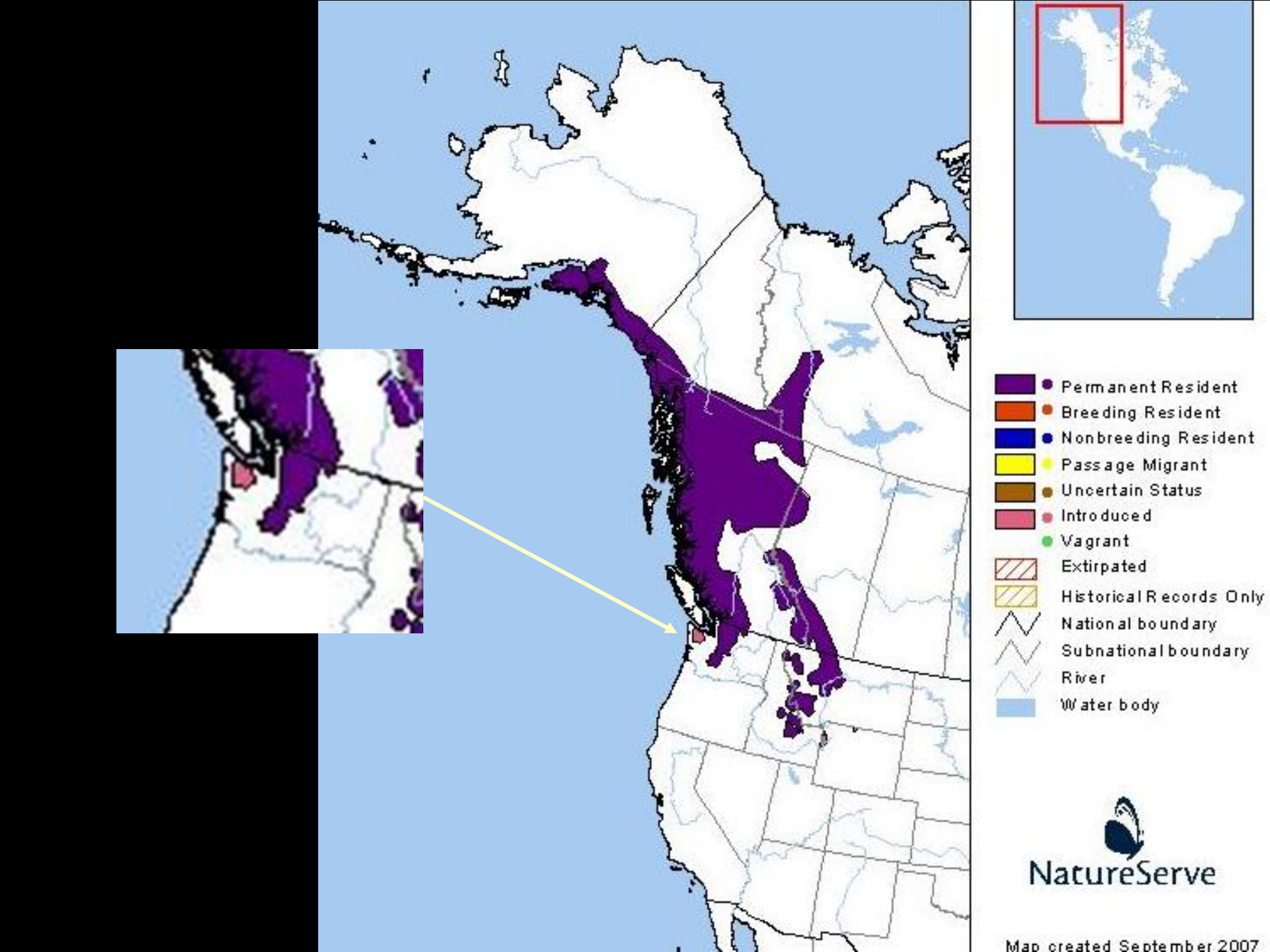
# Olympic National Park

U.S. Department of the Interior
National Park Service

# Olympic National Park Goat Management Plan/EIS

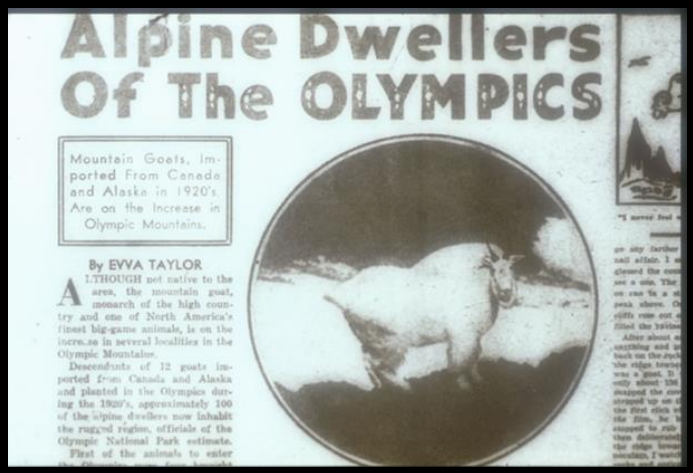
August 2017


Permanent Resident
Breeding Resident
Nonbreeding Resident
Passage Migrant
Uncertain Status
Introduced
Vagrant
Extirpated
Historical Records Only
National boundary
Subnational boundary
River
Water body
NatureServe
Map created September 2007

# Olympic Peninsula
# Mountain Goat Introduction Sites
## 11-12 goats, 1925-1929




Population Expansion, 1920-1960's



Alpine Dwellers Of The OLYMPICS

Mountain Goats, Imported From Canada and Alaska in 1920's Are on the Increase in Olympic Mountains.

By EVVA TAYLOR

ALTHOUGH not native to the area, the mountain goat, monarch of the high country and one of North America's finest big-game animals, is on the increase in several localities in the Olympic Mountains.

Descendants of 12 goats imported from Canada and Alaska and planted in the Olympics during the 1920's, approximately 100 of the alpine dwellers now inhabit the rugged region, officials of the Olympic National Park estimate.

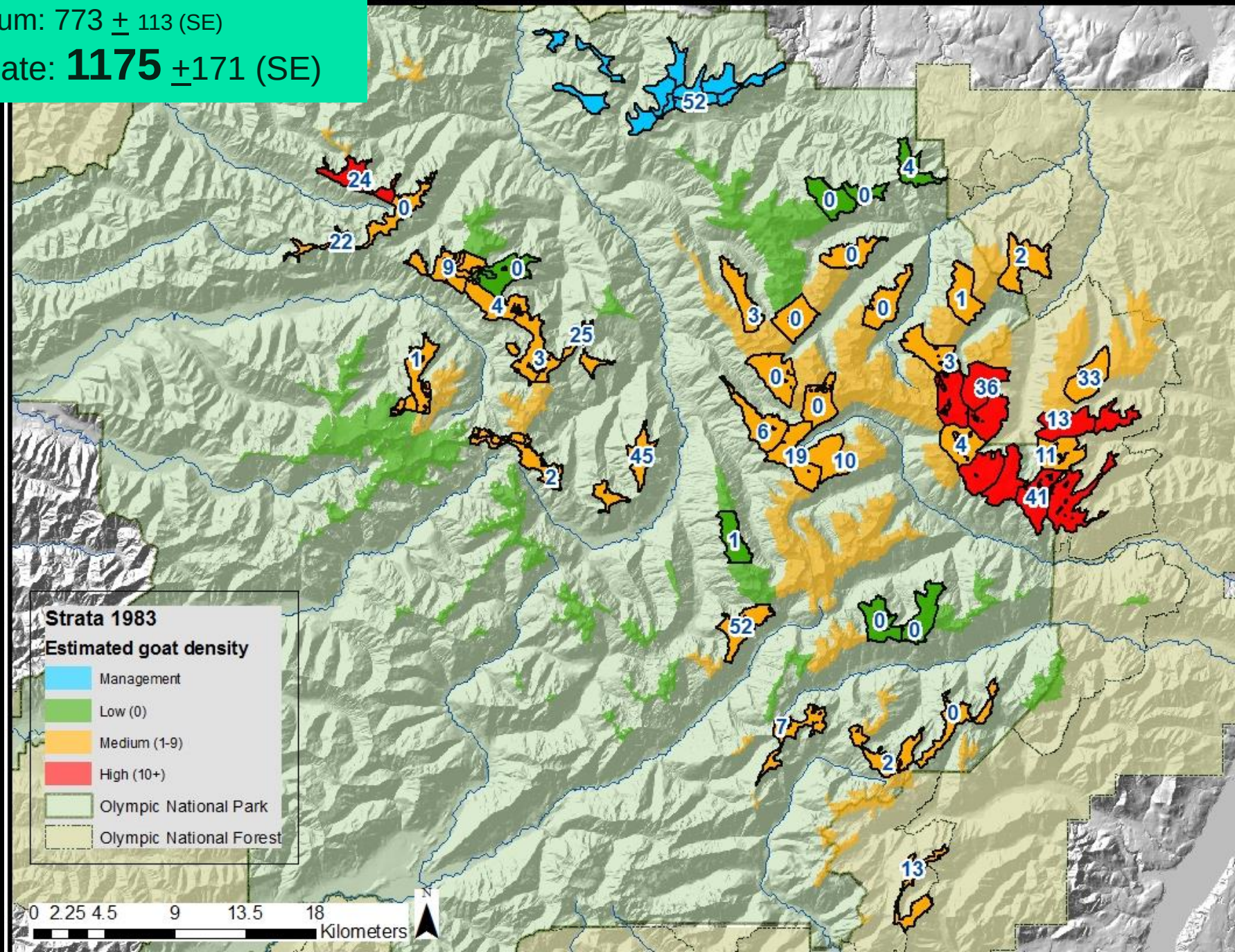
First of the animals to enter

1980:
Estimated 222 goats on Klahanne Ridge

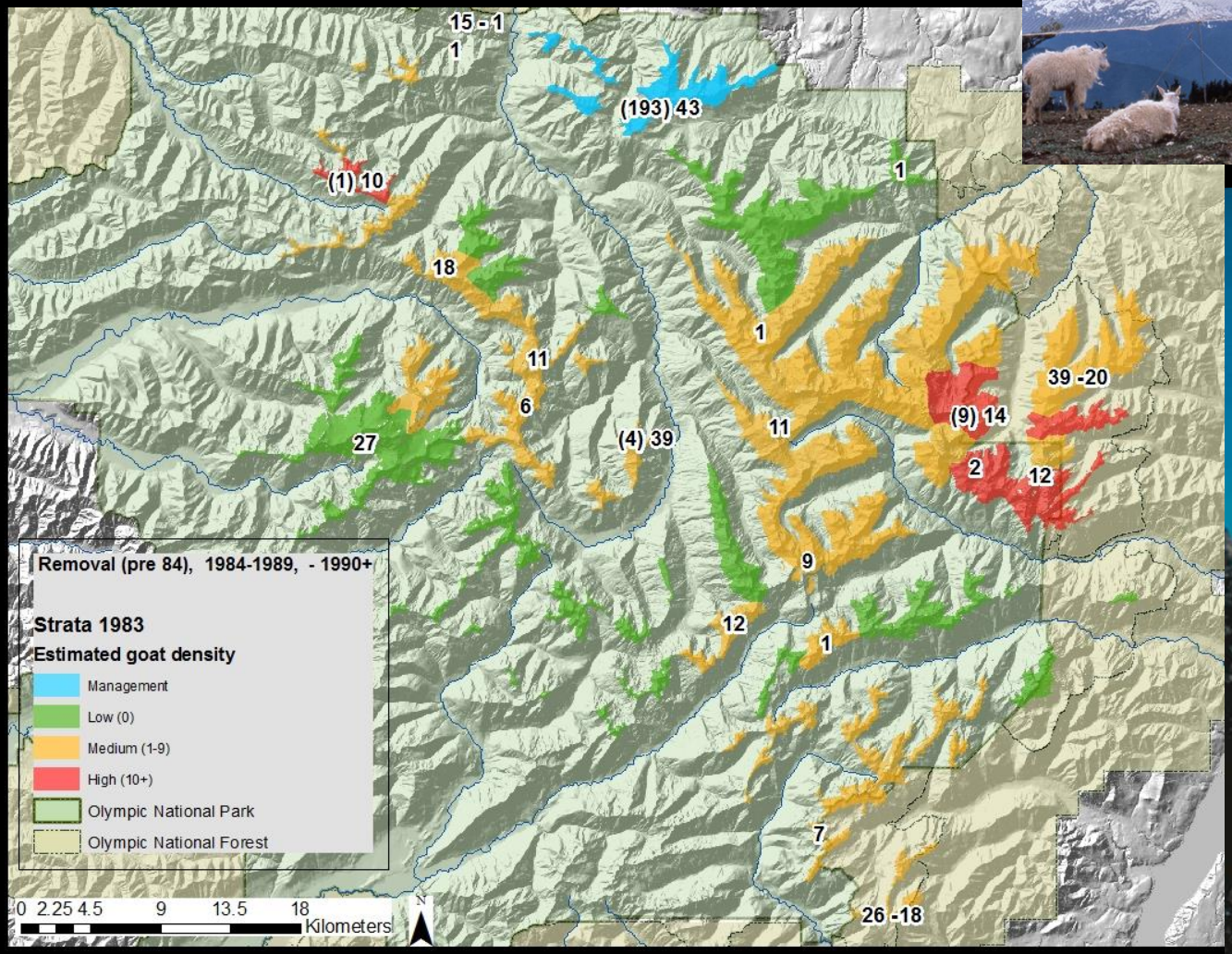
# Goat Population 1983:

