

Conservation in Action

News from our programs and preserves | Number 64 | Winter 2020

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*"I think of bear grass as the
forest's candle! It practically
glows in the burnt redwood
understory. Truly amazing."*

*—Jennifer Potts,
Bouverie Preserve Resource Ecologist*

WINTER 2020

New Decade, New Solutions

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On the cover: Bear grass, a 'fire follower' found in Bouverie Preserve's pygmy redwood forest. Learn more on page 8. *Photo: Jennifer Potts*



DOWNLOAD TODAY!
ACR's STRATEGIC PLAN
is available at egret.org/strategic-plan-2019-2022

We enter this decade ready to tackle the urgent and complex problems facing our planet.

Several articles in this edition relate either directly or indirectly to climate change. The Kincadee fire, declines in shorebird populations and adaptations to sea level rise can all trace their roots to the climate extremes and unpredictability we are already experiencing.

Undeterred, the ACR community continues to go where we can have the greatest impact. We're working on protecting coastal wetlands for carbon sequestration, managing forests with prescribed fire and teaching the next generation to embrace nature and science.

Another area where we'll lead by example is in rebuilding the Bouverie Preserve facilities following the 2017 Nuns fire.

Guided by architects Siegel and Strain (siegelstrain.com), and informed by input from staff, volunteers and supporters, we are excited about ideas that are emerging. Among them are creating a community resource that reflects the preserve's natural and cultural history, using more precise site planning to reduce our overall footprint and energy use and restoring key natural connections between drainage basins, vernal swales and pools.

Our success has been, and will always be, based on collaboration with our community, united in action for the greater good of our natural world.

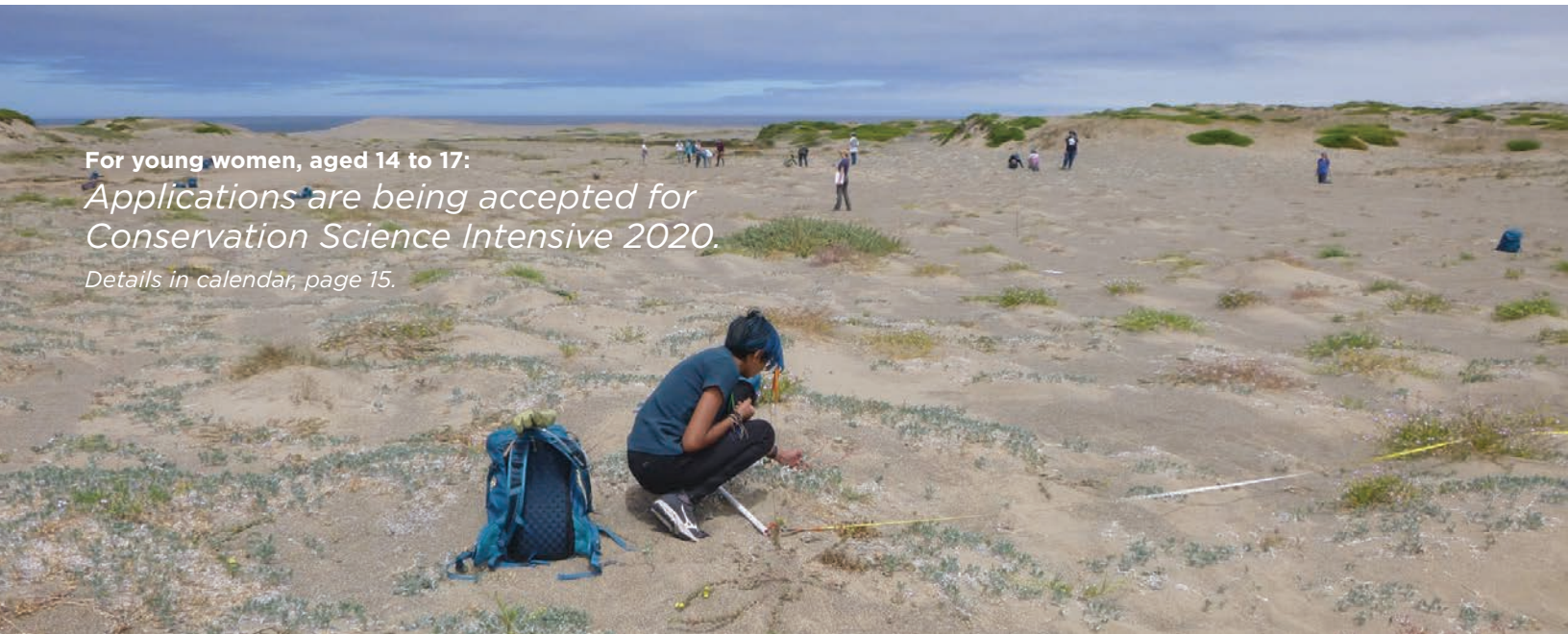
In gratitude for your partnership,

John Petersen
Executive Director



Ten ACR staff members returned to Bouverie Preserve after being displaced by the Nuns Fire in 2017. A heartfelt thank you to the Jacobs family for one year of donated office space in Kenwood.

For young women, aged 14 to 17:
*Applications are being accepted for
Conservation Science Intensive 2020.*
Details in calendar, page 15.



Conservation Science & Stewardship Briefs

CYPRESS GROVE RESEARCH CENTER

ACR Tags Western Sandpipers With the Canadian Wildlife Service

Local populations of migratory birds are declining, and it's important that we know how, when and where the birds move.

This spring, ACR's Director of Conservation Science Nils Warnock and Sarah Warnock collaborated with the Canadian Wildlife Service (CWS) on a pilot project. Nils and Sarah captured and radio-tagged 20 Western Sandpipers at San Francisco Bay.

Our Canadian colleagues will be able to see how long migrating shorebirds stop at British Columbia sites and better estimate populations moving through.

For ACR biologists, we'll gain further insight into where our sandpipers stop during migration and why numbers, like those at Tomales Bay, are declining.

