The use of qualitative and quantitative tools to optimize shorebird habitat at Cabo Rojo Wildlife Refuge, Puerto Rico

Louise Alexander-Vaughn
Biodiversity & Spatial Information Center
NC Cooperative Fish and Wildlife Research Unit
Department of Biology, North Carolina State University

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USGS science for a changing world

Caribbean Islands, Greater and Lesser Antilles

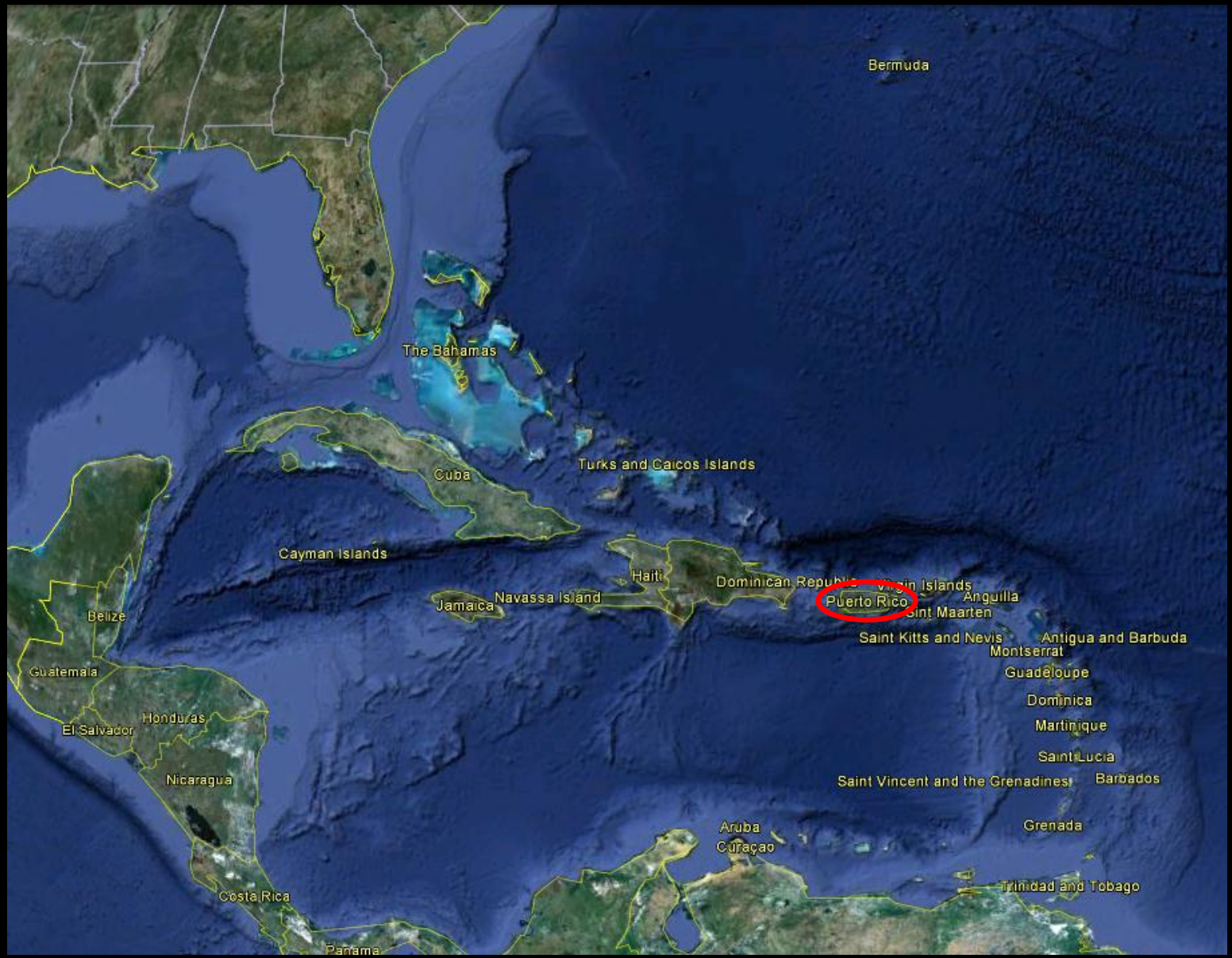
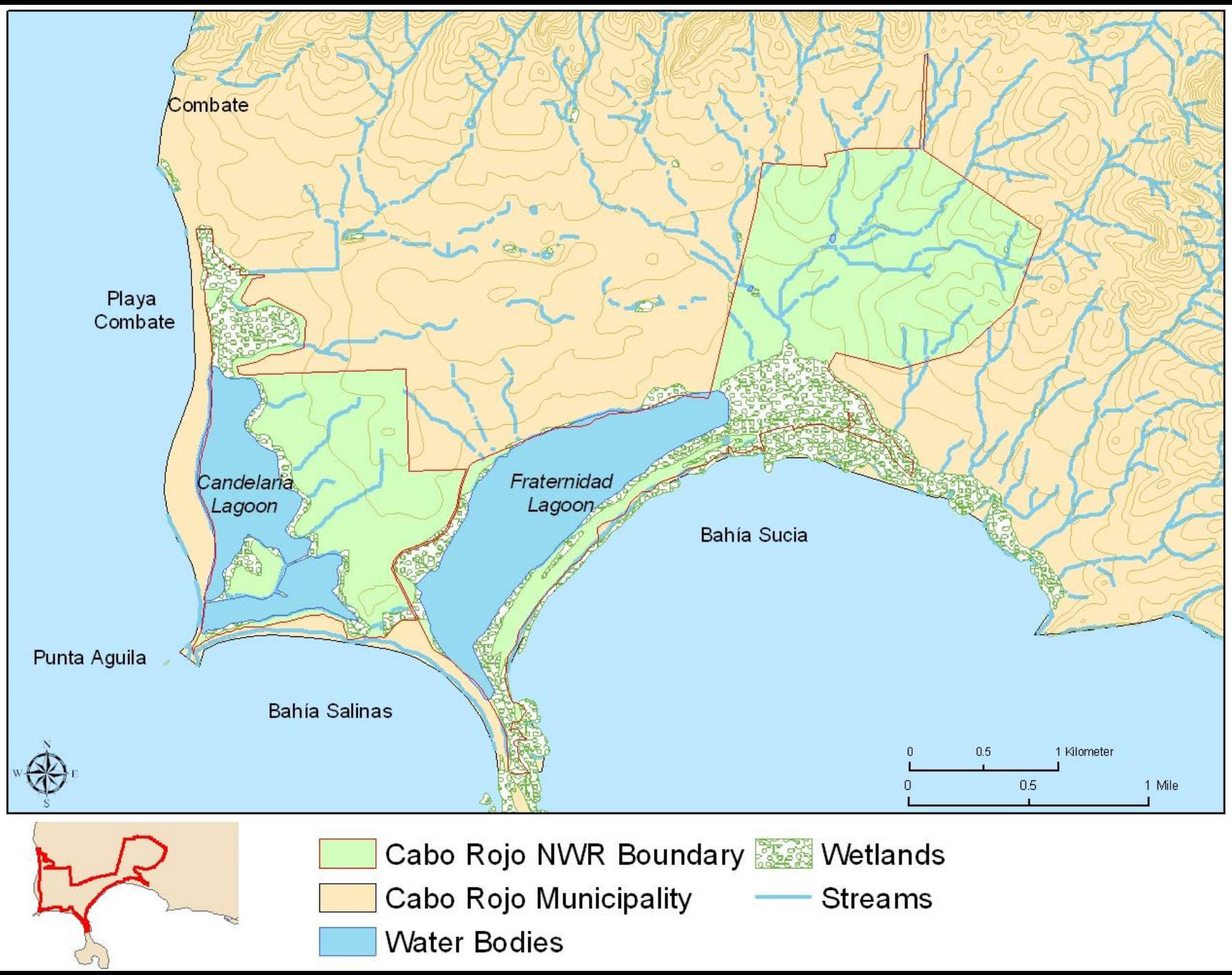


