



Rivers, Creeks and Climate Change

for people who live near waterways



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The areas alongside streams, creeks, and rivers—called riparian areas—make up only a small proportion of the North Bay’s land base, but they provide a remarkable range of services to people and nature. These services are even more critical in a time of changing climate, as a healthy network of streams creates watersheds that are more resilient to the impacts of climate change.

A thriving riparian zone



Lush riparian plants of all sizes and forms, including grasses and sedges, shrubs, vines, and trees colonize floodplains

Climate change will likely mean warmer and drier conditions overall, as well as more extreme weather. In winter we can expect more frequent and higher floods and perhaps colder cold snaps. In summer we can expect longer droughts and hotter heat waves. One of the effects of high summer temperatures will be less water remaining in the ground by the end of the growing season.

Heat and fire

Droughts lead to water shortages for people and nature. Droughts dry up streams, stunt or kill crops, harm wildlife, and cause people to pump more groundwater near streams. As the land gets drier, streamside forests and wetlands come under more pressure to provide water, recreation, and wildlife habitat. As the land dries out, the risk of fire increases. When it does rain in burned areas, more soil washes off the hills and into roads, ditches, and streams.

Floods

One of the projected impacts of climate change is the increased likelihood of extreme floods capable of destroying streamside land, buildings, roads, and crops. Floods can be especially severe near the coast and the bay shoreline, where higher tides caused by sea level rise can push flood levels even higher. In California, the North Bay’s Sonoma County is already the top recipient of repetitive flood damage payments and, in fact, has losses greater than those of the next nine communities combined, making it the county with the highest number of properties suffering repetitive flood losses west of the Rockies.¹ *In 2005, the most recent year for which data is available, 30% of Sonoma County’s urban areas were in a high hazard area for flooding.*²

What would happen...
if your property experienced a severe flood?



The December 31, 2005 flood on Sonoma Creek in Glen Ellen, CA

1 Sonoma County Hazard Mitigation Plan 2011. http://www.sonoma-county.org/prmd/docs/hmp_2011. See Page 21.

2 Sonoma County Hazard Mitigation Plan 2011. http://www.sonoma-county.org/prmd/docs/hmp_2011. See Chapter 3.

How Do Streams Protect Us From Climate Change?

Streamside land plays an important role in our communities and can protect us from climate change in many ways.

Flood devastation in Sonoma County



Damage from the December 31, 2005 flood, between Schell and Sonoma Creeks in Schellville, CA at Highways 121 and 12

Water supply

The porous soils and rocks under and alongside creeks and rivers are often the best locations for rain and runoff to filter into the ground. Soils absorb flood water and eventually recharge groundwater supplies. The North Bay is unusually reliant on groundwater compared to other counties in California, so these recharge zones are critically important.³

Flood protection

Streamside areas can effectively buffer buildings, roads, and crops from floods, if given the room to do so. The plant roots, stems, and trunks slow down flowing water and spread it out.

Clean water

Streamside plants efficiently filter out pollutants, cleaning the water for human use and animal life. Aquatic animals in our area include protected fish such as steelhead trout and salmon, rare frogs and salamanders, and the insects and smaller creatures that feed a complex food web.

Over 135 species of California birds, both rare and common, depend on riparian habitats. Riparian areas provide food, nesting habitat, cover, and migration corridors. Another 90 species of mammals, reptiles, invertebrates and amphibians, both rare and common, also depend on California's riparian habitats.⁴

Wildlife habitat

Across the North Bay, much of the natural streamside vegetation has been replaced by buildings, roads, and farm fields. Thin strands of streamside forest are sometimes the only remaining habitat for wildlife.

Animals depend on streamside areas not just for food and shelter, but also to travel.

Wildlife depends on riparian habitat



Great Horned Owls fledged from a nest in a dead Fremont cottonwood along Sonoma Creek near Glen Ellen, CA

³ "Sonoma County reportedly has the second largest number of private and public wells of any county in California. It is estimated that 42% of the population's water supply comes from groundwater sources." Sonoma County GP2020 DEIR, page 4.9-8.5.

⁴ Riparian Habitat Joint Venture, <http://www.rhvjv.org>.

You Can Make A Difference!

