

2nd
3rd revision

MAR 23 2018

College of Natural Resources & Sciences
Humboldt State University

HUMBOLDT STATE UNIVERSITY
**INSTITUTIONAL ANIMAL CARE AND USE PROTOCOL
FOR THE HUMANE CARE AND USE OF LIVE VERTEBRATE ANIMALS**

**This box is for the review of the use by the Institutional Animal Care and Use Committee.
Authors should not write or type inside the borders of the box.**

Date 1st Received: 3/18/18 Revision 1 Date: 3/20/18 Revision 2 Date: 3/23/18 No. 17,18 B.72- A

- () E- Procedures are exempt from full IACUC review because they are purely observational, non-invasive, and produce no perceptible discomfort or they concern only the use of tissues from dead animals. To be considered exempt, tissues from dead animals must be obtained from animals euthanatized or otherwise killed by means, and for purposes, unrelated to the proposed project. The procedure may be approved by the Chair one additional member of the IACUC.
- (X) A- Procedures will be minimally invasive or produce relatively little discomfort. Protocols may involve, bleeding, injections, minimal sampling, anesthesia or humane euthanasia without prior invasive manipulation. The procedure may be approved by the Chair and two additional members of the IACUC. Project topics will be reviewed by the IACUC at the next scheduled meeting.
- () B- Procedures will involve prolonged manipulation or be invasive. Protocols may involve surgical or other stimuli inducing pain or distress, but all pain or distress will be mitigated with appropriate anesthetics or analgesics. The procedure may be initially approved by the Chair, the Campus Veterinarian and one additional member of the IACUC. Protocols will be reviewed by the IACUC at the next scheduled meeting.
- () C- Procedures will be invasive and may cause prolonged physiological or psychological stress. Pain, considerable distress, or discomfort may be induced and not mitigated by anesthesia or adequate analgesia (e.g. LD50 experiments, long-term food or water deprivation, etc.). These protocols will be reviewed thoroughly by the IACUC prior to commencement of the project.

Requires Health Assurance (X) Yes () No

Margaret Heland 3/22/18
Signature, IACUC Member Date

(X) Approved () Denied

see attached email 3/22/18
Signature, IACUC Member Date

(X) Approved () Denied

Signature, Campus Veterinarian (if necessary) Date

() Approved () Denied

[Signature] 3-23-18
Signature, IACUC Chair Date

(X) Approved () Denied

Final Committee Decision. All protocols must be approved prior to the start of research.

Protocol Edition 2/15/2017

1. Faculty Project Leader: Dr. Dawn Goley

Department Affiliation: Biological Sciences

2. Project Title: Population Dynamics of the Northern Elephant Seal in King Range Conservation Area

3. Email address(es) of the Faculty Project Leader and other corresponding applicants:

Pdg1@humboldt.edu

4. Names of others handling live animals in the absence of, or not directly supervised by, the faculty project leader, and their qualifications to perform the procedures indicated. (Do not include class rosters here - see 8 below):

Crew leads: Parker Forman and Claire Nasr have a combined 10 years of experience in flipper tag application and will be the only researchers to approach and apply flipper tags. Collectively they have deployed tags on hundreds of elephant seals and on all age classes of elephant seals. Parker and Claire have worked on elephant seal demographics studies for a long-term research project of Dr. Dan Costa at the University of California Santa Cruz and have come highly recommended to work on this project. Parker and Claire have had significant experience working with elephant seals colony at the Año Nuevo Rookery at Año Nuevo State Park in Santa Cruz county. PI Dr. Goley has experience tagging harbor seals and Steller sea lions.

