SCIENTIFIC NAME	COMMON NAME
Sternotherus minor depressus	turtle, flattened musk
Sternotherus minor minor	turtle, loggerhead musk
Sternotherus minor peltifer	turtle, musk
Sternotherus odoratus	turtle, stinkpot(common musk)
FAMILY Testudinidae	
Asterochelys radiata	tortoise, radiated
Asterochelys yniphora	tortoise, angulated
Chelonoidis elephantopus	tortoise, Galapagos
Gopherus (Xerobates) agassizi	tortoise, desert
Gopherus flavomarginatus	tortoise, Bolson
Gopherus polyphemus	tortoise, gopher
Indotestudo (all species in genus)	tortoise
Kinixys belliana	tortoise, Bell's hinged
Kinixys erosa	tortoise, Schweigger's hinge-back
Kinixys homeana	tortoise, Homer's hinged
Malacochersus tornieri	tortoise, pancake
Manouria (all species in genus)	tortoise
Psammobates geometricus	tortoise, cape geometric
Pyxi arachnoides	tortoise, spider
FAMILY Trionychidae	
Chitra indica	turtle, narrow-headed soft-shell
Cyclanorbis elegans	turtle, Nubian soft-shell
Cyclanorbis senegalensis	turtle, Senegal soft-shell
Cycloderm aubryi	turtle, Aubry's soft-shell
Cycloderma frenatum	turtle, bridled soft-shell
Lissemys punctata	turtle, Indian flap-shelled
Pelochelys bibroni	turtle, giant soft-shell
Trionyx (all species in genus)	turtle, soft-shell

3333

DEPARTMENT OF THE TREASURY

INTERNAL REVENUE SERVICE
P. O. BOX 2508
CINCINNATI, OH 45201

DEC 12 2003

Date:

AMAAE COMMUNITY FUND (ARTISTS WORKING FOR AWARENESS KNOWLEDGE & EDUCATION)
C/O EMILY RICHARDS
4444 ENSIGN AVE STE 214
WEST TOLUCA LAKE, CA 91602

Employer Identification Number:
57-1187132
DLN:
17053317014003
Contact Person:
JULIE CHEN
ID# 31261
Contact Telephone Number:
(877) 829-5500

Accounting Period Ending:
December 31
Foundation Status Classification:
509(a)(2)
Advance Ruling Period Begins:
October 10, 2003
Advance Ruling Period Ends:
December 31, 2007
Addendum Applies:
No

Dear Applicant:

Based on information you supplied, and assuming your operations will be as stated in your application for recognition of exemption, we have determined you are exempt from federal income tax under section 501(a) of the Internal Revenue Code as an organization described in section 501(c)(3).

Because you are a newly created organization, we are not now making a final determination of your foundation status under section 509(a) of the Code. However, we have determined that you can reasonably expect to be a publicly supported organization described in section 509(a)(2).

Accordingly, during an advance ruling period you will be treated as a publicly supported organization, and not as a private foundation. This advance ruling period begins and ends on the dates shown above.

Within 90 days after the end of your advance ruling period, you must send us the information needed to determine whether you have met the requirements of the applicable support test during the advance ruling period. If you establish that you have been a publicly supported organization, we will classify you as a section 509(a)(1) or 509(a)(2) organization as long as you continue to meet the requirements of the applicable support test. If you do not meet the public support requirements during the advance ruling period, we will classify you as a private foundation for future periods. Also, if we classify you as a private foundation, we will treat you as a private foundation from your beginning date for purposes of section 507(d) and 4940.

Grantors and contributors may rely on our determination that you are not a private foundation until 90 days after the end of your advance ruling period.

2526629

ENDORSED - FILED
In the office of the Secretary of State
of the State of California

OCT 10 2003

KEVIN SHELLEY
Secretary of State

AWAKE Community Fund
(Artists Working for Awareness Knowledge & Education)
A Nonprofit Organization
Articles of Incorporation

I

The name of this corporation is AWAKE Community Fund (Artists Working for Awareness Knowledge & Education).

II

A. This corporation is a nonprofit **public benefit corporation** and is not organized for the private gain of any person. It is organized under the Nonprofit Public Benefit Corporation Law for charitable purposes.

B. The specific purpose for which this corporation is organized is to educate using music and the arts by disseminating knowledge and heightening awareness of important issues facing today's world.

III

The name and address in the State of California of this corporation's initial agent for service of process is:

Emily Richards
4444 Ensign Ave #214
Toluca Lake, CA 91602

IV

A. This corporation is organized and operated exclusively for **charitable and educational** purposes within the meaning of Section 501(c)(3) of the Internal Revenue Code.

B. No substantial part of the activities of this corporation shall consist of carrying on propaganda, or otherwise attempting to influence legislation, and the corporation shall not participate or intervene in any political campaign (including the publishing or distribution of statements) on behalf of, or in opposition to, any candidate for public office.

V

The property of this corporation is irrevocably dedicated to charitable purposes and no part of the net income or assets of the organization shall ever insure to the benefit of any director, officer or member thereof or to the benefit of any private person. Upon the dissolution or winding up of the corporation, its assets remaining after payment of, or provision for payment of, all debts and liabilities of this corporation, shall be distributed to a nonprofit fund, foundation, or corporation which is organized and operated exclusively for charitable purposes and which has established its tax-exempt status under Section 501(c)(3) of the Internal Revenue Code.

OFFICE OF THE SECRETARY OF STATE

Emily Richards, Incorporator

2526629

State of California

OFFICE OF THE SECRETARY OF STATE

SECRETARY OF STATE

I, *Kevin Shelley*, Secretary of State of the State of California, hereby certify:

That the attached transcript of 1 page(s) has been compared with the record on file in this office, of which it purports to be a copy, and that it is full, true and correct.

IN WITNESS WHEREOF, I execute this certificate and affix the Great Seal of the State of California this day of

OCT 16 2003

Kevin Shelley

Secretary of State

THE GREAT SEAL OF THE STATE OF CALIFORNIA

EUREKA

CALIFORNIA

Awake Community Fund

EIN: 57-1187132 | Santa Monica, California, United States

Form 990-N (e-Postcard)

Organizations who have filed a 990-N (e-Postcard) annual electronic notice. Most small organizations that receive less than $50,000 fall into this category.

- Tax Year 2021 Form 990-N (e-Postcard)
- Tax Year 2020 Form 990-N (e-Postcard)
- Tax Year 2019 Form 990-N (e-Postcard)
- Tax Year 2018 Form 990-N (e-Postcard)
- Tax Year 2017 Form 990-N (e-Postcard)
- Tax Year 2016 Form 990-N (e-Postcard)
- Tax Year 2015 Form 990-N (e-Postcard)
- Tax Year 2014 Form 990-N (e-Postcard)
- Tax Year 2013 Form 990-N (e-Postcard)
- Tax Year 2012 Form 990-N (e-Postcard)
- Tax Year 2011 Form 990-N (e-Postcard)
- Tax Year 2010 Form 990-N (e-Postcard)
- Tax Year 2009 Form 990-N (e-Postcard)

STATE OF CALIFORNIA
FRANCHISE TAX BOARD
PO BOX 942857
SACRAMENTO CA 94257-0540

Entity Status Letter

Date: 4/27/2023

ESL ID: 4855030841

Why You Received This Letter

According to our records, the following entity information is true and accurate as of the date of this letter.

Entity ID: 2526629

Entity Name: AWAKE COMMUNITY FUND (ARTISTS WORKING FOR AWARENESS KNOWLEDGE & EDUCAT

- [X] 1. The entity is in good standing with the Franchise Tax Board.
- [ ] 2. The entity is **not** in good standing with the Franchise Tax Board.
- [X] 3. The entity is currently exempt from tax under Revenue and Taxation Code (R&TC) Section 23701 d.
- [ ] 4. We do not have current information about the entity.
- [ ] 5. The entity was administratively dissolved/cancelled on through the Franchise Tax Board Administrative Dissolution process.

Important Information

- This information does not necessarily reflect the entity's current legal or administrative status with any other agency of the state of California or other governmental agency or body.
- If the entity's powers, rights, and privileges were suspended or forfeited at any time in the past, or if the entity did business in California at a time when it was not qualified or not registered to do business in California, this information does not reflect the status or voidability of contracts made by the entity in California during the period the entity was suspended or forfeited (R&TC Sections 23304.1, 23304.5, 23305a, 23305.1).
- The entity certificate of revivor may have a time limitation or may limit the functions the revived entity can perform, or both (R&TC Section 23305b).

Connect With Us

Web: **ftb.ca.gov**
Phone: 800-852-5711 from 7 a.m. to 5 p.m. weekdays, except state holidays
916-845-6500 from outside the United States

California
Relay Service: 711 or 800-735-2929 (For persons with hearing or speech impairments)

State of California—The Resources Agency
DEPARTMENT OF FISH AND GAME

TRANSFER

DESERT TORTOISE PERMIT APPLICATION

NO FEE

SEE INSTRUCTIONS ON REVERSE BEFORE COMPLETING APPLICATION. TYPE OR PRINT CLEARLY

FIRST NAME	M.I.	LAST NAME	DAY TELEPHONE
JOHN	S	NOGAWSKI	(310) 980-4458

MAILING ADDRESS	PRIOR TAG NUMBER (If applicable)
1000 S. CARMELINA AVE	227062

CITY	STATE	ZIP CODE	DATE ACQUIRED
LA	CA	90049	03/12/2016

PHYSICAL ADDRESS WHERE THIS TORTOISE IS LOCATED, IF DIFFERENT FROM ABOVE

SAME

HOW/WHO DID YOU ACQUIRE THIS TORTOISE?

CTTC VALLEY CHAPTER

SPECIES	AGE (Circle One)	SEX (Circle One)	UNIQUE FEATURES (If applicable)	HEALTH (Circle One)
5, AGASSIZII	HATCHLING JUVENILE (ADULT)	(M) F		POOR (GOOD) EXCELLENT

I certify that all information contained on this application is true and correct. I understand that, in the event this information is found to be untrue or incorrect, the permit issued will be considered invalid and must be surrendered where issued and that I will be subject to criminal prosecution. I declare under penalty of perjury that I lawfully acquired and possess the tortoise(s) listed above.

SIGNATURE	DATE
X John Nogawski	03/12/2016

FOR DEPARTMENT OF FISH AND GAME USE ONLY **PERMIT TO POSSESS DESERT TORTOISE**

The person whose name appears above is hereby known as the permittee and is authorized by this permit to possess the tortoise identified herein. The permittee shall attach the tag accompanying this permit to the tortoise and shall not thereafter remove such tag, nor sell, barter, breed, transfer or release this tortoise without prior permission from the Department of Fish and Game.

TAG NUMBER	ISSUED BY	DATE
227062	Ken Berry	03/12/2016

LAS 9048

FG 1531 (Rev. 6)

BLUE - PERMITTEE PINK - LAB YELLOW - REGION

Attachment 6

INSTRUCTIONS FOR COMPLETING THE DESERT TORTOISE PERMIT APPLICATION

Contact the Licensee and Revenue Branch at LRB@dfg.ca.gov if you have questions regarding the Desert Tortoise Permit Application.

1. Complete an application for each animal.
2. It is mandatory to complete all items on the application. Incomplete applications will be returned.
3. Sign and date the application.
4. Mail all copies of the application to the appropriate address: Ms. Ginger Wilfong, PO Box 2095, Castro Valley, CA 94546-0006 **STATEWIDE, EXCEPT IN** Los Angeles, Orange, Riverside, San Bernardino and Ventura Counties mail to the California Turtle and Tortoise Club (CTTC), PO Box 1753, Chino, CA 91708-1753. Include a self addressed, stamped, legal size envelope for processing. This application will become your permit when validated and returned to you. Please allow 8-10 weeks for processing. **DO NOT MAIL TO THE DEPARTMENT OF FISH AND GAME.**

IMPORTANT INFORMATION

Breeding of captive tortoises is not authorized by the terms of this permit. If the gender of the tortoise is unknown and you have more than one, you should keep them separated to prevent breeding.

It is illegal to take tortoises from the wild. The penalty for doing so can be up to $5000 and one year in jail.

If you need assistance in finding a new home for your tortoise, contact the California Turtle and Tortoise Club at www.tortoise.org. No tortoise that has been in possession shall be released into the wild.

DFG 97 (NEW)

Attachment 6

CTTC Adoptions Programs—2021 Quarterly Reports

first | second | third | fourth

1 January — 31 March 2016 (10 Chapters reporting)						
Species	**Incoming**				**Placed**	**Died**
	Total	**M**	**F**	**U**		
Desert Tortoise, *Gopherus agassizii*	232	22	17	25	46	9
Texas Tortoise, *Gopherus berlandieri*	1	—	—	—	—	—
African Spurred Tortoise, *Centrochelys sulcata*	5	—	1	—	1	—
Russian Tortoise, *Testudo horsfieldii*	19	7	3	1	11	—
Greek Tortoise, *Testudo graeca*	2	—	—	—	—	—
US Box Turtle (3-toed), *Terrapene carolina triunguis*	15	2	2	—	6	—
US Box Turtle (Ornate), *Terrapene ornata ornata*	2	—	—	2	—	2
Red-eared Slider, *Trachemys scripta elegans*	20	—	2	14	4	—
Softshell turtle, *Apalone* species	1	—	—	—	—	—
Total	**297**	**31**	**25**	**42**	**67**	**11**

Explanations:

Abbreviations: M.F.U = Male.Female.Unknown; CDFG = California Department of Fish and Wildlife.

