OCH News

Second Quarter 2021 (April–June)

Quarterly News

ENVIRONMENTAL NEWS

Ecosystem Services: The Value of Nature

By Kevin Bartelheim

Living through modern times our societies, at their cores, are run by money. We have assigned some sort of monetary value to almost every single facet of our lives and our planet. However, this becomes rather difficult when it comes to the natural world and its many ecosystems as there are some benefits we gain from them that can be difficult to put a dollar value on. While the people of the world certainly value nature, we can take for granted many benefits that it provides for us. These range from the food we eat to sustaining a livable planet. These benefits are called “ecosystem services”, which The National Wildlife Federation defines simply as any positive benefit that wildlife or ecosystems provide to people whether by direct or indirect means. We categorize an ecosystem service between four different types of services: provisioning, regulating, cultural, and supporting.

Photo Credit: TEEB Europe

Provisioning Services

Provisioning ecosystem services may be one of the most directly noticeable services to us. Almost every aspect of our modern lives is due to this kind of service. Provisioning services are essentially any type of benefit to people that we are able to extract from nature. This includes all the essentials to life that sustain life as we know it. The first and most important of those is water. Without water there would be no life. Secondly, ecosystems provide us with the capability to grow and harvest the food we eat. The California Department of Food and Agriculture reports that in California alone we produce most of the nation's fruits, vegetables, nuts and produces the most food in the country. Nature also

Spotlight Species

Least Bell’s Vireo

By Michelle Picca

Least Bell’s Vireo. Photo Credit: Bob Steele

The smallest of the four subspecies of Bell’s Vireo, the Least Bell’s Vireo (*Vireo bellii pusillus*), calls Southern California riparian woodlands home for half the year. As a neotropical migrant, the Least Bell’s Vireo flies nearly 2,000 miles every spring from Southern Mexico up to Southern California to find suitable riparian habitat to breed before migrating back south in July. This chatty songbird is identified by its tiny size, ash-grey-colored head, whitish body, faint eye-rings, and straight beak. The Least Bell’s Vireo depends on understory and shrubs near the ground where they like to make cup-like nests and inhabit dense riparian vegetation such as willows (*Salix* sp.), mulefat (*Baccharis salicifolia*), California wild rose (*Rosa californica*), cottonwoods (*Populus deltoides*), and sycamores (*Platanus occidentalis*). These plants provide a plethora of cover and food for the insectivorous Least Bell’s Vireo where they are found foraging in the thickets or along streambeds for their next meal.

Despite the Least Bell’s Vireo once being known as one of California’s most common birds, this small bird has faced large threats to its existence. Declining numbers of the Least Bell’s Vireo have been noted as early as the 1930s due to habitat loss from urbanization. Fast forward to the late 1970s and this bird had lost significant range as it was extirpated from Northern California and the Central Valley, leaving only 300 breeding pairs within Santa Barbara, Riverside, and San Diego counties.

Current species distribution map for the Least Bell’s Vireo. Map created by Conservation Biology Institute. Taken from Data Basin.

The downfall of the Least Bell’s Vireo is mainly attributed to habitat loss and degradation, a common theme with threatened species. Riparian habitats in Southern California have decreased by about 90% of what was present in 1850. Causes of their riparian habitat loss include the construction of dams, channelization of rivers and streams, urbanization, agricultural develop-

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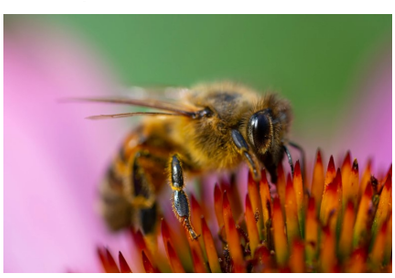
provides all the raw materials that make up our modern lives. We use them to create a place to call home and create every other item, possession, and technology we have. These could range from sand to form glass, oils for fuel and plastics, metals for electronics and buildings, wood and cement for our buildings, and so much more. Even all the many amazing medical advances we have made are due to the environment with many of our medicines being derived from the natural properties of plants. In some way, we owe every part of our lives to nature. Yet it is hardly something that we ever stop to think about and appreciate.

