The Next Mass Extinction

Alan Mauldin
TeleGeography
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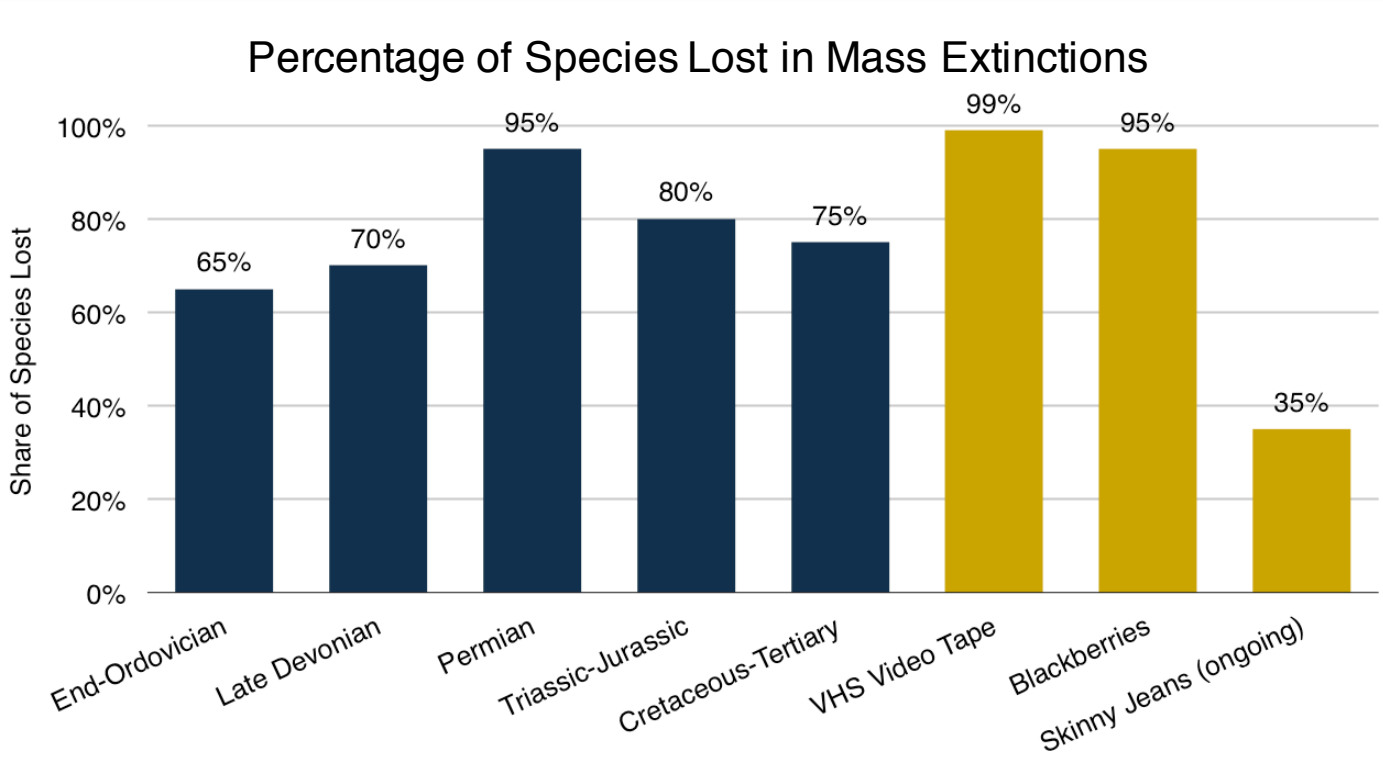
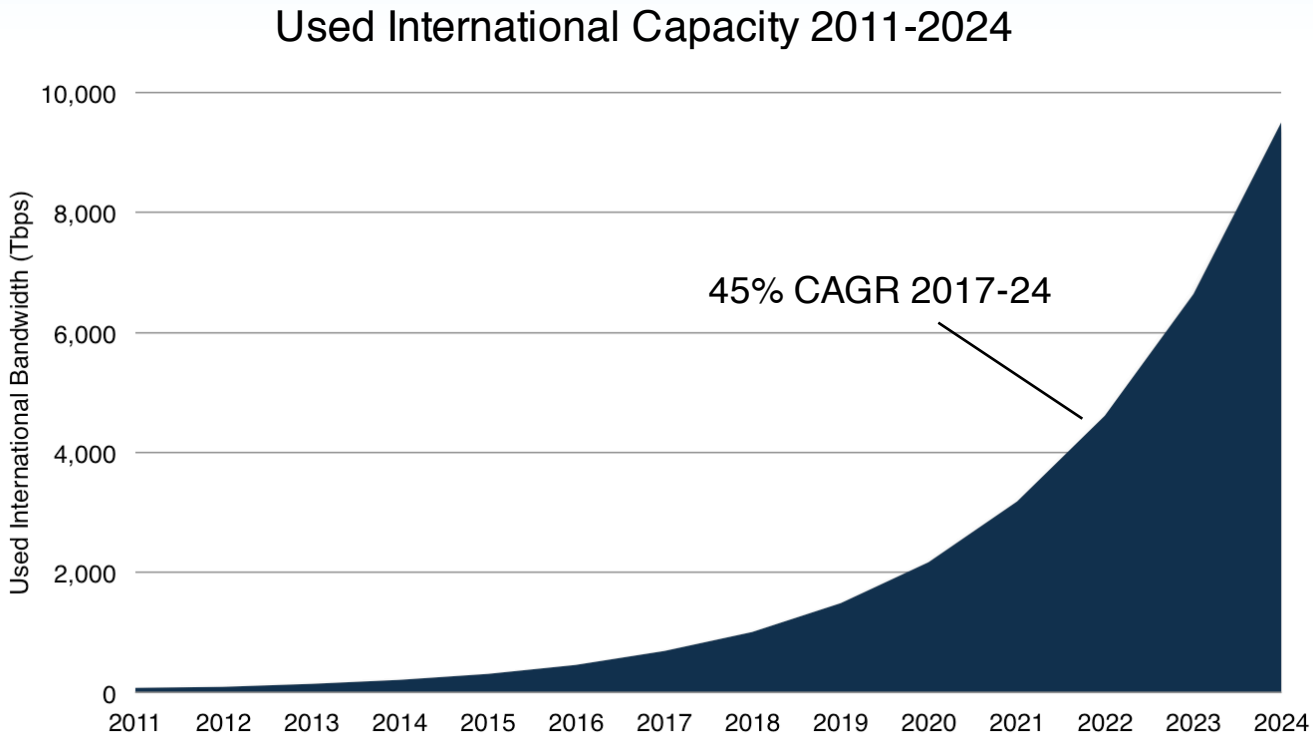
Mass extinctions throughout history