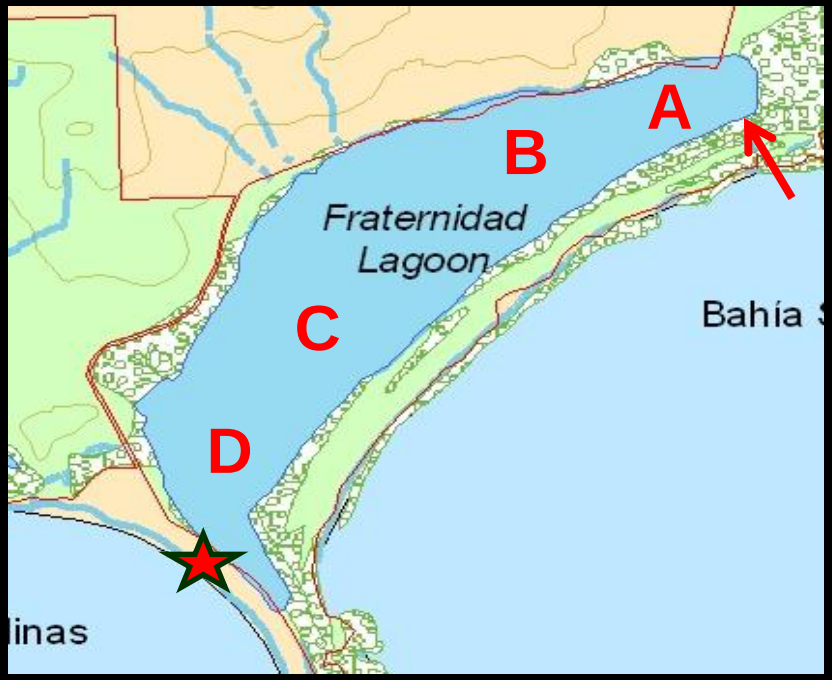
Image from Google Earth

Puerto Rico

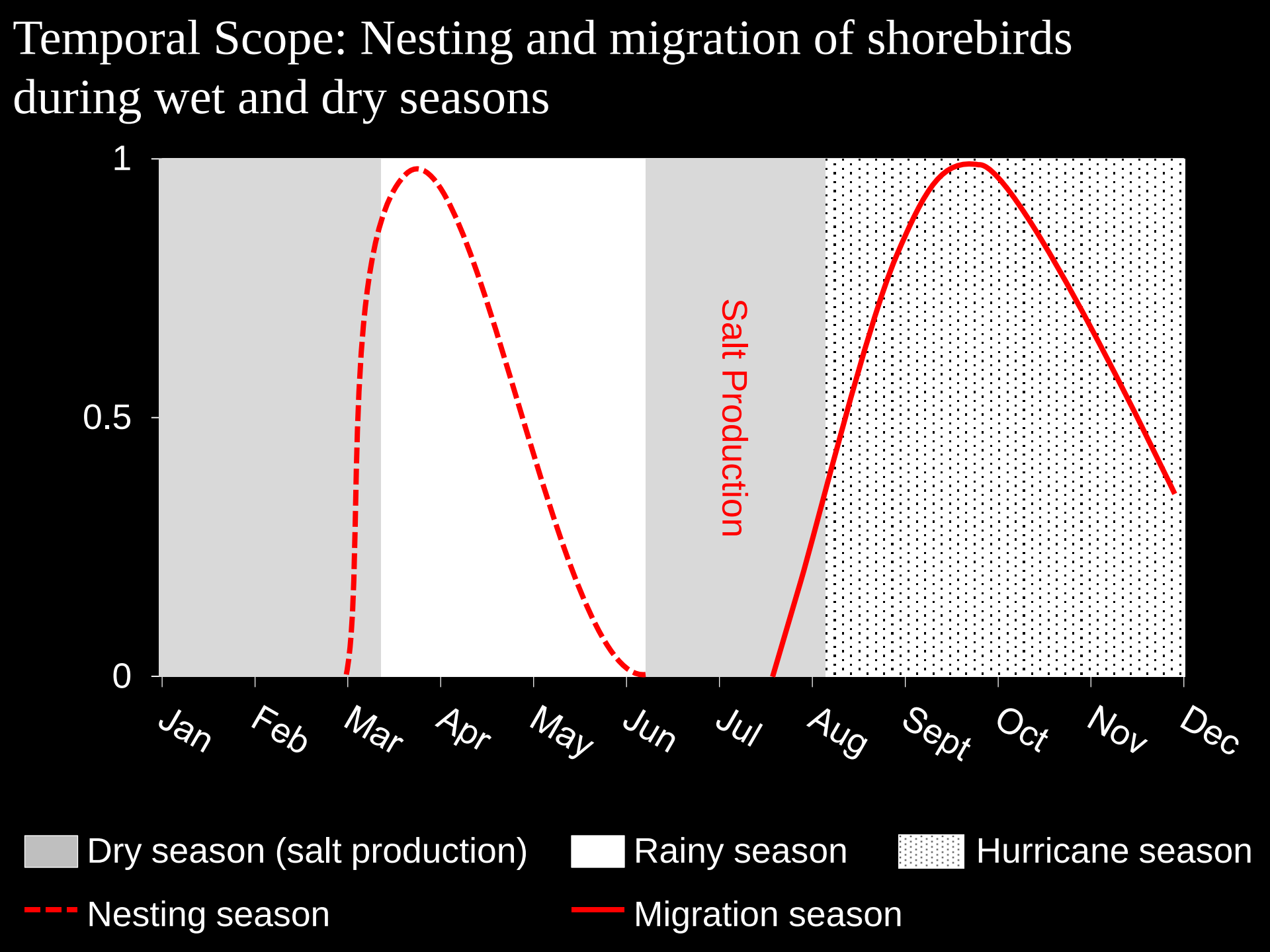
Cabo Rojo Wildlife Refuge


Combate
Playa
Combate
Candelaria
Lagoon
Fraternidad
Lagoon
Bahía Sucia
Punta Aguila
Bahía Salinas
N
W
E
S
0
0.5
1 Kilometer
0
0.5
1 Mile
Cabo Rojo NWR Boundary
Cabo Rojo Municipality
Water Bodies
