

Animal culture, conservation & welfare

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Cultural
Evolution
Society

Culture, conservation & welfare

- Goals of conservation biology and animal welfare
- What is biological diversity
- Some characteristics of cultural populations
- Cultural diversity and resilience
- Exploiting humans
- Translocation and reintroduction
- Delineating conservation units
- Culture and animal welfare

Goals of:

Conservation Biology

- describe the **diversity** of the living world
- understand the effects of human activities on species, communities, and ecosystems
- develop practical interdisciplinary approaches to protecting and restoring biological **diversity**

Animal Welfare

- providing for an animal's physical and mental needs

What is biological diversity?



- within species
- between species

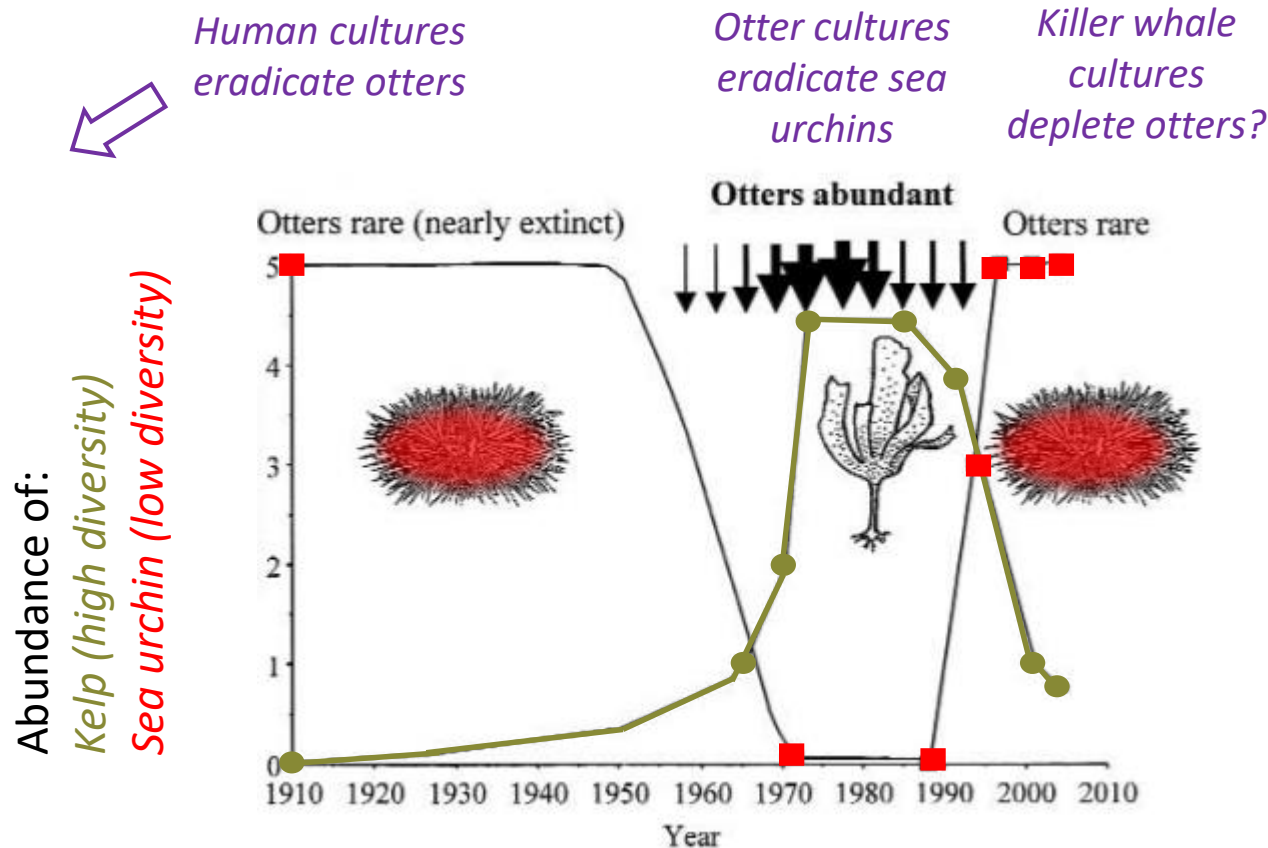


Phenotypic diversity:
Genetic processes
Cultural processes

- of ecosystems

Variation in ecosystems:
Cultural input

Culture and ecosystems



Amchitka, Alaska: Sea otters, sea urchins and kelp

Some characteristics of cultural populations

- Rapid spread of novel behaviour through social learning
- Inhibition of the acceptance of novel behaviour through cultural conformism
 - Cultural traps
- Division of species into subpopulations with distinct cultures, which may be sympatric

