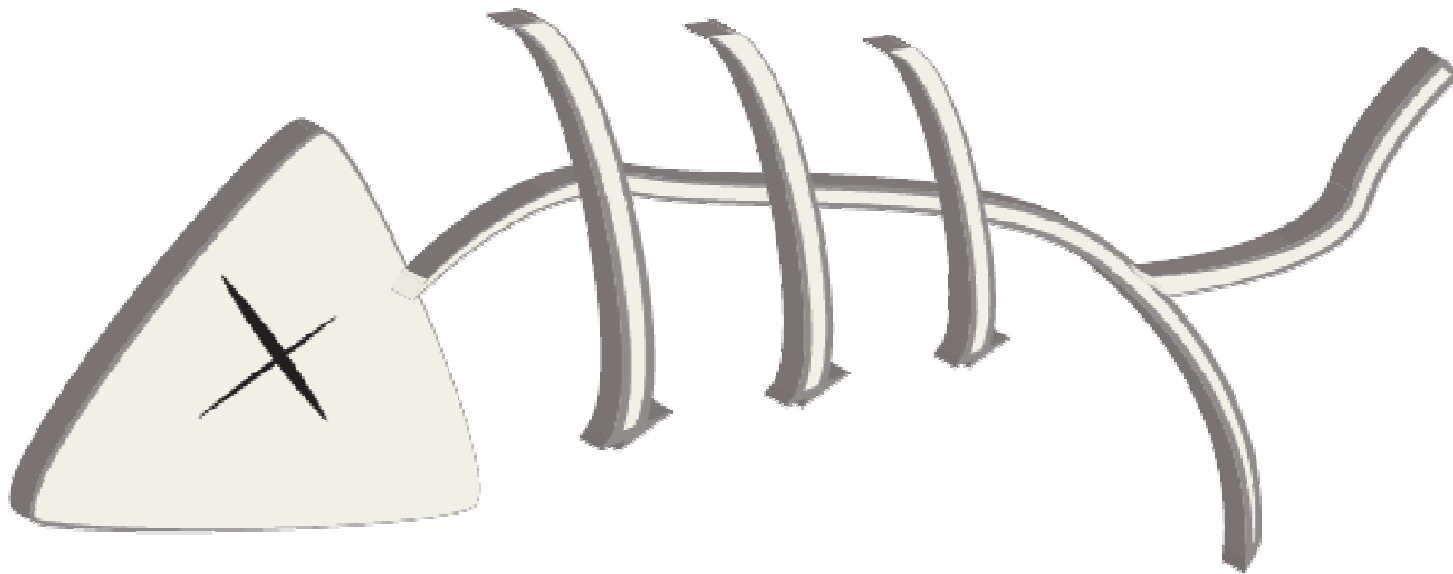
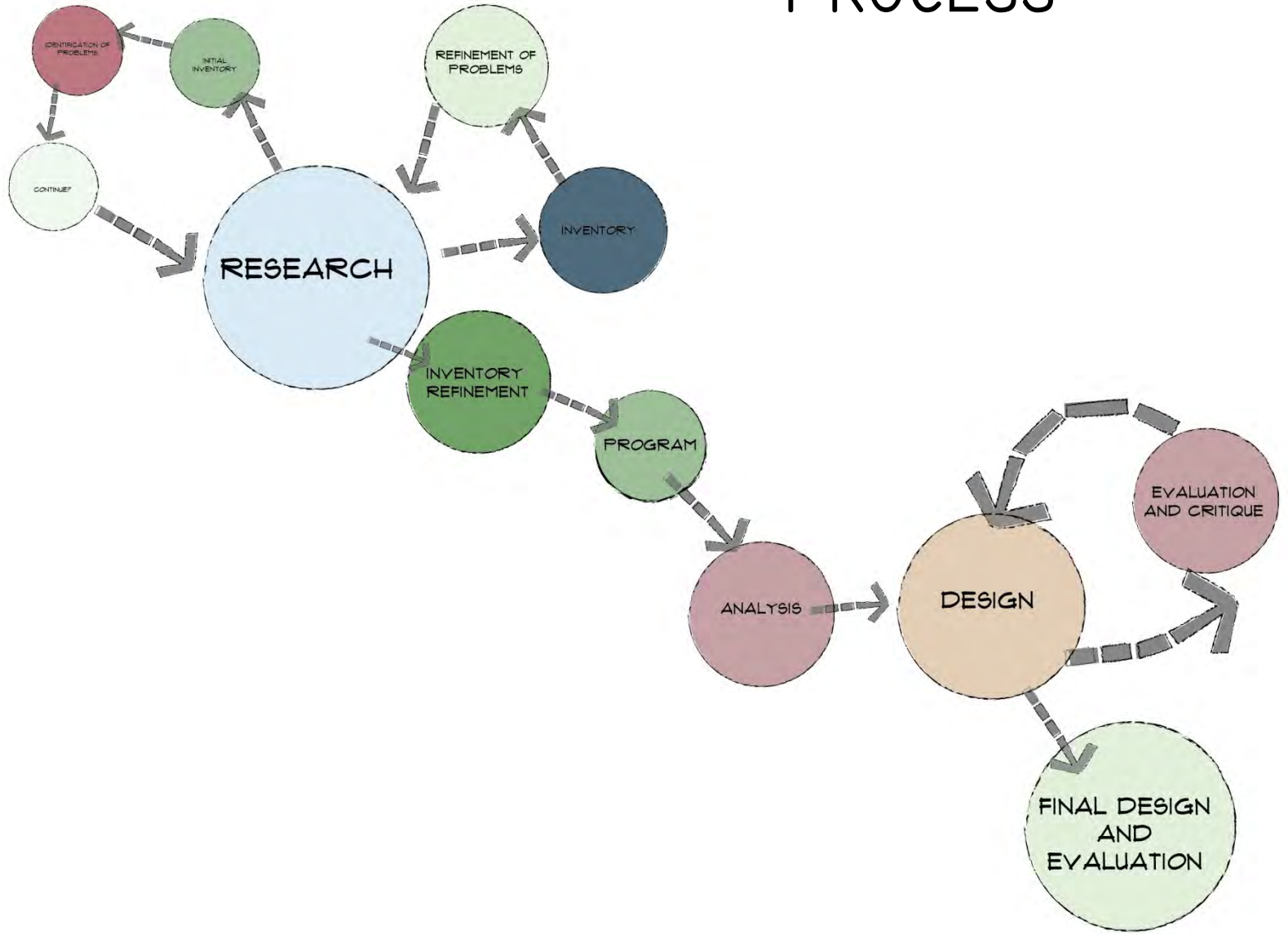
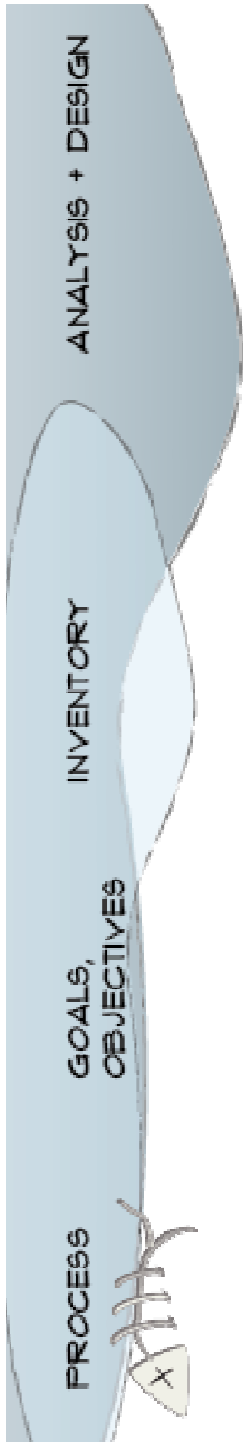