PI, Parker Forman or Claire Nasr will be in the field with HSU students and volunteers on each observation survey. PI, Parker, and Claire will be opportunistically flipper tagging, and as part of this method will briefly handle the rear flippers of northern elephant seals while they are sleeping. To mitigate the risk of physical interaction with elephant seals, only experienced field personnel (PI, Parker and Claire) will approach the seals to the 0-5 m distance and that will be done using standard techniques to lessen the impact on individual behaviours including moving slowly in a crouched posture. Students and volunteers will be assisting with our tagging efforts by taking notes and they will not be handling live animals. HSU students who may join us in the field include: Paul Ruiz-Lopez, McKenzie Bartie, Jackie Parry, Rachel Hein, Cecilia Ledesma, Sean Thull, Elizabeth Nguyen, Katrina Smith, Trinity Smith. No one will be handling live animals, but either Parker Forman, Claire Nasr or the PI will be in the field with HSU students and volunteers on each observation survey. Parker and Claire have had significant experience working with elephant seals at the Año Nuevo Rookery at Año Nuevo State Park in Santa Cruz county. They have worked at the colony on a long-term research project of Dr. Dan Costa and have come highly recommended to work on this project. HSU students who may join us in the field include: Paul Ruiz-Lopez, McKenzie Bartie, Jackie Parry, Rachel Hein, Cecilia Ledesma, Sean Thull, Elizabeth Nguyen, Katrina Smith, Trinity Smith

5. Will the described project be funded? ☐ Yes ☒ No

If funded, will the funds be administered by the HSU Sponsored Programs Foundation (SPF)?

☐ Yes ☐ No

If funded, but not administered by the HSU SPF, then list the unit that will administer the funds:

Click or tap here to enter text.

6. Proposed starting date (the starting date cannot precede date of approval, and all protocols must be renewed or extended annually). The Annual Protocol Review Form must be approved on or before the anniversary of the approval date to indicate termination of the project or to request extension of the dates of approval.

We are already conducting observations on these animals under IACUC 1718.B.39-E. This is a replacing request in order to include tagging abilities. We will begin tagging as soon as this new proposal is approved.

Upon Approval

7. **Provide a brief, non-technical, description of the project. Your response should include the proposed goals, general methods, and educational or scientific objectives that the proposed use is designed to meet.**

We propose to document the distribution and abundance of elephant seals in the King Range Conservation Area along the Lost Coast. This is a newly emerging colony of which little is known. We will be working with the Bureau of Land Management (BLM) to document the abundance and distribution of elephant seals on their rookery throughout the breeding season (December- March) and during the off-breeding season (March - November). Observations will include counting the elephant seals of different age/sex classes from the adjacent berm using binoculars. We will also record the color and embossed number from cattle ear tags that have been applied to the flippers of elephant seals from different rookeries throughout California. We will attach cattle tags to the hind flippers of all seals on the King Range colony with colony specific tags.

8. **Is the primary purpose of the project for ☐ instruction, ☒ research, or ☐ both?**

Based on your answer, please address the relevant questions below.

If the primary purpose is for instruction, list the course number and write the CRN for this semester (note that this CRN will need to be updated with any future offering of the course covered by this protocol).

Course # (e.g. ZOOL 356): Click or tap here to enter text.

CRN: Click or tap here to enter text.

Will all of the enrolled students in the course denoted by the CRN above participate in the use of animals covered by this protocol? ☐ Yes ☐ No

If no, then provide a list of the students exposed to, or otherwise using, live vertebrate animals.

Click or tap here to enter text.

Describe the learning objectives that justify 1) the use of, and 2) duplication of procedures involving, live animals for instruction.

Click or tap here to enter text.

If the primary purpose is for research, explain how you determined that this protocol does not unnecessarily duplicate previously published observations or experiments; please include:

1. **the type of literature searches conducted:**
Google Scholar
2. **keywords used:**
Elephant Seal populations and Tagging

3. range of dates searched:

1960-present

4. other resources used:

Local and Regional Expertise

9. Will any of the animals described in this protocol be housed in an animal facility?

☐ Yes ☒ No

If yes, check the appropriate facility below:

☐ Biological Sciences Animal Rooms

☐ Fish Hatchery

☐ Samoa Aquaponics

☐ Telonicher Marine Lab

☐ Wildlife Pens

☐ Zebra Fish Development Lab

☐ Other. Please list: Click or tap here to enter text.

9a. Facility managers must be consulted prior to submitting protocol form. Please enter the date the manager was consulted: Click or tap here to enter text.

10. Scientific name, common name, and characteristics of all species to be used. List species separately to explain variation in use. Please also list the total numbers of animals to be used or substantially affected by this project.

For field studies, please list all target species and note their status (not protected = NP; protected, including species of special concern or candidate species = P; considered by the state or federal government to be threatened = T, considered by the state or federal government to be endangered = E); also list non-target species that are likely to be impacted. List the range of numbers of individuals to be used for each species.