Cultural Services

In contrast the Millennium Ecosystem Assessment defines cultural ecosystem services as the non-material benefits that we derive from nature. Many of these benefits are rather intangible and explore many different types of human experiences. Natural spaces provide ample and diverse areas for us to enjoy and explore various recreational activities, provide a place to relax or exercise in, and ultimately benefits our mental and physical health. Ecotourism is an incredibly important cultural service, especially when it comes to protected habitat areas and wildlife, as it produces a vast number of jobs all over the world and adds to many countries' economies. According to Allied Market Research, the ecotourism industry was worth a total of 181.1 billion dollars in 2019 and expected to grow to 333.8 billion by 2027. All throughout our history, nature has been a major source of inspiration and is intimately connected to culture, languages, art and religion. You can trace this back to early mankind with various cave paintings, with the Romantics and their landscape paintings, or by how intertwined nature is with our indigenous communities. Natural spaces also contribute to a sense of place and belonging. We build memories and associate aspects of our lives to these natural spaces. There is even the simple idea of enjoying nature just because of aesthetic reasons, meaning the appreciation of its natural beauty. For as long as we have existed we have interacted and shaped nature while nature in turn has shaped us. These cultural services that ecosystems provide take all manner of shape in our lives.



Pollination, as done by bees, is a regulating service. Photo Credit: Kris Mikael Krister

Regulating Services

Regulating ecosystem services provide many of the services that make our lives possible or as the NWF defines it, “a regulating service is the benefit provided by ecosystem processes that moderate natural phenomena”. Examples of regulating services include climate regulation, carbon storage, wastewater treatment, erosion prevention and soil fertility, pollination, and biological control. Carbon storment, invasion of non-native plants, and pesticides. Furthermore, the Least Bell’s Vireo’s decline is exacerbated by the increased human activity surrounding riparian habitat. They are sensitive to human presence, noise, and nighttime light, and, if present, will cause them to abandon the area. These birds depend on mid-successional riparian habitat for breeding, but with most of it lost, their populations and success as a species has dwindled. The remaining habitat is also severely fragmented, leaving only small, vulnerable subpopulations. Habitat fragmentation is defined as “the process during which a large expanse of habitat is transformed into a number of smaller patches of smaller total area isolated from each other by a matrix of habitats unlike the original”(Fahrig, 2003). Fragmented habitat, especially those with no buffer between riparian and urban areas, can make the Least Bell’s Vireo more susceptible to predation by feral cats and the Argentine ant (Linepithema *humile*). Argentine ants are a non-native, invasive ant species whose spread is believed to be elevated by urbanization (Suarez et al. 1998). These ants have been observed to be a predator of vireo nests where they co-occur. The Argentine ants will gradually build in numbers in the nest and attack by biting nestlings as they hatch.

A Least Bell’s Vireo and hatchlings. Photo Credit: Anthony Mercieca from Science Source

Another serious threat the Least Bell’s Vireo has faced is brood parasitism by Brown-headed Cowbirds (*Molothrus ater*). Brown-headed Cowbirds are implicated in the decline of Least Bell’s Vireo populations because of their reproductive strategy. Female Brown-headed cowbirds will lay their eggs in the nests of other birds such as the Least Bell’s Vireo and let the vireo mother bird do all of the chick-rearing. This strategy is used by Brown-headed Cowbirds so they can save energy from building a nest and having to care for their own young. The cowbird will wait for the Least Bell’s Vireo to leave her nest and then will usually damage or remove one or more eggs and replace it with their own. When Brown-headed Cowbird eggs are laid in the Least Bell’s Vireo nests this leads to either the Least Bell’s Vireo abandoning the nest or the Brown-headed Cowbird hatchling indirectly killing the Least Bell’s Vireo chicks by starving them out. The Brown-headed Cowbird hatches earlier than the other eggs, is bigger in size, cries louder for food, and is able to raise its head higher so it gets more of the food from the vireo mother. Brown-headed Cowbirds are native to North America but have been in California for only 76 years. Since they are a newly introduced species, the Least Bell’s Vireos have not evolved a defense mechanism against them.

Action was taken to save the Least Bell’s Vireo from possible extinction in 1986 when it was federally listed as endangered under the Endangered Species Act (ESA). Under the Endangered Species Act, the Least

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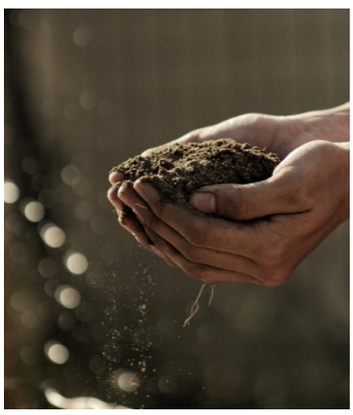
age is incredibly important, especially as we move forward with climate change. The planet is naturally able to absorb a large amount of carbon out of the air as part of its natural cycles. According to NASA's Earth Observatory, the ocean and plants have taken in about 55 percent of the excess carbon we have released. While normally the ocean has a way to cycle and balance the amount of absorption, it is now taking in too much, increasing its acidity. Pollination is another incredibly important regulating service, as without pollination a large majority of our plants would no longer exist along with the species, including us, that depend upon them for the food and regulating services they provide. The U.S. Forest Service explains that 80% of the 1,400 crop plants we grow require pollination and that these crops are estimated to be worth $10 billion a year. Flowering plants provide us with oxygen and carbon removal, their root systems hold the earth together preventing soil erosion and protecting us from flooding, and according to the Pollinator Partnership, without pollinators we would not have 75%-95% of all the world's plants. Without the many different regulating services all our ecosystems provide, life as we know it would not be possible.



