Conserving Andean bears in Ecuador: status and current research



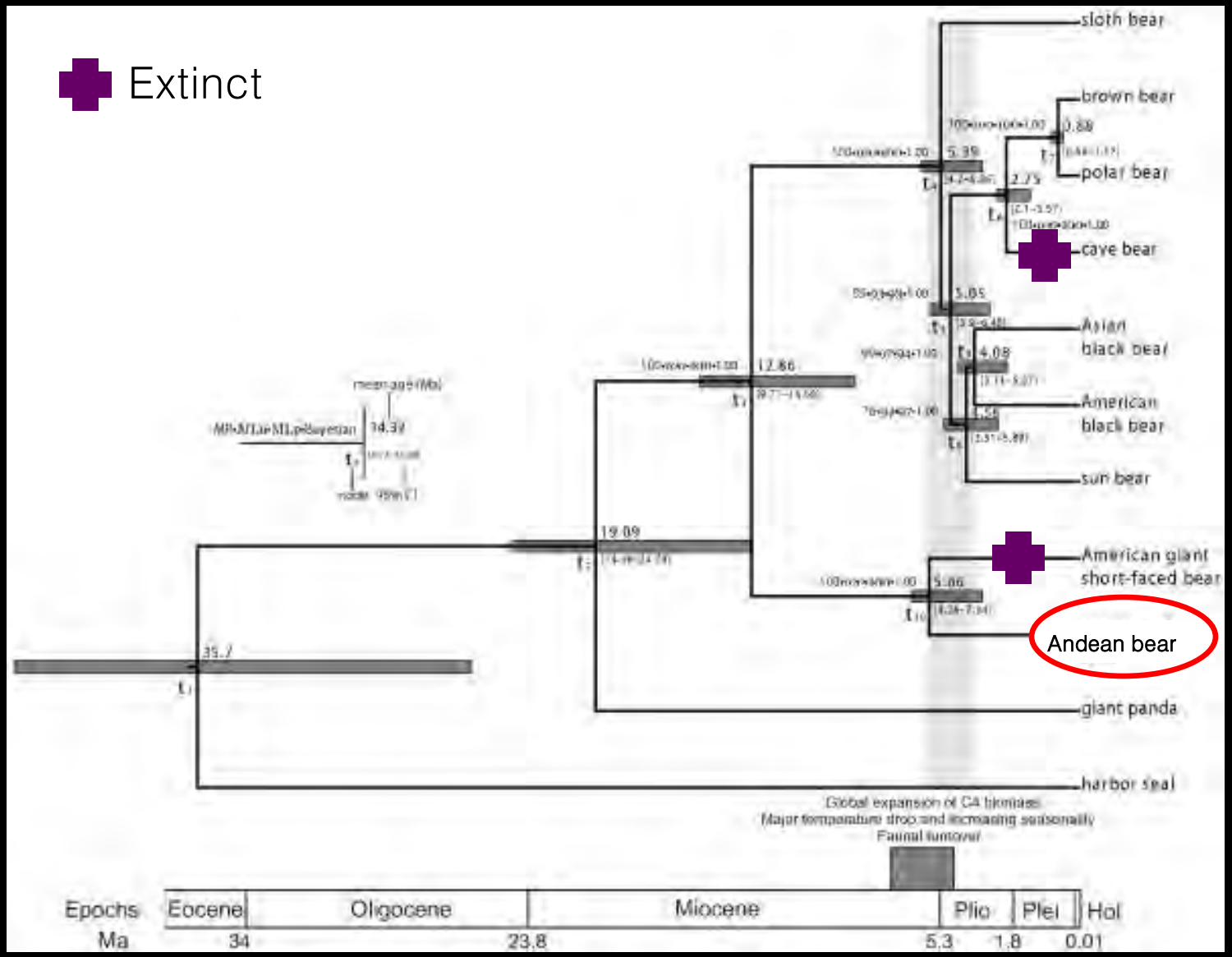
María Paulina Viteri

2012

Andean (Spectacled) bear

(*Tremarctos ornatus*)

Bear Phylogeny (Krause et al. 2008)



Distribution

Pete Oxford & Reneé Bish

- Northwest of South America
- Andes Mountains
- Wide range of ecosystems from 250 to 4750 m

DRY FOREST

www.trekperu.org/travel01.html

NORTHERN ANDES

PARAMO

MONTANE FOREST

CLOUD FOREST

SOME CHARACTERISTICS

- Black with white patches
- Males 1.8–2m; 175kg
- Females 1.2–1.5m;140kg
- Solitary/Diurnal
- Nest on trees
- Omnivorous

Pete Oxford

Troya et al. 2004

- Plants (90%) (Bromeliaceae, Ericaceae, Poaceae)
- Insects and small mammals

Goldstein et al. 2006, Flores et al. 2006

Phillip Henry

- Corn crops
- Cattle

CONSERVATION STATUS

World (IUCN)

Ecuador (IUCN)

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World (IUCN)

Ecuador (IUCN)

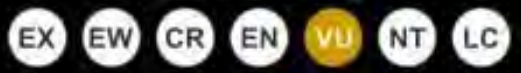
Main threats

- Habitat fragmentation
- Poaching:
  - Illegal trade
  - Traditional practices
  - Corn & cattle predation

In Ecuador 70 to 120 bears are killed per year

CONSERVATION STATUS

World (IUCN)



Ecuador (IUCN)