Here are some approaches to help you, your streamside land, and your community survive and thrive in the era of climate change:

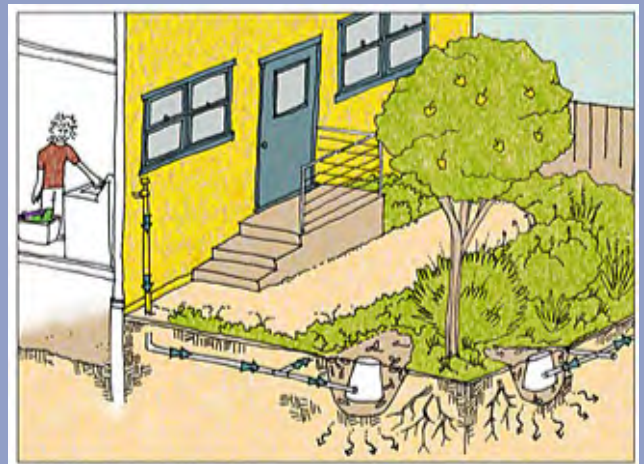
Reduce your water needs

- Shift your landscaping to drought-tolerant plants. Most households use up to half their water outside on landscaping, so this is an area of large potential water savings.
- Wise up your irrigation by using drip, timers, and sensors.
- Replace water-hungry appliances.

Find new water sources to meet your needs

- Explore water sources other than a streamside well or the stream itself. Consider capturing water from your roof and your property before it enters a storm drain or creek, and/or storing water in tanks or ponds. Be aware that some of these projects require permits.
- Enhance your property's ability to soak up water that will keep the soil moist longer in the spring, feeding groundwater, plants, and the stream.

Do-it-yourself water conservation



A "Laundry to Landscape" water re-use system reduces the need for potable water: manual available from www.sfwater.org

Help the stream absorb the impact of floods and droughts

- Remove or minimize hard surfaces like pavement. Alternatives are paving stones, buried gravel trenches, or permeable pavement.
- Plant native plants, especially trees, to help the soil store water.
- Replant bare or disturbed areas quickly, to keep soil from reaching the stream.
- Keep anything that can be damaged by floods far from the stream. Consider moving—instead of repairing—flood-damaged fences, tanks, and sheds.
- Wherever possible, allow room for floodwaters to spread out, slow down, and sink in. The more we leave the stream room to roam, the greater its ability to absorb floodwaters, protect infrastructure, and recharge groundwater.

In the North Bay, thousands of houses and hundreds of miles of roads sit very close to streams. Some conflicts between streams and structures are inevitable.

More Ways To Help Yourself And Your Streamside Land

Provide shelter and food for wildlife

- Encourage native vegetation at multiple heights: groundcover, shrubs, and trees.
- Encourage a patchwork of habitats, such as a small grassy area near a dense shrubby area near a group of tall trees.
- Leave old and dead trees in place if they do not threaten structures.
- Allow natural processes, such as flooding and laying down new layers of sediment.
- Modify or remove fences so that wildlife can move along the stream corridor, and from the stream corridor to surrounding areas.
- Get involved in a local creek group. Work with your neighbors and enjoy the satisfaction of enhancing your stream.

Wildlife travel along streams



The California Giant Salamander is dependent on movement corridors, particularly along streamside forests. This one was photographed at Van Hoosear Wildflower Preserve, near Sonoma, CA

Climate change will not only stress our human communities and built infrastructure, but will also threaten the incredible biodiversity of our region. By enhancing the habitat of your stream-side property you will create a refuge for many threatened plants and animals.

Streams and their floodplains provide benefits that build the North Bay's climate resilience.

Climate resilience is the ability of a landscape or community to adapt to climate change without losing key attributes or functions. By protecting our streams and watersheds, we increase our water security, enhance public safety, and protect our natural heritage.

Learn More

I want more details about climate change impacts right here in the North Bay.

Read *Climate Smart North Bay: Climate Change in the North Bay* (available at www.northbayclimate.org)

How do I capture rainwater and runoff water on my property?

Read *Slow It, Spread It, Sink It! A Homeowner's and Landowner's Guide to Beneficial Stormwater Management* (available at www.sscr.org/rainwater.php)

How do I support the steelhead and salmon in my creek or river?

Check out the Landowner Tools page at www.cohopartnership.org

How do I replace water-hungry plants in my yard and on my property?

Take your cue from the excellent book *Plants and Landscapes for Summer-Dry Climates* by Nora Harlow.

The North Bay Climate Smart fact sheet series is a project of the North Bay Climate Adaptation Initiative (NBCAI). NBCAI is a coalition of natural resource managers, policy makers and scientists working to identify and promote effective climate adaptation strategies that sustain the ecological and human communities of the North Bay watersheds. This document is also available at www.northbayclimate.org.