2021 BearFest

LaVern Beier

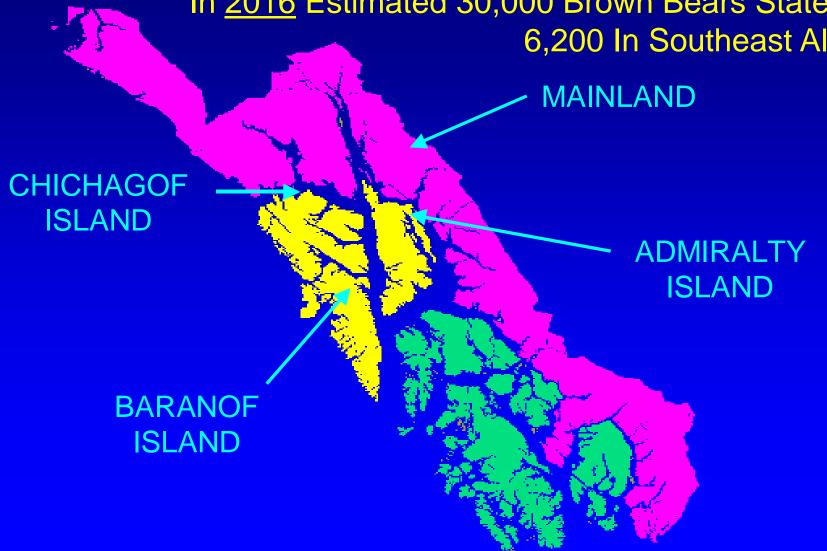
Bits & Pieces Of Catching & Tracking Brown Bears For Research In The Temperate Rainforests Of Southeast Alaska

LaVern Beier (retired)
Alaska Department Of
Fish & Game 1973-2016

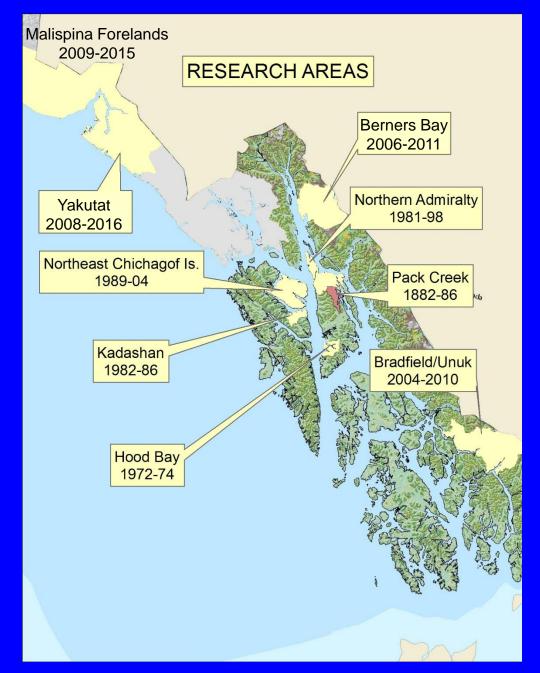
Methods, Tools & Evolving Technologies
Discoveries
Lessons Learned
Getting Up Close & Personal
Plenty Of Pucker Factors!

Southeast Alaska Brown Bear Distribution

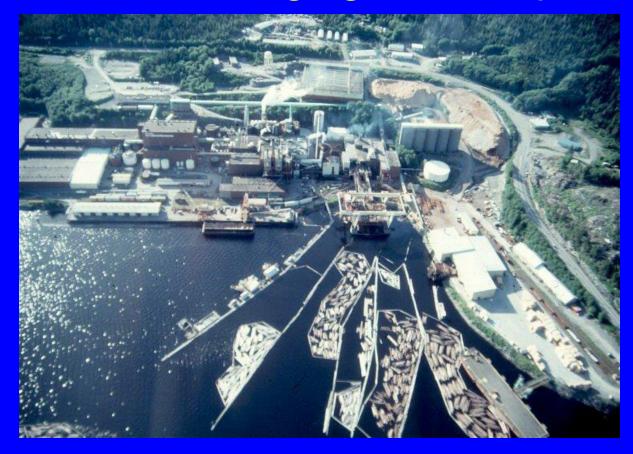
(Mainland Has Spotty Brown Bear Populations Mixed With Black Bears)
In 2016 Estimated 30,000 Brown Bears Statewide
6,200 In Southeast Alaska



Southeast Brown Bear Research Areas 1972-2016



The Mid1950s Brought Timber Industry And Changing Landscape To Southeast Alaska



Ketchikan Pulp Mill



Timber Industry Brings Challenging Bear Issues





Habitat Change

Roads/Access



Landfill Issues

Access: Vulnerability
To Hunting
Bear Human Conflicts

December 1, 1978 President Carter Uses The Antiquities Act To Create Admiralty & Misty Fiords National Monuments

THE ANTIQUITIES ACT



The President of the United States is hereby authorized, in his discretion, to declare by public proclamation historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest that are situated upon the lands owned or controlled by the Government of the United States to be national monuments...

Theodore & Conswell JUNE 8, 1906

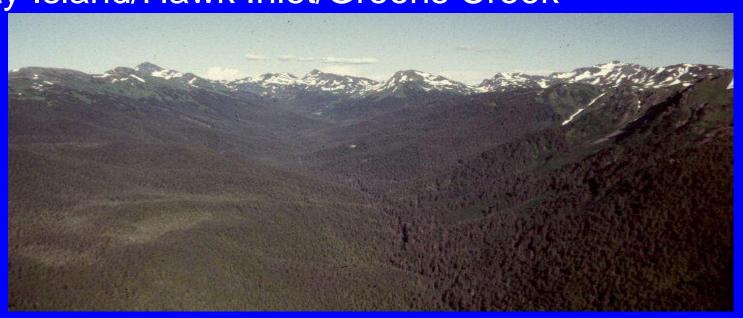
Issue: 1981 Development Of Largest Silver Mine In



North America

Admiralty Island/Hawk Inlet/Greens Creek

In Heart Of Denses Brown Bear Population In The World



It's A Complex Process Leading Up To Implementing A Research Project In A Particular Geographical Area

- Brown Bears Are The 2nd Slowest Reproducing Big Game Animal Of The 28 Big Game Animals In North America.
- Brown Bears Are Long Lived Reaching 30 Years Of Age.
- Because Of These Factors The Female Component Of The Population Is The Most Important To Monitor And Manage.
- A Symbol Of Healthy Ecosystems And Wild Lands.
- Its Required Of Wildlife Researchers And Managers To Continually Seek Scientific Precision And Answers To The Questions To Maintain Sustainable Populations.
- Surveys Indicate Visitors Traveling To Alaska Are Hopeful To See Wildlife...Primarily...Bald Eagles, Whales And Brown Bears.

What Else Is Required To Start Up A Brown Bear Research Project In A Particular Study Area

- Qualified Personnel
- Scientifically Defendable Objectives
- Funding
- Defined Study Area
- Logistically Realistic
- Utilize Available Technologies For Collecting Data
- Capture Methods Most Practical For The Landscape

The 1960's Brought The "Palmer Capture Rifle"



With The Development Of Wildlife Immobilizing Drugs
Along With Capture Equipment This Enabled Wildlife Researchers
A Method To Inject And Immobilize Wildlife From A Distance

Plenty Of... Lessons Learned About..."The Power Of Drugs" And "Pucker Factors!"



In SEA'S Rainforest One Capture Method Of Choice To "Catch" Brown Bears Is The Aldrich Foot Snare...







Trail Sets



Admiralty Island Hawk Inlet/Greens Creek Mine Heart Of Denses Brown Bear Population In The World







Mine Port/Tailings Pond



Greens Creek Road To Mine

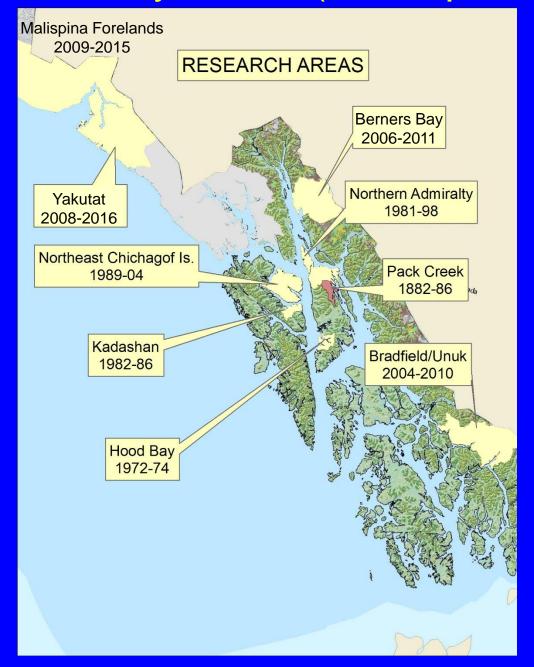
1970s Bring VHF Radio Transmitters And
Telemetry To Wildlife Research
Provide Researchers With A Method To Determine:

Each Transmitter Has Unique Frequency

- Habitat Use
- Home Range Size
- Breeding Age
- Mortality/Fate
- Denning
- Population Estimate
- Vulnerability To Hunting
- Energetics (time/energy utilized to gather food)



Hawk Inlet, Admiralty Island (121 sq. miles) 1981-98



Issue: 1981 Development Of Largest Silver Mine In



North America

Admiralty Island/Hawk Inlet/Greens Creek

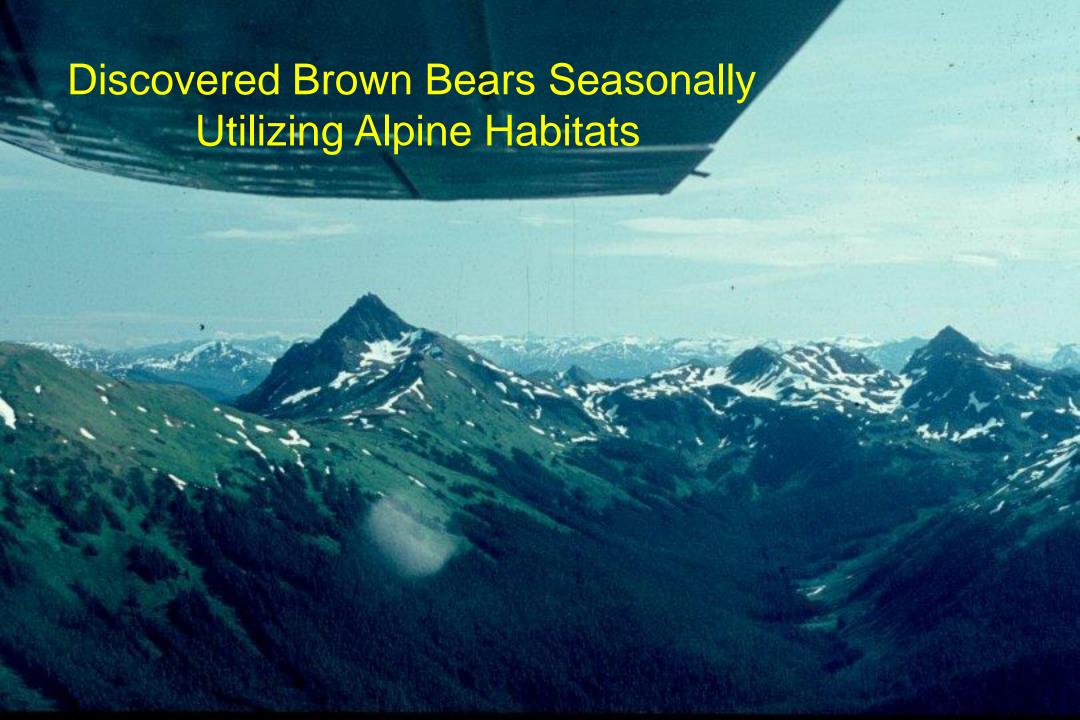
In Heart Of Denses
Brown Bear
Population On
The Planet



1981 Admiralty Island Brown Bears Are The First In SE Alaska Deployed With VHF Radio Transmitters







1981 First Brown Bears Captured By Helicopter In

Southeast Alaska On Admiralty Island



A Lesson Learned...

