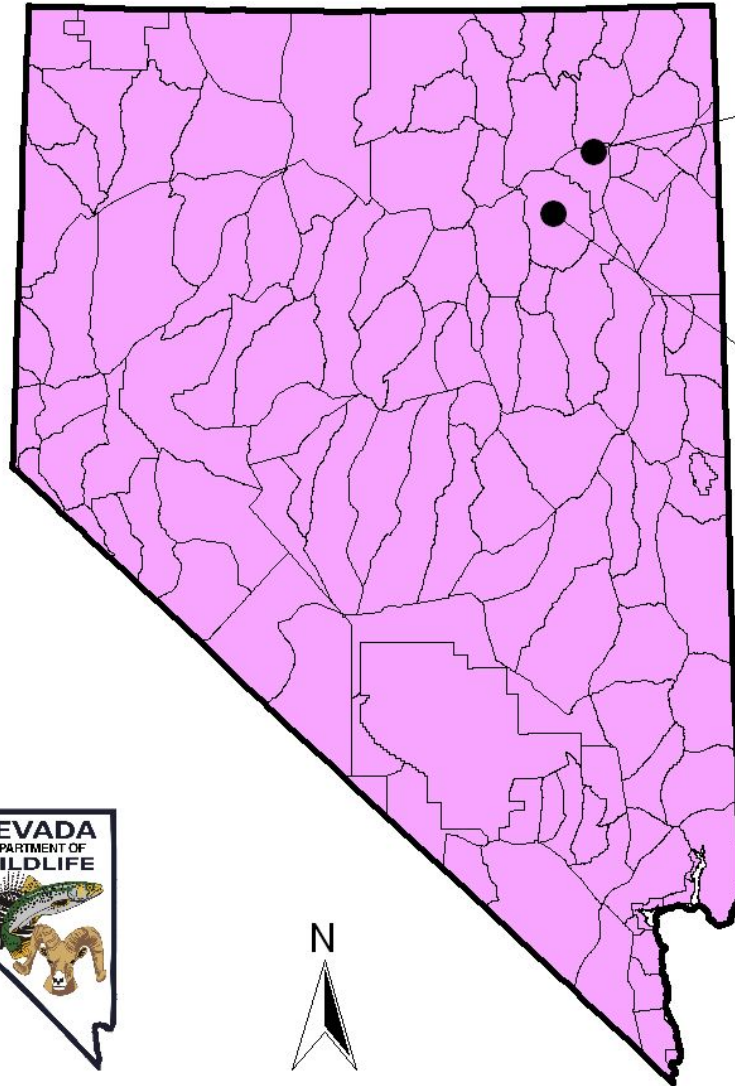


**ROCKY MOUNTAIN BIGHORN SHEEP  
DISEASE EVENT  
EAST HUMBOLDT'S AND RUBY MOUNTAINS  
ELKO COUNTY, NV  
2009-2010**

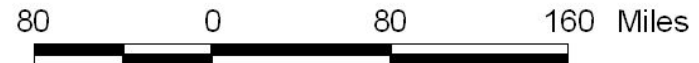
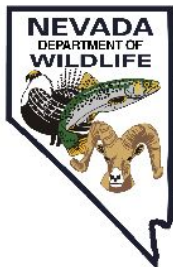


# Locations of Rocky Mountain Bighorn Sheep Disease Events in Nevada



**Unit 101 - South of I-80  
and just west of Wells**

**Unit 102 - South of I-80  
and just east of Elko**



The 2009 population estimate for sheep in unit 101 (East Humboldt's) is 180 animals. Approximately 140 animals have been observed in this area since January 1, 2010

The 2009 population estimate for the Ruby Mountains is 160 individuals. The primary observations for the Ruby Mountains have been in Lamoille Canyon and 51 animals have been observed.

# TIME LINE – RUBY MOUNTAINS



12/8/09 – Reports of coughing sheep

- 12/10 – 50 sheep seen / 30+ coughing and nasal discharge. Ram found dead.
- 12/13 – 3 yr Ram with severe clinical sign harvested.



1/4 – 1/9/2010 3 additional rams found dead. 75% of Remaining sheep still coughing.