The total number of incoming animals may be less than the total placed/died/holding because the latter may include animals held from the previous quarter.

Other Reports by Year: 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |

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California Turtle & Tortoise Club

Dedicated to Turtle and Tortoise Preservation, Conservation and Education

Welcome to the California Turtle & Tortoise Club

Since 1964, **California Turtle & Tortoise Club (CTTC)** has been promoting and facilitating the care and adoption of native and nonnative turtle species.

CTTC is a California Public Benefit Corporation recognized as a non-profit organization under IRS Code 501(c)(3). Contributions and donations to **CTTC** are tax deductible to the full extent of the law.

CTTC was founded in 1964 and has over 1,000 members world-wide. Membership in **CTTC** is managed through the Club's many **Chapters**.

Most **CTTC** Chapters hold monthly meetings that typically include an educational program and a chance to socialize and share information. Many Chapters maintain libraries with borrowing privileges for members. Many Chapters also hold annual turtle and tortoise shows, sponsor field trips, and participate in community outreach activities. All Club members receive the **CTTC newsletter, the *Tortuga Gazette***, as a benefit of membership in **CTTC**.

Donations to the CTTC Executive Board

Donate

Funds donated here go to the **CTTC** Executive Board in support of the Club's conservation and educational mission, in addition to general operational expenses. To make a tax-deductible donation through our secure server provided by PayPal, please click the 'Donate' button above.

Donations to a Specific CTTC Chapter

To make a tax-deductible donation to a specific **CTTC** chapter, please contact the chapter directly. Find postal mailing addresses, email addresses, and links to chapter websites on the **CTTC Directory page**.

Thank you for your support!

Last updated: 05-May-2023

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Search

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2023 CTTC Shows and Events

20 May 2023: Valley Chapter Show
11 AM to 4 PM at **Woodland Hills Christian Church**, 5920 Shoup Avenue, Woodland Hills, CA 91367. See the **Valley show flyer** for more information.

20 May 2023: Orange County Chapter Show
10 AM to 3 PM at **First Christian Church of Orange**, 1130 East Walnut, Orange, CA. See the **OC show flyer** for more information.

16 September 2023: Inland Empire Chapter Show
10 AM to 3 PM at **The Ark Church Fellowship Hall**, 1307 East Citrus Avenue, Redlands, CA 92374. See the **Inland Empire show flyer** for more information.

Mojave desert tortoise, *Gopherus agassizii*.
Public domain.

FAQ: CLIMATE CHANGE IN CALIFORNIA

HOW WILL CALIFORNIA BE IMPACTED BY CLIMATE CHANGE?

California is the most populous state in the United States and a global economic powerhouse. The state, however, has one of the world's most varied and volatile climates and scientists and public officials are concerned about the impacts that human-caused climate change will inflict upon California. Already subject to drought, wildfires, and extreme weather, California's environmental and social problems will be exacerbated by a warmer world. Temperatures will continue to rise in coming decades due to greenhouse gases that are accumulating in the atmosphere from transportation, industry, and other human activity. These gases absorb and trap heat radiating from the Earth's surface, and bolster the atmospheric greenhouse effect that is increasingly warming the planet.

Scripps scientists have contributed regional downscaled modeling, analysis, and organization to a series of California Climate Change Assessments. Besides providing a comprehensive assessment of possible climate change trajectories and outcomes, the Scripps products served numerous other study teams, underpinning an evaluation of effects of climate change at regional and local scales. In California's recent Fourth Climate Change Assessment (https://www.climateassessment.ca.gov/), the Scripps team produced an ensemble of climate change information at unprecedented detail that was made available to government agencies and other decision makers in California.

HOW WILL TEMPERATURE CHANGE IN CALIFORNIA?

Average summer temperatures in California have risen by approximately 3 degrees F (1.8°C) since 1896, with more than half of that increase occurring since the early 1970s. If global greenhouse gas emissions continue at current rates, the state is likely to experience further warming by more than 2 degrees F more by 2040, more than 4 degrees F by 2070, and by more than 6 degrees F by 2100. Some of the most impressive impacts of warming will be felt during short period heat events (e.g. days exceeding 106.6 degrees F). For example, if emissions continue at current rates, Fresno will likely suffer 43 extreme heat days per year between 2050 and 2099; 10 times more than its yearly average between 1961 and 2005.

California's unique landscape and coastal setting will affect the patterns of warming. For instance, Scripps climate researcher Alexander Gershunov has detected a trend (https://scripps.ucsd.edu/news/heat-waves-move-toward-coasts-study-finds) in the flavor of California's heat waves, with particularly strong impacts along the coast. Specifically, he found that some heat waves have become increasingly humid. These events have produced markedly warmer nighttime temperatures, a trend consistent with climate change projections. Moreover, the mid-summer heat waves are getting stronger in generally cooler coastal areas. This has particular importance (https://journals.ametsoc.org/view/journals/apme/53/1/jamc-d-13-0130.1.xml) to the millions of coastal dwelling Californians whose everyday lives are acclimated to moderate temperatures.

COULD CLIMATE CHANGE CAUSE MORE WILDFIRES IN CALIFORNIA?

Scripps researchers have found (https://scripps.ucsd.edu/news/study-bolsters-case-climate-change-driving-many-california-wildfires) that the number of wildfires could grow significantly over the next 40 years. With an increase in summer temperatures, the area burned by wildfires has risen fivefold from 1972 to 2018. Warmer summer temperatures and climate-driven aridity are likely to fuel more wildfires in the future. One Fourth Assessment model predicts that large wildfires (greater than 25,000 acres) could become 50% more frequent by the end of the century if emissions are not reduced, and the average area burned statewide would increase 77 percent.

To respond to this rise in wildfires, a consortium of universities including Scripps Oceanography developed what is now ALERTCalifornia (https://ALERTCalifornia.org), a backcountry observation network of more than 600 cameras, a now critical firefighting tool helping first responders confirm and monitor wildfires from ignition through containment.

Scripps climate scientist Janin Guzman Morales' research on Santa Ana winds (https://scripps.ucsd.edu/news/climate-change-may-suppress-santa-ana-winds-particularly-fall) – traditionally most noted in the fall, when they spread Southern California's wildfires – found that this wind season is projected to narrow down onto its natural peak in the winter (December-January). Given decreasing projected precipitation in the fall (see below), vegetation is more likely to remain dry into December, when back-to-back Santa Ana winds are common, resulting in expected later and stronger future wildfire season. The Thomas Fire, which burned through most of December 2017 and into January

2018 ,was fanned by consecutive Santa Ana wind events and grew to be the biggest wildfire in California's history at the time. This very late-season wildfire can be considered a harbinger of future later and greater wildfire activity.

HOW WILL CLIMATE CHANGE AFFECT CALIFORNIA'S PRECIPITATION?

The last two decades underscore California's strong propensity for wet and dry periods, with a string of multi-year droughts punctuated by a few spectacular wet years. Scripps downscaled global models indicate that, by the mid-21st century, California's dry years may become drier, wet years occasionally becoming wetter. On top of its already volatile hydroclimate, these precipitation and drought extremes would exacerbate other climate problems confronting the state, both flood- and drought-related.

Two key climate change signals in the hydroclimate of California have been identified (https://www.nature.com/articles/s41598-017-11285-y): progressively less frequent precipitation, particularly in the fall and spring, and greater precipitation extremes. Although these signals tend to cancel each other out in the annual mean precipitation, they exacerbate the natural volatility of the region's hydroclimate by increasing reliance on the largest storms of the year to make up the annual total precipitation.

- **Heavy Precipitation Events:** In California, the ups and downs of the annual water supply are dictated by the presence or absence of a few large winter storms. In most cases, these extremely wet storms come in the form of long, narrow bands of water vapor known as atmospheric rivers (ARs). ARs are the source of the West Coast's heaviest rains. ARs are both a hazard and a benefit – they cause most of the West Coast's floods but they deliver the majority of their rain and snow that is vital for the region's water supply. Like hurricanes, atmospheric rivers become more damaging the stronger they are (https://scripps.ucsd.edu/news/new-scale-characterize-strength-and-impacts-atmospheric-river-storms). Scripps researchers found that these storms pose a $1 billion-a-year flood risk (https://scripps.ucsd.edu/news/atmospheric-river-storms-create-1-billion-year-flood-damage) in the West. Scientists expect that atmospheric rivers will become even more significant (https://scripps.ucsd.edu/news/atmospheric-rivers-become-even-more-dominant-source-california-water-resources-and-flooding) flood risk as global warming trends increase their intensity.

  Scientists at Scripps' Center for Western Weather and Water Extremes (https://cw3e.ucsd.edu/)study these storms to improve forecasts, assess their potential for producing rain and snow, and advise water managers who operate critical state reservoirs.

- **Drought:** Tree rings and other paleoclimate evidence show that the Southwest is prone to megadroughts that can last for decades. Such droughts will likely increase as global temperatures warm and California precipitation becomes more variable. Under warmer temperatures, more moisture evaporates from plants and soil, leading to drier seasonal conditions even in years with historically average precipitation. Seasonal dryness could become prolonged, with soils drying

earlier in spring and persisting longer into fall and sometimes winter. Under current water management operations, modeling indicates that the annual volume of water stored in Shasta and Oroville reservoirs, the two largest in the state, could shrink by one-third by the end of the century. This reduced storage could limit water supplies and thus lower resilience to droughts.

HOW WILL CLIMATE CHANGE AFFECT CALIFORNIA SNOWPACK?

Historically, California has relied heavily on the Sierra Nevada snowpack. Runoff from melting mountain snow is captured and distributed throughout the state via an extensive network of aqueducts. Observations over recent warmer decades reveal a decline in California's lower elevation snowpack, and climate models indicate considerably greater loss of mountain snowpack as temperatures continue to warm. Water managers may not, on average, be presented with less overall precipitation, but more of it will fall as rain instead of snow, and the snow that does manage to accumulate will melt earlier in the spring. Thus, climate change will jeopardize California's dependence on mountain snowpack as a natural water reservoir which stores water from winter storms and gradually releases it in spring and summer. As spring snowpack diminishes in future decades the state's water storage capacity will effectively be reduced. Scripps researchers are confronting this storage issue by developing improved weather and streamflow forecast techniques in order to help manage the state's increasingly variable water supplies. This technology bears on important questions about when and where to store and consume water, issues especially critical to California agriculture.

Scripps researcher Amato Evan found that winters are becoming increasingly shorter (https://scripps.ucsd.edu/news/winters-becoming-shorter-mountainous-western-us) in the mountainous western U.S., with snow disappearing earlier in the year. His research showed that fall and spring seasons are becoming longer, essentially shortening winter from both sides. Other studies show that by 2050, the average water supply from snowpack is projected to decline to 2/3 of historical levels. If greenhouse gas emissions reductions do not occur, water from snowpack could fall to less than 1/3 of historical levels by the year 2100.

ARs bring much of the snow to California. Warmer weather and changes in ARs' intensity could affect how much snow they bring, as well as affecting existing snowpack on the ground. For example, in 2017 Scripps researchers found (https://scripps.ucsd.edu/news/researchers-identify-factor-behind-2017-oroville-dam-spillways-incident) that warm, wet weather from an AR resulted in a rush of snowmelt – snow that was delivered by an earlier AR – that strained the capacity of California's second largest reservoir and contributed to the near-failure of Oroville Dam. Scientists stress that more intense storms in the future could continue to threaten public safety and infrastructure.

HOW WILL SEA-LEVEL RISE AFFECT CALIFORNIA?

By 2050, almost $18 billion worth (https://www.energy.ca.gov/sites/default/files/2019-11/Statewide_Reports-SUM-CCCA4-2018-013_Statewide_Summary_Report_ADA.pdf) of residential and commercial buildings could be flooded due to sea level rise, which will increase significantly over historical rates of about 7" over the 20th Century along the Southern California coast. Increased greenhouse gases that have already accumulated in the atmosphere and ongoing climate warming already commit Earth to continued sea level rise. Increases over recent historical levels may reach 1.5 feet if action is not taken to reduce greenhouse gas emissions. Further projections (https://www.latimes.com/local/lanow/la-me-california-coast-storm-damage-20190313-story.html) estimate that more than half a million people and $150 billion in property in California will be at risk of flooding by 2100, with the upper range projections of rise reaching or exceeding four feet, almost twice the level projected if greenhouse gas emissions were substantially reduced.