Healthy soil is a supporting service. Photo Credit: Gabriel Jimenez

Supporting Services

Now we come to perhaps the most important section of ecosystem services which are the supporting services. The Institute for Natural Resource Conservation defines supporting services as those necessary for the production or the maintenance of all other ecosystem services. Some examples include biomass production, production of atmospheric oxygen, soil formation and retention, nutrient cycling, water cycling, and provisioning of habitat. Supporting services are those that occur over an incredibly long period of time. For example, according to Jennifer Chu of MIT, oxygen did not start to fill the air until 2.3 billion years ago. Plants, fish, and animals, as we know them, did not even exist until 500 million years ago. Without all that time to develop all the diversity of plants and animals we wouldn't have had anything to eat as our species evolved and survived through the ages. The formation of healthy and rich soil that we have depended upon for thousands of years to grow our food takes an incredibly long time to form. According to Farm Progress it takes anywhere from 100-400 years to create just one inch of topsoil. Without all of these long term processes, there would be no air to breathe, no plants or animals for food and all the unique forms of life, including

Bell's Vireo was designated critical habitat which encompasses a total of 38,000 acres that stretches from Santa Barbara to San Diego county. According to the US Fish and Wildlife Service (USFWS), critical habitat is "specific geographic areas that contain features essential to the conservation of an endangered or threatened species and that may require special management and protection. Critical habitat may also include areas that are not currently occupied by the species but will be needed for its recovery." As a result of this designation, federal agencies and activities that involve a federal permit, license, or funding are prohibited from destroying or adversely modifying the critical habitat. Private landowners are not affected by this designation. According to the 1998 Draft Recovery Plan for the Least Bell's Vireo, a population total of 4,200 pairs would be needed for delisting. The US Fish and Wildlife Service's last review of the Least Bell's Vireo in 2005 shows there's an increase in the population and estimates that there are 2,500 breeding pairs in the wild. Under the ESA, Recovery Plans are made to outline measurable steps that need to be taken to delist a species. Along with providing the Least Bell's Vireo critical habitat, one main measure mentioned in the Draft Recovery Plan is the reduction of Brown-headed Cowbird brood parasitism. Funded by mitigation requirements of the ESA, monitoring, trapping, and euthanasia of Brown-headed Cowbirds are often employed. Other measures include habitat creation, restoration, monitoring, research, and a river enhancement and management plan for the Santa Clara River.

In the face of challenges the Least Bell's Vireo has encountered within the last century, efforts to restore their habitat and bring them back look promising. In 2005, a pair of Least Bell's Vireo nested in a restored part of the San Joaquin National Wildlife Area, nearly 60 years after they had last been seen in San Joaquin County. At the Otay Delta restoration site located in San Diego county, it only took three years after the initial planting of riparian vegetation for the Least Bell's Vireo to reappear. Furthermore, in 2017 Point Blue Conservation Science released a study concluding that restored habitat leads to increased bird abundance and species richness, which will continue to increase over time as the restored site matures and grows.

OC Habitat's restoration team making room for riparian habitat in Upper Newport Bay.

OC Habitats (OCH) is dedicated to restoring local habitats across the county, including our threatened riparian habitats. Currently, the OCH restoration team is working at the Upper Newport Bay with Project Grow in several riparian locations by removing a variety of species including invasive species, and installing and monitoring native riparian vegetation that will help support the return of the Least Bell's Vireo. Assistance in the conservation of this species is needed from people of all backgrounds. One way you can help with efforts to bring back the Least Bell's Vireo is by looking into the volunteer and internship opportunities that OCH offers. Information about how to get involved can be found on the OC Habitats website.

