

FEB 24 2014

HUMBOLDT STATE UNIVERSITY
INSTITUTIONAL ANIMAL CARE AND USE
 PROTOCOL ROUTING SLIP

College of Natural Resources & Sciences
 Humboldt State University

The attached protocol for the humane care and use of live vertebrate animals was submitted on

20 Feb 2014 by Darren Ward for Masters Thesis
 (date) (faculty project leader) (course # if appropriate)

Check whether the work described in this protocol will be supported by funding administered by the
 (X) HSU Foundation, () another administrative unit -list _____, or () will be unfunded.

Animals used for this project will be housed in the following facilities (please check all that apply):

() Animal Rooms; () Fish Hatchery; () Game Pens; () Telonicher Marine Lab;

() Natural History Museum; () Other, specify site and room _____

Person / phone number (or e-mail) to contact: Darren Ward darren.ward@humboldt.edu x 3344

Project Title: Outmigration Behavior and Marine Survival as a Function of Rearing Habitat for Coho Salmon in the Shasta River, CA

ROUTE FIRST TO THE CHAIR OF THE IACUC, ASSOCIATE DEAN OF THE COLLEGE OF NATURAL RESOURCES AND SCIENCES (RM. 106C IN THE FORESTRY BUILDING). Please allow ten working days for review of proposals to conduct minimally invasive procedures and an excess of one month for review of proposals to conduct invasive procedures; note that these time periods are minimal and assume that no revisions will be necessary prior to approval. ALWAYS VERIFY APPROVAL (OFFICE OF THE CHAIR OF THE IACUC; 826-3256) BEFORE STARTING YOUR PROJECT.

THE REMAINDER OF THIS PAGE IS FOR THE USE OF THE INSTITUTIONAL ANIMAL CARE AND USE COMMITTEE

Date 1st Received 1/31/14

REVIEW

No. 13/14.F.63-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.

☒ 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.

[Signature]
 Signature, IACUC Member

2/25/14
 Date

☒ Approved

() Denied

[Signature]
 Signature, IACUC Member

2/27/14
 Date

☒ Approved

() Denied

Signature, IACUC Chair	2-28-11	<input checked="" type="checkbox"/> Approved	<input type="checkbox"/> Denied
Routing slip revision 05/09			

cc: ☐ Project Leader, ☐ Animal Facility Supervisor, ☐ Department Chair

PROTOCOL FOR THE HUMANE CARE AND USE OF LIVE VERTEBRATE ANIMALS

Federal animal welfare regulations require that an Institutional Animal Care and Use Committee (IACUC) review and approve all activities involving the use of vertebrate animals prior to their initiation. This includes any animals used for the development of experimental methodologies, instructional purposes, research, etc. Approved protocols for ongoing and recurrent activities must be reviewed by the IACUC on an annual basis. However, extensions and amendments requiring an abbreviated application process may be granted for a total of three consecutive years. Compliance with animal welfare regulations is mandatory and is the responsibility of all individuals (including faculty and students) who choose to work with live vertebrate animals.

To avoid the proliferation of submissions, please provide generic descriptions (including multiple routes of compound administrations, minor procedural variations, similar laboratory exercises from a single course, routine exercises used in several courses, etc). When multiple vertebrate species are to be used, please clearly describe all procedures, and all variations thereof, to be used with each individual species.

Once completed, signed, and dated, please submit your protocols to the Chair of the IACUC, Associate Dean of the College of Natural Resources and Sciences, Forestry Bldg, Room 106C. All protocols should be submitted on the most recent version of the forms. For your convenience, protocol forms are available in several software formats from the Chair of the IACUC, from several department offices and stockrooms, and they can be downloaded from the IACUC web page (<http://www.humboldt.edu/~iacuc>). You can expedite the review process by following these formatting rules: avoid changing the format of the routing slip unless minor reformatting is necessary to keep it to a single page; leave an extra blank line between your answers and the questions; leave questions in bold-face type; type your answers in regular (non-bold) type; and format the final signature page so that it begins with the final question. Please contact the Campus Veterinarian, Dr. Richard Brown, (by phone-826-3320, or e-mail- RNB2@humboldt.edu) with questions concerning protocol preparation and submission.