SALTON SEA REHABILITATION: REBUILDING A CRITICAL AVIAN ECOSYSTEM



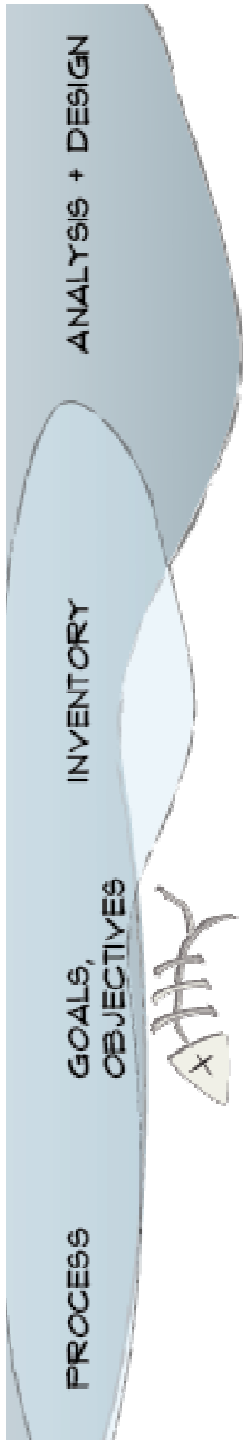
ALEX FAGNAN
LA 602
WINTER 12
JESSICA HALL

PROCESS



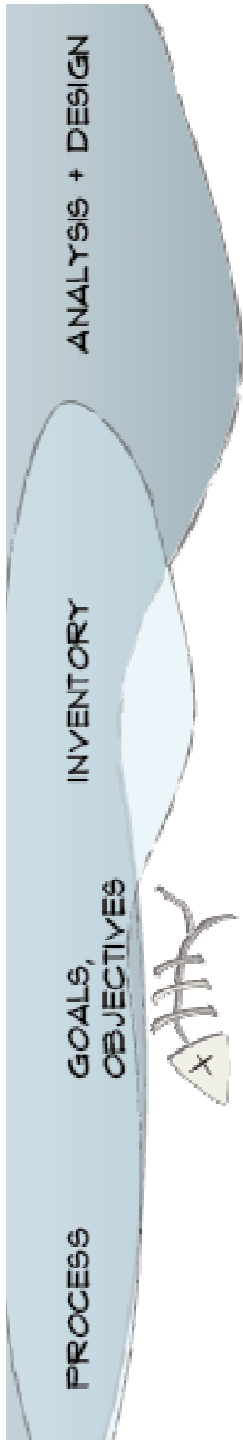
GOALS

- IMPROVE THE SALTON SEAS CAPACITY TO SUPPORT HEALTHY ECOSYSTEMS.
- MAINTAIN THE SALTON SEA AS PART OF THE PACIFIC FLYWAY.
- REHABILITATION OF ECOSYSTEM HEALTH.



OBJECTIVES

- SALINITY REDUCTION AND MAINTENANCE AT 40 G/L OR LOWER.
- IMPROVE WATER RETENTION THROUGH SURFACE AREA REDUCTION.
- REDUCE THE EFFECTS OF POOR WATER MIXING AND HIGH TEMPERATURES THROUGH INCREASED SEA DEPTH.
- NUTRIENT LOAD REDUCTION
- IMPROVE QUALITY OF FISH SUPPLY
- IMPROVE BIRD HABITAT