Coastal impacts will be particularly severe when sea level rise is boosted by high astronomical tides and winter storm waves and short term sea level increases. Already, coastal coastal communities in California are already experiencing impacts from rising sea levels. The City of Imperial Beach in San Diego County, for instance, is a low-lying community surrounded by water on three sides, and so especially vulnerable to sea-level rise. The community regularly faces flooding from higher storm surge and extreme tide events during the winter months. To aid Imperial Beach in adaptation planning, the David C. Copley Foundation (https://copleyfoundation.org/) funded a partnership with Scripps' Center for Climate Change Impacts and Adaptation (https://climateadapt.ucsd.edu/imperialbeach/) on the Resilient Futures (https://climateadapt.ucsd.edu/imperialbeach/)program, a monitoring and flood alert program to forecast these inundation events.

A team of researchers at Scripps led by Adam Young is studying coastal erosion in San Diego County to understand how changes (https://www.sciencedirect.com/science/article/pii/S0169555X20305183) in sea level, wave activity, and rainfall will impact the shoreline. The collapse of coastal cliffs is expected to increase with enhanced wave attack at the cliff base due to sea-level rise. These cliffs support homes, business, railways, and roads. This research will become increasingly important as sea levels continue to rise and threaten California's beaches and coastal communities. The Fourth California Climate Assessment warns that two-thirds of beaches in Southern California could disappear by 2100 if sea levels continue to rise at the same rate.

HOW WILL CLIMATE CHANGE IMPACT CALIFORNIA'S COAST AND OCEAN?

California has recently experienced unprecedented events along its coasts including a historic marine heat wave (/research/climate-change-resources/californias-marine-heatwaves), record harmful algal blooms, fisheries closures, and a significant loss of northern kelp forests. These events increase concern that coastal and marine ecosystems are being transformed, degraded, or lost due to climate change impacts, particularly sea-level rise, ocean acidification (/research/climate-change-resources/faq-ocean-acidification), and warming.

"The Blob," a very warm patch of ocean water off the coast of California that occured from 2013-2016, demonstrated that anomalously warm ocean temperatures can produce unprecedented events, including the mass abandonment of sea lion pups. Additionally, the Shore Stations Program (https://shorestations.ucsd.edu), which has tracked ocean temperature at Ellen Browning Scripps Memorial Pier since 1916, measured record high ocean temperatures in 2018 and 2020.

Scripps postdoctoral researcher Lillian McCormick found that (https://scripps.ucsd.edu/news/low-oxygen-levels-could-temporarily-blind-marine-invertebrates) changes in oxygen levels due to a warmer ocean could blind some California marine species, including the commercially-important market squid. Warmer surface water temperatures can decrease mixing in the ocean, which is crucial for transporting oxygen-rich surface waters into deeper depths. Oxygen losses are especially pronounced in areas of naturally occurring low oxygen and upwelling, such as off the coast of California.

The biodiverse kelp forests that define much of the California coast are crucial for fisheries and the stability of the nearshore marine environment. Commercially-important fish like rockfish make their habitat here, and iconic species like sea otters rely on the health of these habitats for their survival. However, warmer waters, especially in Northern California, have decimated huge swaths of kelp forest. Kelp relies on cold water in order to grow and reproduce, and increased ocean temperatures, combined with explosions in kelp-eating sea urchins, have threatened these ecosystems along the coast.

HOW WILL CLIMATE CHANGE IMPACT CALIFORNIANS?

From wildfires to extreme heat, Californians will be affected by a variety of climate impacts. Vulnerable populations already experience adverse health impacts from weather extremes. For example, heat waves are the natural disaster responsible for the most weather-related deaths in California and the World over the last 30 years, and scientists predict warmer temperatures will bring more of them. This is already happening and the trend has been clearly observed (https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2012GL052979). The 2006 heat wave killed over 600 people, resulted in 16,000 emergency department visits, and led to nearly $5.4 billion in damages. Research suggests (https://www.climateresolve.org/wp-content/uploads/2020/10/FactSheet_BayArea.pdf) that mortality risk for those 65 or older could increase ten-fold by the 2090s because of climate change. Scientists at Scripps found (https://scripps.ucsd.edu/news/coastal-heat-waves-can-tax-public-health-even-outside-summer) that heat waves driven by Santa Ana winds can impact hospitalizations for heat-related illness in fall, spring, and winter. The findings stress that heat-related illnesses are not just limited to the summer here, and could be exacerbated by warming temperatures in the future all year round.

Direct climate impacts like wildfire, drought, and flooding will negatively affect public health, along with additional indirect effects. For example, wildfire smoke leads to increased respiratory illness and is more dangerous to human health than similar levels of pollution from other sources, warmer temperatures lead to the spread of mosquito-borne diseases like Zika and West Nile virus, and increased disasters lead to greater stress and mental trauma.

Expert Reviewers:

- Daniel Cayan (https://dcayan.scrippsprofiles.ucsd.edu/), Climate Researcher: Climate, Atmospheric Science & Physical Oceanography Division at Scripps
- Julie Kalansky (https://scripps.ucsd.edu/profiles/jkalansky), Program Manager and Post-Doctoreal Researcher: Center for Western Weather and Water Extremes at Scripps
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Further reading:

- California Fourth Climate Change Assessment (https://www.climateassessment.ca.gov/)
- Center for Western Weather and Water Extremes (https://cw3e.ucsd.edu/)
- Center for Climate Change Impacts and Adaptation (https://climateadapt.ucsd.edu/)

Related News Stories:

- New High-Resolution Study on California Coastal Cliff Erosion Released (https://scripps.ucsd.edu/news/new-high-resolution-study-california-coastal-cliff-erosion-released) (August 4, 2022)
- More Evidence that California Weather Is Trending toward Extremes (https://scripps.ucsd.edu/news/more-evidence-california-weather-trending-toward-extremes) (August 3, 2022)
- Climate Change Identified as Contributor to Oroville Dam Spillway Incident (https://scripps.ucsd.edu/news/climate-change-identified-contributor-oroville-dam-spillway-incident)(March 2, 2022)
- Exposure to Wildfire Smoke Increased Number of Bay Area COVID Deaths (https://scripps.ucsd.edu/news/exposure-wildfire-smoke-increased-number-bay-area-covid-deaths)(Jan. 24, 2022)
- Eyes on Wildfires: ALERTWildfire camera network reaches 610-camera milestone during season of record fires (https://scripps.ucsd.edu/news/eyes-wildfires) (Nov. 4, 2020)
- Coastal Heat Waves Can Tax Public Health – Even Outside of Summer (https://scripps.ucsd.edu/news/coastal-heat-waves-can-tax-public-health-even-outside-summer) (April 2, 2020)
- Atmospheric River Storms Create $1 Billion-A-Year Flood Damage (https://scripps.ucsd.edu/news/atmospheric-river-storms-create-1-billion-year-flood-damage) (Dec. 4, 2019)
- Study Bolsters Case that Climate Change is Driving Many California Wildfires (https://scripps.ucsd.edu/news/study-bolsters-case-climate-change-driving-many-california-wildfires)(July 16, 2019)

- Atmospheric Rivers to Become Even More Dominant Source of California Water Resources and Flooding (https://scripps.ucsd.edu/news/atmospheric-rivers-become-even-more-dominant-source-california-water-resources-and-flooding) (July 8, 2019)
- Climate Change May Suppress Santa Ana Winds, Particularly in Fall (https://scripps.ucsd.edu/news/climate-change-may-suppress-santa-ana-winds-particularly-fall) (Jan. 31, 2019)
- Winters Becoming Shorter in Mountainous Western U.S. (https://scripps.ucsd.edu/news/winters-becoming-shorter-mountainous-western-us) (Dec. 12, 2018)

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3. Polade et al., "Precipitation in a warming world: Assessing projected hydro-climate changes in California and other Mediterranean climate regions (http://www.nature.com/articles/s41598-017-11285-y)."
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6. Martin et al., "Winters becoming shorter in mountainous western U.S (https://scripps.ucsd.edu/news/winters-becoming-shorter-mountainous-western-us)."
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AWAKE Community Tortoise Tracking
Tortoise Climate Research Summary
2021 and 2022 - Los Angeles & Kauai

Year	LIH v LAX	Temperature (°F)			Dew Point (°F)			Humidity (%)			Wind Speed (mph)			Pressure (in)			Precipitation (in)
		Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Total
2021	9 mo avg LIH > LAX	12	13	14	14	14	15	0	3	7	3	6	8	0	0	0	2.27
2022	9 mo avg LIH > LAX	9	10	12	13	14	16	5	9	13	2	5	7	0	0	0	0.89

Los Angeles:

2021	Totals Days	275	100%
	Total days >=75	61	22%
	Total days >=85	10	4%
2021	Totals Days	275	100%
	Total days >=75	90	33%
	Total days >=85	13	5%
2021 & 2022	Totals Days	550	100%
	Total days >=75	151	27%
	Total days >=85	23	4%
	Days below 85 degrees	527	96%
	Days below 75 degrees	399	73%

Attachment 10

AWAKE Community Tortoise Tracking
Comparative Weather History
Monthly Average - 2021 & 2022 (excluding brumation months of Dec, Jan, Feb)

Month	Location	Temperature (°F)			Dew Point (°F)			Humidity (%)			Wind Speed (mph)			Pressure (in)			Precipitation (in)
		Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Total
2021																	
Mar	LAX	64	56	49	47	42	35	83	64	41	19	8	0	30	30	30	1.32
Mar	LIH	76	71	68	68	65	62	92	81	69	23	17	11	30	30	30	11.88
Mar	LIH > LAX	12	15	19	20	23	28	9	16	28	4	8	11	0	0	0	10.56
Apr	LAX	67	60	55	52	49	44	84	69	52	17	8	0	30	30	30	0.00
Apr	LIH	79	72	69	67	63	58	86	72	61	18	13	7	30	30	30	1.55
Apr	LIH > LAX	12	12	14	15	14	13	1	3	9	1	5	6	0	0	0	1.55
May	LAX	67	61	57	55	53	51	86	74	61	16	8	1	30	30	30	0
May	LIH	81	76	71	70	68	65	87	76	63	18	13	8	30	30	30	0
May	LIH > LAX	15	14	14	15	15	15	1	2	2	2	5	7	0	0	0	0.36
Jun	LAX	68	63	59	57	55	53	87	75	60	15	8	1	29	29	29	0
Jun	LIH	81	75	72	69	67	65	84	72	59	17	12	6	29	29	29	1
Jun	LIH > LAX	13	13	13	12	11	11	-3	-3	-1	2	5	6	0	0	0	1.01
Jul	LAX	73	68	62	63	62	58	92	81	65	16	8	0	30	30	30	0
Jul	LIH	85	80	76	73	70	65	86	74	58	20	15	10	30	30	30	2
Jul	LIH > LAX	12	12	14	11	8	6	-5	-8	-7	5	7	9	0	0	0	1.59
Aug	LAX	77	71	67	65	63	61	93	80	63	16	8	0	31	31	31	0
Aug	LIH	89	83	79	75	73	71	85	74	62	19	14	9	31	31	31	1
Aug	LIH > LAX	12	12	13	11	10	10	-8	-5	-1	3	6	8	0	0	0	1.28
Sep	LAX	71	65	61	59	57	55	85	73	57	15	7	0	29	29	29	0
Sep	LIH	81	76	73	71	68	64	86	74	60	19	14	8	29	29	29	2
Sep	LIH > LAX	10	11	12	12	11	9	2	1	3	5	7	8	0	0	0	1.83
Oct	LAX	72	65	58	60	52	41	90	69	41	15	7	0	30	30	30	0
Oct	LIH	81	76	73	71	68	64	86	74	60	19	14	8	29	29	29	2
Oct	LIH > LAX	9	11	14	11	16	23	-4	5	19	4	7	8	-1	-1	-1	1.37
Nov	LAX	69	61	55	52	46	40	82	64	45	11	5	0	29	29	29	0
Nov	LIH	79	73	66	69	66	60	90	78	60	15	10	5	29	29	29	1
Nov	LIH > LAX	10	12	12	17	20	21	9	13	15	4	5	5	0	0	0	0.91