Wetlands
Streams

Salt Flat Production

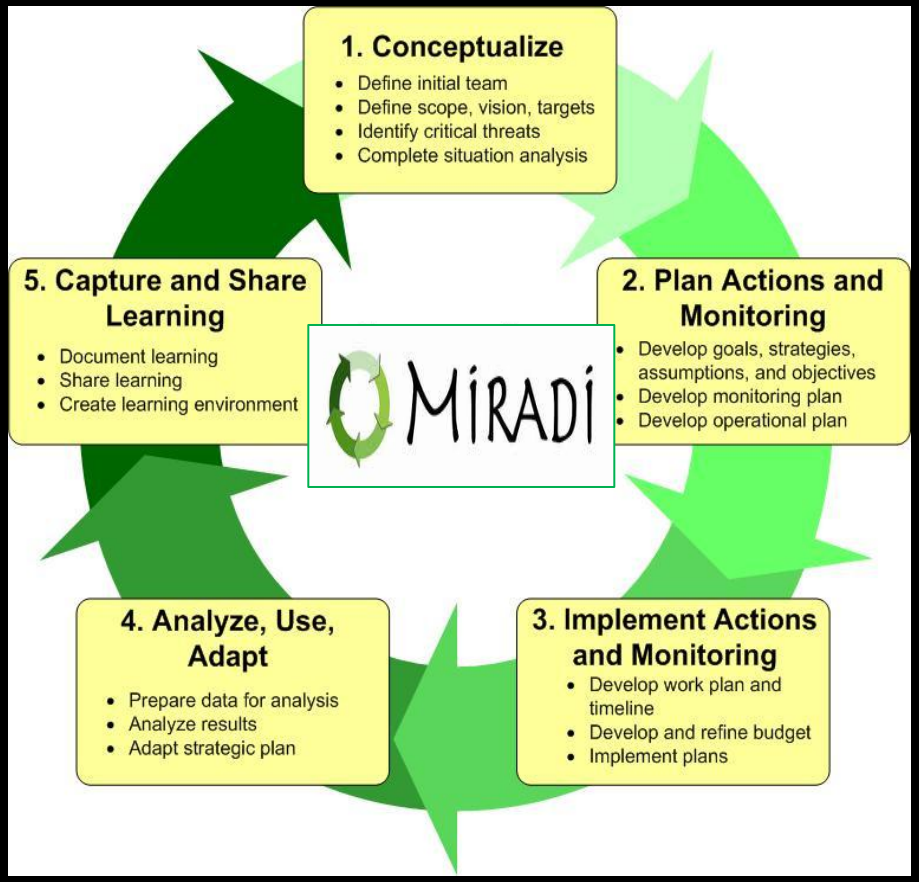


Temporal Scope: Nesting and migration of shorebirds during wet and dry seasons



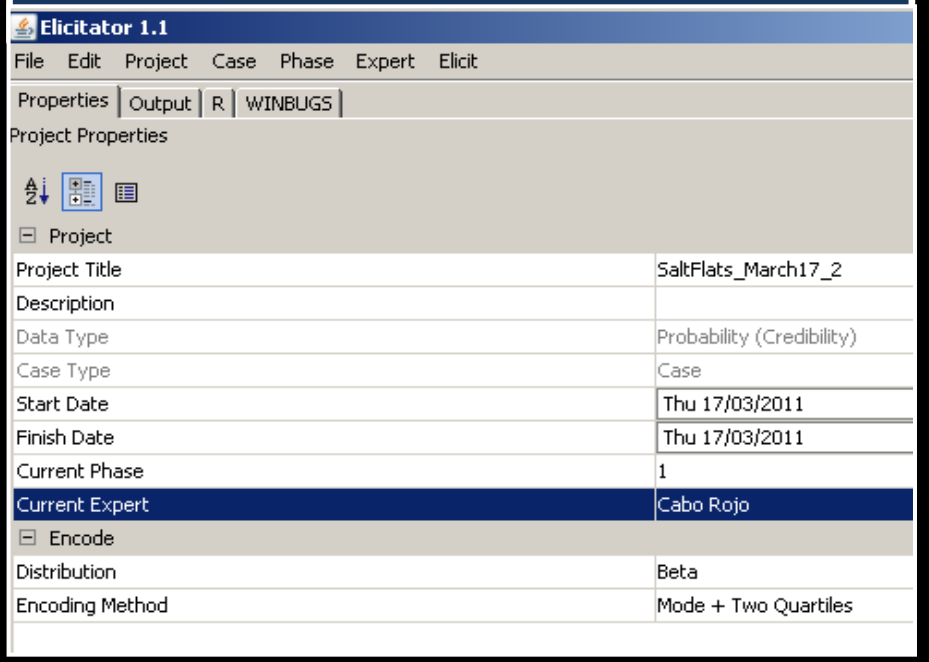
GOAL: Provide high quality nesting and foraging habitat through the active management of hydrology while allowing salt production