- 1/10 – Mtn. goat found dead. Mtn. goats seen mixed with bighorn sheep



1/13/10 – 2 rams/1 ewe immobilized, sampled, ear tagged and administered the antibiotic DRAXXIN

- 16 others darted with DRAXXIN

# TIMELINE – EAST HUMBOLDT’S



- 12/29 – Reports of sick sheep in clover creek.  
1 dead but heavily scavenged ram found
- 12/30 - Trout Creek, Beverley Hills, Welcome - sheep observed coughing with nasal discharge



- 1/2/10 - 5 ewes immobilized, sampled, radio collared and treated with DRAXXIN
- 1 ram harvested due to severe clinical signs



- 1/6 – 14 - 4 additional sheep found dead
- 30 others darted with DRAXXIN
  - 1/30 – 31 - additional 22 animals found dead

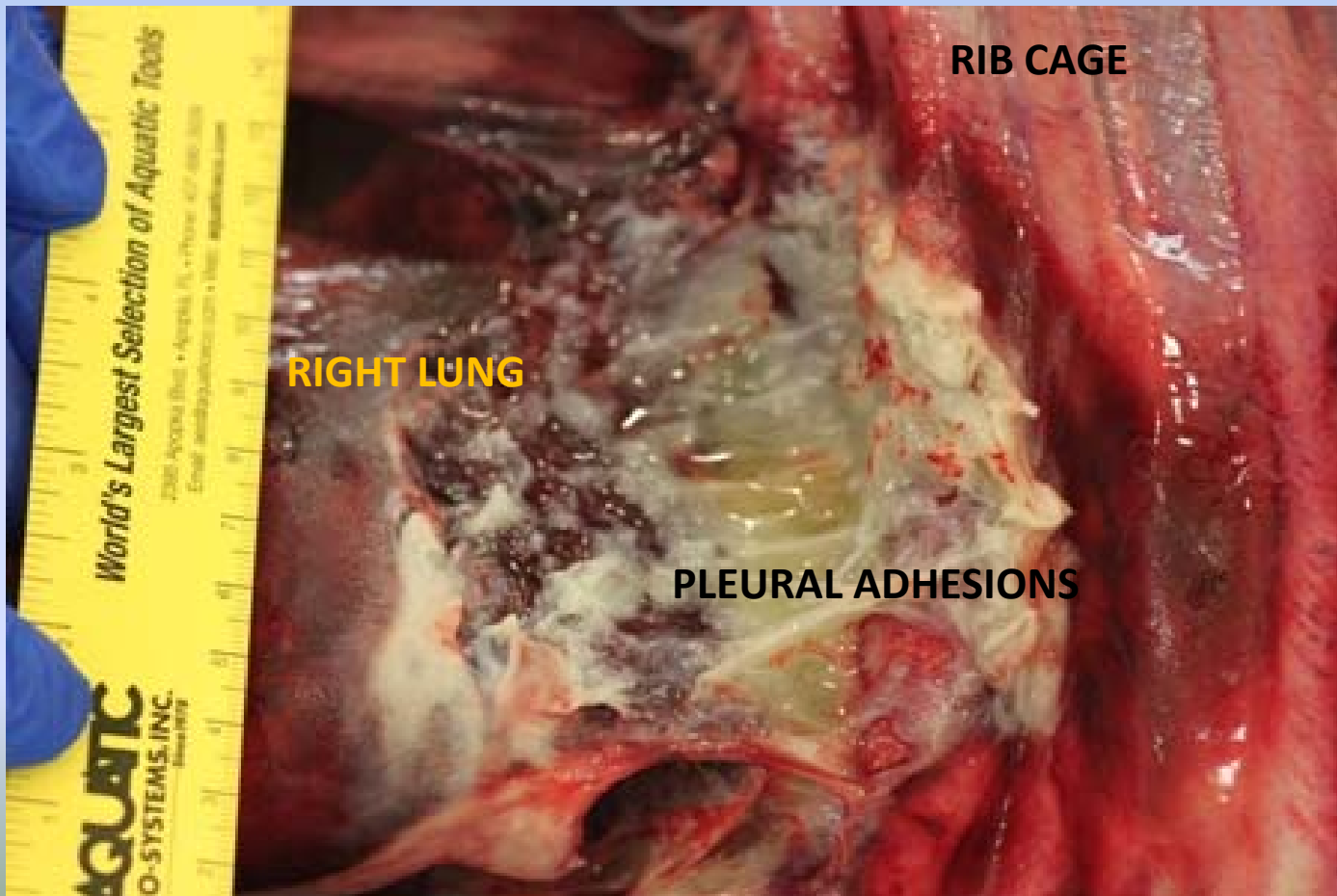