Another Tool And Potential Capture Method... Processing... Radio Mark/Collect Biological Samples



Biological Samples & Measurements Are Collected



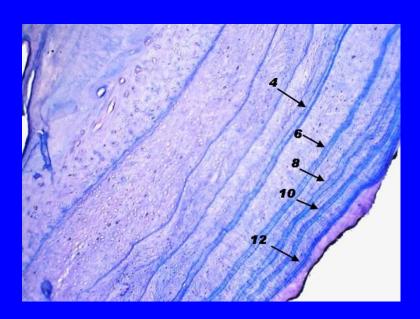
Blood/Variety Of Analysis



Body & Skull Measurements



Premolar Tooth Pulled For Ageing



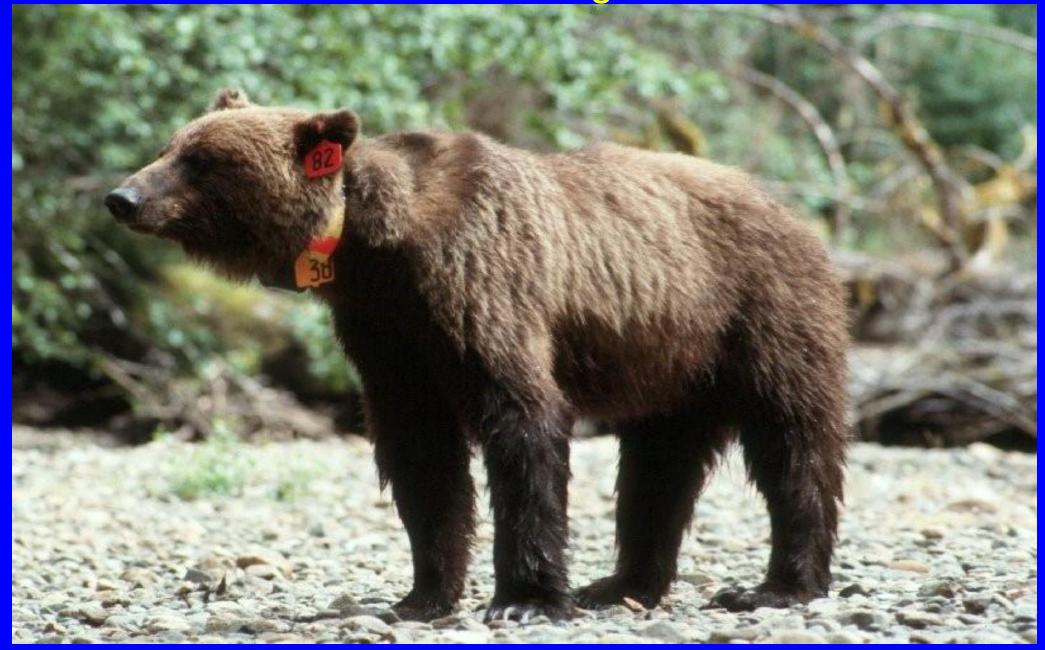
Tooth Cementum Lines/Ageing



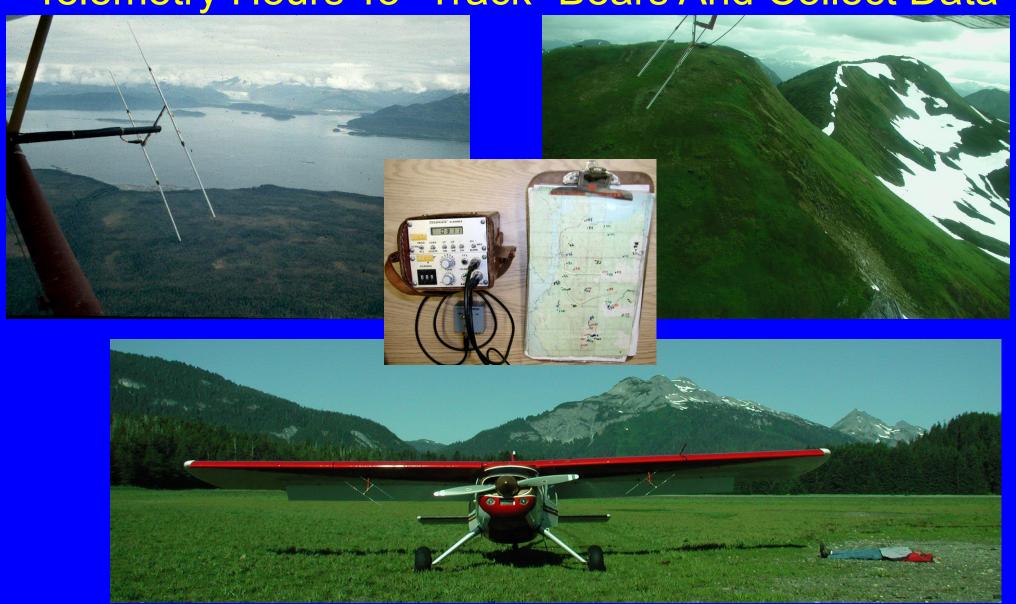




Visual Markings

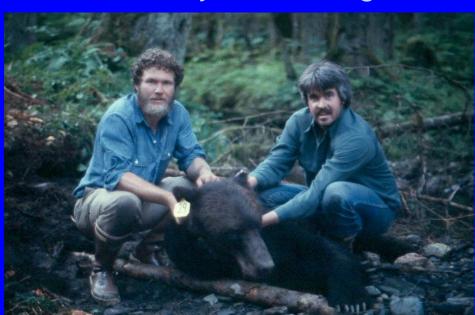


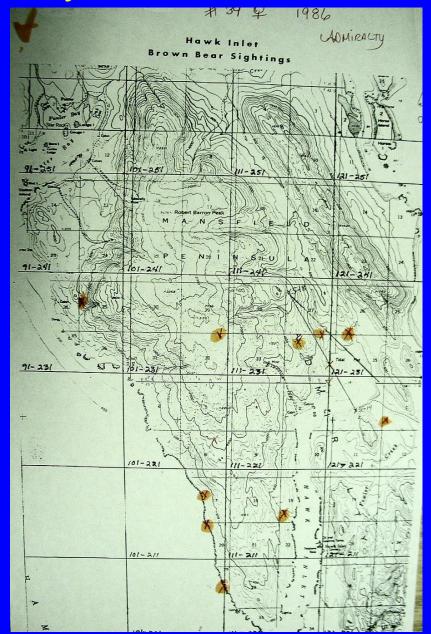
VHF Radio Transmitters Require Hundreds Of Aerial Telemetry Hours To "Track" Bears And Collect Data



VHF Radio Transmitter Telemetry Data Before GPS

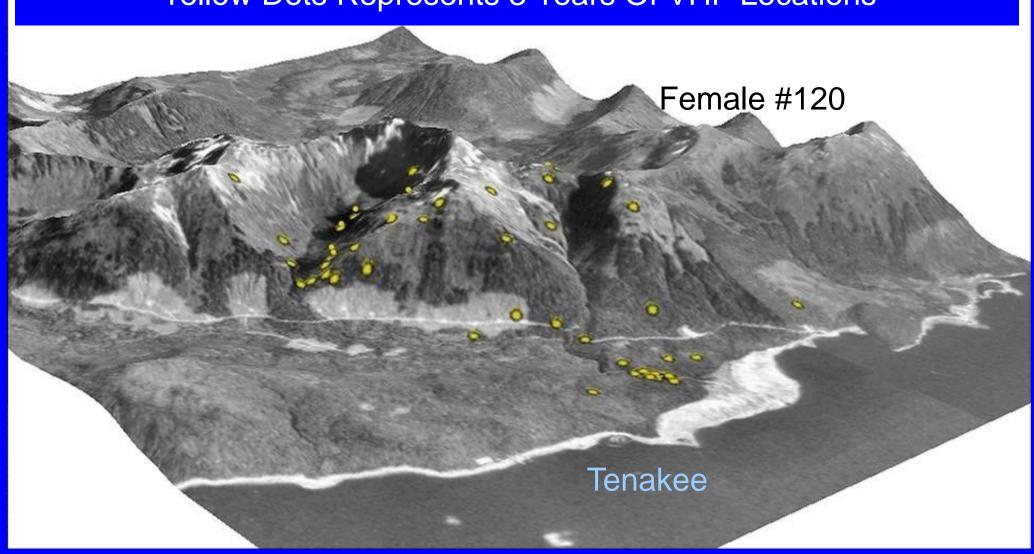
- Habitat Use
- Home Range Size
- Breeding Age
- Mortality/Fate
- Population Estimate
- Denning
- Vulnerability To Hunting





For One VHF Radio Collared Brown Bear Upwards of 12 Locations Are Collected In 1 Year

Yellow Dots Represents 3 Years Of VHF Locations



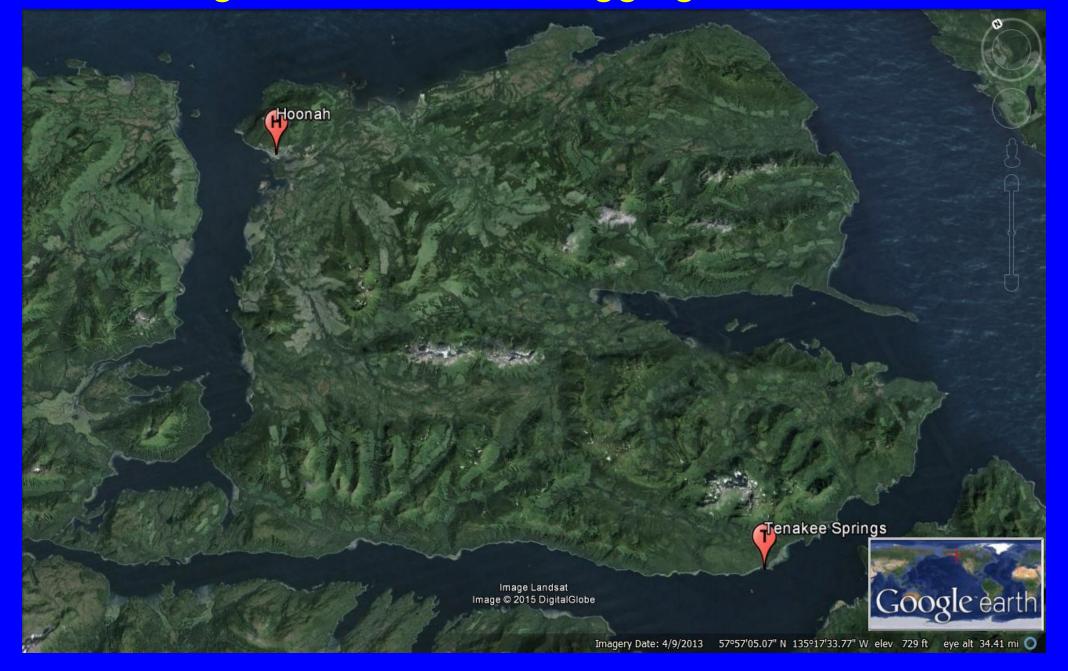
Helicopters Are
A Primary Tool For
Wildlife Capture Work
Across Alaska



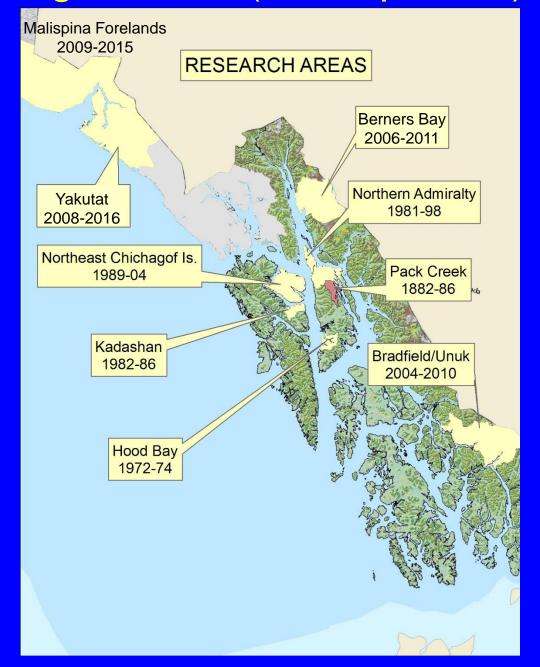
9LOTW

Cheated death...
October 5, 1990

NE Chichagof Island, Issue:Logging/Road Construction



NE Chichagof Island (429 sq. miles) 1989-04



North East Chichagof Island 1989-2004 (37M 74F)



VHF Trapsite Transmitters Introduced 1991



Checking VHF Trapsite Transmitters From A Distance















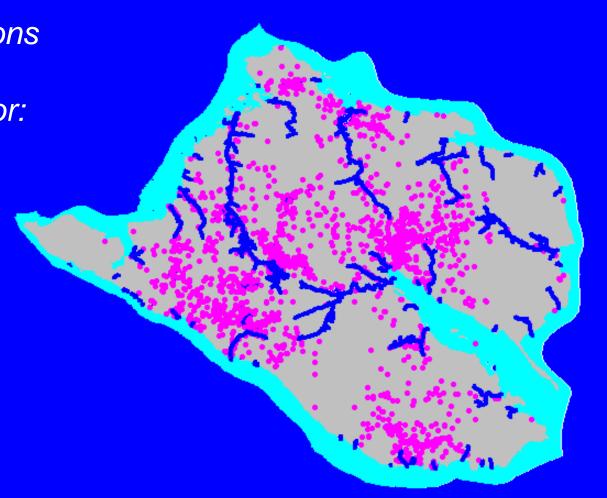


NORTHEAST CHICHAGOF STUDY AREA Example Of VHF Relocations

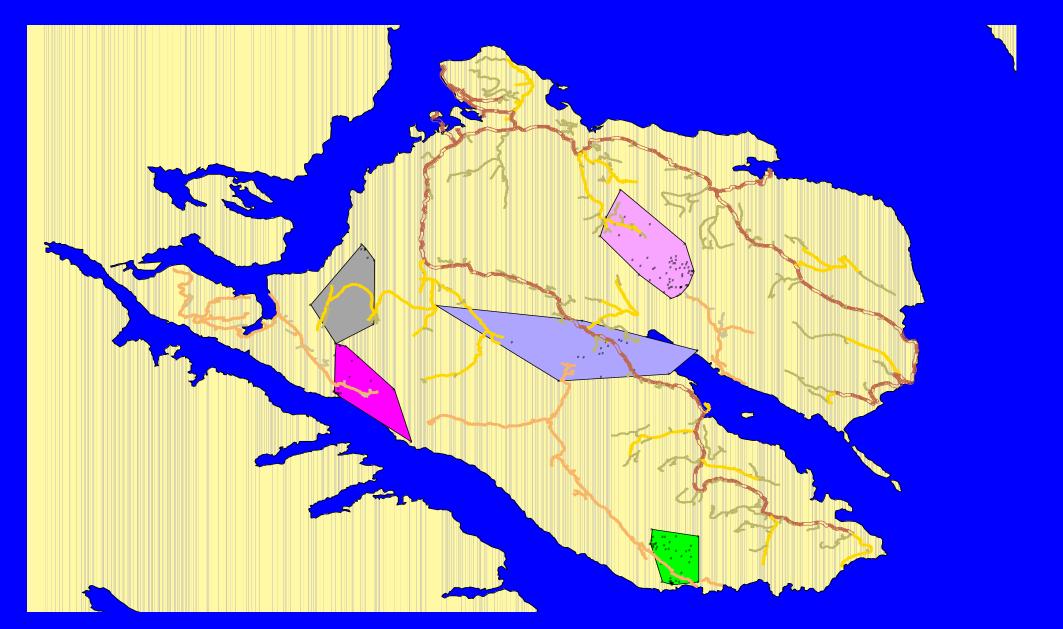
2,100 VHF Relocations

From 1989-2004 For:

