

Life Finds a Way:
California Department of
Fish and Wildlife, 2023

CDFW



MUNUC 36

Model United Nations at the University of Chicago

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CHAIR LETTER

Dear Delegates,

Welcome to MUNUC 36! I am beyond excited to explore the richly diverse world of the California Department of Fish and Wildlife with you this February. It is an incredibly complex and multi-dimensional area of contemporary policy discourse and I am looking forward to a weekend of lively debate and creative crisis arcs.

And now for the obligatory icebreakers: my name is Anna Guzman and I am a fourth year student studying Public Policy and Law, Letters, and Society. Last year, I served as Under Secretary General for ChoMUN XXVI and CD'd the Iceland Constitutional Convention at MUNUC 35. Engaging with the MUNiverse has been one of the highlights of college for me, and I am so excited to return as Chief Administrative Officer for ChoMUN XXVII this year.

I grew up in Sacramento, CA, meaning that these past three winters have been my first foray into the unique experience that is Chicago weather. Growing up in such a beautiful and complex state, I spent many summers exploring the California wilderness by hiking (read: getting very lost), camping and mountain biking across the state. In many ways, this committee is really a love letter to my home state and the diverse environment and ecosystem that I got to grow up around.

When I am not amusing my friends with my enchantment (and rapid disillusionment) with the snow, I can be found taste-testing copious amounts of tea around Chicago, fueling my obsessing with the Supreme Court with a steady diet of podcasts, and getting into “friendly” public policy arguments with my classmates.

I am looking forward to delivering a unique and engaging crisis experience over the course of the weekend. Exploring the California Department of Fish and Wildlife presents a novel opportunity to engage in the global dialogue surrounding conservation, environmental policy and politics, and ecological governance. Of course, there are certainly many political, economic, and social factors that threaten, shape, and ultimately define this particular moment in the California environmental politics arena - we are looking forward to exploring the tensions between the California fishing industry and the threat of species extinction, debating proper management of public health crises from rising diseases in animal populations, and working together to understand the motivations of eco-activists regarding endangered animals. We are also looking forward to seeing how you approach political and bioethical debates regarding cloning, de-extinction and the utilization of biotechnology in ecological preservation - this is truly cutting edge technology and we are so excited to see

how you choose to wield it! Given the substantial powers and responsibilities of the CDFW to inform the future of conservation science across the state (and, let's be honest, the country) we are excited to see how you choose to shape this emerging world.

While it surely goes without saying, we recognize that we may encounter some sensitive topics throughout our exploration of the CDFW, and we fully expect these topics to be treated with the respect that they are owed. With that being said, we anticipate a productive and engaging weekend of first-class debate!

In closing, I am very excited to get to see you all at MUNUC 36 come February!

Don't forget to recycle!

Anna Guzman

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CRISIS DIRECTOR LETTER

Dear Delegates,

Welcome to MUNUC 36! My name is Virginia Wright and I am a third-year majoring in Political Science and minoring in Spanish at UChicago. Outside of MUNUC, I serve as the Chief Design Officer for ChoMUN 27, UChicago's collegiate Model UN conference, and I also compete on the collegiate MUN circuit through UChicago's Team. So, if you can't tell already, I'm very excited to be serving as your crisis director for *Life Finds A Way: California Department of Fish and Wildlife, 2023*.

To give you all a bit more background on me, I am from a very rural area of Kansas and went to school in a tiny town called Pomona. I play the flute in the University Wind Ensemble and love to play some jazz on my alto saxophone. For my MUN history, I was the assistant chair for ChoMUN 25's *To Melt or Merge: Ben and Jerry's*, 2000 and the EAC for last year's JCC: *Wasted in the Windy City*. I also served as the Chair of MUNUC 35's ECOFIN last year. In my free time outside of school and MUN, you can usually find me dancing to *Barns Courtney* in my bedroom, cooking some super random recipe that I'm sure my roommates would hate, or exploring one of Chicago's 77 neighborhoods (or more specifically, its coffee shops).

As you look towards preparing for MUNUC 36, we first and foremost want to wish you good luck in the competition but would like to remind you to have fun! This topic can be more complex than you would initially think and we are looking forward to reading and hearing your interesting, unique, and comprehensive solutions to the different problems, issues, and situations we may throw at you throughout the weekend. With regard to backroom expectations, we expect complete and creative notes and arcs centered around the main themes of the committee. That said, we are not looking to shoot down any ideas that you may come up with if you can deliver a detailed plan that will get you to whatever end goal you may have in mind. And, as a personal preference, I would like to point out that I love creative, funny, and interesting breaks so feel free to plan your arcs geared towards that.

Though this committee promises to be exciting and this weekend (hopefully) a fun time, I would like to bring your attention to some sensitivities of this committee. Though some of the issues that we bring up to you might be primarily lab-based or feel unrealistic, we still ask you to be respectful. Absolutely no sexism, racism, or any behavior of that sort will be tolerated and disciplinary actions will be taken as needed. We also ask that you keep the safety of all animals in mind as you plan all of your front and back room solutions for the entirety of the weekend.

With that being said, Anna and I are so incredibly excited to meet all of you and see all of the amazing, creative arcs and directives that you come up with. Please feel free to reach out with any questions or concerns and we look forward to an incredible MUNUC 36!

Best,

Virginia Wright

Crisis Director, *Life Finds A Way: California Department of Fish and Wildlife, 2023*

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COMMITTEE STRUCTURE AND MECHANICS

This committee functions as through a continuous crisis structure, which entails constant directive and update rounds throughout the duration of conference. With a more fast-paced and dynamic structure than our traditional counterparts, we anticipate that committee will run quickly and cover a significant amount of ground over the course of the weekend. With that being said, we understand that the dynamics of a crisis committee can take a bit of getting used to - please feel free to ask questions at any time. As your dais, we are here to act as your guides throughout the duration of the weekend and answer any questions that may arise. Additionally, if you want to clarify any questions before committee actually starts, feel free to reach out to us by email at annajuzman@uchicago.edu and wrightv@uchicago.edu.

The mechanics of the crisis committee itself will allow delegates to step into the roles of the staff

members, political advisors, and elected bureaucrats who make the day-to-day decisions at CDFW. Delegates will assume the roles, bios, and portfolio powers of the diverse group of individuals who make the critical policy, economic and political decisions at the department in order to navigate dynamic crises arising across the state. Successfully defining environmental policy for the state will require political finesse, economic prowess, and a sharp keen understanding of the complex intricacies interweaving the several stakeholders engaged in these debates. Delegates will be asked to tackle these social and political challenges both collectively- in the form of short directives passed in response to crisis breaks- as well as individually - through delegate arcs in backroom notes. For more information about crisis mechanics, check out the MUNUC Delegate Training Materials on the website, munuc.org.



Statement of the Problem

Sturgeon And Paddlefish Extinction

Sturgeon and paddlefish are freshwater fish that have existed for millions of years, but now face extinction due to illegal trade. The International Union for Conservation of Nature (IUCN) released the first comprehensive assessment of sturgeon and paddlefish species in over 13 years, confirming that all 26 species currently remaining are threatened with extinction. In this assessment, almost two-thirds of sturgeon and paddlefish species are classified as critically endangered on the IUCN Red List of Threatened Species (“Sturgeon Fishing Regulations – Is It Too Late to Close the Barn Door When the Horse Is Gone? | Western Outdoor News” 2022). This means that sturgeon and paddlefish species are among the world’s most threatened species. The Chinese paddlefish, Yangtze sturgeon, and Danube ship sturgeon were all listed as officially extinct under the new classification.