Main threats

- Habitat fragmentation
- Poaching:
  - Illegal trade
  - Traditional practices
  - Corn & cattle predation

Potential Andean bear habitat (Rodriguez et al. 2003)

- 42% of the original area remain (Kattan et al. 2004)
- Few studies on abundance and densities estimates (Ruiz-Uzeda et al. 2007, Garshelis 2011)
- If current conditions continue, Andean bears will get extinct within the next 30 years (Goldstein et al. 2008)

Potential Andean bear habitat
(Rodríguez *et al.* 2003)

ECUADOR

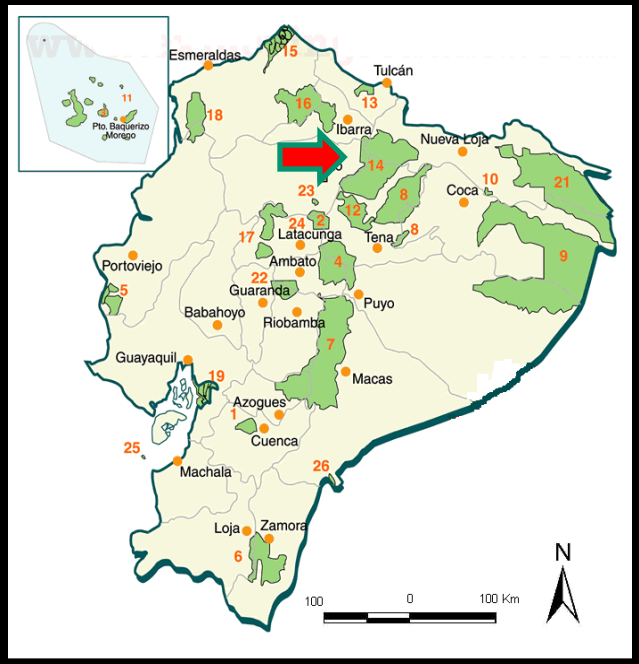
- Protected Areas (PA) cover 32% of bear habitat

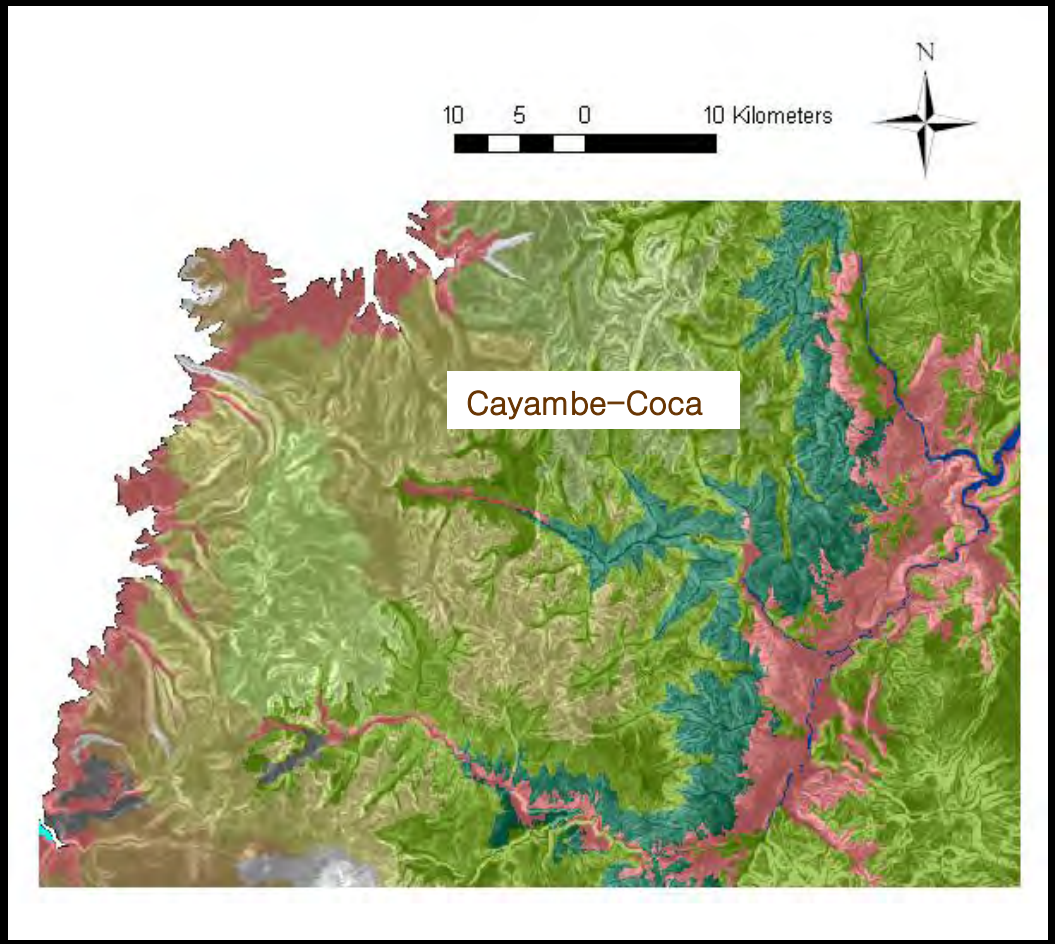
- One study that estimated Andean bear population size inside the Cayambe–Coca National Park (Viteri 2007)

- No data to evaluate functional connectivity – amount of gene flow between populations

