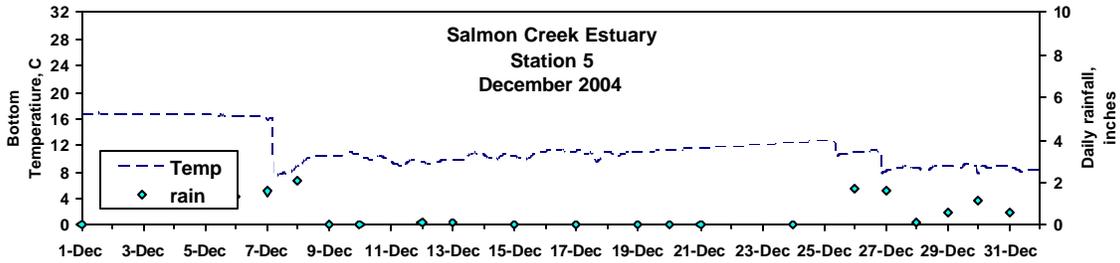


Figure WQ-23. Bar-open bottom temperatures, Station 4, December 04 – May 04.

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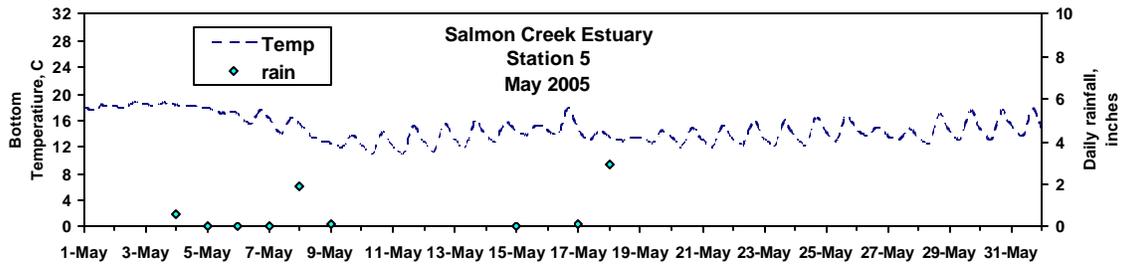