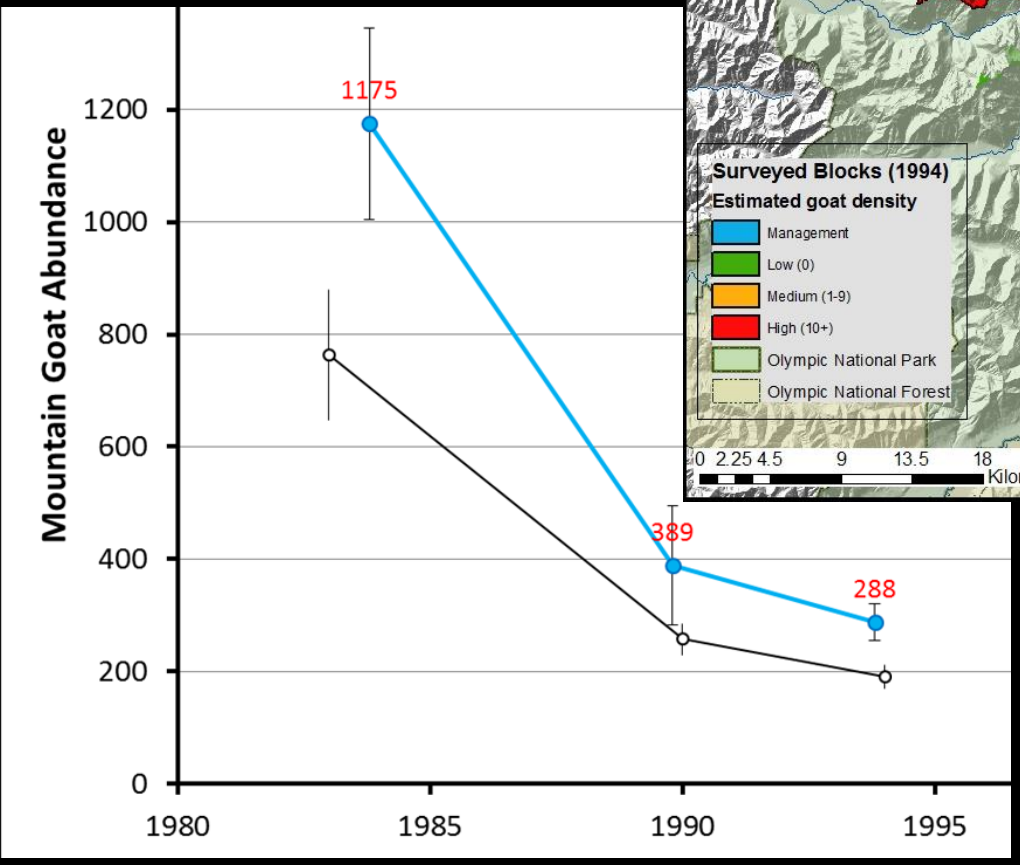
Minimum: 773 ± 113 (SE)

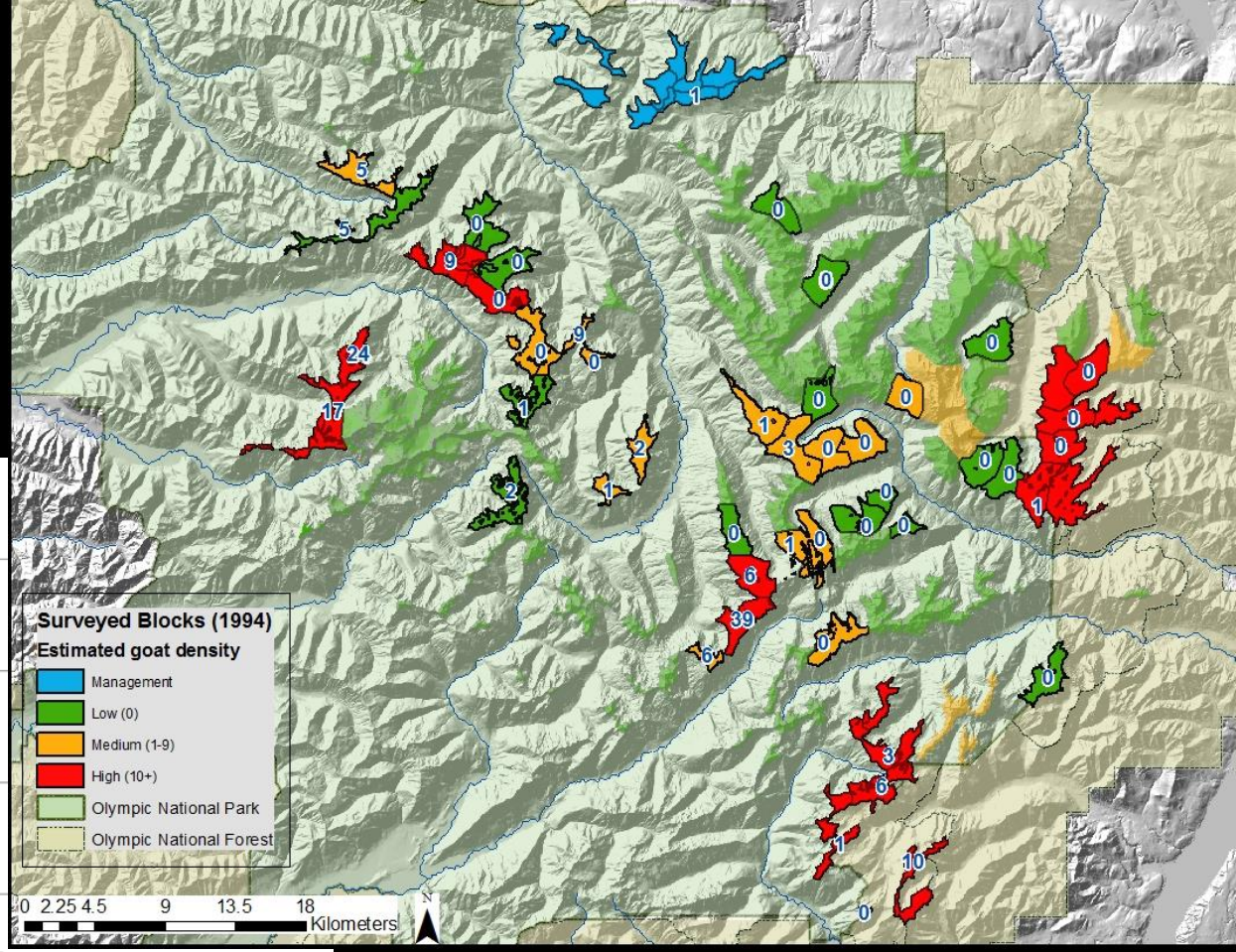
Estimate: **1175** ±171 (SE)



**Removals:**
***before* 1983 survey: (207)**
**1983-1989 : 240**
**1990-1998 : - 39**



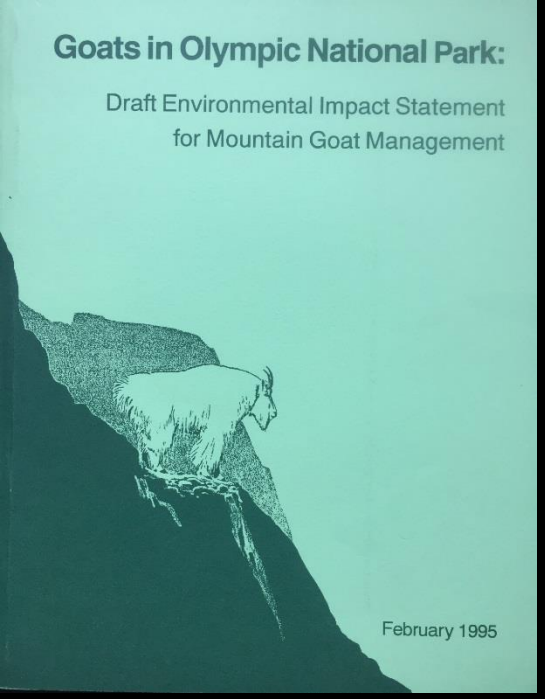




Minimum Index — Estimate (1)

Index: minimum population number of goats, 1983-2004 survey area, no correction for sightability
Estimate (1) : 1983-2004 survey, corrected for sightability using correction factor

# Goats in Olympic National Park:

## Draft Environmental Impact Statement for Mountain Goat Management



February 1995

**Review of Scientific Material Relevant to the Occurrence, Ecosystem Role, and Tested Management Options for Mountain Goats in Olympic National Park**

**Fulfillment of Contract #14-01-0001-99-C-05, U.S. Department of Interior**

Reed F. Noss, Russell Graham, Dale R. McCullough, Fred L. Ramsey, Jennifer Seavey, Cathy Whitlock, and Michael P. Williams

May 30, 2000

Contractor:
Conservation Biology Institute
260 SW Madison Ave., Suite 106
Corvallis, OR 97333
541-757-0687

USGS
science for a changing world

Prepared in cooperation with the U.S. National Park Service and Washington Department of Fish and Wildlife

## Seasonal Distribution and Aerial Surveys of Mountain Goats in Mount Rainier, North Cascades, and Olympic National Parks, Washington

Open-File Report 2011-1107

U.S. Department of the Interior
U.S. Geological Survey

Washington Department of Fish & Wildlife

*Tools and Technology Article*

# A Sightability Model for Mountain Goats

**CLIFFORD G. RICE,**[1] *Wildlife Program, Washington Department of Fish and Wildlife, 600 Capitol Way N, Olympia, WA 98501, USA*
**KURT J. JENKINS,** *United States Geological Survey, Forest and Rangeland Ecosystem Science Center, Olympic Field Station, 600 E Park Avenue, Port Angeles, WA 98362, USA*
**WAN-YING CHANG,**[2] *Wildlife Program, Washington Department of Fish and Wildlife, 600 Capitol Way N, Olympia, WA 98501, USA*