- Increasing conflicts that affect local communities & indigenous groups (land tenure rights, bear predation on cattle and crops, access to water) (Achig 2011, Flores et al. 2006)

OYACACHI TERRITORY





- Cayambe-Coca National Park
- 1000 Km^2

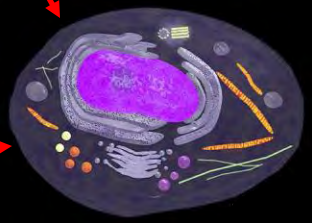
Viteri 2003, Viteri 2007, Viteri and Waits 2009

PARABIOLOGISTS: TEK HOLDERS

NON-INVASIVE GENETIC SAMPLING

scat sample

hair sample



cells

DNA
microsatellite

Individual
ID

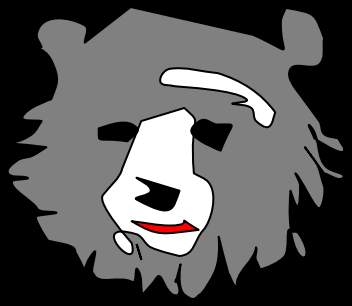
GENETIC DIVERSITY, ID, SEX & MINIMUM COUNT

155/155 102/102 215/217 98/100

heterozygous

155/157 102/102 239/241 98/98

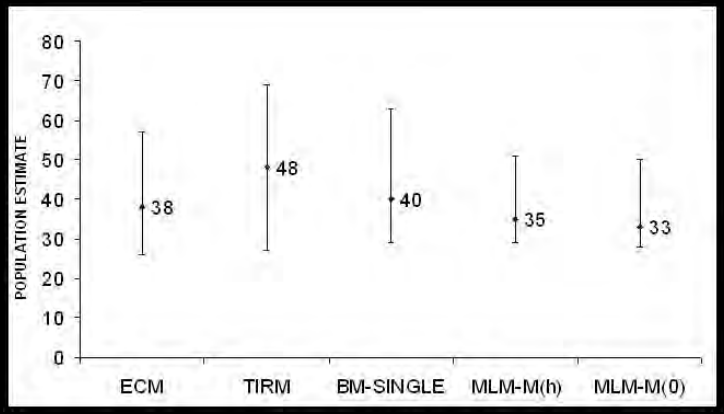
homozygous

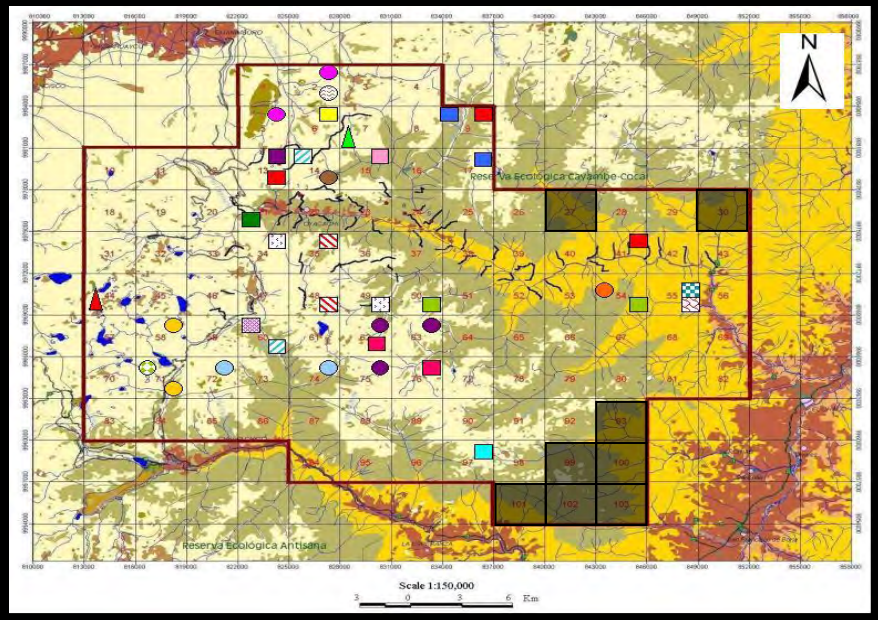


153/155 100/100 217/219 96/98

RESULTS FROM MS THESIS

- Molecular methods to ID Andean bears
- Wild population (H_E=0.54)
- Population size 33–48 bears (26–69, 95%CI)