Currently, the five U.S. Atlantic sturgeon population segments are either categorized as endangered or threatened under the US Endangered Species Act. These populations are primarily threatened by entanglement in fishing gear, habitat degradation, habitat impediments

(Eg, dams or other barriers) and vessel strikes. In fact, one recent study found that California’s

white sturgeon numbers have been declining every year by as much as 5% (“Sturgeon Fishing Regulations – Is It Too Late to Close the Barn Door When the Horse Is Gone? | Western Outdoor News” 2022).

The CDFW has currently sought to resolve this problem through a coordinated operation with the California Department of Water Resources (DWR), NOAA Fisheries, and Yolo County. Together, these groups work to operate the Fremont Weir Adult Fish Passage, where dozens of adult sturgeon and other large fish are able to navigate back to the Sacramento River and away from receding flood waters within the Yolo Bypass (“Fremont Weir Adult Fish Passage | BDO | Area Offices | California-Great Basin | Bureau of Reclamation” n.d.) . It is critical that operations such as this one are able to continue functioning because they provide opportunities for sturgeon to reach the Sacramento River to migrate upstream and spawn. Because sturgeon can only spawn every few years, if they do not migrate successfully, it would be very dangerous for the continued existence of the species.

While the passage is significantly more expensive to operate and maintain, the alternative option is that biologists rescue and trap sturgeon and other fish species in the Yolo Bypass by hand. However, this alternative is not preferred because stress from handling could prevent spawning and reduce the likelihood that fish continue their upstream migration after rescue. It is therefore critical that the CDFW continue to prioritize ways for fish to migrate on their own.

While some champion the infrastructural solutions for protecting sturgeon migrations, others argue that these policies fail to regulate the root cause of sturgeon endangerment - dangerous fishing practices. There has been a recent push to impose a temporary categorical catch and release policy for all sturgeons. This policy would be very unpopular for more than 46,000 sturgeon anglers across the state (“Scientists Propose Catch and Release for California Sturgeon | The Sacramento Bee” 2022).

When discussing this pressing debate, delegates should keep in mind the conflicting interests between the massive fishing population and sturgeon safety. How can policy both engage stakeholders and bring recreational and professional fishers to the table, while also prioritizing species conservation? Delegates should also keep in mind the limited capacity, both financially and in terms of resources; not every solution will be functionally feasible, so it will be important to prioritize both short and

long term solutions that can see material results for the future of the species.

Depredation

Depredation permits are one important way that CDFW can recognize the ecological benefits of certain animals and protect conservation efforts. Depredation policies dictate what landowners can legally do in response to damage. For certain animals, depredation permits are required for landowners to legally kill animals that cause damage (OAEC 2023). For example, up until a recent 2023 policy change, landowners could apply for a permit to kill a beaver, without a requirement for deterrence or co-existence. However, with the implementation of a new policy by CDFW, groundwork was laid for relocation and prioritization of non-lethal damage deterrence prior to lethal removal. CDFW has also recently revisited their depredation policies for other animals, such as bears and mountain lions, and may consider other animals in the future (Anna Miller, 2022).

This growing trend for updating depredation permits reflects motivations to recognize the ecological value of wildlife, including those that might cause damage, while also developing innovative approaches to balance the property interests of landowners. Delegates should consider updating depredation policies as a potential avenue to protect other endangered species; however, delegates should also consider

how updated policies will impact the economic property interests of landowners, and how engaged stakeholders will respond to any potential policy changes.

Water Management



Volunteers help build wildlife water tank (Bureau of Land Management, 2015)

As climate change has increased the severity of drought and continued to test the limits of desert animal survival across the driest regions of California, the necessity of the artificial water catchments (AWCs or guzzlers) has become increasingly relevant, serving as a lifeline for struggling desert animals (Gavidor 2022).

However, wildlife-friendly water catchment systems are controversial - environmental advocates seeking to negotiate water rights on behalf of animals find the interests of these animals in tension with interests of water allocation and management (Gavidor 2022). Historically, the interests of the agriculture

industry have won out over protections for wildlife, especially when it comes to the construction and regulation of AWCs.

Though guzzlers don't inherently require water diversion, AWCs rely on rain, meaning that they require manual maintenance during droughts ("Hunters Work To Repair Old Guzzlers In California | Here & Now" n.d.). During especially dry stretches, these AWCs can provide the only reliable source of water for thousands of animals, such as tortoises, deer, bighorn sheep, mountain lions, coyotes, bobcats, foxes, ringtail, quail, bats, and birds that frequent these resources ("Upland Game Bird Management Account Projects" n.d.).

Because this infrastructure has increasingly required maintenance and manual refillment to function, they have come under scrutiny. Some opponents argue that wildlife intervention and manipulation contravenes wildlife principles - the maintenance associated with these sites includes heavy motorized intrusions. For example, maintenance requires helicopters for dropping water, vehicle use for access and maintenance, and heavy equipment use (Gavidor 2022). These same opponents argue that the inherent purpose of AWCs is to manipulate the environment to maintain

desired conditions at the expense of natural processes, and argue that AWCs artificially inflate wildlife populations. In addition, water drops are extremely expensive; a recent manual water drop cost over \$65,000 for just one water drop for one guzzler.

Other groups have argued that AWCs are dangerous to vulnerable desert species. During the transition away from the ranching era, CDFW proposed converting abandoned ranching infrastructure, particularly livestock wells, into AWCs that could function as watering systems for animals. However, this plan was met with a lawsuit that claimed that guzzlers were impacting the desert tortoise, which is listed as “threatened” under the Endangered Species Act. In the suit, the Center for Biological Diversity argues that tortoises have drowned after getting stuck in guzzlers, and guzzlers are also faulted for attracting ravens, a major predator of the tortoise (*Daily Press* 2005).

Thus, the maintenance and operation of AWCs is a complicated issue; many stakeholders have called for CDFW to develop an overarching plan detailing how agencies can implement a coordinated effort to protect water sources for wildlife. When

debating this issue, delegates should consider how AWCs may prioritize the health of larger wildlife at the expense of endangered species like the desert tortoise. Delegates should also balance the economic interests at play in this case and consider ways to reduce costs for AWC maintenance.

Wildlife Management - Managing Gray Wolf Packs



Grey Wolves, (Macdonald R, 2013)

Gray wolves were native to California, with historical records indicating the presence of wolves in the coastal range from San Diego to Sacramento from 1750 to 1850. There is additional indication within the historical records that wolves were present in Shasta County and in the Sierra Nevadas between 1850 to 1990.

This relative prominence of the gray wolf was dramatically changed by increased European settlement, which changed the landscape of

California, introducing missions, towns, ranchos, agricultural development, and roads (“Gray Wolf” n.d.). This encroachment on wolf habitat was combined with market hunters who actively decimated wolf populations and pursued an era of conflict with California wolf populations (“Gray Wolf” n.d.).

These trends reflect a larger mass wolf extermination campaign across the United States during the early 20th century. In line with these campaigns, the California state legislatures codified wolf bounty laws with the purpose of eradicating wolves and coyotes and protecting livestock. By the middle of the 1920s, wolves had entirely disappeared from California entirely.