37 Males And 74 Females



Examples Of Home Ranges For 5 NEC Brown Bears Based On VHF Or GPS Locations

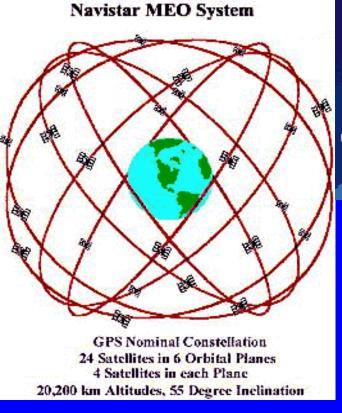


2001 Chichagof Island Brown Bears Become The First In Southeast Alaska Deployed With GPS/VHF Radio Transmitters



GPS/VHF Brown Bear Location Data Provides

- GPS Transmitters Uplink With Satellite Every 30 Minutes Per Location
- GPS Collars Store Location Data On Board <u>Up To 10,000 Data Points</u>
- GPS Collars Fitted With A Programmable Time-Release Mechanism
- GPS Collars Must Be Retrieved To Download Data
- Or Data Retrieved From A Distance As Of 2005
- GPS Includes Body Temperature Data







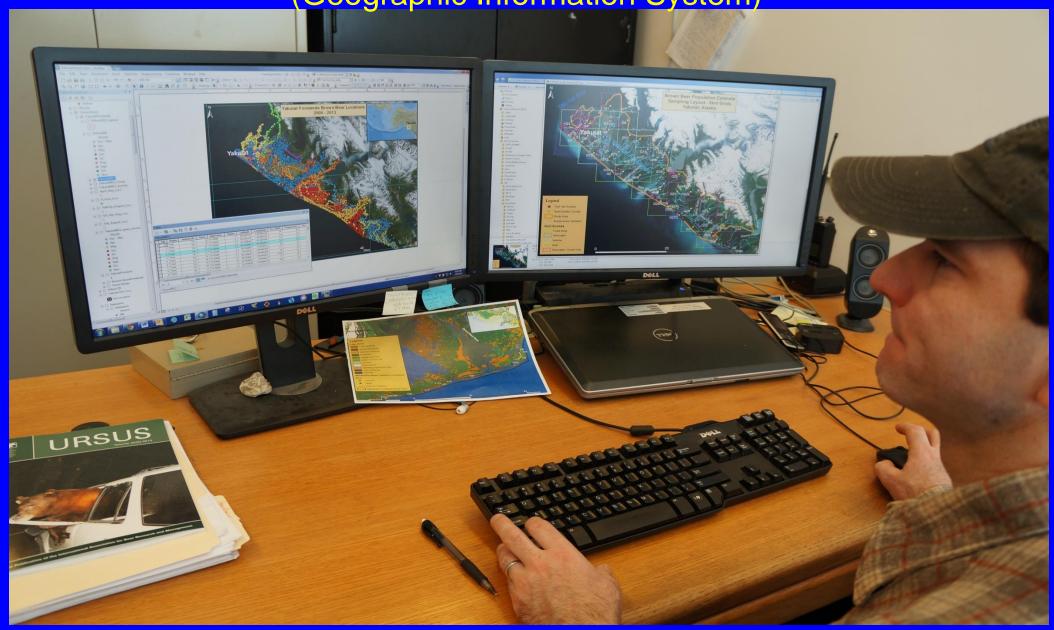


Down Loading Stored On-Board GPS Data



GIS Mapping/Data Analysis

(Geographic Information System)



In Contrast to VHF... **GPS May Acquire With** Precision Up To 10,000 **Location Points In** 1-2 Years For Each Radio Collared Bear Any Day Or Weather

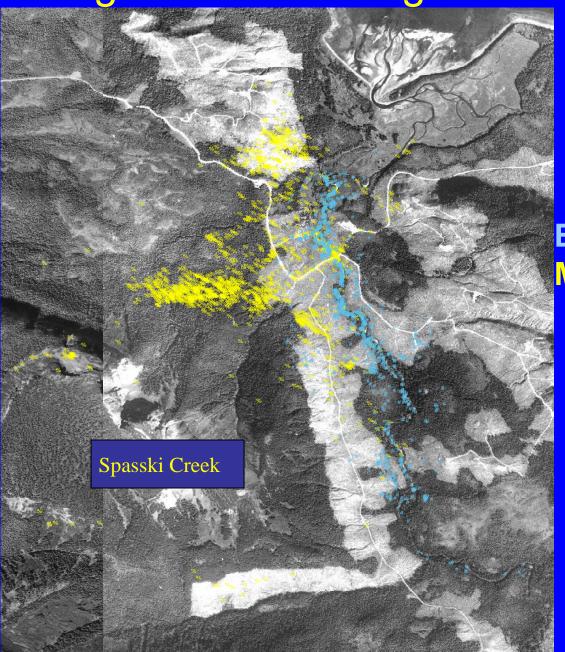
> Young Male Bear #280 3 Months Of Locations



Example...Of "Energetics" Of Fishing Bears & Clearcuts

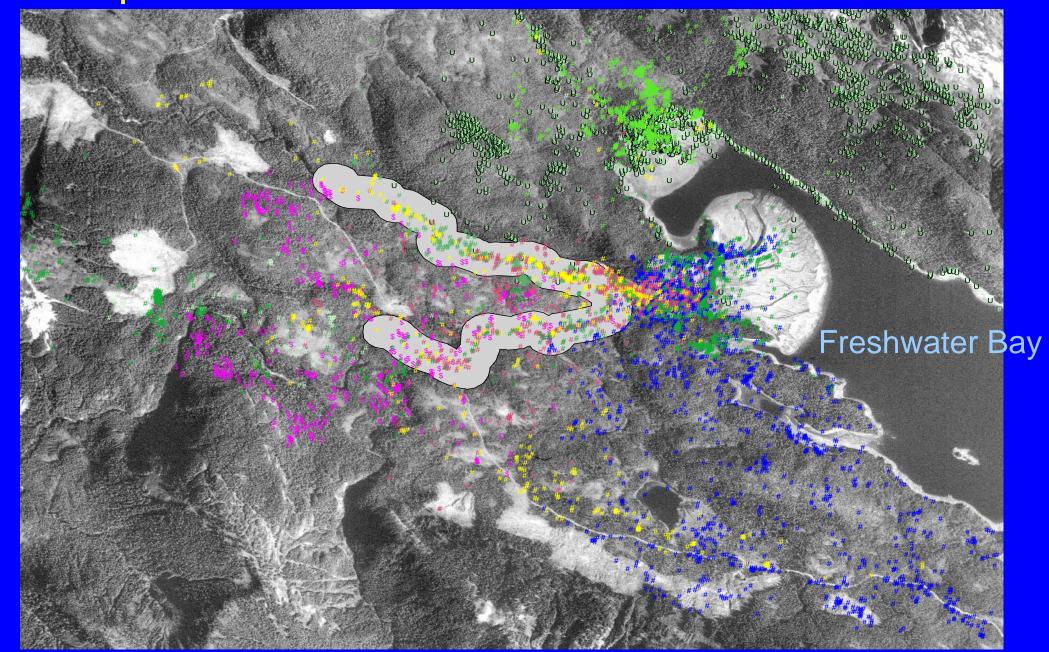
Yellow...
Female Bear #264

Cost For Low Reproduction & Low Survival



Blue... Male Bear #262

Example Of GPS Locations For 6 NEC Brown Bears



In 1990s The Science Of DNA And Stable Isotope Analysis Emerge As Additional Tools



Collect Hair For DNA Analysis



Collect Blood For Both DNA & Stable Isotope Analysis

2002 First Single Catch Hair Snares Deployed Capturing DNA To Identify Minimum Numbers Of Bears

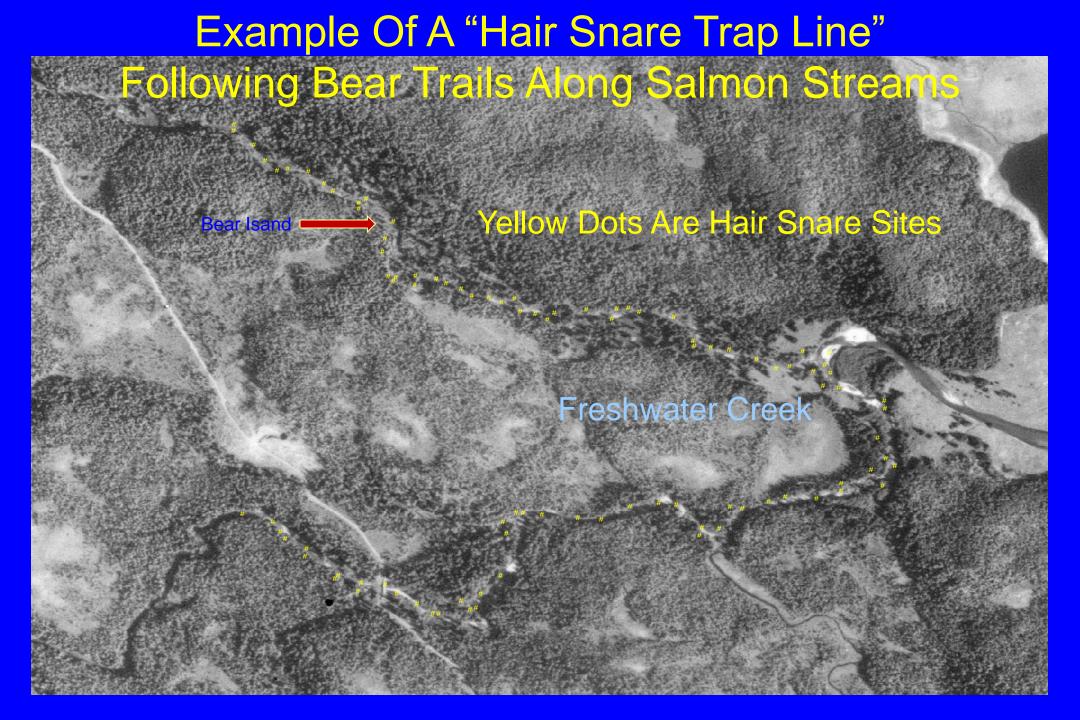
Snares Set On Bear Trails





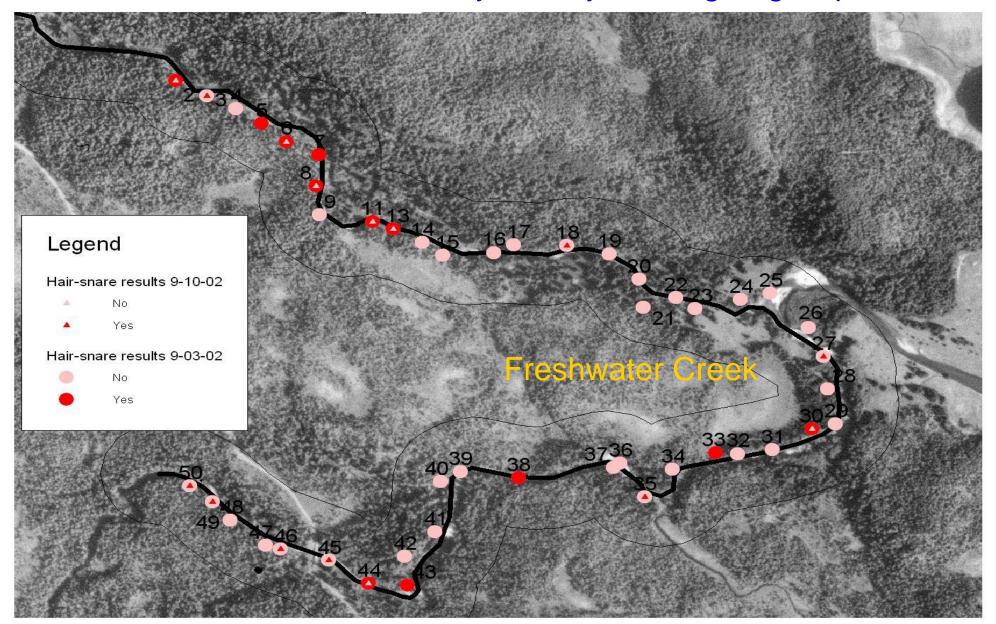






Red Dots & Triangles Are Successful Hair Sites

These Are Checked Every 10 Days During Aug-Sept



Our Work Forces
Us To Trespass
In The Bears
Habitats (Space)
In Serious Ways
Frequently
Crossing Paths

