

# Leatherback Turtle Endangered Species Act Listing Determination East Pacific subpopulation



A Joint NOAA Fisheries and U.S. Fish  
and Wildlife Service ESA Status Review



# Endangered Species Act Status Review

- 1970 – leatherbacks listed *globally* as Endangered
- 2013: NOAA Fisheries and USFWS 5-year review
  - Substantial amount of info on genetics and movement since listing in 1970
  - Recommended conducting a status review to apply “Distinct Population Segment” Policy
- 2017: Petition received to re-consider listing (from fishing industry)
- December 6, 2017: NMFS’ Positive 90-day Finding
  - Petition “may be warranted”
  - Solicited information on leatherback turtles *worldwide*
- February 2018
  - Commenced joint status review of the species worldwide



# Approach to Status Review

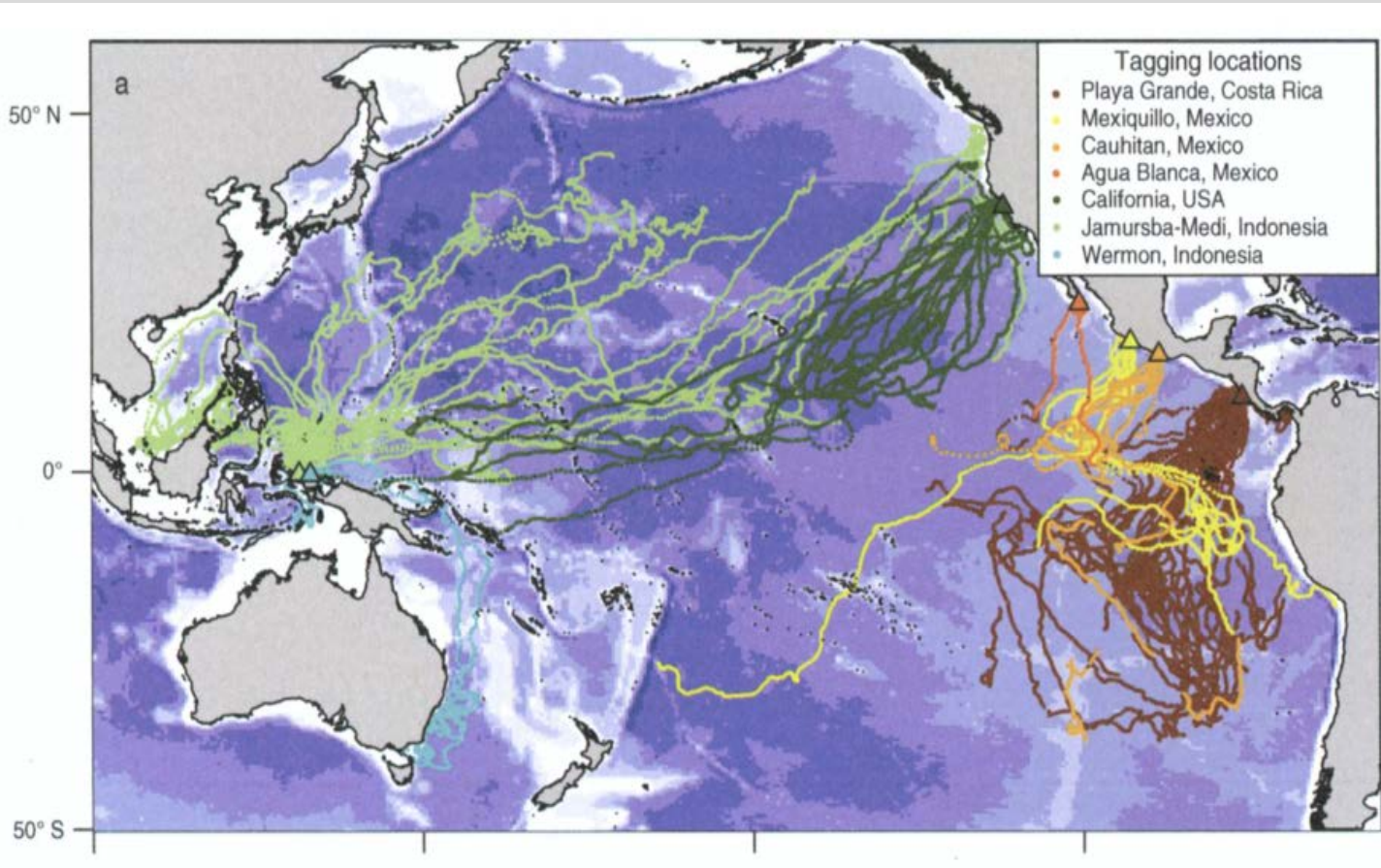
- Consider “distinct population segments” or “subpopulations”
  - Subpopulations must be “Discrete” and “Significant”
    - Markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological, or behavioral factors (quantitative measures of genetic or morphological discontinuity may provide evidence of this separation);