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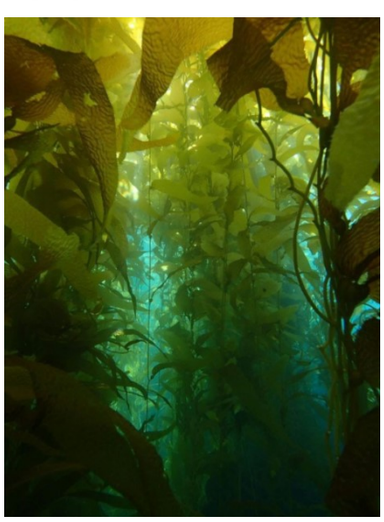
us, on our planet could not exist.

While we go about our lives it can be easy for us to discount nature, especially so on an economic scale. There are many corporations, people, and politicians that follow an anthropocentric view on life and the world. Anthropocentrism, according to Britannica, is the idea that human beings are the central and most important part of the world. Those with this view regard humans as being separate and superior to nature. Anthropocentrism believes that humans are the only things with intrinsic value and plants, animals, resources, and nature itself are to be exploited for our profit. Those that follow this philosophical line of thinking take for granted just how much intrinsic value and importance that our natural ecosystems have. You can see these views reflected in companies' drive for profit at all cost, or in the policies politicians create and the protections they remove. Yet the very lives we live, everything we have created, everything we have accomplished, and every breath we take can be traced back to nature in some way. This is why it is important we do our best to preserve and protect our ecosystems. In doing so we do not just protect nature but we also protect and enrich ourselves. There are many ways we can help: lowering our plastic consumption, changing our lifestyle habits, or volunteering our time for a worthy cause. Here at OC Habitats we have ample resources for ways you can make those changes and opportunities to get involved through our restoration events.

Next time you find yourself taking a deep breath, enjoying a good meal, or are exploring nature, just remind yourself how it all came to be.

Kelp Aquaculture in Orange County

By Kyle Fructuoso



Kelp Forest. Photo Credit: Nancy Caruso

Seaweed could be the next super food the world needs to cultivate. All species of seaweeds are not plants – they are types of algae called macroalgae. In fact, the only similarity between seaweed and land plants is the usage of photosynthesis to convert sunlight into energy. There have been about 12,000 species of seaweed described to date. At a glance, seaweed is globally responsible for providing an abundance of food, producing about

Volunteer of the Months

April 2021

Kyle Fructuoso volunteered with OCH in the Fall and was more than ready to get his hands dirty with our restoration programs at Upper Newport Bay and Huntington Beach Wetlands Conservancy. He came to every restoration and learned protocols, habitats, and species quickly while also showing qualities of leadership early on. Starting in the new year, Kyle started an internship with us and moved into a leadership role in our restoration programs by helping to advise, teach, and organize our team to be as productive as possible with the limited number of people and hours we were allowed to be on site due to pandemic conditions. He has been working on a variety of projects and programs as well as becoming a trained monitor for our coastal dune monitoring program. Kyle has a quiet confidence and leads by example through his hard work, sense of style for our projects and marketing, and his attention to detail in all of the projects he works on. Kyle is a graduate of UC Riverside with his degree in Environmental Science. Kyle is passionate about wild animals and marine life and hopes to someday work with or for the California Department of Fish and Wildlife. Kyle recently acquired a Scientific Aid position with the Santa Ana Regional Water Quality Control Board and is already being given more responsibility at his position there. Despite his schedule becoming increasingly busy with his new job and responsibilities he has continued on with his work for OCH and proved himself to be quite an asset to our team. We feel fortunate to have Kyle on our team and thankful for the skills and positive attitude he brings. We see great things in Kyle and know that he will make a big impact wherever he is.

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70% of the world's oxygen, and capturing extensive amounts of the world's carbon emissions. Amongst all the various species of seaweed, the beneficial uses seem almost endless. To name a few, uses of seaweed range from human consumption, medicine, skin care, and plant fertilizer or animal feed to biodegradable plastic substitutes, carbon sequesters, and even possible biofuels. The practice of cultivating and harvesting seaweed has been dated back 12,000 years ago and still continues to gain additional traction as various forms of seaweed aquaculture have become popularized around the world. Seaweed aquaculture is still in the beginning stages in the United States as the industry looks to prove it's worth past the possible impacts and consequences. The main concerns of seaweed aquaculture in the United States are stringent regulations, benthic productivity impacts, the feasibility of operating offshore, and the stigma of eating and working with seaweed. When we dive deeper into the beneficial uses of seaweed, one could see that all the numerous pros of seaweed aquaculture greatly outweigh the cons. Through seaweed aquaculture, the problems of climate change, environmental sustainability, and food shortages are all addressed in a beneficial way.