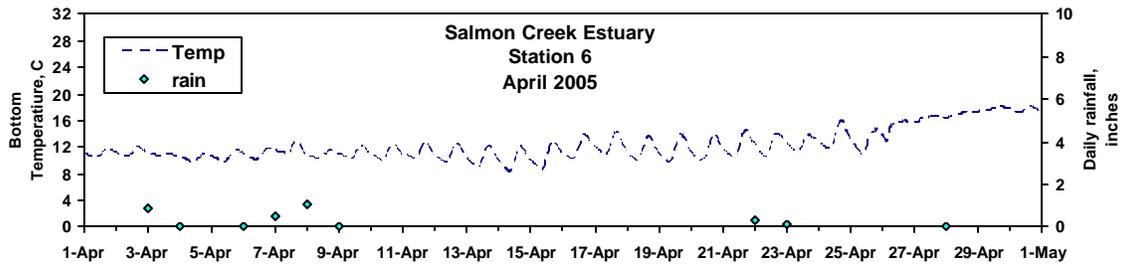
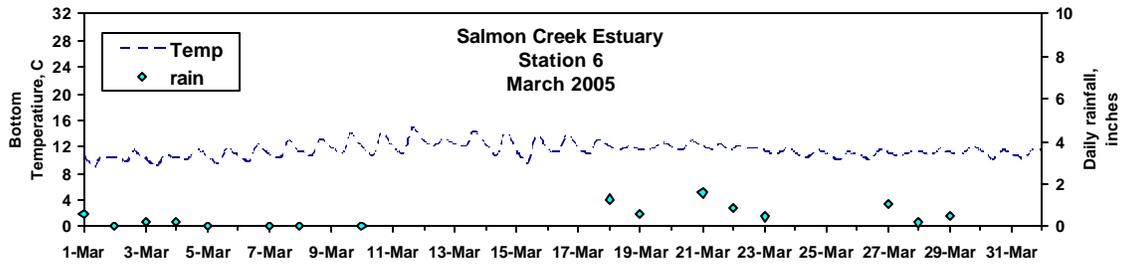
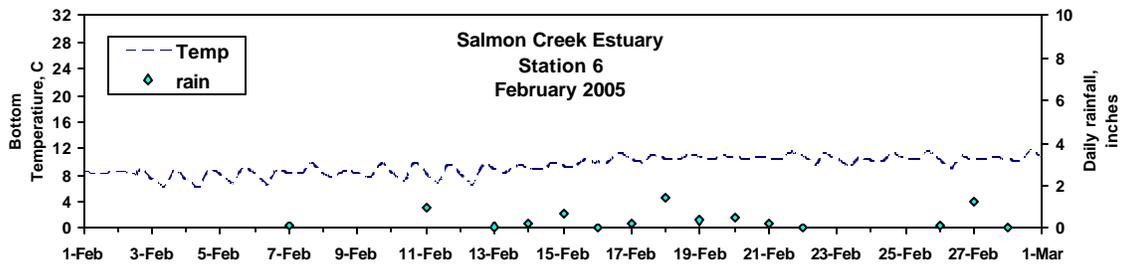
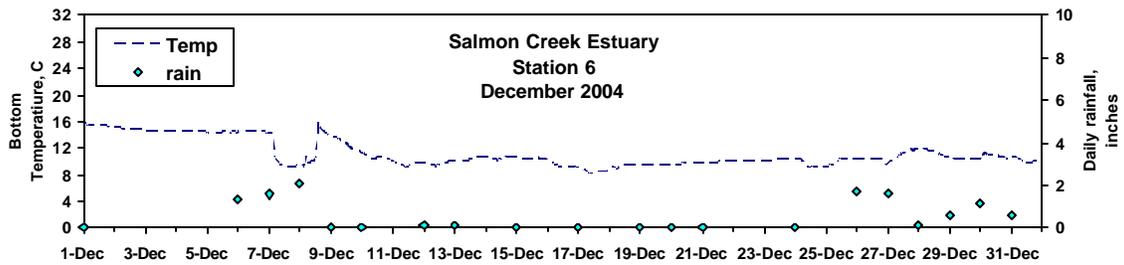
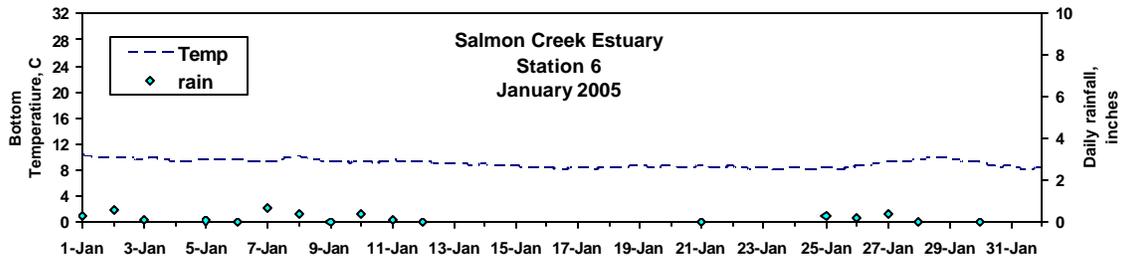