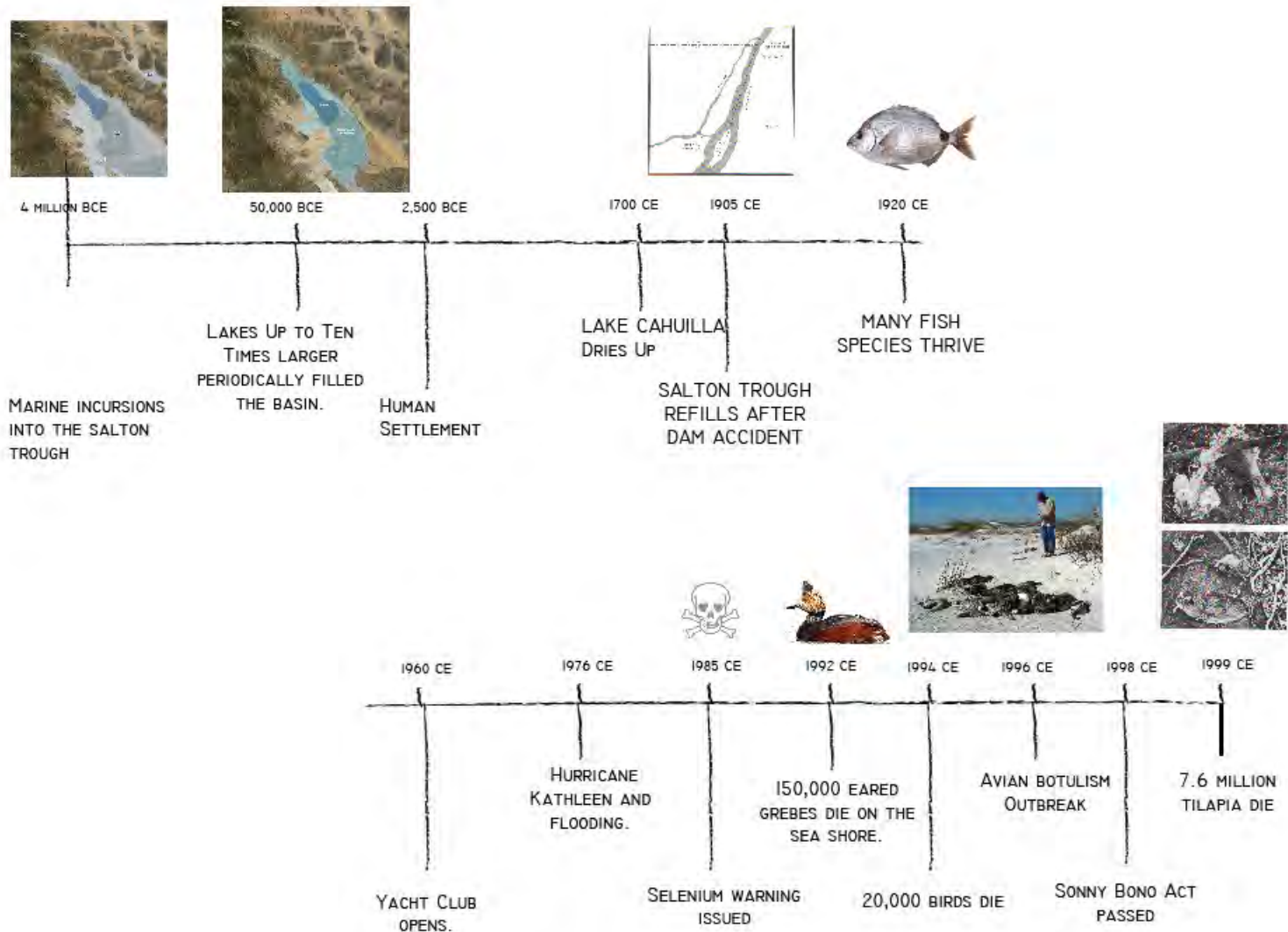
ANALYSIS + DESIGN

INVENTORY

GOALS, OBJECTIVES

PROCESS

SALTON TIMELINE

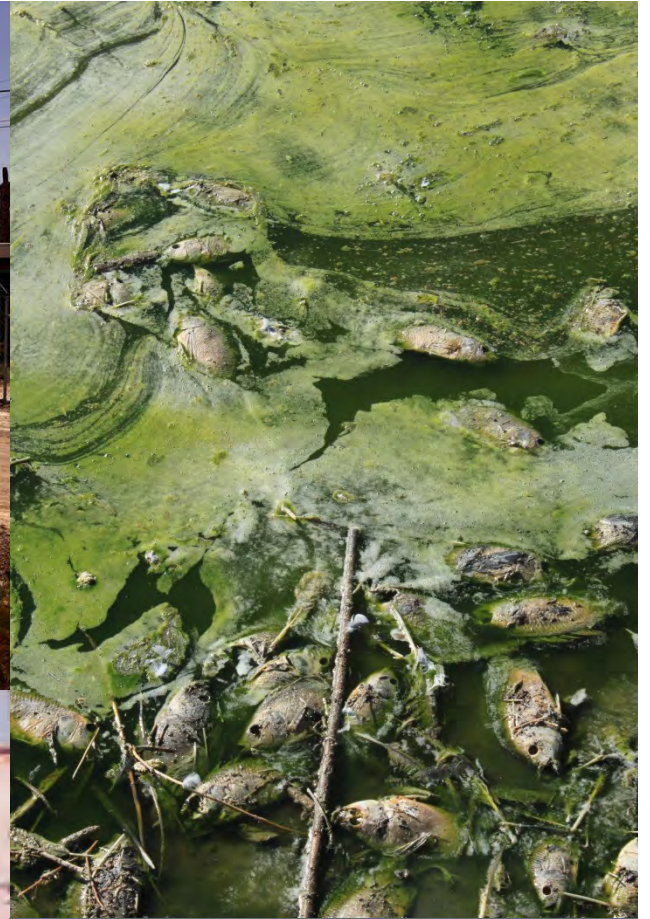


PROCESS

GOALS,
OBJECTIVES

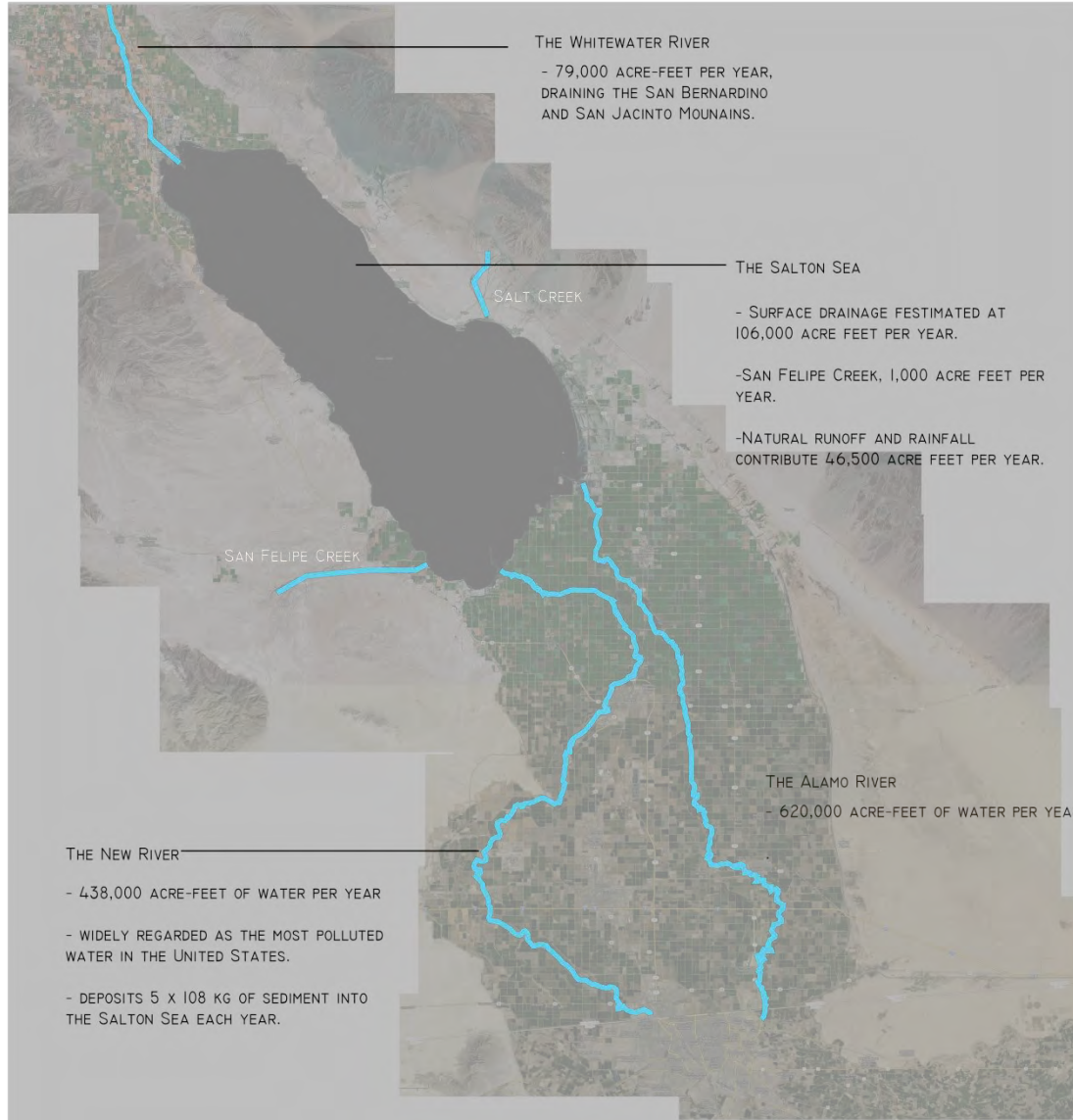
INVENTORY

ANALYSIS + DESIGN



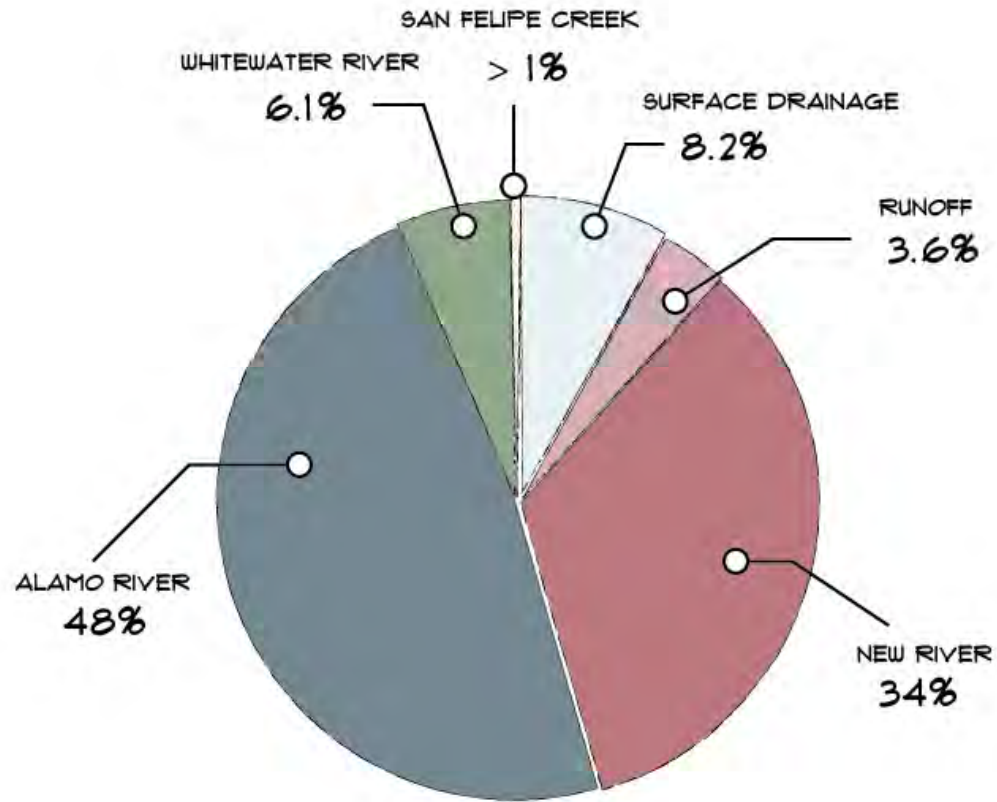


SALTON INFLOWS





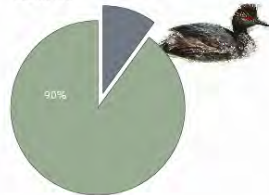
SALTON INFLOWS (CONTD)



THE PACIFIC FLYWAY

AROUND 400 SPECIES OF BIRDS
HAVE BEEN DOCUMENTED AT
THE SALTON SEA INCLUDING
ENDANGERED AND THREATENED
SPECIES.