Common varieties of harvested seaweed species in the United States are dulse, kombu, and bladderwrack. However, most farmed seaweed is usually some form of kelp. Kelp farming is done using a mooring that hangs thick ropes with strings of kelp seedlings perpendicularly attached below the surface of the water. The crops require almost no maintenance during the normal six-month time frame that the kelp takes to mature. The various species of kelp are incredibly fast-growing and can grow up to two feet per day under ideal conditions.

Kelp Aquaculture. Photo Credit: FoodFarmNews

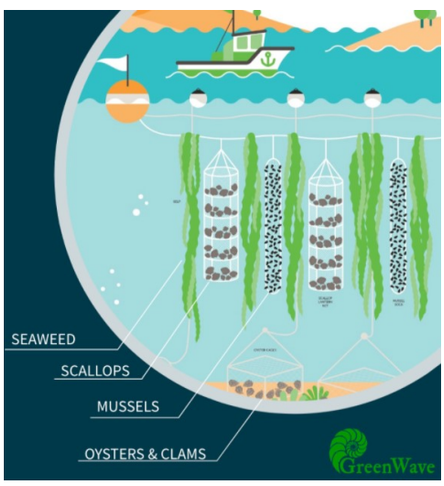
In fact, the kelp produced provide ecological and environmental benefits of sustainability, excess carbon absorption, battling ocean acidification, filtration, as well as providing important habitat for many marine species in California. The produced kelp is harvested in a sustainable way. By cutting at the base of the blades rather than the stipe or air bladders, the kelp will be able to regrow the blades back relatively quickly. Farming this way greatly reduces the amount of waste from one harvest to the next as well as allows the farmed, re-

May 2021

Melissa King came to OCH in August of 2020 seeking to gain experience in an environmentally focused nonprofit. She is currently a practicing lawyer for Katie Law Group and is working towards being an environmental lawyer. As a new volunteer, Melissa became one of our more active volunteers right out of the gates: learning how to become a habitat monitor on the coastal dunes, working at our restoration project at Huntington Beach Wetlands Conservancy, and helping with our inland and MPA hike program. In addition, she has mentored some of our interns in researching environmental policy and law as they were preparing for their projects and programs with OCH. She is an intelligent woman with a real passion for the environment. As she has mastered the various skills of monitoring, she has become one of our newest trainers; taking the initiative to send invitations out to our team to get others trained. She has a real interest in our hiking programs and has already led and swept many of our MPA hikes and worked with our interns on our newest inland hiking programs. Her enthusiasm for the environment and the work we do at OCH is inspirational to all on our team. We feel very fortunate to have her with us and acting as a guiding light as to what it means to be a true advocate for the environment.

Jackie Tran began her internship with us through UCI in October 2020. She has proven herself to be quite an asset to our team, working on various projects including the Western Snowy Plover research, our education programs, grant research and writing, our Volunteer Spotlight project, and writing articles for our blog. Jackie is a diligent and detail-oriented person, student, and intern who is currently juggling her undergraduate studies, her part-time work, and her OCH internship weekly and impressing every group. She picks up new skills easily and makes quick work of her assignments and has excellent communication skills to express her ideas and input with the team. Her uplifting personality seems to see the bright side of the world and she is willing to learn from others and grow. Her SNPL project has included incredible amounts of research from literature reviews to interviews with government agency contacts and is turning into a

generating kelp forest to continuously be used as habitat, shelter, or nursery by the various species of marine animals in the ecosystem. Contrary to most agriculture and aquaculture, kelp aquaculture specifically has nearly a non-existent “foodprint”. It doesn’t require any extra irrigation, feed, nor fertilizer. Additionally, the farmed seaweed can be used in livestock farming for animal feed. Animals feeding on the seaweed products have been proven to have lower emissions of carbon dioxide. Kelp aquaculture can also be modified to a regenerative ocean farming system to grow kelp alongside oysters, mussels, and clams to create a diversified, healthy ecosystem whilst developing a sustainable yield.



Regenerative Aquaculture.
Photo Credit: GreenWave

The environmental and agricultural potential that seaweed has makes the algae farming industry extremely valuable. The worldwide market for seaweed cultivation is estimated to be worth $16.7 billion in 2020 with projections of nearly doubling within the next 5 years. Over the last few years, seaweed aquaculture has continuously expanded from the temperate coastlines of China, Japan, and Korea to along the coast of California. Although California is still a small player in the overall market, farms like the Catalina Sea Ranch, Hog Island Oyster Farm, and Salt Point Seaweed have garnered a lot of public and governmental interest. The U.S. Department of Energy granted Catalina Sea Ranch over $450,000 to kick off the first U.S. aquaculture farm permitted in federal waters around 6 miles from the coast of Huntington Beach. Catalina Sea Ranch has used their awarded money to fund additional research to enhance their aquaculture’s synergy and husbandry of kelp and other offshore aquaculture to create a new sustainable industry within California.