TARGET SPECIES - please attach additional pages if needed

Latin Binomial(s)	Common name(s)	Sex	Age or Wt Range	Status	Numbers
<i>Mirounga angustirostris</i>	Elephant Seal	M	Pup to sub-adult	NP	500
<i>Mirounga angustirostris</i>	Elephant Seal	F	Pup to adult	NP	500
Click or tap here to enter text.	Click or tap here to enter text.	Select One	Click or tap here to enter text.	Select One	Click or tap here to enter text.
Click or tap here to enter text.	Click or tap here to enter text.	Select One	Click or tap here to	Select One	Click or tap here to

			enter text.		enter text.
Click or tap here to enter text.	Click or tap here to enter text.	Select One	Click or tap here to enter text.	Select One	Click or tap here to enter text.
Click or tap here to enter text.	Click or tap here to enter text.	Select One	Click or tap here to enter text.	Select One	Click or tap here to enter text.

NON-TARGET SPECIES – please attach additional pages if needed

Latin Binomial(s)	Common name(s)	Status	Numbers
<i>Phoca vitulina</i>	Harbor Seal	NP	500
Click or tap here to enter text.	Click or tap here to enter text.	Select One	Click or tap here to enter text.
Click or tap here to enter text.	Click or tap here to enter text.	Select One	Click or tap here to enter text.
Click or tap here to enter text.	Click or tap here to enter text.	Select One	Click or tap here to enter text.

- 11. Explain why a smaller number would not allow you to meet your objectives (please provide justification based on statistical or other logical reasoning). If this is a field project, and you cannot predict the exact number of animals to be sampled, please give your best estimate and an explanation of the variables that will determine your sample size. N/A is an inappropriate response unless the protocol covers only the transportation, use, and/or storage of carcasses or tissues.**

We will record natural history information of all animals on the rookery. To date this number has not exceeded 200 for both sexes. There is some potential that the colony could grow this year to 300, but there is no way to know this at this time. We are not subsampling from the group - we are simply documenting the demographic information from the animals present.

- 12. Source of the animals (or tissues) to be used for captive studies or the location of study area(s) for field studies. For transportation, storage, and use of tissues from carcasses, explain the circumstances of death. If this information is unknown, provide the name and contact information for the person or company from which the samples are to be obtained.**

We will not be capturing any animals.

13. Will live vertebrate animals be maintained in captivity for greater than 12 hours?

☐ Yes ☒ No

If yes, describe where and how the animals will be housed (include all relevant husbandry details):

Click or tap here to enter text.

Who will be responsible for their daily care?

Click or tap here to enter text.

14. List the specific procedures likely to affect the behavior, physiology or wellbeing of live animals.

Remote observation of elephant seals is unlikely to cause a reaction in the subjects. Closer inspection of the tags may cause an animal to lift its head briefly before resuming rest on the rookery. We don't expect any physiological impact on the animals or any direct or indirect impact on the well-being of the elephant seals from behavioral observation and tag assessment.

We are also proposing to tag elephant seal hind flippers with cattle ear tags (Allflex Inc. "Global sheep tags"). The tag application process may yield some short-term effects on the behavior, physiology or wellbeing of the animals. The type of tags and methods for application proposed for this project are the same that have been used in all other elephant seal colonies (and the majority of pinniped colonies) for the past 50 years. This is the standard for pinniped (seal and sea lion) resighting protocols throughout the US. Although this method may cause some short-term reactions in the subjects, the crew follows standard protocol to reduce the potential stress in the short-term and long-term to reactions to this process are unlikely.

15. Mark the level of expected pain or distress caused by your methods below.

- ☐ The methods described are purely observational and non-invasive OR will involve only the tissues or carcasses of dead animals; behavior of live animals will not be influenced intentionally.
- ☐ The methods will affect behavior, but no animals will be captured or handled (e.g. baiting animals, cameras in close proximity to animals, production of noises within normal limits of volume and frequency)
- ☐ The methods involve capture or handling without anesthesia, but only for a brief period for measurement or observation. No samples will be collected.
- ☒ The methods involve capture or handling without anesthesia, and routine samples (hair, blood, etc.) will be collected or euthanasia will be performed; this may involve use of routine pharmaceuticals to promote health (e.g. antibiotics, vitamins, fluids). This work may also involve temporary marking, placement of permanent tags, or fitting with telemetry transmitters or GPS receivers.
- ☐ The methods require use of anesthesia to mitigate distress or facilitate handling, and routine samples (hair, blood, etc.) will be collected or euthanasia will be performed. As above, this work may involve temporary marking, placement of permanent tags, or fitting with telemetry transmitters or GPS receivers.