or

- Delimited by international governmental boundaries within which significant differences exist in regards to control of exploitation, management of habitat, conservation status, or regulatory mechanisms.



# Marked separation: behavioral factors-- movement



135 leatherbacks  
tagged at nesting  
sites or at sea  
(California)

Bailey *et al.*  
(2012)

# Discreteness Summary

- Marked separation of seven populations based on:
  - Behavioral factors (nesting and breeding site fidelity)
    - Genetic discontinuity
    - Movement (tracking and tagging) studies
  - Physical factors
- Overlap at foraging areas, but no gene flow
- 7 discrete populations:
  - NW Atlantic
  - SW Atlantic
  - SE Atlantic
  - SW Indian
  - NE Indian
  - West Pacific
  - East Pacific

# Determining “Significance”

- Persistence of the discrete population segment in an ecological setting unusual or unique for the taxon;
- Evidence that loss of the discrete population segment would result in a significant gap in the range of a taxon;
- Evidence that the discrete population segment represents the only surviving natural occurrence of a taxon that may be more abundant elsewhere as an introduced population outside its historic range; or
- Evidence that the discrete population segment differs markedly from other populations of the species in its genetic characteristics.

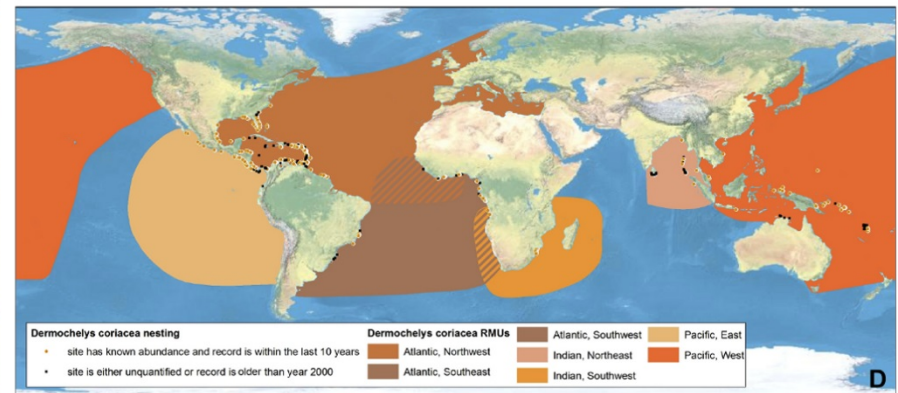