1. Course Number (if applicable).

Project Title (note that this title must match the title shown on the routing slip).

Outmigration Behavior and Marine Survival as a Function of Rearing Habitat for Coho Salmon in the Shasta River, CA.

2. Responsible Faculty Member: Instructor, Principal Investigator or Project Director.

Name **Darren Ward**

Department **Fisheries Biology**

3. Names of others involved in animal use activity and their qualifications to perform the procedures indicated.

Fisheries Graduate Student ^{4/17} Molly Gorman. Molly has been working on a related project in the

Shasta River since January 2012 as an employee of California Department of Fish and Wildlife (CDFW).

The CDFW field crew that runs the fish trapping and tagging program that this study is integrated with is supervised by Bill Chesney, MS in Fisheries and > 20 years with CDFW as a fish biologist.

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4. **Proposed starting date (the starting date cannot precede date of approval, and note that *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; annual review is automatic and you no longer need to submit an end date.

On approval.

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5. **Scientific name, common name, and characteristics of all species to be used. List multiple species separately to explain variation in use. For field studies, please list all target species, species listed as protected, threatened, or endangered by the USFWS or the state in which the work will be conducted, and any non-target species that are likely to be impacted.**

Latin binomial	Common name	Sex	Age or Weight Range
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Focal Species:

<i>Oncorhynchus kisutch</i> *	coho salmon	M & F	<1-1 year
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Other species that will encountered:

<i>Oncorhynchus tshawytscha</i>	Chinook salmon	M & F	<1 year
<i>Oncorhynchus mykiss</i>	steelhead trout	M & F	0-3 years

*Coho salmon in the Shasta River are listed as threatened on both state and federal Endangered Species Acts.

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6. **Number of animals to be used. Explain why a smaller number would not allow you to meet your objectives (please provide clarification if based on statistical 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. Write N/A if this protocol covers only the transportation, use, and/or storage of carcasses or tissues.

≤ 500 of the target species- coho salmon

This estimate is based on two years of tagging and may vary greatly depending on yearly conditions and the availability of fish suitable for tagging. Fish under 55 mm in length or that exhibit visible injuries or indications of smoltification will not be tagged. In order to maximize the number of fish detected in subsequent encounters it is necessary to tag as many individuals as possible. Due to the inherently inefficient nature of trapping as a sampling technique (on average less than 50% of fish passing the trap are captured) it will be necessary to tag all captured fish deemed to be of taggable condition and size in order to increase the precision of estimates of

outmigration rates and movement. However, 500 fish is the highest number that will likely be located and tagged during the sampling period.

Samples of adult coho salmon otoliths will be utilized from a sample archive. These otoliths are collected by CDFW personnel from coho spawned at the Iron Gate Fish Hatchery.

The other, non-focal, species listed may be encountered during sampling. These fish will only be handled by CDFW personnel as part of their ongoing sampling operations, not as part of this project.

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- 7. Source of the animals (or tissues) to be used or the 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.

Fish will be captured from the wild in the Shasta River and its tributaries located in Siskiyou County, CA. Otoliths will be procured from deceased animals collected by CDFW personnel at Iron Gate Fish Hatchery.

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- 8. If live animals are to be maintained in captivity for greater than 12 hours, explain where and how the animals will be housed and who will be responsible for their daily care.** If no animals will be maintained in captivity, please clearly state that to be the case. Write N/A if this protocol covers only the transportation, use, and/or storage of carcasses or tissues.

No animals will be maintained in captivity for greater than 12 hours. Some animals may remain in the flow-through live wells of traps for up to 24 hours (if traps are checked once daily). Molly Gorman and the CDFW sampling crew are responsible for the care and safe release of these individuals.

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- 9. Provide a non-technical description of the proposed goals, general methods, and the educational or scientific objectives that the proposed use is designed to meet.**

The Shasta River is utilized as habitat by the target species, coho salmon, which is listed as threatened in this area under the Endangered Species Act. Several studies have been completed and are in progress in order to determine successful methods to increase survival and overall health of this population. This project integrates with other ongoing work to characterize coho salmon emigration and rearing strategies in the Shasta River and evaluate the relationship of these juvenile life history traits to subsequent survival.