- ☐ The methods require use of anesthesia to mitigate pain or distress, and procedures will be invasive enough to require pain killing drugs (analgesics) upon revival. Sampling and marking may be performed as above.
- ☐ The methods will cause pain or considerable distress, but analgesics will not be used to mitigate the pain (e.g. surgeries from which animals are revived without provision of analgesics).
- ☐ The methods will be invasive and cause prolonged physiological or psychological stress without adequate mitigation of pain or distress. This may involve allowing animals to progress to death without provision of euthanasia or analgesia (e.g. LD50 experiments or long-term food or water deprivation).

16. Provide a complete and detailed description of all procedures to be performed involving live vertebrate animals. This response should justify comments made in # 13-15 and provide a detailed explanation of all procedures that affect animal behavior, physiology or wellbeing. Your response must address the handling and restraint of animals; deprivation of food or water; use of chemicals or biological agents; sampling methods for removal of biological samples; surgical and post-surgical procedures. N/A is an inappropriate response unless the protocol covers only the transportation, use, and/or storage of carcasses or tissues.

To determine age and sex and presence of tags, elephant seals will be observed using binoculars from a distance of 10-50 meters away. Elephant seals on the rookery are not likely to be disturbed from approach at this distance, based on experience with them in the field. The age and sex of each individual will be determined by observing the external morphology of the animals. If a tag is seen from the berm using binoculars, either the PI, Parker or Claire will approach the tagged individual to a distance from 0-5 meters to read the embossed number on the tag. In the 50 years of elephant seal research through UC Santa Cruz, these techniques to approach elephant seals have been used to identify age/sex classes and to read tags and result in little to no reaction. If elephant seals do respond it will be by raising their head before resuming their resting state. To reduce response, only one of two people will be at the closest distance at any time. When approaching, the PI, Parker or Claire will approach slowly and in a crouched position to lessen the potential for disturbance as is the established protocol for approaching elephant seals on the other colonies in California. Surveys will be conducted 1-2 x per week during the peak breeding season (December- March) and 1-2X month during the off season.

To determine age and sex and presence of tags, elephant seals will be observed using binoculars from a distance of 10-50 meters away. Elephant seals on the rookery are not likely to be disturbed from approach at this distance, based on experience with them in the field. The age and sex of each individual will be determined by observing the external morphology of the animals. If a tag is seen from the berm using binoculars, either the PI, Parker or Claire will approach the tagged individual to a distance from 0-5 meters to read the embossed number on the tag. In the 50 years of elephant seal research through UC Santa Cruz, these techniques to approach elephant seals have been used to identify age/sex classes and to read tags and result in little to no reaction. If elephant seals do respond it will be by raising their head before resuming their resting state. To reduce response, only one of two people will be at the closest distance at any time. When approaching, the PI, Parker or Claire will approach slowly and in a crouched position to lessen the potential for disturbance as is the established protocol for approaching elephant seals on the other colonies in California. Surveys will be conducted 1-2 x per week during the peak breeding season (December- March) and 1-2X month during the off season.

Applying identification tags to elephant seals in this study will allow us to track these animals over their lifetime, establish baseline information on the return rate of the local breeding population, assess the population growth of the colony, help us determine immigration and emigration rates, and allow for individuals to be identified at other colonies. These tags are designed as livestock ear tags and are the standard used in seal and sea lion research. The method for tag application in elephant seals has been widely used by researchers at all colonies in the United States and Mexico, is the most effective long-term method for identification purposes with minimal potential stress to animals and no anesthesia is required. Although this method may cause some

short-term reactions in the subjects, the crew follows strict protocol to minimize the potential stress including: selecting sleeping subjects that are least likely to react to tag application, choosing subjects that are not close to nursing pups or in the harem, slowly approaching resting elephant seals from behind, gently spreading their flippers apart while they are resting and attaching the identification tag between the digits in the webbing of the seal's flipper using a tag applicator. The tags are applied quickly (3 to 5 seconds) and may cause some short-term effects and changes in the subjects' behavior before they resume their resting state. Following tag deployment, researchers silently move away from the animal and allow it to return to its resting state. Long-term effects to this process are unlikely.