Attachment 10

9 mo avg	**LIH > LAX**	**12**	**13**	**14**	**14**	**14**	**15**	**0**	**3**	**7**	**3**	**6**	**8**	**0**	**0**	**0**	**2.27**
2022																	
Mar	LAX	68	60	53	52	47	39	85	66	42	17	8	1	30	30	30	1
Mar	LIH	78	73	68	69	67	64	94	83	68	16	11	5	30	30	30	3
Mar	LIH > LAX	10	13	15	17	20	25	9	17	26	-1	3	4	0	0	0	2.23
Apr	LAX	68	61	55	52	47	42	80	63	45	18	9	1	29	29	29	0
Apr	LIH	78	72	71	70	67	61	94	82	67	21	16	10	30	30	30	2
Apr	LIH > LAX	10	12	16	18	20	20	14	19	22	3	7	9	1	1	1	1.30
May	LAX	69	63	58	55	52	48	83	70	55	17	8	0	30	30	30	0
May	LIH	80	74	71	71	67	66	93	79	70	18	13	9	30	30	30	3
May	LIH > LAX	11	11	13	16	14	18	10	9	15	1	5	8	0	0	0	2.70
Jun	LAX	73	67	63	60	59	57	87	76	62	16	8	1	30	30	30	0
Jun	LIH	79	74	71	70	68	66	94	82	68	17	13	8	30	30	30	0
Jun	LIH > LAX	7	7	8	10	9	9	7	6	7	1	5	7	0	0	0	0.43
Jul	LAX	74	68	64	62	61	59	88	77	63	16	8	1	30	30	30	0
Jul	LIH	84	79	75	71	69	67	84	73	61	20	15	10	30	30	30	1
Jul	LIH > LAX	10	11	11	9	9	8	-3	-4	-2	4	7	10	0	0	0	0.95
Aug	LAX	77	71	67	64	62	59	87	74	59	16	8	1	30	30	30	0
Aug	LIH	83	77	72	72	70	68	91	80	67	17	12	7	30	30	30	2
Aug	LIH > LAX	6	6	6	8	8	9	5	6	7	0	4	6	0	0	0	2.19
Sep	LAX	82	75	69	67	64	61	86	71	53	16	8	0	30	30	30	0
Sep	LIH	85	79	74	73	71	69	89	77	64	15	11	5	30	30	30	1
Sep	LIH > LAX	3	4	5	6	7	8	2	6	11	-1	3	5	0	0	0	0.52
Oct	LAX	64	57	50	51	46	40	87	70	49	12	6	0	30	30	30	2
Oct	LIH	74	68	63	61	58	54	87	73	56	15	7	0	30	30	30	0
Oct	LIH > LAX	11	11	13	10	12	14	0	3	7	2	1	0	0	0	0	-1.68
Nov	LAX	69	60	51	52	42	32	83	58	35	15	7	0	30	30	30	2
Nov	LIH	81	75	72	70	67	65	87	74	63	20	15	9	30	30	30	1
Nov	LIH > LAX	12	15	20	18	25	33	4	17	29	6	8	9	0	0	0	-0.67
9 mo avg	**LIH > LAX**	**9**	**10**	**12**	**13**	**14**	**16**	**5**	**9**	**13**	**2**	**5**	**7**	**0**	**0**	**0**	**0.89**

LIH: https://www.wunderground.com/weather/us/hi/lihue/PHLI
LAX: https://www.wunderground.com/weather/us/ca/los-angeles/KLAX

Attachment 10

AWAKE Community

Research Purpose and Process

Desert Tortoise
Climate & Habitat Research
Kilauea, Hawai'i

January 1, 2023

AWAKE Community – Research Purpose and Process - Desert Tortoise

PURPOSE

Research:

The aim of this document is to outline AWAKE Community's "Research Purpose and Processes" to be followed for data collection correlating to the climate, habitat and health of the Mojave Desert Tortoise (Gopherus agassizii) also referred to as George, a threatened species, on the island of Kaua'i. AWAKE has collected climate data and correlating tortoise health and behavior information in a controlled habitat in Santa Monica, California to be compared and contrasted with similar data to be collected in a controlled habitat in Kilauea, Kaua'i, Hawai'i. This data will be shared with the California Turtle & Tortoise Club (official adoption arm of California's Department of Fish & Wildlife), Dr. Frank Lavac (desert tortoise expert in Santa Monica, CA), and other desert tortoise rescues and conservation groups. In addition, this data will be shared with both the San Diego Zoo and the Honolulu Zoo to facilitate discussion on establishing a desert tortoise habitat in Honolulu in partnership with San Diego.

Education:

AWAKE will continue its threatened species education on desert tortoises, along with threatened and endangered butterflies, through both film (online workshops, conferences, seminars and YouTube videos) and exhibition (visitors, guests and volunteers at Shambhala Gardens in Kilauea).

Note: Due to Hawai'i's sensitive environment and the specific requirements for the Gopherus agassizii, AWAKE intends to import only one desert tortoise for this research and education.

BACKGROUND

AWAKE is an educational nonprofit organization researching the impact of climate, air quality, and controlled habitat on the health and behavior of the Mojave Desert Tortoise. Through a permit issued by California's Department of Fish and Wildlife and in partnership with its official adoption program managed by the California Turtle and Tortoise Club, AWAKE has cared for and provided habitat for a desert tortoise, "George," on its Brentwood Urban since March of 2016. George, now 23 years old, was born in 2000 in captivity, along with seven brothers, in the beach town of Venice on the west side of Los Angeles. Endemic to this geographic location for thousands of years, desert tortoise populations have declined significantly since urban development due to loss of habitat, human ignorance about brumation, pollution, and disease. Desert Tortoises are more naturally protected in Joshua Tree National Park and California's

Mojave State Desert, however still subject to predators, vehicle collision, pollution and other human activity.

As Desert Tortoises have moved closer to an endangered listing, California's tortoise adoption programs have increased their efforts in the more populated areas of Los Angeles, with a focus on neighborhoods with adequate habitat. Due to resources and environmental priorities on the west side of Los Angeles, including Santa Monica, tortoise adoptions have increased in these cities.

Humidity and dew point on the west coast of southern California are higher than that of the inland deserts and while night temperatures are comparable, daytime temperatures are much lower in total and can make it particularly challenging for desert tortoises that are emerging from their annual brumation and should be at the height of grazing volume.

Tortoise science, conservation, adoption councils and veterinarians report challenges for desert tortoises in environments where the daily temperature high does not exceed 70-75 degrees.

AWAKE is working to research other climates and geographic locations that may be hospitable for desert tortoise exhibits, conservation, research, and preservation.

DATA COLLECTION

AWAKE has collected climate data (high, low and average temperature; high, low and average dew point; high, low and average humidity; high, low and average windspeed; high, low and average pressure; inches of precipitation) for each day in the months of March through November for the years 2021 and 2022 for both Los Angeles (LAX) and Kaua'i (LIH). Note: December, January and February are not relevant to this study as they are desert tortoise brumation months.

For the health of a desert tortoise, and so that it may digest and move, tortoise habitats in captivity should maintain a daytime temperature of 85 degrees and not lower than 70-75 degrees.

In Los Angeles, over the 2 year data collection period outlined above, the maximum temperature averaged 70.7 degrees Fahrenheit. The average daily temperature over the same 2 year period had a median of 64.8 degrees. Alternatively on Kauai, the maximum temperature averaged 80.7 degrees. The average daily temperature of the same 2 year period had a median of 75.1 degrees. The temperatures on Kaua'i is within the range of that which is considered to be ideal for a desert tortoise.

Los Angeles, during the 550 days of the 2021 and 2022 collection period, only 151 days reached 75 degrees or higher and of those days only 23 reached 85 degrees. As a result, George required artificial lighting and warm baths on 521 days of 2021 and 2022 to take his environment and body temperature to the optimal 85 degrees for digestion and movement.

For the same dates in 2023, similar data will be collected along with daily comparative tortoise behavior like waking, basking, eating, napping and sleeping.

Since 2016, from December 1 to March 1 George has brumated in a controlled environment.

KAUA'I HABITAT

Secured Enclosure**:**

AWAKE has constructed a secured, controlled desert tortoise micro-habitat at its Shambhala Gardens location in Kilauea, Kaua'i. The habitat is southeast facing, optimal for basking, with both covered and uncovered sections, and also a fully enclosed hut, providing protection from rain and the elements. This habitat has been constructed on a deck with completely enclosed perimeter, more than 15 feet above ground, with secure railings, wirecloth and a lockable, latched gate to ensure the tortoise does not come in contact with other Kaua'i wildlife or the island's sensitive environment. Soil will be purchased from local nurseries for placement on weed cloth lined sections of the deck for basking.

Food Source:

George's primary food sources are Bermuda grass, hibiscus flowers, and dandelion greens. Bermuda grass and hibiscus flowers grow naturally throughout Shambhala Gardens (and Kaua'i) and will be collected for him daily. Dandelion greens are grown at a variety of local farms and available at farmers markets and grocery stores on the island.

Cleanliness:

For George's caretakers, and visitors to Shambhala Gardens, thorough hand washing is required both prior to and after entering George's habitat. There is an outdoor handwashing station on the walkway that leads to the secured enclosure and signs at the habitat entrance remind all to wash their hands, and to ensure the latch is closed behind them. The habitat is locked with a code-controlled padlock and only Shambhala's caretakers have access to that code.

Note: George has no history whatsoever, under AWAKE's care nor previously, of spreading any infection or disease to other humans or animals.

GOALS FOR THIS PROJECT

At Shambhala Gardens, AWAKE aims to research in greater depth the impact of a climate 10-15 degrees average warmer than Los Angeles (like Kaua'i), also with comparable humidity, on the daily patterns and well-being of a desert tortoise like George. AWAKE believes this pilot research project may provide insight for the institutions working to save the desert tortoise from endangerment and extinction by exploring other habitats that may be hospitable to the species. AWAKE intends to share its data and conclusions with California's Department of Fish &

Wildlife, the California Turtle & Tortoise Club, desert tortoise veterinary specialists and other conservation groups. AWAKE is also pursuing the possibility of partnership between the San Diego Zoo and the Honolulu Zoo to open a desert tortoise habitat at the Honolulu Zoo.

AWAKE also aims to educate visitors to and volunteers at Shambhala Gardens on this threatened species, thereby expanding awareness of human behavior that threatens not only the desert tortoise, but other species including many threatened on Hawai'i.

AWAKE also aims to continue its education through films, music videos, climate workshops and other multi-media platforms that have included George for the past 6 years.

EXHIBIT A

AWAKE Community
Standard Operating Procedures
Entering Desert Tortoise Habitat

1. Prior to entering tortoise habitat wash hands thoroughly.
2. Unlock gate and double check latch is secured behind you.
3. Feed tortoise hibiscus at Shambhala and chemical-free, approved greens only.
4. Upon exiting tortoise habitat, secure latch and lock gate.
5. After leaving tortoise habitat, wash hands thoroughly.

- Caretakers only: close and latch door on tortoise hut each evening at sunset and each morning within an hour after sunrise.

EXHIBIT B

AWAKE Community
Standard Operating Procedures
Climate & Tortoise Data Collection

For the months of March through November each year, the following weather data will be for two geographic locations: Kaua'i (LIH) and Los Angeles (LAX).

1. Max, Min and Average Temperature
2. Max, Min and Average Dew Point
3. Max, Min and Average Humidity
4. Max, Min and Average Wind Speed
5. Max, Min and Average Air Pressure
6. Precipitation in Inches

Additionally, the following data will be recorded in accordance with the current location of George the desert tortoise.

1. Time of tortoise emergence from hut (+- 30 minutes)
2. Volume of food consumption (# of salads, # of flowers)
3. Length of in-hut napping (+- 30 minutes)
4. Time of tortoise final retreat into hut for evening (+- 30 minutes)
5. Was a warm bath given? For hydration? Or warming body temperature?
6. Was artificial lighting required?
7. Note special conditions (rain, overcast, windy, cold, etc.)

Tropical climates may be suitable for endangered desert tortoise exhibits, rescues, adoptions

AWAKE Community, Emily Richards, John Nogawski

Los Angeles, California, USA; Kilauea, Kauai, Hawaii, USA

Submitted June 7, 2023

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ABSTRACT

Governmental, educational, environmental and other nonprofit organizations have placed focused efforts on conservation action for the threatened Mojave desert tortoise (*Gopherus agassizii*). AWAKE Community (AWAKE), a nonprofit organization dedicated to sustainability, natural wildlife habitats and endangered species, is one such organization and the author of this report. While federal and state institutions focus their efforts on the Mojave desert tortoise in its native habitat of the southwestern United States, there are other conservation groups whose work is dedicated to the rescue, rehabilitation, rescue, placement and adoption of the desert tortoise in civilian homes and neighborhoods as well as sanctuaries, reserves and exhibits. The California Turtle and Tortoise Club (CTTC) is the official adoption arm of California's Department of Fish and Wildlife (CDFW). CTTC provides significant instruction on methods of care for desert tortoises raised in captivity including housing, feeding, sexing, health and hibernation for both adults and hatchlings. AWAKE's research is aimed at benefiting and supplementing the guidelines provided by CTTC, specifically for coastal climates. AWAKE's research also aims to provide insight to be considered for expanding adoption possibilities to other locations, specifically tropical climates, as adoption needs for desert tortoises increase. We present an analysis of one coastal and one tropical climate that can serve as a basis for: 1) understanding and evaluating climate in both existing and potential habitats for desert tortoise adoptions, rescues and exhibits; 2) providing insight and special instruction for desert tortoise adoptions in coastal communities; 3) expanding awareness around desert tortoise needs in captivity with the aim of increasing the knowledge, resources and potential assistance with the unique needs for desert tortoise adopted and preserved in captivity. Note that while it is possible this research may provide insight that will benefit efforts to save the Mojave desert tortoise in its native habitat, this paper is focused on the climate needs of tortoises living in captivity through official adoption programs. (AWAKE's hibernation research for adopted tortoises is beyond the scope of this paper but will be shared under separate report.)