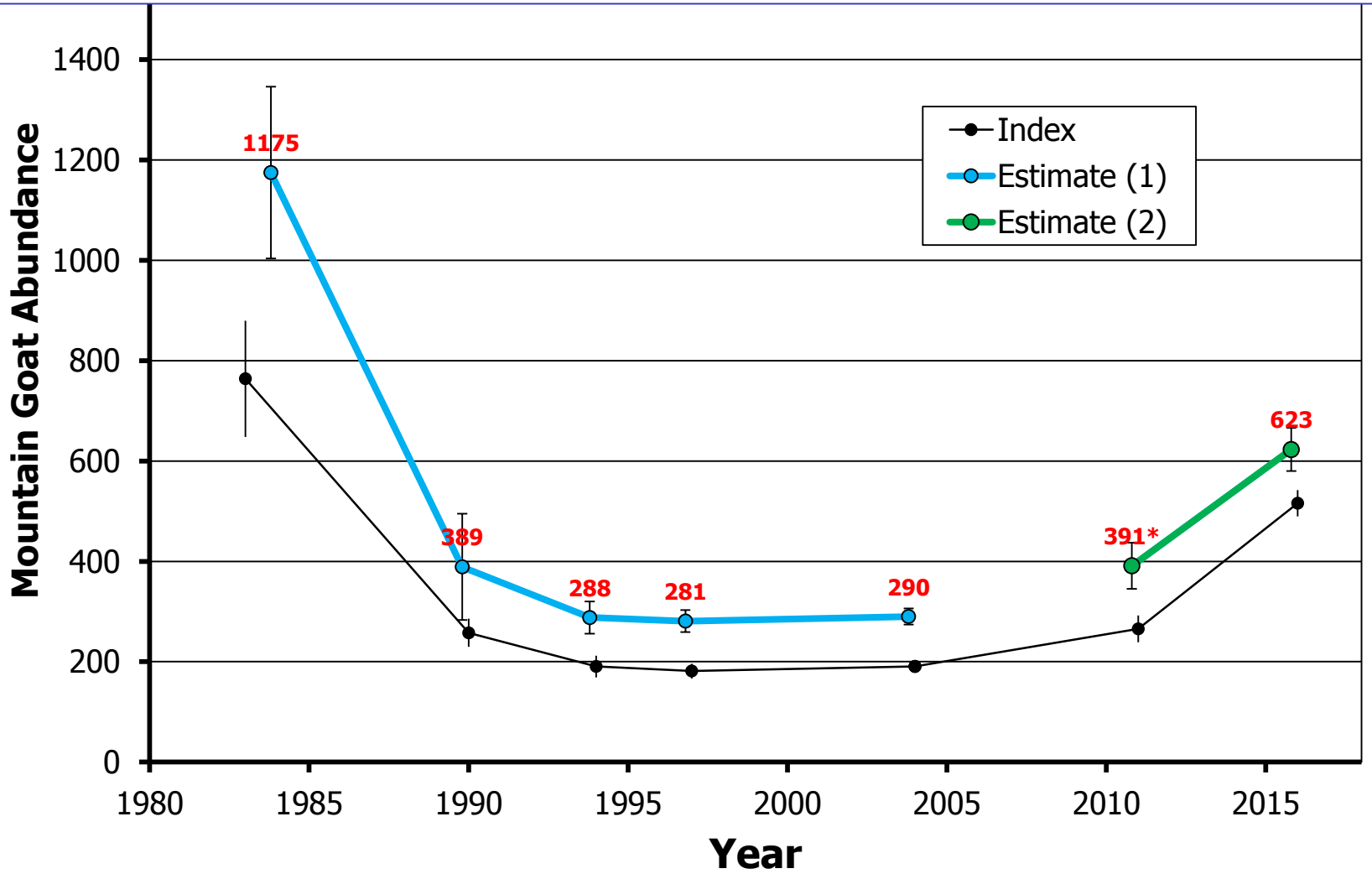
**ABSTRACT** Unbiased estimates of mountain goat (*Oreamnos americanus*) populations are key to meeting diverse harvest management and conservation objectives. We developed logistic regression models of factors influencing sightability of mountain goat groups during helicopter surveys throughout the Cascades and Olympic Ranges in western Washington during summers, 2004–2007. We conducted 205 trials of the ability of aerial survey crews to detect groups of mountain goats whose presence was known based on simultaneous direct observation from the ground ($n = 84$), Global Positioning System (GPS) telemetry ($n = 115$), or both ($n = 6$). Aerial survey crews detected 77% and 79% of all groups known to be present based on ground observers and GPS collars, respectively. The best models indicated that sightability of mountain goat groups was a function of the number of mountain goats in a group, presence of terrain obstruction, and extent of overstory vegetation. Aerial counts of mountain goats within groups did not differ greatly from known group sizes, indicating that under-counting bias within detected groups of mountain goats was small. We applied Horvitz–Thompson-like sightability adjustments to 1,139 groups of mountain goats observed in the Cascade and Olympic ranges, Washington, USA, from 2004 to 2007. Estimated mean sightability of individual animals was 85% but ranged 0.75–0.91 in areas with low and high sightability, respectively. Simulations of mountain goat surveys indicated that precision of population estimates adjusted for sightability biases increased with population size and number of replicate surveys, providing general guidance for the design of future surveys. Because survey conditions, group sizes, and habitat occupied by goats vary among surveys, we recommend using sightability correction methods to decrease bias in population estimates from aerial surveys of mountain goats. (JOURNAL OF WILDLIFE MANAGEMENT 73(3):468–478; 2009)

DOI: 10.2193/2008-196

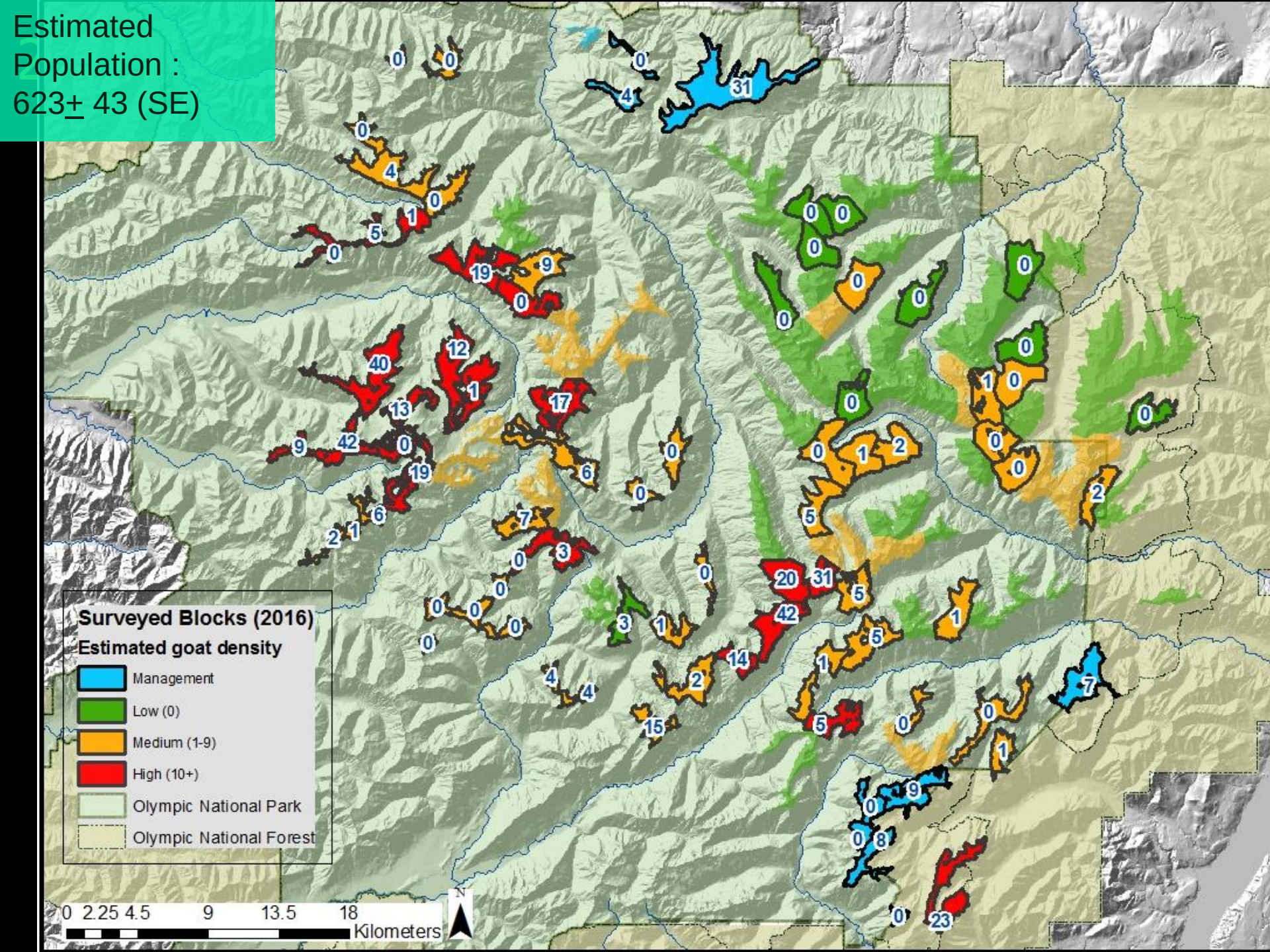
**KEY WORDS** aerial survey, census, mountain goats, *Oreamnos americanus*, sightability, survey effort.

# Olympic mountain goat population trends 1983-2016

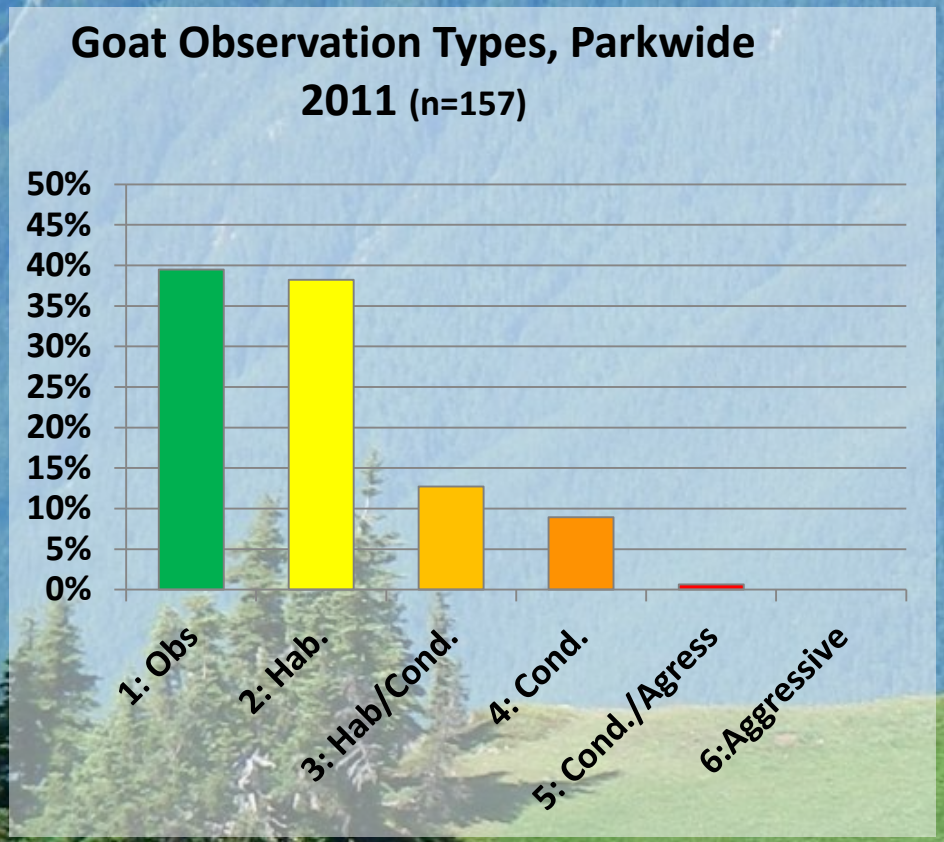
2016 estimate: 623 ± 43 (SE) goats. Increasing at 8.1 ± 1.5%/yr (2004-2016)