While this method may seem unusual for tagging wild terrestrial mammals, this level of response is not unusual for elephant seals. In over 90% of the cases, the animal has continued to sleep or is briefly awoken before continuing to rest. In the less than 10% of the cases when a seal responded to tagging, the animal briefly woke up and turned over, and or may have moved a few meters away from the tagging before once again resting. The long-term physiology or wellbeing of the animals is likely not affected as a result of tag application process and the short-term effects are reduced by selection of appropriate candidates, minimizing the time spent near the subject and on the colony.

Candidates for tag application include animals of all age classes except females nursing or non-weaned pups. Most of our tagging effort this spring will be allocated to the weaned pup age class and at this time of the season few adults are present at the colony. Tagging during this time period allows for the least amount of potential stress to occur and most flexibility in researchers movement on the colony. During the spring and summer molt and then again for the winter breeding season, subadults and adults will be returning to the beaches and tags will be deployed opportunistically on animals that are alone and are in their resting state. We will not tag adult males at this time. The tagging method for elephant seal research has been very effective across age classes at all other colonies and the primary crew has experience in tagging all age classes without incident.

Applying identification tags to elephant seals in this study will allow us to track these animals over their lifetime, establish baseline information on the return rate of the local breeding population, assess the population growth of the colony, help us determine immigration and emigration rates, and allow for individuals to be identified at other colonies. These tags are designed as livestock ear tags and are the standard used in seal and sea lion research. The method for tag application in elephant seals has been widely used by researchers at all colonies in the United States and Mexico, is the most effective long-term method for identification purposes with minimal potential stress to animals and no anesthesia is required. Although this method may cause some short-term reactions in the subjects, the crew follows strict protocol to minimize the potential stress including: selecting sleeping subjects that are least likely to react to tag application, choosing subjects that are not close to nursing pups or in the harem, slowly approaching resting elephant seals from behind, gently spreading their flippers apart while they are resting and attaching the identification tag between the digits in the webbing of the seal's flipper using a tag applicator. The tags are applied quickly (3 to 5 seconds) and may cause some short-term effects and changes in the subjects' behavior before they resume their resting state. Following tag deployment, researchers silently move away from the animal and allow it to return to its resting state. Long-term effects to this process are unlikely.

old
text

While this method may seem unusual for tagging wild terrestrial mammals, this level of response is not unusual for elephant seals. In over 90% of the cases, the animal has continued to sleep or is briefly awoken before continuing to rest. In the less than 10% of the cases when a seal responded to tagging, the animal briefly woke up and turned over, and or may have moved a few meters away from the tagging before once again resting. The long-term physiology or wellbeing of the animals is likely not affected as a result of tag application process and the short-term effects are reduced by selection of appropriate candidates, minimizing the time spent near the subject and on the colony.

Candidates for tag application include animals of all age classes except females nursing or non-weaned pups. Most of our tagging effort this spring will be allocated to the weaned pup age class and at this time of the season few adults are present at the colony. Tagging during this time period allows for the least amount of potential stress to occur and most flexibility in researchers movement on the colony. During the spring and

summer molt and then again for the winter breeding season, subadults and adults will be returning to the beaches and tags will be deployed opportunistically on animals that are alone and are in their resting state. Although our colony does not currently have any adult class males, tag application methods on older and larger animals will be the same used on other age classes. The tagging method for elephant seal research has been very effective across age classes at all other colonies and the primary crew has experience in tagging all age classes without incident.

Tagging Effort:

Tagging efforts of weaned elephant seal pups will occur over two-three weekends in March-April. Tagging of subadults and adults will occur opportunistically when subjects are present, in a optimal position, are in a resting state, a position where we can minimize our presence and the disturbance to the subject. The tagging effort may occur concurrently with the weekly observational study during the molting period, fall haul-out, and winter breeding season and only when the conditions are appropriate and safe to do so. Tagging intermittently throughout the season allows for the researchers to minimize their presence on the colony and allows for less disturbance to occur to the rest of the colony as they have time to wait for the candidate to be in an appropriate position in accordance with protocol.