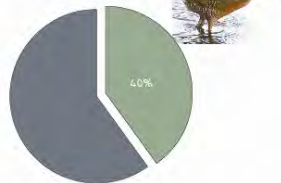
CONTINENTAL POPULATION
OF EARED GREBS ON THE
SALTON SEA



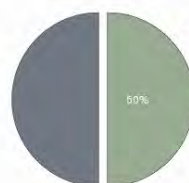
NORTH AMERICAN POPULATION OF BREED-
ING WHITE PELICANS



YUMA CLAPPER RAIL



WORLD POPULATION OF
MOUNTAIN PLOVERS

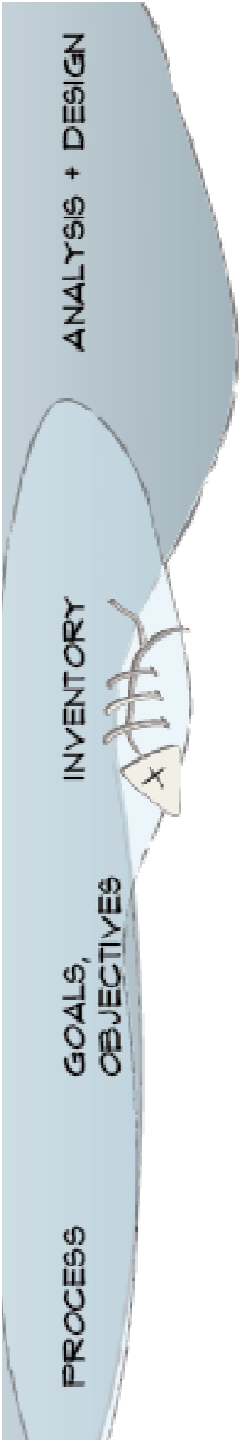


<http://www.dfg.ca.gov/wildlife/avianfu/migration.html>

SITES OF BIRD DIE-OFFS AND PUFFISH HABITATS

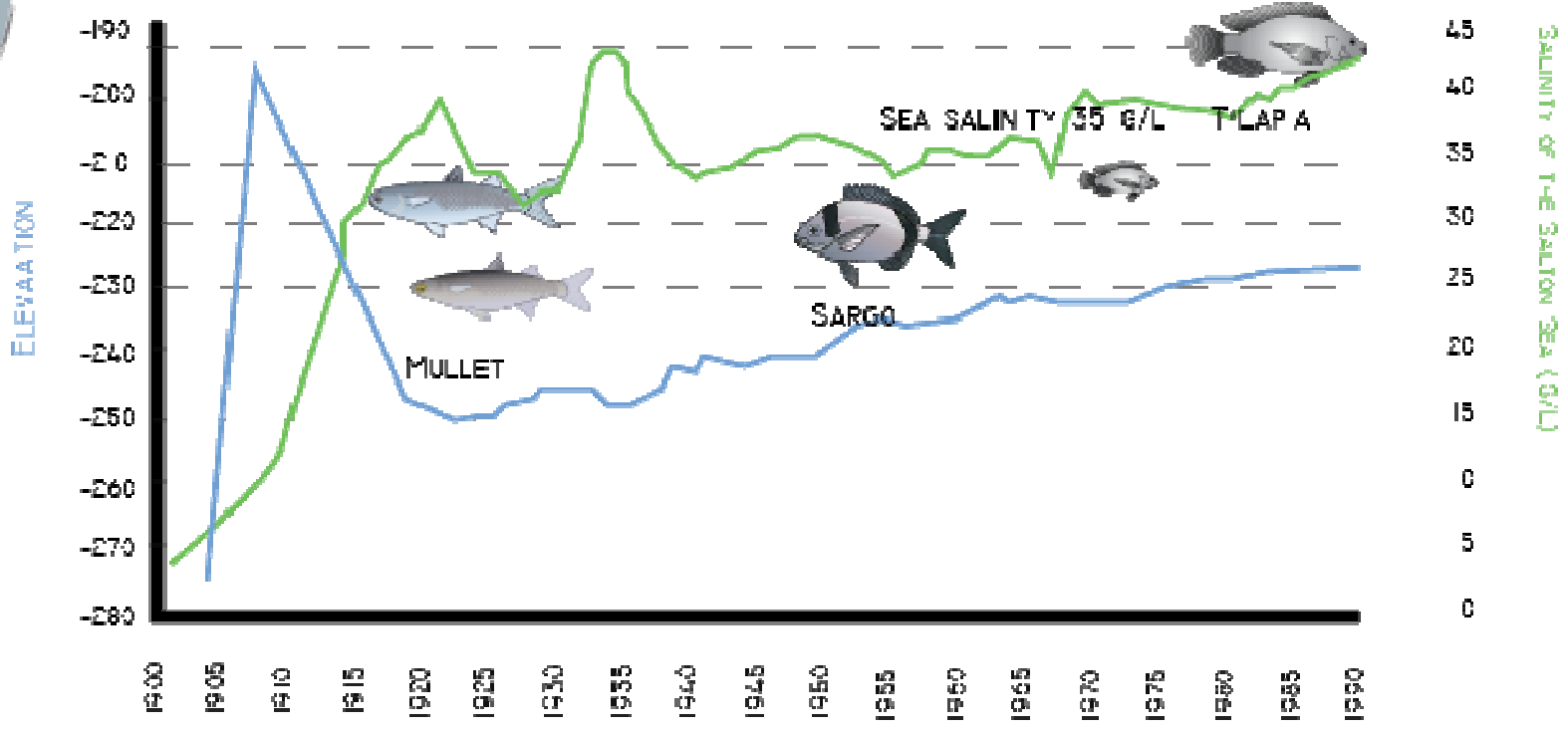


LAND OWNERSHIP





SALINITY AND SEA LEVEL



ADAPTED FROM: COHEN, N. J. (1990) WILL WE SECURE THE FUTURE OF THE SALTON SEA WITH MONITORING? CALIFORNIA PACIFIC INSTITUTE