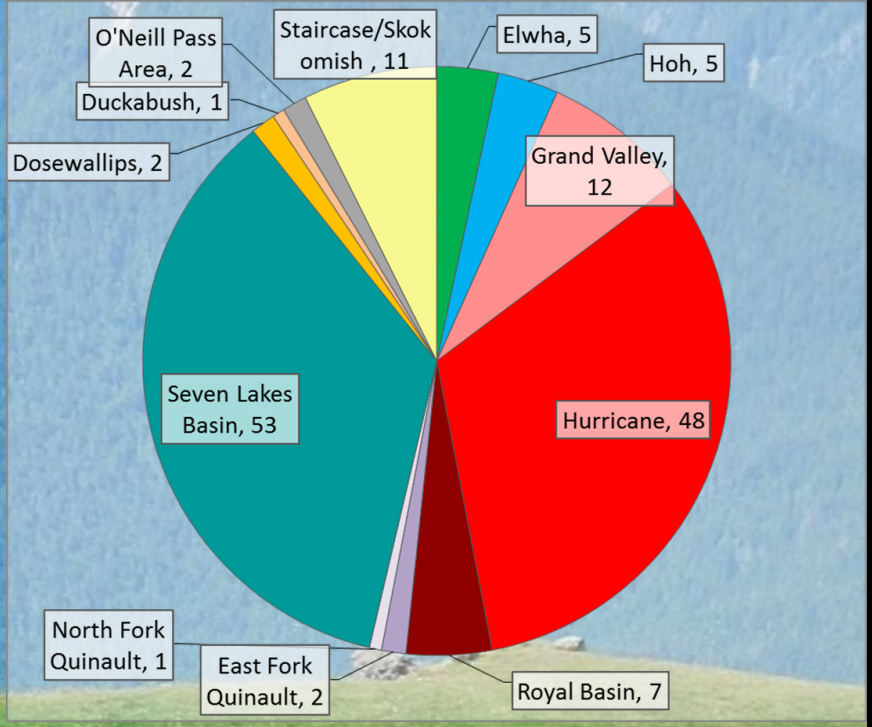



Index: minimum population number of goats, 1983-2004 survey area, no correction for sightability
Estimate (2) : 2011-2016 sample frame, corrected for sightability using model
*2011 estimate includes count from Ellinor from 2012


Estimated Population : 623± 43 (SE)
Surveyed Blocks (2016)
Estimated goat density
Management
Low (0)
Medium (1-9)
High (10+)
Olympic National Park
Olympic National Forest
0 2.25 4.5 9 13.5 18
Kilometers
N

| Occurrence | Responses to situation |
|---|---|
| **1: Observations of goats at > 100m (300f)** | • Post level 1 signs |
| **2: Goats don't move off trail until get close, but easily shooed away.** | • Post level 2 signs<br>• Implement aversive conditioning during regular patrols. |
| **3: .. follow people on trail, come into campsites; not easily chased away; no aggressive postures** | • Inform Wildlife Incident team of situation<br>• Increase patrols in area<br>• Mark animals with paint balls |
| **4: .. persistently follow people on trail, come into campsites; hard to chase away; aggressive postures in adult males** | • Evaluate need for area closure<br>• NPS Aversive Conditioning team patrol area |
| **5: .. aggressively seek salt; exhibits threat posture when encountered on trail; will not leave area without aggressive hazing** | • Consider closing trail/ area<br>• Consider use of permanent marks (e.g. radio collar)<br>• Lethal removal if behaviors are repeated |
| **6: Goat attacks human; makes contact or corners people making egress impossible** | • Lethal removal |

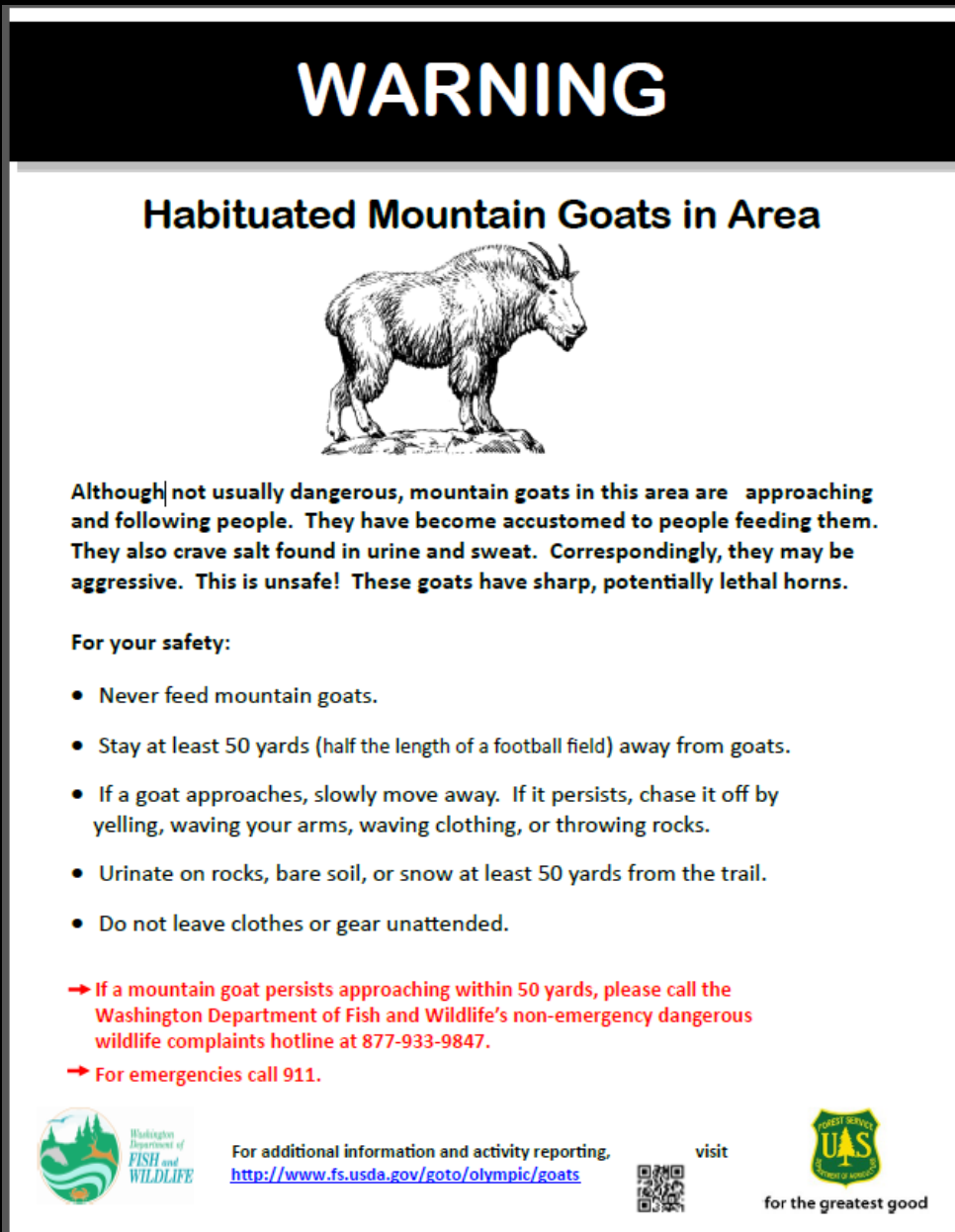



# Goat – Human Interactions 2011

# Mountain Goat Management on Olympic National Forest

- NPS, WDFW, USFS prepare consistent public message on how to interact around goats (trailhead, website, video)
- 2012 - USFS close Mt. Ellinor after repeated encounters and begin adverse conditioning/hazing of goats.
- USFS-WDFW develop goat incident reporting form; field ranger patrols
- USFS – WDFW- population census (2012, 2014); meeting with USFS leadership in Regional Office and Forest on goat management
- 'Conflict reduction hunt' started in 2014



## WARNING

### Habituated Mountain Goats in Area



**Although not usually dangerous, mountain goats in this area are approaching and following people. They have become accustomed to people feeding them. They also crave salt found in urine and sweat. Correspondingly, they may be aggressive. This is unsafe! These goats have sharp, potentially lethal horns.**

**For your safety:**

- Never feed mountain goats.
- Stay at least 50 yards (half the length of a football field) away from goats.
- If a goat approaches, slowly move away. If it persists, chase it off by yelling, waving your arms, waving clothing, or throwing rocks.
- Urinate on rocks, bare soil, or snow at least 50 yards from the trail.
- Do not leave clothes or gear unattended.

→ If a mountain goat persists approaching within 50 yards, please call the Washington Department of Fish and Wildlife's non-emergency dangerous wildlife complaints hotline at 877-933-9847.

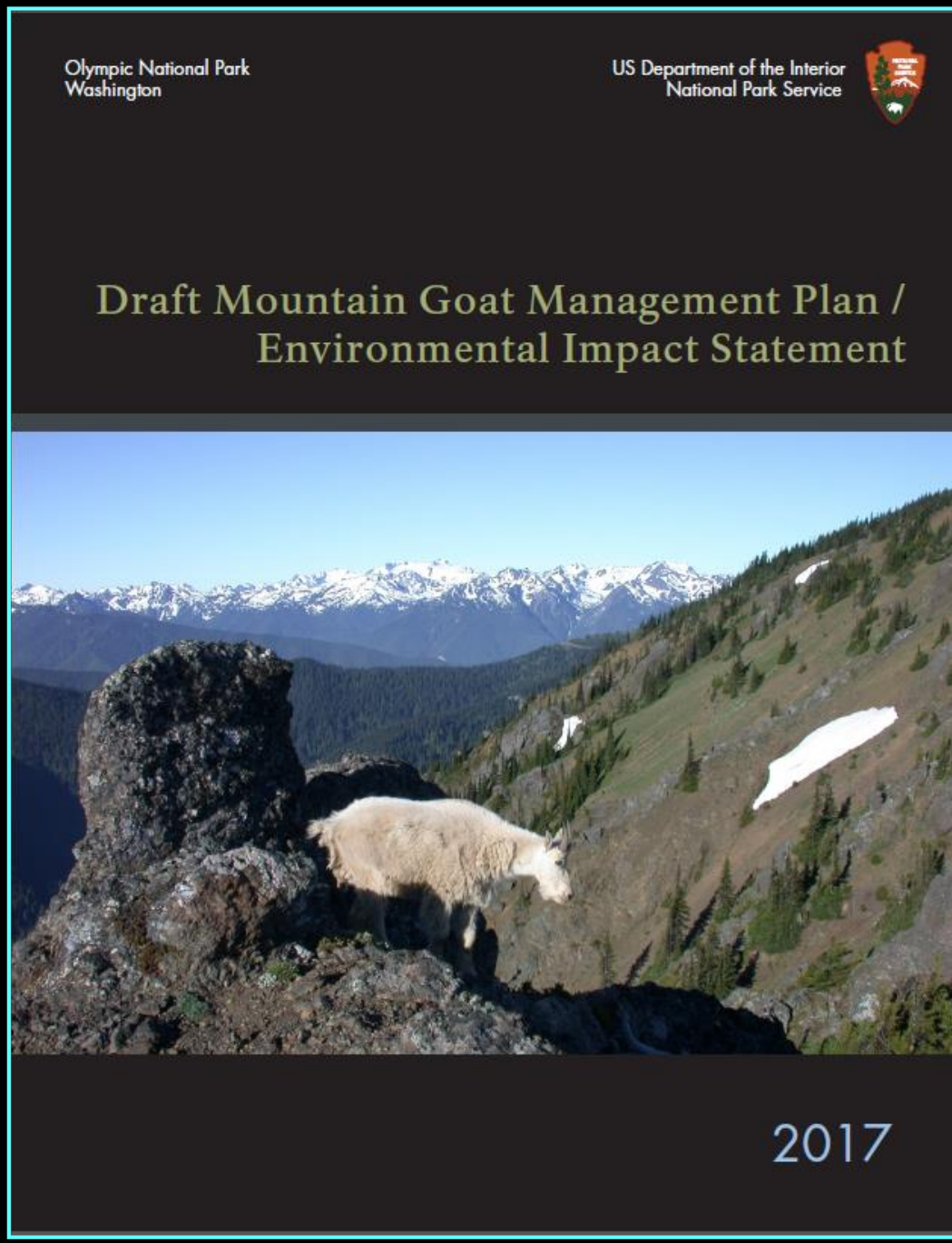
→ For emergencies call 911.