"Bear Central"

















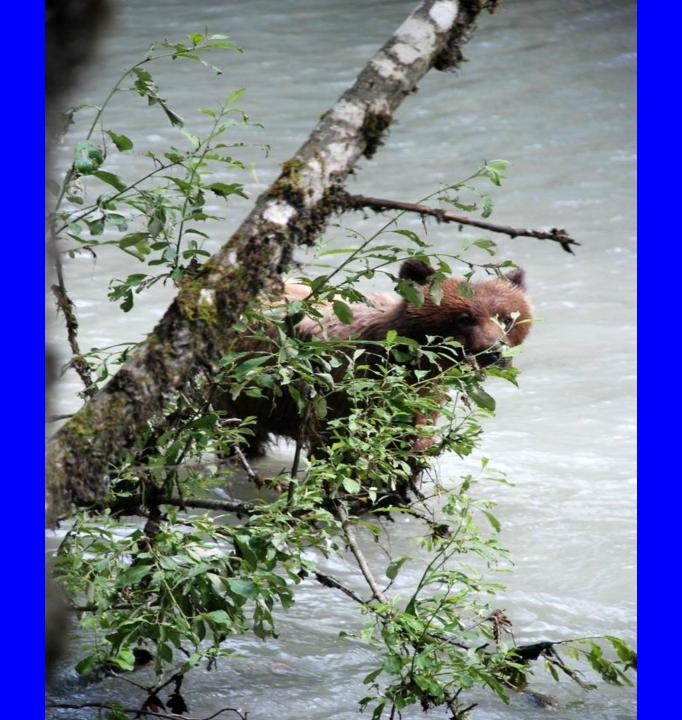


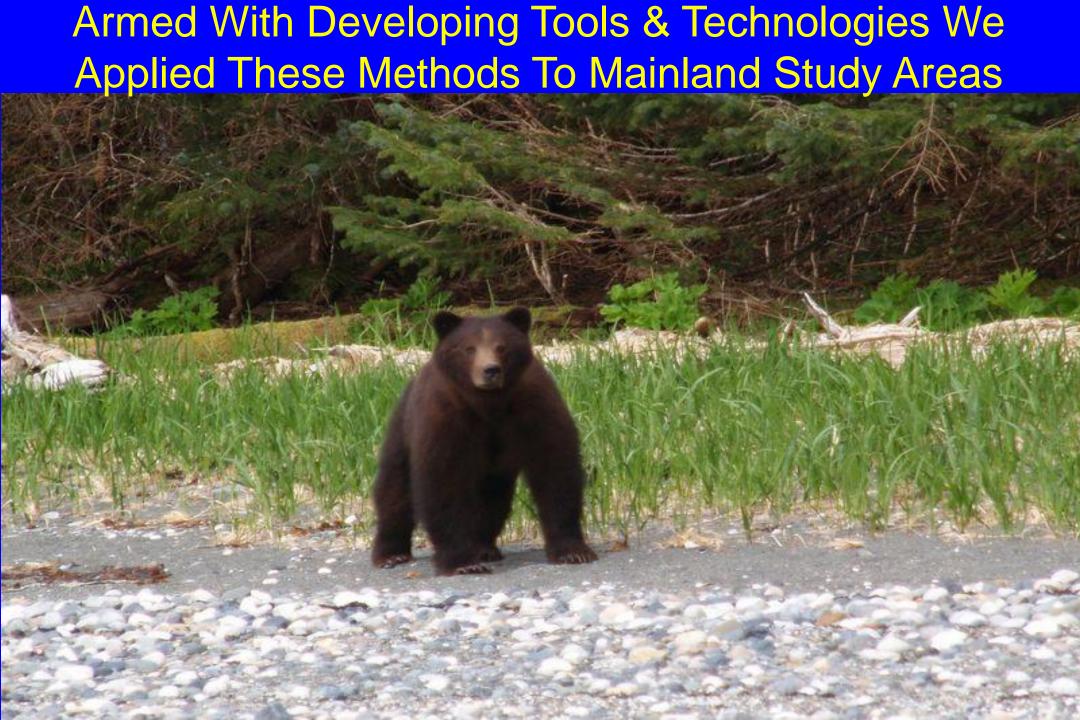










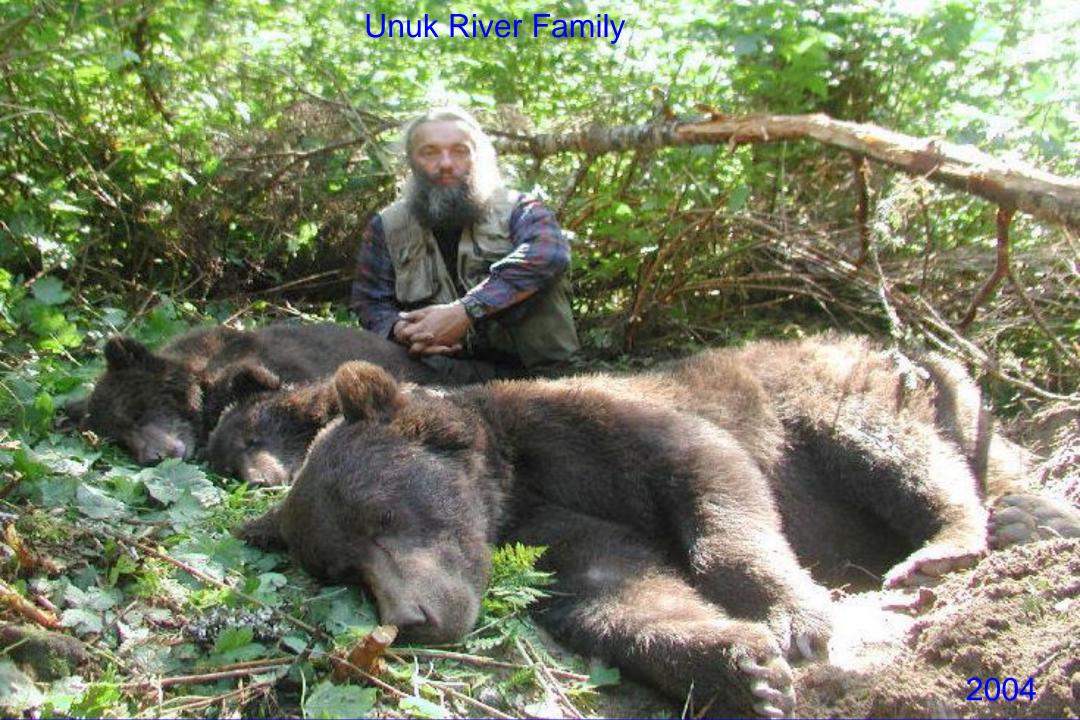


Unuk River...A Trans Boundary River 2004-2010 Also Located Inside Misty Fiords National Monument