Figure WQ-24. Bar-open bottom temperatures, Station 5, December 04 – May 04.

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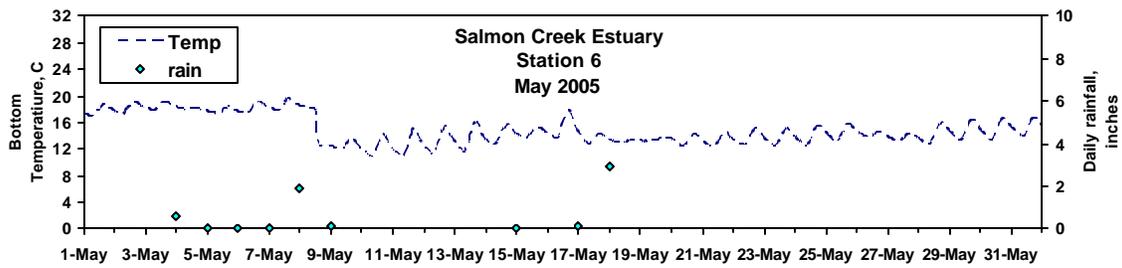
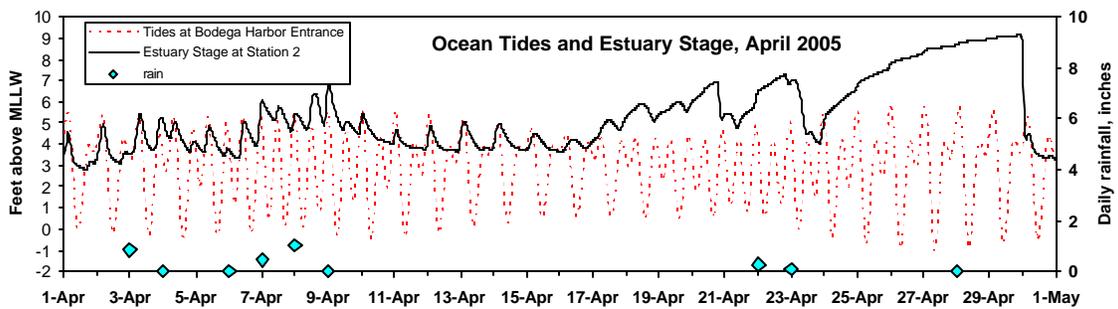
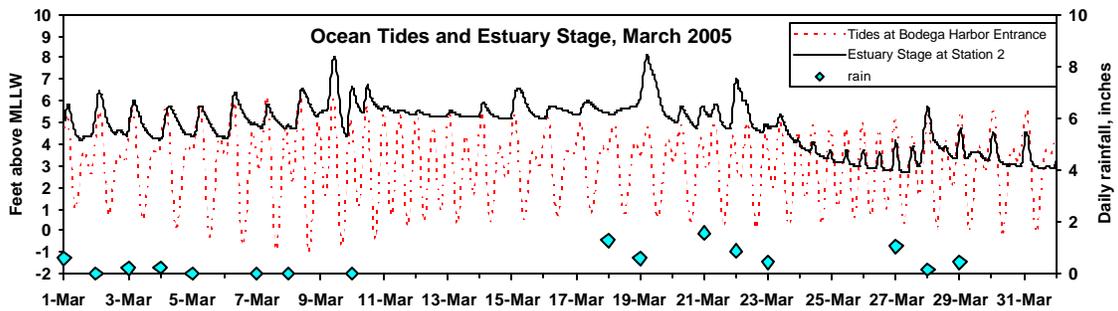
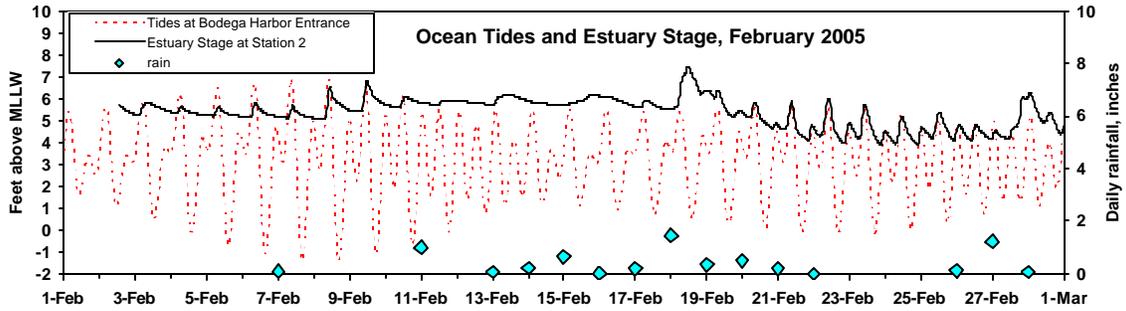


Figure WQ-25. Bar-open bottom temperatures, Station 6, December 04 – May 05.