Washington Department of FISH and WILDLIFE

For additional information and activity reporting, visit http://www.fs.usda.gov/goto/olympic/goats

USDA FOREST SERVICE for the greatest good

- NPS starts process for goat plan in 2014
- WDFW and USFS are cooperators
- Public scoping July – September 2014

# Olympic National Park

U.S. Department of the Interior
National Park Service

## OBJECTIVES

**Develop a scientifically based method** for the management of exotic mountain goats..

**Reduce or eliminate impacts on sensitive environments** and unique natural resources from mountain goats on the Olympic Peninsula.

**Reduce or eliminate the potential for visitor safety issues ….**

**Protect the wilderness character …** in the park and Olympic National Forest.

**Work cooperatively with co-managers of mountain goats …**

Support the wildlife management objectives of cooperating agencies and tribes...

**Provide opportunities to reestablish or augment sustainable native mountain goat populations** in suitable mountain goat habitat on NFS lands in the North Cascades national forests.

# Olympic National Park

## ALTERNATIVES

A. **No Action**: Continuation of current mountain goat management methods.

B. **Capture and translocation**: Mountain goats would be captured on the Olympic Peninsula, then transferred to WDFW and translocated to areas where they are native in the North Cascades national forests. Primarily use helicopters for capture and translocation.

C. **Lethal removal**: Mountain goats would be lethally removed from the Olympic Peninsula using shotguns and rifles, via ground and helicopter-based methods.

D. **Preferred: Combination of capture and translocation and lethal removal** Mountain goats would be captured and translocated, similar to alternative B, followed by lethal removal of additional mountain goats, similar to alternative C, of remaining goats.

## Alternatives Considered, Not Carried Forward Include:

- Increased nuisance control
- Fertility control
- Introduction of wolves
- Fencing

- Use of salt licks as long-term management measure
- Public and/or tribal hunting in Park

| | Alternative A: No Action | Alternative B: Capture and Translocation | Alternative C: Lethal Removal | Alternative D: Capture and Translocation and Lethal Removal (*preferred*) |
|---|---|---|---|---|
| **Number of Mountain Goats Removed** | None, unless under current management options. | Approximately 50% of the population. (~350 goats) | Approximately 90% of the population. (~650 goats) | Approximately 90 % of the population. About 50% would be captured and translocated. (~350) 40% would be lethally removed. (~300) |
| **Projected Goat Population 2028** | Would continue to grow; current rate of increase is 8%/ year ~ >1500 | Unknown; may stay low (<300) for many years, or may start to increase. | Between 0 and 50<br><br>(goal is 0) | Between 0 and 50<br><br>(goal is 0) |

*Estimated goat population in 2018 ~725*

| | Alternative A: No Action | Alternative B: Capture and Translocation | Alternative C: Lethal Removal | Alternative D: Capture and Translocation and Lethal Removal (*Preferred*) |
|---|---|---|---|---|
| **Initial Management Duration (years 1-5)** | Current management would continue. | Two 2 week periods (July and Sept) for 3 to 5 years.<br>Most actions during years 1 and 2. | Two 2 week periods (July and Sept) 3 to 5 years.<br>Most actions during years 1 to 3. | Two 2 week periods (July and Sept) 3 to 5 years, with most activity in years 1 to 4.<br>Capture and translocation used during initial years, and switch to lethal removal sometime during years 2 or 3. |
| **Maintenance activities and Duration (years 6-20)** | Current management would continue. Level of effort likely to increase with increasing goat population. | Goat population will likely rebound within 10 to 15 years.<br>Will need to periodically repeat initial management, and management under A indefinitely. | Depends on the success of initial removals. Additional lethal removal may not be needed at all, or may not be needed until 5 to 15 later.<br><br>Management activities would include use of ground based and helicopter operations and would be short duration (1 to 5 days). | |

## **Preferred Alternative**:

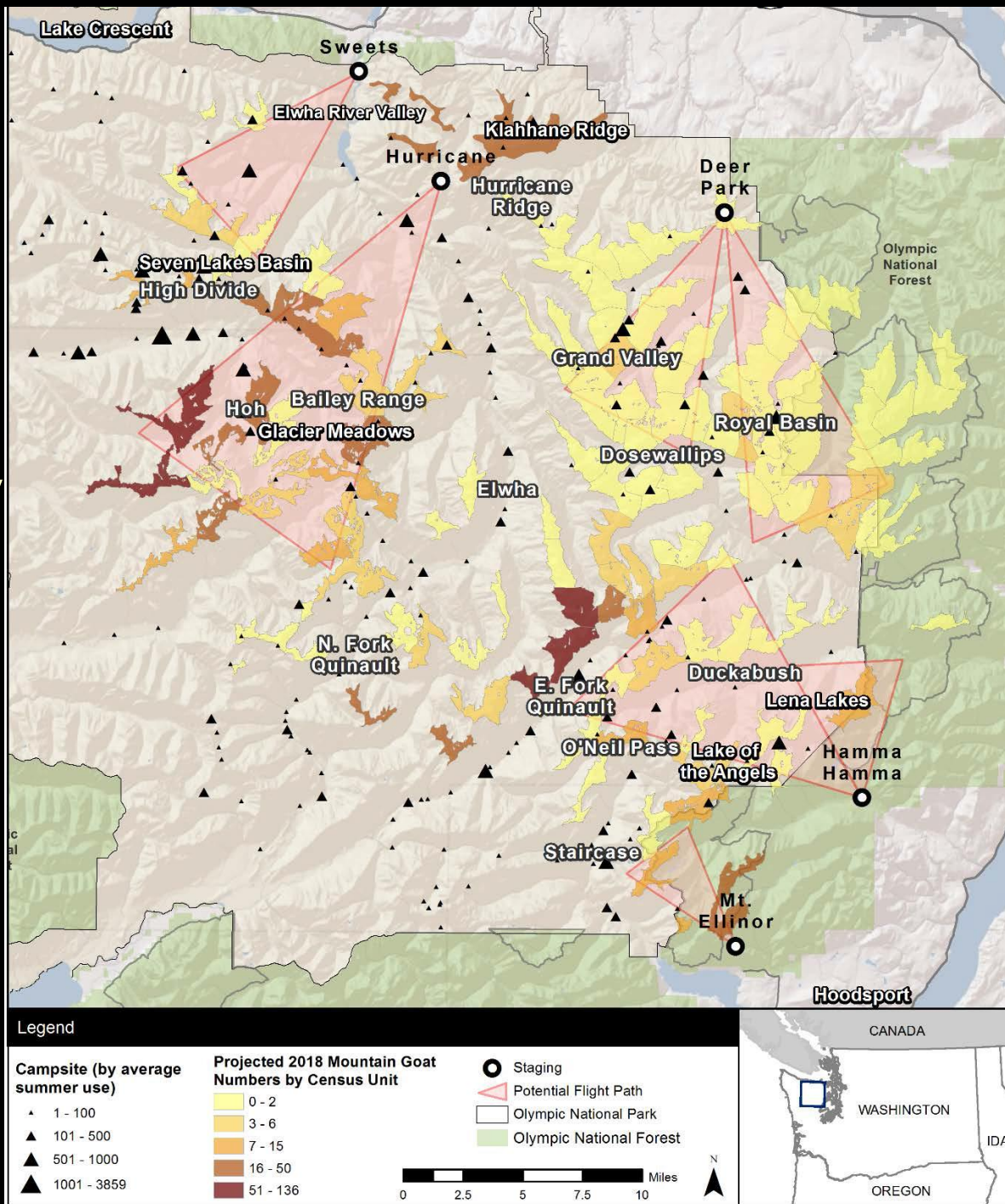
- Meets purpose and need and objectives the best of all alternatives.

- Capture as many goats as safely and efficiently can. Stop when
  - Not safe or efficient
  - No more places to put them
  - No more resources for translocation
  - *Estimate 2 years and 50% of population*

- Lethal removal could start at end of year 2 (September)
  - Start with ground-based operation
  - Use designated, skilled and trained volunteers
  - Follow with aerial operations the following year (s)

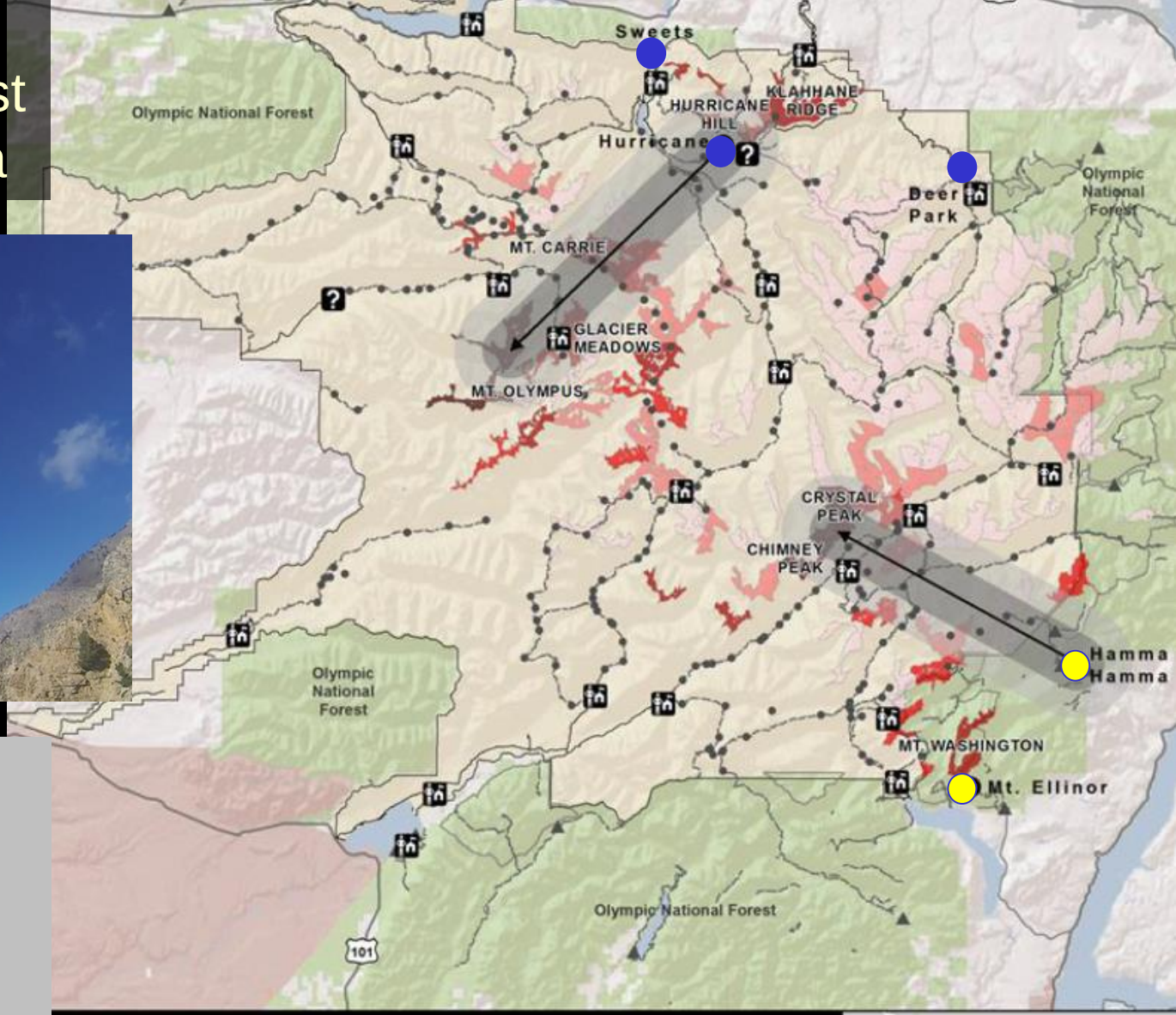
# Translocation:

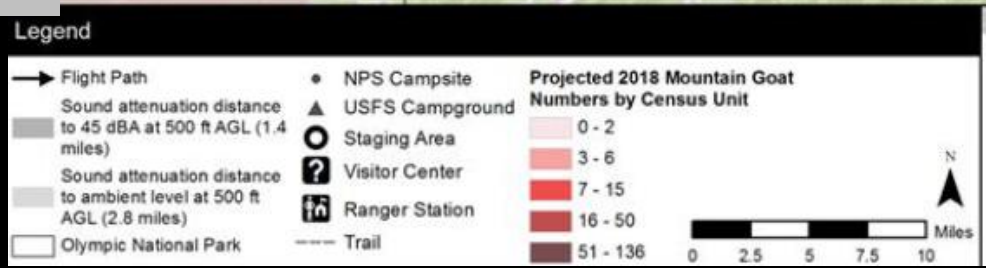
- Helicopters needed for capture and translocation
- 2 primary periods of operation:
  - 2 weeks in mid July
  - 2 weeks in late August/ early September



# Transport to closest active staging area

1 staging area in the north (NPS) and 1 in the southeast (USFS)

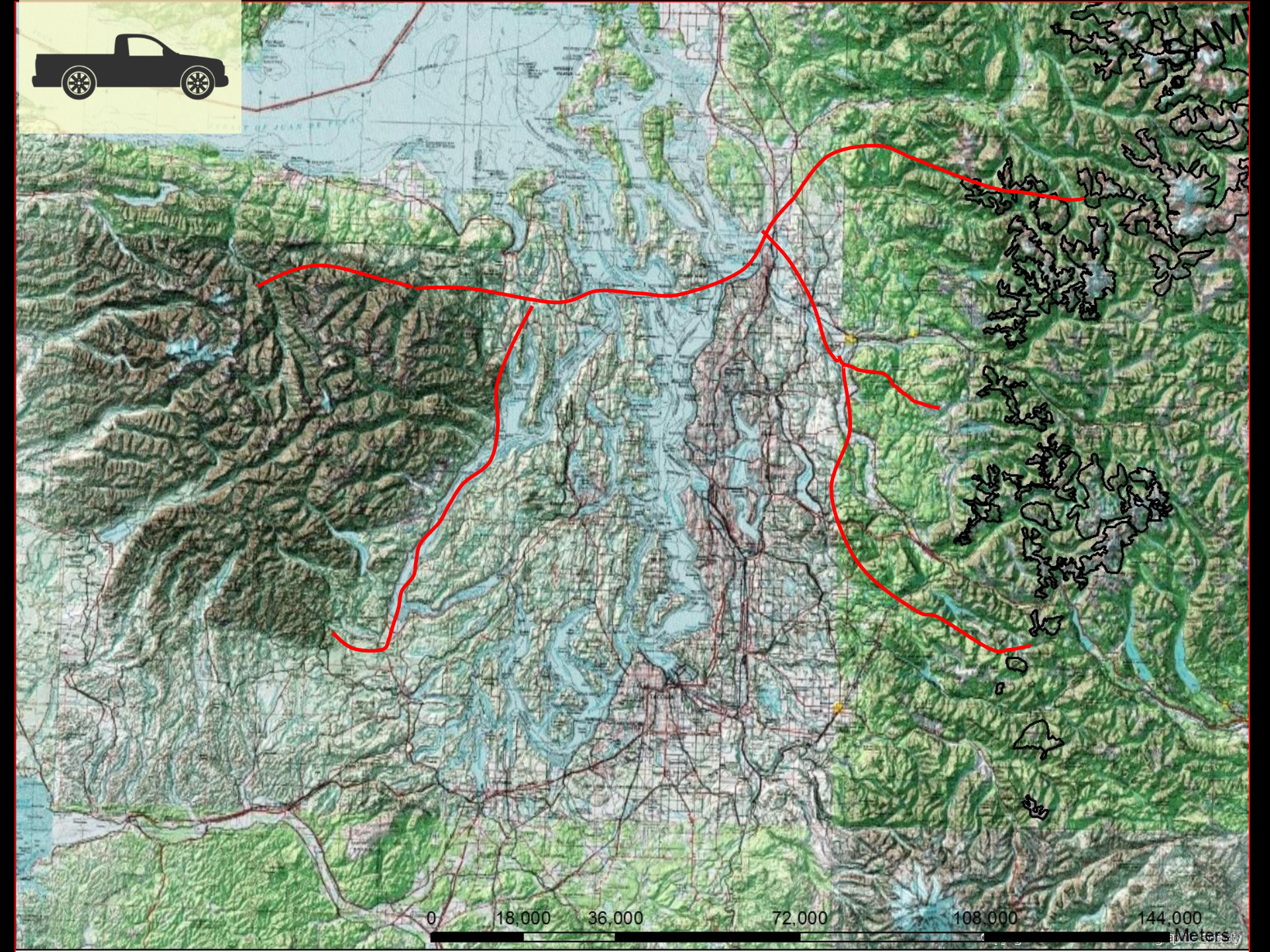


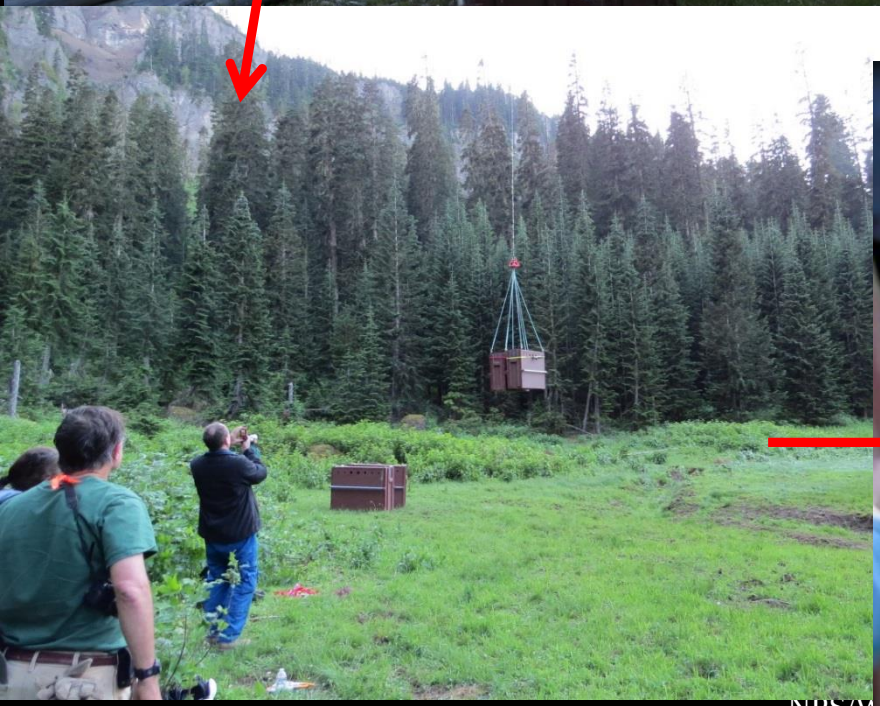





2


U-COOL
REFRIGERATION
GMC


0
18,000
36,000
72,000
108,000
144,000
Meters



NPS/W

# Mountain Goats in the Cascades

## STATUS OF MOUNTAIN GOATS IN WASHINGTON

**CLIFFORD G. RICE** [1], Research Scientist, Washington Department of Fish and Wildlife, 600 Capitol Way N., Olympia, WA, 98501, USA

***Abstract:*** Based on aerial surveys (2004–2007, adjusted for sightability) and subjective estimates for unsurveyed areas, I developed an estimate of the total number of mountain goats (*Oreamnos americanus*) in Washington State, USA. Mountain goat populations were estimated for 56 units, 40 areas, and 21 zones, yielding a total 2,815 (2,401–3,184) mountain goats. Of the un
been monitored with aerial surveys. For the remaining areas, th
ground counts and the rest subjectively estimated. Additional aeri
Rainier National Park, the North Wenatchee Mountains, and th
knowledge of mountain goat populations in Washington.

***Biennial Symposium of the Northern Wild Sh***

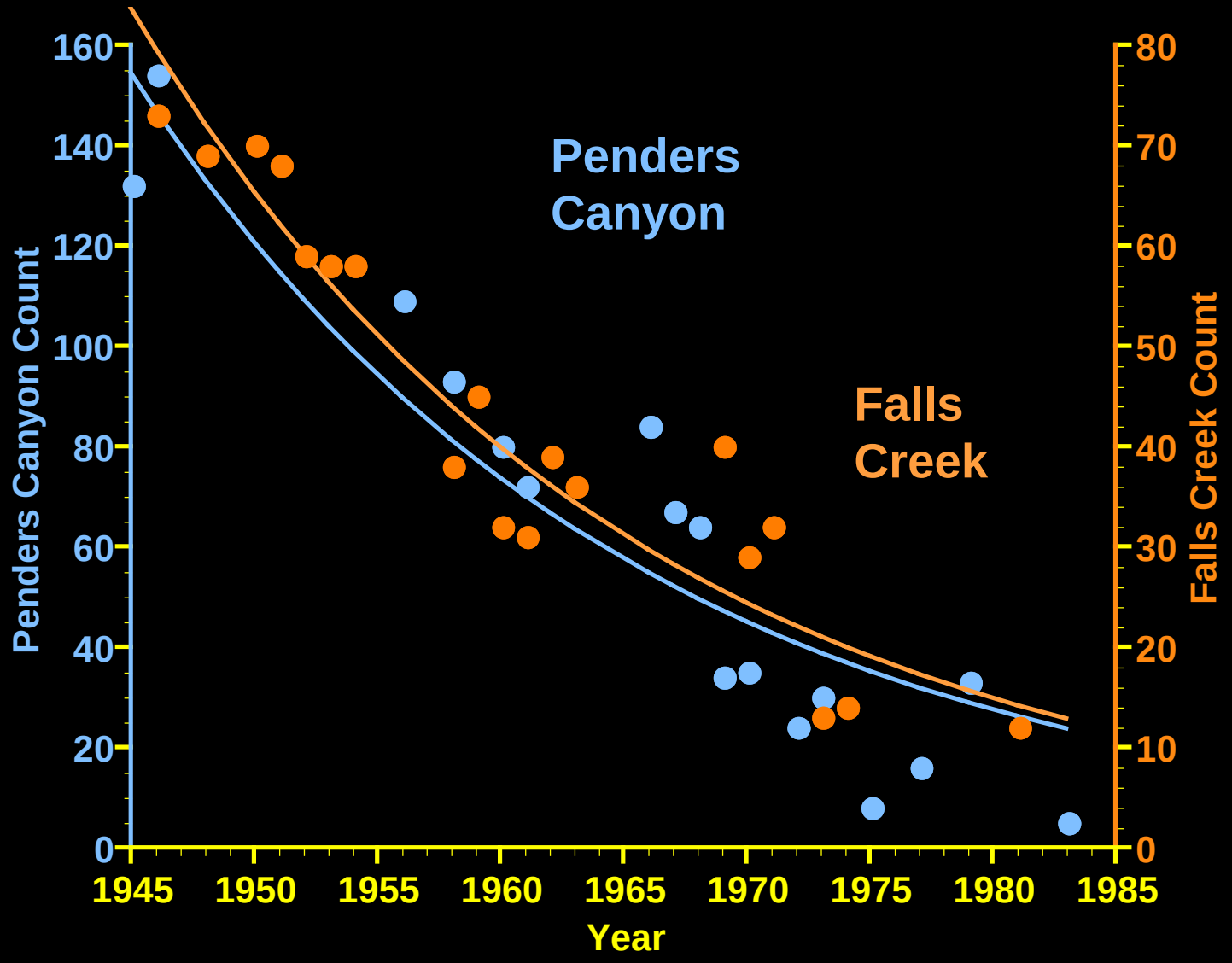
***Key words:*** population, *Oreamnos*, survey.