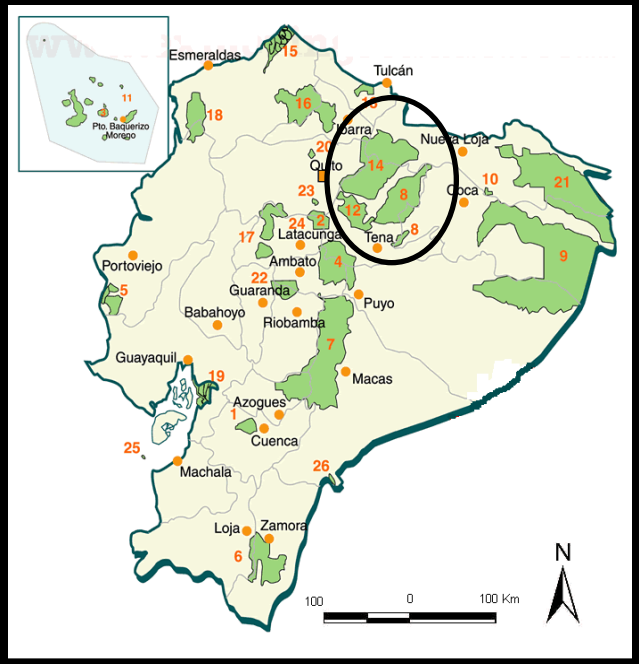


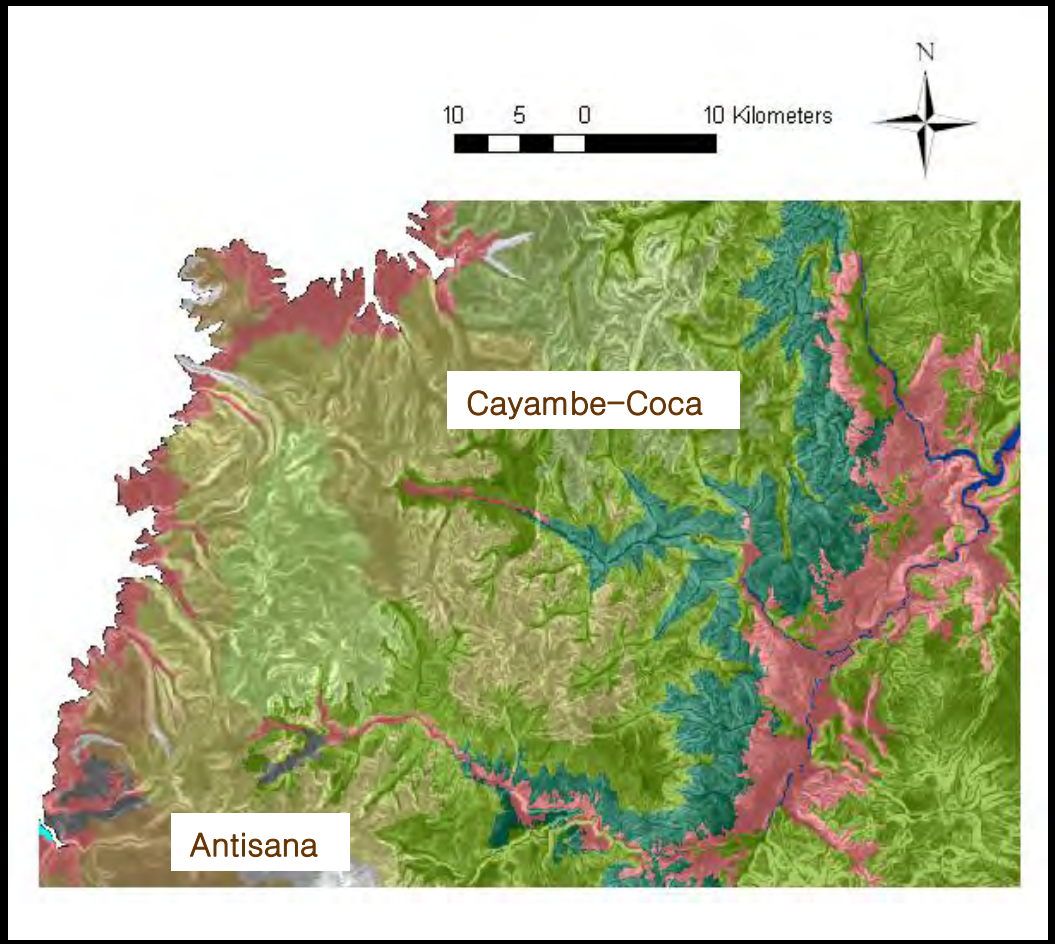


- Adjacent areas need to be studied: functional connectivity
- Combining local knowledge and science is key for conserving wildlife.