These trends were reflected across the country - by the 1960s, wolves had only been sighted in northern Minnesota and Isle Royale in Michigan. Motivated to reverse these trends, conservationists Aldo Leopold and Adolph Murie began spreading awareness for wolf conservation, founded largely on the important ecological role played by wolves (“Wolves in California” n.d.). Thanks to these efforts, as well as the larger environmental movement sweeping across the nation in the 1960s and 1970s, the

gray wolf received protections under the federal Endangered Species Act.

Wolf populations began to increase rapidly in the mid-1990s due to the reintroduction of wolves into the northern Rockies and Yellowstone National Park in the mid 1990s. Scientists have become increasingly aware of the role of the wolf in restoring natural ecosystem dynamics as recovery has progressed.



Grey Wolf Crosses into California, (Blanchard, 2016)

As of 2022, there are three known packs of wolves in Northern California. These are the Lassen, Beckwourth and Whaleback packs. At present, wolves are protected under California’s Endangered Species Act in addition to their federal protection under the federal Endangered Species Act. It is illegal to intentionally kill or harm wolves in the state. Most recently, in July 2023, a new gray wolf pack was cited in Tulare County (“CDFW News | New Gray Wolf Pack Confirmed in

Tulare County” n.d.). This is currently the Golden State’s southernmost pack. Given the need to protect these new endangered wolves, and continue to provide opportunities for the newly integrated wolf population to thrive in California more generally, it will be important to continue to prioritize wolf conservation in California.

The presence of wolves in California has generated a great degree of public interest among major stakeholders representing substantial agricultural, environmental, and hunting interests. These stakeholders have called for CDFW to develop a multi-tiered implementation plan for wolf conservation and management. In 2016, CDFW initiated this project by securing a U.S. Fish and Wildlife Service (USFWS) Section 6 grant to fund the development of a gray wolf plan that could be implemented in the coming years to support the conservation and protection of gray wolves across the state. Since receiving the grant, CDFW has begun organizing major stakeholders and developed a plan for wolf conservation (“California Department of Fish and Wildlife Conservation Plan for Gray Wolves in California Part I” 2016).

The CDFW has created a list of the following priorities for the conservation of gray wolves:

1. Assessing and monitoring California’s wolf population
2. Assessing and addressing threats to wolf conservation
3. Protecting and managing habitats, manage wolf-livestock conflicts
4. Developing outreach with affected publics
5. Managing human-wolf interactions
6. Conducting surveys of the public to understand knowledge and perception on wolves
7. Managing conflicts between wolves and other listed species when possible
8. Coordinating with other agencies and individuals on wolf conservation

In addition to material solutions to protect wolf populations in California, CDFW is at the forefront of the debate regarding decisions to delist the gray wolf from categorization as an endangered species. This would remove the federal protections that the gray wolf currently enjoys under the Endangered Species Act. On November 3, 2020, the U.S. Fish and Wildlife Service published a final rule delisting the gray wolf everywhere it was listed in the lower-48

United States and Mexico, except for the Mexican wolf subspecies (85 FR 69778). The rule took effect in January 2021. This decision was met with extreme opposition by a number of environmental groups, who threatened litigation if the rule was not revoked. (“Are Gray Wolves Ready to Be Delisted as an Endangered Species?” 2021)

This conflict is well-precedented; since 1978, there have been various attempts to delist or downgrade the gray wolf from federal protection as an endangered species. Many of these delisting efforts have been initially approved by the FWS, these approvals have been historically followed by litigation, which has ultimately led to the delisting rules being completely vacated by the courts. One example of this pattern occurred in 2003 when the FWS issued a rule downgrading two of the subspecies of the gray wolf; however, this rule was rejected by two district courts. A similar pattern occurred in 2012 when the FWS issued another rule classifying and delisting sub-species of the gray wolf called the Western Great Lakes wolves. This rule was also vacated by a district court and confirmed by the D.C. Circuit, which acknowledged the right of the FWS to classify and de-list subspecies, but ultimately rejected

the rule because it did not fully address the impact of extraction on the population of wolves.

On February 10, 2022, that delisting rule was vacated by the U.S. District Court for the Northern District of California (U.S. Fish and Wildlife Service 2023). As a result, all gray wolves in the lower-48 United States outside of the Northern Rocky Mountain region continued to maintain protection under the Endangered Species Act. Multiple parties appealed the district court’s order to the U.S. Court of Appeals for the Ninth Circuit and engaged in court mediation, which reached a conclusion in January of 2023. At the end of mediation, the Circuit Mediator issued an order temporarily staying the appeals for administrative purposes. During the abeyance, the FWS is instructed to update the status review for the gray wolf through stakeholder engagement.

As a prominent state with wolf populations in the lower 48 states, CDFW will play a prominent role in these stakeholder engagement meetings and has the opportunity to take a position on this debate. In addition, the California Fish and Game Code section 2077 requires CDFW to “review species listed as an endangered

species or as a threatened species every five years to determine if the conditions that led to the original listing are still present.” (“California Department of Fish and Wildlife Conservation Plan for Gray Wolves in California Part I” 2016) Thus, CDFW will have to critically examine the policy implications of delisting the gray wolf, including the legal, political, and economic consequences of these decisions.

Wolf Livestock Compensation

Pilot

While gray wolf conservation raises important legal and political questions, there is also an important need to consider the impacts of wolf-livestock interactions, and how these dynamics affect the economic well-being of ranchers across the state. California’s 2021-22 state budget allocated \$3 million to fund a CDFW’s Wolf-Livestock Compensation Pilot Program. Through the program, ranchers are able to apply for value compensation for confirmed and probable livestock loss due to wolf attacks as well as funding for deploying non-lethal deterrents to reduce wolf presence near livestock. CDFW has allocated over \$750,000 in compensation to support these efforts (“California Is Spending Millions to Compensate Ranchers for Living Near Wolves | Ambrook Research” 2023).

Beyond direct impacts, CDFW also compensates ranches with indirect impacts, such as livestock production losses due to wolf-induced stress such as reduced calf weight gains or lower pregnancy rates.

This program is not permanently funded, and the pilot has been controversial. While some ranchers feel that the compromise properly compensates them for the direct and indirect impacts of wolf-livestock interactions, others feel that this expensive program solves a symptom of the problem rather than the root issue. Others have voiced concerns that the program is extremely expensive, given that it funds up to 100% of impacts, while other states offer less expensive funding that is split or prorated amongst all qualifying applicants (“California Is Spending Millions to Compensate Ranchers for Living Near Wolves | Ambrook Research” 2023).

Delegates should consider whether the CDFW should continue, modify, or discontinue the pilot. Delegates should also consider how to balance the interests of ranchers when creating policy for wolf conservation more broadly.

Emergency Management - Avian Botulism



Flock of Birds Perching, (PxFuel)

Beyond conservation for endangered and vulnerable animals across California, the CDFW is also being called to navigate emerging threats that result from environmental changes across the state. The threat of avian botulism is one example of these new emerging concerns. Due to stagnant and warming water conditions in Tulare Lake in California, the lake has undergone a recent resurgence. This occurred after becoming dried up due to damming and water diversion for agriculture. The lake reappeared this year after California was hit by an unusual degree of atmospheric rivers (“Avian Botulism Detected at California’s Resurgent Tulare Lake, Raising Concern for Migrating Birds” n.d.).