This is the first estimate of mountain goat state, t

for should this be attempted.

My total estimate of 2,815 mountain goats in Washington was substantially less than the estimate of 8,555 goats from 1961. My estimate for the areas included for the 1961 estimate was 2,007 goats. It is difficult to say how much of this difference is due to declines in mountain goat populations, and how much is due to differing methods. It is clear that there have been large declines in some areas. For instance, the Snoqualmie area was thought to contain 450 mountain goats in 1961 (Wadkins 1962), while the current estimate was 50. Similarly the Bumping River area population was estimated at 475 in 1961 and my estimate was 67. Excessive harvest is thought to be the primary cause of such declines (Rice and Gay 2010). In contrast, Mount Rainier

# Historic Declines

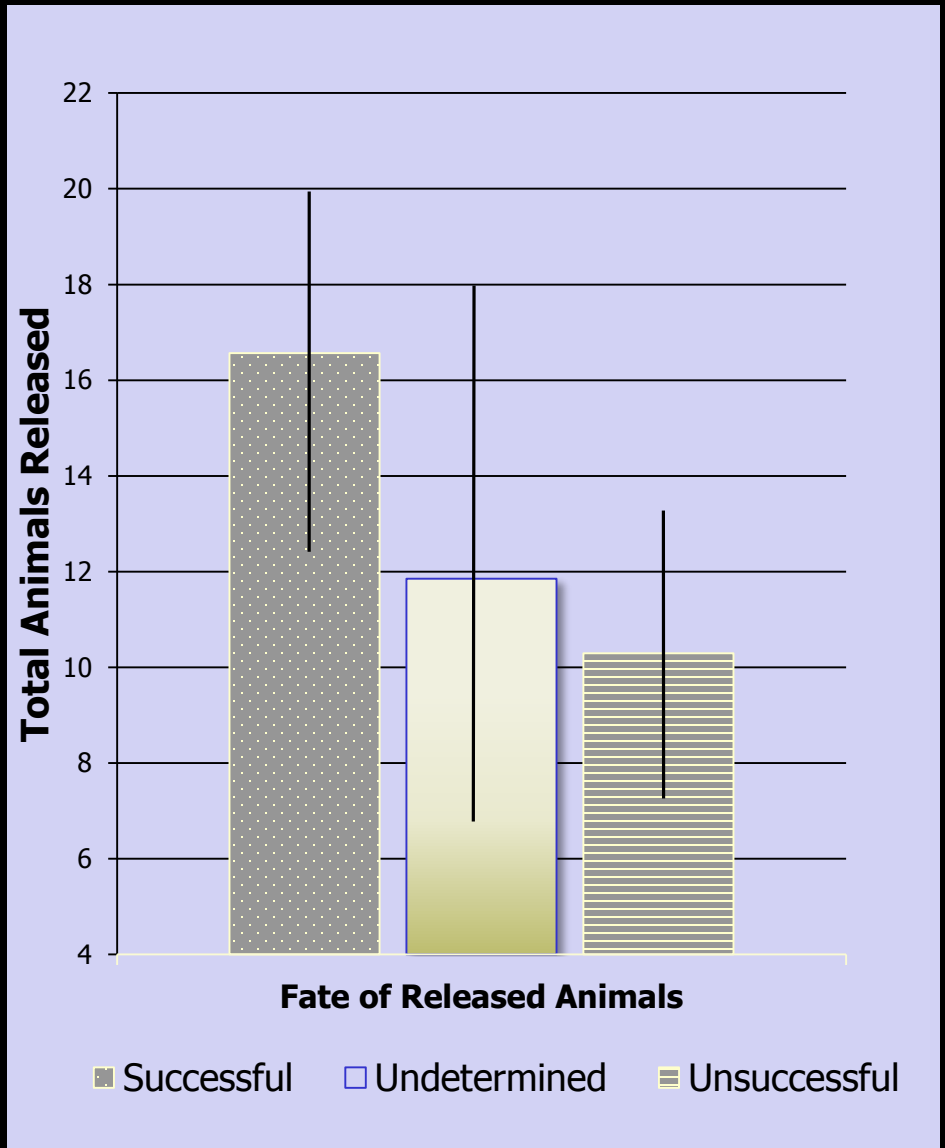


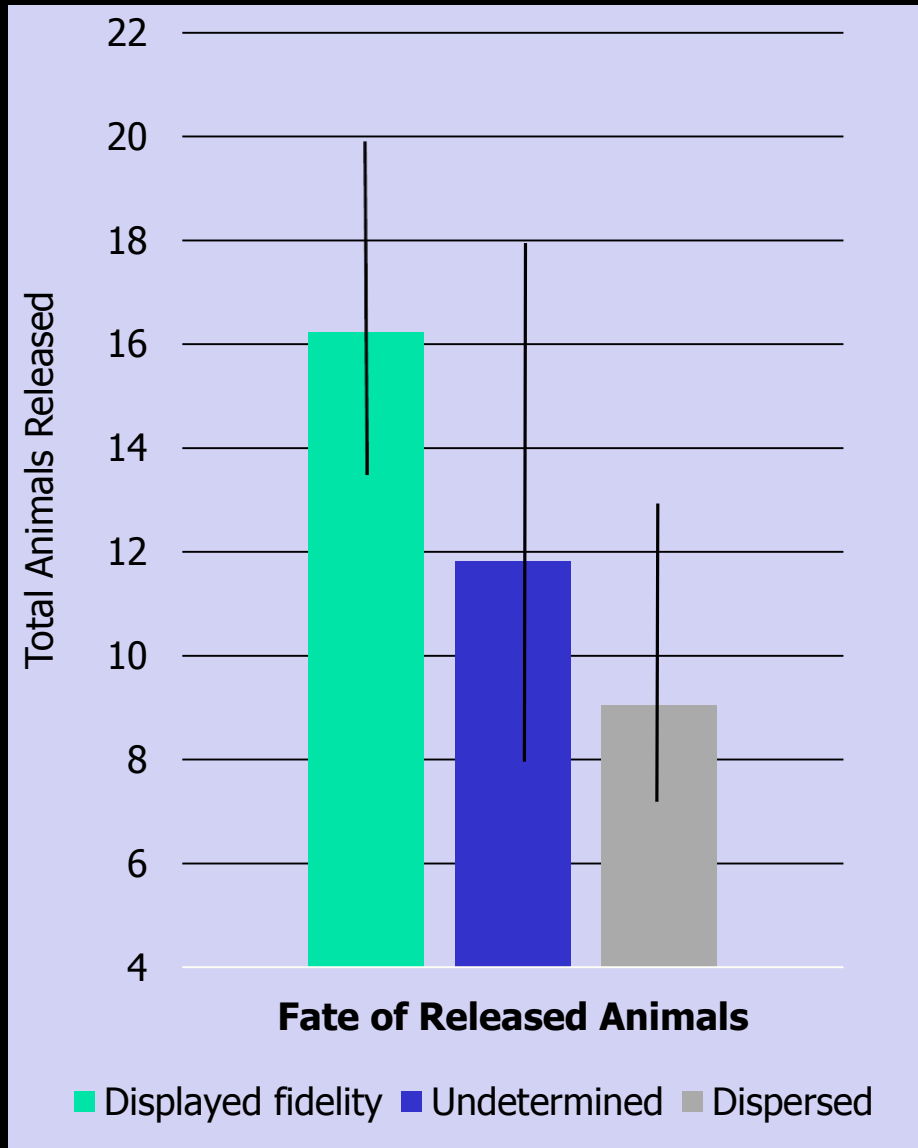
# Factors Predicting Success of Mountain Goat Reintroductions

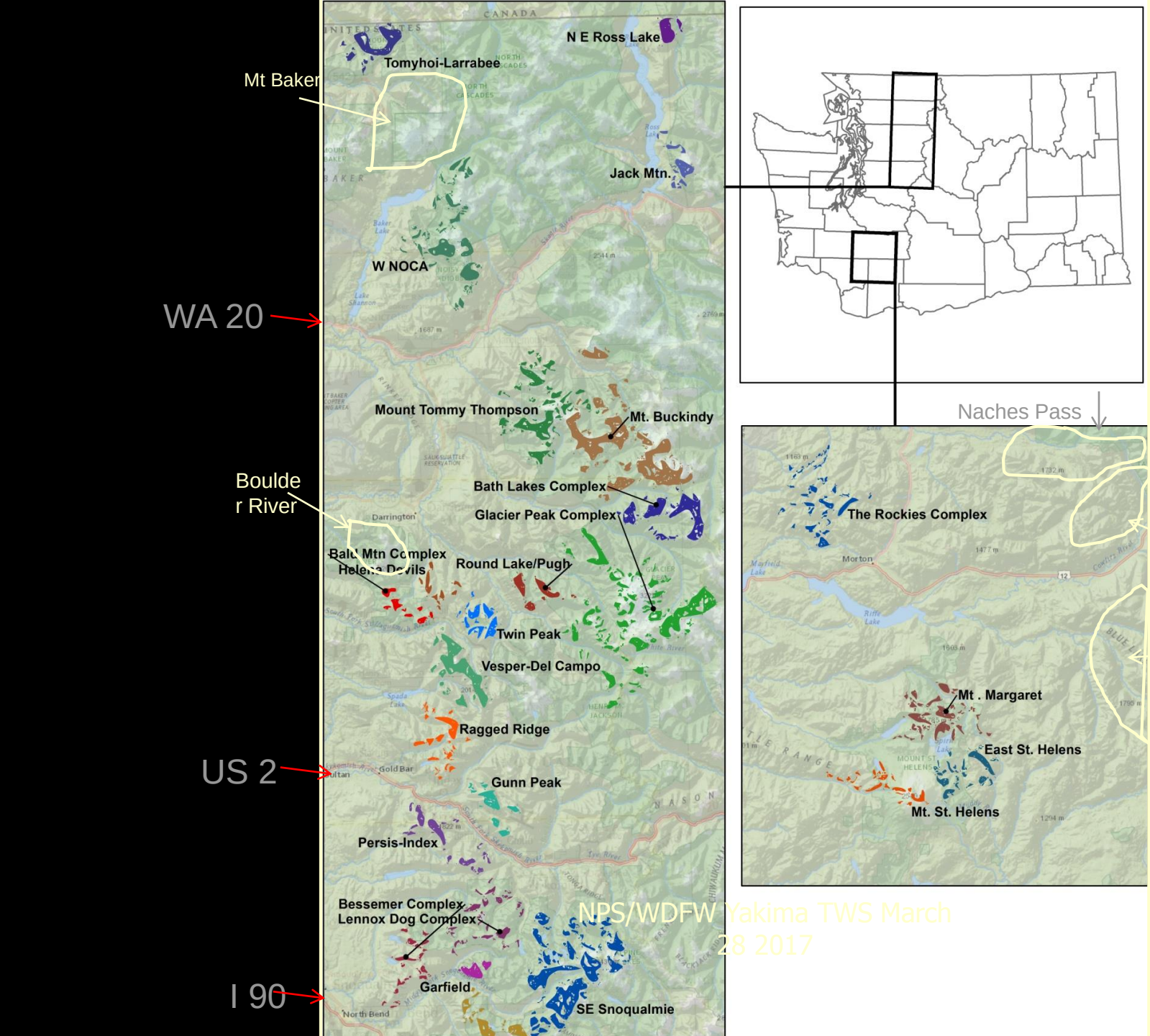
**RICHARD B. HARRIS,**[1] *Washington Department of Fish and Wildlife, 600 Capitol Way N, Olympia, WA 98501, USA*
**BRIAN STEELE,** *Department of Mathematics, University of Montana, Missoula, MT 59812, USA*

**ABSTRACT** We adopted a retrospective approach to assess factors associated with success of mountain goat (*Oreammos americanus*) reintroductions into native habitats during 1950-2010. We excluded translocations into areas not historically inhabited by mountain goats, as well as projects best considered augmentations. To supplement published and unpublished literature, we requested data on translocations from staff at state and provincial wildlife agencies likely to have access to information otherwise unavailable. Where data allowed, we estimated post-translocation growth rates, *r*. Because most projects did not allow the quantification of growth, we also categorized reintroduction projects as successful or not, reintroduced populations as extant or extirpated, and released animals as having displayed site fidelity or dispersing soon after release. We examined a suite of hypothesized explanatory variables for these outcomes, including number of males, females, juveniles, and kids, as well as number of separate releases, number of source populations (assumed a proxy for genetic variation), and whether source populations themselves originated as translocations. In contrast to earlier work that suggested no demographic predictor of mountain goat translocation success (Guenzel 1980), we found that the number of adult founders was strongly predictive of long-term success. Releases of just a few animals were relatively likely to have been extirpated within the time duration studied. Evidence suggested that releasing juveniles and kids along with adults produced no improvement in probability of a successful outcome.