Viteri 2003, Viteri 2007, Viteri and Waits 2009

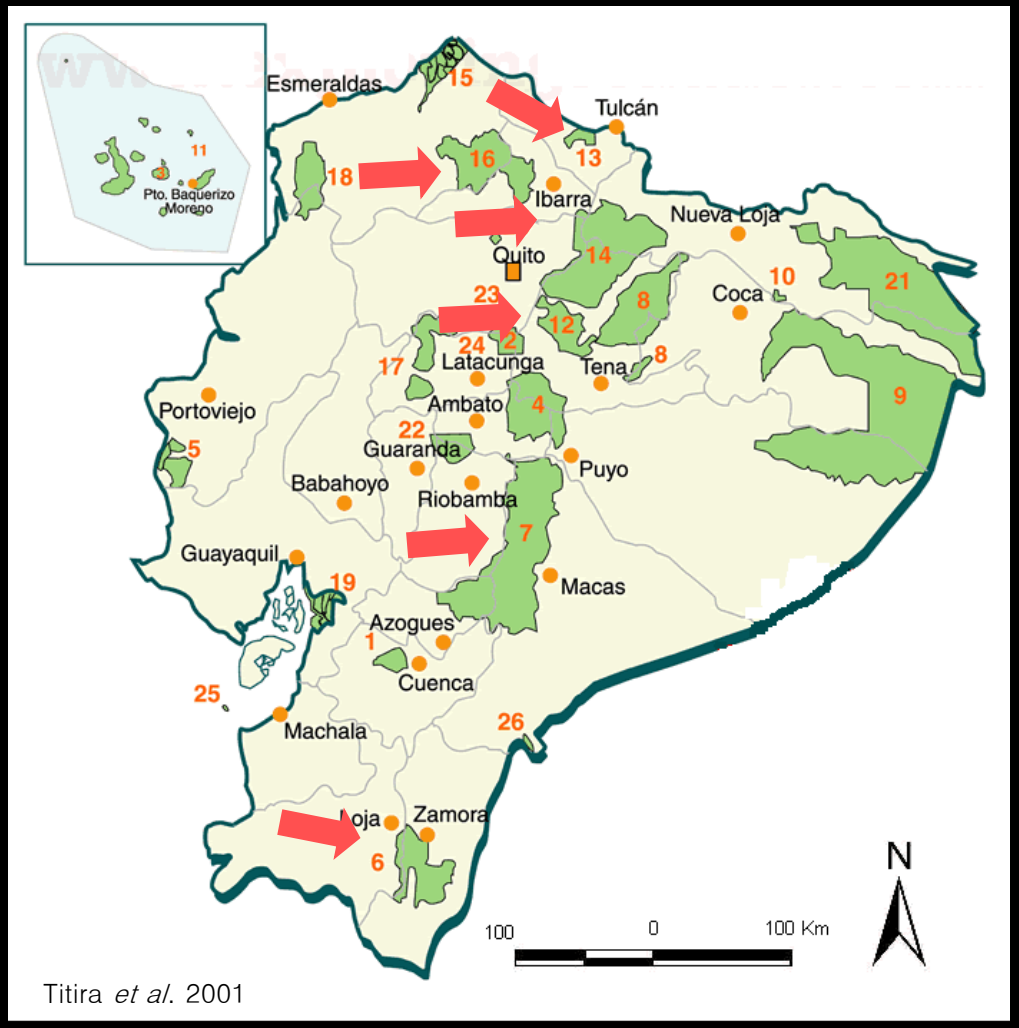
PHD RESEARCH





- Antisana Ecological Reserve
- Cayambe-Coca National Park
- Guandera, Chamizo & Huaca

COLLABORATORS



Titira *et al.* 2001

12 Antisana Mountain > 16,000 feet

13	Guandera, Chamizo & Huaca	100 km^2
16	Cotacachi–Cayapas	2044 km^2
14	Cayambe–Coca	4031 km^2
12	Antisana	1200 km^2
7	Sangay	5177 km^2
6	Podocarpus	1462 km^2

GENETIC & ECOLOGICAL RESEARCH

- Genetic diversity, population size and density estimates of Andean bears in Cayambe-Coca National Park in Northeastern Ecuador.
- Gene flow and population structure of Andean bears across three protected areas of the Northern Andes of Ecuador using nuclear microsatellite loci and the mtDNA control region.
- Using Least-cost path models to predict Andean Bear movement in the northern Andes of Ecuador.
- Combining genetics and local knowledge to develop field and laboratory methods for Andean bear research in Ecuador
- Genetic diversity of Andean bears in Podocarpus National Park, Southern Andes of Ecuador.

People live inside
~70% of PA's

High deforestation in PA's borders; agriculture expansion

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High deforestation in PA's borders; agriculture expansion