# CLINICAL FINDINGS

- COUGHING
- NASAL DISCHARGE - cloudy to purulent
- LETHARGY
- WEIGHT LOSS
- DEATH



# NECROPSY FINDINGS

Acute to chronic, fibrinopurulent bronchopneumonia  
Consistent with bacterial pneumonia







# CULTURE AND SEROLOGY RESULTS

Pharyngeal swabs and lung cultures:

- *Pasturella trehalosi*
- *Pasteurella multocida*
- *Mannheimia hemolytica*

Pharyngeal, nasal, sinus, trachea, and lung PCR:

- *Mycoplasma ovipneumoniae*

Serological titers:

- BVD 1
- PI3

Gastrointestinal parasites:

Eimeria

Nematodirus

Protostrongylus

# TRACE MINERAL ANALYSIS

## LIVER ANALYSIS:

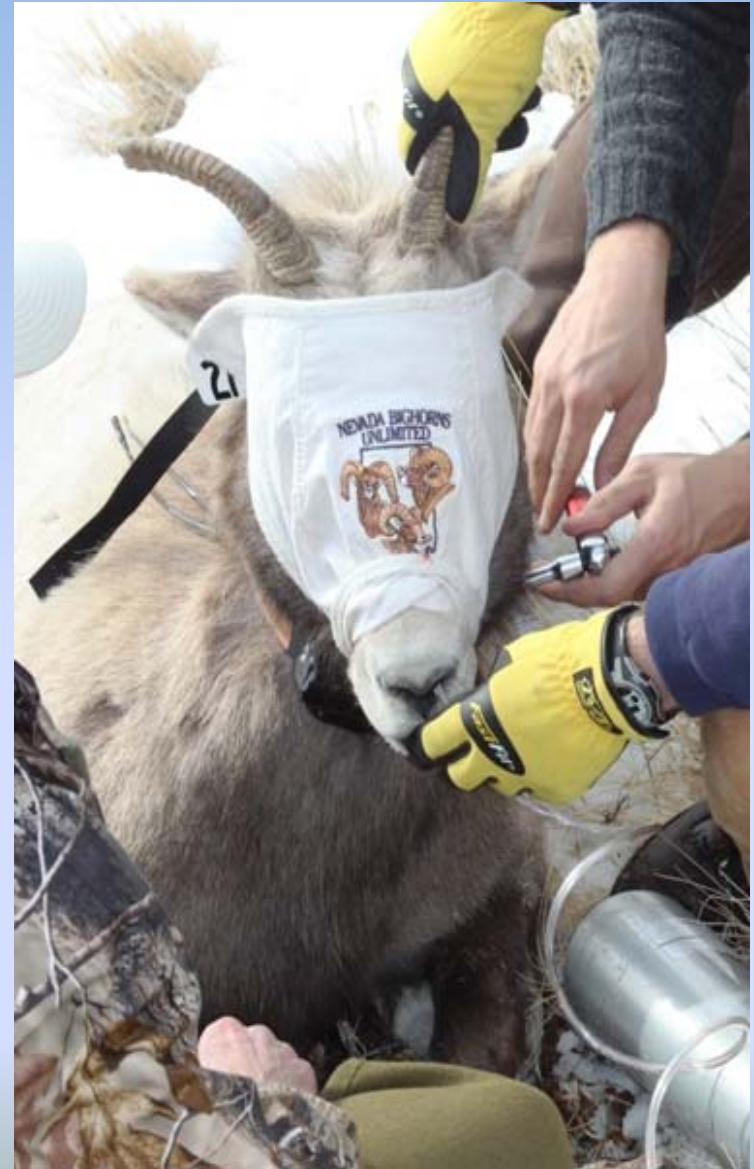
- Selenium – low normal to deficient
- Whole Blood Analysis
  - Selenium – low normal to deficient