The Shasta River is a tributary to the Klamath River and is located far inland near the town of Yreka, CA. The river has been subject to a slew of adverse conditions leading to degradation of fish habitat. Coho salmon typically remain in fresh water for at least a year before outmigrating to the ocean. However, previous work indicates that young of the year coho salmon subjected to degraded habitat outmigrate earlier from the Shasta River in an attempt to find suitable rearing conditions in the main stem Klamath or other tributaries. Determining the fate and eventual rearing locations of these fish is one goal of this sampling effort. In the upper Shasta River, the Big Springs Creek tributary has maintained suitable habitat for coho salmon due to its spring fed

hydrology and maintenance by the Nature Conservancy, the property owner. Therefore this area has suitable habitat for juvenile coho year-round.

This study will determine how freshwater survival, growth, emigration behavior, and other life history traits differ between rearing habitats in Big Springs Creek and other areas of the Shasta River and whether these differences affect subsequent survival to adulthood. Juvenile coho salmon will be tagged with Passive Integrated Transponder (PIT) tags at various locations in the Shasta River. Movement and survival of these fish will then be monitored using remote antennas that log tag detections as well as separate collection of outmigrating individuals. These individuals will be leaving the Shasta River and entering the Klamath River either as juveniles seeking other rearing habitat or as smolts outmigrating towards the ocean. Detections of returning adults tagged as juveniles in previous years of sampling by CDFW will provide estimates of relative survival to adulthood based on differing juvenile life history strategies.

If detections of tagged adults are too low, otolith (ear bone) samples from natural origin fish captured at Iron Gate Fish Hatchery will be utilized to evaluate the juvenile life history strategies of adult coho salmon successfully returning to spawn in the Klamath River. Microchemistry analysis will be used to compare isotope ratios of Sr within the juvenile region of the otolith, as these isotopes reflect the ambient water conditions of the rearing location. The area of growth directly after emergence (natal site signature) will be compared with the region created during rearing and subsequent smoltification (rearing site signature). Comparing the natal site and rearing site signatures will indicate whether the adult fish (whose otolith is being analyzed) reared in its natal stream or emigrated to rear in a non-natal location. By determining the percentage of natural origin return individuals employing each life history strategy an estimate of relative contribution to the spawning population for each juvenile life history type can be determined. However, this is not the preferred approach for this study because results will not be specific to the Shasta River.

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- 10. Provide a complete and detailed description of all procedures to be performed involving live vertebrate animals.** Your response should address the handling and restraint of non-anesthetized animals; deprivation of food or water for a period that is atypical for this species; use of chemical or biological agents; the drawing of blood; the use of anesthetics, analgesics, sedatives or tranquilizers; surgical procedures; exposure to radioactive materials, known carcinogens, or highly toxic substances; and any post-operative procedures. Write N/A if this protocol covers only the transportation, use, and/or storage of carcasses or tissues.

Juvenile coho will be captured either by snorkeling with a hand net (Big Springs Creek) or in outmigrant screw traps operated by CDFW in the Shasta River. The screw traps will be checked daily at the very least by either the graduate student or CDFW personnel. Fish will be initially assessed as candidates for tagging. No fish less than 55 mm long or that exhibit signs of smoltification (silvery appearance, deciduous scales) will be tagged. Individual fish that are determined to be healthy and that have a fork length of 55 to 60 mm will be given a 9 mm PIT tag while fish with a fork length greater than 60 mm long will be given a 12 mm PIT tag. Healthy appearance will be determined by lack of visible injuries and sufficient body depth to support width and length of tag. Any fish not necessary for the study will be immediately released. Fish to be tagged will be placed into a tub of water treated with either carbon dioxide bubbled from a tank or from one tablet of Alka Seltzer Gold to anesthetize the animal. The anesthetizing water will be carbon dioxide saturated and fish will be submerged until equilibrium imbalance is observed. Then a 12-gauge needle will be utilized to make a small incision on the ventral left side of each fish between the pectoral and pelvic fins and a tag will be inserted. The needle will be sterilized using 99% strength isopropyl alcohol and rinsed with distilled water prior to each tagging event.