Keywords: Desert tortoise, Mojave desert tortoise, Gopherus agassizii, tortoise adoptions, threatened species, endangered species, desert tortoises in captivity, desert tortoise climate

1. INTRODUCTION

The Mojave desert tortoise is a facing a conundrum as a species. Wild Mojave desert tortoises are moving closer to extinction in their native habitat yet growth in the captive desert tortoise population, through prohibited breeding, has created an increasing need for adoptions of the species into human controlled habitats. AWAKE focuses its research on desert tortoise adoptions and the species' health in captivity. The focal point of this paper is to share AWAKE's

current study comparing the climate of two test locations, the coastal community of west Los Angeles and the eastern side of the tropical island of Kauai. The climate of each location is compared and assessed with that required to maintain the health of a desert tortoise in captivity for the following purposes:

- To expand education about the requirements needed to maintain the health and well-being of desert tortoises adopted in the cooler climates of coastal California
- To learn more about other possible geographic locations that may be suitable for desert tortoise exhibits, sanctuaries and adoptions in an era of climate change
- To expand awareness about the differing needs of desert tortoises in captivity as compared to the needs of wild desert tortoises in their native desert habitat

Background

The Mojave population of desert tortoise (*Gopherus agassizii*) was first listed as threatened under the federal Endangered Species Act in 1990[1]. In October of 2020 the California Fish and Game Commission (CFGC) granted temporary uplisted endangered species status to the Mojave desert tortoise[2] in response to a petition filed by the Defenders of Wildlife[3] under the California Endangered Species Act (CESA) and a report submitted by the California Department of Fish and Wildlife (CDFW)[4] wherein it was determined the wild Mojave desert tortoise population in California has declined substantially from historical levels and has continued to trend downward since the species was listed as a threatened species by the CFGC in 1989.

The Mojave population of wild desert tortoise includes all tortoises north and west of the Colorado River in Arizona, Utah, Nevada and California. These tortoises in their native habitat are impacted by ongoing threats, including ever-increasing habitat loss, and also degradation and fragmentation of habitat due to urban, suburban and commercial development. Desert tortoises are negatively impacted by increasing wildfires due to human-introduced, invasive vegetation. Traffic on roads, highways, freeways, as well increasing off-road vehicle activity, has increased road mortality of the desert tortoise. Increased predation of their eggs and hatchlings, spurred by human disruption to the natural order of the desert ecosystem, has decreased the desert tortoise's ability to recover population loss in the wild. Additionally, the release of desert tortoises bred in captivity into the wild has greatly increased the spread of upper respiratory disease amongst wild desert tortoises.

The Mojave population of desert tortoise lives in a variety of southwestern United States desert habitats including the sandy flats of dry desert washes to sloping, rocky foothills and canyons. In the wild, desert tortoises can hibernate in burrows for up to nine months annually, and is most active from March to June and September to October. In captivity, desert tortoises hibernate for just three to four months, often in climate-controlled locations, overseen by human caretakers. In coastal California communities, desert tortoises in captivity are ready to be wakened from hibernation in early March having started their annual brumation sometime in November or December.

The US Fish & Wildlife Services describes the species: "the desert tortoise has a top shell is brown, gray or black, and the shell underneath is lighter. The desert tortoise produces a variety of sounds - *hisses, grunts, pops, whoops, huhs, echs, bips,* etc. The desert tortoise has a short tail, flattened front legs that are adapted for digging, elephant-like hind legs and a high-domed shell and its shell height measures from 4 to 6 inches with its shell length measuring anywhere from 8 to 15 inches. Adult tortoises weigh eight to 15 pounds. Desert tortoises can live roughly

50 to 80 years, but take 13 to 20 years to reach sexual maturity. Desert tortoises eat various herbs, grasses, cacti and wildflowers"[5].

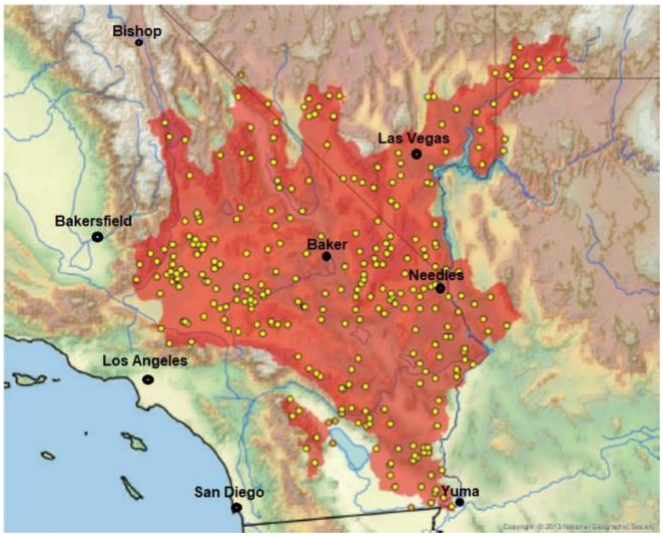

Figure 1: Mojave desert tortoise range and distribution (yellow dots). Figure from Berry and Murphy (2019)[6].

Desert tortoises are acknowledged to be keystone species[7], which means other species in the ecosystem are largely dependent on them and that the disappearance of the desert tortoise would have a drastic impact on other species in the related environment. Many other species use the burrows dug by desert tortoises for shelter during harsh summer and cold winter conditions, including the Gila monster, collared peccaries, roadrunners, and burrowing owls. After desert tortoises digest, they disperse seeds from the native desert plants they ingest through their feces, which repopulates the flora and fauna of the desert ecosystem[8].

Desert tortoises eat a variety of grasses, cacti, shrubs, and wildflowers, and in times when water is scarce, receive much of their hydration from succulents. Desert tortoises rely on areas with significant diversity of plant species for both food and protection from weather and predators. Fires in the desert have increased, both due to climate and also human ecosystem disruption, and can easily destroy the habitat of a desert tortoise which has not adapted as a species for fire. When fires are more frequent, diverse desert landscapes can become nonnative weed patches. Desert tortoises thrive in their desert environments with fully retractable heads and legs, protecting their body from predators, although certainly not from vehicles. The front legs of the desert tortoise emulate small shovels and the tortoise can readily dig into desert sand and dirt to build shelters for warmth on cool desert nights and shade on hot summer days. Once they reach adulthood, desert tortoises can live between 30-50 years in the wild, and sometimes up to 80 years in captivity. It's estimated that desert tortoises have lived on earth for 15 to 20 million years[9], yet due to human behavior, desert tortoises are struggling for survival[10].

2. THREATS TO THE DESERT TORTOISE

The desert tortoise is listed as threatened, and is under review for uplisting to endangered status, because of significant losses and threats to tortoise populations and development, disruption and fragmentation of desert tortoise habitat. In addition to the negative impacts described in section 1 above, desert tortoises are directly impacted by increased raven predation on juveniles, collection by humans, vandalism, losses on roads and to off-highway vehicle (OHV) activities, and Upper Respiratory Tract Disease (URTD). Predation is the greatest cause of mortality for desert tortoise hatchlings and eggs which are eaten by Gila monsters, foxes, coyotes, snakes, and badgers. Juvenile tortoise shells do not fully harden until they reach

the age of five or more years and young tortoises often fall prey to ravens, hawks, eagles, coyotes, foxes, bobcats, badgers, skunks, and feral dogs and cats. Up to 200 young tortoise carcasses have been found under raven perches and nests. Ravens peck tortoises at their shells and eat the animals' flesh inside. Fifty years ago, ravens were uncommon in the desert, but their population has increased 700 percent because of human activity. Under natural circumstances, the ravens would likely not survive the harsh desert environment, but because humans make food and water sources available, including landfills, illegal dumps, unsecured dumpsters and trash cans, man-made ponds, irrigation systems, and road kill, ravens have begun to thrive in harsh desert environments[11]. While considered unusual, coyotes, foxes, bobcats, eagles, and feral dogs have been known to prey on adult tortoises. Habitat quality can affect predation in certain habitats[12].

3. TORTOISE ADOPTIONS

The southwestern states of Utah, Nevada, Arizona and California have desert tortoise adoption programs authorized by each state's Department of Fish and Wildlife. CDFW refers adoptions of, and licensing for, Mojave desert tortoises to the California Turtle and Tortoise Club (CTTC). CTTC Adoption Committees rescues, rehabilitates and place hundreds of desert tortoises into suitable homes each year[13] - in 2021, there were 232 incoming desert tortoises managed by CTTC[14] chapters. Due to the population and resources of organizations and citizens in southern California urban areas, CTTC focuses significant adoption efforts in coastal communities like Los Angeles[15], Santa Barbara, Orange County, Long Beach, and San Luis Obispo[16].

The CTTC maintains a database of captive desert tortoises as well as processes and oversees the issuance of permits and registration for the Permit to Possess Gopherus Tortoises program[17], for which qualified individuals may apply[18]. The program enables the legal possession of a protected desert tortoise -- which has a large captive population but is endangered in the wild -- thereby discouraging the illegal taking of wild tortoises from their native habitat. This legal mechanism for desert tortoise possession and husbandry is essential in the endeavor to prevent civilians from returning captive tortoises to the wild, a once common practice that has contributed significantly to the spread of Upper Respiratory Tract Disease (URTD) in desert tortoises and that has devastated the wild population[19].

Despite restrictions on backyard breeding, desert tortoises are being born in "overwhelming numbers of clutches" according to Tortoise Group, the legal adoption nonprofit organization in Nevada [20]. Because a female tortoise in captivity is capable of laying 1-15 eggs in a single clutch, and up to three clutches in a single year, there is an increasing need for rescues and adoptions of desert tortoises for raising in captivity, thereby also protecting desert tortoises in the wild.

4. COASTAL CALIFORNIA CLIMATE RESEARCH

AWAKE's California headquarters (aka the "Brentwood Urban Farm") is located in the western area of Los Angeles, on the border of Santa Monica. AWAKE's research in this paper focuses on the climate of desert tortoises adopted into coastal communities that live and exist with consistently lower temperatures than those in their native Mojave desert in spring, summer and fall months. In March of 2016, AWAKE adopted a Mojave desert tortoise (referred to as "George") through CTTC and was issued a permit to possess a desert tortoise by CDFW. Since 2016, AWAKE has engaged in research shared with the aim to assist caretakers of captive desert tortoises better maintain the health of the species under their stewardship.

AWAKE's hands-on experience in at the Brentwood Urban Farms has revealed man-made interventions are often required to maintain the health and well-being of a desert tortoise in a coastal community of California due to cool temperatures.

AWAKE has collected climate data for western Los Angeles from the Los Angeles International Airport Station[21] for each day for the months March through November, for the years 2021 and 2022, and the months March and April of 2023 (and will continue collecting the same data for May through November of 2023). Because desert tortoises hibernate December through March annually, data was not collected for those months for this report. A summary of the temperature data collected as part of AWAKE's research is presented below:

Temperature Summary Los Angeles			
2021	Totals Days Monitored	275	
	Total days temperature >=75	61	22%
	Total days temperature >=85	10	4%
2022	Totals Days Monitored	275	
	Total days temperature >=75	90	33%
	Total days temperature >=85	13	5%
2023	Totals Days Monitored (Mar, Apr)	61	
	Total days temperature >=75	2	3%
	Total days temperature >=85	0	0%
2021, 2022, 2023	Totals Days	611	100%
	Total days >=75	153	25%
	Total days >=85	23	4%
	Days below 85 degrees	588	96%
	Days below 75 degrees	458	75%

Figure 2: AWAKE Community LAX temperature data Mar 2021-Apr 2023, excluding hibernation months of Nov-Feb

Of the 611 days monitored in March 2021 through April 2023, 458 of those required heating lamps and/or warm baths for the desert tortoise "George" under the care of AWAKE at its Brentwood Urban Farm in western Los Angeles. These manmade warming methods were required for the tortoise habitat to reach the temperature required for a desert tortoise to move, eat, digest, process calcium and vitamin D, and maintain respiratory health.