Illegal trade, poaching & wildlife–human conflicts

People live inside ~70% of PA's

High deforestation in PA's borders; agriculture expansion

Illegal trade, poaching & wildlife–human conflicts

Weak PA system

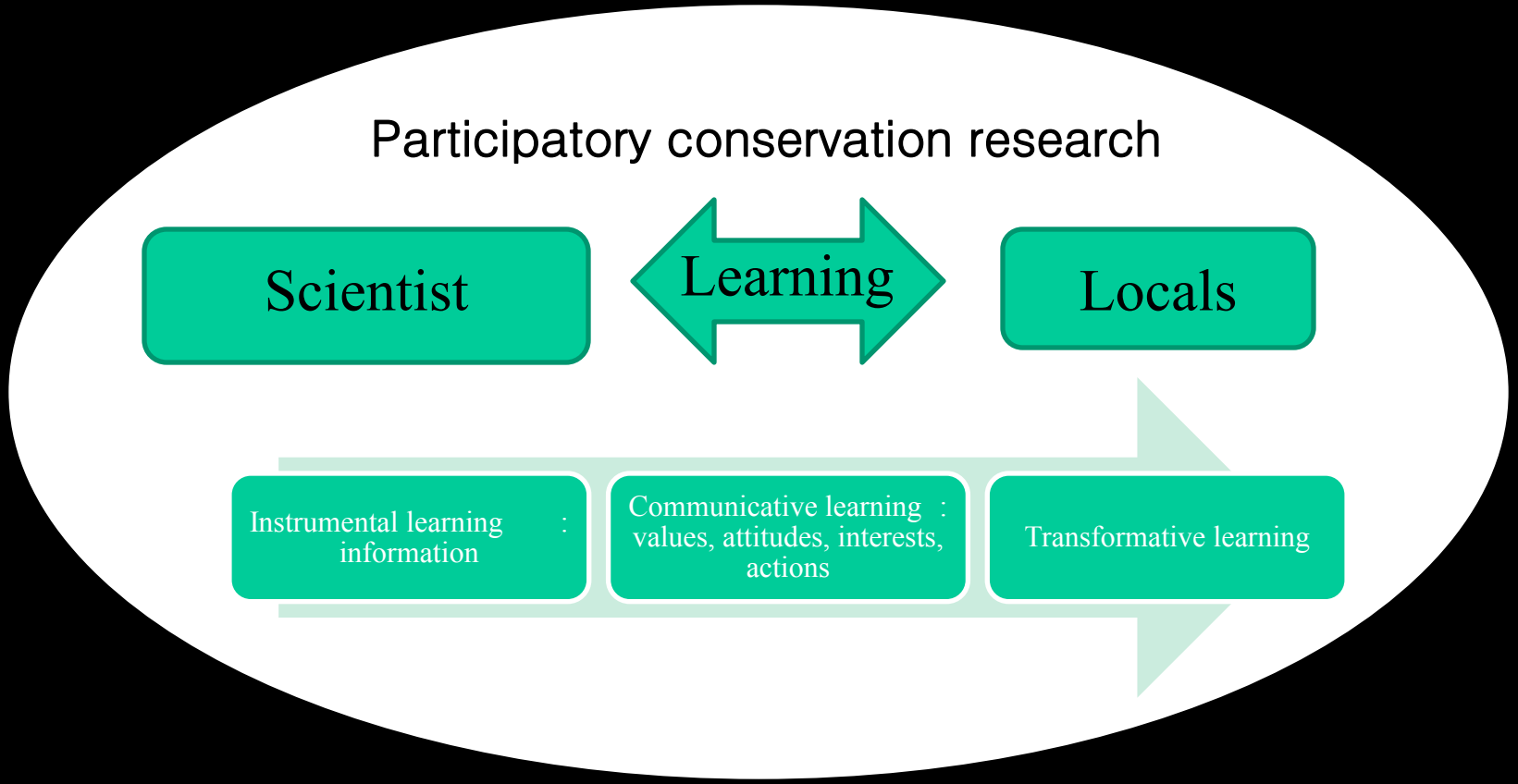
People live inside 70% of PA's

PARTICIPATORY CONSERVATION RESEARCH

Combining science and TEK in conservation

TRANSFORMATIVE LEARNING

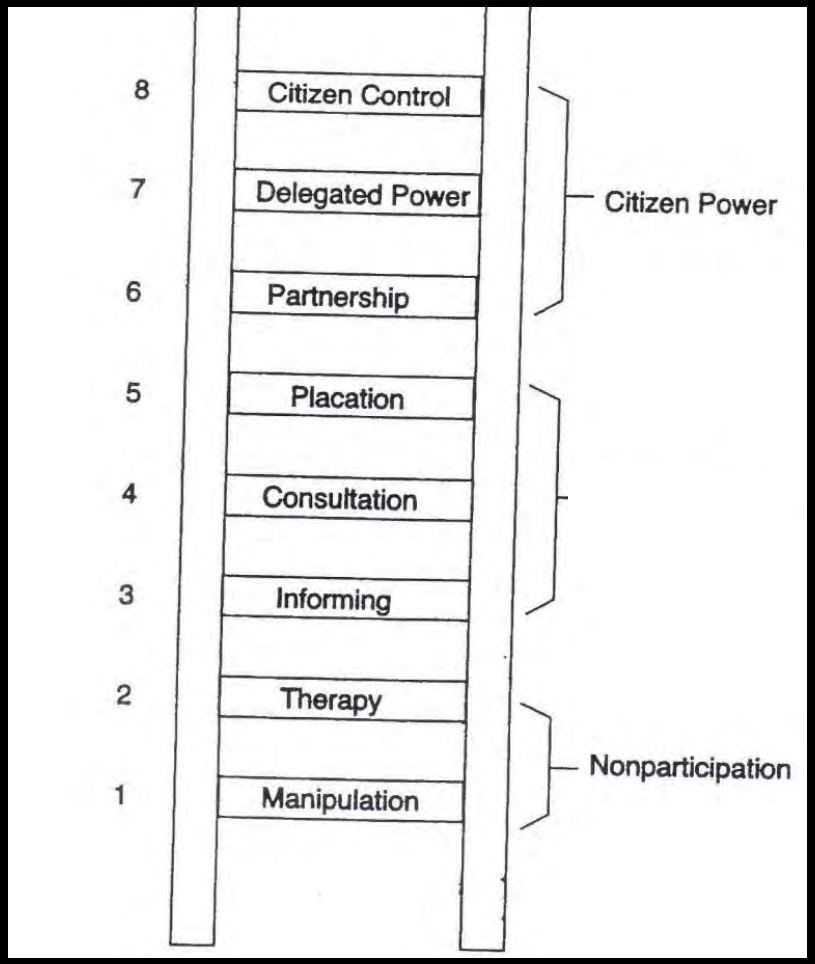
Mezirow 1995, Habermas Communicative Action Theory



(+) collaboration (+) empowerment (+) stewardship (+) conservation (+) adaptive management (+) transactive planning (+) environmental justice (-) conflicts people-bears (+) knowledge (+) empathy