The last big avian botulism event in 1983 occurred at Tulare Lake and killed nearly 30,000 birds. Avian botulism, which is

caused by naturally occurring toxin-producing bacteria that enters the food chain, causes paralysis and death.

Millions of waterfowl, shorebirds and other species are expected to migrate to Tulare Lake. To respond to this problem, the Department of Fish and Wildlife has begun surveys of air, ground, and water (“Lake That Reappeared Is Killing Migrating Birds” 2023). However, in addition to substantive solutions that could seek to mitigate the root of the problem, the CDFW must also manage the public relations and communication components of their management solution in order to preserve the trust that the public holds in the department.

De-Extinction

With rapid innovations occurring in de-extinction technology, there are significant ethical debates surrounding companies pursuing research in de-extinction.

Proponents of de-extinction argue that the technology has the potential to rewild ecosystems, thereby helping to reverse climate change, combat invasive species, mitigate diseases, bring back degraded habitats, and restore biodiversity (Hysolli, Hadly, and Sivas 2023). However, opponents worry about the lack of resources and underdeveloped regulatory

framework that would not be able to properly provide guardrails to protect against unintended consequences (“De-Extinction Debate: Should We Bring Back the Woolly Mammoth?” n.d.).

Opponents argue that, in the zero-sum game of animal conservation, it is dangerous to divert time, resources, energy, and innovation away from tested material solutions for animal conservation. These critiques point to the success of conservation techniques already in place - such as media campaigns spreading awareness about species loss, the successful development of captive breeding and release programs, and species and habitat protection programs that have led to stabilization of populations of American alligators, bald eagles, gray wolves, and pandas (“De-Extinction Debate: Should We Bring Back the Woolly Mammoth?” n.d.). Diverting resources from these projects could come at the expense of the success of critically endangered animals who need immediate and significant attention to avoid extinction.

In addition, some opponents are concerned about the lack of regulatory framework to provide guardrails for de-extinction technology. To this point, the majority of federal and state law related to conservation are focused on present-day concerns (ie regulating the imports of invasive species or preventing trade of endangered animal parts), but do not provide legal structures for managing the introduction of genetically

engineered extinct species (Hysolli, Hadly, and Sivas 2023).

In addition, critics pose substantial legal and moral questions that will need to be addressed should de-extinction play a significant role in conservation efforts of the future. For example: how should new species be classified when they are reintroduced - would these species receive the legal protections of an “endangered” classification, thereby diverting resources from existing classified species? In addition, how should ownership and property rights be allocated - would biotechnology companies like Revive & Restore maintain property rights over the animals that they create? Similarly, how should land rights for reintroduction be negotiated, especially given the changing dynamics of legal ownership over historical land? What would the notice and comment and consent process look like for reintroduction, should it affect surrounding communities?

While CDFW is not responsible for answering all of these questions, should de-extinction technology begin to proliferate across the state, the department will be responsible for providing guidance and regulation over the consequences of this technology. Similarly, California is home to many biotechnology companies conducting this research, such as Revive & Restore and San Diego Zoo Wildlife Alliance Frozen Zoo. Thus, in many ways, CDFW will be the national guinea pig for

defining regulations and testing policies related to de-extinction.

History Of The Problem

The CDFW

The California Department of Fish and Wildlife (CDFW) traces its origins back to 1909 when the Board of Fish Commissioners was established to oversee the state's fish and game resources. This marked the beginning of wildlife management in California. In 1927, the department was reorganized and renamed as the Department of Natural Resources, which continued to regulate hunting, fishing, and conservation efforts. Subsequent reorganizations led to the creation of the Department of Fish and Game (DFG) in 1951, consolidating responsibilities related to wildlife, fisheries, and habitat management. In 2013, the agency underwent another name change, becoming the California Department of Fish and Wildlife (CDFW), reflecting its expanded role beyond traditional hunting and fishing regulation. Over the years, CDFW has focused on conserving and managing the diverse ecosystems of California, including wildlife habitats and fisheries. The department is dedicated to maintaining healthy and sustainable populations of fish, wildlife, and plants, as well as ensuring public access to recreational opportunities like hunting, fishing, and wildlife

watching. Through various conservation initiatives, research projects, and law enforcement efforts, CDFW continues to play a vital role in safeguarding California's natural resources for future generations.¹

Conservation And The CDFW's Mission

The California Department of Fish and Wildlife (CDFW) employs a range of techniques and strategies to carry out conservation efforts. The CDFW often engages in habitat restoration projects to enhance and rehabilitate natural environments that have been degraded or altered. This might involve planting native vegetation, removing invasive species, and restoring natural water flows to help recreate healthier ecosystems. The CDFW also conducts research and monitoring programs to study the distribution, abundance, and behavior of various wildlife species. This information helps inform management decisions and conservation strategies. For endangered or threatened species, the CDFW develops recovery plans. These plans outline actions and strategies to help these species recover and thrive, including habitat protection,

¹“California Department of Fish and Wildlife.” *Wikipedia*, June. [https://en.wikipedia.org/wiki/California_Department_of_Fish_and_Wildlife#:~:text=In%201909%2C%20the%20Board%20of,Fish%20and%20Game%20\(DFG\).](https://en.wikipedia.org/wiki/California_Department_of_Fish_and_Wildlife#:~:text=In%201909%2C%20the%20Board%20of,Fish%20and%20Game%20(DFG).)

captive breeding programs, and reintroduction efforts. Additionally, the CDFW enforces regulations related to hunting, fishing, and other activities that impact wildlife. By controlling the exploitation of wildlife and enforcing regulations, they contribute to species protection. Further, educating the public about the importance of conservation is a key aspect of CDFW's efforts. They conduct outreach events, workshops, and educational programs to raise awareness and promote responsible interactions with wildlife. When a species is critically endangered, the CDFW might establish captive breeding programs to increase its population depending on the severity of the situation. Once the population has grown, they can reintroduce these animals into the wild to bolster their numbers. Additionally, the CDFW often collaborates with other government agencies, non-profit organizations, research institutions, and local communities to pool resources and expertise for conservation efforts. CDFW takes a holistic approach to conservation by focusing on the management of entire ecosystems. By considering the interconnectedness of species, habitats, and environmental factors, they aim to achieve balanced and sustainable ecosystems.²



Map of California, (California Department of Fish and Wildlife, 2023)

Biodiversity And California's National Parks

The national parks of California form a mosaic of biodiversity, each park offering a distinct window into the state's ecological diversity. Yosemite National Park, with its towering granite cliffs and lush alpine meadows, supports a wide range of wildlife, from black bears and mule deer to rare species like the Sierra Nevada bighorn sheep. Sequoia and Kings Canyon National Parks, home to the world's largest trees, the giant sequoias, also shelter varied ecosystems ranging from high mountain meadows to rugged canyons, fostering habitats for species like the American black bear and mountain lion. In stark contrast, Joshua Tree National Park thrives in the desert's arid environment, where the peculiar Joshua trees stand as icons. The park's rocky terrain hosts

² "Conservation and Management of Wildlife and Habitat." n.d. <https://wildlife.ca.gov/Conservation>.

desert bighorn sheep, desert tortoises, and a diverse array of reptiles and insects uniquely adapted to the extreme conditions. Meanwhile, Death Valley National Park's arid landscape might seem inhospitable, yet it supports unique desert flora and fauna, including desert pupfish and sidewinder rattlesnakes, showcasing the resilience of life in extreme environments.