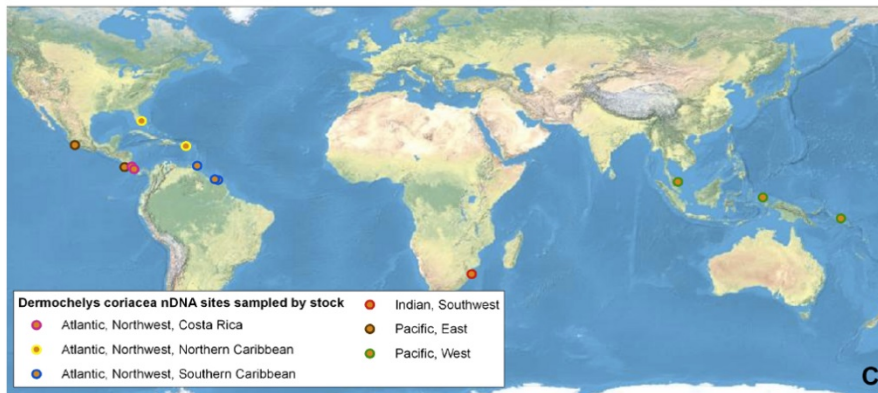
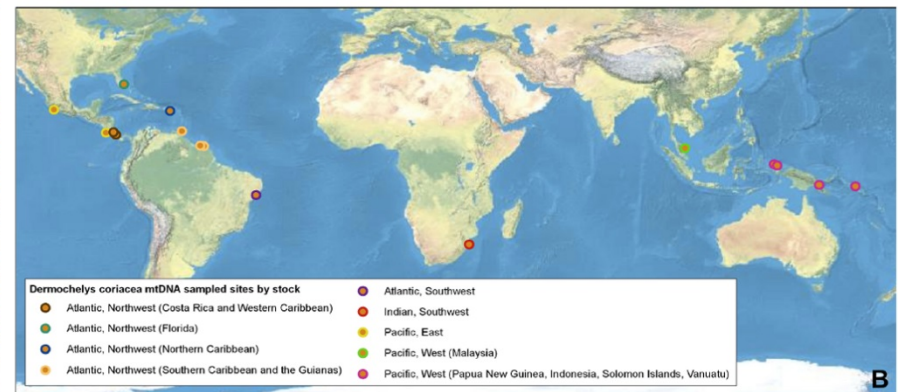
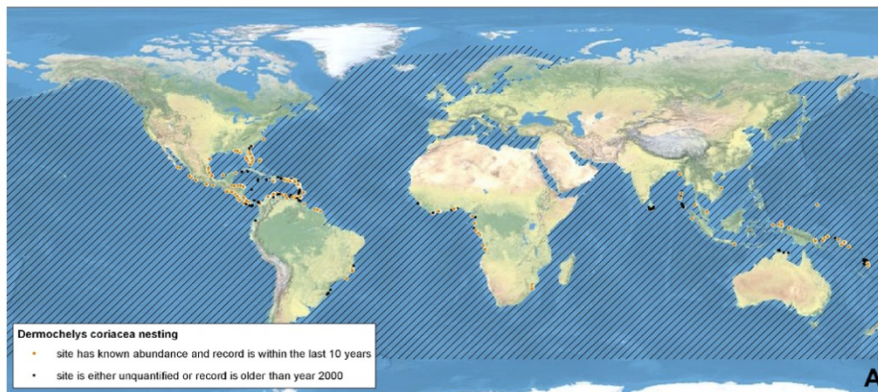


# Summary

- Seven discrete populations based on marked separation of nesting beaches based on behavioral (genetics, tagging, and tracking studies) and physical factors
- All seven are significant to the species because the loss would create a gap in the nesting range of the species; and some occur in a unique ecological setting

# Seven Subpopulations:

- Our “subpopulations” matched closely w/ Wallace et al. (2010) “regional management units”





# Listing Guidance

- Listing Guidance
  - Demographic factors: abundance, productivity, spatial distribution, and diversity
  - 5 threat categories: habitat loss/modification; overuse; disease/predation; inadequate regulatory mechanisms; other (e.g. fisheries, climate change, pollution/marine debris)

# East Pacific Leatherbacks: Abundance (summary)

- Conclusion: Low nester abundance; high confidence
- Less than 800 nesters, does not include unmonitored nesting beaches (Mexico/Costa Rica) or those without recent data
- IUCN Redlist assessment estimated the total number of mature individuals (including females and males) to be 633 turtles (Wallace *et al.* 2013)
- Conclusion: Overall decreasing trend in nesting
- IUCN Redlist: decreasing trend of -97.4% over past 3 generations (Wallace *et al.* 2013)