Habitat variation with space and time, enhanced by human activities

- Change foods

*Promoted by
innovation and
social learning*

- Change foraging
strategies

-

*Impeded by
cultural
conformism*

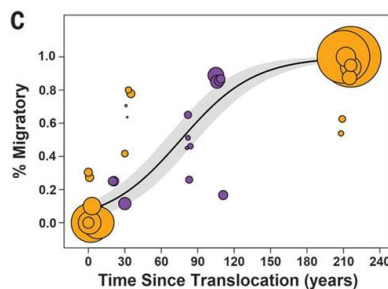
- Move

So, culture can improve, or worsen, ability to deal
with anthropogenic changes

Habitat variation, culture and conservation

Migratory cultures of ungulates

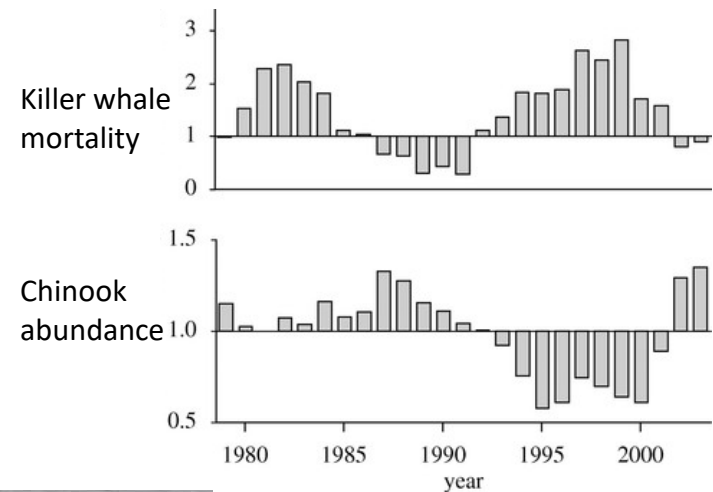
- Reintroduced populations of **bighorn sheep** and **moose** do not seasonally migrate like historical herds
- However, after several decades, become increasingly migratory
- Introduced animals learned about their environment and shared the information



B. Jesmer et al. *Science* 2018

Conformist cultures of killer whales

- 71% of fish killed chinook salmon
- Other species more plentiful



J. Ford & G. Ellis *Mar Ecol Pr Ser* 2004

J. Ford et al. *Biol Lett* 2009

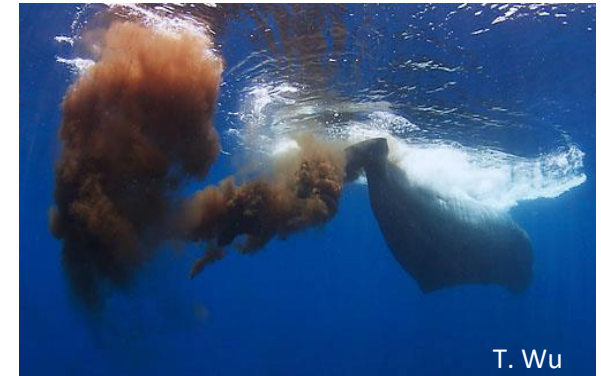
Cultural diversity and resilience

- Female sperm whales
 - Live in kin-based social units
 - Each social unit is a member of a *clan*
 - Clan-specific culturally transmitted behaviour
 - *Clans* can be sympatric