The oceanic majesty of Channel Islands National Park introduces a realm of marine biodiversity. The surrounding waters are teeming with marine life, including sea lions, dolphins, and diverse fish species, while the islands themselves provide refuge for native plants, seabird colonies, and rare island foxes. From the ancient coastal redwoods of Redwood National and State Parks, which tower above some of the world's tallest trees, to the steaming vents and boiling pools of Lassen Volcanic National Park, where extremophiles thrive, the range of environments across these parks highlights California's geological and ecological diversity. Pinnacles National Park, with its unique talus caves and rocky formations, shelters species such as California condors and bats, contributing to its unique biodiversity. The varied landscapes and ecosystems of these national parks exemplify California's exceptional natural diversity, making each park a treasure trove of unique species and habitats. Collectively, they underscore the importance of conservation efforts in preserving and protecting these

ecosystems for future generations to enjoy and learn from.³



Map of Trees in California³

Cloning: What Is It?

Domestic animals can be cloned using techniques including embryo splitting and nuclear transfer to produce genetically identical individuals. This means that the multicellular embryo can be divided into two, four, or eight parts at an early stage of development to generate "twins". This type of cloning occurs naturally and has also been performed in the laboratory with several animal species.⁴ Although embryo splitting is limited to

³ California, California State Parks State Of. n.d. "California State Parks." CA State Parks. <https://www.parks.ca.gov/>.

⁴Rahbaran, Mohaddeseh, Ehsan Razeghian, et al. 2021. "Cloning and Embryo Splitting in Mammals: Brief History, Methods, and Achievements." *Stem Cells International* 2021 (November): 1–11. <https://doi.org/10.1155/2021/2347506>.

the production of only a few identical individuals, the nuclear transfer of donor nuclei into recipient oocytes, whose own nuclear DNA has been removed, can result in large numbers of identical individuals. Nuclear transfer is where the DNA is removed from an oocyte (a specific kind of cell in an ovary), and injecting the nucleus which contains the DNA to be cloned.⁵

Moreover, clones can be produced using donor cells from sterile animals, but in reality, very few identical individuals are generally produced, and these clones are primarily used as breeding stock due to low efficiencies and the high costs of cloning domestic species. In addition to providing a means of rescuing and propagating valuable genetics, somatic cell nuclear transfer (SCNT) research has contributed knowledge that has led to the direct reprogramming of cells and a better understanding of epigenetic regulation during embryonic development.⁶ The SCNT technique is where the nucleus of a somatic (body) cell is transferred to the cytoplasm of an enucleated egg (an egg that has had its own nucleus removed). Once inside the egg, the somatic nucleus is reprogrammed by egg

cytoplasmic factors to become a zygote (fertilized egg) nucleus.⁷

Dolly The Sheep

Dolly the Sheep was the first mammal to be cloned from an adult somatic cell. She was born in 1996 at the Roslin Institute in Scotland. Dolly's creation involved a technique called somatic cell nuclear transfer, where the nucleus of an adult mammary gland cell was inserted into an enucleated egg cell. This egg cell was then stimulated to develop into an embryo, which was implanted into a surrogate mother. Dolly's birth marked a groundbreaking achievement in cloning technology. However, her creation raised concerns about the health and longevity of cloned animals, as Dolly developed arthritis and other age-related issues at an earlier stage than usual.⁸ These complications highlighted potential problems associated with cloning and raised ethical discussions about the implications of cloning for animals and humans.

⁵ "Nuclear Transfer." *Wikipedia*, May. https://en.wikipedia.org/wiki/Nuclear_transfer.

⁶ Keefer, Carol L. 2015. "Artificial Cloning of Domestic Animals." *Proceedings of the National Academy of Sciences of the United States of America* 112 (29): 8874–78. <https://doi.org/10.1073/pnas.1501718112>.

⁷ Stocum, David. 2009. "Somatic Cell Nuclear Transfer (SCNT) | Definition, Steps, Applications, & Facts." *Encyclopedia Britannica*. April 13, 2009. <https://www.britannica.com/science/somatic-cell-nuclear-transfer>.

⁸ "The Life of Dolly." n.d. Dolly the Sheep. <https://dolly.roslin.ed.ac.uk/facts/the-life-of-dolly/index.html>.



Dolly the Sheep⁸

Dolly was cloned through SCNT. Here's how the process worked step-by-step:

Isolation of Somatic Cell: A somatic cell, which is any cell in the body other than sperm or egg cells, was taken from the udder of an adult sheep.

Enucleation of Egg Cell: An egg cell (oocyte) was collected from a female sheep and its nucleus (genetic material) was removed, leaving behind an enucleated egg cell.

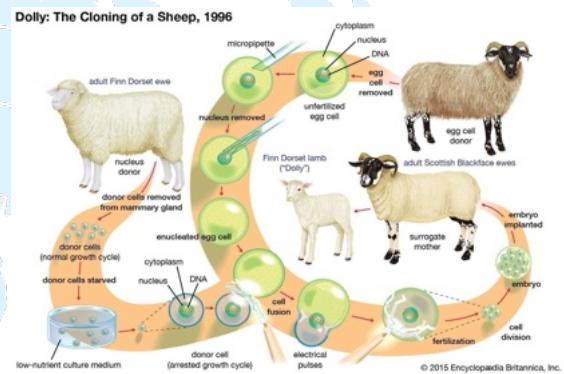
Fusion of Somatic Cell and Enucleated Egg: The nucleus from the somatic cell was extracted and inserted into the enucleated egg cell. This resulted in a reconstructed egg cell containing the genetic material from the adult somatic cell.

Stimulation and Culturing: Chemical or electrical stimulation was used to trigger the reconstructed egg cell to start dividing and developing into an embryo. This early-stage

embryo was then cultured in a lab dish to encourage further development.

Implantation into Surrogate Mother: The developed embryo was implanted into the uterus of a surrogate mother sheep. The surrogate carried the pregnancy to term and gave birth to Dolly.

Birth and Development: Dolly developed and grew like any other sheep, but her unique feature was that she carried the genetic material of the adult somatic cell donor.



Dolly the Sheep Cloning Cycle⁸

Cloning And The CDFW

Politically, the cloning of animals for food production could present an entirely different series of issues relating to the ethical and safety concerns related to the consumption of cloned animal products. The Food and Drug Administration (FDA) approved the sale of milk and meat but no other animal products from cloned animals and their offspring in 2008. In their guidance, FDA did not recommend any special measures relating to the use of products

from animal clones as human food or animal feed. The guidance states that food products from the offspring of clones from any species traditionally consumed for food are suitable to enter the food and feed supply. Additionally, the FDA declared that cloned food is not required to be labeled, which some people believe was eliminating consumers' right to avoid eating these experimental foods.⁹ In contrast to the US' approach to the risks of animal cloning, the Agriculture Committee of the European Parliament called for a ban in the European Union on the cloning of animals for food, and an embargo on imports of cloned animals, their offspring, and products derived from these sources in 2008.