Of the 20 Western Sandpipers we tracked migrating toward Alaska breeding grounds, we detected 16 at Washington and British Columbia coastal sites—a great recovery rate! ■

Follow ACR's Facebook page for the latest news at facebook.com/AudubonCanyonRanch



MARTIN GRIFFIN PRESERVE

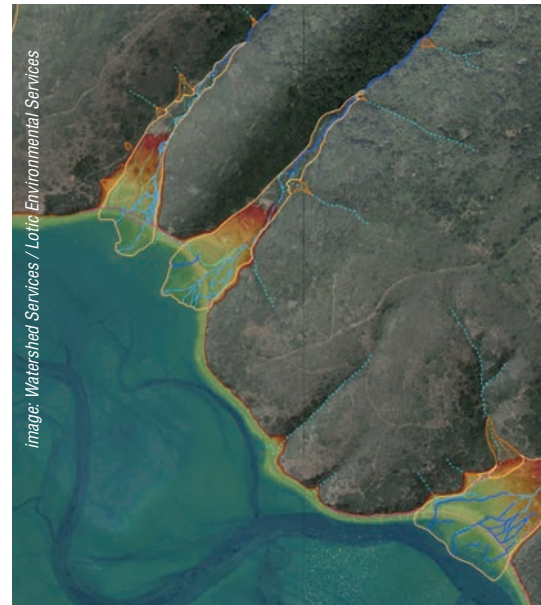
ACR's Stewardship Adapts to Climate Change

With a keen eye on climate change's potential impacts on preserve ecology and infrastructure, ACR contracted with Laurel Collins of Watershed Services and Jason Pearson of Lotic Environmental Services.

Their preliminary geomorphic assessment of MGP's four watersheds will:

- Provide insight on current and long-term processes affecting flow, sediment sources and sedimentation near Bolinas Lagoon
- Document conditions of sediment removal and ditch clearing by Caltrans in 2018
- Determine streambed change from the 2019 rainy season
- Establish benchmarks and coordinates for future monitoring
- Project how future climate change and sea level rise will influence water and sediment movement from canyons to Bolinas Lagoon ■

The report is available online at egret.org/acrs-stewardship-efforts-are-adapting-climate-change



BOUVERIE PRESERVE

Return of Songbird Monitoring and Crayfish Removal

After more than a year offline because of the Nuns Fire, we've rebooted both signal crayfish removal and songbird nest box monitoring. The goal? To maintain native biodiversity in our aquatic and oak woodland habitats.

Along Stuart Creek, staff and volunteer stewards set eight new crayfish traps to replace 2017 losses. Twice a week, we measure and remove invasive crayfish that prey on native invertebrates and fish. High water volume and velocity in early 2019 meant significantly fewer crayfish.

In the oak woodlands, we kicked off spring by monitoring 19 songbird nest boxes to measure their reproductive success. In 2018, 90 Western Bluebirds, Tree Swallows and Violet-green Swallows fledged from the Bouverie boxes (a record high in nearly seven years).

At each nesting season's end, we share our findings with the nationwide Cornell Lab of Ornithology's Nest Watch Project (nestwatch.org). ■





EDUCATION BRIEFS

Environmental Science in the Classroom

by Marie Fox, Grants Manager

ACR is building on its long history of immersing children in nature by expanding initiatives to bring nature into the classroom.

ACR educators Jacqueline Levy and Liz Martins are joining forces with ACR science staff to help Sonoma County teachers build environmental science into K-12 curricula.

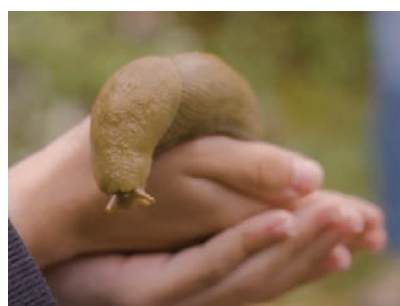
Classroom presentations and curriculum development will support teachers in meeting the Next Generation Science Standards (NGSS) of learning science by doing science.

NGSS outlines the skills K-12 students should master at each grade level. But educational resources are scarce, leaving teachers struggling for interesting and affordable ways to help their students grasp core concepts.

To this end, Liz and Jacqueline are creating lesson plans and interactive studies that inspire critical thinking and strengthen environmental literacy. Their effort adheres to NGSS's three-dimensional framework of Science and Engineering Practices, Cross-Cutting Concepts and Disciplinary Core Ideas.

Our curricula are developed from ACR's science projects. Living with Lions makes math and science principles come alive for high schoolers. Our Egret Telemetry Project creates a fun opportunity for third graders to master graphing by following the capture data of Great Egrets.

This year, our goal is to reach 4,000+ students with classroom visits and curriculum development. Later, we plan to expand the project—regionally and in number of students learning environmental science daily. ■



Videos Prep Students for On-the-Trail Learning

Each fall and spring, it's all hands on deck at the Bouverie and Martin Griffin Preserves. Land stewards and volunteer crews work on tens of miles of trails, creek crossings, picnic areas and other facilities for the return of third, fourth and fifth grade classes from all over the Bay Area.

What will those children find when they arrive on the preserves? For many, it's the first time they'll have an educational experience in nature.

To support student learning prior to the nature hike, ACR docents visit classrooms. They introduce ecological concepts and natural history and offer opportunities to connect science with art and observation.

New this year, students can preview the preserves' wonders through the lens of award-winning filmmaker Peter Jordan. Working with our education staff and docents, Peter distilled ACR's vision into a captivating narrative on the special relationship we can forge with nature. ■

Grab a tissue and watch our nature field trip unfold for young students:
egret.org/nature_ed

LIVING WITH LIONS: SCIENCE IN YOUR BACKYARD

Citizen Scientists Advance Area's Understanding of Wildlife

The Living with Lions project works with Sonoma and Napa County locals to collect visual data on mountain lions and other wildlife from trail cameras on their properties. These data are adding to the overall understanding of our region's wildlife activity, diversity and relative abundance.

As of late 2019, 26 residents sponsored 34 cameras throughout the Sonoma Valley area.

Sightings have included fox, jackrabbit, bobcat, raccoon, skunk and Great Blue Heron. Some of our more elusive wild neighbors turned up too—coyotes, mountain lions and even a rare sighting of a river otter in Bennett Valley!

Apart from the research objectives, this exciting project strives to support our community's interest in our wild neighbors, while providing vital information to help protect them.

A landowner's view of her own wildlife corridor

Camera sponsor Katie Christ relocated from San Francisco to Glen Ellen years ago to live surrounded by nature.

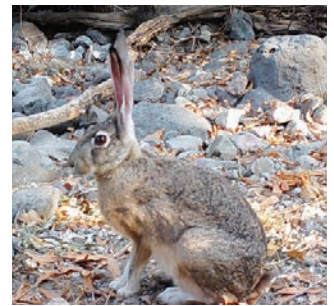
"With two cameras on my property," she explains, "I see images of the wildlife that pass through at all hours. Coyote, bobcats, fox and mountain lions use the creek as a main corridor. Supporting the important work of the Living with Lions project is my pleasure and an honor."

Katie hopes more landowners will participate and "reveal the majesty and beauty of our resident mountain lions."

No camera? No problem!