Qualitative & Quantitative Approach



Open Standards for the Practice of Conservation

Queensland University of Technology

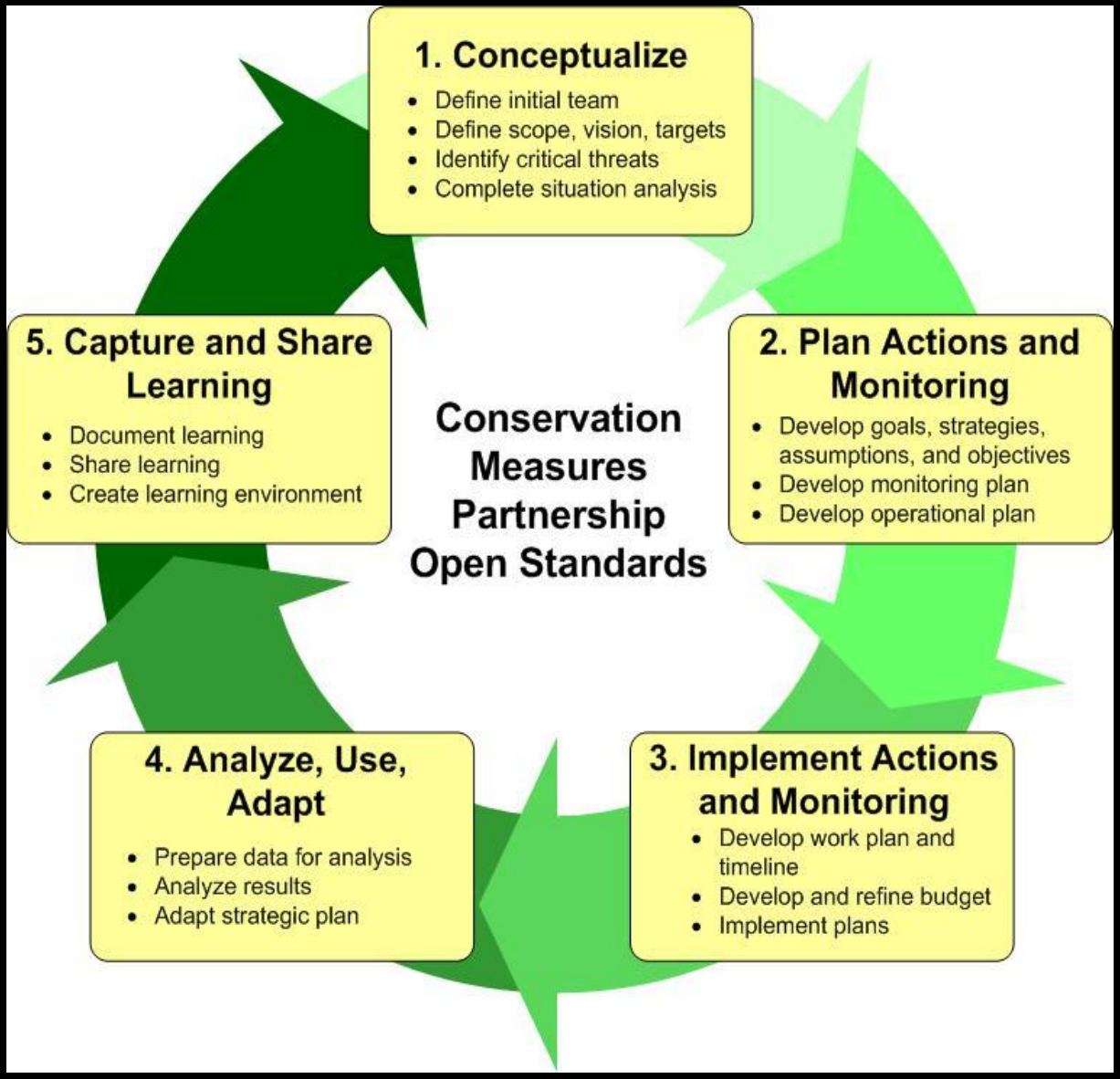


Elicitator Software

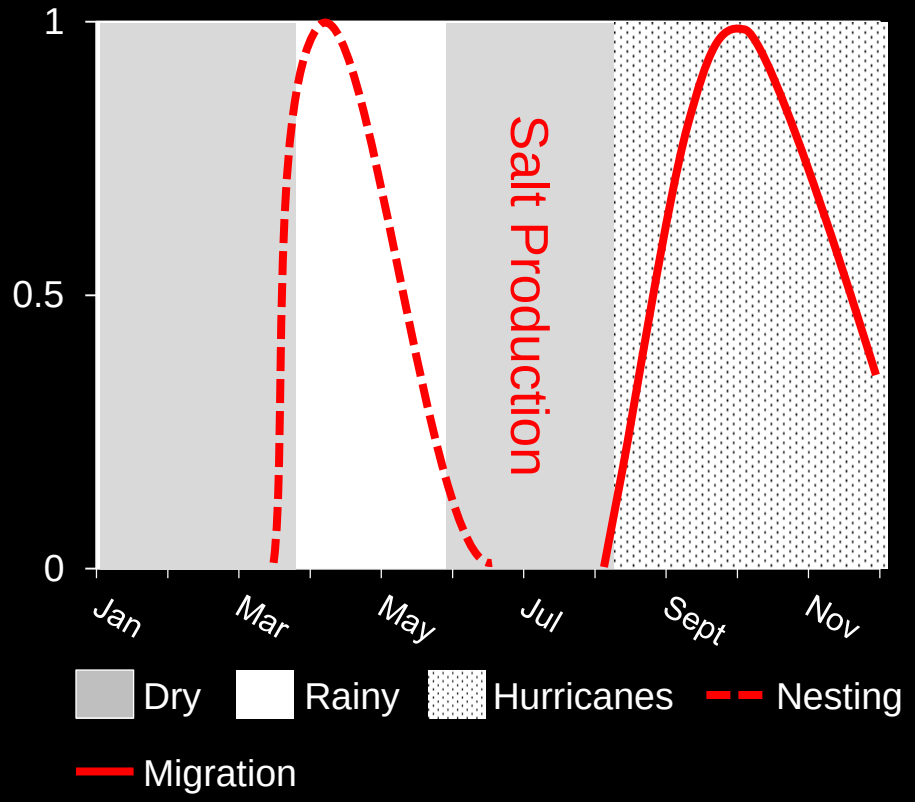
Open Standards for the Practice of Conservation