Most relevant to this committee, in 2021, the black-footed ferret was cloned in San Diego, the first for any endangered species in the United States. This clone is a genetic copy of a wild female who died in the mid-1980s whose cells have been cryopreserved at the Frozen Zoo, a program of San Diego Zoo Global that has collected samples from some 1,100 rare and endangered species worldwide. Researchers hope to breed this clone and introduce her offspring into the wild to inject much-needed genetic

diversity into the population. This success suggests that cloning can be a viable tool for conservation, according to Revive and Restore's executive director. It also illustrates the importance of preserving the cells of rare and endangered species, says San Diego Zoo's director of conservation genetics. They followed essentially the same process used in Dolly the sheep, the first mammal cloned from an adult cell—although it's slightly more complicated as it involves transferring genetic material from one species into another.¹⁰

As this field continues to evolve and progress, the push to utilize technologies including the cloning of species for ecological preservation and the protection of endangered species. Though the scientific aspects are important, it is equally important to remember the financial, ethical, and political aspects of these issues and be prepared to handle anything that may come from this as well.

The San Diego Frozen Zoo Project

The San Diego Zoo Frozen Zoo, officially known as the "San Diego Zoo Global Institute for Conservation Research's Frozen Zoo," is a pioneering initiative focused on preserving the

⁹“Center for Food Safety | Government Regulation || Government Regulation of Animal Cloning.” n.d. Center for Food Safety. <https://www.centerforfoodsafety.org/issues/302/animal-cloning/government-regulation>.

¹⁰ Main, Douglas. 2021. “A Black-Footed Ferret Has Been Cloned, a First for a U.S. Endangered Species.” *Animals*, May 4, 2021. <https://www.nationalgeographic.com/animals/article/black-footed-ferret-clone-conservation-milestone>.

genetic diversity of endangered species through cryopreservation techniques. Its mission is to safeguard the genetic material of various animal species, especially those facing the threat of extinction, by storing their living cells, tissues, and DNA at extremely low temperatures. This process allows scientists and conservationists to preserve the genetic information of these species, even if the actual animals are no longer alive. The Frozen Zoo's primary objectives are as follows:

Genetic Preservation: The core purpose of the Frozen Zoo is to collect and store biological samples from a wide range of animal species. These samples can include sperm, eggs, embryos, and cells from different tissues. By maintaining a repository of these samples at ultra-low temperatures (liquid nitrogen temperatures), the Frozen Zoo ensures that the genetic material remains viable and available for future use.

Conservation and Research: The stored genetic material serves as a valuable resource for conservation efforts and scientific research. In the event that a species faces a significant decline or extinction in the wild, scientists can use the genetic material to potentially restore genetic diversity through techniques like artificial insemination or cloning. Additionally, the genetic material can be used for scientific research to better understand genetic traits, diseases, and evolutionary patterns.

Species Recovery and Management: The Frozen Zoo's genetic bank plays a critical role in species recovery programs. When the genetic diversity of a population is compromised due to small numbers or inbreeding, the stored genetic material can be introduced to enhance genetic diversity and improve the health of the population.

Collaboration and Education: The Frozen Zoo collaborates with other institutions, zoos, and conservation organizations to share knowledge, resources, and genetic materials. The facility also plays a role in raising public awareness about the importance of genetic conservation in preserving biodiversity.

The San Diego Frozen Zoo represents a forward-thinking approach to conservation by utilizing cutting-edge biotechnology to safeguard the genetic heritage of Earth's endangered species. It aligns with broader efforts in the conservation community to address the challenges of species decline and extinction in an ever-changing world.¹¹

¹¹ "Frozen Zoo." 2018. San Diego Zoo Wildlife Alliance. January 5, 2018. <https://science.sandiegozoo.org/resources/frozen-zoo%C2%AE>.

CHARACTER BIOGRAPHIES

Lesley Lee : Regional Manager (Northern Region)

As a Regional Manager of the Northern Region of California, Lesley Lee is responsible for communicating and motivating the team to improve, working with different groups to offer wildlife programs that match the department's goals, and managing projects within budget limits. Additionally, she effectively uses modern leadership ideas to help staff grow and manage operations in a specific area, always considering these ideas when making decisions. The Department of Fish and Wildlife in the northern region of California is confronted with a range of challenges, such as habitat degradation, loss of biodiversity, invasive species, water resource management, enforcement of regulations, and balancing conservation with recreational use of natural areas. Given the progressive and environmentally conscious nature of California's northern region, there might be significant support for the idea of new, cutting edge biotechnology like San Deigo's Frozen Zoo. This region often values innovative approaches to conservation and science, making the concept of preserving genetic diversity through frozen samples appealing to many residents and organizations.

Lana Franco : Regional Manager (North Central Region)

Lana Franco's responsibilities include communicating and motivating the team to improve, working with different groups to offer wildlife programs that match the department's goals, and managing projects within budget limits. Additionally, she effectively uses modern leadership ideas to help staff grow and manage operations in a specific area, always considering these ideas when making decisions. As Regional Manager of the North Central Region of California, she is concerned with problems such as drought and water scarcity, biodiversity loss, habitat fragmentation, soil degradation from agriculture, invasive species, and urban growth and development. Due to the region's diverse ecosystems and wildlife and significant agriculture presence, many members of the community are in support of the biotechnology advancements occurring around the state.

Rudolph Clay : Regional Manager (Bay Delta Region)

Rudolph Clay is responsible for communicating and motivating the team to improve, working with different groups to offer wildlife programs that match the department's goals, and managing projects within budget limits. Additionally, he effectively uses modern leadership ideas to help staff grow and manage operations in a specific area, always considering these ideas when making decisions. The Bay Delta region is currently being faced with problems related to growth and development, water management and pollution,

invasive species, and climate change. The Bay Delta region is a hub for scientific research, particularly in the fields of ecology, fisheries, and water management; therefore, Rudolph Clay sees new biotechnology as a way of supporting research on species adaptation, population dynamics, and ecosystem health.

Marcos George : Regional Manager (Central Region)

In his role as the Central Region's Regional Manager in California, Marcos George oversees the team's communication and motivation for enhancement, collaborates with diverse groups to provide wildlife programs aligned with departmental objectives, and oversees projects within budgetary constraints. Moreover, he employs contemporary leadership concepts to facilitate staff development and operational management within a designated sector. This region is being faced with problems concerning growth and development, intensive agriculture, excessive livestock grazing, water management conflicts, degradation of aquatic ecosystems, recreational pressures, and invasive species. The Central Valley is an important agricultural region, and views on new biotechnology, such as the Frozen Zoo, might be influenced by discussions on preserving genetic diversity in livestock and crop species. Agricultural interests might see potential benefits in maintaining genetic resources for breeding and research purposes.

Joy Muños : Regional Manager (South Coast Region)

As a Regional Manager of the South Coast Region of California, Joy Muños is responsible for communicating and motivating the team to improve, working with different groups to offer wildlife programs that match the department's goals, and managing projects within budget limits. She also effectively uses modern leadership ideas to help staff grow and manage operations in a specific area, always considering these ideas when making decisions. The Department of Fish and Wildlife in the south coast region is confronted with a range of challenges related to growth and development, water management and degradation of aquatic ecosystems, invasive species, altered fire regimes, and recreational pressures. The southern region of California is densely populated and has a diverse mix of urban and suburban areas. Views on new biotechnology might be influenced by the region's focus on technology, science, and entertainment. Some individuals and organizations might be interested in the potential scientific advancements and conservation benefits, while others might have concerns about ethical and regulatory aspects.