An annual camera sponsorship includes equipment, site selection and installation. Camera hosts also receive an on-site project update from a Living with Lions researcher every three to four months and a one-year ACR membership. ■

Ready to host a wildlife camera on your property? Email trailcamera@egret.org or visit egret.org/living-with-lions.



Along with this sighting of P1 (top) in Glen Ellen, several collared and uncollared mountain lions have been spotted by participants in the trail camera project. Semi-rural Sonoma County is home to a range of wildlife, including a rare sighting of a river otter in Bennett Valley (below).

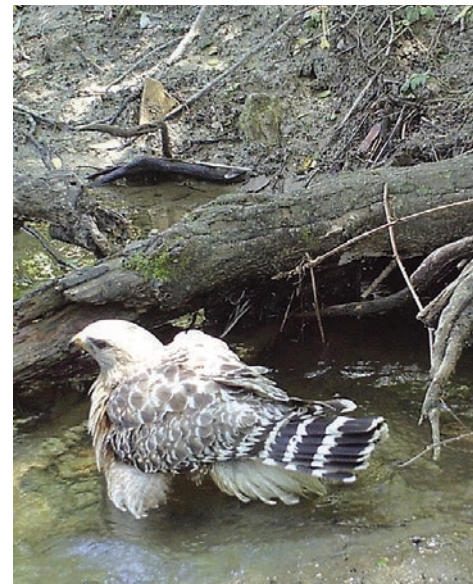




photo: David Lumpkin



photo: Sarah Minnick

FIRE FORWARD

Fire Forward—Capacity Building for Prescribed Burns

by Sasha Berleman, Ph.D., Director of Fire Forward

Above, the short flame lengths of a prescribed burn in grassland; five newly trained volunteer wildland firefighters on the Monan's Rill burn unit. Below, handtool demonstration at a Basic Wildland Firefighter training; a crew of volunteers and professionals monitor a grassland burn at Bouverie Preserve.

This past year, ACR's Fire Forward team came together with diverse partners across the region to develop a regional prescribed burn workforce. Already, in the program's first year, we see the impacts—three cooperative prescribed burns in 2019 and many more scheduled for 2020.

Training our volunteer workforce

In April 2019, Fire Forward hosted its first Basic Wildland Firefighter training. A weekend event at Martin Griffin Preserve, the 40-person class was immediately full with a waitlist.

We discovered a well of enthusiasm for making a difference. Participants arrived having already spent many hours on required online education.

They had also self-administered the arduous pack-test—three miles in less than 45 minutes wearing 45 pounds of gear—showing their dedication and desire to strengthen the team.

Training was a whirlwind and resounding success. Instructors were impressed at how participants absorbed the onslaught of information while being pushed to demonstrate field capabilities.

The program equipped the Bay Area with 40 new professionally trained and certified residents who could assist in any cooperative burn.

Organizing and cooperating

Meanwhile, Fire Forward and UC Cooperative Extension spearheaded the formation of the Good Fire Alliance, the Bay Area's first prescribed burn association, a broad community of neighbors helping neighbors.

The group compiled a list of over 300 concerned residents willing to help in cooperative burn efforts. About 80 are wildland fire-trained and certified to meet agency standards where such standards apply.

Simultaneously, ACR partnered with agencies, organizations and academic institutions to organize the Bay Area Prescribed Fire Council. This coalition brings together a local network of fire management and fire science experts.

With an eye for supporting this new workforce, we developed a prescribed burn equipment cache, which is now available for regional prescribed burns. Collectively, these efforts represent a dramatic improvement in the North Bay's ability to conduct work during prescribed burn season.

The new resources at work

Three times in 2019 we mobilized the resources and equipment to conduct prescribed burns. We were blown away by the incredible support of our volunteer burners who used their April training to help get good fire on the ground.



photo: Tim Farley



photo: David Lumpkin

In June, at Bouverie Preserve in the Sonoma Valley, the cooperative volunteer burn team assembled—with support of federal and local firefighters, and permit approval of CAL FIRE and Bay Area Air Quality Management District (BAAQMD). They conducted 21 acres of grassland burning across four burn units. These actions reduced wildfire hazard from annual grass build-up along Highway 12 and under powerlines, while reducing invasive weeds that crowd out native wildflowers and bunchgrasses.

Then, later that month, we took advantage of optimum weather conditions to partner with Monan's Rill, a 440-acre intentional community in the Mark West watershed east of Santa Rosa. The volunteer team reconvened, this time supported by federal and contract firefighters and community residents. The six-acre prescribed burn reduced Douglas fir and tan oak fuel in the mixed evergreen forest/woodland understory.

This work positioned us for future treatments extending across the north end of the property. The process removed tan oak resprouts and new Douglas fir seedlings, and created ground and canopy openings to encourage a more diverse native understory.

Finally, in October, the team came together again with local and federal fire agencies at Martin Griffin Preserve in West Marin to burn 9.5 acres of pruned and thinned Douglas fir understory. It has been encroaching on the coastal prairie over the past 30 years.

This step was the beginning of saving and restoring this precious area of the preserve. Just a month and a half later, we saw dramatic results—a 75% decrease in the mass of dead branches and leaves on the ground, better light reaching the understory, and vigorous resprouting of native bunchgrasses and other native understory species. We also began reestablishing the Bourne fire road for firefighter access to the ridge, a foundation for future ecological restoration burn projects.

The strength of our community

The power we have when we work together is palpable. The number of workers trained in prescribed burning is increasing, capacity is improving, and this is only the start.

In 2020, it's an all-hands all-lands effort to make a difference. No place is better prepared than our own Bay Area community. For that we thank you, and look forward to your help and showing the world what we can do together. ■

Follow Fire Forward at egret.org/fire-forward

Inset: ACR Founder and Emeritus Director Martin Griffin lights the test fire prior to a 9.5-acre prescribed burn of understory vegetation. Below, aerial view of the burn unit atop the Bourne Ridge at Martin Griffin Preserve.



photo: Richard James



“One of the most memorable and profound days of my life.”

-L. Martin Griffin

photo: Ron Sanders



photo: Jared Childress



photo: Darren L. Smith



With each passing year after fire, the shrub canopy will close and rare understory annuals—like the redwood lily, bear grass and Napa false indigo pictured above— will seemingly blink out, until the next fire. Top far right, California hazel.



photo: Sasha Berleman

POST-WILDFIRE RESILIENCE: BOUVERIE PRESERVE

The Fire Followers of the Pygmy Forest

by Jennifer Potts, Bouverie Preserve Resource Ecologist

When the Nuns Fire swept through the North Bay in October 2017, it became known as one of the most destructive wildfires in California's history. On Bouverie Preserve, the wildfire burned roughly 75 percent of the Preserve's 535 acres and destroyed seven of nine preserve buildings.

