Field Biosafety Issues in Animal Wildlife Research

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Overview

- Lit Review
- Potential Hazards
- Limitations/Challenges in Managing Field Work Biosafety
- Potential Approaches for Managing Field Work Biosafety
- Summary

Literature Review

GUIDANCE ON SAFETY IN FIELDWORK © The University Safety and Health Association 2011
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"**It is stressed that by adopting this guidance it should not be necessary for institutions to increase bureaucracy prior to routine travel.**"

"…there will be many instances of field work that can be demonstrably assessed as low risk…"

Field Work

"Any work carried out by staff or students for the purposes of teaching, research or other activities while representing the institution off-site."

USHA UCEA Guidance on Health and Safety in Fieldwork

GUIDANCE ON SAFETY IN FIELDWORK, continued

- Roles and responsibilities
- Planning
- Threat analysis (wrt political instability)
- Risk assessment

'…should be undertaken by a competent individual, usually the person responsible for the fieldwork…'

'…[risk should be controlled]…so far as is reasonably practical…"

GUIDANCE ON SAFETY IN FIELDWORK…

- Emergency response planning
  - Available support
  - Missing persons procedure
  - Methods for contacting next of kin
  - Civil unrest and natural disasters
  - Medical emergencies…
  - Financial plan for emergencies
  - Communication strategy
  - Media management plan

GUIDANCE ON SAFETY IN FIELDWORK, continuted

- Insurance
- Information exchange/Communication
  - Emergency plans
  - Setting expectations for accommodations
- Competence/training
  - Combination of knowledge, experience, qualifications, acknowledging limitations
  - Academic competence vs management/leadership skills

Training Considerations

- **Fieldwork planning and orientation**
- **Risk assessment (as a dynamic process)**
- **Leadership**
- **Travel health**
- **Behavior**
- **Equipment**
- **Language, culture, and hostile environments**
- **First aid**
- **Activity training**
- **Emergency response**

GUIDANCE ON SAFETY IN FIELDWORK, continued

- Supervision (during work and non-work hours)
- Health and medical issues (OHSP)
- Consideration of third party providers
  - Travel
  - Activity leaders
  - Laboratories
  - Other contracted activities
- Accommodations, Meals, Transport, Equipment

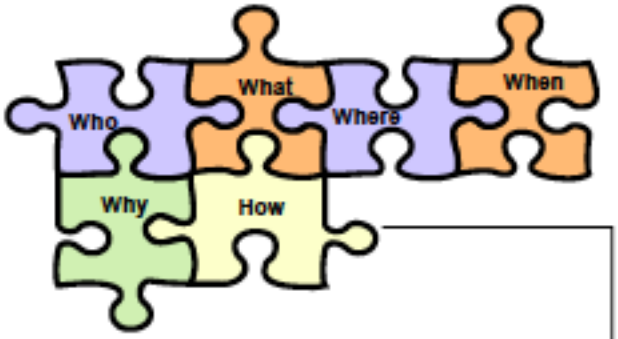
Literature Review

- National Park Service “Safe Work Practices for Employees Handling Wildlife”

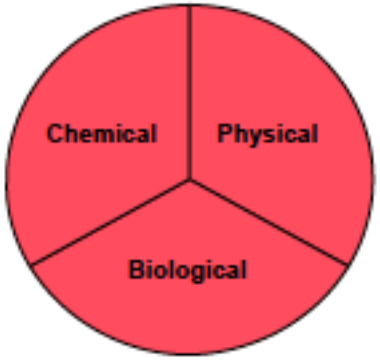
NPS OSHP Manual 50B: http://www.nps.gov/policy/RM50BTOC.pdf