# WHY TREAT WITH DRAXXIN?

Concurrent disease events in MT & WA

- MT – harvesting all animals that exhibit clinical signs
- 75 animals harvested to date
- WA – documenting and monitoring outbreak spread
- Will begin harvesting animals in 1 location in mid-February



# DRAXXIN<sup>®</sup> (Tulathromycin)

Only marketed antibiotic for treatment of respiratory disease in cattle and swine

That is indicated for:

- *Pasturella* spp.
- *Mannheimia* spp.
- *Mycoplasma* spp.

Small dosage

Potential efficacy after single treatment

Used safely in domestic sheep, goats, wild sheep

No imminent hunting seasons



Immobilized animals  
also received:

- Vitamin E
- Banamine



# East Humboldt Range

- 33 sheep have been found dead
- 4 animals have received necropsies
- 35 sheep have been administered Draxxin
- 5 ewes have been immobilized, sampled and outfitted with radio collars

# Ruby Mountains

- 10 sheep have been found dead
- 3 sheep have received necropsies
- 19 sheep have been administered Draxxin
- 2 rams and 1 ewe were immobilized, sampled and ear tagged

# NEXT STEPS



**Plan for Detailed Investigations and Further Surveillance for  
East Humboldt Range and Ruby Mountains  
Rocky Mountain Bighorn Sheep Disease Events in Nevada,  
January – September 2010**



# OBJECTIVES

Compare and contrast:

BHS sub-herds w/in East Humboldt's (EHR) and Ruby Mountains (RM)

- Evaluate animals for respiratory pathogens, general health and nutritional status
- Evaluate forage quality and trace mineral levels and precipitation history at corresponding sites

Measure effectiveness of the antibiotic Draxxin

- Survival
- Body condition
- Residual lung pathology
- Detected pathogens
- Lamb recruitment

Compare and Contrast:

Forage quality, trace mineral levels and precipitation history and animal mineral levels in other Rocky Mtn/California bighorn herds (South Snake Range, Montanas, Santa Rosas, and High Rock/Calicos) that were captured in January 2010 with results from the EHR and RM

# METHODS

Mark / radio collar additional animals

- Survival
- Lamb recruitment
- Establish marked control group (no DRAXXIN treatment)

In separate sub-herds/sites mark additional animals:

Rattlesnake Canyon (RM) - 0 tagged/ marked/sampled

- (capture - n = 10; necropsy - n = 3)

Lamoille Canyon (RM) – 3 tagged

- (capture - n = 10; necropsy – n = 1)

Willow/Trout Creek/Beverly Hills (EHR) – 5 - (4 radiomarked)

- (capture - n = 6; necropsy – n = 1)

## METHODS CONTD.

Standard necropsy and sampling to be conducted on harvested BHS and fresh carcasses

Collect forage and soil samples at all sites identified in Objective #3 will be analyzed for nutrients and trace minerals

Aerial surveys of all bighorn herds in the study during late winter 2010 to estimate lamb recruitment for each herd.

Recapture and re-sample radio marked animals prior to their leaving wintering areas

Follow ewes and lambs weekly during 1<sup>st</sup> 6 weeks of standard lambing period to evaluate production and lamb survival

Information from this project will be assessed in the fall 2010 and if preliminary data support the need to continue to monitor adult survival and specifically lamb recruitment additional funding will be sought

# Draft Budget for Area 10 Bighorn Sheep/Mtn Goat Disease Surveillance

9 mos estimate

Item	Units	Unit of Measure	Cost/Unit	Total
Antibiotic	60	animal	2	\$120
Tranquilizing and biological sampling supplies				\$1,715
Blood Chemistry, Bacteria and Mycoplasma culturing and PCR, Serology, Fecal Analyses, and Trace Mineral Analyses				\$8,100
Pregnancy Testing	35	animal	25	\$875
Necropsy and Histopathology costs and supplies				\$1,320
Forage and Soil Analyses				\$8,750
Replacement costs for borrowed radio collars	10	collar	450	\$4,500
Helicopter Survey and Capture Costs				\$42,010
			<b>TOTAL</b>	<b>\$67,390</b>