Tag Information:

Allflex Inc. "Global Sheep" tags will be used in the study and are in accordance with the type of tags used by other studies. The dimensions of the allflex tags are 5/8" long, 2" high, are made of flexible material and are inscribed with an alpha (K) followed by three digits (K001-K200) on both sides. We have also reached out for comment to all of the other colonies and have aligned our tag type, color and series with the suggestions of all other research occurring on the west coast. The male and female ends of the tags are connected with the use of applicators that quickly connect the two parts while still allow for rotational movement of tag to occur for comfort in the webbing of the hind flipper.

old text

17. Use of animals for teaching or research requires consideration of alternative procedures to reduce the number of animals used and the pain and suffering caused by animal use. Explain how you determined whether alternative procedures were feasible for your study.

Please refer to the Altweb website (<http://altweb.jhsph.edu/resources/searchalt/>), which provides links links to search engines and provides general information on alternatives, for help in searching for alternatives to animal use.

- 1. the type of literature searches conducted:**
Biosis, Science Direct, Zoological Record, Google Scholar
- 2. keywords used:**
elephant seal, survey, tags, life history
- 3. range of dates searched:**
1960-present
- 4. other resources/methods used to determine alternative procedures:**
Colleagues who have been studying Elephant seals in California for the past 20-30 years.

18. Describe alternative procedures that were considered and rejected and a brief explanation of why the alternative procedures were rejected. N/A is an inappropriate response unless the protocol covers only the transportation, use, and/or storage of carcasses or tissues.

Visual surevys are an effective method to document the age/sex class of elephant seals on the rooker and to resight tags. Alternative methods to surveying including aerial surveys and drones, but do not provide the detail needed to assess age/sex class or to read tags without disturbance.

Although flipper tagging seals is the most commonly implemented strategy for identification and tracking of seals over time, other alternate methods were considered. Photo identification can be used to identify older

males who have unique scarring from competitive fights as well as other elephant seals with unique scarring. The photo identification method was rejected because it is not a reliable way to identify a majority of individuals who do not have unique scarring patterns and young who are visually identical. Compared to tagging, branding seals would be a more effective way to identify and track an animal over its lifetime and brands can be resighted at a greater distance than tags. The branding seals method was rejected because can cause significant stress and pain to animals, requires a large crew to help restrain seals which may cause great distress to the animals. The flipper tagging method was selected because it is tested and varified method to effectively track individuals in the population, minimize our presence on the colony, no restraint of animals is necessary, and potential stress/pain to the animals in the application of ID tags is minor.

19. Identify serious human health risks (non-routine exposures to risk, disease agents, toxic chemicals, dangerous environmental conditions, etc.,) to which any participants might be exposed during the routine performance of the duties proposed herein.

The main health risks to participants are associated with travel to and from the colony as it is located on a remote stretch of beach along the Lost Coast Trail in the Kings Range. There is a very low health risk associated with the observation of elephant seals on the rookery from the trail. The observation point is approximately 20 meters from the elephant seal colony and is behind a raised berm adjacent to the beach. To mitigate the risk of physical interaction with elephant seals, only experienced field personell {PI, Parker and Claire) will approach the seals to the 0-5 m distance and that will be done using standard techniques to lessen the impact on individual behaviours including moving slowly in a crouched posture. Each of us has experience working on an elephant seal colony and has been trained in this approach.

Tagging animals intermittently and opportunistically throughout the season also allows for reduced risks to occur because primary researchers have more time and have the opportunity to select candidates when they are in a safe position for tag application.

Describe steps taken to mitigate risks.

We have devised a safety propotocl to check on the health and well being of all field participants. We have supplied safety equipment to the reserachers in the field. Each field tieam will be supplied with SPOT tag (Smart Position Only Tag) which enables crew leaders to track the loataion of field team on site. Observers will never be on colony alone and will have hand-held radios to communicate while in the field. We have a field first-aid kit and contact information for an occupied cabin within one mile of the rookery. The crew checks in with John Mcabery who lives in a small cabin near the haulout. Although there is no phone service on the coast, John has emergency response equipment and a nearby vehicle to assist in the case of emergency.