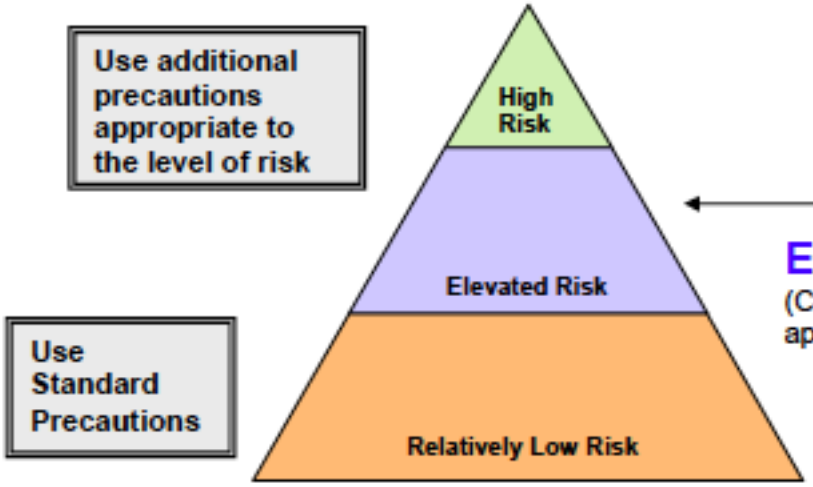
“A thorough understanding of potential hazards associated with different activities performed by employees working with wildlife…”

Plan
(Define the task and the context in which it will occur)



Prepare
(Understand the hazards; this may require outside assistance)





Execute
(Carry out the protective actions appropriate to the level of risk)

Literature Review

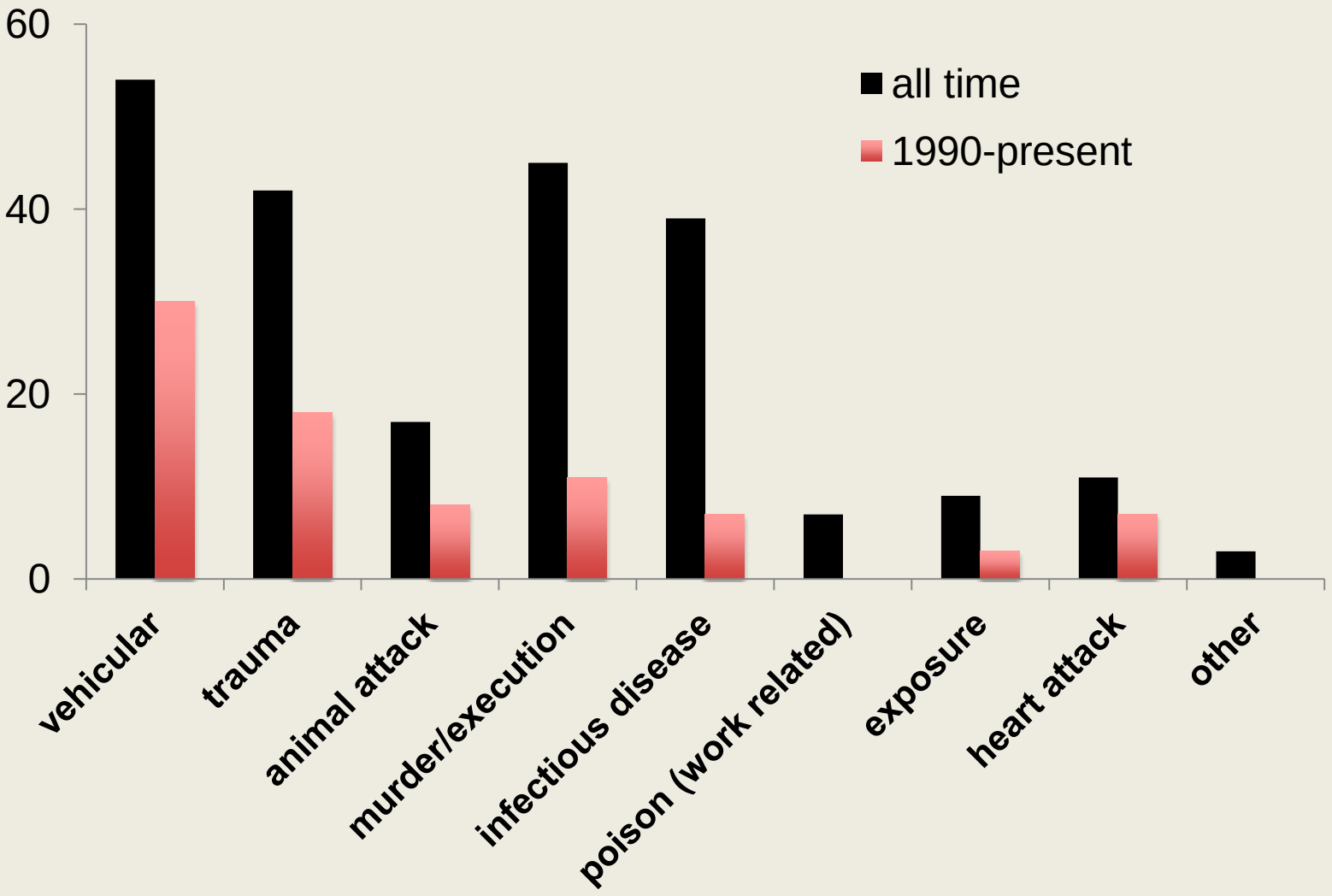
- BMBL: Very little guidance
- CDC traveler's health information: wwwnc.cdc.gov/travel/
- Other websites: Yale, U KY, etc