Cultural diversity and resilience

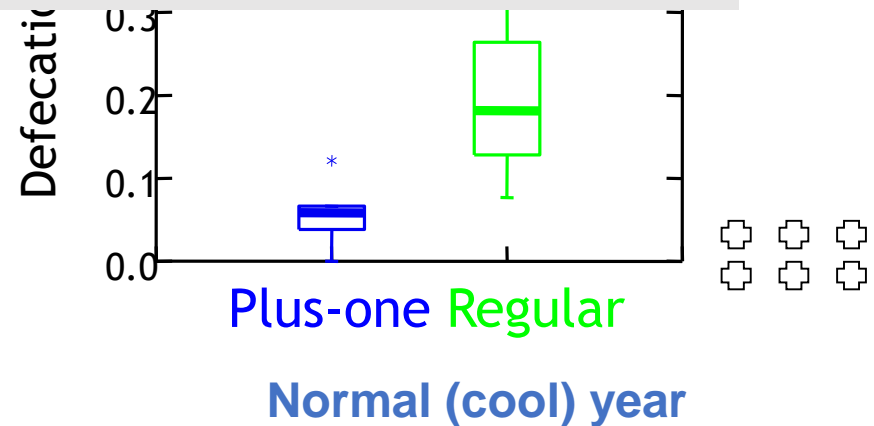
Clans of female sperm whales off Galápagos Islands



Sperm whales are greatly affected by El Niño

Climate change will likely increase the extremes of El Niño cycle

Cultural diversity of sperm whale clans becomes increasingly important



H. Whitehead & L. Rendell *J Anim Ecol* 2004
W. Cai et al. *Nat Clim Change* 2015

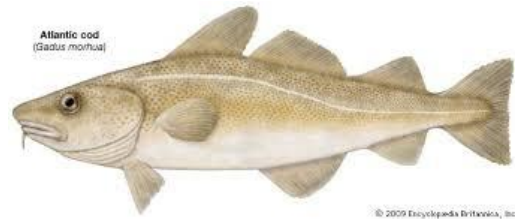
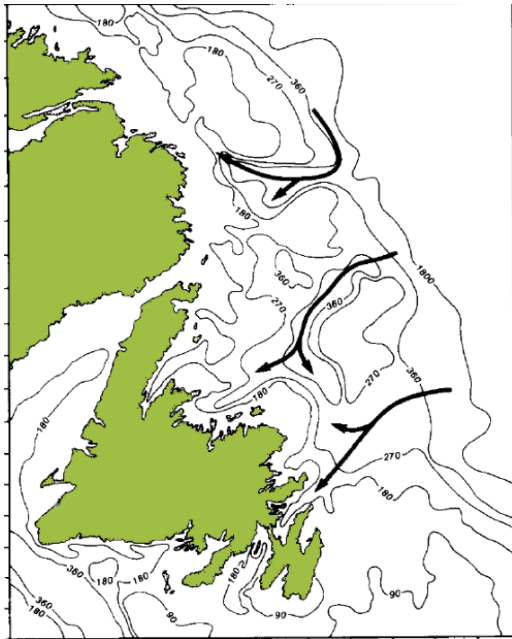
Loss of culture reduces population resilience

- Culture less rich with
 - Low population size
 - Fewer links in social network
 - Fewer links among subpopulations
 - Fewer older animals
- Less rich culture => Lower population resilience

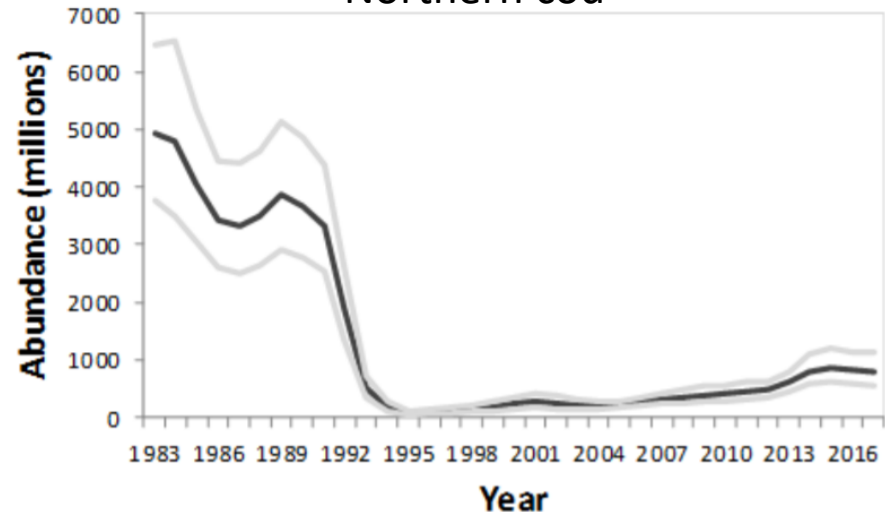


Over-exploitation
Habitat destruction

The codfish



Northern cod



- Young fish follow older fish on migration
- Near extirpation of stock, almost no older fish
- Loss of knowledge of feeding/spawning grounds
- Takes many years to rebuild knowledge, and stock