Unfortunately, the kelp aquaculture industry in California is still in its infancy stage. The hurdles to establish and maintain seaweed aquaculture haven’t yet been addressed. Catalina Sea Ranch fell short on their end due to bearing the weight of the industry’s growing pains, newfound regulatory agency demands, as well as a $10-million accidental wrongful-death lawsuit. Sadly, they failed to meet regulatory compliance with the California Coastal Commission and the U.S. Army Corps of Engineers permit requirements and even ignored enforcement letters. Catalina Sea Ranch painted themselves an erroneous picture of seaweed aquaculture conveying shortcuts and misuse of equipment – like using old well written research study that OCH will be able to share with the team and the world in the coming months. As part of this process, she also worked with Ross and Stacey to complete an application for a Listed Species permit that will benefit our organization in how we can work with the Western Snowy Plover and how we can interact with the various agencies that work to protect them. She shines when it comes to public speaking and teamwork and has an amazing way of engaging with others, making them feel comfortable, and lifting them up with her affirmations. As she nears graduation in June 2021, she has secured herself a position at a firm here in Orange County, which may allow OCH to keep her in some capacity after her internship.

June 2021

Kevin Bartelheim is currently an undergraduate student at Cal State Long Beach majoring in geography and minoring in environmental science and policy. He has been an intern with us at OCH since January and has proven himself to be a wonderful asset to our organization. Kevin dove in head first by taking part in all aspects of our work and has proven himself to be a strong team player. He is adaptive and intelligent so he quickly became a coastal dune habitat monitor. He also quickly got trained to lead some of our MPA hikes while he has been working on expanding our guided hike program (see up-coming events!) to teach people about indigenous uses of native plants and the overall value of nature. Kevin is extremely hard-working and reliable, so he will be transitioning into a leadership role with our restoration programs for the remainder of his internship. He is also helping us develop education programs for the Girl Scouts of OC and has put his strong communication skills to use with writing articles for our blog. If you have had the chance to work with Kevin you know what a positive spirit he is to be around. He has an undeniable passion for the environment, a remarkable work ethic, and has been a wonderful asset to our organization.

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tractor batteries to weigh down lines – rather than proper and well-maintained equipment per regulations. Despite all of this, Catalina Sea Ranch still provided a blueprint to what could be a booming, environmentally friendly industry in the future.

Edible Seaweed Foraging. Photo Credit: Michael Macor

As technology continues to progress, the feasibility of seaweed aquaculture will become more and more realistic on a large scale. Luckily, the idea of future seaweed aquaculture is still being pursued by California regulatory agencies and eventually may be able to supply California and the United States' demand for seaweed instead of importing more than 90% of the seaweed consumed in the United States. If you're a California resident and love seaweed, make sure to check out the California Department of Fish and Wildlife rules and regulations for recreational seaweed harvesting. Popular edible seaweed species of Wakame, kombu, and bladderwrack are found throughout California's coast; however, no harvesting is allowed in State marine reserves or protected areas. You can also help promote the seaweed aquaculture industry by buying local seaweed products from coastal restaurants and stores that provide them. Lastly, spreading the word of all of seaweed's beneficial uses both for consumption and the environment may greatly influence the general acceptability and demand for more seaweed aquaculture along California's coast.

The Future of Renewable Energy

By Gina Thompson

As constant pollution and the looming effects of climate change make it increasingly urgent to phase out fossil fuels, we are turning to renewable energy to replace our current sources. As of 2019, 17% of U.S. power generation comes from renewable energy, a combination of various types including wind, hydroelectricity, solar, and geothermal. Now that plans are being made to invest in and increase usage of renewable energy, many people ask which source is the best. Which is the cheapest, the most efficient, the most environmentally friendly? However, there is not a clear answer to this question, as each renewable has its own unique pros and cons and may be better in some

INTERNS

During the spring and early summer, we welcome several new interns to our team: Sanjay Das, Crystal Ryan, and James Tran. Interns that have wrapped up their internship are: Josh Ball, Kyle Fructuoso, Michelle Picca, Jackie Tran, and Jonathan Vazquez. Thank you for all of your hard work!

OCH READS ENVIRONMENTAL BOOK CLUB

OC Habitats has decided to discontinue the book club meetings due to scheduling conflicts.

GRANTS

OC Habitats have been selected for the LUSH Grant and the CA Relief Grant Program.