The Wall of the Dead: A Memorial to Fallen Naturalists

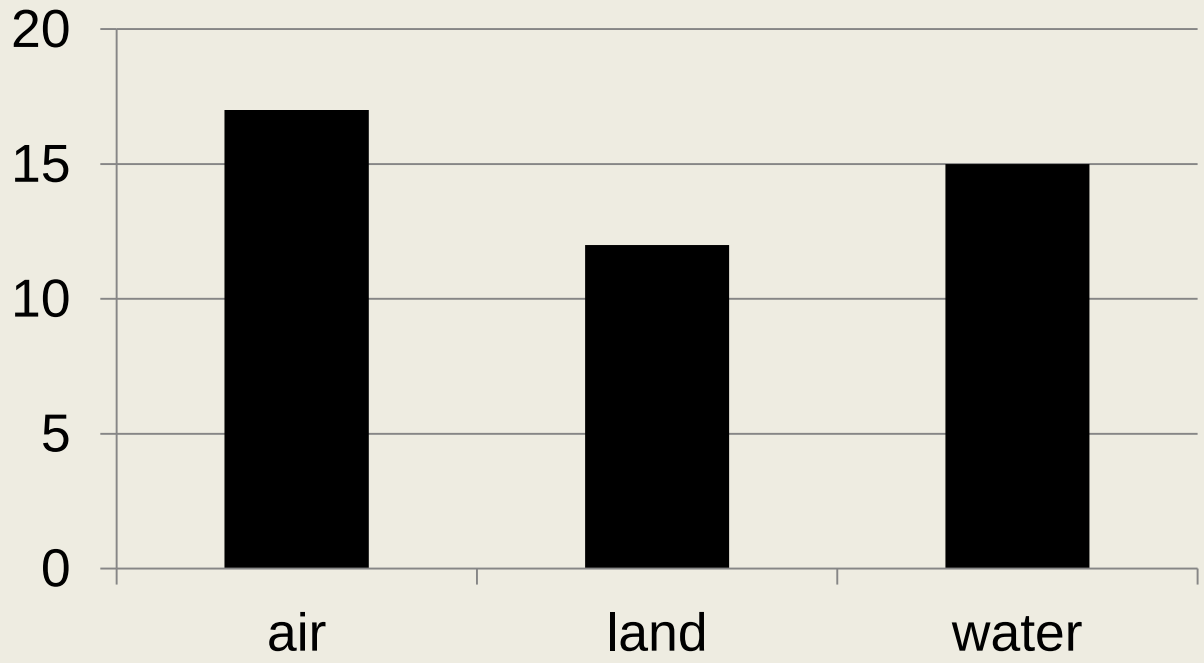
strangebehaviors.wordpress.com/2011/01/14/the-wall-of-the-dead/