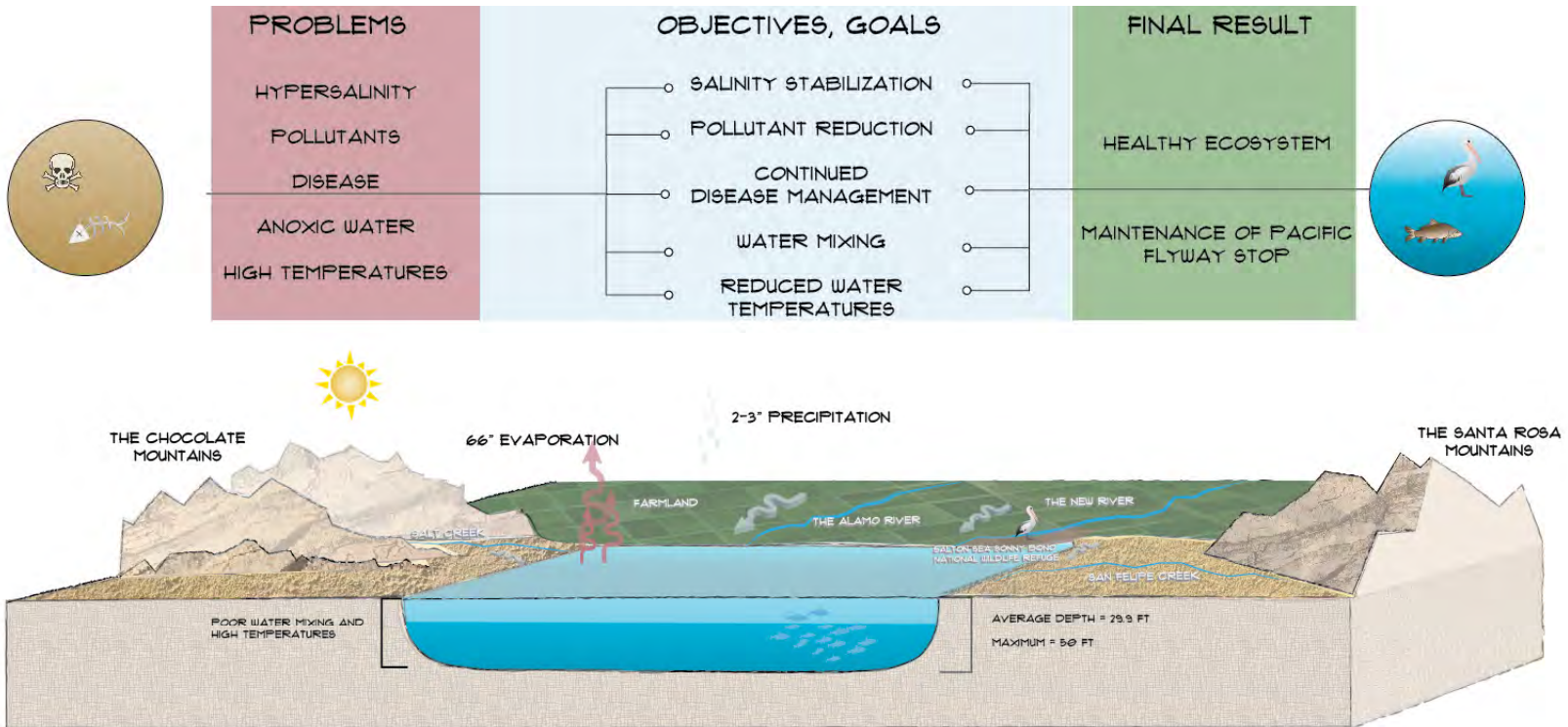
ANALYSIS + DESIGN

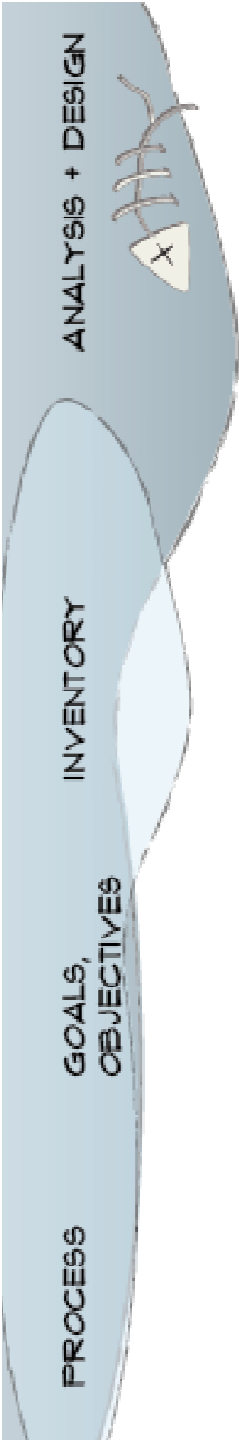
INVENTORY

GOALS, OBJECTIVES

PROCESS

EXISTING CONDITIONS





SALTON SEA

TOTAL ACREAGE: 236,800 ACRES
 DESIGN ACREAGE: 148,048 ACRES
 PERIMETER: 69 MILES

REQUIRED FILL: 4,281, 278, 144 CUBIC YARDS

AVAILABLE FILL: 716, 552,320 CUBIC YARDS PER YEAR

AFTER 10 YEARS: 7,165,523,200

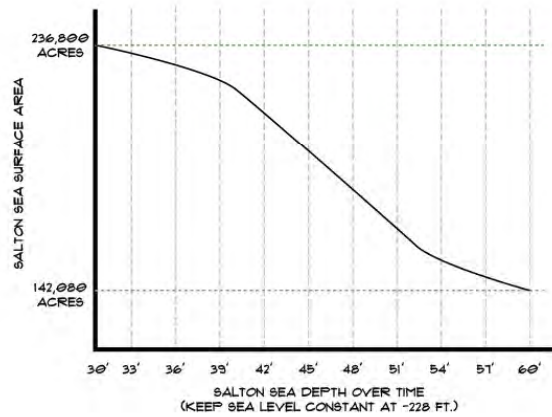
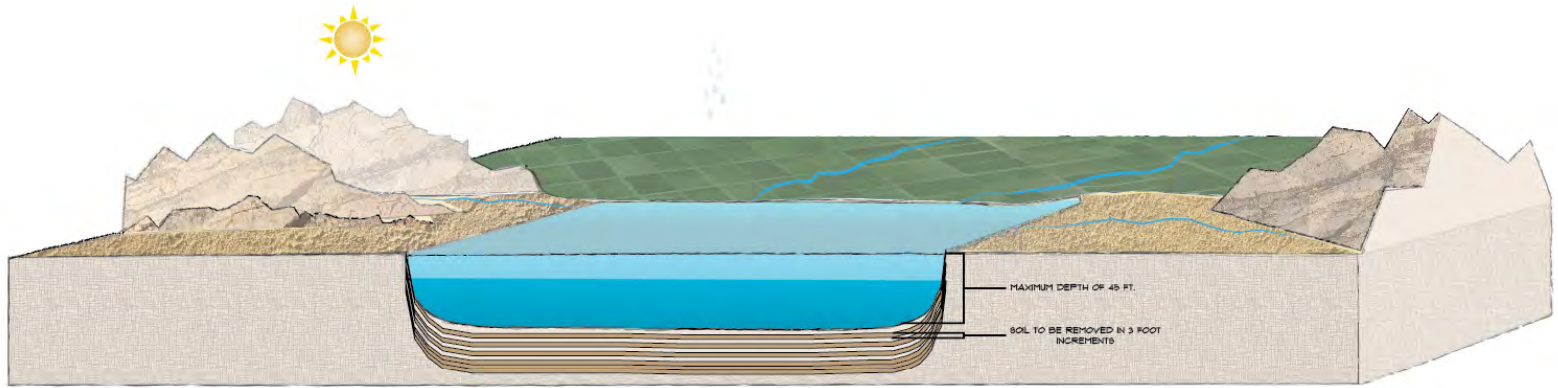
ANALYSIS + DESIGN