SHARING POWER

- For learning to happen; power needs to be shared
- Participation is power

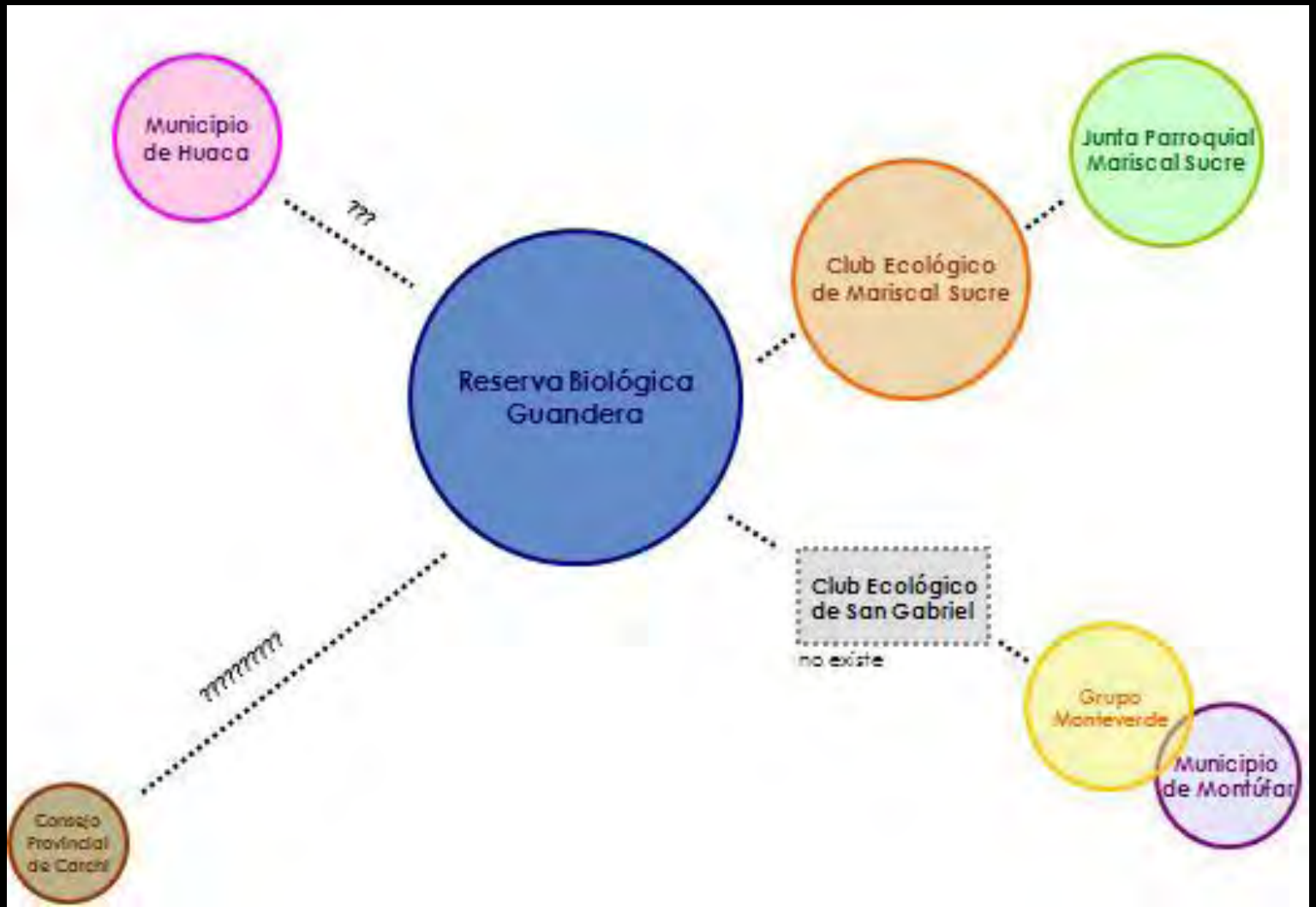


Ladder of citizen participation (Arnstein 1969)