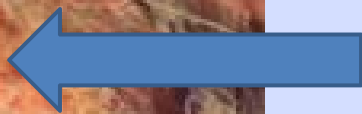
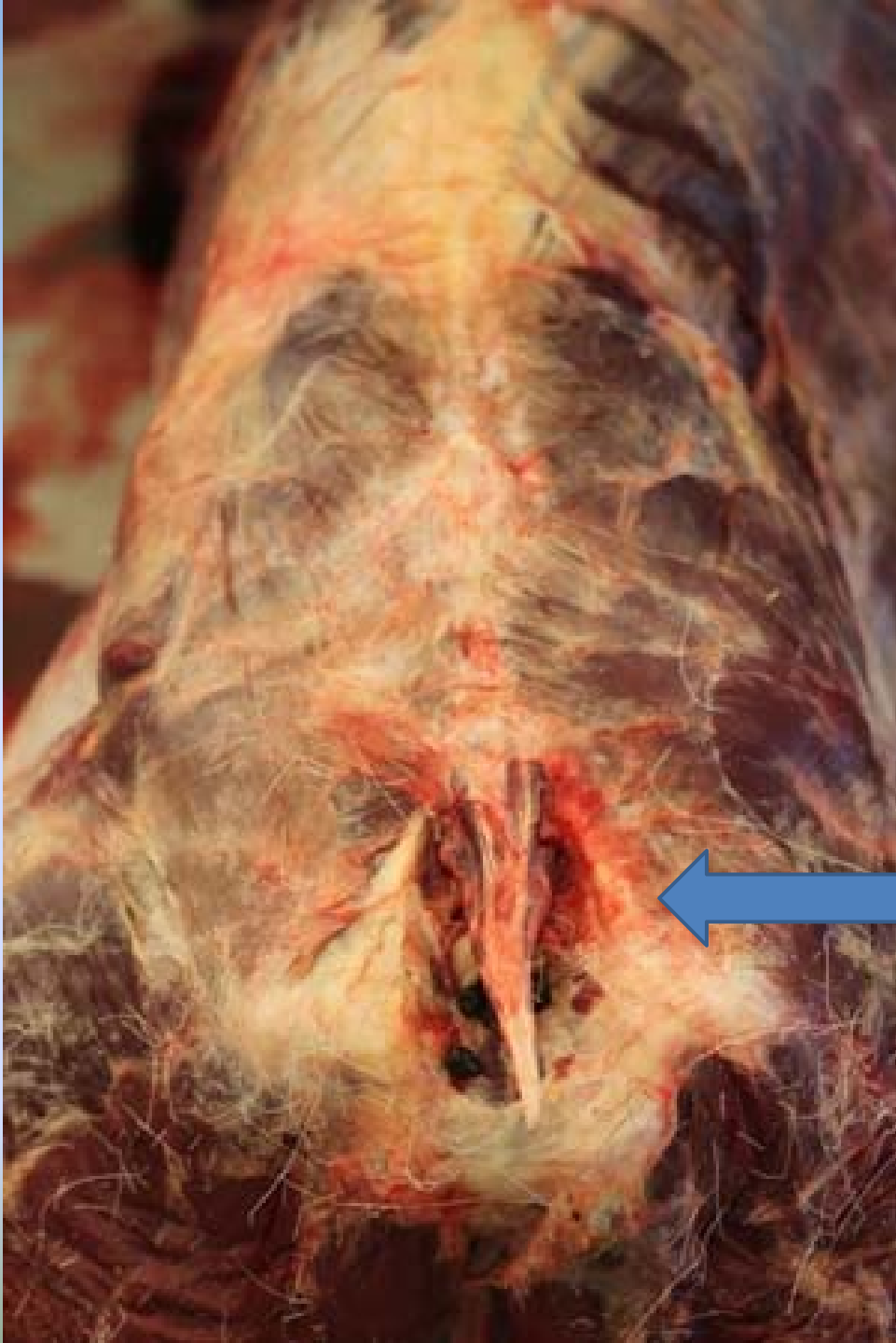