There is a potential, although very unlikely, risk for the primary researchers (PI, Parker, Claire) to be bitten by elephant seals in the tagging process. This risk, although serious, is very unlikely to occur because the primary researchers have been trained to work in pairs (for safety measures) and only select to tag seals that are in a location and behavioral state (sleeping) that will minimize the potential stress to the animals and risks to the primary researchers tagging the seals.

Application of tags to the hind flippers of elephant seals reduces the opportunity for any harm to researchers as they are positioned far away from head of the animal. Working in pairs also allows for multiple eyes to be present to monitor and prevent risks from occurring. The primary researchers (PI, Parker and Claire) are always safety conscious and tagging of seals will only happen when the conditions are in the best interest and well-being of the animals and the safety of the crew.

20. Describe the fate of the animals upon completion of the protocol. Include (1) the procedure for euthanasia whether necessary as an experimental termination or in the case of unanticipated, accidental, injury whenever animals will be confined or handled and (2) the method of verification of death. Chemical euthanasia methods must include an appropriate, pharmaceutical-grade, drug, the route, and the dose to be used. Applicants should review the current Guidelines for Euthanasia (or its replacement in the Code of Federal Regulations), and justify any variations from the approved methods. Note that the Responsible Faculty Member must report unexpected deaths to the IACUC immediately and that N/A is an inappropriate response unless the protocol covers only the transportation, use, and/or storage of carcasses or tissues.

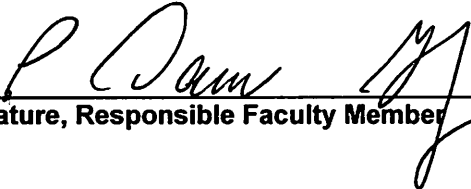
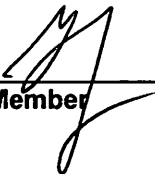
In the extremely unlikely even that an animal requires euthanization, we will contact the North Coast Marine Mammal Center in Crescent City to respond. They are the authorized marine mammal response team for sick/injured animals.

21. I certify by checking each of the boxes below, that all of the following are true:

- ☒ I have read and agree to abide by the "Principles for the Utilization and Care of Vertebrate Animals Used in Testing, Research, and Training at HSU," and that I will make copies of these principles and other pertinent guidelines available to those persons who work under my supervision, and that deviations from this protocol, including any unanticipated injuries or death of animals, will be reported *immediately* to the IACUC.
- ☒ My level of supervision will be such that the procedures outlined in this protocol will be carried out in a humane and a scientifically acceptable manner as described herein.
- ☒ I take responsibility for the conduct of anyone working under this approved protocol, and I will supervise the research to ensure that no work is conducted that is not covered herein or in a separate approved protocol.
- ☒ I will ensure that no work described in this protocol will begin until the protocol has been fully approved by the IACUC, and that I will adhere to all deadlines and procedure outlined in the HSU ANIMAL WELFARE ASSURANCE in accordance with the PHS Policy for Humane Care and Use of Laboratory Animals.
- ☒ I am aware that my research might require permits from federal and/or state agencies that regulate the harassment, capture, transport, captive maintenance, handling and manipulation of live vertebrate animals.
- ☒ My research will be conducted in accordance with all relevant federal and state laws.
- ☒ My study does not unnecessarily duplicate previous studies using live vertebrate animals, as determined through literature database searches.
- ☒ I have considered the use of less invasive procedures, use of fewer numbers of animals and have determined that the methods proposed in this protocol are justified for the research and/or instructional objectives described herein.

I am aware that the following Acts apply to my study (check all that may apply):

- ☐ Animal Welfare Act
- ☐ State of California Fish and Game Commission (Title 14) - Scientific Collecting Permit(s)
- ☐ Endangered Species Act
- ☐ Fishery Conservation and Management Act
- ☐ Lacey Act
- ☒ Marine Mammal Protection Act
- ☐ Convention on International Trade in Endangered Species of Wild Fauna and Flora
- ☐ **Other: please list** Click or tap here to enter text.

  22 March 2018

Signature, Responsible Faculty Member Date