AWAKE's daily climate data collection from the Los Angeles International Airport Station[22] for March through November, for 2021 and 2022, and the months March and April of 2023 is summarized below:

Month	Location	Temperature (°F)			Dew Point (°F)			Humidity (%)			Wind Speed (mph)			Pressure (in)			Precipitation (in)
		Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Total
2021																	
Mar	LAX	64	56	49	47	42	35	83	64	41	19	8	0	30	30	30	1.32
Apr	LAX	67	60	55	52	49	44	84	69	52	17	8	0	30	30	30	0.00
May	LAX	67	61	57	55	53	51	86	74	61	16	8	1	30	30	30	0
Jun	LAX	68	63	59	57	55	53	87	75	60	15	8	1	29	29	29	0
Jul	LAX	73	68	62	63	62	58	92	81	65	16	8	0	30	30	30	0
Aug	LAX	77	71	67	65	63	61	93	80	63	16	8	0	31	31	31	0
Sep	LAX	71	65	61	59	57	55	85	73	57	15	7	0	29	29	29	0
Oct	LAX	72	65	58	60	52	41	90	69	41	15	7	0	30	30	30	0
Nov	LAX	69	61	55	52	46	40	82	64	45	11	5	0	29	29	29	0
9 mo avg	**LAX**	**70**	**63**	**58**	**57**	**53**	**49**	**87**	**72**	**54**	**16**	**7**	**0**	**30**	**30**	**30**	**0.21**
2022																	
Mar	LAX	68	60	53	52	47	39	85	66	42	17	8	1	30	30	30	1
Apr	LAX	68	61	55	52	47	42	80	63	45	18	9	1	29	29	29	0
May	LAX	69	63	58	55	52	48	83	70	55	17	8	0	30	30	30	0
Jun	LAX	73	67	63	60	59	57	87	76	62	16	8	1	30	30	30	0
Jul	LAX	74	68	64	62	61	59	88	77	63	16	8	1	30	30	30	0
Aug	LAX	77	71	67	64	62	59	87	74	59	16	8	1	30	30	30	0
Sep	LAX	82	75	69	67	64	61	86	71	53	16	8	0	30	30	30	0
Oct	LAX	64	57	50	51	46	40	87	70	49	12	6	0	30	30	30	2
Nov	LAX	69	60	51	52	42	32	83	58	35	15	7	0	30	30	30	2
9 mo avg	**LAX**	**71**	**65**	**59**	**57**	**53**	**49**	**85**	**69**	**51**	**16**	**8**	**0**	**30**	**30**	**30**	**0.57**
2023*																	
Mar	LAX	61	55	50	51	46	41	88	74	58	17	9	1	30	30	30	8
Apr	LAX	65	58	53	52	49	45	89	75	57	16	8	0	30	30	30	0
May	LAX																
Jun	LAX																
Jul	LAX																
Aug	LAX																
Sep	LAX																
Oct	LAX																
Nov	LAX																
2 mo avg	**LAX**	**63**	**57**	**52**	**51**	**47**	**43**	**89**	**74**	**57**	**17**	**8**	**1**	**30**	**30**	**30**	**3.83**
* 2023 months May-Nov to be collected in the future																	

Figure 3: AWAKE Community LAX Climate Data Mar 2021-Apr 2023, excluding hibernation months of Nov-Feb

AWAKE currently shares this data with CTTC and has begun circulating it with individuals and organizations that adopt desert tortoises so that stewards of desert tortoises in captivity have additional insight in order to provide specialized care in coastal communities where cooler temperatures are pervasive, when compared to California deserts and valleys.

5. KAUAI CLIMATE RESEARCH

AWAKE is the process of relocating its headquarters from the Brentwood Urban Farm to Shambhala Gardens in Kilauea, Kauai, thus giving AWAKE the impetus to compare the tropical climate of Kauai to the coastal climate of western Los Angeles. AWAKE has collected climate data for Kauai from the Lihue Airport Station[23] for each day for the months March through November, for the years 2021 and 2022, and the months March and April of 2023 (and will continue collecting the same data for May through November of 2023). Because desert tortoises hibernate December through March annually, data was not collected for those months. A summary of the temperature data collected as part of that research is presented below:

Temperature Summary Kauai			
2021	Totals Days Monitored	275	
	Total days temperature >=75	265	96%
	Total days temperature >=85	75	27%
2022	Totals Days Monitored	275	
	Total days temperature >=75	251	91%
	Total days temperature >=85	43	16%
2023	Totals Days Monitored (Mar, Apr)	61	
	Total days temperature >=75	61	100%
	Total days temperature >=85	0	0%
2021, 2022, 2023	Totals Days	611	100%
	Total days >=75	577	94%
	Total days >=85	118	19%
	Days below 85 degrees	493	81%
	Days below 75 degrees	34	6%

Figure 4: AWAKE Community LIH temperature data Mar 2021-Apr 2023, excluding hibernation months of Nov-Feb

Of the 611 days monitored in March 2021 through April 2023, only 34 of those never reached temperatures of 75 degrees as compared with Los Angeles, where 458 days never reached 75 degrees. The temperatures recorded on Kauai are much closer to those required for desert tortoise optimal health.

AWAKE's other daily climate data collection for the same time period and location as stated above is summarized below:

Month	Location	Temperature (°F)			Dew Point (°F)			Humidity (%)			Wind Speed (mph)			Pressure (in)			Precipitation (in)
		Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Total
2021																	
Mar	LIH	76	71	68	68	65	62	92	81	69	23	17	11	30	30	30	11.88
Apr	LIH	79	72	69	67	63	58	86	72	61	18	13	7	30	30	30	1.55
May	LIH	81	76	71	70	68	65	87	76	63	18	13	8	30	30	30	0.36
Jun	LIH	81	75	72	69	67	65	84	72	59	17	12	6	29	29	29	1.01
Jul	LIH	85	80	76	73	70	65	86	74	58	20	15	10	30	30	30	1.71
Aug	LIH	89	83	79	75	73	71	85	74	62	19	14	9	31	31	31	1.30
Sep	LIH	81	76	73	71	68	64	86	74	60	19	14	8	29	29	29	1.83
Oct	LIH	81	76	73	71	68	64	86	74	60	19	14	8	29	29	29	1.83
Nov	LIH	79	73	66	69	66	60	90	78	60	15	10	5	29	29	29	0.91
9 mo avg	**LIH**	**81**	**76**	**72**	**70**	**68**	**64**	**87**	**75**	**61**	**19**	**14**	**8**	**30**	**30**	**30**	**2.49**
2022																	
Mar	LIH	78	73	68	69	67	64	94	83	68	16	11	5	30	30	30	3.33
Apr	LIH	78	72	71	70	67	61	94	82	67	21	16	10	30	30	30	1.53
May	LIH	80	74	71	71	67	66	93	79	70	18	13	9	30	30	30	2.70
Jun	LIH	79	74	71	70	68	66	94	82	68	17	13	8	30	30	30	0.44
Jul	LIH	84	79	75	71	69	67	84	73	61	20	15	10	30	30	30	0.95
Aug	LIH	83	77	72	72	70	68	91	80	67	17	12	7	30	30	30	2.19
Sep	LIH	85	79	74	73	71	69	89	77	64	15	11	5	30	30	30	0.65
Oct	LIH	74	68	63	61	58	54	87	73	56	15	7	0	30	30	30	0.24
Nov	LIH	81	75	72	70	67	65	87	74	63	20	15	9	30	30	30	1.10
9 mo avg	**LIH**	**80**	**74**	**71**	**70**	**67**	**65**	**90**	**78**	**65**	**18**	**12**	**7**	**30**	**30**	**30**	**1.46**
2023																	
Mar	LIH	80	74	69	70	67	64	90	78	65	18	11	3	30	30	30	4.97
Apr	LIH	79	73	63	70	67	59	92	81	64	18	12	5	30	30	30	6.05
May	LIH																
Jun	LIH																
Jul	LIH																
Aug	LIH																
Sep	LIH																
Oct	LIH																
Nov	LIH																
2 mo avg	**LIH**	**79**	**74**	**66**	**70**	**67**	**61**	**91**	**79**	**64**	**18**	**12**	**4**	**30**	**30**	**30**	**5.51**

Figure 5: AWAKE Community LIH Climate Data Mar 2021-Apr 2023, excluding hibernation months of Nov-Feb

An aspect of AWAKE's mission, and one of its programs, researches manmade interventions for species that have become threatened and endangered largely through human activity[24], with the hypothesis that if it is human activity causing the decline of a species, inverse human assistance may help reverse the species decline.

In some scenarios, intentional aid given to species negatively impacted by human activity has had unexpected benefits on the surrounding environment and other species. One such case is at the Makauwahi Cave Reserve on Kaua'i[25] where unwanted sulcata tortoises in need of rescue were provided habitat on the reserve. Now over 10 sulcata tortoises control invasive weeds and improve soil fertility at Makauwahi Cave on the south shore of Kauai, while providing habitat for tortoises that emulate behaviors of Kauai's extinct giant ducks and geese[26].

AWAKE is not suggesting that the desert tortoise will provide a benefit to the island of Kauai nor is AWAKE proposing to attempt any such project. AWAKE is conducting its study of the desert tortoise on the island through observation of only a singular desert tortoise in a secured environment removed from the ecosystem under strict biological control. It is important to note that several non-native species introduced to Hawaii, that were not evaluated nor under biological control, have negatively impacted native forests and species[27]. One such import, the Indian Mongoose, was introduced to Hawaii in 1883 by the sugar industry to control rats, however, the Mongoose have made little impact on controlling the rodents and rather, have negatively impacted native birds, sealife, insects, and animals.[28]

AWAKE is hypothesizing that Kauai provides a potential test environment wherein it is possible to explore the impact of a tropical climate on a desert tortoise, so that similar climate zones may be considered for establishing desert tortoise exhibits, rescues, and sanctuaries under biological control. Additionally, the research AWAKE proposes to conduct on Kauai may provide unexpected insight that could possibly aid in the preservation of this species, both in captivity and in the wild, as the status of the desert tortoise continues to decline in its native habitat.

6. COMPARATIVE CLIMATE ASSESSMENT

AWAKE compiled the daily climate data for both Los Angeles, California and Lihue, Kauai in figures 2-5 above, and then compared and contrasted this data as follows:

Month	Location	Temperature (°F)			Dew Point (°F)			Humidity (%)			Wind Speed (mph)			Pressure (in)			Precipitation (in)
		Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Total
2021																	
Mar	LAX	64	56	49	47	42	35	83	64	41	19	8	0	30	30	30	1.32
Mar	LIH	76	71	68	68	65	62	92	81	69	23	17	11	30	30	30	11.88
Mar	LIH > LAX	12	15	19	20	23	28	9	16	28	4	8	11	0	0	0	10.56
Apr	LAX	67	60	55	52	49	44	84	69	52	17	8	0	30	30	30	0.00
Apr	LIH	79	72	69	67	63	58	86	72	61	18	13	7	30	30	30	1.55
Apr	LIH > LAX	12	12	14	15	14	13	1	3	9	1	5	6	0	0	0	1.55
May	LAX	67	61	57	55	53	51	86	74	61	16	8	1	30	30	30	0
May	LIH	81	76	71	70	68	65	87	76	63	18	13	8	30	30	30	0
May	LIH > LAX	15	14	14	15	15	15	1	2	2	2	5	7	0	0	0	0.36
Jun	LAX	68	63	59	57	55	53	87	75	60	15	8	1	29	29	29	0
Jun	LIH	81	75	72	69	67	65	84	72	59	17	12	6	29	29	29	1
Jun	LIH > LAX	13	13	13	12	11	11	-3	-3	-1	2	5	6	0	0	0	1.01
Jul	LAX	73	68	62	63	62	58	92	81	65	16	8	0	30	30	30	0
Jul	LIH	85	80	76	73	70	65	86	74	58	20	15	10	30	30	30	2
Jul	LIH > LAX	12	12	14	11	8	6	-5	-8	-7	5	7	9	0	0	0	1.59
Aug	LAX	77	71	67	65	63	61	93	80	63	16	8	0	31	31	31	0
Aug	LIH	89	83	79	75	73	71	85	74	62	19	14	9	31	31	31	1
Aug	LIH > LAX	12	12	13	11	10	10	-8	-5	-1	3	6	8	0	0	0	1.28
Sep	LAX	71	65	61	59	57	55	85	73	57	15	7	0	29	29	29	0
Sep	LIH	81	76	73	71	68	64	86	74	60	19	14	8	29	29	29	2
Sep	LIH > LAX	10	11	12	12	11	9	2	1	3	5	7	8	0	0	0	1.83
Oct	LAX	72	65	58	60	52	41	90	69	41	15	7	0	30	30	30	0
Oct	LIH	81	76	73	71	68	64	86	74	60	19	14	8	29	29	29	2
Oct	LIH > LAX	9	11	14	11	16	23	-4	5	19	4	7	8	-1	-1	-1	1.37
Nov	LAX	69	61	55	52	46	40	82	64	45	11	5	0	29	29	29	0
Nov	LIH	79	73	66	69	66	60	90	78	60	15	10	5	29	29	29	1
Nov	LIH > LAX	10	12	12	17	20	21	9	13	15	4	5	5	0	0	0	0.91
9 mo avg	**LIH > LAX**	**12**	**13**	**14**	**14**	**14**	**15**	**0**	**3**	**7**	**3**	**6**	**8**	**0**	**0**	**0**	**2.27**