INVENTORY

GOALS, OBJECTIVES

PROCESS

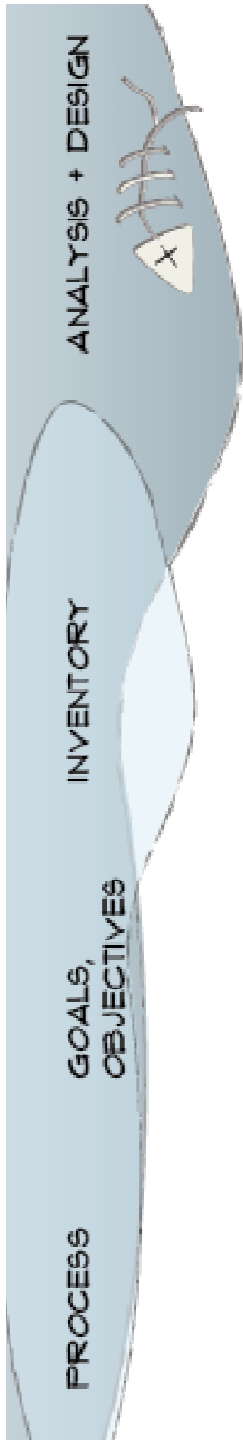
SALTON SEA DEPTH INCREASE



INITIAL SURFACE AREA

SALTON SEA FINAL SURFACE AREA





SALT REMOVAL

ROUGHLY 10,000 ACRES OF TRADITIONAL SALT PONDS WOULD BE NEEDED TO KEEP CURRENT SALINITY CONSTANT.

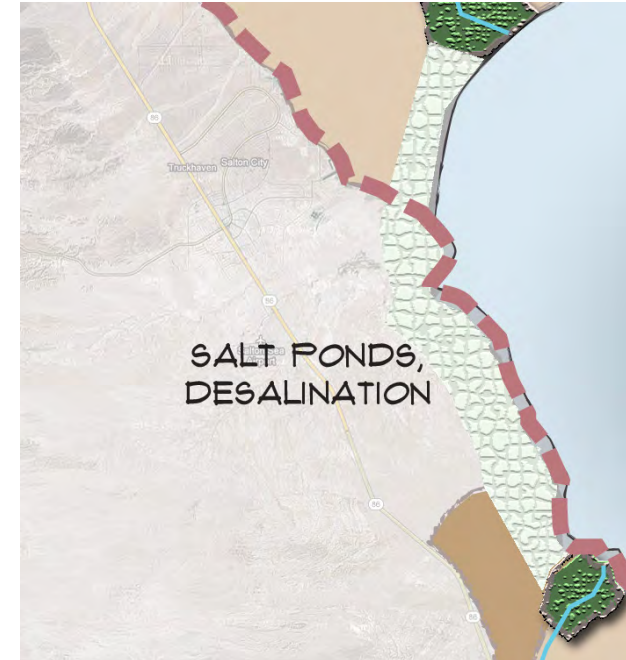
TO ACHIEVE A 20% REDUCTION IN SALINITY, MUCH MORE AREA WOULD BE NEEDED, OR ENHANCED METHODS WOULD BE REQUIRED.

POSSIBLE DESALINATION OR ENHANCED EVAPORATION SALT TOWERS.

MORE MODELING WOULD BE REQUIRED TO IDENTIFY HOW TO MEET THE NEEDS OF THE SEA.

DISPOSAL SITE WOULD BE REQUIRED 🗑️

3,434,000 METRIC TONNES PER YEAR



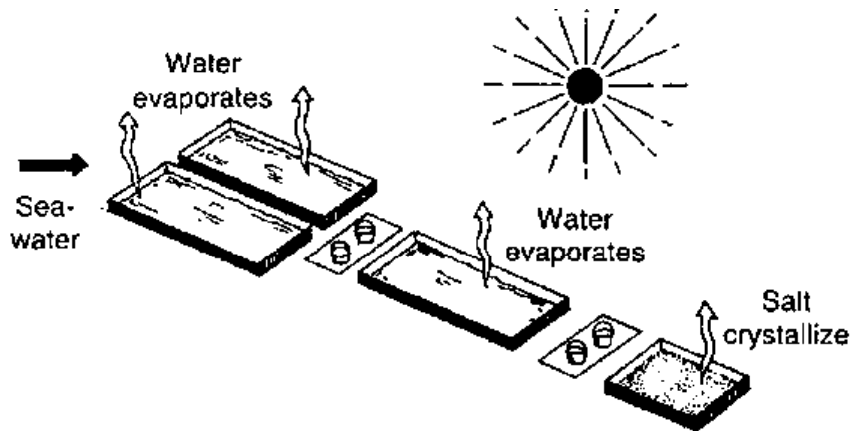
ANALYSIS + DESIGN

INVENTORY

GOALS, OBJECTIVES

PROCESS

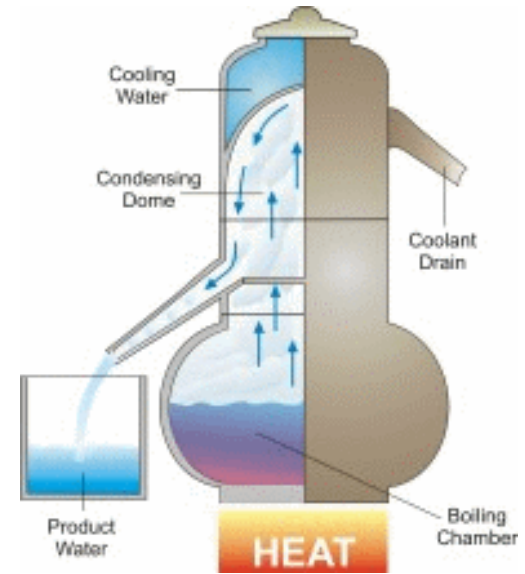
EVAPORATION



http://www.nrdl.org/esdlmod?e=d-00000-00--off-0rn12-2-00-0-0-10-0-0-0direct-10-4-----0-11-11-en-50--20-about-00-0-1-00-0-4---0-0-11-10-Outfz-8-00&cl=CL3_33&d=HASHad92f71605f7c1b3c2d988723&et=1