# East Pacific Leatherback

## Threats: Fisheries Bycatch, Climate Change, Overutilization (poaching eggs and turtles)

- **Fisheries Bycatch** = Major threat
  - Affects juveniles, subadults, and adults
  - Reduces abundance and productivity (when nesters taken)
  - Nets have a high impact on EP leatherbacks (Wallace *et al.* 2013)
  - Longlines *may* have high impact on East Pacific leatherbacks based on effort, location, etc.
  - Coastal artisanal fisheries – likely high impact especially off nesting beaches
- **Climate change** = threat, increasing
  - Affects all life stages (reduces productivity)
  - Increases in sand temperatures (Santidrian-Tomillo *et al.* (2012) predicted hatching success would decline from 42% to 18% by 2100)
  - Sea surface temperature (Willis-Norton *et al.* (2014) predicted a 15% decline in the core foraging habitat over the next century)
- **Overutilization** (poaching eggs and leatherbacks) = threat

# East Pacific Leatherback Threats: Inadequate Regulatory Mechanisms

- Regulatory mechanisms provide some protection to the species; most are inadequate to reduce the threat they were designed to address to sustainable levels, generally as a result of poor implementation or enforcement.
- **IATTC Resolutions**
  - Longline Observer Coverage
    - Non-standardization of data form (e.g., species ID, condition, location lacking)
    - Even low observer coverage is showing leatherback and other sea turtle bycatch
  - Sea turtle resolution (2007)
    - Require fishermen to carry and implement safe-handling equipment – de-hookers, line-cutters, dipnets on longline vessels
    - “Expediently undertake fishing trials to determine feasibility and effectiveness of appropriate combinations of circle hooks and bait...”
    - “At future meetings...consider measures related to the use of circle hooks and other gear modifications”
    - Conclusion: inadequate regulatory mechanism, considering Swimmer et al. (2017) showed -84% reduction in leatherback bycatch in Hawaii shallow-set longline fishery with circle hook/fish bait (regulations implemented)

# East Pacific Leatherbacks: Threats Summary

Threat	Exposure (life stage)	Impact	Magnitude of threat
Destruction or modification of habitat	Eggs	Reduction of nesting and hatching success (productivity)	
Overutilization (e.g. poaching, direct killing of turtles)	Eggs and nesters; turtles at sea	Loss of nesters (abundance) and reproductive potential (productivity)	
Predation	Eggs and hatchlings	Low: reduction of nesting and hatching success (productivity)	
Inadequate regulatory mechanisms	Eggs and turtles at all life stages	Laws are poorly enforced or regulations do not adequately reduce threats	
Fisheries bycatch	Most foraging turtles and inter-nesting females	Loss of individuals (abundance) and loss of nesters (productivity)	
Regime shift (e.g., El Nino, Pacific Decadal Oscillation)	Most foraging turtles	Reduced productivity	
Marine debris and pollution	Many sea turtles ingest plastics or become entangled in marine debris	Sublethal effects are likely more common than lethal effects (abundance)	
Climate change	Nesters, eggs, hatchlings	Reduction of nesting and hatching success (productivity) Increasing due to rising temperature	



# East Pacific Leatherback: Extinction Risk Analysis

- Low abundance, decreasing trend
- Moderate spatial distribution, diversity provide some resilience
- Clear and present threats = fisheries bycatch, inadequate regulatory mechanisms, overutilization, regime shift, marine debris, and climate change, habitat loss and disease/predation
- Does this subpopulation meet the definition for high risk?
- Is it: "...at or near a level of abundance, productivity, spatial structure, and/or diversity that places its continued persistence in question"?
- What is our confidence level in our conclusion?
- Stay tuned... the Leatherback Status Review is currently being peer-reviewed