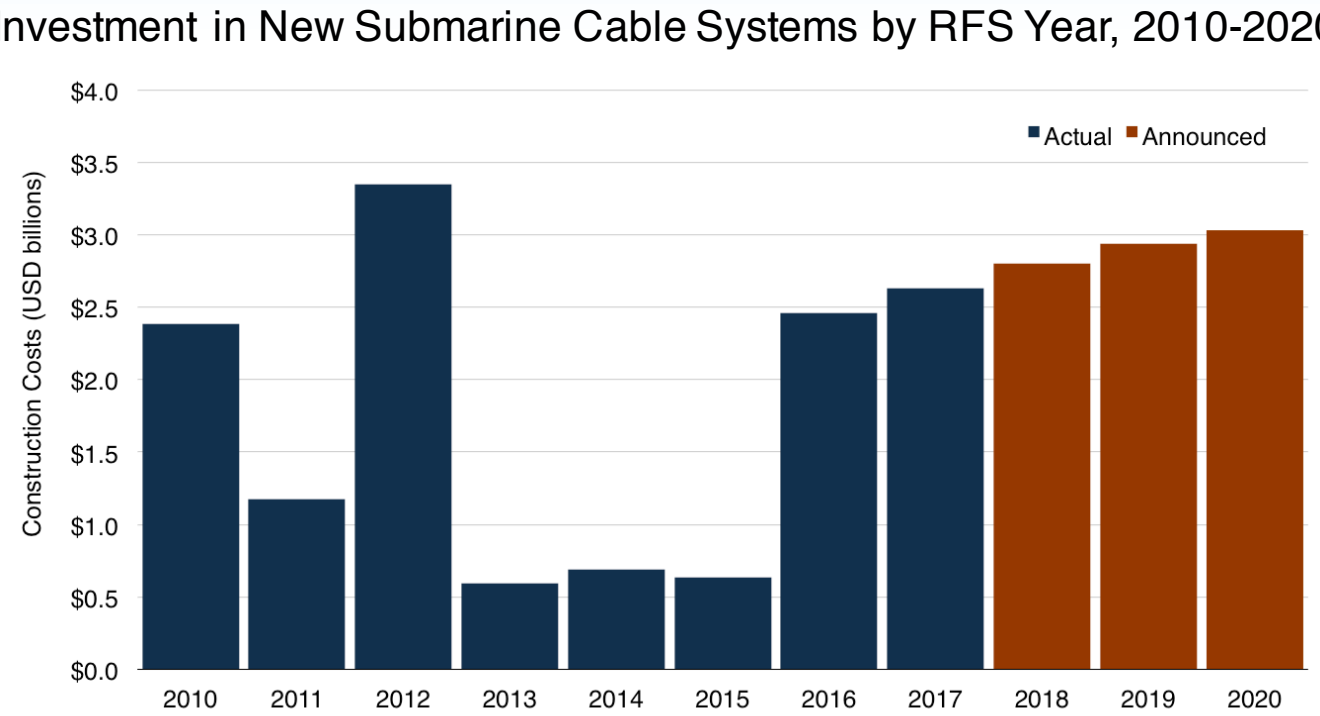


Is a submarine cable mass extinction looming?