OCH COFFEE & CONVERSATION (C&C)

OC Habitats began hosting monthly live streams on Google Meet or Zoom during the pandemic in an effort to connect and engage with the public. These events are typically hosted Saturday morning where we go over many different topics regarding our organization, environmentalism, and sustainability. Check out our previous live streams and join our email list to know when the next live stream is scheduled!

HIKING PROGRAM

OCH is currently doing a monthly 2.5-mile MPA hike along Little Corona del Mar beach to learn about the habitat and the different species living therein. However, the MPA hikes will be discontinued for the summer due to low tides not being low enough. We are hoping to substitute our MPA hikes with tide pools exploration, which are open to all ages -- so stay tuned for updates! Recently, we have expanded our hiking program to include a 2-mile nature hike along the Santiago Oaks Regional Park Trail where you'll learn about the various species living and the history of the area. If you're interested in joining us on our hikes, space is limited, so register through EventBrite!

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areas than others.

Wind farm in a desert valley. Photo Credit: Steven Miller/Flickr

Wind

Wind power has many advantages. Not only does it produce energy without any emissions, it is also one of the cheapest forms of energy to choose from. This is because of the lack of highly expensive materials, the little maintenance needed on turbines once they are built, as well as their long lifespan of several decades. Additionally, while a single turbine is very tall, it does not take up much ground space. Sadly, everything comes with drawbacks: for wind energy one of those is an impact on local wildlife. Wind farms take or alter habitat and cause bird and bat mortality. However, according to the Department of Energy, estimated annual bird mortality rates associated with wind turbines are ten times less than those with communications and other towers, one thousand times less than with power lines, and one thousand to ten thousand times less than with buildings. An additional downside is that wind farms are often far from big cities that require the most power, resulting in long transmission lines to transport the power produced. Among the drawbacks, wind turbines cause aesthetic and noise pollution, as they are often built in beautiful rural locations and can disturb humans and wildlife with their ever rotating blades.

Hydroelectric Dam. Photo Credit: Kristin Manke & Richard May/Flickr

Hydroelectricity

While hydroelectric dams are expensive to build and emissions are produced during this process, once built this cost and pollution is offset by their long life-span of clean energy production. They also provide flood control and water for consumption or irrigation. Hydroelectricity is also highly flexible, as energy production can be quickly started and stopped, making hydroelectricity capable of responding to fluctuations in energy consumption. It is also dependable, as it produces consistent levels of

CONTINUATION OF RESTORATION

With summer coming up, OCH is changing our restoration schedule. At the Huntington Beach Wetlands Conservancy, we will be maintaining our public one event a month on every 3rd Saturday of the month. At the Upper Newport Back Bay, we will be transitioning to two Saturdays a month with a monthly monitoring on a Wednesday. OCH is looking for committed restoration volunteers, especially for the Upper Newport Bay location. Interested? Contact OCH@ochabitats.org.

Upcoming Events & Opportunities

July 2021

- July 4th: Independence Day
- July 17th, 9–12 PM: HBWC Restoration*
- July 18th, 8–11 AM: Dripping Cave Nature Hike
- July 17th–25th: Latino Conservation Week
- July 25th, 10–11 AM: C&C–Environmental Justice

August 2021

- August 7th, 10–11 AM: C&C–Water Usage (Depletion)
- August 21st, 9 –12 PM: HBWC Restoration
- Nature Hike: TBD*

September 2021

- September 1st: Protect & Preserve Giving Day
- September 6th: Labor Day
- September 18th, 9–12 PM: HBWC Restoration
- September 19th: Coastal Clean-Up Day
- C&C: TBD*
- Nature Hike: TBD*

*Please check our website or your email for updated event information.

For new and upcoming events, join our mailing list.

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energy unlike other renewable sources that are intermittent (such as wind or solar). However, dams and reservoirs take up a large amount of space. They contribute to habitat loss or modification, notably for migrating fish, and can displace communities that live near the river being dammed. The physical characteristics of the water near them is also affected from changes in temperature patterns to excessive sediment deposition. Due to these negative aspects of dams, many have been removed to restore the river and surrounding area to their natural state. Over 1,700 dams have been removed in the U.S., most occurring after 1990, when dam removal began increasing greatly.