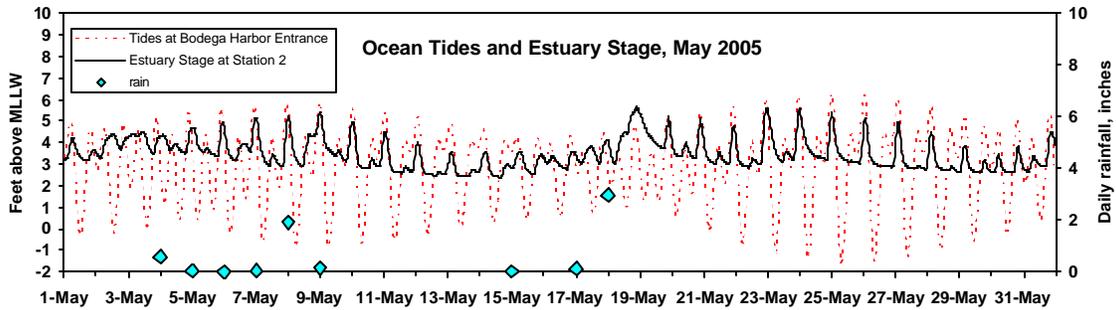
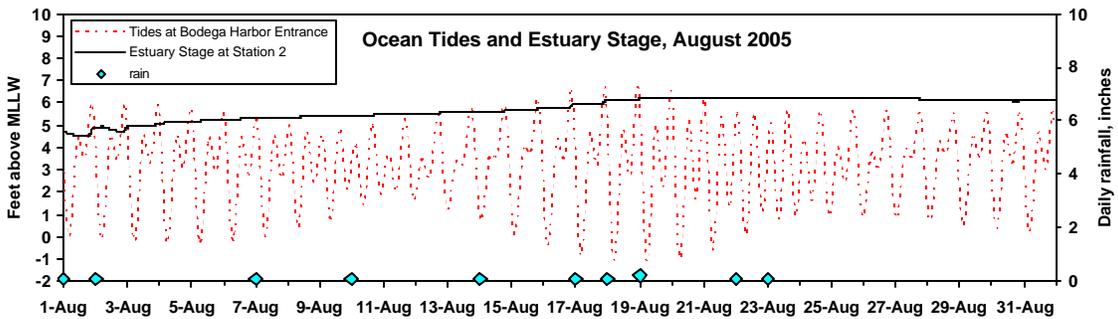
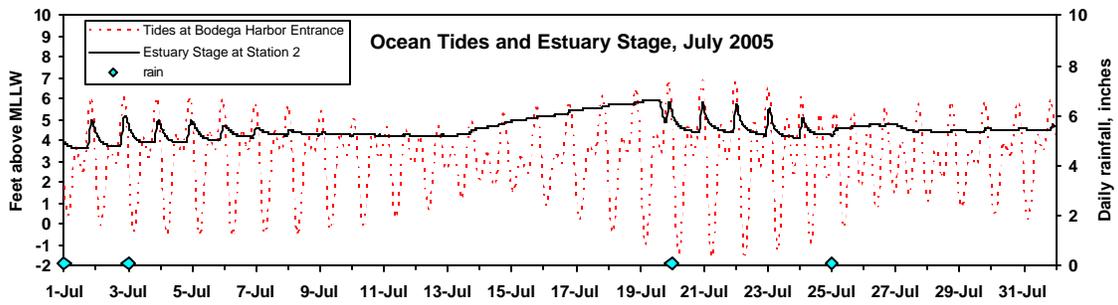
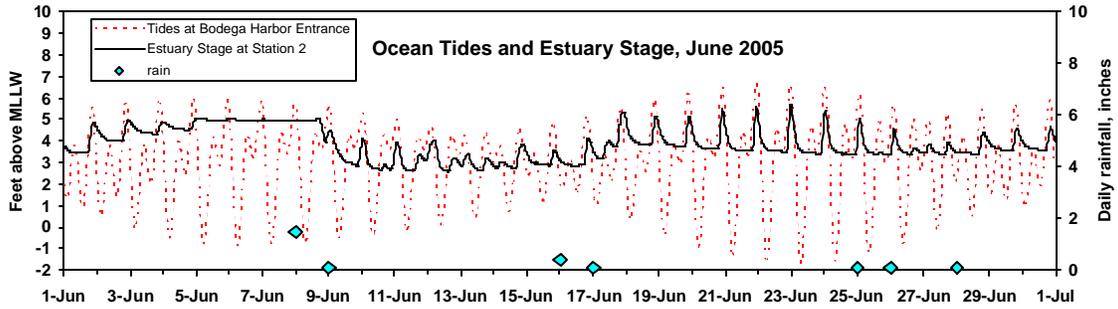


Figure WQ-26. Ocean tides, estuary stage, and rainfall, February through May 2005.

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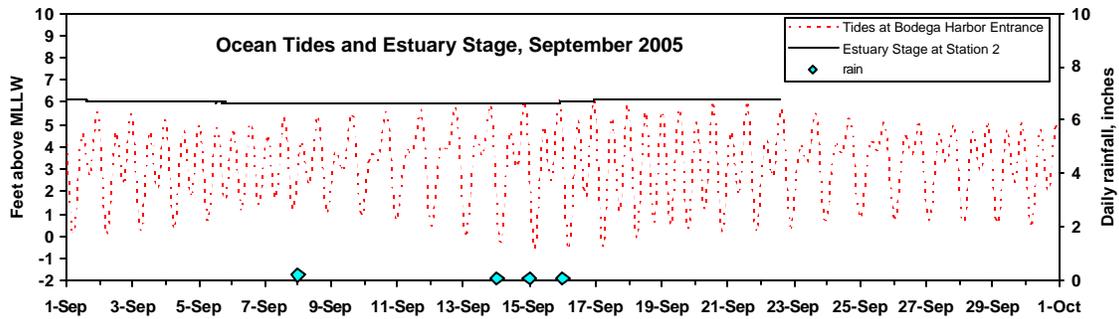


Figure WQ-27. Ocean tides, estuary stage, and rainfall, June through September 2005.