Exploiting humans

- Using discards
 - Baboons
- Raiding crops
 - Elephants
- Depredation of fishing gear
 - Sperm whales
- Being “fed” by tourists
 - Dolphins
- Eating humans
 - Tigers



*Speed of spread,
and impact,
greatly
exacerbated by
social learning*



⇒ loss of natural behaviour, social segregation,
disease, killing, calls for culls,...

Translocation and reintroduction

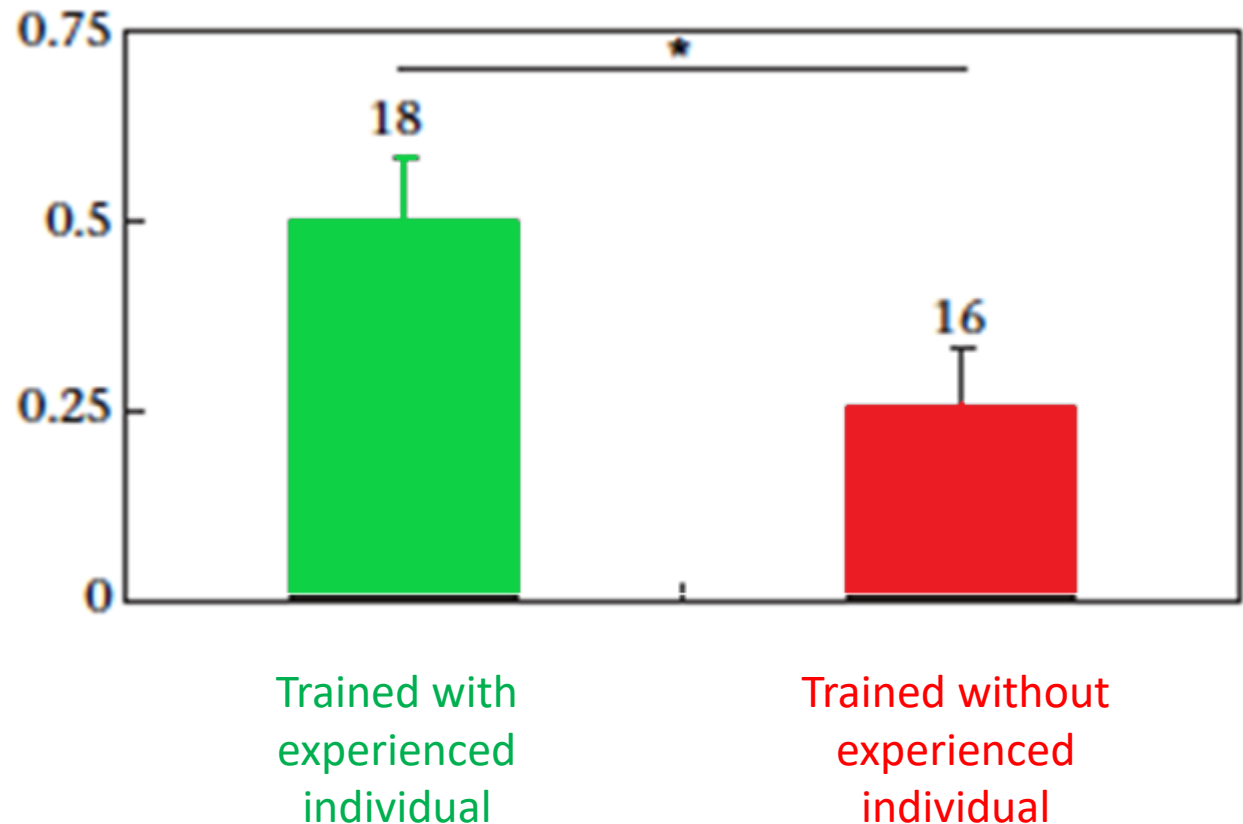
- Animals moved into area in wild
 - From other areas: translocation
 - From captivity: reintroduction
- Purposes
 - Re-establish species extinct, or low numbers, in the wild
 - Restore natural ecosystems
 - Provide hunting opportunities
 - Increase survival prospects of threatened species