Geothermal. Photo Credit: Asgeir Eggertsson / Wikimedia Commons

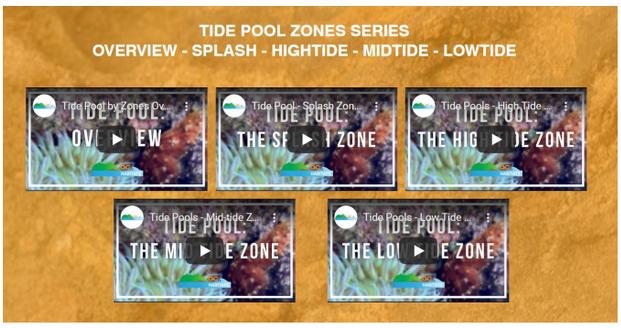
Geothermal

Geothermal power involves harnessing natural heat from below the surface of the earth that is found in reservoirs of hot water and steam. One considerable advantage of this energy source is its consistency. Geothermal power plants can produce the same amount of energy at any time of day or year, meaning power output can be accurately predicted. Other renewables like solar and wind do not have this luxury. Geothermal also has a small land footprint, using less land per GWh of energy than many energy sources including coal, wind, and solar. Despite these advantages, producing geothermal energy has several disadvantages. Power plants can only be built at locations that have underground reservoirs of hot water or steam which mostly occur in volcanically and tectonically active regions. Additionally, the drilling process used to access the geothermal reservoirs can cause surface instability which leads to a risk of earthquakes. Although it is clean compared to fossil fuels, there are small levels of emissions associated with certain geothermal power plants, as they release gases stored beneath the surface of the earth including greenhouse gases and hydrogen sulfide.

Solar

There is a lot of potential for solar energy as enough sunlight hits the planet each day to supply energy for the entire world for a year. Once solar farms are installed they have no emissions and require little maintenance. Another type of solar energy production, photovoltaic (PV) cells, can be installed on rooftops, which increases the value of a property, saves money on electricity bills, and lessens the environmental impact of the building. These PV cells are becoming increasingly popular for household energy, especially in southwestern

OCH HABITAT VIDEO SERIES



We have several habitat video series projects in the works that discusses the specific habitats and the species living therein. We are hoping for the publication of several of them by the end of 2021. There is also an in-depth look into the tide pool habitat that explores the successes and struggles that various tide pool animals experience in the microhabitats of each zonation. Keep your eyes open for a notification about these videos about our habitats of Orange County.

THE NATIVE HABITATS OF OARNGE COUNTY

ORANGE COUNTY HABITATS OVERVIEW

COASTAL DUNES

TIDE POOLS

RIPARIAN

OCH SPOTLIGHT INTERVIEWS 2021

We will be continuing to post spotlight interviews with our interns, volunteers, and staff. These interviews highlight the variety of backgrounds, cultures, and experiences from our volunteers, and we embrace them all. Check out our videos to see how the OCH culture is diverse and welcoming.

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A row of solar energy panels. Photo Credit: Brookhaven National Laboratory/Flikr

states, but hazardous materials are used in their production. Another impact of solar on the environment is habitat loss and modification since solar thermal plants require lots of space and the power must be transported to consumers. Other downsides include harm to migratory birds, water consumption, potential leaks of hazardous fluids, and the fact that output depends on good weather.

So, which renewable energy source is the best?

As you've seen from this article, it is difficult to choose one superior renewable resource, since they each have distinct pros and cons. Depending on what you are prioritizing, different sources will be better than others. Some are cheaper like wind, while some are more consistent and dependable like hydroelectric and geothermal. Some take up less habitat or do less harm to local wildlife and others consume a lower amount of water. Each performs best under different conditions, like solar in the southwest where it is sunny, and wind in the northeast where it is windy.

With all of this in mind, the best way to phase out fossil fuels is likely using a combination of the various renewable resources we have instead of choosing one. Using each where they are the most effective and utilizing their different advantages to complement the others. To learn more about these energy sources including descriptions of how they work, where they are used, and new developments in the industries, please watch our Happy Hour on renewable energy.

Join the OCH Crew!

OCH is looking for people who want to share their talents and time to improve their local environment and habitats. We have many opportunities to get involved, check them out below.

Volunteer:

- Become a Habitat Monitor
- Join our Habitat Education Team
- Help with Administrative Tasks
- Help with Outreach and Marketing
- Become a Tide Pool Docent
- Work on OCH's Social Media Outreach
- Help with ongoing Restoration Projects
- Work with our Grant Writing Team to secure funding for our organization, programs, and projects.

Internships:

- College Level Students earn credit through CSUF and UCI
- Gain experience in the conservation field, a grassroots nonprofit, business administration, public speaking, education, and more.
- Become a film or art intern for OCH.

We look forward to hearing from you!

Join Our Crew

Volunteers of the Year

2017	2018	2019	2020
			
Tom Ghee	Bianca Borja	Crystal Ryan & Trevor Stocking	Ross Griswold