Yet as damaging as wildfires are, from an ecologist's viewpoint, fires can be rejuvenating. They're nature's way of cleaning house—clearing out dead and overly dense vegetation, recycling nutrients and eliminating pathogens.

Fire also stimulates the growth of rare flora, known as fire followers, that bloom for a few years and then disappear. In the first year following the fire at Bouverie, we were treated to a spectacular display, including the reappearance of bear grass (*Xerophyllum tenax*) in the Pygmy Forest.

What is bear grass?

First named bear grass by members of the Lewis and Clark Expedition, the plant is not a grass, but a member of the corn lily family and has been prized by native peoples for basketry, hats and decorative dress.

With its rhizome buried deep in the soil, bear grass can survive light to moderate fire then regrow and prevent soil erosion.

You can recognize bear grass by its tall stalk and long, wiry basal leaves topped with a cluster of small, dense white flowers. At Bouverie, it grows alongside redwood lily and Napa false indigo, both rare species, and California hazel.

Despite its name, bears do not eat the plant, but they do use the leaves as material for their dens. ■

Harding Grass Meets Its Match

On a two-acre plot near vernal wetlands, we've been working for three years to remove pernicious Harding grass (*Phalaris aquatica*). It's proven a formidable opponent! We've burned, mowed, grazed, tarped and rototilled to little benefit. However, our latest approach is gaining ground: digging out the highly competitive non-native grass followed by planting native grass, California poppy, lupine and soaproot.

Fortunately, many hands have joined us. Most recently, a group of Junipers (ACR's junior naturalists) and Bouverie Preserve volunteer stewards planted nearly 600 blue wild rye (*Elymus glaucus*) plugs over two days. We propagated the young plants from seeds collected on the Preserve last spring. Our goal on this two-acre unit is to increase plant diversity, which in turn will support higher insect diversity, leading to a smorgasbord of meal options for nesting swallows and blue birds. ■



POST-WILDFIRE STEWARDSHIP: MODINI PRESERVE

Repairing Bulldozed Fire Lines in Sensitive Modini Habitat

The Kincade Fire burned 95% of Modini Preserve's 3,000 acres, leaving the ecosystem damaged by fire and by the firefight. To stop the fire's advance, 13 acres of fire lines were carved by bulldozers along ridgetops and through some of the preserve's sensitive serpentine habitat.

The area supports rare populations of St. Helena fawn lilies as well as serpentine sunflowers. Heavy equipment also compromised the primary access route to the preserve, requiring major repairs and erosion control measures.

Community responds with loving care

Our community stepped forward, offering services, in-kind donations and even a \$20,000 matching grant. In less than two weeks, friends and supporters surpassed the matched gift, enabling preserve staff and contractors to restore ecological health.

Erosion was a big concern. We smoothed the fire lines and berms to avoid water concentration that carves rills and gullies. Then we applied a native grass mix—California brome (42%), purple needle grass (14%), blue wild rye (27%), and a sterile annual grass mix (17%).

The blend included rapid germination species for immediate erosion control and slow-growing, long-lived species, like purple needle grass which may span more than 100 years. We laid weed-free rice straw on top and germination began during late fall rains.

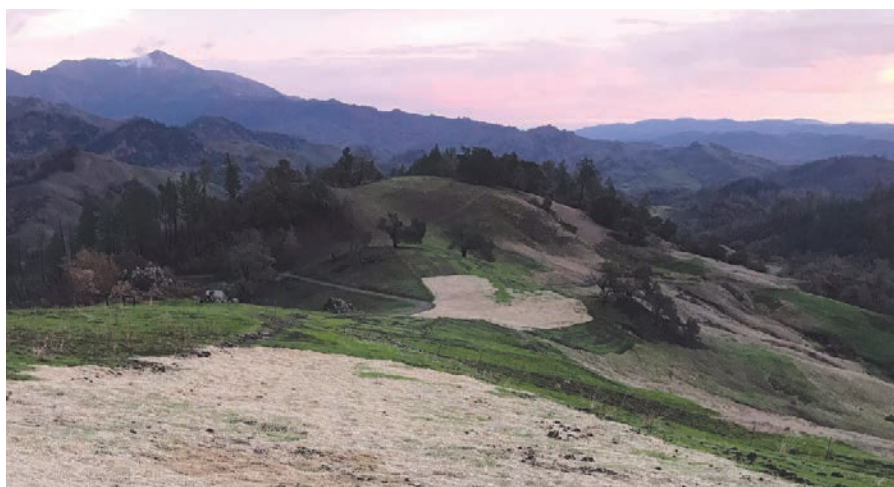
Collaborative learning and resources for recovery

As rainy weather arrived, ACR's Fire Forward team joined efforts with the Northern Sonoma County Fire Protection District, Sonoma Resource Conservation District (RCD), UC Cooperative Extension Sonoma and Natural Resources Conservation Service (NRCS).

The group hosted a post-wildfire landscape stewardship tour for nearly four dozen neighbors and conservation colleagues. Many attendees had lost homes or significant habitat during the Kincade Fire and were eager to learn ways to heal their land.

While the wildfire still challenges our infrastructure, collaboration is bringing forth practical and ecologically supportive solutions. ■

Two views taken after the Kincade Fire show the impact of the firefighting efforts, including bulldozed fire lines and a retardant drop (top) and restoration efforts, including hand labor to smooth out water bars followed by native grass seed sowing (bottom).



ACR Hosts Post-Wildfire Research

Soon after the Kincade fire, preserve manager Michelle Cooper approved three projects to study post-wildfire water and soil quality.

Scientists from United States Geological Survey (USGS) and Sonoma Water collected soil and ash samples from the recently burned Modini Preserve. They'll examine how burned sediments and fire retardants impact water quality and nutrient transport in streams and reservoirs.

A second USGS/Sonoma Water project—year-round monitoring of the Russian River and its tributaries—tests wildfire ash effects on aquatic chemistry and microbial activity. And a Stanford University researcher is investigating how wildfire transforms soil minerals and if post-fire serpentine soils pose ecological and human health risks.

ACR is proud to support this research and broaden understanding of our environment. ■



A FOCUS ON PHILANTHROPY

Making ACR's Work Perpetual: The Zumwalt Legacy Circle

by Jen Newman, Associate Director of Philanthropy

If a sense of wonder for the natural world is the foundation of the ACR mission, then being community funded is our superpower.

Each year about half the organization's operating budget comes from donations and grants made by today's generous members and supporters.

The remaining half is funded by the ACR endowment. This nest egg was initiated decades ago by forward-thinking ACR founders to help fund programs and preserves for years to come.