Compounding growth leading to massive volumes



Large investment in new cables underway



How a submarine cable becomes ‘extinct’ (retired)?

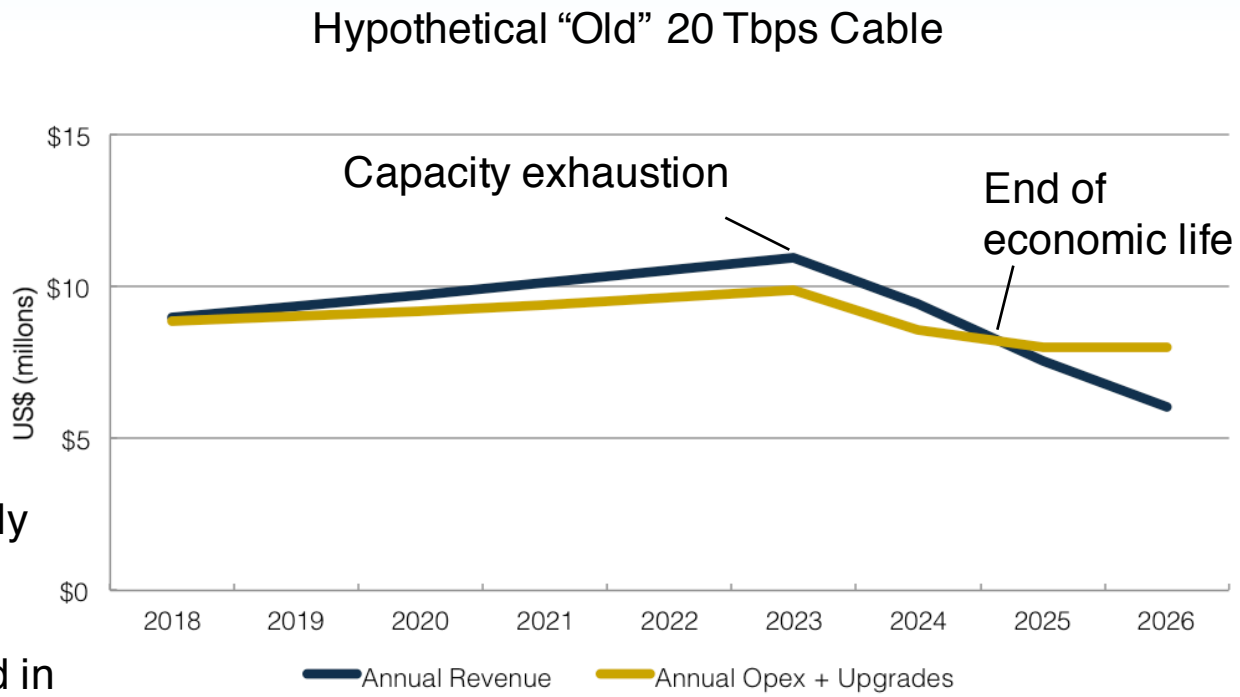
- Cables’ minimum *design* life is 25 years, but what matters is *economic* life
- Economic life of a cable depends on a system’s revenues exceeding costs
- Cables must continually add capacity to offset the negative effect of lower capacity prices on revenues
- At some point, annual costs exceed revenues, once this threshold is reached…

How a submarine cable becomes ‘extinct’ (retired)?

What does economic life look like?

Model Assumptions:

- Construction costs recovered/written off
- Opex - $8m/year
- Upgrade cost - $75k/100G, declining 10% annually
- Prices - $15k/month/100G, declining 20% annually
- Sales - 100% 100G leases
- Demand - 5 Tbps sold in 2018, rising 30% annually