(Mainland) Unuk River (338 sq. miles) 2004-2010







2005 Remote Trail Cameras Are Incorporated

These Aide In Identification, Composition & Behavior

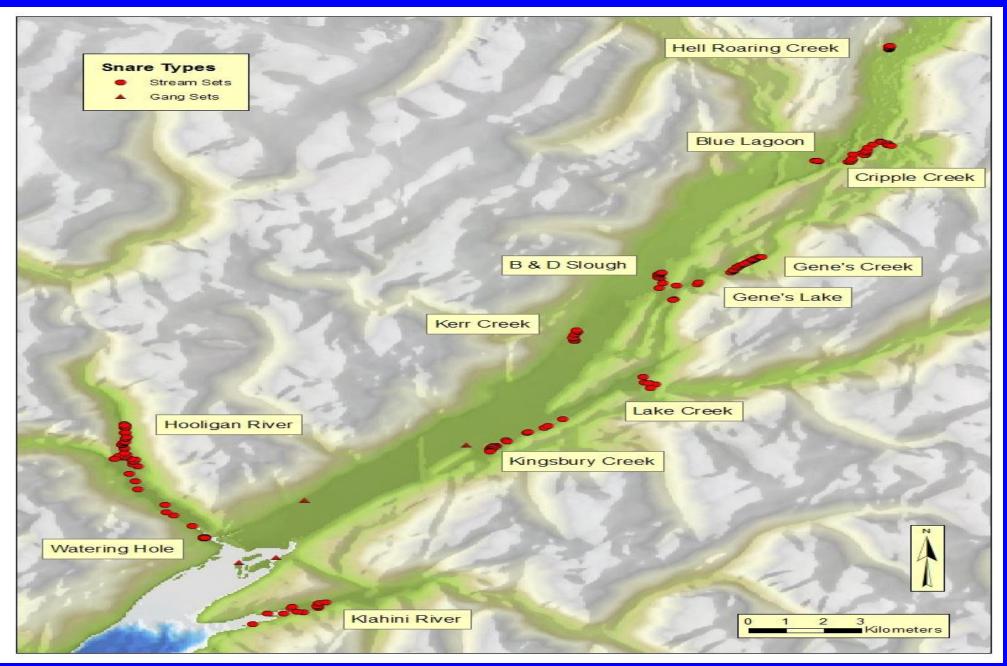


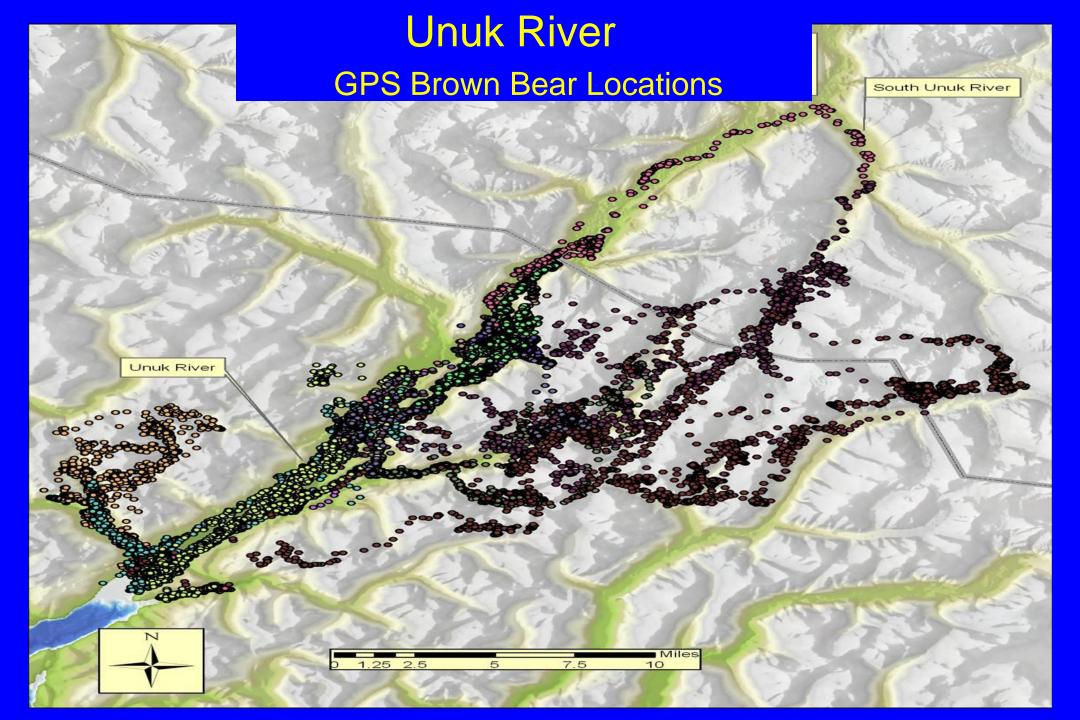




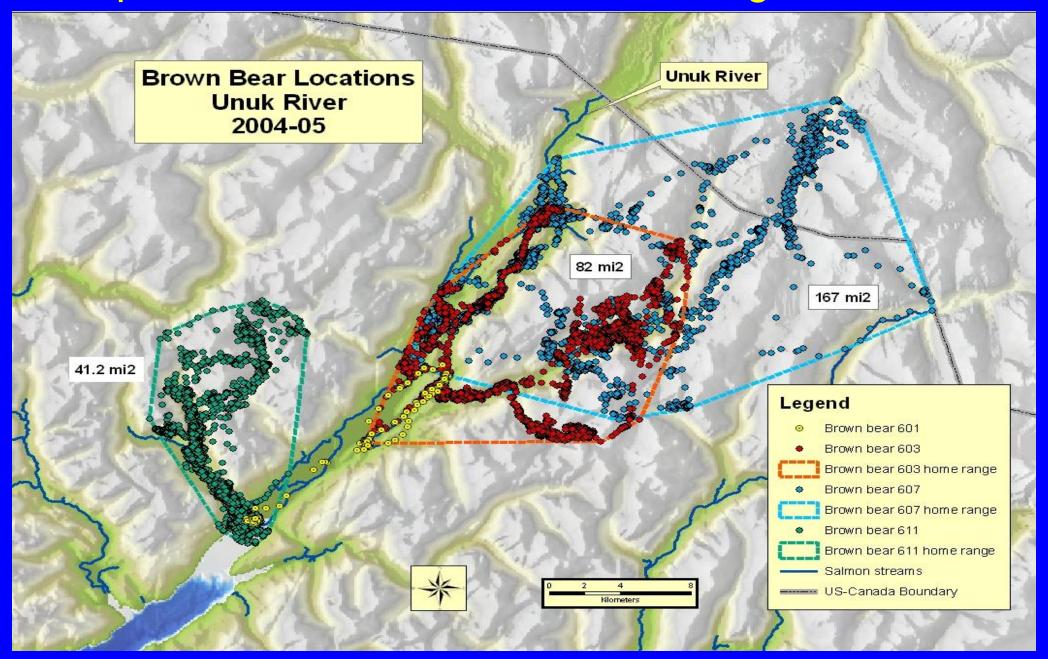


Unuk River...160 Hair Snares

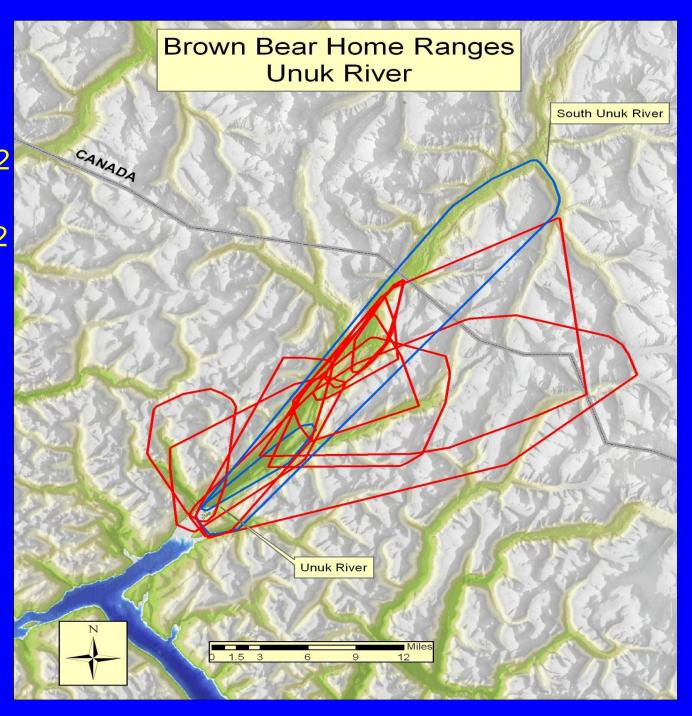




Examples Of Locations And Home Ranges Of 3 Bears



1Male =150 mi² 9 Females = 80 mi² To 242 mi²



(Mainland) North & East Fork Bradfield River



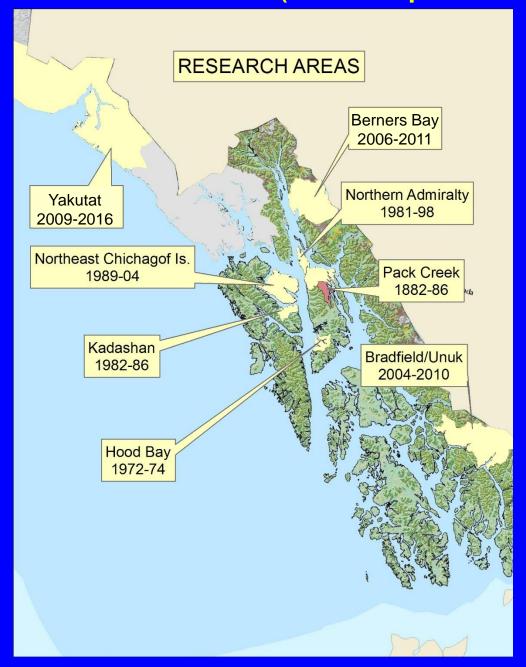
Bradfield Canal/River 2004-2010



Old Frank's & Tom Creek Bradfield Canal



(Mainland) Bradfield Canal (422 sq. miles) 2004-2010



Upper Marten Lake Mt. Female #506

2nd Brown Bear On The Mainland Captured With A Helicopter

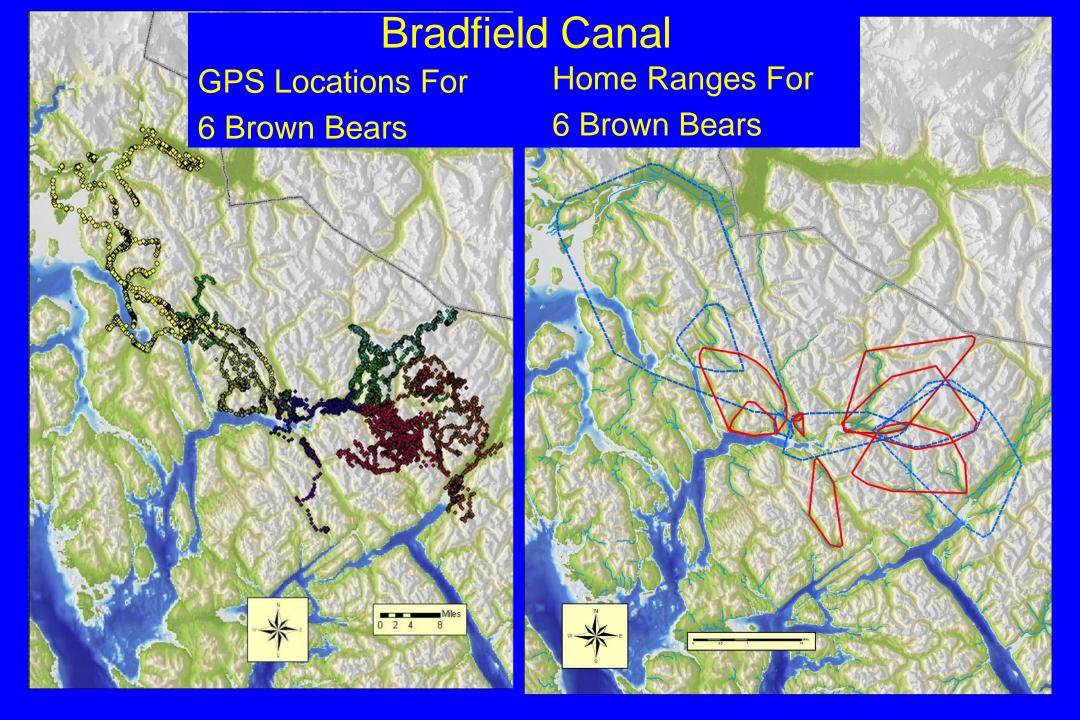




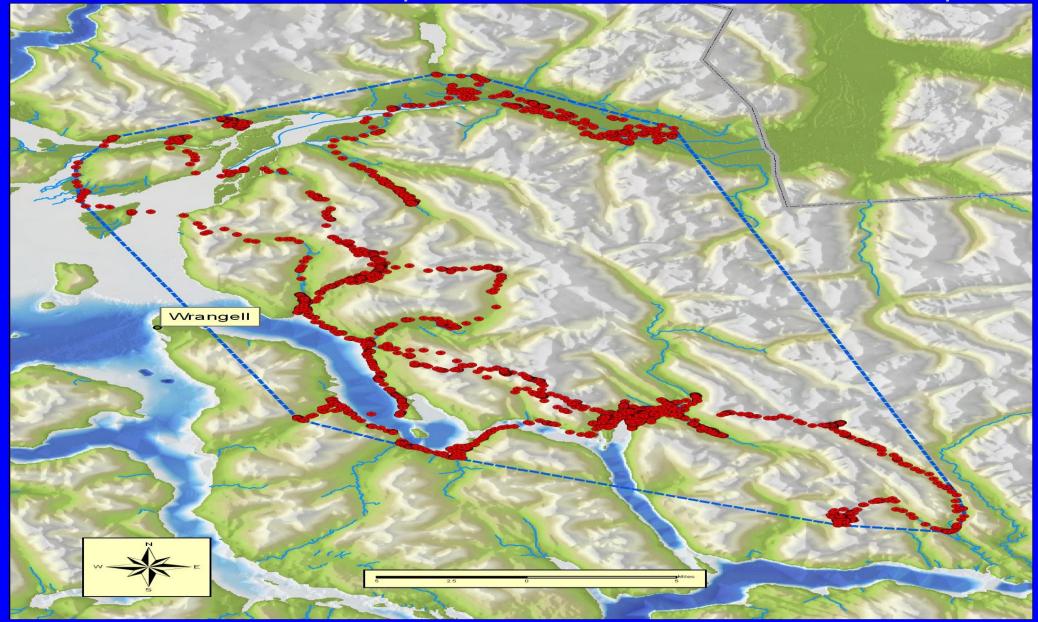


Bradfield...137 Hair Snares





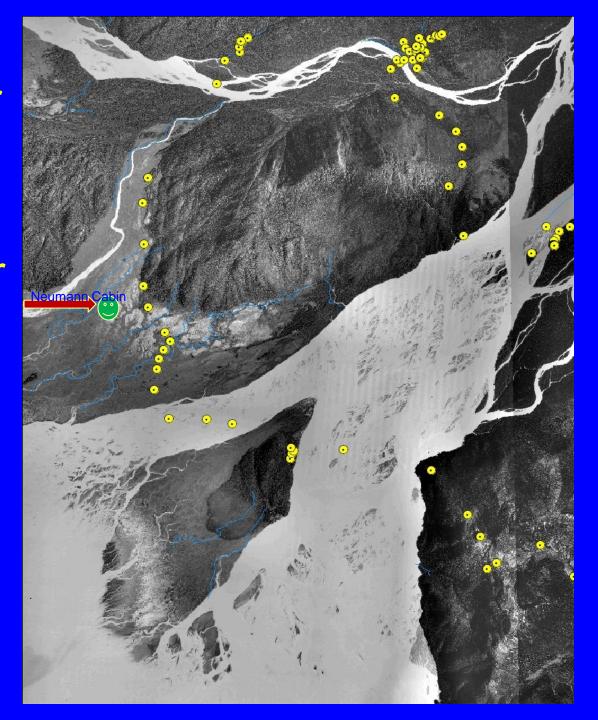
Bradfield Male #505 Home Range = 571 mi² The First Brown Bear Captured On The Mainland With A Helicopter



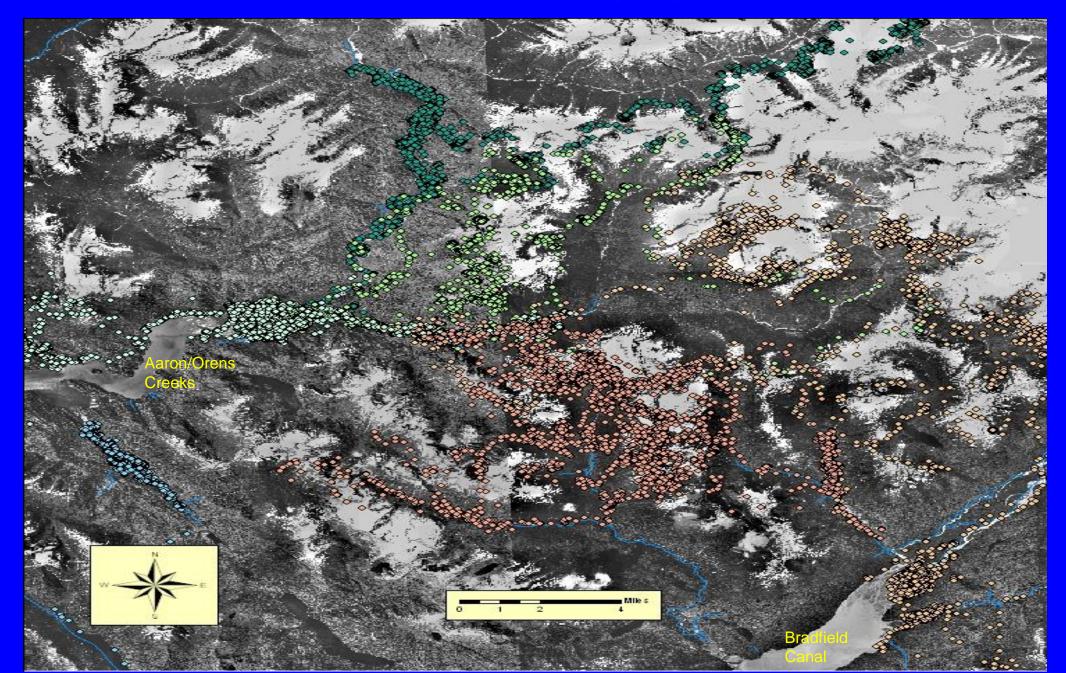
Stikine River A Trans Boundary River

GPS Locations Of Upper Marten Lake Mt.