Step 1:
- Define scope, vision, targets
- Identify critical threats
- Complete situation analysis

Step 2:
- Develop goals, strategies, assumptions, and objectives



Scope: Shorebird nesting and foraging habitats during migrating season (late July to early January with peak times in late August to late October)



Vision: A managed system to support quality feeding and nesting habitat for aquatic birds and salt production

Conservation Targets

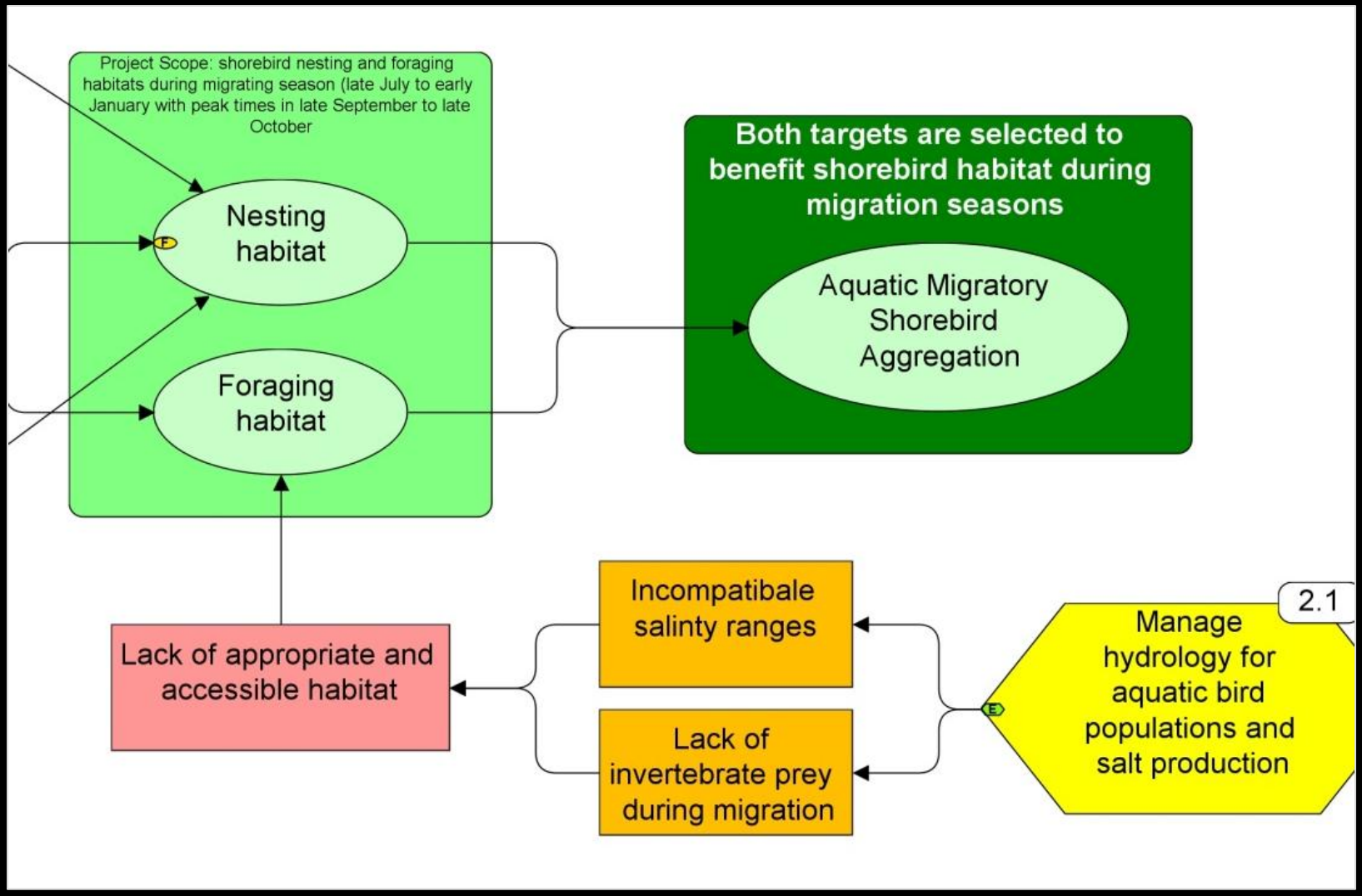
Nesting habitat

Clear, open spaces with slight elevations in micro-topology or "mounds" protected from minor flooding