Donors who pledge gifts to the endowment from their estates, in any amount, become members of our Zumwalt Legacy Circle. Named in honor of Clerin "Zumie" Zumwalt, ACR's first naturalist, the fund is managed for longevity by our board of directors.

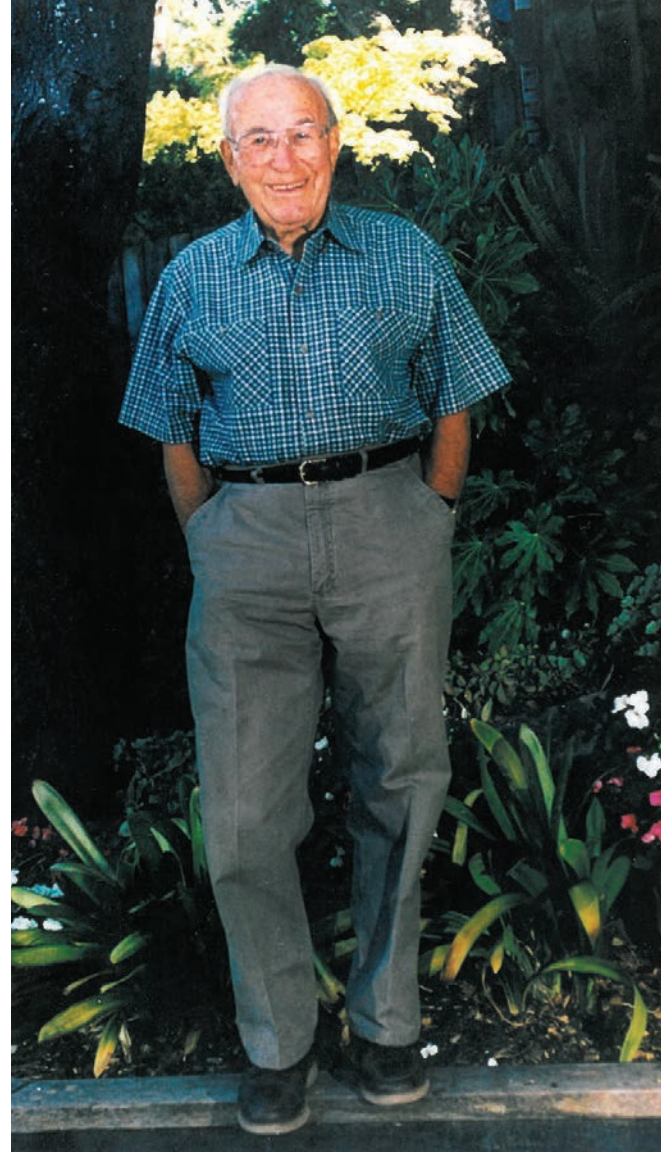
A life of nature and nurture

Zumie was a champion mountain climber and a former rangeland manager in the U.S. Forest Service. He joined ACR in 1967 to interpret the natural world for what surged to more than 1,000 visitors a weekend.

On staff until 1972, Zumie ushered in the first class of Martin Griffin Preserve docents in 1970. In his retirement, he served on our board and committees, taught classes and hiked the trails until his death in 1996 at age 85.

Every year, ACR honors Zumie's commitment and our generous Legacy Circle donors with a special-access event. At this past spring's luncheon, overlooking Tomales Bay from our Cypress Grove Preserve's Conly Center, Director of Conservation Nils Warnock expressed his deep thanks and shared the impact of their gifts. ■

Learn more about estate planning and join our generous Zumwalt Circle donors by visiting egret.org/legacy_gifts or contacting Director of Philanthropy Naomi Sultana Young at (415) 868-9244 ext. 311.



Clerin Zumwalt, ACR's first staff naturalist and inspiration for ACR's Legacy Circle

"Giving beyond my own life through the Zumwalt Circle gives me hope that Zumie's sense of wonder will echo for others as it has for me."

— Betsy Stafford, Nature Guide and ACR Advisor

ACR Membership

Audubon Canyon Ranch members, as well as our business and foundation partners, know the health of our planet depends on responsible conservation practices. Not a one-time fix, it requires generations of committed, knowledgeable people willing to tackle complex environmental issues. Won't you join us?

Membership has its benefits:

- make an immediate and enduring impact on regional conservation initiatives
- receive bi-annual editions of our *Conservation in Action* bulletin
- attend exclusive members-only events
- receive a 30-year special edition copy of *The Ardeid*, our journal of conservation science and stewardship
- enjoy a 10% discount in our bookstore and more

For more information, contact Associate Director of Philanthropy Jen Newman at 415-868-9244 ext. 119. Not a member? Become one today at egret.org/membership.



Receive a set of nature-themed notecards with your **Monthly Sustainer** membership!

CONSERVATION SCIENCE & STEWARDSHIP REPORTING

Conservation in Action and The Ardeid Join Forces

by Nils Warnock, Ph.D., Director of Conservation Science

You may have noticed ACR's annual publication, *The Ardeid*, has not shown up. The brainchild of John Kelly, our emeritus conservation science director, *The Ardeid* has long summarized what was new and exciting in ACR science and stewardship.

A detailed, scientific publication, it was geared toward members who volunteer for our science, stewardship and education programs. *The Ardeid* was published alongside our biannual newsletter, *Conservation in Action*, a more succinct, general bulletin for all our members.

Both print outlets have served our community well, but as we incorporate other types of outreach (e.g. our web page, Facebook, eNews), we are streamlining and unifying our communications.

Consequently, we have decided to blend *The Ardeid* and the *Conservation in Action* newsletter into one publication. We'll issue *Conservation in Action* twice a year and more items electronically.

The Ardeid Collection holds a wealth of ACR's findings and serves as a record of the region's ecology. Because of this, in coming months we will publish online a comprehensive article index, making this important research accessible to all.

We are excited about the change, as seen in this edition of *Conservation in Action*, and trust you will be as well. We welcome your feedback on what you like about the new formats and what you miss. ■

The Ardeid Collection is available at egret.org/ardeid



SCIENTIFIC CONTRIBUTIONS

Nesting Double-Crested Cormorants in the SF Bay Area, 1975–2017

In the Bay Area, the Double-crested Cormorant population has recovered from significant declines to reach population sizes comparable to those from the late 19th century.

In the early 1970s, only one colony of fewer than 50 breeding pairs was known, offshore at the South Farallon Islands.

Now the San Francisco Bay estuary is home to approximately 3,500 breeding pairs across more than 20 colonies. On Tomales Bay, a colony formed on Hog Island in 2001 has become the largest in the study area.