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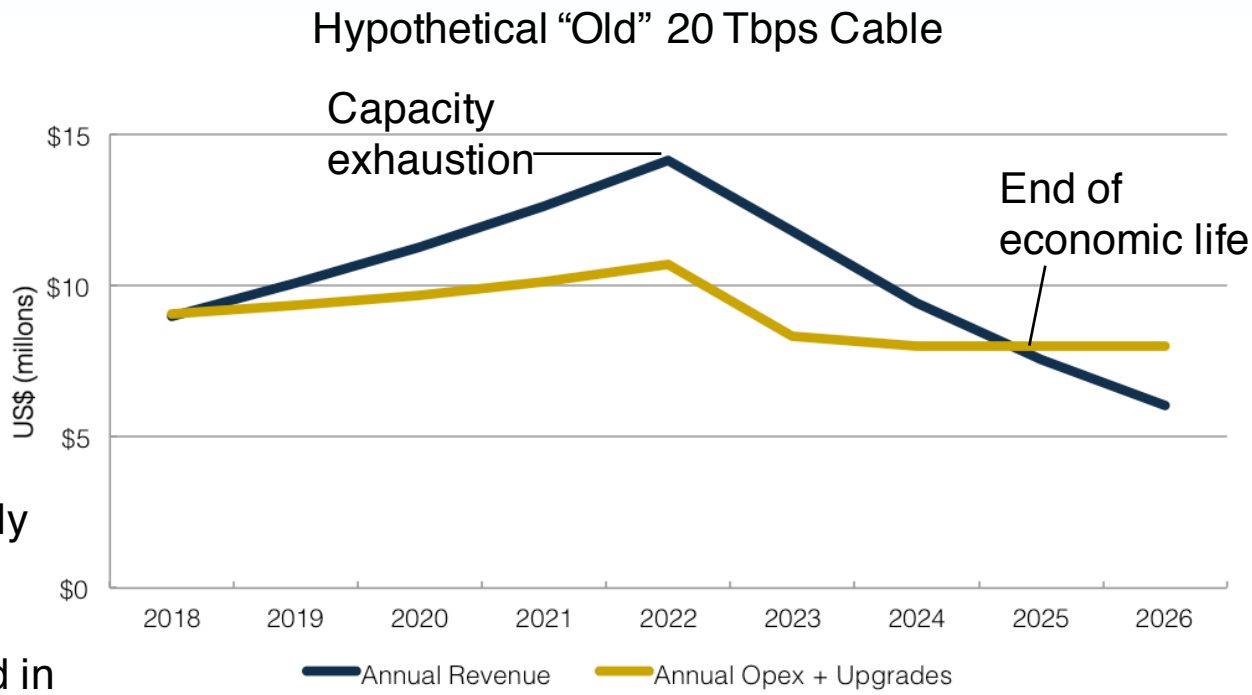

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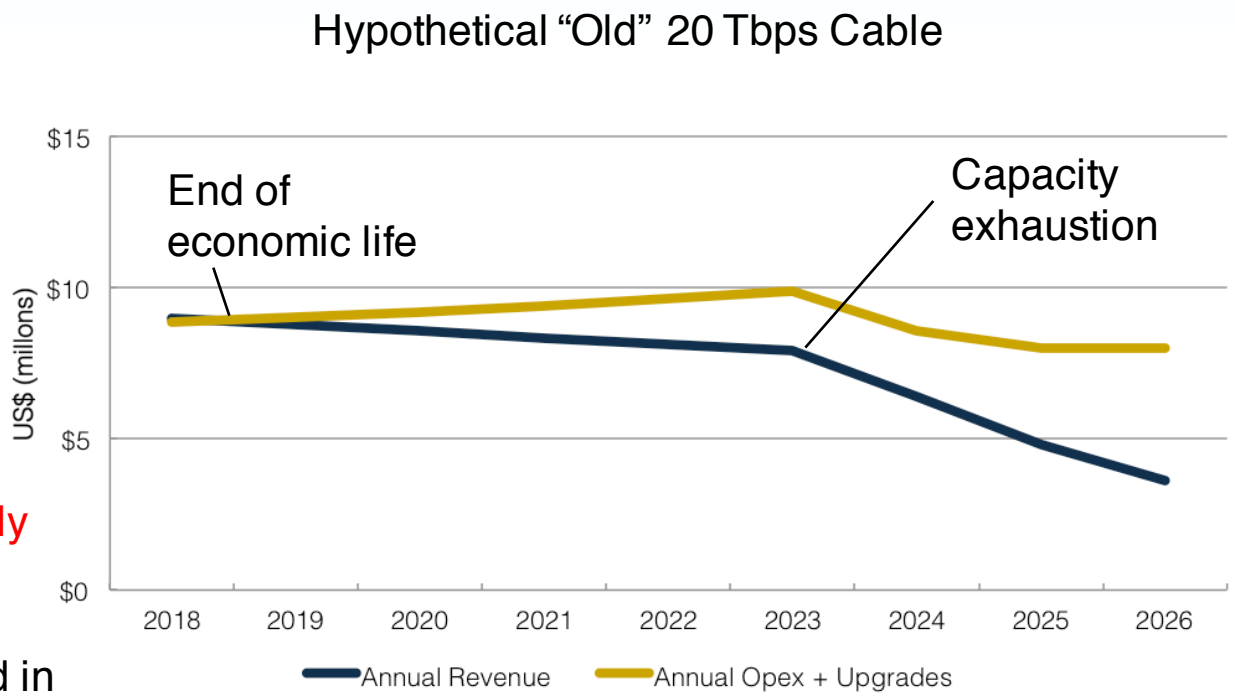
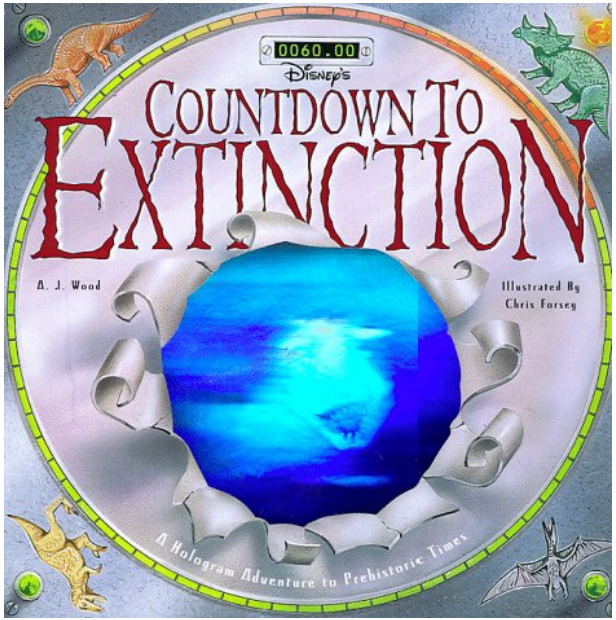