Each fish will have its length and weight recorded along with the unique tag identification number. Fish weight will be measured in grams by taring the weight of a container of water and then placing the fish in said container. Length will be measured while the fish is submerged in water whenever possible. If not possible the fish will be weighed outside of water, but maintained wet, very briefly. Once the coho has been tagged it will be placed into a bucket of cool water with less than 50 fish. An attached aerator will keep oxygen levels high and normal swimming ability and behavior will be confirmed before release. Prior to tagging, all fish will be scanned with a PIT tag reader to determine if fish is previously tagged. If so, the fish will be anesthetized as stated above and length and weight will be measured once again before following release procedure.

A large portion of fish (approximately 80%) tagged at the outmigrant screw trap will be released at the trap site to continue migration. Remaining fish (20% or less) will be transported to Big Springs Creek. This type of transplantation effort has been done successfully in the past and nearly identical protocols will be followed. Fish will be transported in buckets with external aerators attached and temperature will be consistently monitored. Prior to release at the new location monitoring will occur to make sure fish are exhibiting normal swimming behavior and do not look stressed. Water temperature will be stabilized in the bucket using water from the transplantation site. This will ensure temperature in the bucket is less than 2 degrees Celsius different from the transplantation site prior to release. This type of field experiment offers insight into whether fish that have started outmigration can shift strategies and remain in a suitable rearing environment if they encounter one.

Subsequent detections of tagged fish to assess survival and movement behavior will come from three sources: 1) antenna arrays stationed throughout the Shasta basin, the main stem Klamath River, and potential juvenile rearing habitats that outmigrants may encounter in other Klamath River tributaries 2) in-hand sampling conducted as tagging efforts continue for this project or by other fish population monitoring projects in the Shasta River, Klamath River, or other tributaries 3) antenna detections as fish return as adults in future years (or as tagged fish from previous cohorts return).

If the number of returning tagged adult detections is not sufficient for an assessment of the relationship between juvenile life history and survival to adulthood, otoliths from natural-origin, sea-run coho salmon collected in past years at the Iron Gate Fish Hatchery will be used. These otoliths are harvested post mortem by CDFW personnel at Iron Gate Hatchery after fish have been spawned and humanely euthanized. Microchemistry analysis will be used to compare isotope ratios of Sr within the juvenile region of the otolith, as these isotopes reflect the ambient water conditions of the rearing location. The area of growth directly after emergence (natal site signature) will be compared with the region created during rearing and subsequent smoltification (rearing site signature). Comparing the natal site and rearing site signatures will indicate whether the adult fish (whose otolith is being analyzed) reared in its natal stream or emigrated to rear in a non-natal location. By determining the percentage of natural origin return individuals employing each life history strategy an estimate of relative contribution to the spawning population for each juvenile life history type can be determined. However, this is not the preferred approach for this study because results will not be specific to the Shasta River.

11. Will any of these procedures cause pain or distress (other than that necessitated by collection, injection, and otherwise mild, momentary discomforts)? If so, please explain. Write N/A if this protocol covers only the transportation, use, and/or storage of carcasses or tissues.

No, see procedures as stated above.

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- 12. For researchers, explain how you determined that this protocol does not unnecessarily duplicate previously published observations or experiments (cite the type of literature searches as well as any other resources used). For instructors, explain the value of the lesson that merits using live animals. Write N/A if this protocol covers only the transportation, use, and/or storage of carcasses or tissues.**

A literature review surrounding this species and area has resulted in the discovery of no identical study. The California Department of Fish and Wildlife has participated in the transport of coho salmon and former HSU students have worked with PIT tagging coho. Data from these projects will be incorporated into the analysis for this study, but no similar combination of emigration study and PIT tagging study with this species and research area has previously been attempted.

Search Dates: 8/26/13 through 2/1/14 (Note: These searches occurred and were repeated on multiple dates throughout this time frame to search for relevant literature).