ACR co-authored this article in *Marine Ornithology*, after severe nesting disruptions were observed during the construction of the new Bay Bridge. ■

Article available at marineornithology.org/PDF/47_1/47_1_127-138.pdf



Mountain Lion Habitat Is the Key

ACR's Director of Living with Lions, Dr. Quinton Martins, is one of a dozen scientists who contributed to a recent research article for the *Journal of Wildlife Management*.

The article, "Using Mountain Lion Habitat Selection in Management," calls attention to California's need for a formal plan to conserve and manage mountain lions.

Granted, the situation is complicated. The elusive species is spread the length of the state and endangered in one region while stable in another.

However, when the authors combined studies they found that mountain lions consistently choose similar habitats. So manipulating the land (for instance, removing junipers where they take cover to stalk their prey) may allow wildlife managers to reduce predation on declining deer and elk as well as domestic livestock. The article also recommends increasing education

so Californians who likely share mountain lion territory can act to reduce conflict with the animals. ■

Article available at egret.org/scientific_contributions



photo: David Lumpkin

CONSERVATION SCIENCE: TOMALES BAY

Beyond Counting Birds

by Nils Warnock, Ph.D., Director of Conservation Science

Recently, at a Wildlife Conservation Committee meeting, I asked for funding for part of our heron and egret monitoring study. One of the commissioners asked me, “Why do you need more data? You already have enough.”

I frequently get this question. I explained the need for annual monitoring of herons and egrets in the North Bay in order to understand their population response to this rapidly warming and changing world. But my mind flipped to a 2013 paper, “Counting the books while the library burns: why conservation monitoring programs need a plan for action.”¹

I’ve helped run numerous long-term monitoring projects, so this paper struck a nerve. The authors, even though they recognized the value of long-term monitoring, made the point that many programs lack metrics and management plans for mitigation actions. As a result, animals were counted right up until they went extinct.

ACR has a long, rich history of monitoring bird populations. In Bolinas Lagoon, we have tracked heron and egret populations for over 50 years. On Tomales Bay, we have 30 years of continuous waterbird and shorebird surveys.

Using monitoring data to take action

Looking through past issues of *The Ardeid*, one can read about ways ACR has effectively used our monitoring data to influence management decisions: comments on proposed development that would impact heron and egret breeding colonies, comments on herring fisheries’ management plans to mitigate negative impacts on waterbirds, evaluation of wetland restoration projects.

However, we are still working on establishing “trigger points”² that lead to conservation action when populations we monitor reach critical levels or experience substantial declines.

Case in point is ACR’s shorebird monitoring project on Tomales Bay. Since 1989, we have conducted six to eight baywide shorebird surveys per year with a group of passionate and dedicated volunteers.

We have used these data to look at the effects of the Giacomini Wetlands Restoration project³ and oyster farming on shorebirds in the bay.⁴ But years have passed since we examined trends in shorebird abundance on the Bay even though recreational and commercial use of the area has increased.

Alarming decline in bird populations

In our last e-newsletter, I mentioned attending the American Ornithological Society’s annual meeting in Anchorage, where I listened to a rather depressing talk on trends of North American birds.

Overall, North American bird populations have declined 29% in numbers since 1970.⁵ One of the hardest hit groups appears to be shorebirds, with a 37% loss in numbers. With that in mind, we began analyzing trends of shorebirds on Tomales Bay. Initial results were startling, although a complete statistical analysis is still in progress.

If you look at Fig. 1, a plot of the mean high counts of wintering shorebirds against year, far fewer shorebirds are visiting Tomales Bay in the winter. We are seeing roughly 65% fewer individual birds (depending on how you calculate it), from around 15,000 birds in the late 1980s to early 1990s to current highs between 4,000 and 7,000 birds.

Five species account for over 85% of the total number of shorebirds we see in an average year: Dunlin (43%), Least Sandpiper (15%), Marbled Godwit (13%), Western Sandpiper (11%), and Sanderling (6%).

Trends of Dunlin, our most abundant shorebird, follow the same general trend as all shorebirds combined, with a steep decline in the 1990s and no recovery.

1 Lindenmayer, D.B., Piggott, M.P. and Wintle, B.A., 2013. “Counting the books while the library burns: why conservation monitoring programs need a plan for action,” *Frontiers in Ecology and the Environment* 11:549–555.

2 *Ibid.*

3 Kelly, J.P. and Condeso, T.E., 2017. “Tidal marsh restoration stimulates the growth of winter shorebird populations in a temperate estuary,” *Restoration Ecology*. 25:640–649.

4 Kelly, J.P., Evens, J.G., Stallcup, R.W. and Wimpfheimer, D. 1996. “Effects of aquaculture on habitat use by wintering shorebirds in Tomales Bay, California,” *California Fish and Game*. 82:160–174.

5 Rosenberg, K.V., Dokter, A.M., Blancher, P.J., Sauer, J.R., Smith, A.C., Smith, P.A., Stanton, J.C., Panjabi, A., Helft, L., Parr, M. and Marra, P.P., 2019. “Decline of the North American avifauna,” *Science* 366:120–124.

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Least Sandpipers also declined in the 1990s but then increased past early high levels. Marbled Godwits have displayed a varied pattern of abundance but have generally stayed stable. Western Sandpipers have declined steadily from the late 1980s to the present. Lastly, Sanderlings increased in the 1990s, fell in the first 15 years of the 2000s and have remained stable in the past few years.

Thus, two of the biggest losers, whose populations remain reduced relative to the early years of our study, appear to be Dunlin and Western Sandpipers (Fig. 1).

Finding the cause

While still early in the data analysis stage, we are working on understanding why our Tomales Bay shorebird populations have declined so dramatically.

Two explanations rise to the top, neither mutually exclusive: 1) local population declines reflect changes in the global populations and/or 2) local population declines reflect changes within Tomales Bay.

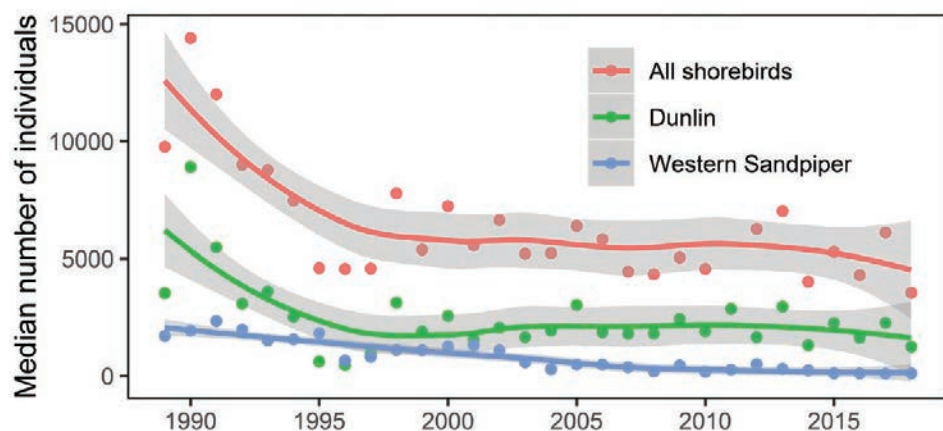


Figure 1 – Median winter shorebird numbers at Tomales Bay, 1989-2018. LOWESS (Locally Weighted Scatterplot Smoothing) used to create the lines of best fit to show the relationship between annual shorebird numbers and year.