**TAIL**

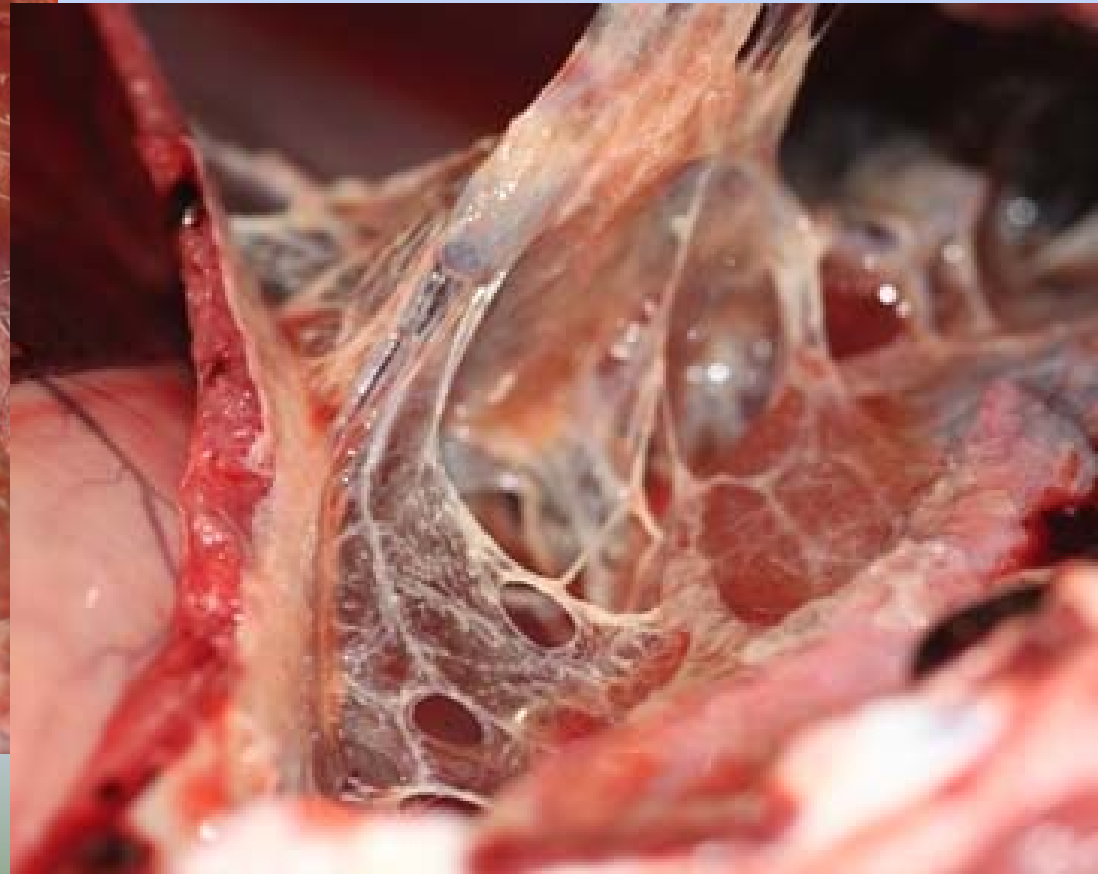
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LAMOILLE CANYON – RUBY MOUNTAINS  
RAM LAMB  
1/14/2010



An anatomical dissection of a right lung. The image shows the right cranial lung lobe, which is dark red and lobulated. A blue arrow points to the right bronchus, which is the first exit off the trachea. The surrounding tissue is bright red and appears to be the pleural cavity or mediastinum. A surgical instrument is visible in the upper left corner, holding the lung tissue.

**RIGHT CRANIAL LUNG LOBE**

**RIGHT BRONCHUS - FIRST EXIT OFF THE TRACHEA**

# EAST HUMBOLDT SUB GROUP