Literature Search Terms: juvenile coho rearing, coho marine survival, coho emigration strategies, coho fresh water survival, coho smoltification, juvenile coho growth, juvenile coho migration, juvenile coho movement, coho habitat use, coho temperature tolerance, Shasta river coho, coho migration timing, juvenile Salmonid pit tag, juvenile coho carbon dioxide tolerance, coho life history, juvenile coho dissolved oxygen, coho recovery plan, coho overwinter survival, otolith analysis, coho threatened status.

Databases Utilized: Fish, Fisheries, and Aquatic Biodiversity Worldwide and BIOSIS.

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- 13. Provide alternative procedures that were considered and rejected as well as a brief explanation of why the alternative procedures were rejected. Write N/A if this protocol covers only the transportation, use, and/or storage of carcasses or tissues.**

A habitat use study conducted using passive fish observation and habitat surveys was considered but rejected. This form of study would only indicate presence or absence of coho in various habitat types and would give no indication of movement, marine survival, or length and size of fish. To determine these factors and to comparatively study Big Springs Creek and the main stem Shasta River these fish need to be both handled and tagged. Minimally invasive procedures have been outlined as much as possible to maintain low impact of the study.

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- 14. Identify serious human health risks (expected exposures to disease agents, toxic chemicals used, dangerous environmental conditions, etc.) to which any participants might be exposed during the routine performance of the duties proposed herein, and describe steps taken to mitigate those risks.**

The primary human exposures for this project are related to use of and handling of isopropyl alcohol. Care will be taken when pouring the alcohol and personnel will use gloves when

immersing implements. HSU project participants have also completed lab training and hazardous materials safety training. In the event of hazardous environmental conditions (such as storms, etc.) sampling will be suspended. Any other environmental risks can simply be attributed to normal outdoor conditions and participants will be instructed in these potential risks (i.e. hypothermia, heat stroke, etc.)

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- 15. Describe the fate of the animals upon completion of the protocol. Include the procedure for euthanasia (if chemical, include drug, route, and dosage) and the method of verification (whether necessary as an experimental termination or in the case of unanticipated, accidental injury).** Note (1) that you must justify the scientific necessity for any variations from the established guidelines for euthanasia (2000 Report of the AVMA Panel on Euthanasia as published in the Journal of the American Veterinary Medical Association, 2001, 218(5): 669-696 or its replacement in the Code of Federal Regulations), (2) that you must report unexpected deaths to the IACUC as soon as possible to consider options, and (3) that you may write N/A only if this protocol covers only the transportation, use, and/or storage of carcasses or tissues.

After completion of the protocol fish will be returned to their natural habitat once normal swimming behavior has resumed. If for any reason the animal appears to be distressed or injured it will be monitored and given special care before release. Special care will include monitoring of water temperature in holding buckets and increased oxygenation through use of aerators. If a fish cannot be revived using these methods, it will be euthanized by overdose of MS-222 (250 mg/l buffered to neutral pH). Mortality will be confirmed after 5 minutes with no visible opercular movement.

16. I certify that the above information is accurate and complete, that 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," 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 to the IACUC. Further, my level of supervision will be such that these procedures will be carried out in a humane and a scientifically acceptable manner as described herein. I understand that, as the research supervisor, 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 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, and I have marked all boxes pertaining to the relevant laws (and state permits) governing the species used in my research. I certify that my research will be conducted in accordance with all relevant federal and state laws.

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

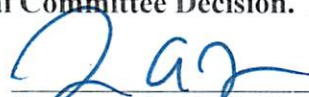
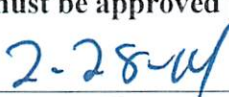
- ☐ Animal Welfare Act
☒ State of California Fish and Game Commission (Title 14) - Scientific Collecting Permit(s)
☒ Endangered Species Act
☐ Fishery Conservation and Management Act
☐ Lacey Act
☐ Marine Mammal Protection Act
☐ Convention on International Trade in Endangered Species of Wild Fauna and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

 
Signature, Responsible Faculty Member Date

Review by the IACUC Attending Veterinarian (if necessary):