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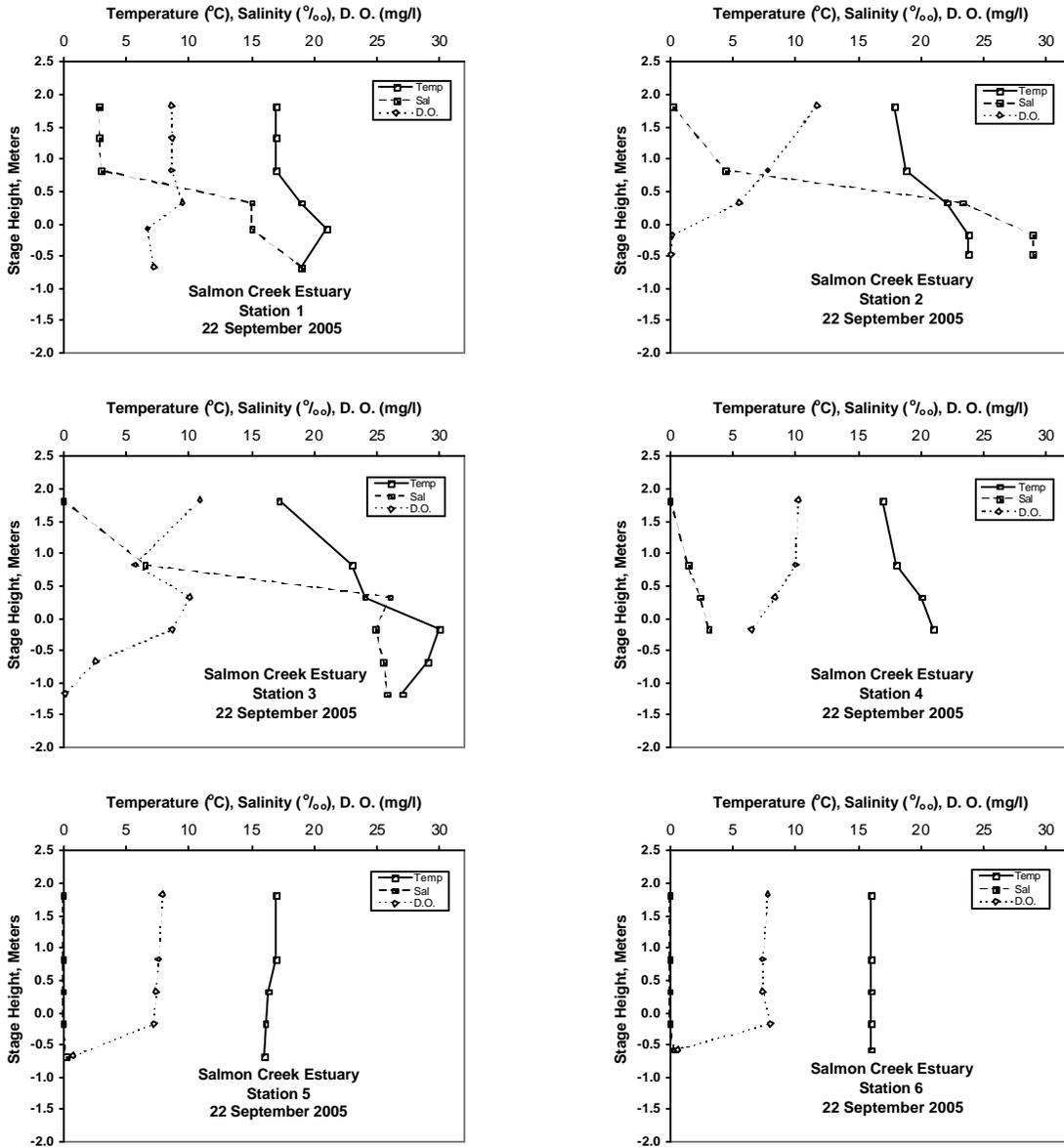