Factors influencing economic life

- Price erosion – more rapid erosion will move up the end of economic life
- Demand – large differences in volumes and pace of growth lead to far different economic lifespans across regions/routes
- Upgrade costs – unit upgrade costs are often higher on older cables compared to newer systems
- Increased competition – new high capacity cables can reduce an older cable's market share, slower sales growth shortens economic life
- Faults – increases in repairs as cables age, which would boost costs and hasten end of life

Factors influencing economic life (continued)

- Capacity exhaustion – running out of capacity does *not* mean immediate end of economic life, but does start the countdown to extinction



Cable retirement challenges

- Consortia have differing requirements for voting for retirement: unanimous decision? majority?
  - Members with favorable backhaul agreements may be reluctant to vote for retirements
  - Members from countries with a limited number of cables may be less inclined to vote for retirement
- Customers with existing IRUs may need to be compensated
- Hidden retirement costs – some governments require portions of cables to be recovered once they are decommissioned

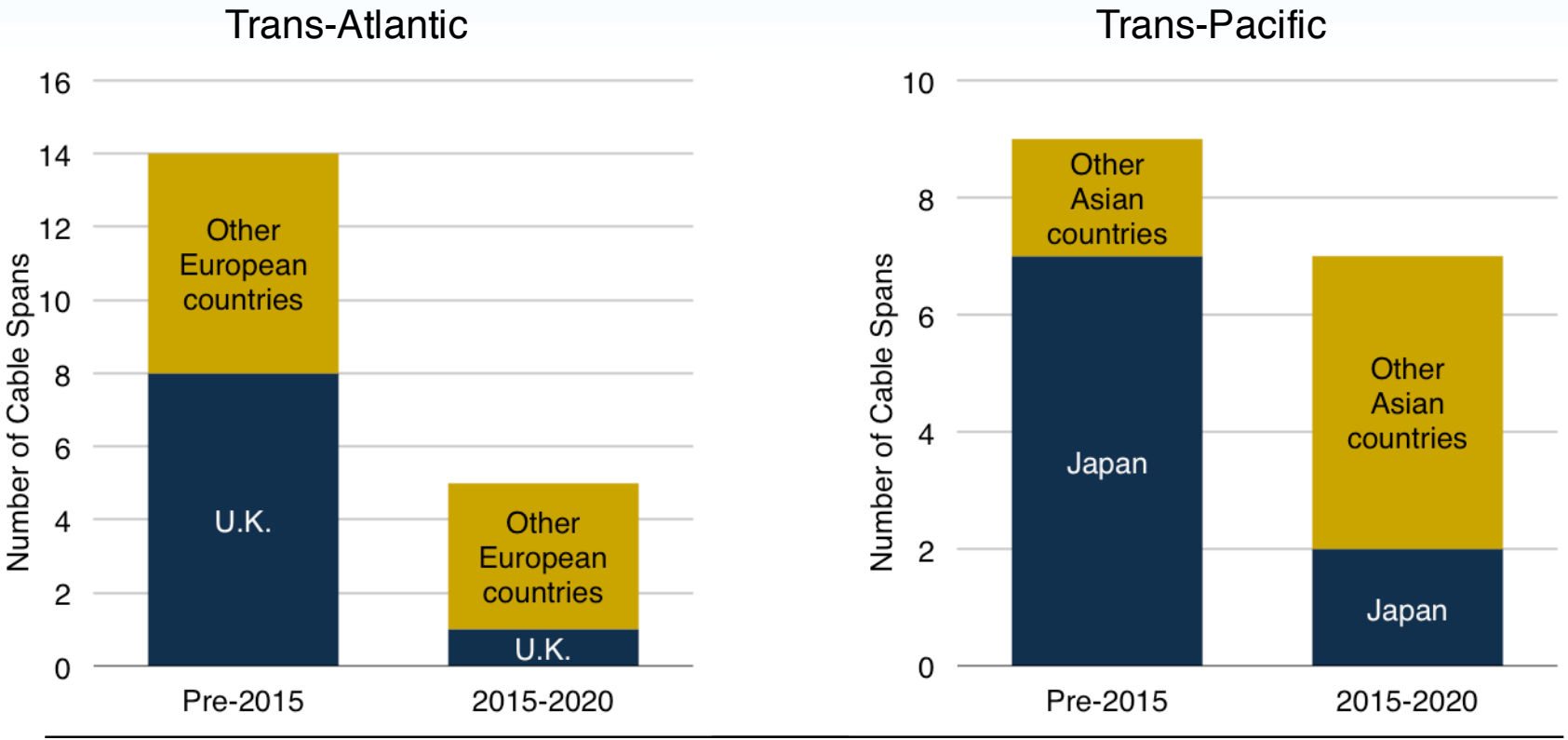
Cable extinction phases

- Zombie Cables (commercial retirement) – cable remains operational, but not actively selling capacity or engaging in additional upgrades
- Dismembered Cables (partial retirement) – only specific spans or branches are decommissioned
  - e.g. Americas-I, Columbus-II, CANTAT-3
- Death Row Cables ("soft" decommissioning) – maintenance contract cancelled, but cable remains in service until the next fault
- Dead Cables (full decommissioning)

Traits of the new species of cables

- Not a one-for-one replacement
  - Higher fiber pair count in new cables
  - New routings and landings

New cables evolving beyond Japan and the U.K.