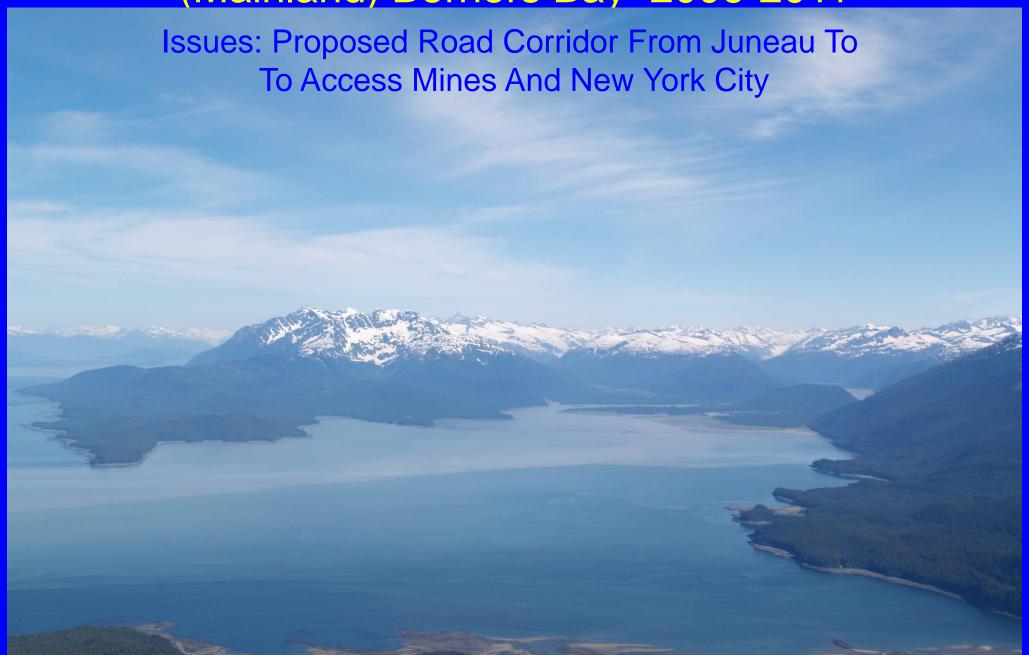
Male #505



Bradfield Brown Bear GPS Locations



(Mainland) Berners Bay 2006-2011



(Mainland) Berners Bay (510 sq. miles) 2006-2011



Helicopter Foot Snare Trap Line





Berners Bay Spot And Swoop Helicopter Darting

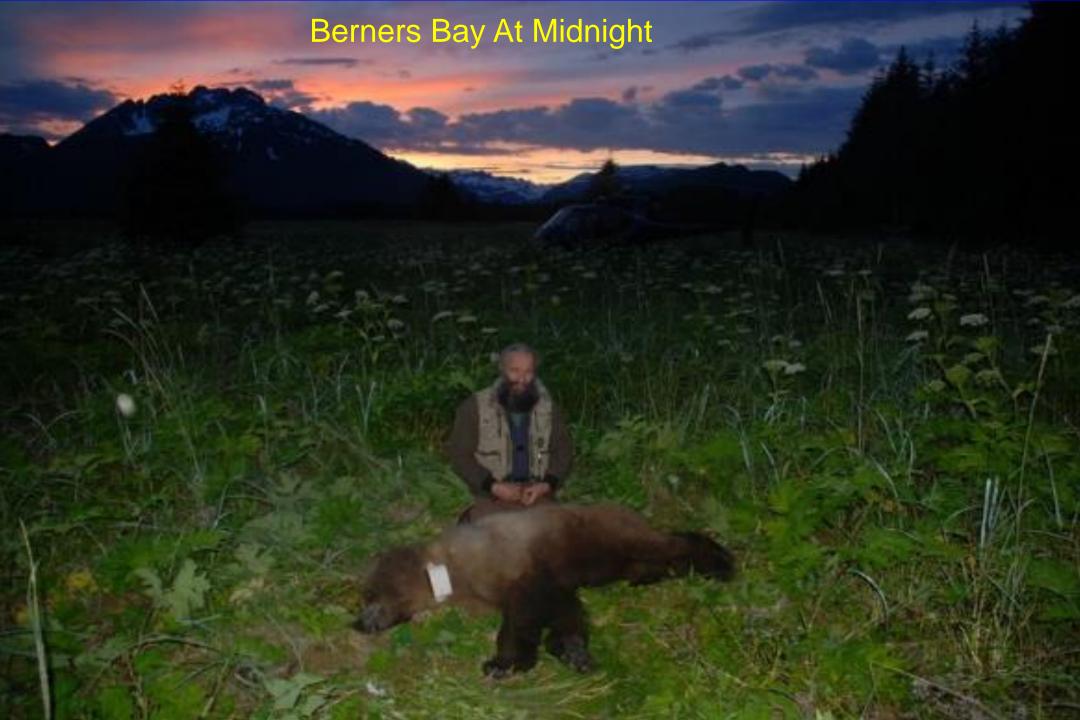




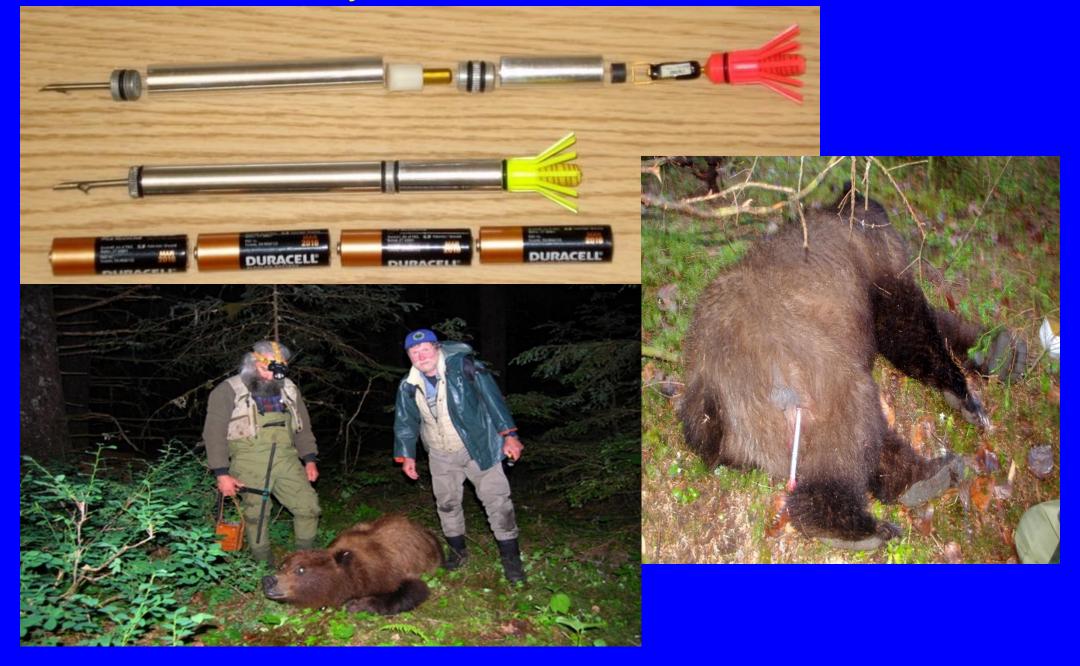








2006 Telemetry Darts Introduced As Another Tool





Coho Research Camp Turned Brown Bear Trapping Camp Located In "Bear Central"



Coho Become The Bait October/November Foot Snaring















Berners Bay...Example Of 9 Brown Bear GPS Locations







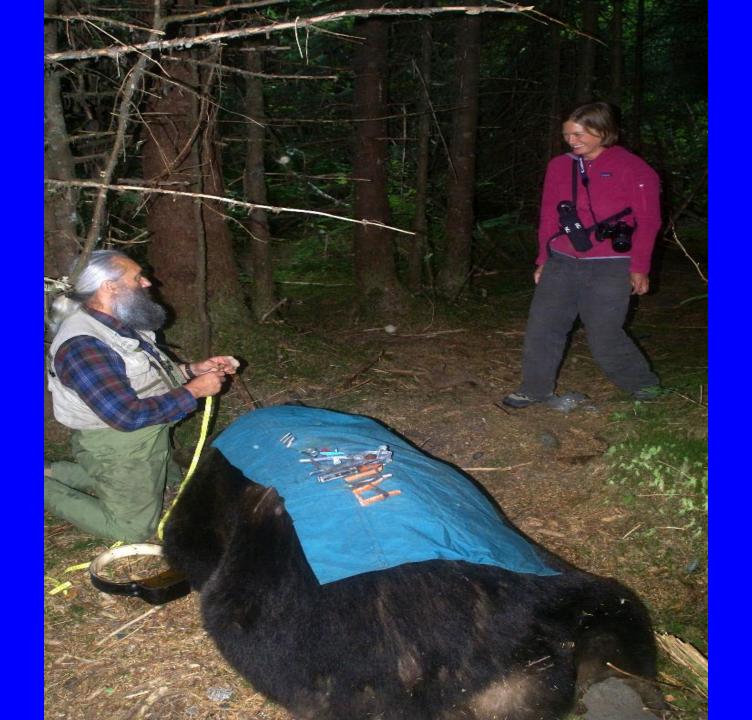
Yakutat Forelands (Yakutat Landfill) 2009-2016



Utilize Radio Transmitter Capture Darts As Another Capture Tool For "Ground Darting"