Figure WQ-28. Bar-closed WQ Profiles, 22 September 05

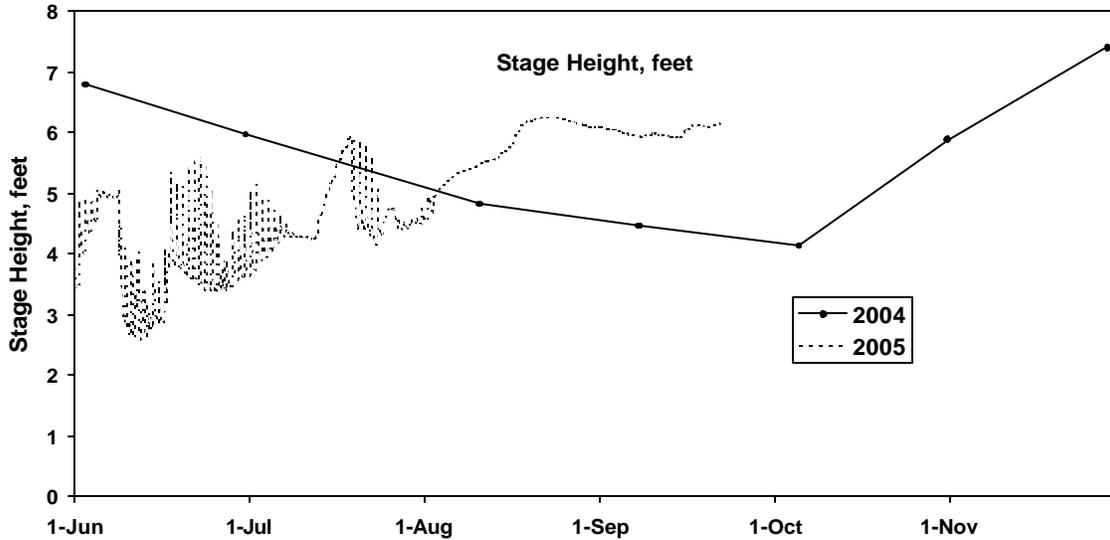


Figure WQ-29. Comparison of summer stage heights between 2004 and 2005.

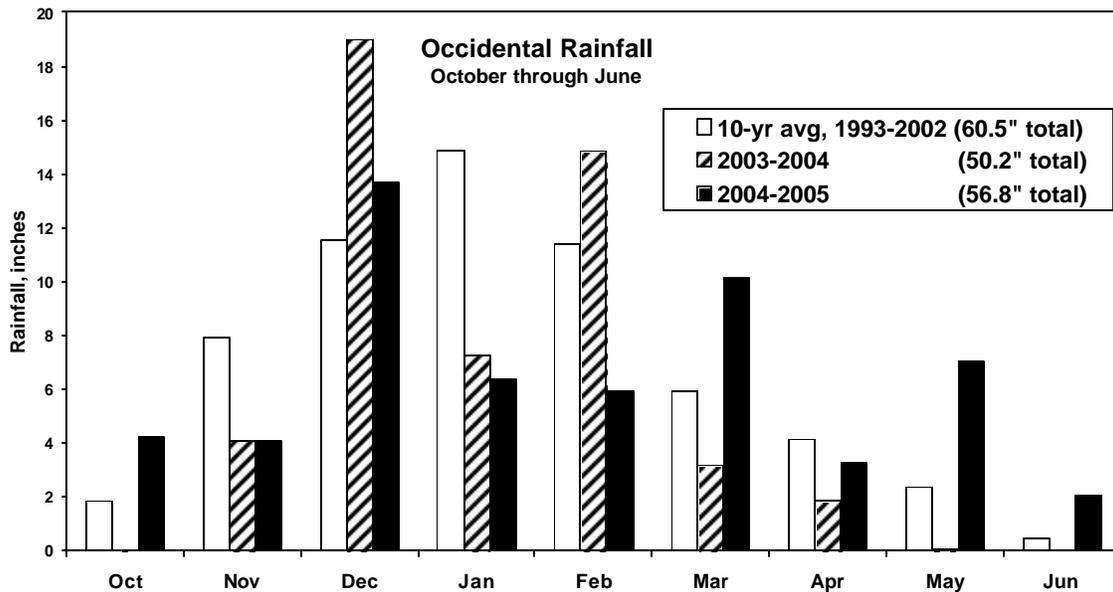


Figure WQ-30. October through June monthly rainfall summary, 2003-2004 and 2004-2005 seasons compared with the average rainfall for the 10 previous years.