Foraging habitat

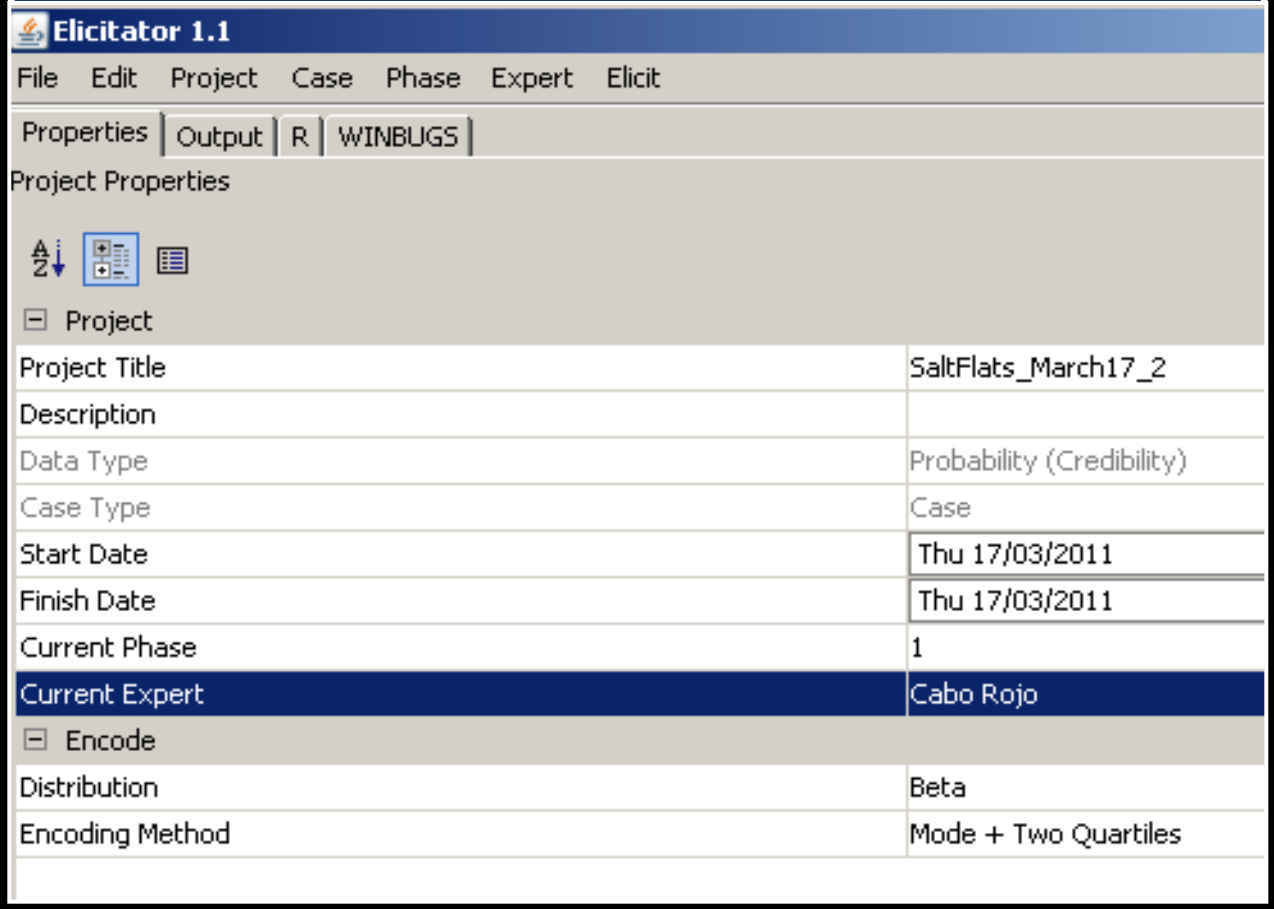
Accessible (<10cm); salinity (<35ppt to 100ppt); abundant source of invertebrate prey (moist soils and substrates).

MIRADI

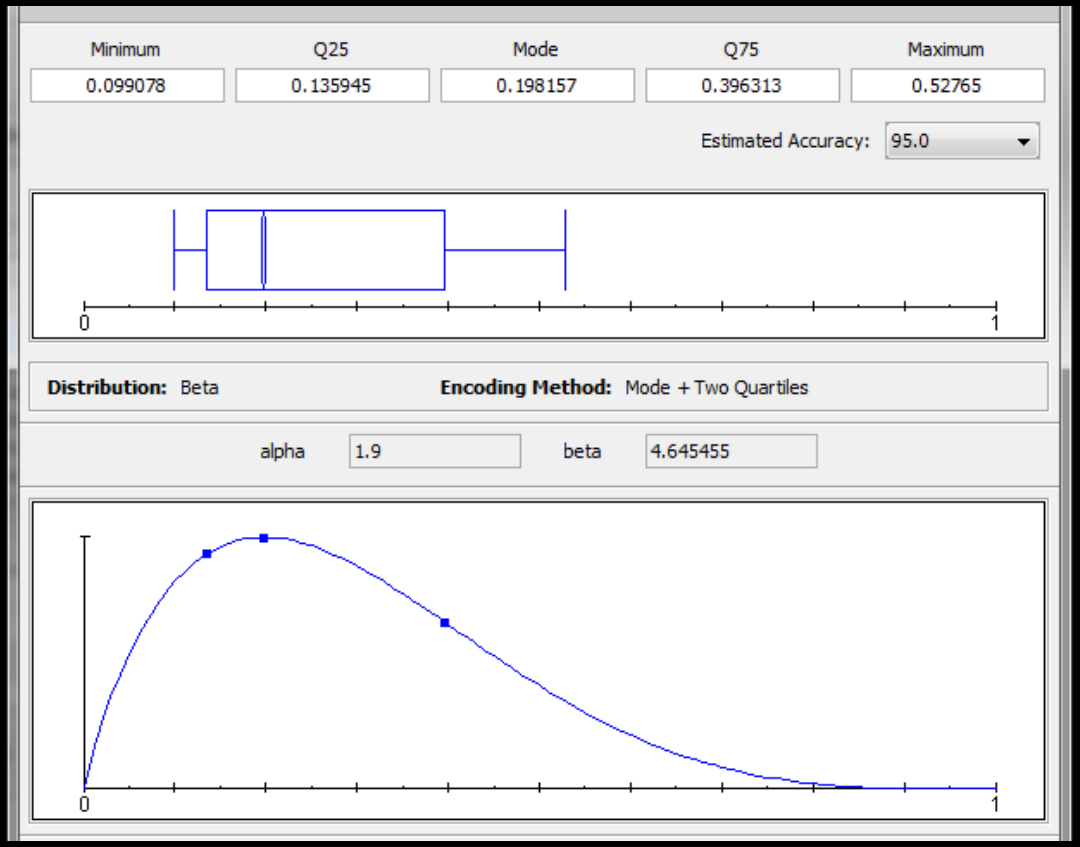

Project Scope: shorebird nesting and foraging habitats during migrating season (late July to early January with peak times in late September to late October
Nesting habitat
F
Foraging habitat
Both targets are selected to benefit shorebird habitat during migration seasons
Aquatic Migratory Shorebird Aggregation
Lack of appropriate and accessible habitat
Incompatibale salinty ranges
Lack of invertebrate prey during migration
E
Manage hydrology for aquatic bird populations and salt production
2.1