Unfortunately, global trend data are poor for most of our West Coast shorebird populations. If we look at data on two of our most concerning species, Western Sandpipers and Dunlin, there are suggestions that Western Sandpiper populations are declining,^{6,7} although not everywhere.⁸ The race of Dunlin that occurs at Tomales Bay, *Calidris alpina pacifica*, is thought to be declining overall.⁹

At nearby Bolinas Lagoon, where shorebirds have been monitored by Point Blue since the 1970s, Dunlin and Western Sandpipers also show downward trends.¹⁰

Ecological stories are rarely simple, and we know that other factors can affect the abundance and distribution of shorebirds. ACR's own John Kelly demonstrated that above-average rainfall results in lower numbers of shorebirds at Tomales Bay than are observed in dry years.¹¹

For the *pacifica* race of Dunlin, there is some evidence that their winter range is contracting northward, perhaps in response to warming climates.¹² Another theory is that some of our coastal wintering shorebirds have moved into the Central Valley to exploit the expansion of rice farms, a habitat that many shorebirds use.¹³ Yet another possible factor is the rise of falcon populations after the insecticide DDT was banned. Increased predator pressure may cause shorebirds, favored prey of falcons, to abandon smaller sites in favor of larger and presumably safer wintering sites.¹⁴

We will be examining these and many other issues as we learn more about the trends of Tomales Bay shorebirds and shorebirds in general. At the same time, we will be doing more than passively watching as "the library burns." We will be actively working to protect our wild and amazing natural resources by making sure that results of our monitoring work are heard by those who can influence stewardship practices. ■

To volunteer for ACR's annual shorebird survey contact cgrc@egret.org or call 415.663.8203.

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- 11 Stenzel, L. E. and G. W. Page. 2018. "Trends in the abundance of wintering waterbirds relative to rainfall patterns at a central California estuary, 1972-2015," In *Trends and traditions: avifaunal change in western North America* (W.D. Shuford, R.E. Gill, Jr, and C. M. Handel, eds.) pp. 236-257. *Studies of Western Birds* 3. Western Field Ornithologists, Carmarillo, CA.
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- 15 Taylor, C.M., Lank, D.B., Pomeroy, A.C. and Ydenberg, R.C., 2007. "Relationship between stopover site choice of migrating sandpipers, their population status, and environmental stressors," *Israel Journal of Ecology & Evolution* 53:245-261.



WE'RE HERE FOR YOU

Meet Our New Board Members and Program Staff

Jeff Reichel, Board Director, first learned of ACR's work more than 30 years ago when his wife Linda became a Bouverie Preserve docent. In 2012 Jeff also completed the 22-week training and joined their ranks. Now retired from plastic and reconstructive surgery, Jeff continues to serve the North Bay, through groups such as the Napa County Land Trust and Queen of the Valley Foundation.

Susie Allen, Events Manager and M.F.K. Fisher Last House Program Coordinator. Before joining ACR, Susie supported the David and Lucile Packard Foundation's conservation and science program for 14

years and served as events manager for the Sonoma Int'l. Film Festival. Susie has a B.A. in humanities and arts from the California Institute of Integral Studies.

Kyle Doron, Modini Preserve Land Steward, joins ACR after serving as resident

land steward at Ocean Song Farm and Wilderness Center in Bodega Bay. He brings over 25 years of experience stewarding wildlands and conducting general maintenance tasks. He has an extensive knowledge of Modini Preserve's local flora and the fine art of invasive species management.

Henry Inman, Martin Griffin Preserve Resource Ecologist, earned their bachelor's degree in physical geography from UC Santa Barbara before serving as a habitat restorationist

and botanist at the University of Hawai'i in Hilo and Kure Atoll Wildlife Sanctuary. Assignments followed with the Golden Gate National Recreational Area and the Point Reyes National Seashore.

Sheila McCarthy, Living with Lions Field Technician, works with Trail Camera Project participants and assists in field research and education. She earned a bachelor's in recreation from CSU East Bay and is a UC-certified California Naturalist. Sheila has monitored wildlife cameras for Sonoma County Regional Parks, California State Parks and LandPaths.

Jennifer Spangler, Administrative Assistant, brings her experience as field institute coordinator for Point Reyes National Seashore Association and administrative assistant at Marconi State

Historic Park and Conference Center to ACR's Bouverie and Martin Griffin Preserves. Jennifer has a B.A. in environmental studies from Sonoma State University. ■

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Scott Jennings, Avian Ecologist
David Lumpkin, Avian Ecologist

MARTIN GRIFFIN PRESERVE

Gwen Heistand, Preserve Manager and Resident Biologist
Henry Inman, Resource Ecologist

Natasha Lekach, Education Program Manager
Claire Seda, Weekend Program Coordinator
Steve Trivelpiece, Land Steward

MODINI PRESERVE

Michelle Cooper, Preserve Manager and Resident Biologist
Julianne Bradbury, Resource Ecologist
Kyle Doron, Land Steward
Tomas Ruiz, Land Steward

FIRE FORWARD

Sasha Berleman, Ph.D., Consulting Director
Jared Childress, Prescribed Fire Specialist
Brian Peterson, Consulting Fire Ecologist

LIVING WITH LIONS

Quinton Martins, Ph.D., Director and Principal Investigator
Alex Hettena, Research Associate
Sheila McCarthy, Field Technician
Liz Martins, Education Coordinator

Development and Communications

Naomi Sultana Young, Director of Philanthropy
Susie Allen, Events Manager
Wendy Coy, Communications Manager
Marie Fox, Grants Manager
Jennifer Newman, Associate Director of Philanthropy
Erika Obedzinski, Communications and Development Associate

ACR Events, Opportunities & Training, Winter–Spring 2020

JOIN US ON THE PRESERVE!

Join us for a range of natural history and ethnobotany guided hikes.

Registration required for all events: www.egret.org/calendar

Suggested donation: \$20 per person

Bouverie Preserve



Guided Nature Walks

Saturdays ~ March 14, April 18, May 2, 10:00 a.m. – 1:00 p.m.