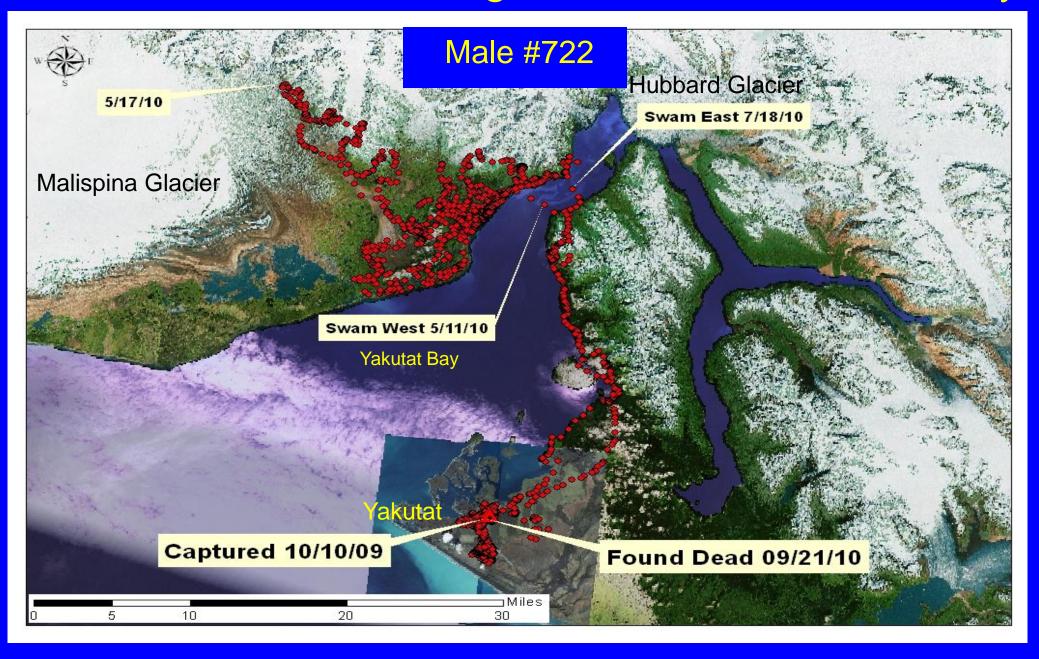




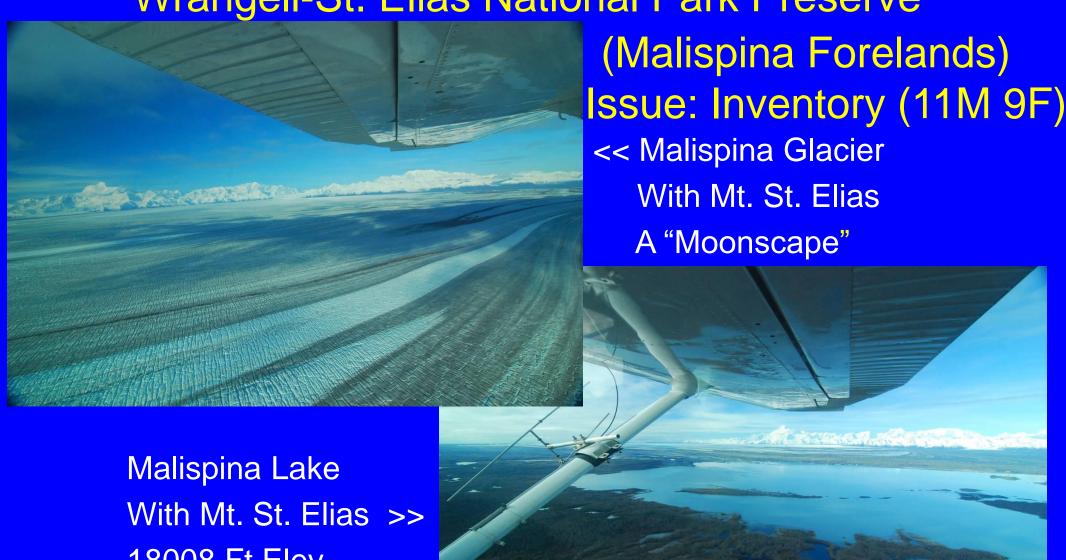
9 Yakutat Landfill Brown Bear Locations



A Landfill "Ground Darting"---A 3 Mile Swim One Way



Wrangell-St. Elias National Park Preserve



With Mt. St. Elias >>
18008 Ft Elev
2nd Highest Peak In
United States

Malispina Forelands 2009-2015



Malispina Forelands/Wrangell St. Elias National Park

Turbo Otter/Entire Field Camp Including 4 Wheeler & Trailer









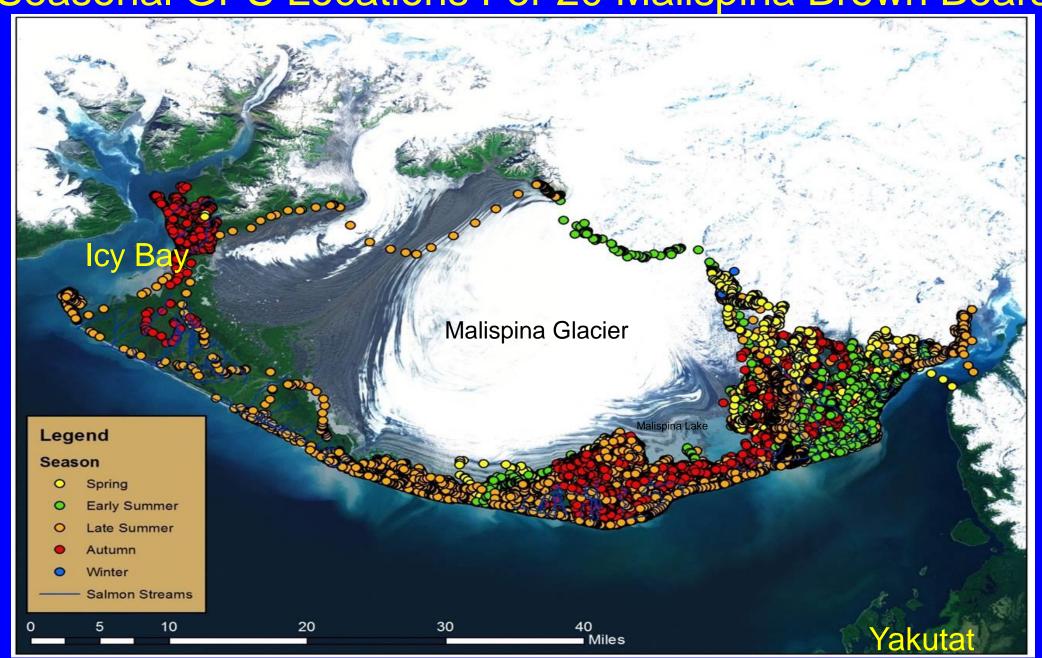
Helicopter Darting



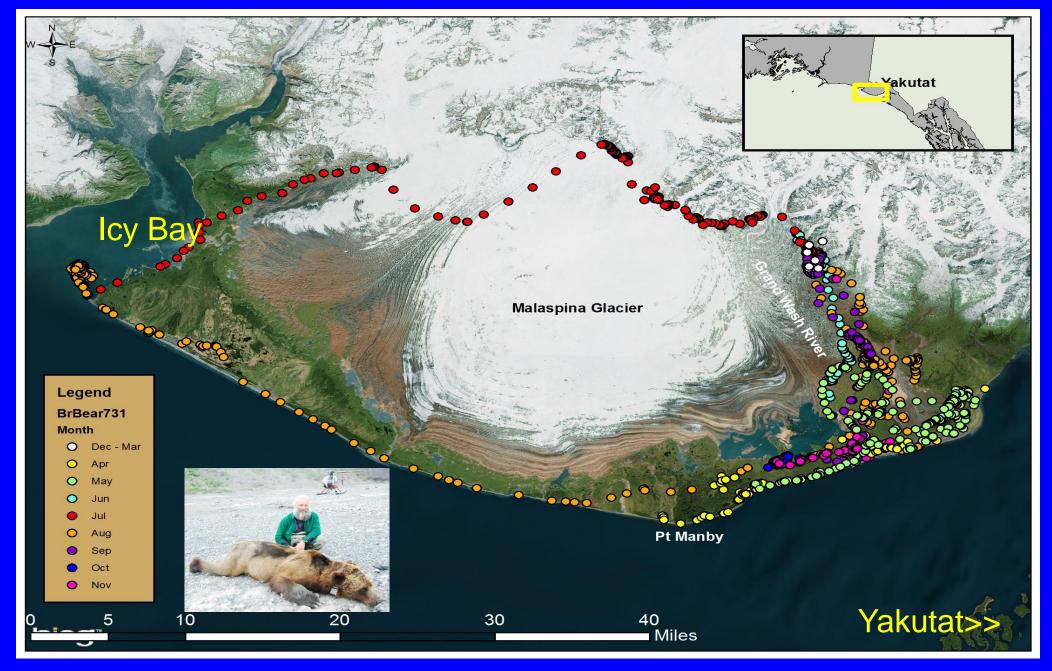




Seasonal GPS Locations For 20 Malispina Brown Bears



Seasonal GPS Locations For 9 Yr Old Male #731



Yakutat Forelands (41M 40F) 40 Miles Of "Strawberry" Beaches & Surfers Mecca



Yakutat Forelands (650 sq. miles) 2009-2016

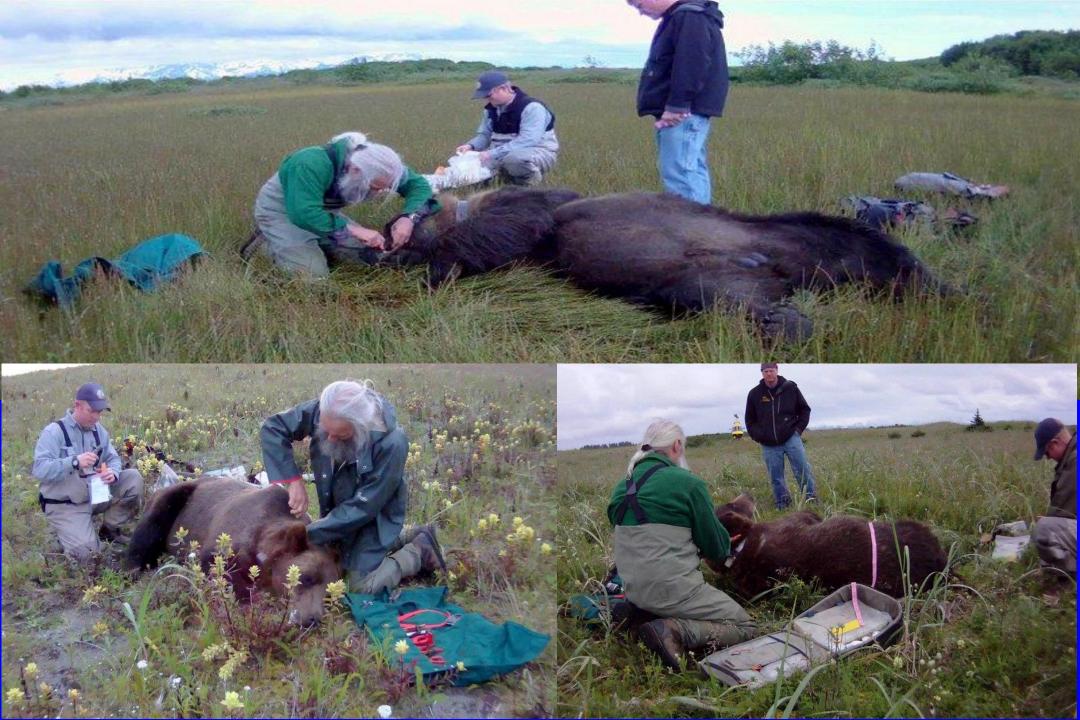
















2013 Incorporated "Spot Messenger" GPS Technology For Checking Remote Foot Snares



When Foot Snare Is Tripped Email Messages Are Sent Out



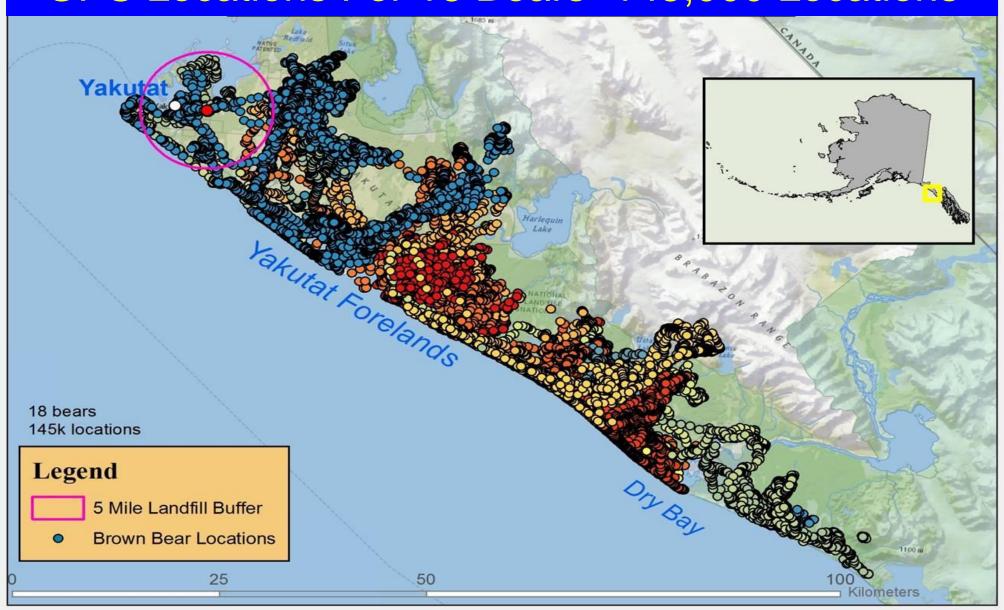
Helicopter Trap Line

"Spot Messenger"
Foot Snared Bear
Captured
30 Miles From
Yakutat



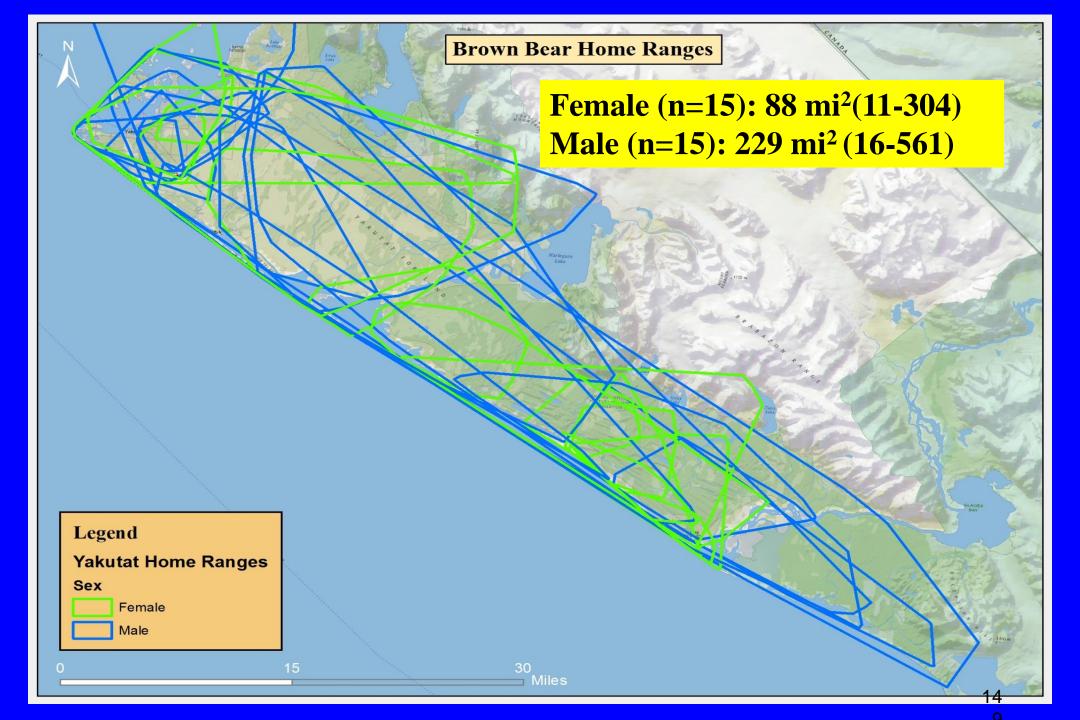


GPS Locations For 18 Bears=145,000 Locations

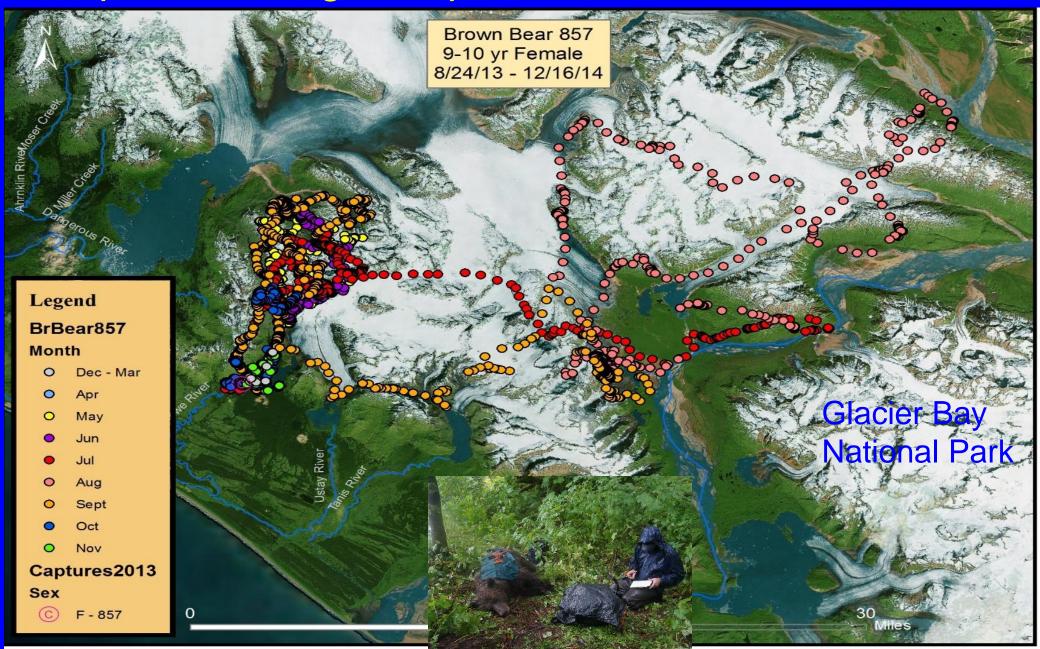


Yakutat Forelands Example Of Seasonal Locations

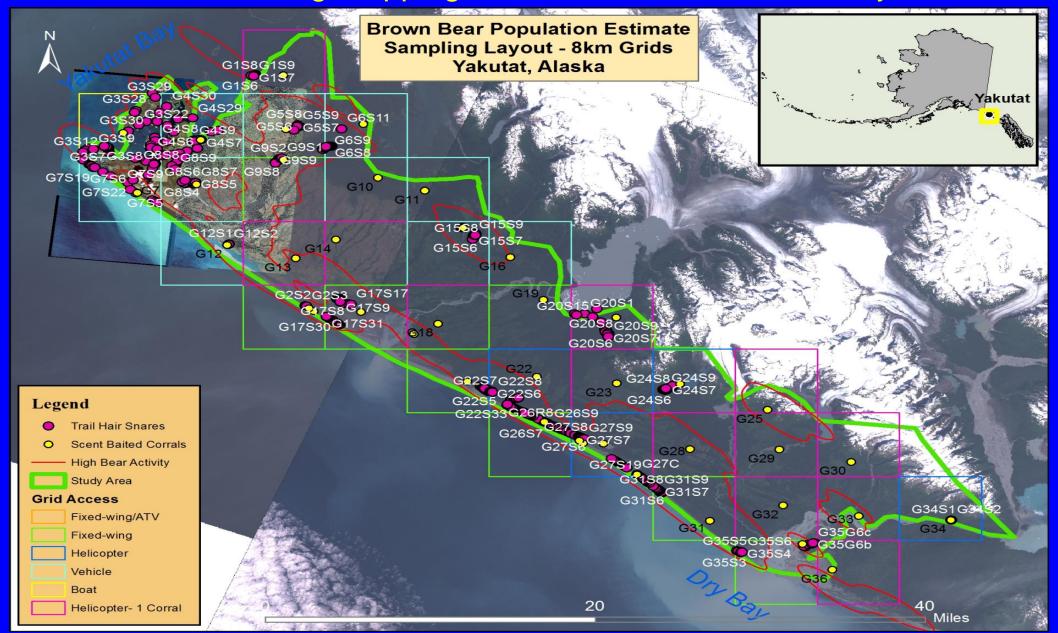


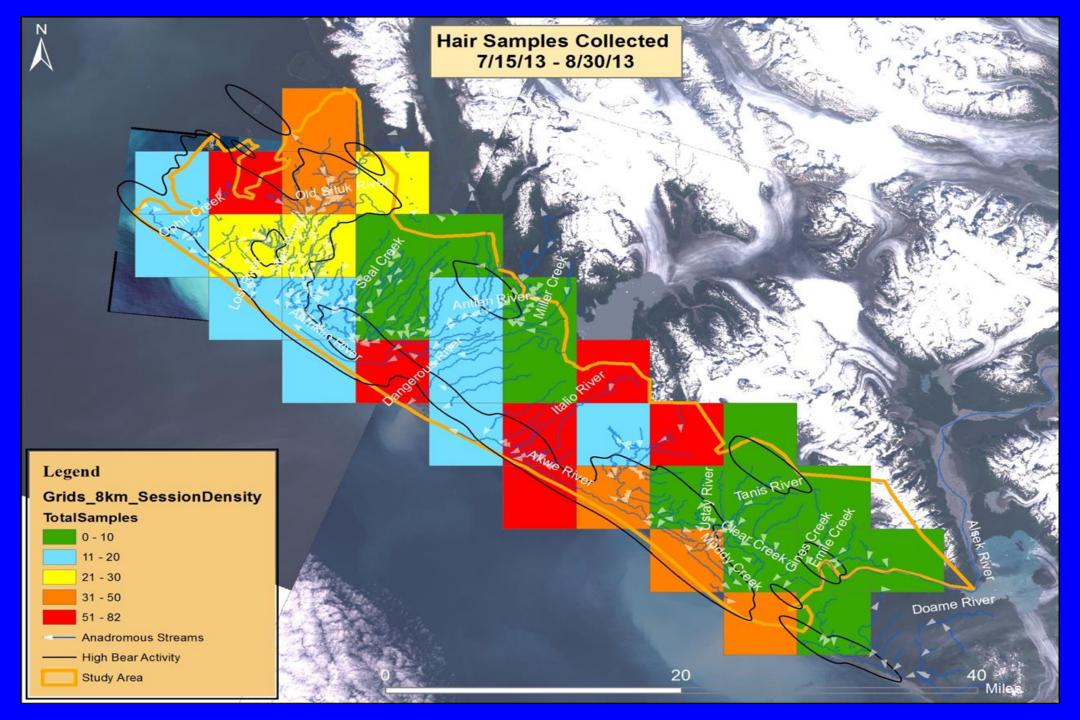


"Spot Messenger Capture" 40 Miles From Yakutat



Yakutat Forelands 650 sq miles Hair Snaring Trapping Grids-Checked Within 10 Days





2013 Field Hair Sampling & Logistics

Collected 849 Hair Samples –4 lbs Bear Hair

- 569 Hair Snares
- 269 Scented Barbed Wire Corrals
- 11 Rub Trees

Accessed Hair Traps Utilizing:

Helicopter Airplanes Vehicles Boats







Breeding Pair

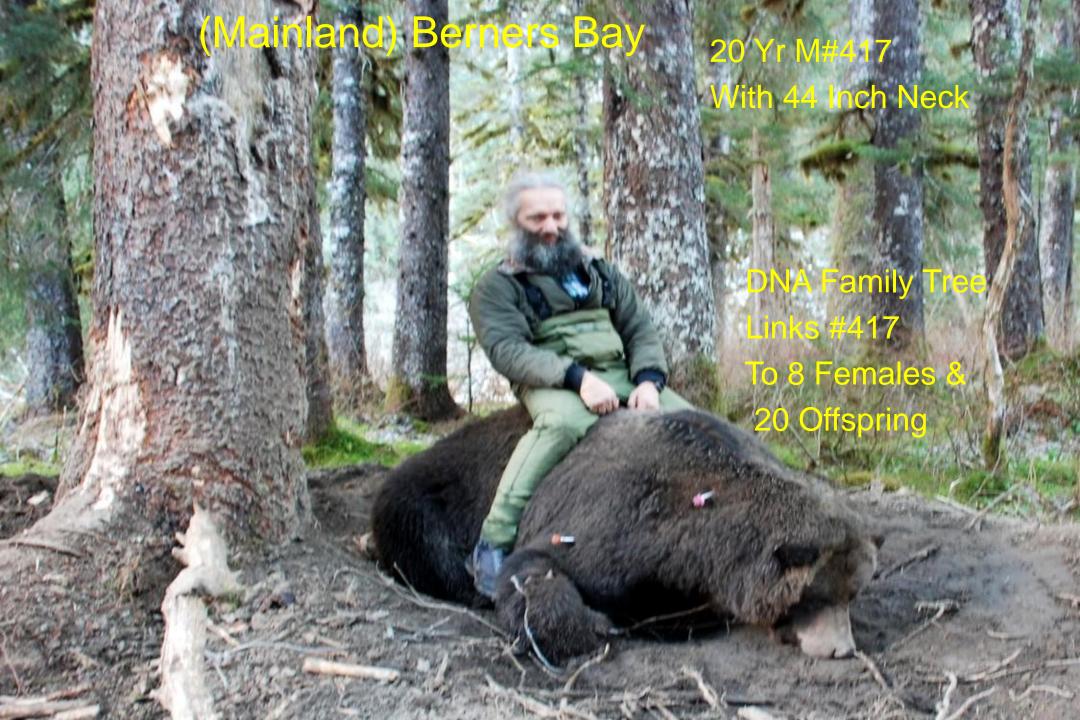


- The Brown Bear Mating Season In Southeast Alaska Is The End Of April Through The First Week Of July.
- Most Mainland Brown Bears Mate In Lowland Habitats.
- In Contrast Most Admiralty, Baranof & Chichagof Brown Bears Mate Above 2000 Ft Elevation.