Elicitator

Queensland University of Technology

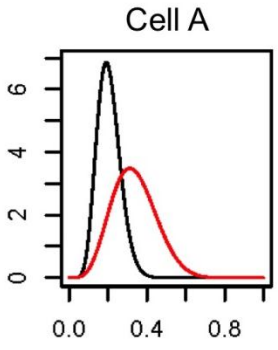


Scenarios

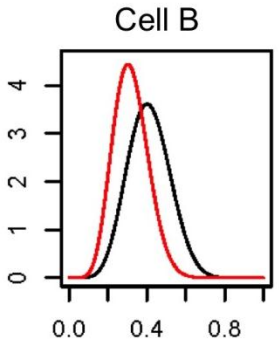


Please think back to the past five years of your experience observing birds at Fraternidad lagoon. At the end of migration season (late November to early December, at the end of the hurricane season), what is the minimum number of birds, of all the birds present at Fraternidad lagoon, would you expect to see in cell/area C? How sure are you? 100% sure of your answer?? Can you bring in these limits – to be more informative – so that you're 95% sure?

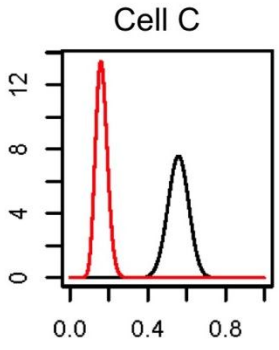
OUTPUT



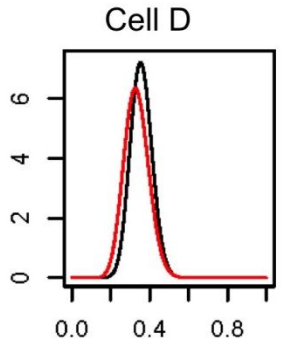
Early Mig



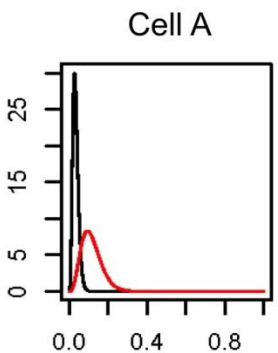
Mid Mig



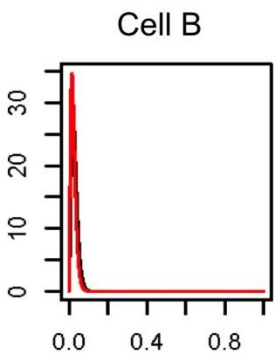
End of Mig



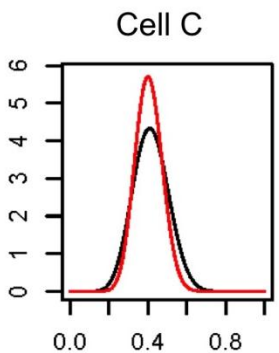
Early Nesting



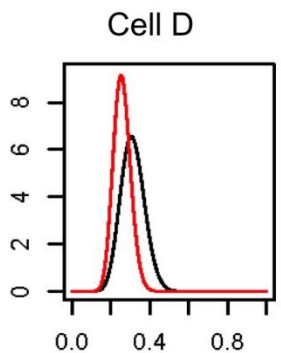
Peak Nesting



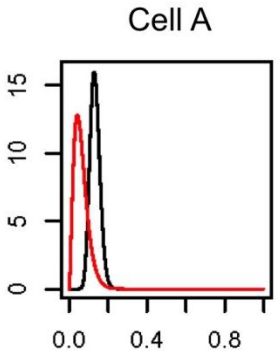
End of Nesting



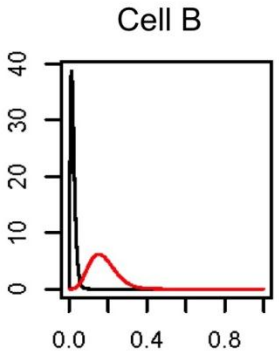
Mid Migration



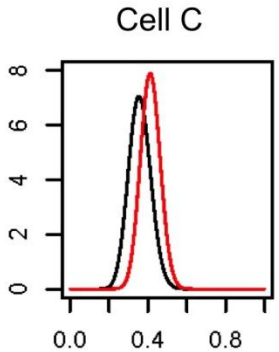