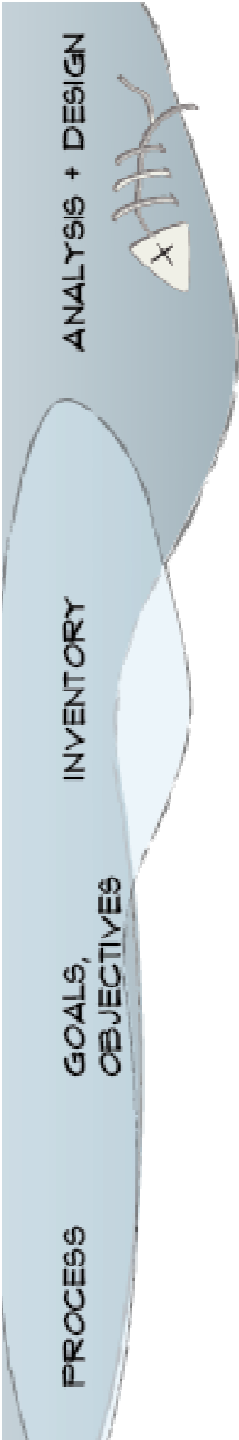
INEXPENSIVE,
HIGH LAND REQUIREMENTS

DESALINATION



<http://sa.water.usgs.gov/edu/drinkseawater.html>

EXPENSIVE AND ENERGY
INTENSIVE



ENHANCED EVAPORATION ALTERNATIVE



UP TO 44% MORE EFFECTIVE THAN
SIMPLE EVAPORATION PONDS



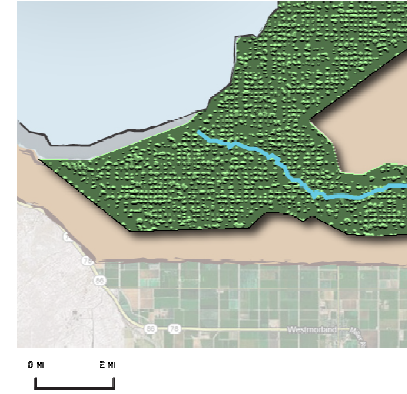
ANALYSIS + DESIGN

INVENTORY

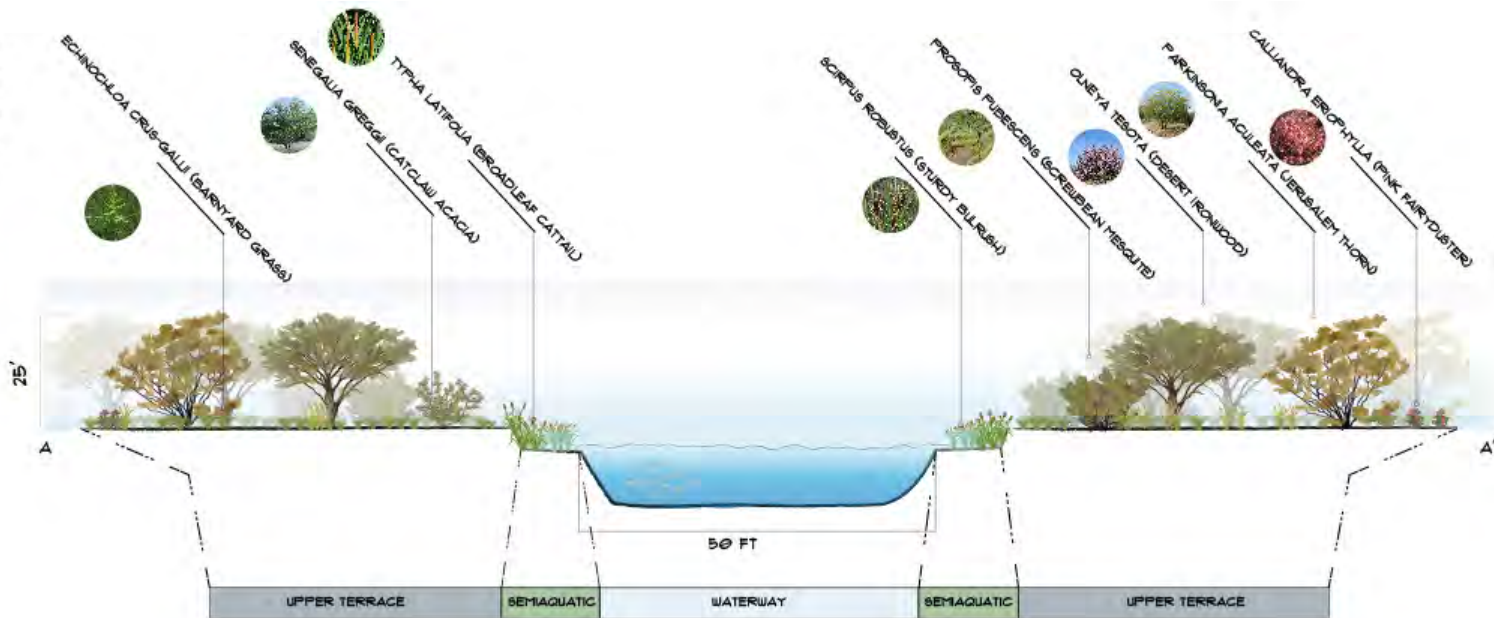
GOALS, OBJECTIVES

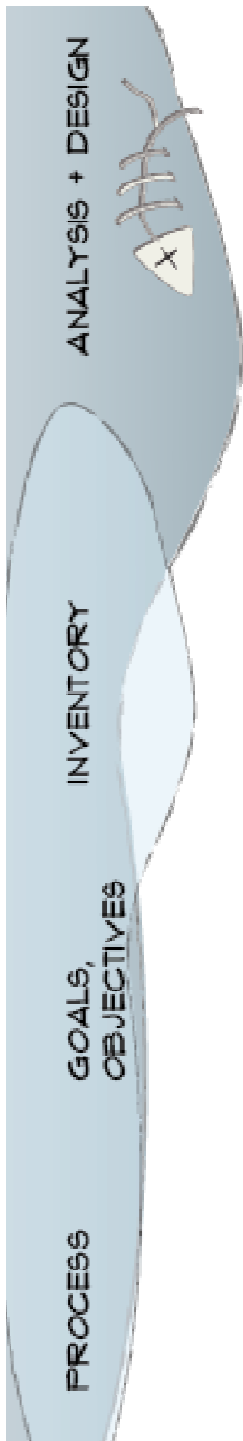
PROCESS

WATERWAY SECTION



REHABILITATION PLANTS





PLANT PALETTE

MOSTLY NATIVE PLANTINGS WITH THE EXCEPTION OF THE BARYNYARD GRASS.

SELECTIONS PROVIDE COVER AND HABITAT FOR BIRD SPECIES.

MANY OF THESE SPECIES ARE ALREADY IN USE IN THE SONNY BONO SALTON SEA NATIONAL REFUGE.