Figure 6: AWAKE Community LAX v LIH Climate Data Mar -Nov 2021

Month	Location	Temperature (°F)			Dew Point (°F)			Humidity (%)			Wind Speed (mph)			Pressure (in)			Precipitation (in)
2022		Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Total
Mar	LAX	68	60	53	52	47	39	85	66	42	17	8	1	30	30	30	1
Mar	LIH	78	73	68	69	67	64	94	83	68	16	11	5	30	30	30	3
Mar	LIH > LAX	10	13	15	17	20	25	9	17	26	-1	3	4	0	0	0	2.23
Apr	LAX	68	61	55	52	47	42	80	63	45	18	9	1	29	29	29	0
Apr	LIH	78	72	71	70	67	61	94	82	67	21	16	10	30	30	30	2
Apr	LIH > LAX	10	12	16	18	20	20	14	19	22	3	7	9	1	1	1	1.30
May	LAX	69	63	58	55	52	48	83	70	55	17	8	0	30	30	30	0
May	LIH	80	74	71	71	67	66	93	79	70	18	13	9	30	30	30	3
May	LIH > LAX	11	11	13	16	14	18	10	9	15	1	5	8	0	0	0	2.70
Jun	LAX	73	67	63	60	59	57	87	76	62	16	8	1	30	30	30	0
Jun	LIH	79	74	71	70	68	66	94	82	68	17	13	8	30	30	30	0
Jun	LIH > LAX	7	7	8	10	9	9	7	6	7	1	5	7	0	0	0	0.43
Jul	LAX	74	68	64	62	61	59	88	77	63	16	8	1	30	30	30	0
Jul	LIH	84	79	75	71	69	67	84	73	61	20	15	10	30	30	30	1
Jul	LIH > LAX	10	11	11	9	9	8	-3	-4	-2	4	7	10	0	0	0	0.95
Aug	LAX	77	71	67	64	62	59	87	74	59	16	8	1	30	30	30	0
Aug	LIH	83	77	72	72	70	68	91	80	67	17	12	7	30	30	30	2
Aug	LIH > LAX	6	6	6	8	8	9	5	6	7	0	4	6	0	0	0	2.19
Sep	LAX	82	75	69	67	64	61	86	71	53	16	8	0	30	30	30	0
Sep	LIH	85	79	74	73	71	69	89	77	64	15	11	5	30	30	30	1
Sep	LIH > LAX	3	4	5	6	7	8	2	6	11	-1	3	5	0	0	0	0.52
Oct	LAX	64	57	50	51	46	40	87	70	49	12	6	0	30	30	30	2
Oct	LIH	74	68	63	61	58	54	87	73	56	15	7	0	30	30	30	0
Oct	LIH > LAX	11	11	13	10	12	14	0	3	7	2	1	0	0	0	0	-1.68
Nov	LAX	69	60	51	52	42	32	83	58	35	15	7	0	30	30	30	2
Nov	LIH	81	75	72	70	67	65	87	74	63	20	15	9	30	30	30	1
Nov	LIH > LAX	12	15	20	18	25	33	4	17	29	6	8	9	0	0	0	-0.67
9 mo avg	**LIH > LAX**	**9**	**10**	**12**	**13**	**14**	**16**	**5**	**9**	**13**	**2**	**5**	**7**	**0**	**0**	**0**	**0.89**

Figure 7: AWAKE Community LAX v LIH Climate Data Mar-Nov 2022

Month	Location	Temperature (°F)			Dew Point (°F)			Humidity (%)			Wind Speed (mph)			Pressure (in)			Precipitation (in)
2023		Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Total
Mar	LAX	61	55	50	51	46	41	88	74	58	17	9	1	30	30	30	8
Mar	LIH	80	74	69	70	67	64	90	78	65	18	11	3	30	30	30	5
Mar	LIH > LAX	19	19	19	19	21	23	1	5	7	2	2	2	0	0	0	-2.59
Apr	LAX	65	58	53	52	49	45	89	75	57	16	8	0	30	30	30	0
Apr	LIH	79	73	63	70	67	59	92	81	64	18	12	5	30	30	30	6
Apr	LIH > LAX	14	15	10	18	18	14	3	6	7	2	5	5	0	0	0	5.96
May	LAX																
May	LIH																
May	LIH > LAX																
Jun	LAX																
Jun	LIH																
Jun	LIH > LAX																
Jul	LAX																
Jul	LIH																
Jul	LIH > LAX																
Aug	LAX																
Aug	LIH																
Aug	LIH > LAX																
Sep	LAX																
Sep	LIH																
Sep	LIH > LAX																
Oct	LAX																
Oct	LIH																
Oct	LIH > LAX																
Nov	LAX																
Nov	LIH																
Nov	LIH > LAX																
2 mo avg	**LIH > LAX**	**17**	**17**	**14**	**19**	**19**	**18**	**2**	**5**	**7**	**2**	**3**	**4**	**0**	**0**	**0**	**2**

Figure 8: AWAKE Community LAX v LIH Climate Data Mar-Apr 2023, May-Nov to be collected

With this comparative analysis there are several noteworthy statistics:

- Average daily high temperatures in Lihue fell between the suggested 70-90 degree daytime guideline[29] for desert tortoises in captivity for all 20 months collected.
- Average daily high temperatures in Los Angeles fell below the suggested 70-90 degree daytime guideline for 12 of the 20 months collected, averaging above 80 degrees only one of those 20 months.
- Lihue daily high temperatures averaged 12 degrees warmer than daily high temperatures in Los Angeles for the collection period.
- The overall maximum humidity in Lihue averaged just 3 percentage points higher than that of the overall maximum humidity in Los Angeles.

- The average maximum and minimum barometric pressure of both Kauai and Los Angeles was identical, with zero percent difference.

This paper focuses on issues facing desert tortoises that were born into or now live in captivity, specifically the climate of coastal southern California communities, where desert tortoise adoptions are ever-increasing. Desert temperatures and climate data have been excluded from this paper because desert tortoise native habitat, though important to understand when studying anything related to the desert tortoise, is not in the scope of this report. The desert tortoise "George" that AWAKE has cared for since 2016 was born in captivity in a western Los Angeles coastal community, has lived his last seven years at the Brentwood Urban Farm, and has never inhabited a desert habitat native to the species.

7. CONCLUSIONS

The research summarized herein was conducted to provide insight for desert tortoise rescues and adoptions. The Mojave desert tortoise could be moving from threatened to endangered status in the state of California[30] and it is evermore imperative that desert tortoises in captivity are not released into the wild[31] to avoid introducing infection and weaker genetics strains to the species and ecosystem[32]. The Desert Tortoise Council hosts regular symposiums to share scientific research and papers on a far and wide spectrum of issues facing the desert tortoise[33] encouraging organizations to conduct both central and outlying research to share. Because the need for desert tortoise adoptions is rising while at the same time the status of the species in the wild is declining, there are unique problems to be solved with desert tortoise adoptions. AWAKE has performed, and continues to collect, climate research to highlight potential climates and geographic locations that may be suitable for desert tortoise health. Considering new possibilities for desert tortoise exhibits (zoo, sanctuaries, reserves, etc.) outside the native species habitat can not only aid in the caretaking of the desert tortoise, but can also provide new opportunities for education about desert tortoises in a wider population thereby increasing awareness and consciousness about the struggle of the desert tortoise – both in the wild and now also in captivity. AWAKE will perform additional hands-on research after we receive approval of the permit to import a single desert tortoise by the Department of Agriculture for the state of Hawaii. Observing George's health and behavior in the climate of Kauai as compared to his behavior and health in western Los Angeles will be documented and shared with other desert tortoise organizations. AWAKE is meticulously providing a secure, controlled habitat on Kauai, ensuring there is no impact on Kauai's sensitive environment, and researching the impact of a tropical climate on a desert tortoise -- compared to a coastal southern California climate. By the states of Hawaii and California approving the relocation of George to Kauai, AWAKE has a unique opportunity to observe and record data that might create new possibilities for desert tortoise conservation. AWAKE will provide additional research summaries and results in the future.

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AWAKE Community

Standard Operating Procedures
DT-23

Desert Tortoise
Climate & Habitat Research
Kilauea, Hawai'i

January 24, 2023

AWAKE Community – Standard Operating Procedures Overview - Desert Tortoise

PURPOSE

The purpose of this Standard Operating Procedures outline is to provide guidelines for AWAKE Community (AWAKE) and its caretakers for the desert tortoise ("tortoise"), also referred to as George. The tortoise is a threatened species (Gopherus agassizii). Under permit issued by California's Department of Fish & Wildlife, George has been under the care of AWAKE at its Brentwood Urban Farm in Los Angeles in a controlled habitat since 2016. As the nonprofit has moved its headquarters from Los Angeles to Kaua'i, AWAKE has applied for a permit from the State of Hawai'i to continue its stewardship of this threatened species at Shambhala Gardens in Kilauea, Kaua'i, Hawai'i.

DATA COLLECTION

In correlation with this study of the tortoise, AWAKE has collected and recorded historical climate data for each day for the months of March through November for the years 2021 and 2022 for both Los Angeles and Kaua'i and will continue to collect this data moving forward. Brumation cycles have been and will continue to be recorded. This data includes: high, low and average temperature; high, low and average dew point; high, low and average humidity; high, low and average windspeed; inches of precipitation.

BIOSECURITY OF KAUA'I HABITAT

Secured Enclosure:

AWAKE has constructed a secured, controlled desert tortoise micro-habitat at its Shambhala Gardens location in Kilauea, Kaua'i. The habitat is southeast facing, optimal for basking, with both covered and uncovered sections, providing the tortoise protection from rain and other elements. This habitat has been constructed on a deck with completely enclosed perimeter, more than 15 feet above ground, with secure railings, wirecloth and a locked and latched gate to ensure the tortoise remains restricted to this habitat alone and does not come in contact with other Kaua'i wildlife or the island's sensitive environment. The habitat is directly monitored by two security cameras. Please see Exhibit A for a detail of maintaining security of the tortoise habitat at Shambhala Gardens.

Food Source:

Because the tortoise's food sources (Bermuda grass, hibiscus flowers, dandelion greens) are already either growing on Kaua'i or sold at local markets, there will be no introduction of any new plant species to the island.

Cleanliness:

For the tortoises's caretakers, and visitors to Shambhala Gardens, hands must be washed prior to entering the tortoise habitat and also afterwards. There is an outdoor handwashing station on the walkway that leads toward to the secured enclosure and signs at the habitat entrance remind all who enter the tortoise habitat they must wash their hands before and afterwards.

AWAKE community

EXHIBIT A

AWAKE Community
Standard Operating Procedures
Entering Desert Tortoise Habitat

1. Registered visitors only.
2. Prior to entering tortoise habitat wash hands thoroughly at sink provided.
3. Caretakers: unlock padlock on the gate with security code; visitors: a Shambhala caretaker will unlock the padlock and escort you into the habitat.
4. Upon entering the habitat, ensure latch is secured behind you.
5. Feed tortoise only hibiscus and grasses at Shambhala Gardens and chemical-free, approved greens acquired from local gardens and markets.
6. Upon exiting tortoise habitat, secure latch and lock padlock.
7. After leaving tortoise habitat, wash hands thoroughly at sink provided.

- Caretakers only: close and latch door on tortoise hut each evening at sunset and each morning within an hour after sunrise.

AWAKE community

EXHIBIT B

AWAKE Community
Standard Operating Procedures
Climate & Tortoise Data Collection

For the months of March, June, September, and November each year, the following weather data will be collected for 10 randomly generated dates for each month for two geographic locations: Kaua'i (Kilauea) and Los Angeles (Santa Monica). Additionally, brumation start and end dates will be collected annually.

1. Max, Min and Average Temperature
2. Max, Min and Average Dew Point
3. Max, Min and Average Humidity
4. Max, Min and Average Wind Speed
5. Max, Min and Average Air Pressure
6. Precipitation in Inches

Additionally, the following data will be recorded in accordance with the habitat location of George the desert tortoise.

1. Time of tortoise emergence from hut (+- 30 minutes)
2. Volume of food consumption (# of salads, # of flowers)
3. Length of in-hut napping (+- 30 minutes)
4. Time of tortoise final retreat into hut for evening (+- 30 minutes)
5. Was a warm bath given? For hydration? Or warming body temperature?
6. Was artificial lighting required?
7. Note special conditions (rain, overcast, windy, cold, etc.)