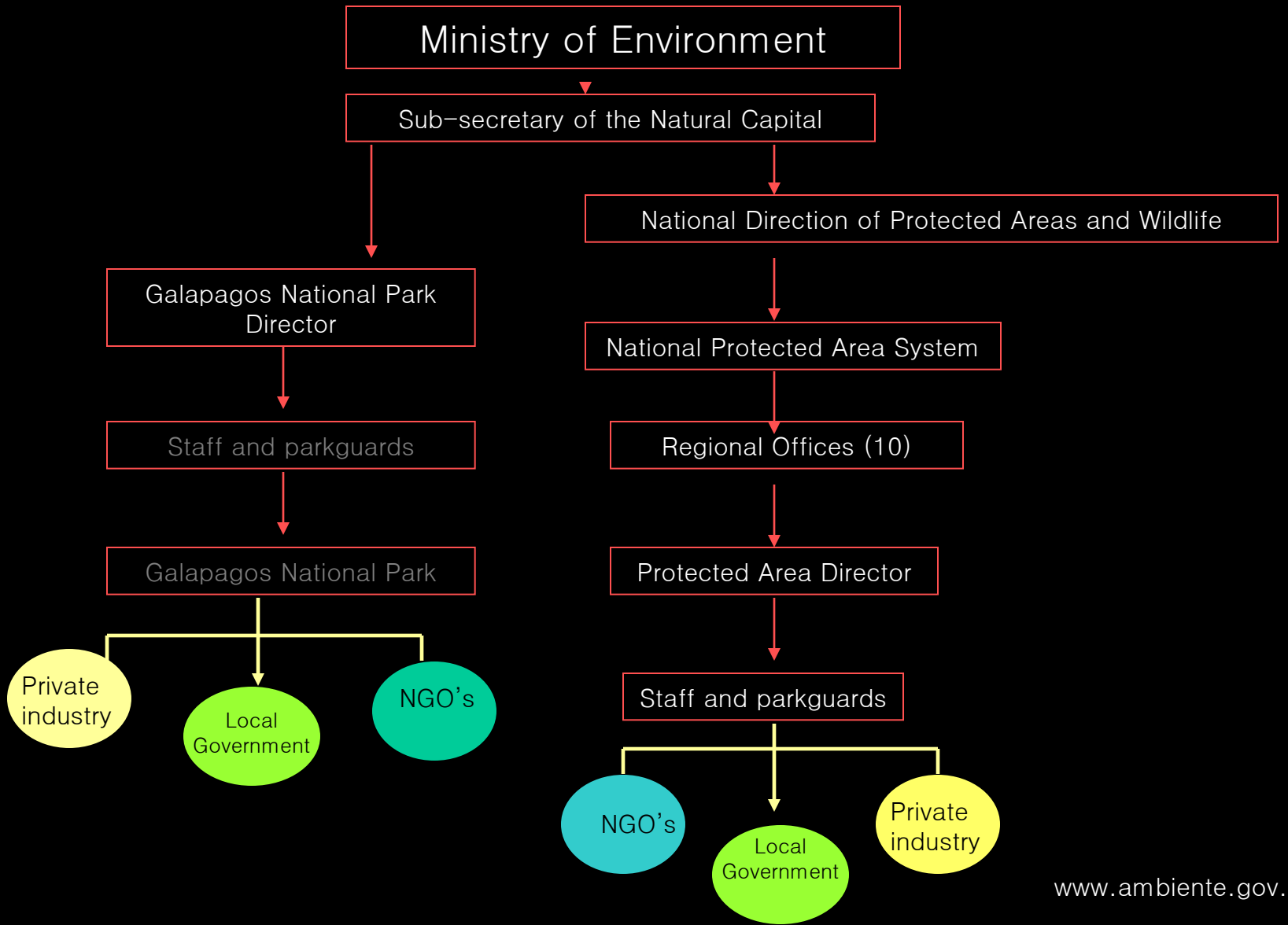
ANDEAN BEAR STAKEHOLDERS

Governments, NGO's, industry, citizens. research institutions, local communities and indigenous people

Roles and relationships of AB stakeholders (Flores and Viteri 2006)



NATIONAL POLICIES



www.ambiente.gov.ec

MANAGEMENT, POLITICS & CONFLICTS

- National Strategy for Andean bear conservation (Castellanos et al. 2010)
- Andean bear predation on cattle: description, conflicts and responses from affected communities and the Ecuadorian environmental authorities.
- Spatial analysis of conflict and poaching patterns across the Andean bear distribution (Shaenandhoa García-Rangel[1]*, Ezequiel Hidalgo, Raúl Ramírez[1], Edgard Daniel Rodríguez, Ximena Velez-Liendo, María Paulina Viteri. In prep.)

COLLABORATORS

Patricio Aigaje,, Marta Munoz, Lisette Waits, Sandra Pinel, Michael Proctor, Rodrigo Cisneros, Wait's lab group, Jen Adams, Dave Tank, Lee Vierling, Chris James, Cort Anderson, Francisco Cuesta, Saskia Flores,, Rossana Manosalvas, Esteban Suarez, Gabriel Trueba, Lucas Achig, Armando Castellanos, Gerardo Canacuan, Don Jose, Manuel Peralvo, Gioconda Remache, Isacc Goldstein, Luis Suarez, Alejandro Viteri, Alvaro Tapia, Veronica Troya, Cora Varas, Municipio de Huaca, Municipio Montufar, Ministerio del Ambiente del Ecuador, Fundacion Jatunsacha, Fundacion EcoCiencia, Fundacion Coordillera Tropical, Universidad San Francisco de Quito, Universidad Tecnica Particular de Loja, Grupo Ecologico Defensores de la Naturaleza,, Maria Aigaje, Hector Parion, Victor Parion, Lorenzo Parion, Holguer Aigaje, Edgar Viteri, Miguel de la Iglesia, Santiago Molina, Irene Llore and many more.

FUNDING SOURCES–THANK YOU

- 2011- Research and Conservation Grant ($5,000)
International Association for Bear Research and Management (IBA)

- 2010-2011 PhD Scholarship SENACYT ($48,000)
National Secretary for Science and Technology, Ecuador (SENACYT)

- 2008- AAUW International Fellowship ($20,000)
International Fellowship, American Association of University Women (AAUW)

- 2008- International Student Scholarship ($900)
Endowment Award from the International Program Office, University of Idaho

- 2007- Idaho EPSCoR Program ($23,980)

- 2006 – Fernando Ortíz Crespo Conservation Grant ($2,500)
Conservation Scholarship, EcoCiencia & Conservation International (CI) Ecuador

- 2005 - Russell E. Train- Education for Nature Scholarship ($35,000)
World Wildlife Fund (WWF)

- 2005-2007 Research and Conservation Grant ($15,000)
International Association for Bear Research and Management (IBA)

- 2004- Latin American Student Fellowship ($1,500)
American Society of Mammalogist

- 2004- DeVlieg Research Fellowship ($1,000)
Laboratory for Conservation and Ecological Genetics, University of Idaho

- 2004- Memorial Bear Fund ($1,500)
Wyoming Chapter of The Wildlife Society (TWS)

- 2004- Foster Award ($600)
College of Natural Resources, University of Idaho

QUESTIONS AND COMMENTS

GRACIAS