# Relationships between size of release and outcome





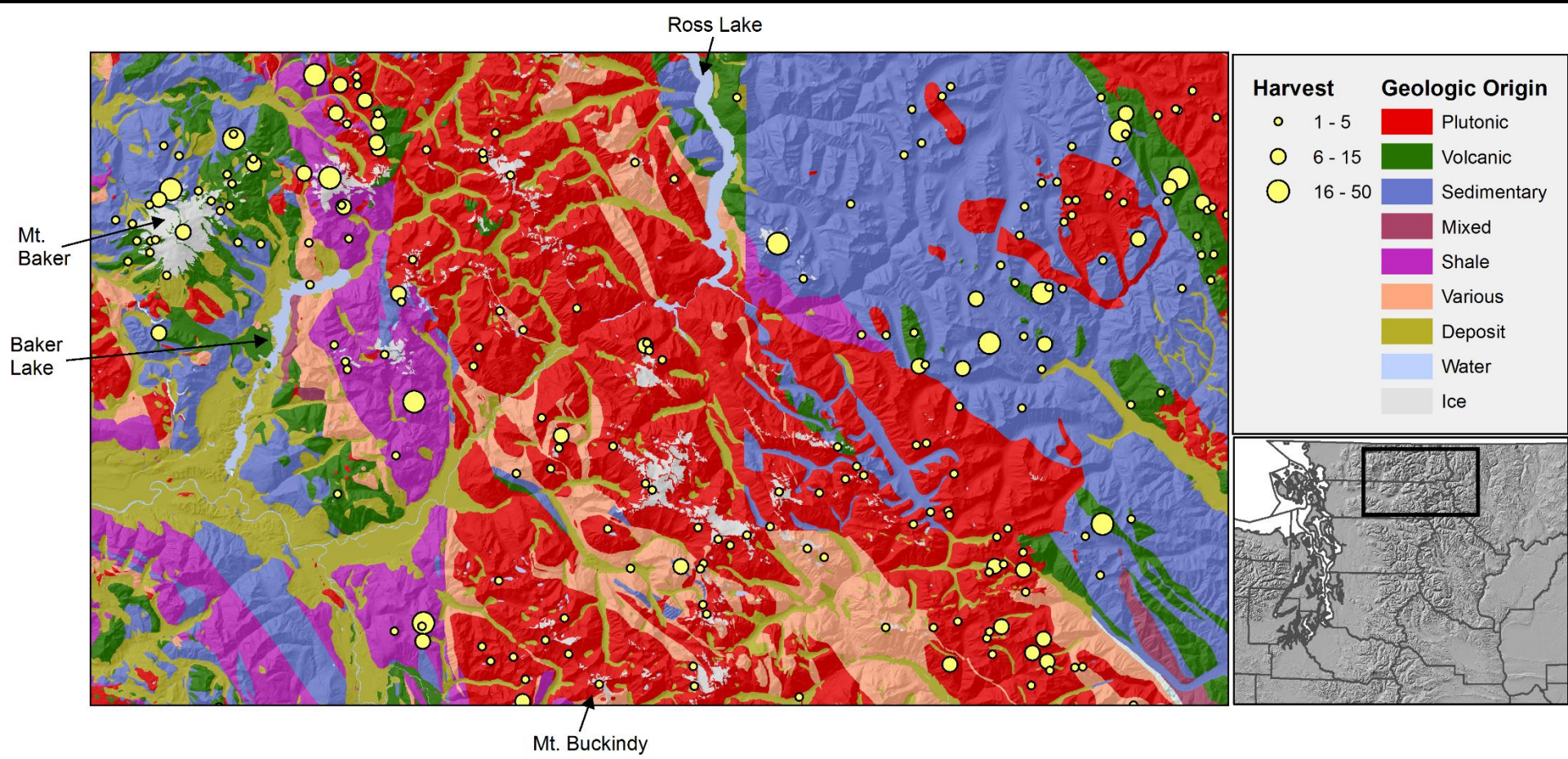

NPS/WDFW Yakima TWS March 28 2017

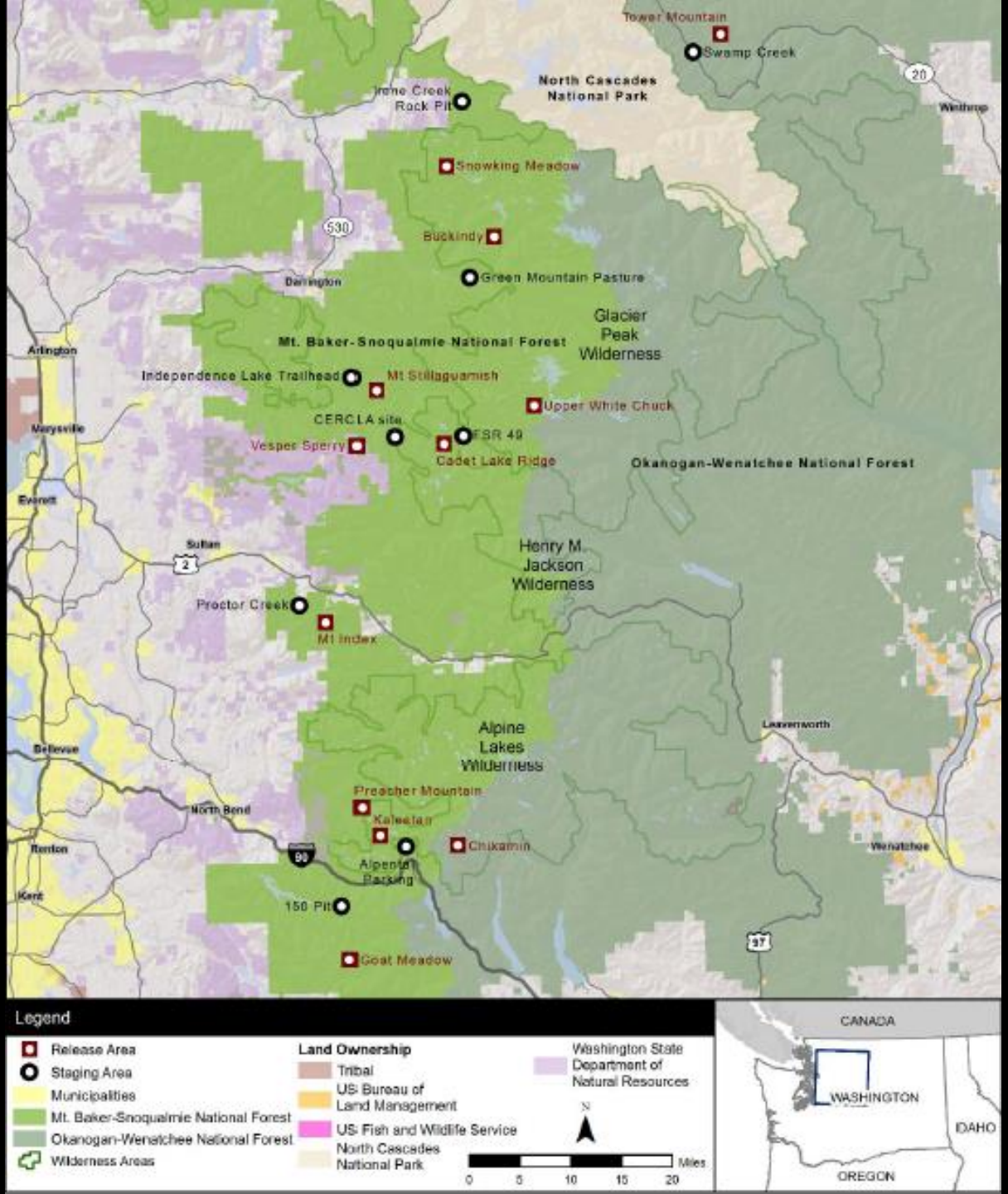
# Analyses conducted

- Rough assessment of summer habitat quality (Wells et al. 2011)
  - Based on 38 GPS collared goats; emphasized topographic features, rough indicator of vegetation only
  - Aggregated to 125x125 scale, then grouped to produce contiguous polygons

- Estimated historic population density
  - Historic abundance indexed by historic harvest
  - Density estimated by applying areas subjected to harvest (Note: NCNP included because much historic harvest preceded NP designation)

- Rough estimate of potential population size
  - Based on estimate of 2.3 goats/$km^2$ appropriate habitat throughout
- Connectivity
- Mountain goat diets in North Cascades
- Historic goat presence as function of underlying geology
- Presence and abundance of preferred forage species by geology
- Logistics:
  - Access, wilderness designation


Ross Lake
Mt. Baker
Baker Lake
Mt. Buckindy
Harvest
1 - 5
6 - 15
16 - 50
Geologic Origin
Plutonic
Volcanic
Sedimentary
Mixed
Shale
Various
Deposit
Water
Ice


Tower Mountain
Swamp Creek
North Cascades National Park
Irene Creek Rock Pit
Snowking Meadow
Buckindy
Green Mountain Pasture
Darrington
Mt. Baker-Snoqualmie National Forest
Glacier Peak Wilderness
Arlington
Independence Lake Trailhead
Mt Stillaguamish
Upper White Chuck
CERCLA site
FSR 49
Vesper Sperry
Cadet Lake Ridge
Okanogan-Wenatchee National Forest
Marysville
Everett
Sultan
Henry M. Jackson Wilderness
Proctor Creek
M1 Index
Alpine Lakes Wilderness
Leavenworth
Bellevue
Preacher Mountain
North Bend
Kaleetan
Chikamin
Renton
Alpental Parking
Wenatchee
Kent
150 Pit
Goat Meadow
Winthrop
Legend
Release Area
Staging Area
Municipalities
Mt. Baker-Snoqualmie National Forest
Okanogan-Wenatchee National Forest
Wilderness Areas
Land Ownership
Tribal
US Bureau of Land Management
US Fish and Wildlife Service
North Cascades National Park
Washington State Department of Natural Resources
N
Miles
0 5 10 15 20
CANADA
WASHINGTON
IDAHO
OREGON

# Timeline

| | |
|---|---|
| 7/28/2017 | Draft EIS Released for 60-day public comment |
| August 14-17 | Public Meetings |
| 9/26/2017 | Public Comment Period Ends |
| Oct-Nov 2017 | Review and Respond to Public Comments |
| Dec. 2017 – March 2018 | Prepare Final Plan / Decision Document |
| Summer 2018 | Plan Implementation |