In Contrast...On The Islands Of Admiralty & Chichagof The Primary Mating Habitat Is The Alpine >2000 Ft







Admiralty Females Breed At 7-8 Years Of Age This Is The Oldest Breeding Age For Any Brown Bear Population



Admiralty Island...We Learned A Few Brown Bears (Interior Females) Never Moved To Salmon Streams



Fur Color Varies Between SE Brown Bear Populations



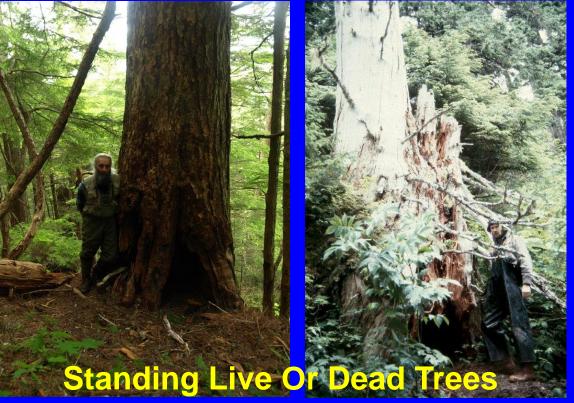




Unuk River Males... Den In Canada & Fish In Alaska

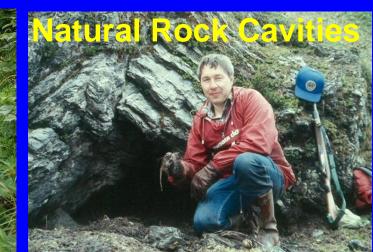


Den Site
Selection
Variations
By
Study
Areas











Yakutat

Admiralty & Chichagof Is. Ave. Den Elev 2000 Ft

Study Area Home Range Comparisons Homerange Sizes Driven By "Food/Habitat & Sex"

(Essentially The Availability Of Food Resources & Mating)

Study Area	Sex/Home Range Size	
	Male/sq mi	Female/sq mi
Yellow Stone	1467	345
Brooks Range	1000-800	
ABC Islands	32	14
Berners Bay	114	34
Bradfield-Unuk	150	80-242
Yakutat-Malispina	?	?

2012 DNA Analysis
Determined There Are
9 Distinct Brown Bear
Populations In
Southeast Alaska

"Genetically distinct clusters of populations of brown bears in SE Alaska determined from the Program Structure based on 20 microsatellite loci."

Interestingly, Admiralty
Brown Bear DNA Ends Up More
Closely Related To Polar Bears
Than Brown Bear Populations
Surrounding Them...



Looking Back At...

Variations, Differences, Adaptations & Habitats Of The Brown Bears Of Each Study Area...With This Perspective Each Study Area "We"

- Perspective Each Study Area "We"

 Might View As A Distinct "Country"
 - Admiralty
 - Baranof-Chichagof
 - Bradfield-Unuk
 - Taku
 - Berners Bay
 - Chilkat
 - Yakutat Forelands
 - Malispina Forelands
 - Glacier Bay NP





The End

Why Should We Care About The Brown Bears That Inhabit The Temperate Rainforests Of The Tongass?

A Retrospective View Of The Methodology/ Technologies Used In Determining Brown Bear Populations In The Tongass 1981 To 2016

LaVern Beier...Alaska Department of Fish Game 1973-2016 (retired)
Juneau, Alaska