Constance Blair Fernandez : Regional Manager (Inland Deserts Region)

Constance Blair Fernandez is responsible for communicating and motivating the team to improve, working with different groups to offer wildlife programs that match the department's goals, and managing projects within budget limits. Additionally, he effectively uses modern leadership ideas to help staff grow and manage operations in a specific area, always considering these ideas when making decisions. The Inland Deserts

region of California faces climate risks including extremely high temperatures, the future of the Salton Sea affecting environmental quality, significant impacts from renewable energy development, increased energy needs for cooling due to housing development patterns, heightened water stress worsened by higher temperatures, changing water availability impacting ecosystems and agriculture, high vulnerability of the population to climate effects, and potential threats to tourism as a crucial economic driver. The high poverty and unemployment rates and low educational attainment levels results in little support of new, cutting edge biotechnology within the region and state.

Lucia Brooks : Regional Manager (Marine Region)

Lucia Brooks's responsibilities include communicating and motivating the team to improve, working with different groups to offer wildlife programs that match the department's goals, and managing projects within budget limits. Additionally, she effectively uses modern leadership ideas to help staff grow and manage operations in a specific area, always considering these ideas when making decisions. The Marine Region is currently being faced with problems regarding overfishing, degradation of marine habitat, invasive species, pollution, and human disturbance. Coastal communities in California may have specific views on new biotechnology due to their proximity to marine ecosystems. Views might lean towards the conservation of marine species, especially those threatened by ocean pollution, overfishing, and climate change.

Debrah Peterson : Chief of Enforcement

Debrah Peterson is the Chief of Enforcement in the California Department of Fish and Wildlife and is responsible for overseeing all aspects of law enforcement and regulatory activities related to wildlife conservation and protection, including managing enforcement operations, developing policies, collaborating with other divisions, and ensuring compliance with wildlife regulations. Additionally, she works closely with other officers to provide proper enforcement within each region. She currently has strong opinions against the creation of new biotechnology as she believes the loss of biodiversity can be solved by proper and consistent regulation enforcement within all regions.

Willow Meyers : Center for Community Action and Environmental Justice Executive Director

As the Executive Director for the Center for Community Action and Environmental Justice, Willow Meyers is responsible for leading and overseeing the organization's efforts in community advocacy, environmental justice, and promoting sustainable practices. The Center for Community Action and Environmental Justice is a group that believes in fairness and coming together to make positive changes in communities through environmental awareness. They work on creating strong leaders from different backgrounds and making neighborhoods self-sufficient and welcoming for everyone. Meyers will only agree on actions that follow the

values of the organization: environmental justice and equity, community empowerment, sustainability, regulatory reform, public health, anti-pollution efforts, community resilience, and education and awareness.

Barry Boyer : Marine Officer

As a Marine Officer with the California Department of Fish and Wildlife, Barry Boyer plays a vital role in enforcing marine conservation laws, protecting aquatic resources, ensuring compliance with fishing regulations, and promoting responsible boating practices along California's coast and marine environments. Their duties encompass a range of activities, from marine enforcement and wildlife rescue to data collection and collaboration with various stakeholders. Although he enforces regulations in all regions, much of his work and collaboration is done within the Marine Region. Although he strives for strong enforcement to maintain biodiversity, Boyer believes that biotechnology advancements have the potential to protect endangered aquatic wildlife.

Russ Palms : Ecological Geneticist at University of California Berkeley

Dr. Russ Palms is an Ecological Geneticist at University of California Berkeley, specializing in unraveling the genetic underpinnings of ecosystems. With a Ph.D. in Ecology and Genetics, Palms combines fieldwork expertise with advanced genetic analysis to explore how genes shape species interactions and adaptations. Collaborative and passionate, he is dedicated to bridging scientific discovery with real-world conservation efforts, making a significant impact on understanding and preserving our natural world. His current work focuses on increasing biodiversity through the invention of new biotechnology.

Cornelius "Raccoon" Patterson : Director of the California Environmental Justice Alliance

Cornelius "Raccoon" Patterson is the Director of the California Environmental Justice Alliance (CEJA). With a background in community organizing and environmental activism, Raccoon leads CEJA's efforts to advocate for equitable environmental solutions. In the organization's vision for California, families enjoy clean air, safe water, and access to healthy housing, communities thrive on sustainable energy, and the elected representatives prioritize the well-being of working families, including marginalized groups, over the profits of large polluting entities. His strategic advocacy focuses on dismantling systemic barriers, championing clean energy, and amplifying marginalized voices. As a dedicated leader, Raccoon's trailblazing spirit is driving positive change for environmental justice across California.

Susanna Morah : New York Times Climate Reporter

Susanna Morah is the lead climate reporter for the Science section of The New York Times' California division covering climate change and the environment. She focuses on people working toward solutions and off-the-beaten-path tales about responses to the crisis. After pursuing a dual degree in Environmental

Science and Journalism, Susanna's internships with local environmental groups and her dedication to reporting on climate issues during college showcased her commitment to the cause. She pursued a master's in Environmental Journalism to refine her skills, leveraging opportunities like international climate conferences to deepen her expertise. Susanna's compelling writing and dedication to accurate reporting led to a successful career at a prominent environmental news outlet before joining The New York Times. Today, she uses her platform to communicate the urgency of climate change and inspire global action through her insightful and impactful reporting. Young but driven, Susanna is determined to work her way to the top of global reporting and would love to make a larger impact on communities in need, reporting the "big" stories related to climate change and global impact.

Chrissy Burn : Communications Director for California Department of Fish and Wildlife

Chrissy Burn, an accomplished Communications Director, channels her journalistic prowess into raising public awareness about the conservation efforts led by the California Department of Fish and Wildlife. With a background in environmental journalism and a genuine passion for wildlife, Chrissy crafts compelling narratives that bridge the gap between scientific insights and public engagement. Her role involves collaborating with field experts, policymakers, and community groups to convey the importance of protecting California's diverse ecosystems. She strives to argue for the advancement of biotechnology for the purpose of increasing biodiversity. By fostering understanding and promoting active participation in conservation, Chrissy contributes to the California Department of Fish and Wildlife's mission of safeguarding the state's natural heritage for generations to come.

Sterling Bauer : Coastal Environmental Rights Foundation Director

Sterling Bauer, a dedicated leader, serves as the Director of the Coastal Environmental Rights Foundation. With a background in environmental law, Sterling is committed to advocating for coastal protection and environmental justice. His strategic vision and legal expertise drive the foundation's efforts to safeguard coastal ecosystems and advocate for equitable access to clean environments. Sterling collaborates with communities, legal experts, and policymakers to address pressing environmental challenges. Although currently wary of the effect biotechnology will have on the ecosystem, he is interested in hearing how it could solve current environmental problems. His unwavering commitment to preserving coastal resources and upholding environmental rights solidifies their role as a pivotal advocate for a sustainable future.

Suzanne Orias : Lead Officer, Special Operations Unit

Suzanne Orias is the accomplished Lead Officer of the Special Operations Unit, a vital force in safeguarding California's natural resources. The Special Operations Unit (SOU) within California Department of Fish

and Wildlife is responsible for investigating crimes involving the misuse of California's natural resources, such as illegal hunting and fishing. With a background in law enforcement and a passion for environmental protection, Suzanne orchestrates specialized operations to combat illegal activities such as poaching, smuggling, and habitat destruction. Her strategic planning and field expertise contribute to successful operations that uphold conservation laws and preserve biodiversity. Suzanne's collaborative approach engages law enforcement agencies, conservation organizations, and communities to ensure a united front against environmental crime. Through her leadership, the Special Operations Unit remains a stalwart defender of California's wildlife and ecosystems, ensuring that the state's natural treasures endure for generations to come.