End of Migration



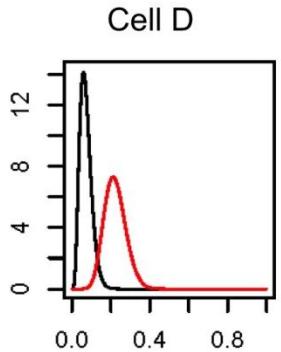
Early Nesting



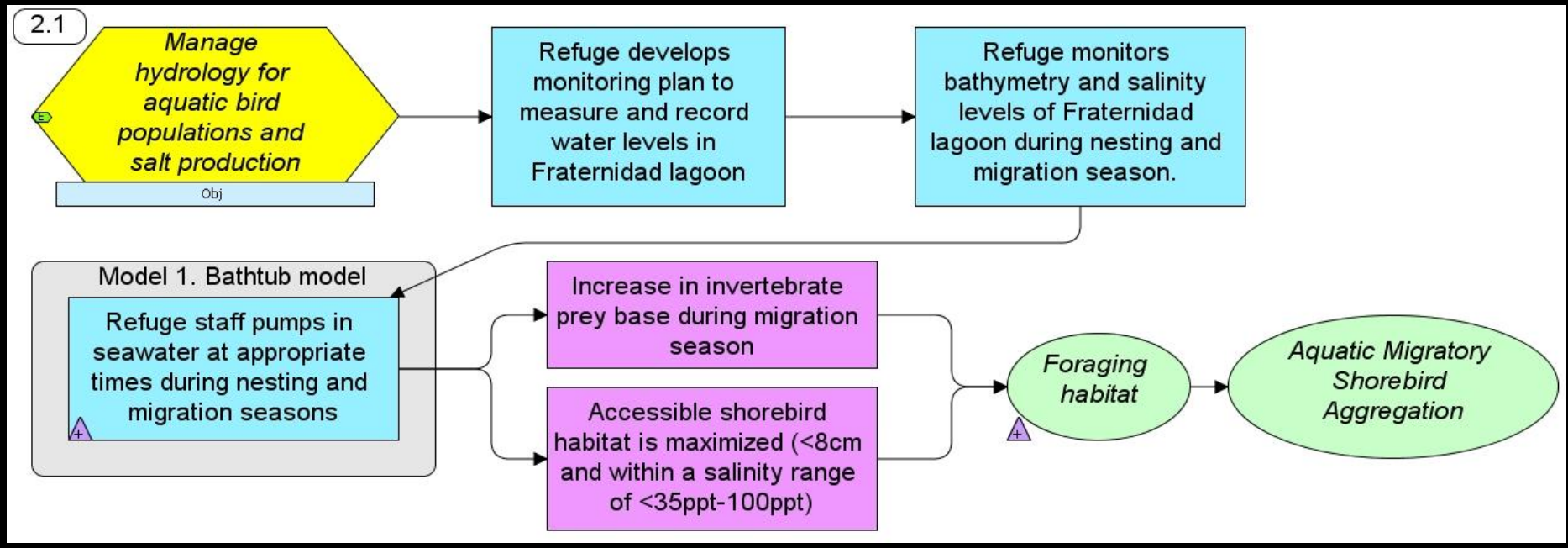
Mid Nesting



End of Nesting



Early Migration



	Indicators	Monitoring strategy
Objective 1. Maximize foraging opportunities by managing hydrology for aquatic bird populations		
By July 2013 foraging habitat will increase by XX% increase (use average of the past five years as a baseline).	• Greater % of birds during the season use more habitat for foraging (BEHAVIOR)	Observations of foraging behavior
	• Improved nest success	Field observations of nest predation or disturbance
Objective 2. Manage hydrology to provide water quality (ppt) and quantity to allow for salt production		
By July 2013 there will be XX amount of water at a salinity range over 120ppt available to be pumped for crystallizers for salt production during the months of Jan - March	• Salinity levels of water around crystallizers • Observation of water quantity	Reports from salt operators

Overall Approach

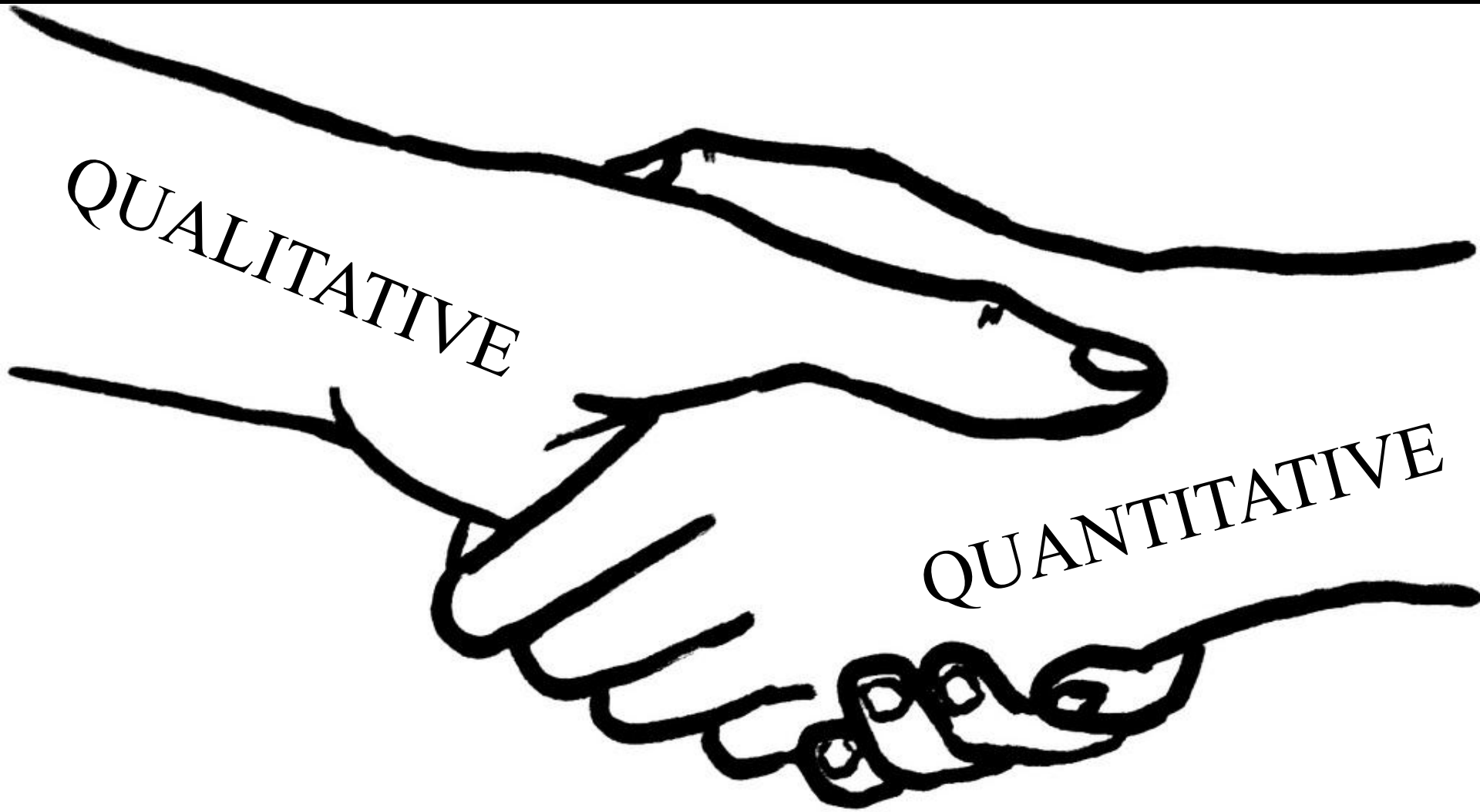


Image created by Aiden Jones