COVID-19 - Curbside Service

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- Appointment Request
- Client Forms
- Refill Request

New Clients

- Appointment Request
- New Client Registration Form
- What to Expect

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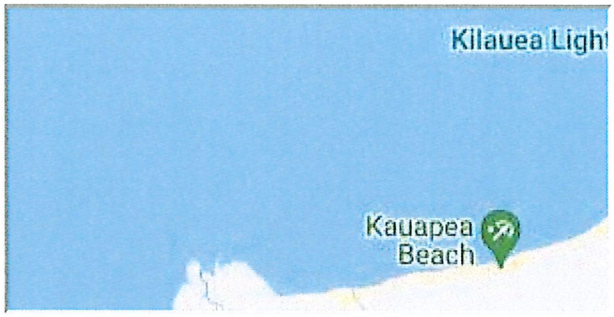
Phone: *(808) 755-8728*
Email: *info@knsac.com*

Hospital Hours:

Sunday: Closed
Monday: Closed
Tuesday: 8 a.m. – 5 p.m.
Wednesday: 8 a.m. – 5 p.m.
Thursday: 8 a.m. – 5 p.m.
Friday: 8 a.m. – 5 p.m.
Saturday: Closed

Map & Directions



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AWAKE Community
Desert Tortoise Habitat
at Shambhala Gardens
Kilauea, Kaua'i

Shambhala Gardens is on the North Shore of Kaua'i in the agriculture zone of Kilauea

Attachment 15

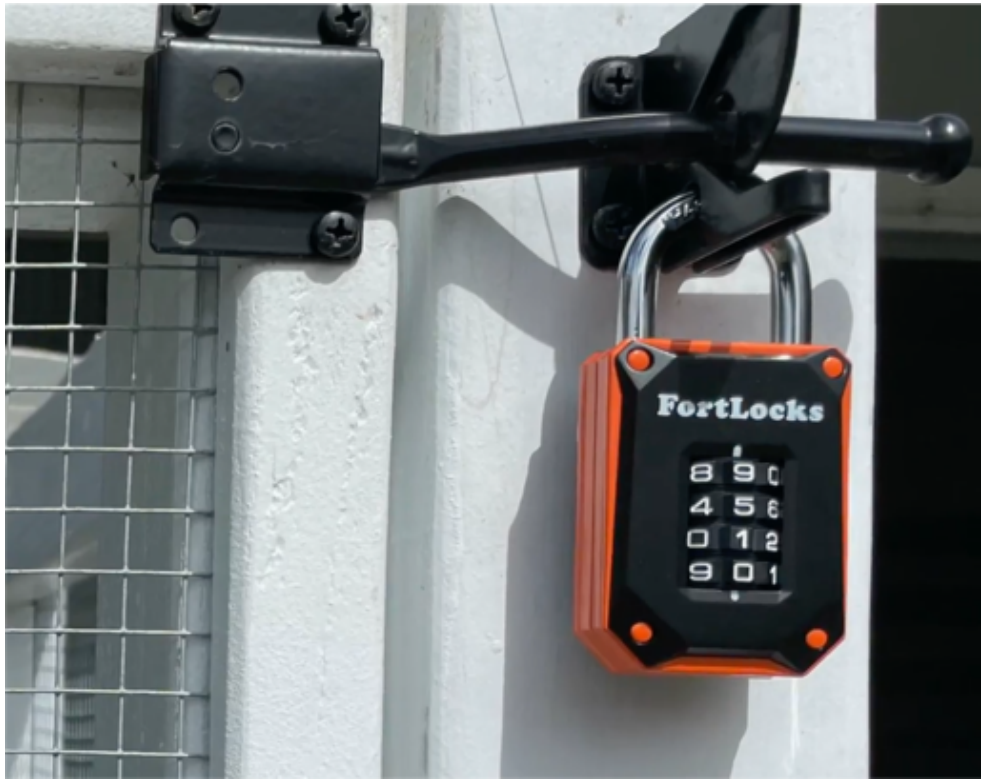
Shambhala Gardens has 3 acres of chemical-free gardens, habitat and forest

Attachment 15

The Desert Tortoise Habitat is 15 feet above ground level

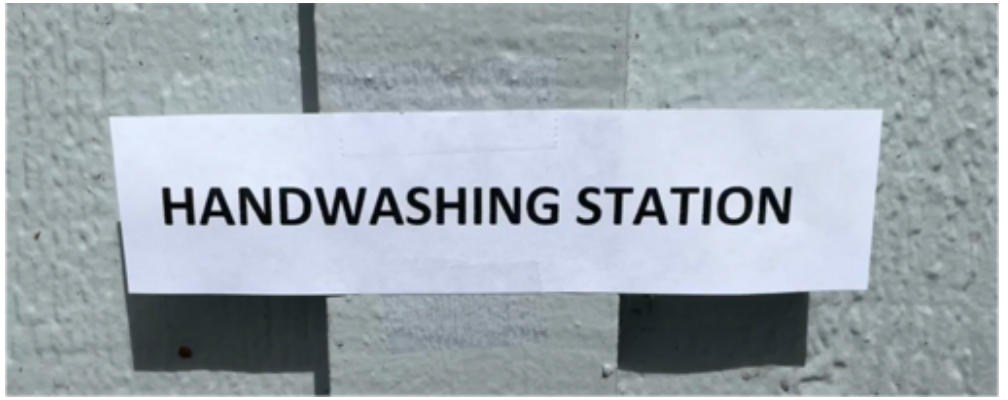
Attachment 15

The habitat is secured by wire-cloth, railings and locked gates



Attachment 15

Visitors and caretakers alike must wash their hands before and after entering the habitat



Attachment 15

Registered visitors are granted access through the locked gate, accompanied by a Shambhala Tortoise caretaker

Attachment 15

Shambhala Gardens is monitored by six security cameras, two of which capture the habitat, its locked gate and handwashing station

Attachment 15

The tortoise cage is protected from elements, adjacent to the caretakers' building and will be opened and secured each evening. The deck is secured and patterned after the basking deck in Los Angeles.

Attachment 15

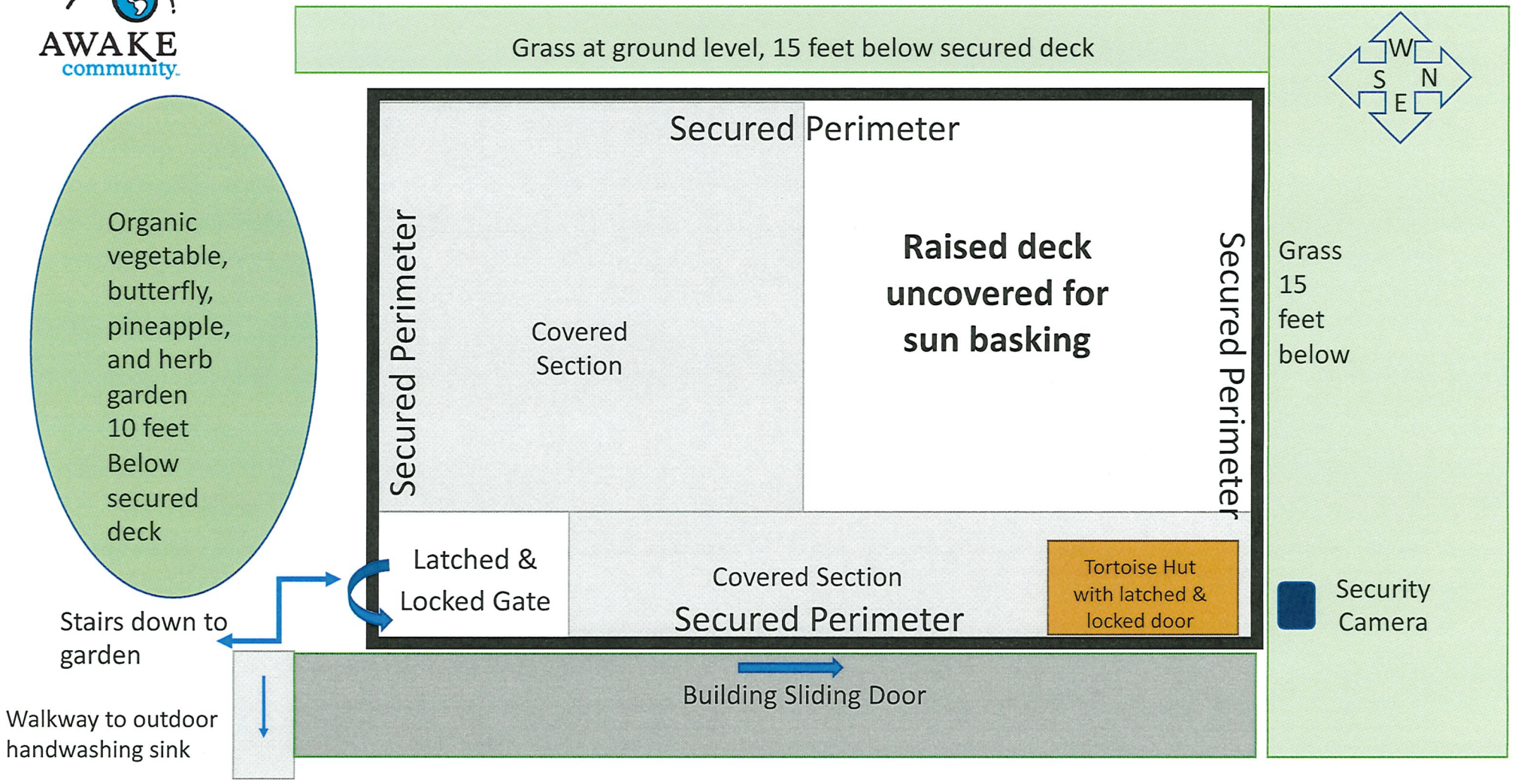
Learn more about our work on organic gardening, stewardship for endangered species, establishing native plants, and living sustainably from the land at:

AWAKE community™ .org

awakecommunity.us

Attachment 15

Shambhala Gardens - Kilauea, Kaua'i - Tortoise Habitat Schematic



Attachment 16

California Turtle and Tortoise Club
A Society Dedicated To Turtle & Tortoise Preservation, Conservation, Study and Education

April 25, 2023

Emily Richards
AWAKE Community
7475 Koolau Rd E
Kilauea, HI 96754

Dear Ms. Richards:

Thank you for your continued communications regarding George, the desert tortoise that you adopted through California Turtle and Tortoise Club (CTTC) in 2016. I have enjoyed the updates and periodic photos that highlight the exemplary care you have provided to him over the last seven years.

As we have discussed, I feel it would be in George's best interest to continue to live with you and John, his caretakers, with the move of your nonprofit organization's headquarters from southern California to Kauai. You are such a huge part of his daily routine, and he of yours, a truly unique relationship.

The research you've performed to date is quite valuable, lays out some of the challenges for adopted desert tortoises in coastal southern California where temperatures are regularly lower than is needed for the optimal health of the desert tortoise. We receive a number of requests from persons who live not on the coast itself, but within a somewhat cool proximity. Your research will help us with placements in those areas, and to assist those adopters to enable desert tortoises to live a healthy life in them. Proper care for many desert tortoises in your climate zone often requires man-made lighting, warm baths, and other helpful human interventions for the well-being of desert tortoises. Our obligation when adopting them is to provide the best living circumstances, as they are a species listed as threatened on both the California and Federal Endangered Species Lists.

The warmer temperatures, comparable humidity and other climate data you've compiled for Kauai is promising for George's physical health. We look forward to receiving the continued research performed on his behalf after relocation -- from the habitat you've constructed in Santa Monica to the one you've built at Shambhala Gardens in Kilauea, Kauai.

On March 12, 2016 on behalf of California's Department of Fish and Game, I was pleased to issue you and John a Permit to Possess a Desert Tortoise for George (tag #227062). Members of California Turtle & Tortoise Club help to maintain the database of captive desert tortoises, and process and issue the permits and registration materials for California Department of Fish and Wildlife's "Permit to Possess Gopherus Tortoises" program. The program was designed to allow the legal possession of a protected species (i.e. the desert tortoise) which has a large captive population but is endangered in the wild.

Thank you for your continued determination to honor the commitment you made to CTTC when you and John adopted George. The stewardship of a desert tortoise is a serious one, and care requires fastidious husbandry. We appreciate you, John, and AWAKE Community, for fulfilling the duty upon which you have agreed.

We look forward to your continued research and updates on George after his relocation.

Respectfully,

Karen Berry
Treasurer/Adoption Team
CTTC Valley Chapter

Dr. Frank Lavac (CA license #07316)
VCA Wilshire Animal Hospital
2421 Wilshire Blvd.
Santa Monica, CA 90403

10 May 2023

Emily Richards
AWAKE Community
7475 Koolau Rd E
Kilauea, HI 96754

Dear Ms. Richards,

I am writing on behalf of the California Desert Tortoise (Gopherus agassizii) in your care, “George”. “George” is registered with the California Fish and Wildlife, # 227062. His hatch date is 2 Aug 2000 and he is nearly 23 years old. He was adopted by John and Emily Richards Nogawski (AWAKE Community’s directors), in 2016 through the California Turtle and Tortoise Club and the California Fish and Wildlife Dept.

I have been examining reptiles since 1980 and have treated hundreds of California Desert Tortoises (CDT). The data supplied by AWAKE Community showing comparable Temperature , Humidity and Wind speed and was helpful in formulating an assessment.

I have evaluated the data provided by AWAKE Community and I have examined “George”. I believe that he will successfully transition from Los Angeles to Kauai. CDT’s have a highly evolved thermoregulatory physiology and he should readily adapt to this Kauai ecologic niche. “George” should continue to thrive in his new environment.

Please let me know if I can be of further assistance.

Regards,

Frank Lavac MS, DVM
Medical Director
VCA Wilshire Animal Hospital
2421 Wilshire Blvd
Santa Monica, CA 90403