Signature, HSU Veterinarian Date ☐ Approved ☐ Denied
Explanation of denial:

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

 
Signature, IACUC Chair Date ☒ Approved ☐ Denied
Explanation of denial:



Pat Comella <pec20@humboldt.edu>

Re: Review of IACUC Protocol No. 13/14.F.63-A

1 message

Darren Ward <Darren.Ward@humboldt.edu>
Reply-To: Darren.Ward@humboldt.edu
To: Ethan Gahtan <Ethan.Gahtan@humboldt.edu>
Cc: "iacuc ." <iacuc@humboldt.edu>

Tue, Feb 25, 2014 at 11:07 AM

Hi Ethan,

Sorry for not addressing that more clearly. This project is operating under the CA Dept of Fish and Wildlife 4d permits, not my research permit. Between their upper and lower basin permits, their take is >2000 fish, but this includes all of their projects on the Shasta (most of the fish tagged for this student's research project are ones they would be tagging anyway). The likelihood of us getting 500 as listed is very small, but tagging as many as possible is important. This is the first project that will attempt to track these fish after they exit the Shasta River, so every additional tagged fish increases the chance that we will get information on their movement and survival.
Darren

On Tue, Feb 25, 2014 at 10:35 AM, Ethan B. Gahtan <Ethan.Gahtan@humboldt.edu> wrote:

Hi Darren, Thanks for your revisions to this protocol. There is one question that you may not have addressed, re Q6. A reviewer asked " What is the take allowed by your NMFS permit?"

If there is a number to report here, I propose you email Pat (please copy me) and ask her to write it in to your revised protocol on file there. If you think there is no revision necessary, please email why in a reply all to this email.

Thanks, Ethan

On Tue, Feb 11, 2014 at 10:31 AM, Ethan B. Gahtan <Ethan.Gahtan@humboldt.edu> wrote:

Dear Darren,

Dear Darren,

I and another IACUC member have reviewed your above referenced protocol application and have the following revision requests. Please email me with any questions about these revision requests. Please submit a revised application to the IACUC office when you are ready.

Thanks,

Ethan Gahtan

(1st pg) Funding source is not listed.

Question 6:

- It's not clear what factors into the ability of individual fish to be tagged. Re-wording suggested.
- As the study concerns an ESA-listed species, tagging as many individuals as possible may not be appropriate. What minimum number of detections are needed to be statistically defensible? What is the take allowed by your NMFS permit?
- Non-focal species are likely to be captured in screw traps. Please describe their handling during the sampling process.

Question 9:

- Please describe how otolith samples are to be used. What will be measured, and how will this inform juvenile life history strategies? How is otolith analysis an alternative, in case detections of tagged adults are too low, for understanding life history of fish from different tributaries?

Question 10:

- What concentration of anesthetic will be used (mg/L CO₂)?
- Will a full strength solution of bleach be used for sanitizing needles?
- What percentage of tagged fish will be transported to Big Springs Creek? Please provide justification for the transplantation procedures (because this is a field experiment?), as this seems likely to be stressful for the animals, and describe how this will be accomplished in greater detail.

Question 12:

- Please specify the databases, dates, and search terms that were searched in your literature review.

----- Forwarded message -----
From: **Pat Comella** <IACUC@humboldt.edu>

Date: Wed, Feb 5, 2014 at 4:13 PM
Subject: IACUC: New Protocol No. 13/14.F.63-A

Please find attached new IACUC Protocol No. 13/14.F.63-A, titled "*Outmigration Behavior and Marine Survival as a Function of Rearing Habitat for Coho Salmon in the Shasta River, CA*". The point person on this protocol is Ethan Gahtan. Please let me know if you have any questions.

Don't forget, you can see a list of all protocols being reviewed, please be sure to check it periodically:
https://docs.google.com/a/humboldt.edu/document/d/13u7WZ6x9C7O7I_c8Y6DB82Gw4cScGJXNLUNvKPAcjB4/edit

Pat Comella | IACUC Staff Support
College of Natural Resources & Sciences
1 Harpst St., Forestry 101 | Arcata, CA 95521
707.826.3256 phone | 707.826-3562 fax

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