Twilight Hike

Friday ~ May 15, 5:30 – 7:30 p.m.

Our Twilight Hikes and Guided Nature Walks are on Fridays and Saturdays throughout fall and spring. Small groups are paired with a trained Bouverie volunteer to explore the mixed evergreen forest and flower-carpeted oak woodland. Hikes and Walks are no more than 2.5 miles long.

Visitors of all ages are welcome. In order to attend a Twilight Hike or Guided Nature Walk, minors (under 18) MUST be accompanied by their parent or legal guardian.

Registration required: egret.org/calendar

M.F.K. Fisher's Last House



Save the date! Interpreting *With Bold Knife and Fork*

Saturday ~ April 4, 3:00 – 6:00 p.m.

Join us at a lovely spring celebration with several well-known Sonoma County chefs serving delicious bites interpreted from Fisher's book *With Bold Knife and Fork*. Great local wines will accompany the dishes. Proceeds will benefit Audubon Canyon Ranch's programs and the continuing restoration of Last House.

Bouverie Preserve, Glen Ellen

Ticketing information: egret.org/calendar

WORKSHOPS & LECTURES

Fire Forward – Building Ecosystem Resilience

Contact Prescribed Fire Specialist Jared Childress at jared.childress@egret.org to register for either of these events.



Bay Area Prescribed Fire Council Spring Meeting

Wednesday–Thursday ~ March 25–26, all day
Martin Griffin Preserve, Stinson Beach

The spring members' meeting will focus on controlled burning in Central California coastal ecologies and include tours of project sites in the Mt. Tamalpais area.



Home Hardening and Defensible Space Workshop

Sunday ~ March 29, 10:00 a.m. – 2:00 p.m.
Fairfield Osborn Preserve, Penngrove

Receive expert instruction on how to "harden" your home and create defensible space against the next wildland fire. Fee: \$10 / free for Sonoma State students.

Living with Lions – Coexisting With Our Wild Neighbors

ACR's Dr. Quinton Martins shares updates from the field. Get to know the iconic cats with whom we share our habitat and become a conservation ambassador.



Pepperwood Preserve

Thursday ~ May 7, 6:30 – 8:30 p.m.

Dwight Center, Pepperwood Preserve, Santa Rosa
Suggested donation: \$10 per person

LEND A HAND OR SHARE YOUR LOVE OF NATURE!

Martin Griffin Preserve



4 Saturdays ~ March 7, 14, 21 and 28
Morning lecture, afternoon field work
11:00 a.m. – 3:00 p.m.

Join Martin Griffin Preserve Resource Ecologist Henry Inman each week for a 1.5-hour lecture followed by a 2.5-hour hands-on stewardship session. Learn about invasive plant species that affect our watershed and help improve riparian and coastal scrub habitats of the Martin Griffin Preserve. Translate the skills learned at this workshop to your own backyard!

March 7 ~ Lecture – Basic botany Field work – Cape ivy

March 14 ~ Lecture – Riparian habitat Field work – Cape ivy

March 21 ~ Lecture – Coastal scrub Field work – French broom

March 28 ~ Lecture – Mapping and apps Field work – Plant identification hike

Sign up: egret.org/calendar



Docent Orientation and Recruitment Hike

Saturdays ~ May 30, June 13, July 18, August 15
Wednesdays ~ June 24, July 29
10:30 a.m. – 12:30 p.m.

An ACR docent is someone with an abiding love of nature and a desire to share that appreciation and enthusiasm with children aged 9 to 11. Over the course of 20 Wednesdays beginning in September, docents receive exceptional coursework in the natural history of Northern California's diverse ecosystems.

Join us for an orientation program beginning with a brief overview of the training program and ending with an hour-long hike on the trail. Seasoned Martin Griffin Preserve docents will lead the hikes and be available to answer questions.

Training begins in September.

Sign up: egret.org/preliminary-docent-training-application

Modini Preserve



Habitat Protection & Restoration Stewards

2nd and 4th Thursdays, beginning January 23
10:00 a.m. – 2:00 p.m. Hours change seasonally.

The Modini Preserve Stewards provide essential hands-on assistance to our land management team, including trail maintenance, invasive plant removal, native plant propagation and other special projects. Come learn more about the Preserves by getting your hands dirty!

Contact Resource Ecologist Julianne Bradbury at julianne.bradbury@egret.org or 707-433-1217



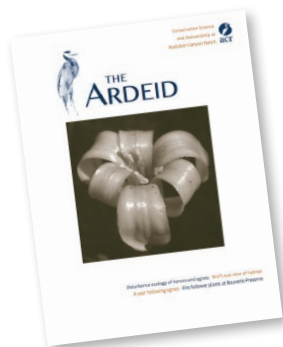
Conservation Science Intensive - 2020

Application Deadline: March 10! Apply today: egret.org/csi

Monday–Friday ~ July 20–24

Martin Griffin Preserve, Stinson Beach

This collaborative expeditionary program challenges participants—physically, creatively and intellectually—as they work with and learn from ACR's highly-skilled female conservation biologists, ecologists, educators and guest artists, writers and musicians. CSI accepts applications from young women, aged 14 to 17, who will be entering their sophomore, junior or senior year of high school in Fall 2020.



INSIDE, page 11:

*The Ardeid and
Conservation in Action
Join Forces*

See event calendar on page 15 for ways to explore, learn and volunteer on our preserves



BOUVERIE PRESERVE



CYPRESS GROVE
RESEARCH CENTER



MARTIN GRIFFIN
PRESERVE



MODINI PRESERVE



Living with Lions and Dr. Quinton Martins Named North Bay Conservation Game Changer

"Good stewardship entails looking after those in our care," says Quinton Martins, director of Living with Lions, in the recent Game Changers special edition of *NorthBay Biz* magazine.

It's no surprise the editors found Quinton's optimism for community-driven conservation a compelling story. But they also discovered how the project is winning the hearts of schoolchildren, landowners, volunteers and research partners.

Read the article > egret.org/news



Native American Artifacts Found at Toms Point

Since 1985 ACR has protected Toms Point and the natural systems of Tomales Bay from development.

Archeological excavations by Tsim Schneider, Lee Panich and team have also shown the cultural importance of places like Toms Point—both historic and contemporary—to native people of California.

Excavated artifacts from Toms Point show that Coast Miwok and Southern Pomo Indians carried on their traditions and maintained tribal ties throughout and beyond California's destructive colonization.

Schneider and Panich's research was recently highlighted in the *San Francisco Chronicle* and is recommended reading for our North Bay community.

Read the article > sfchronicle.com