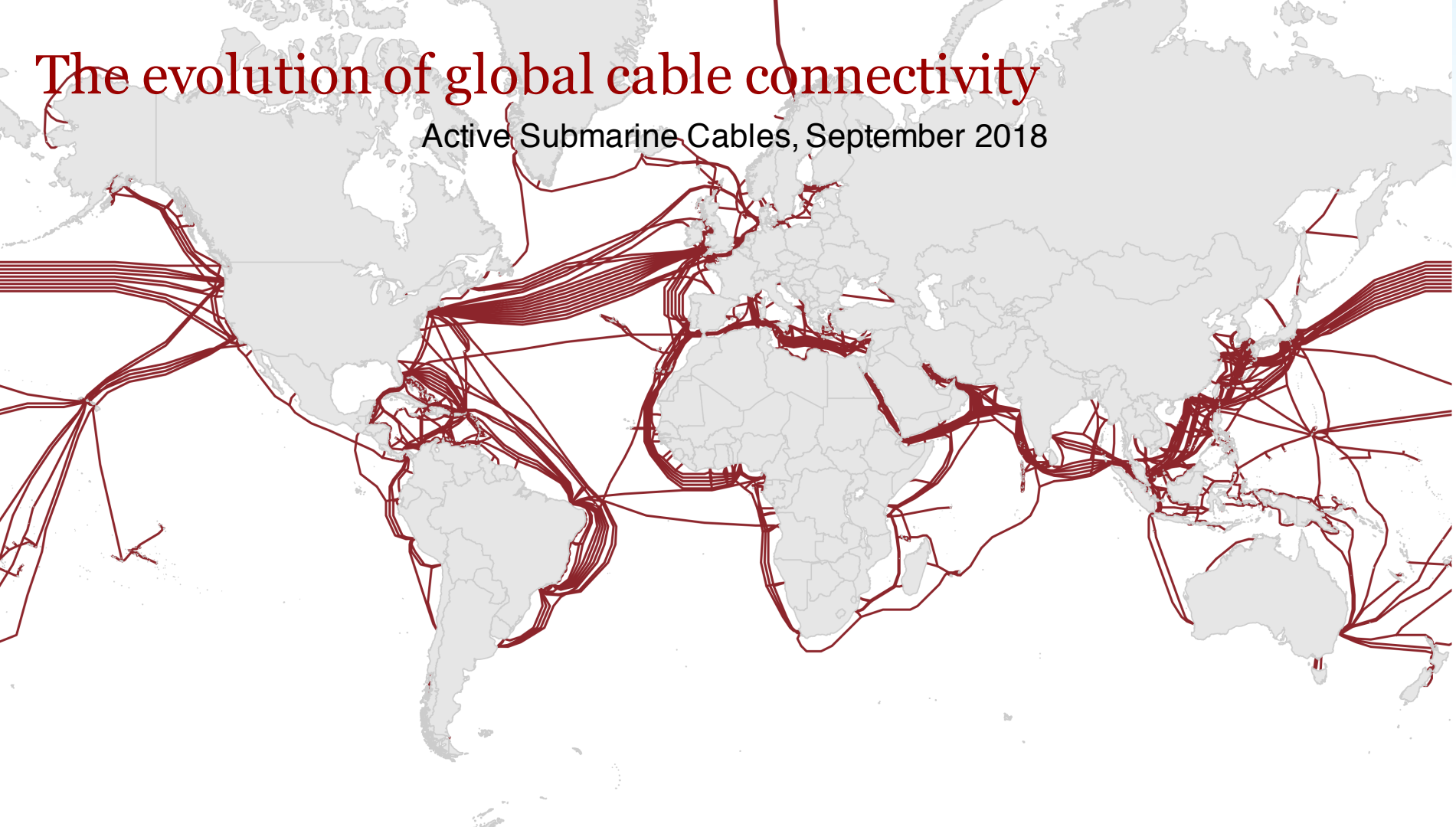


Traits of the new species of cables

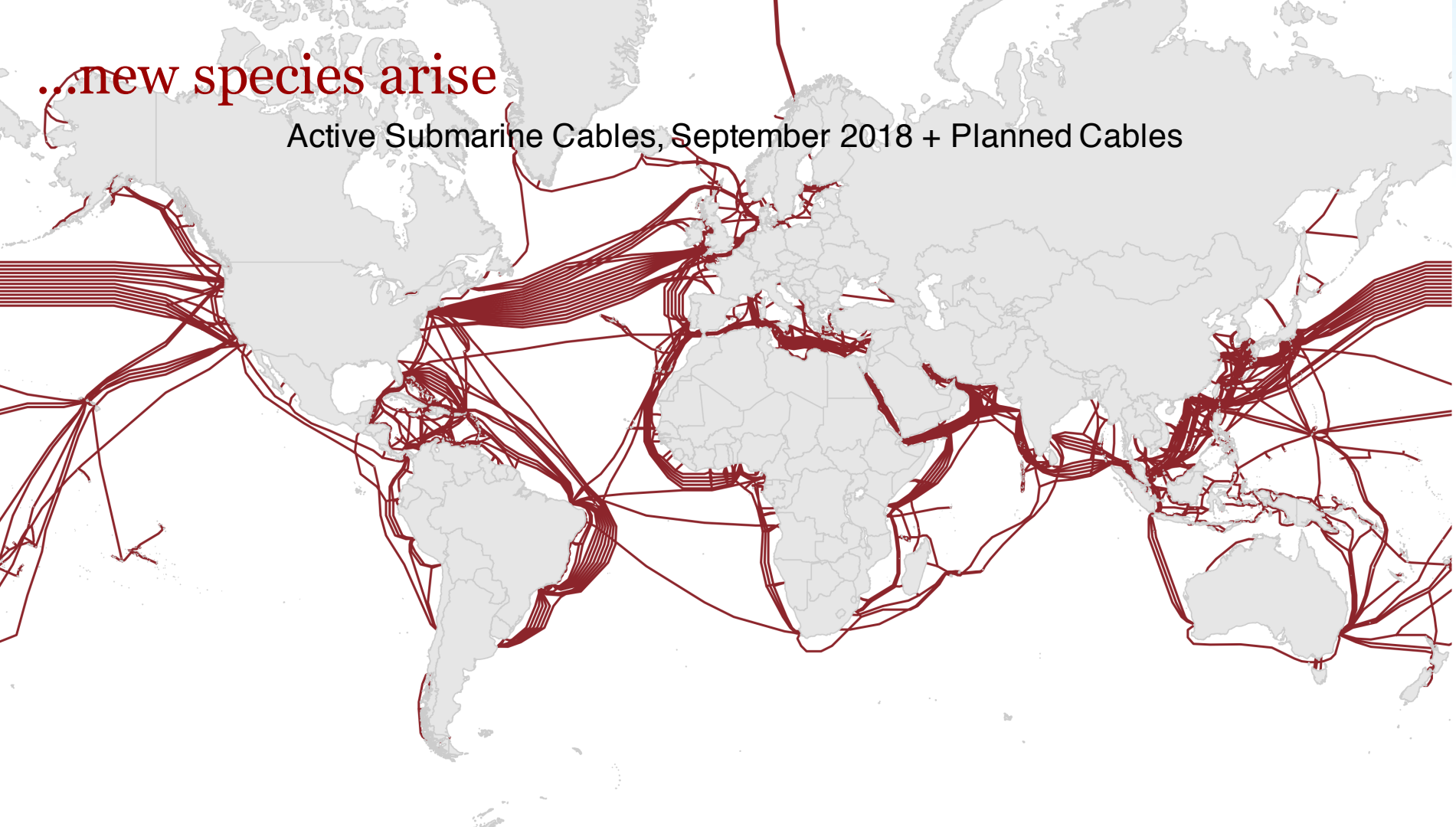
- Not a one-for-one replacement
  - Higher fiber pair count in new cables
  - New routings and landings
  - Different topologies (R.I.P. - self-healing rings)
- Not always the same companies involved, several new builders
  - Content providers: Google, Facebook, Amazon, Microsoft
  - Seaborn Networks
  - Aqua Comms
  - RTI
  - Hawaiki
  - Super Sea Cable Networks