Mixed record of success, sometimes controversial

Black-tailed prairie dog: antipredator training



Survival in
wild of
captive-bred
juvenile (1yr)



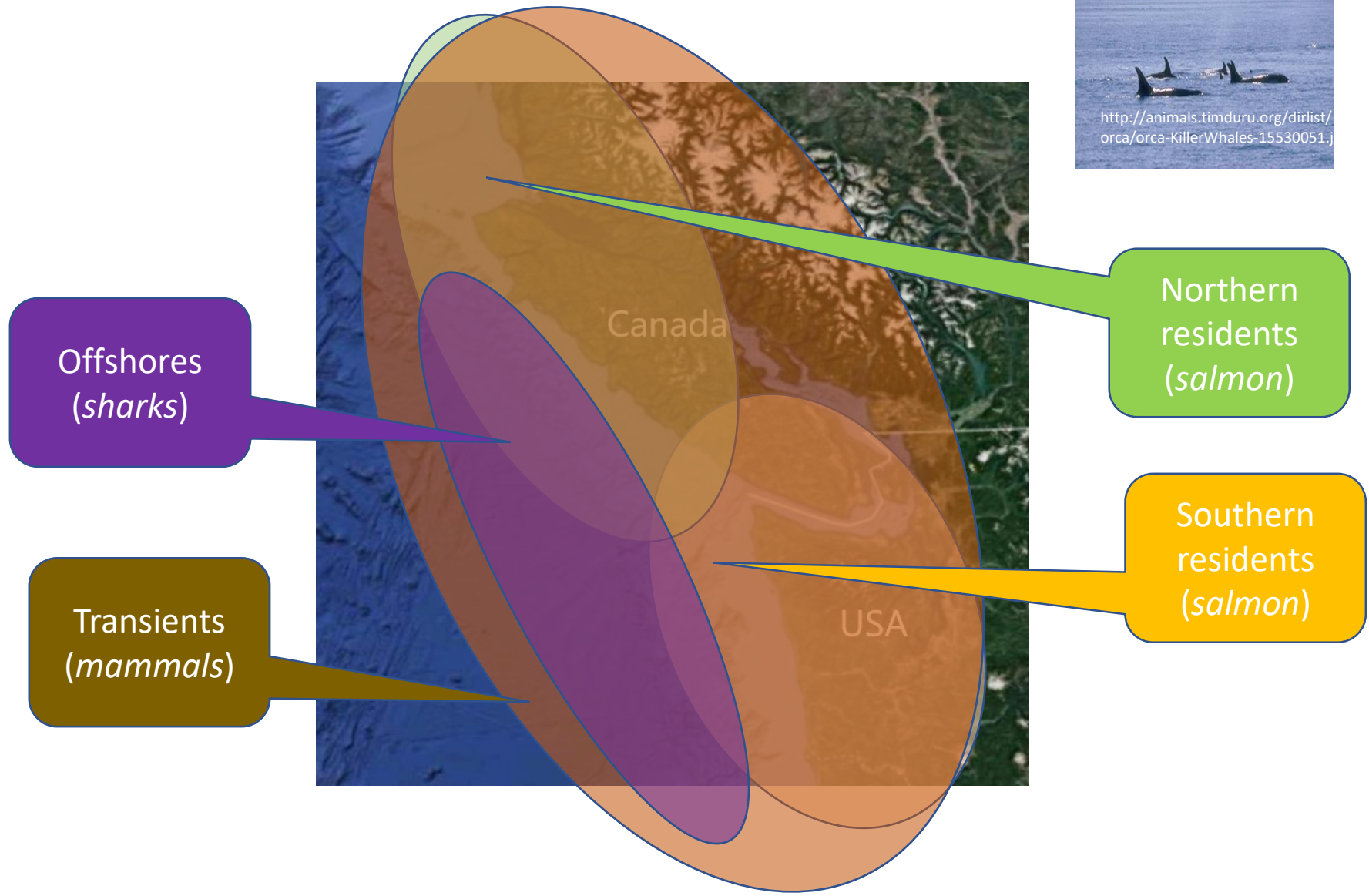
Defining population units for management and conservation