Ron Price : Organizer at the California League of Conservation Voters Education Fund

Ron Price is an experienced organizer at the California League of Conservation Voters Education Fund. With a background in community activism and a deep commitment to environmental causes, Ron strives for initiatives that drive positive change. Through strategic engagement, he mobilizes communities, raises awareness about conservation policies, and advocates for sustainable practices. He advocates for harnessing biotechnology sustainably by embracing innovative solutions to global challenges while prioritizing ethical considerations and thorough regulation. Ron's dynamic approach, practiced through years of grassroots organizing, amplifies the voices of Californians who desire clean energy, environmental justice, and conservation. His tireless efforts contribute to the advancement of impactful policies and a greener future for the state.

Magdalena Lawson : Environmental Reporter, Los Angeles Times

Magdalena Lawson is a seasoned Environmental Reporter at the Los Angeles Times, renowned for her insightful coverage of pressing ecological challenges and innovative sustainability solutions. With a childhood spent in California's diverse landscapes, she developed an early fascination with the environment's delicate balance. After earning her degree Environmental Studies with a focus in Journalism, Magdalena's career took off when she joined a local environmental magazine, where she carved a niche for herself with in-depth investigative pieces on urban development's impact on local ecosystems and marginalized communities. Now a cornerstone of the Los Angeles Times' reporting team, Magdalena's work transcends traditional boundaries, bridging science, policy, and human interest. Her commitment to fostering dialogue and raising awareness about the intersection of environment and social justice has solidified her reputation as a thought leader in the field, making her a driving force behind the newspaper's impactful coverage of environmental issues.

Jaime Malone : President at the California Native Plant Society

Jaime Malone, a dedicated leader, serves as the President of the California Native Plant Society. With a background in botany and a deep love for native flora, Jaime leads the society's mission to promote the conservation and appreciation of California's native plants. Her extensive knowledge and passion drive initiatives that protect native habitats, restore ecosystems, and educate communities about the importance of biodiversity. Jaime's collaborative spirit fosters partnerships with researchers, policymakers, and environmental advocates, enhancing the society's impact. Through her leadership, the California Native Plant Society continues to be a beacon of advocacy for the preservation and restoration of the state's unique and invaluable plant life. Currently, she and the organization support the biotechnological work being performed on plants by the United States Department of Agriculture; however, they are wary of the effects programs, such as San Diego's Frozen Zoo, could have on native plants.

Desmond Perkins : Environmental Reporter, Sac Bee

Desmond Perkins is a dedicated Environmental Reporter at The Sacramento Bee, where he has become a vital voice in shedding light on California's intricate environmental landscape. Hailing from the vibrant heart of Sacramento, Desmond's passion for the environment was ignited during his childhood explorations of the nearby Sierra Nevada mountains and the Sacramento River. His journey began with grassroots reporting on local environmental issues, from wildlife preservation to air quality concerns, contributing to his deep understanding of the region's challenges. Desmond's impressive ability to humanize complex topics and unearth hidden narratives garnered attention, propelling him to his current position as an Environmental Reporter at The Sacramento Bee. Desmond's passion for fostering community engagement and sparking positive change has solidified his role as an essential catalyst for environmental awareness and advocacy across California.

Harvey Williams : Prominent Author on Conservation Ethics

Harvey Williams stands as a preeminent author renowned for his transformative contributions to conservation ethics. With a background in philosophy and ecology, Harvey's keen intellect and empathetic nature converged to shape his pioneering insights. Growing up amid the rolling landscapes of the Pacific Northwest, his connection to nature fostered a lifelong commitment to ethical conservation. Harvey's thought-provoking books, grounded in philosophical rigor, examine the intersection of human values and ecological preservation. His ability to seamlessly meld intricate philosophical concepts with real-world conservation challenges has garnered global acclaim. Beyond his literary accomplishments, Harvey's lectures and workshops radiate his passion for harmonizing human progress with ecological respect. As a

sought-after speaker, he continues to galvanize audiences, from academic circles to community forums, advocating for a paradigm shift in environmental ethics.

Cory Shaw : Coast Guard Representative

Cory Shaw serves as the dedicated Coast Guard Representative, playing a crucial role in maritime safety and environmental protection along California's coastline. With a background in marine operations and risk management, Cory collaborates with diverse stakeholders to ensure the safety of maritime activities and the preservation of coastal ecosystems. His expertise in navigation, emergency response, and regulatory compliance guides Coast Guard efforts to prevent and respond to incidents, such as oil spills and maritime accidents. Cory's commitment to safeguarding both human lives and the marine environment reflects his dedication to upholding the Coast Guard's mission of protecting California's coastal waters and ensuring the sustainability of marine resources for present and future generations.

Marian Walker : Director for the Office of Spill Prevention and Response

Marian Walker is the steadfast Director of the Office of Spill Prevention and Response, a key figure in safeguarding California's marine environment. With a background in environmental science and crisis management, Marian leads the office's mission to prevent, respond to, and mitigate oil and chemical spills. Her strategic thinking and extensive experience in emergency response ensure that the state's coastal ecosystems and communities remain protected. Marian's commitment to collaboration shines through as she works with governmental agencies, industry stakeholders, and environmental organizations to enhance spill preparedness and minimize environmental impacts. Her dedicated leadership reinforces the critical role the Office of Spill Prevention and Response plays in preserving California's precious coastal resources.

Otto Guzman : Wildlife Forensics Laboratory Coordinator

Otto Guzman is the capable Wildlife Forensics Laboratory Coordinator, overseeing intricate investigations that bridge wildlife conservation and law enforcement. With a background in forensic science and a passion for wildlife, Otto leads a team dedicated to solving complex cases related to wildlife trafficking, poaching, and illegal trade. His attention to detail and advanced forensic techniques contribute to the identification of species, enforcement of wildlife protection laws, and preservation of biodiversity. Although dedicated to conservation and biodiversity, he feels wary of using new biotechnology for cloning purposes. Otto's collaboration with law enforcement agencies, conservation organizations, and researchers ensures that justice is served for imperiled species. Through his expertise, the Wildlife Forensics Laboratory plays a crucial role in safeguarding California's natural heritage and holding perpetrators of wildlife crime accountable.

Mike Patrick : Director for the California Fish and Game Commission

Mike Patrick holds the position of Director at the California Fish and Game Commission. With a background in natural resource management and policy, Mike leads the commission's efforts to conserve and protect the state's diverse wildlife and fisheries. His strategic vision guides the implementation of sustainable practices, balancing the needs of both ecosystems and communities. Mike's collaborative approach fosters partnerships with stakeholders, biologists, and policymakers, ensuring that decisions are rooted in scientific expertise and public engagement. His commitment to ethical hunting, fishing, and habitat preservation contributes to the commission's mission of ensuring California's wildlife thrives for generations to come. Through his leadership, Mike upholds the legacy of responsible stewardship and adaptive conservation strategies. He looks forward to seeing how new biotechnology can contribute to future conservation efforts.



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