250 deaths reported since ~1700-present

84 deaths 1990-present


60
40
20
0
all time
1990-present
vehicular
trauma
animal attack
murder/execution
infectious disease
poison (work related)
exposure
heart attack
other

Vehicular deaths/accidents since 1990



Animal Attacks:
Tiger, Elephant, Rhino, Snake, Spider, Toad, Bee, Leopard Seal, Sting Ray, Bear

Infectious Disease:
Dysentery, Gall Fever, Malaria, Diptheria, Typhoid, “Fever”, Typhus, Erysipelas, Hantavirus, Plague

Recently Publicized Incidents

California Valentine Ecological Reserve: *Hantaan virus-associated death of UCSD biology student*

Arizona Grand Canyon: *Plague associated death of renowned puma biologist*

Potential Hazards

- Trauma:
  - Land, water, air travel accidents/crashes
  - Falls, abrasions in difficult/remote terrain
  - Conflict with wildlife (snakes, bears, other predators)
  - Conflict with humans
  - Weather related trauma (lightning, extreme weather)
  - Sunburn

Potential Hazards

- Contact with wildlife/poisonous plants
  - Poison Ivy, Poison Oak
  - Insect bites/stings
  - Ticks
  - Vector Borne Disease (WNV, VEE, Malaria, Tularemia, Dengue, Chagas, etc)
  - Direct zoonotic disease transmission (Plague, WNV, Ebola, etc)

Potential Hazards

- Epidemic disease (environmental/humans)
  - Water borne disease (dysentery)
  - Influenza
  - TB
  - Typhoid
- Chemical/mechanical hazards
  - Anesthetics/chemicals used in field
  - Blisters, sprains, strains, etc

Table 2. Potential Risks

Category	Specific Risk

Physical	• Environmental
	  ◦ Uneven or Extreme Terrain (e.g., slips, trips, falls, avalanche, wind)
	  ◦ Elevation (e.g., altitude sickness)
	  ◦ Climate (e.g., dehydration, drowning)
	  ◦ Weather (e.g., lightning, exposure to heat, cold, UV radiation)
	• Animals
	  ◦ Predators
	  ◦ Handled animal (e.g., kicks, bites, crushing, strains)
	  ◦ Associated animal (e.g., attack from another member of the group)
	• Equipment
	  ◦ Firearms
	  ◦ Helicopters
	  ◦ Biomedical sharps (e.g., needles, scalpels, necropsy knives)
	  ◦ Vehicles, live-capture traps, transport cages
	• Man-Made
	  ◦ Traffic
	  ◦ Noise
	  ◦ Electrical

Chemical	• Task Specific
	  ◦ Pharmaceuticals (e.g., anesthetics, antibiotics)
	  ◦ Chemicals used for specimen preservation (e.g., formalin)
	  ◦ Disinfectants (e.g., bactericides, viricides)
	• Environmental
	  ◦ Toxins (e.g., pesticides, herbicides)
	  ◦ Gases (e.g., hydrogen sulfide, sulfur dioxide)
	  ◦ Chemical spills (e.g., gasoline, oil)

Biological	• Infectious zoonotic disease • Exposure to venomous animals or allergic reaction to any animal • Poisonous plants

National Park Service “Safe Work Practices for Employees Handling Wildlife”

Limitations/Challenges in Managing Field Work Biosafety

- How do you know that field work is being performed??
  - Know the mission and activities of your organization
  - IACUC protocols if animals involved
  - Monitor employee travel

Limitations/Challenges

- Field worker ‘attitude’

The Species Seekers: Heroes, Fools, and the Mad Pursuit of Life on Earth. Richard Conniff

W. W. Norton & Company 2010

“The story of bold adventurers who risked death to discover strange life forms in the farthest corners of planet Earth.”

Limitations/Challenges

- PPE impracticalities
  - Remote locations
  - Limited capacity to carry supplies
  - Extreme conditions exclude laboratory adopted PPE

Potential Approaches for Managing Field Work Biosafety

- Use organizational OHSP resources for training, programmatic development
- Education/training modify training to be situation-specific and relevant
  - Acknowledge limitations
  - Communication tailored to audience/participants
  - Enlist an experienced and respected ally
  - Use examples from your institution or from the literature to illustrate importance!