- Evolutionarily significant units (ESU's)
 - Delineated to preserve
 - adaptive variation in genes and phenotypes
 - evolutionary divergence caused by isolation over time or space
 - Usually delineated using genes
 - But culture is also a significant force behind the evolution and distribution of phenotypes in some species
 - Culturally significant units (CSU's)
 - Add culture to the definition of ESU

S. Ryan *Cons Biol* 2006

H. Whitehead et al. *Biol Cons* 2004

Killer whale ecotypes and communities



Killer whale ESU's

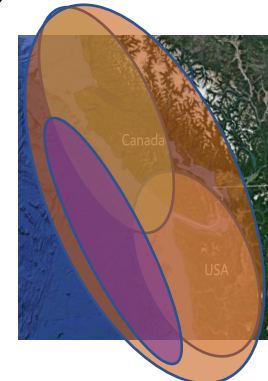
USA (NMFS)

- 2002
- Whole population
 - *Depleted*
- *was insufficient evidence to indicate whether 'cultural' traits were inherited or learned, and thus whether they truly signify an evolutionarily important trait*



Canada (COSEWIC)

- 2001, 2008
- Ecotypes and communities listed as separate Designatable Units (\approx ESU)
- Southern residents:
 - *Endangered*
- *acoustically, genetically and culturally distinct*



Killer whale ESU's

USA (NMFS)

- 2002
- *general killer whale population in the North Pacific, which is considered healthy*
 - *Depleted*
- *was insufficient evidence to indicate whether '**cultural**' traits were inherited or learned, and thus whether they truly signify an evolutionarily important trait*

USA (NMFS)

- 2005
- Southern Residents classified as Distinct Population Segment (\approx ESU)
- Southern residents:
 - *Endangered*
- *based on evaluation of ecological setting, range, genetic differentiation, behavioural and **cultural** diversity*

Culture and conservation policy

- **Committee on the Status of Endangered Wildlife in Canada:**

Designatable Unit (≈ESU)

"discrete population or group of populations differs markedly from others in **genetic** characteristics thought to reflect relatively deep intraspecific phylogenetic divergence. Such differences could be manifested by fixed differences in functional genes, **or in functional and stable cultural behaviour**, or indicated by qualitative genetic differences at relatively slow-evolving markers (e.g., fixed differences in mitochondrial or nuclear DNA sequences, or fixed differences in alleles at multiple nuclear loci, **or clear distinctions in dialect**)" [COSEWIC O&P Manual 2018 changes]

- **Convention on Migratory Species:**

Resolution 11.23 "Conservation Implications of Cetacean Culture" (2014)

Culture and animal welfare

- Providing for an animal's physical and mental needs
- “Capabilities” approach: quality of an animal's life, his or her dignity and free movement, and affiliations with conspecifics
 - Can be adapted to include culture
- Cultural animals need the opportunities for social learning and their results



Items bonobos agreed were important for their welfare

- 1. Having food that is fresh and of their choice
- 2. Traveling from place to place

8. Transmitting their cultural knowledge to their offspring

- 3. Going to places they have never been before
- 4. Planning ways of maximizing travel and resource procurement
- 5. Being able to leave and rejoin the group to explore, and to share information regarding distant locations
- 6. Being able to be apart from others for periods of time
- 7. Maintaining lifelong contact with individuals whom they love
- 8. Transmitting their cultural knowledge to their offspring
- 9. Developing and fulfilling a unique role in the social group
- 10. Experiencing the judgment of their peers regarding their capacity to fulfill their roles, for the good of the group
- 11. Living free from the fear of human beings attacking them
- 12. Receiving recognition, from the humans who keep them in captivity, of their level of linguistic competency and their ability to self-determine and self-express through language

Need to:

- Conserve animal culture for its own sake
 - Part of biodiversity
- Conserve animal culture for population resilience
- Consider how animal culture may
 - Exacerbate human-animal conflicts
 - Help us to translocate or reintroduce
 - Subdivide populations
 - Be important for captive animals
- Consider how social learning and its biases affect conservation effort
- An understanding of animal culture helps us to understand animals, and so address their conservation and welfare