The evolution of global cable connectivity

Active Submarine Cables, September 2018

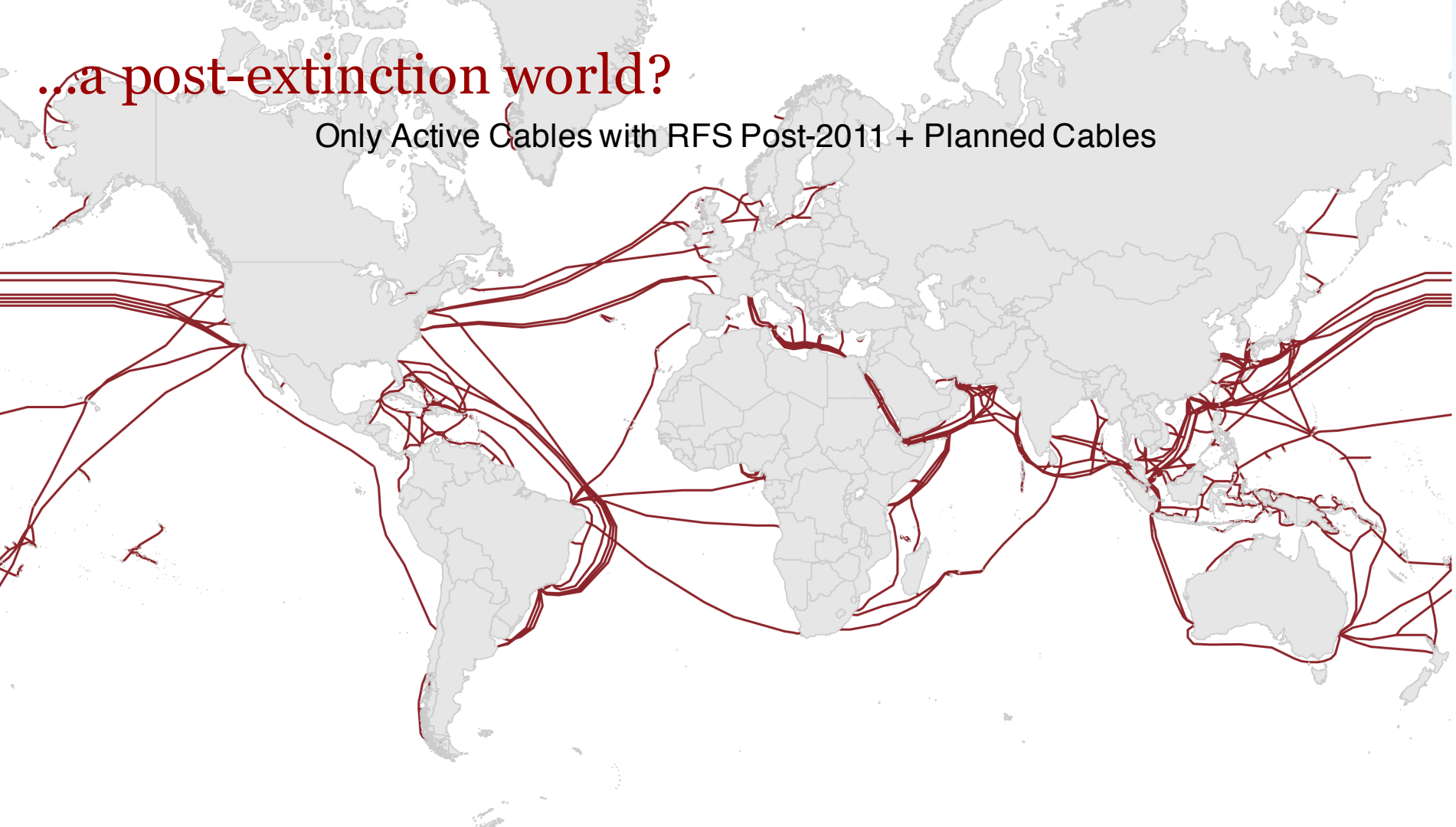


...new species arise



...a post-extinction world?

Only Active Cables with RFS Post-2011 + Planned Cables



Final thoughts on the next mass extinction

- Ecosystem Collapse - The retirement of cables using consortium maintenance agreements may increase the cost for other cables covered under the agreement due to the reduction in total kilometers covered
- Mass Migration - Customers migrating capacity off of retired cables will serve as new revenue sources for other cables
- Rise of New Species - Even if cable retirements are slow to materialize, this does not change the fact that many new cables will be needed to meet the forecasted demand requirements
- “Extinction is the rule. Survival is the exception” – Carl Sagan

Thank You

Alan Mauldin
amauldin@telegeography.com