Methods for Hazard Reduction

- Development and review of protocols or SOPs on animal handling
- Daily or periodic project safety briefings and post-handling debriefing
- Training on appropriate techniques for chemical or physical restraint
- Awareness of intentional or accidental trauma from animals
- Awareness of potential zoonotic diseases in the area or handled species
- Vaccination against potential pathogens as appropriate to the level of risk (e.g., rabies, tetanus)
- Training on when and how to use PPE
- Contingency plans (e.g., escape route, contact information for medical advice)

National Park Service “Safe Work Practices for Employees Handling Wildlife”

Potential Approaches

- Reporting incidents
  - Provide clear, specific and relevant guidelines
  - Know your insurance carrier limitations for off-site work
- Personnel identification
- Investigate local resources near field site

Example: Bobcat tracking/trapping/collar/blood collections

Field Research Safety Guide Contents:

- General Field Safety Information
- Field PPE
- Necropsy PPE
- Colorado State University Workers Compensation Information
- Illness Policy
- “Your rights under the Workers Compensation Act”
- Workers Compensation Insurance Reporting Procedures
- Incident Report Forms
- Wallet Card Blank

General Field Safety Information

Trip Safety Checklist:

- Obtain first aid and antiseptic kits
- Check to make sure immunizations are current
- Check nearby emergency medical care and health insurance
- Assemble and check safety provisions

General Field Safety Information: Potential Hazards

- Animal Bites – in case of bite, carry first aid kit and antiseptic pack; work with two people present
- Needle Stick – carry first aid kit and antiseptic pack; work with two people present

*Make sure to have a sharps container of some kind to carry out needles, scalpel blades, etc

- Ticks/Fleas/other insects – to prevent insect bites, wear long sleeves, insect repellent, long pants, and sturdy boots; check each other for ticks

General Field Safety Information: Potential Hazards

- Cleaning up traps (urine and feces) – wear gloves and an N95 respirator mask when cleaning traps to prevent inhalation of aerosols
- **Know the location and phone number of the closest hospital to your area and contact them beforehand if possible to make them aware of the project and potential hazards you will be exposed to.
- **Carry photo identification with you at all times in case of injury, along with your Wallet Card

General Field Safety Information: Recommended Safety Provisions

- Sunblock
- Hat/sunglasses
- Allergy medication (if required)
- Water purification tablets/filter
- Flashlight
- Flares
- Radio

Field PPE

- Sturdy work pants (Carhartt, etc.)
- Sturdy work/hiking boots
- Gloves of some type – can be latex, nitrile, leather, gardening, etc.
- Long-sleeve shirt
- N95 respirator mask when an animal is found dead or with an open wound AND when cleaning out a soiled trap
- Bring sealable bags for PPE disposal and hand sanitizer gel to use after taking gloves off

Field Necropsy PPE

- N95 respirator mask
- Double gloves (latex or nitrile)
- Close-toed shoes
- Long pants
- Surgical gown if carcass is fresh

*carcasses that have been frozen and thawed are less likely to transmit pathogens

Wallet Card for Field Workers

Emergency Contacts

Name:

Relation:

Phone:

Name:

Relation:

Phone:

List people you share the same residence with, that you may have exposed:

1.

2.

3.

4.

Print all fields legibly

Potential Hazards

Associated with field work:

Plague	Tularemia	Tick Fever
Injury	Frostbite	Heat Stroke

Other:

Location(s) of Field Work:

1.

2.

Employed by Colo St Univ

Workers Comp Physician:

Allergies

Allergic to: Describe reaction:

Contact Information

Name:

Address:

City:

State: Zip:

Phone:

Other:

Immunization Record

Please indicate date of last shot

Tetanus:

Pneumonia:

Flu:

Other:

Summary

Field workers are at risk for unique types of work-related injuries/accidents and exposures

Know your organization's mission to identify and recognize personnel performing field studies

Identify a knowledgeable ally for programmatic development

Consider limitations and practicality during implementation

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