CALLIANDRA ERIOPHYLLA - FAIRY DUSTER



OLNEYA TESOTA - DESERT IRONWOOD



ECHINOCHLOA CRUS-GALLII - BARNYARD GRASS



PARKINSONIA ACULEATA - PALO VERDE



PARKINSONIA FLORIDA - BLUE PALO VERDE



SCIRPUS ROBUSTUS - BULRUSH



PROSOPIS GLANDULOSA - HONEY MESQUITE



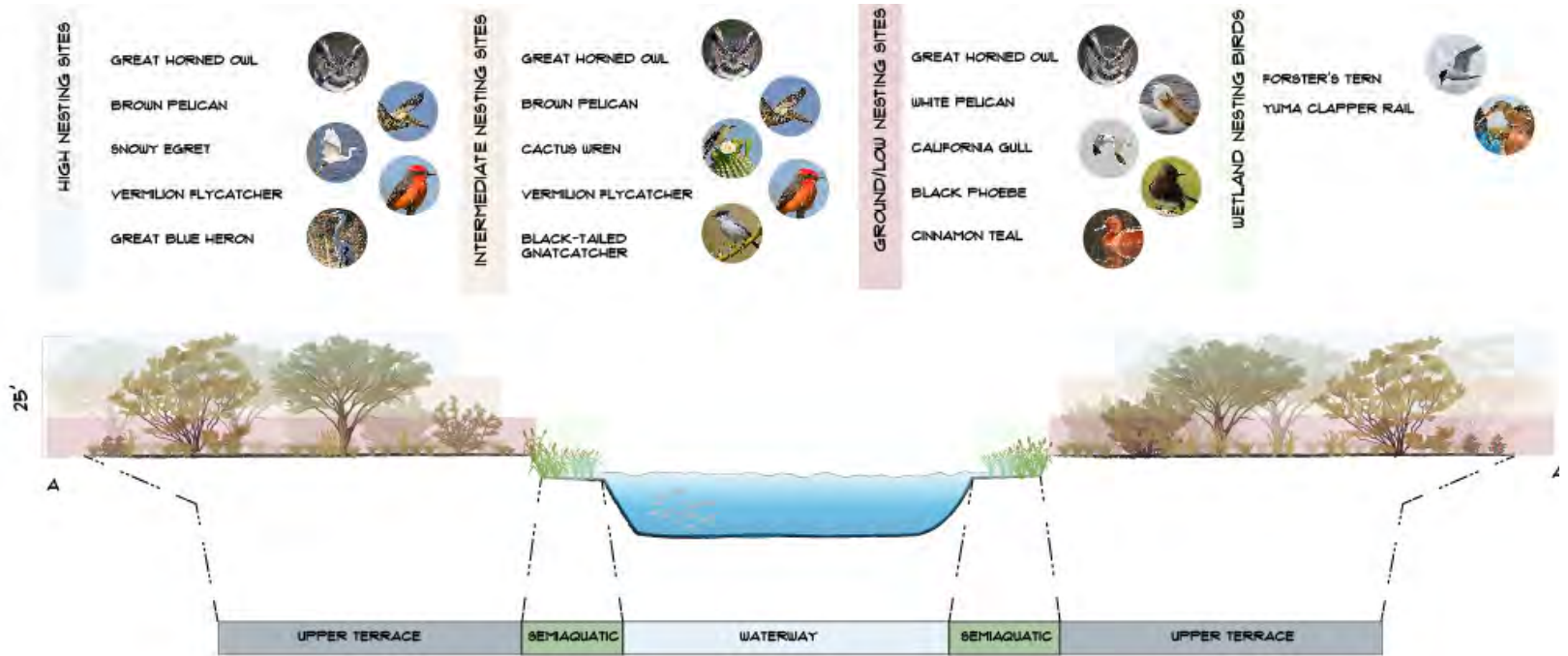
PROSOPIS PUBESCENS - SCREWBEAN MESQUITE



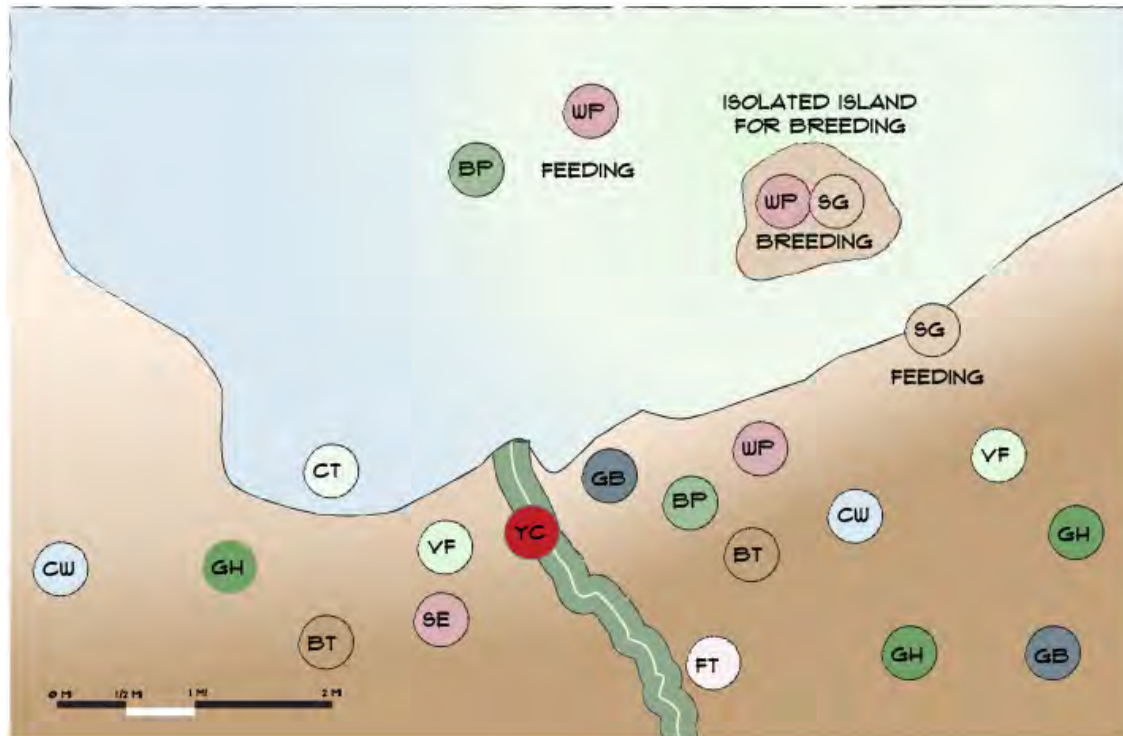
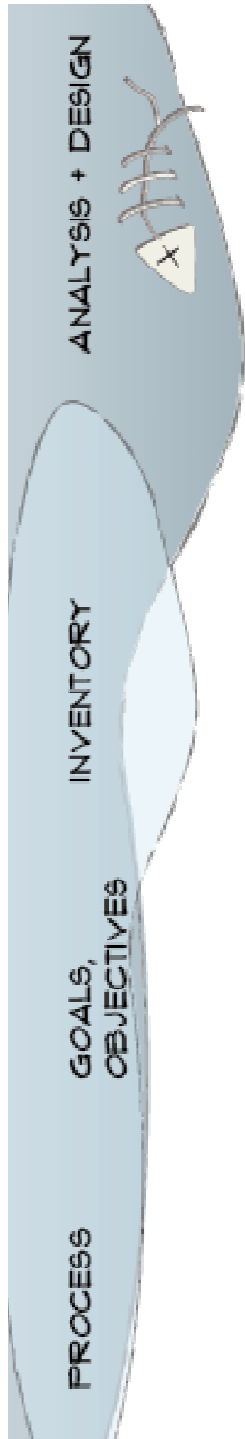
TYPHA LATIFOLIA - CATTAIL

PREFERRED NESTING HABITATS

PREFERRED NESTING HABITATS

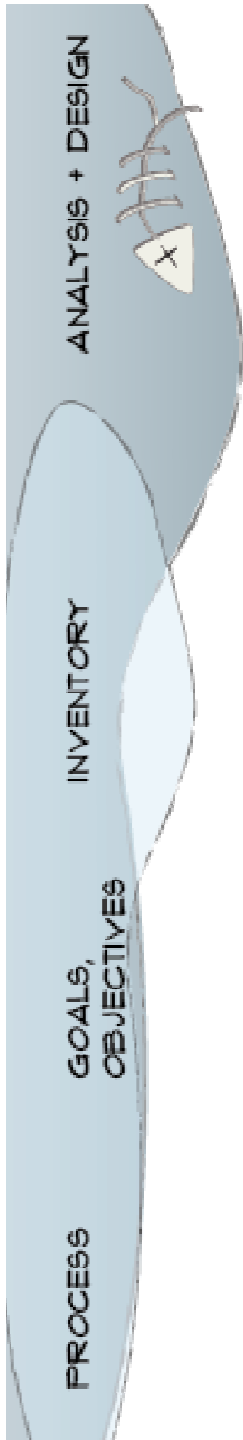


PREFERRED HABITAT OF NESTING SPECIES



BIRD SPECIES

- BP BROWN PELICAN
- WP WHITE PELICAN
- FT FORSTER'S TERN
- VF VERMILION FLYCATCHER
- CT CINNAMON TEAL
- GB GREAT BLUE HERON
- SE SNOWY EGRET
- YC YUMA CLAPPER RAIL
- CW CACTUS WREN
- GH GREAT HORNED OWL
- SG SEA GULL
- BT BLACKTAILED GNATCATCHER



CONCLUSION

DECREASE IN SALINITY TO 40 G/L AND A 40% DECREASE IN THE SURFACE AREA OF THE SALTON SEA WOULD EFFECTIVELY IMPROVE THE ABILITY OF THE SEA TO BECOME A HEALTHY HABITAT FOR BIRDS IN THE PACIFIC FLYWAY.

SALINITY REDUCTION METHODS WOULD NEED TO BE MORE THOROUGHLY EVALUATED AND MODELED.

REHABILITATION OF THE SALTON SEA WOULD IMPROVE THE QUALITY OF THE FISHERY AS WELL AS THE VIABILITY OF THE SALTON SEA AS A CRITICAL STOP IN THE PACIFIC FLYWAY.

LONG TERM POTENTIAL TO SAVE WATER FOR THE COLORADO RIVER.

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- THE JEPSON MANUAL.